

**Applying behaviour change theory to explore adherence to self-management  
physiotherapy programmes in musculoskeletal physiotherapy**

**By**

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## **ABSTRACT**

### **Background**

MSK conditions cause a significant health burden and out-patient physiotherapy is part of their management (NIHR 2018). MSK physiotherapy often includes self-management, requiring patients to undertake some form of behaviour change. Adherence is sub-optimal, and no single interventions increase adherence to self-management physiotherapy programmes (SMPPs). Little is known about the provision and content of SMPPs in NHS MSK out-patient physiotherapy practice. Therefore, understanding adherence measurement and implementation fidelity is difficult. It is proposed that using health behaviour theory; the COM-B (capability, opportunity, and motivation-behaviour) model and theoretical domains framework (TDF) can be applied to explore patient adherence behaviours.

### **Methods**

A mixed-methods design was used in a pragmatic research paradigm. Video recordings of the first two physiotherapy appointments, questionnaires and two interviews after the respective appointments explored recall, adherence and capability, opportunity and motivation to adhere. Content, thematic and framework analysis processes were employed.

### **Findings**

Provision of SMPP programmes varied greatly. Exercises were the most common strategy provided. The time spent on teaching exercises was greater than on non-exercise SMPP strategies. Self-reported adherence was generally high for exercise strategies however, non-exercise SMPP strategies were rarely recalled or adhered to. Eight themes emerged relating to the physiotherapists' provision of SMPPs and four themes relating to patients' experiences of receiving and undertaking SMPPs. All themes mapped to TDF domains. Provision and instruction of SMPP programmes focussed primarily on patients' capability to carry out the SMPP compared to patients who focussed on opportunity and motivation aspects. Physiotherapists' time and environment influenced their provision of SMPPs.

Themes emerging from patients' experiences were patient personalisation of programmes, knowledge and memory, influence of others and patient goals and motivations. Factors affecting adherence and behaviour change were dynamic and inter-related over time; both within patients' behaviours and within the therapeutic relationship.

The key findings broadly focus on issues relating to the SMPP prescription and instruction, the context and setting and patients factors. Longitudinal exploration identified that issues were interdependent and influenced, and were influenced by, each other

## **Original Contribution to Knowledge**

Longitudinal, video-based observation of real-life physiotherapy practice revealed significant variation in the prescription of SMPPs within physiotherapy appointments. A range of dynamic and interdependent factors emerged which reinforce the need for a personalised approach when providing SMPPs. Utilising health behaviour theory (COM-B model and underpinning TDF framework) provided a comprehensive framework to evaluate patients' adherence behaviours and the provision of SMPP programmes. Physiotherapists were seen to focus more on addressing capability compared to patients' opportunity and motivation which contrasts with patients who focussed more on motivational aspects. Other factors such as the physiotherapists' time and environment also affected the provision of SMPPs. The COM-B model is proposed a model that can be used at individual level to support behaviour change.

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## GLOSSARY OF ABBREVIATIONS

AV -	Audio-visual
BCW -	Behaviour Change Wheel
cLBP -	Chronic low back pain
COM-B -	Capability, Opportunity, Motivation-Behaviour
COVID-19 -	Coronavirus identified 2019
CSP -	Chartered Society of Physiotherapy
DALYs -	Disability Adjusted Life Years
GBD -	Global Burden Disease
GRC -	Global rating of Change
HAPA -	Health Action Process Approach
HBM -	Health Belief Model
HBT -	Health Behaviour Theory
HCPC -	Health and Care Professions Council
MSK -	Musculoskeletal
NHS -	National Health Service
NHSE -	National Health Service England
NIHR -	National Institute Health Research
OA -	Osteoarthritis
PHE -	Public Health England
PMT -	Protection Motivation Theory
SDT -	Social determination theory
SCT -	Social Cognitive Theory
SMPP -	Self-management physiotherapy programme
TDF -	Theoretical Domains Framework
TPB -	Theory of Planned Behaviour
TTM -	Trans-theoretical Model

## CHAPTER ONE – INTRODUCTION

### **1.1 Personal and Situational Context for the Study**

This study is borne out of the authors' clinical and academic interest in optimising the value of, and adherence to, self-management physiotherapy programmes (SMPP) for patients attending out-patient physiotherapy departments with Musculoskeletal (MSK) conditions.

I graduated as a Physiotherapist in 1997 and have spent much of my career managing patients with MSK disorders. During my time in clinical practice, I have seen many patients with MSK disorders, some of whom reported a positive experience and engaged with self-management programmes and others who were less engaged and did not adhere. Much time and energy are spent developing interventions in healthcare but if patients do not wish or are not able, to participate and adhere then these developments are fruitless.

Achieving behaviour change and adherence are pivotal, yet I found this challenging in practice. I also observed my peers paying little attention to understanding and facilitating self-management, behaviour change and adherence. All too often patients came to an MSK assessment clinic seeking further help, explaining they had tried physiotherapy and 'all I got was a sheet of exercises'. This exercise sheet may have contained the gold standard, evidence-based intervention for the patients' condition. However, if the patient did not believe in the value of this, or would, or could not engage, then the patient was missing out on the optimal treatment. This was my driver to explore how physiotherapists provide SMPPs in real-life practice and how patients experience and utilise SMPPs. Thus enabling physiotherapists to maximise the impact of self-management strategies in physiotherapy MSK care.

MSK conditions cause a significant health burden (Briggs et al 2018) and out-patient physiotherapy is often considered as central to their management (NIHR 2018). SMPPs are considered an essential component of physiotherapy to support individuals to develop long-term self-care strategies (Hurley et al 2007, Novak 2011, NHSE 2017, Babatunde et al 2017a). The content and specific detail of SMPPs provided in practice has not been evaluated and therefore understanding adherence and implementation fidelity can be difficult (Carroll et al 2007, Bailey et al 2020).

Much of the existing literature base focusses on understanding barriers and facilitators to adherence which are numerous and variable. There has also been a focus on designing and evaluating interventions to increase adherence, often based on specific patient groups with similar



characteristics (McLean et al 2010, Peek et al 2016b, Essery et al 2017). However, in real-life practice within an NHS MSK out-patient physiotherapy service, each consecutive patient presents with a different condition and needs. Predicting how an individual will behave in a specific situation is difficult and is the enigma of health psychologists (Kelly & Barker 2016). Physiotherapists are required to adapt and consider adherence in the context of diversity and complexity. Existing literature reveals that measuring and defining adherence to SMPPs is problematic and one single intervention to increase adherence does not fit all (McLean et al 2010, Peek et al 2016b). Many factors are known to influence adherence and often these factors are reported by patients and physiotherapists at a single point which fails to consider the dynamic nature of motivation and behaviour over time.

Adherence enhancing interventions are often not based on any specific theory. The application of health behaviour theory (HBT) (Munro et al 2007, Rejeski & Fanning 2019) in MSK physiotherapy is limited and it has been questioned whether physiotherapists are maximising opportunities to utilise theory to influence patients' behaviours effectively (McGrane et al 2014, Bassett 2015). Using HBT, this study evaluated the content and provision of SMPPs in real practice over the course of physiotherapy treatment, as well as exploring patients' adherence behaviours and experiences of receiving and undertaking SMPPs. The aim and objectives were as follows.

### **Primary Aim**

To explore the provision of, and adherence to, SMPPs within MSK out-patient physiotherapy.

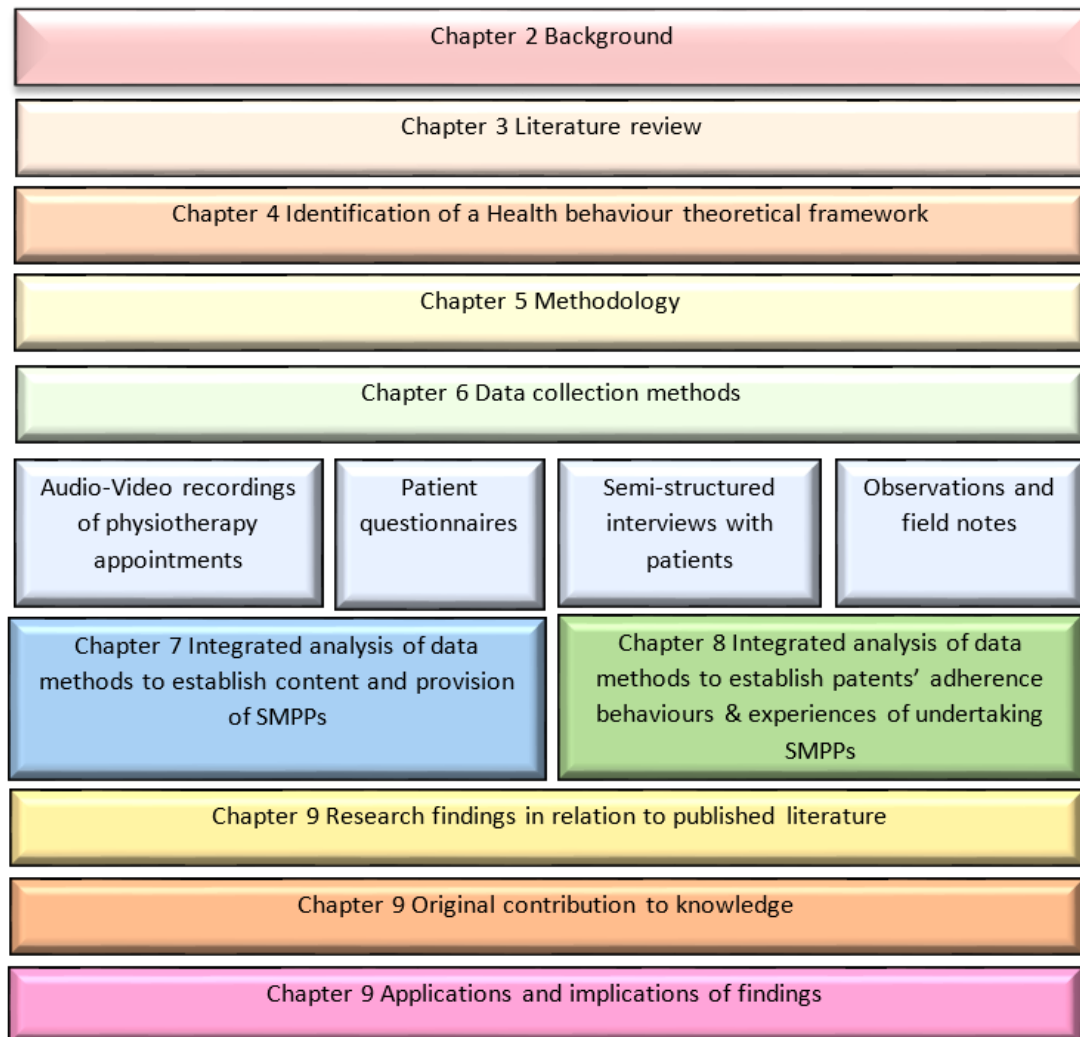
### **Objectives**

1. To establish the content and dosage of SMPP's in routine MSK out-patient physiotherapy.
2. To explore how physiotherapists provide SMPPs and if, and how, they address patients' capability, opportunity, and motivation to adhere to their SMPP.
3. To explore patients' capability, opportunity and motivation to adhere to their SMPP
4. To explore relationships between patient recall and adherence to their SMPP and patient outcomes.

## **1.2 Brief Overview of Thesis Structure and Chapter Content**

The following section will give an overview of the thesis structure, outlining the content that can be found in each chapter. Figure 1.1 gives a diagrammatical representation of the thesis, showing how

the chapters fit together, resulting in the original contribution to knowledge, and application and implications of findings.



**Figure 1.1 - Diagrammatical Representation of Thesis Structure.**

Chapter two sets the scene for the thesis, beginning with an overview of MSK disorders and their prevalence and impact within the context of the United Kingdom (UK) National Health Service (NHS). The role of physiotherapy in supporting patients with MSK conditions is introduced, including the significance of physical activity and SMPPs. This includes the definitions of self-management and adherence and behaviour change concepts.

Chapter three is a narrative review of the literature on the research topic. Due to the large amount of literature relating to adherence to physiotherapy SMPPs, the review focussed specifically on the context of adherence within MSK out-patient physiotherapy care. Both qualitative and quantitative literature was reviewed and compared to understand the broader picture of adherence research.

Quantitative literature, including RCTs which focussed on evaluating interventions to increase adherence to SMPPs was included alongside systematic reviews. It also included qualitative literature exploring both patients' and physiotherapists' views about barriers and facilitators to adherence in practice. This review provides a broad overview of the topic area and poses questions for further investigation of adherence to MSK SMPPs. The chapter concludes with a synthesis of the quantitative and qualitative literature findings.

Chapter four provides an overview and discussion of HBT and the rationale for the selection of the chosen models which were used to design and underpin the analysis of the study. Several key health behaviour theories are presented and compared, culminating in the presentation and justification for the use of the COM-B (Capability, opportunity and Motivation- Behaviour) model and Theoretical Domains Framework (TDF) (Cane et al 2012) which are part of the Behaviour Change Wheel (Michie et al 2011a). This led to the creation of the research aims and objectives which are presented at the end of this chapter.

Chapter five provides the reader with the methodological standpoint of the researcher and the research, presenting and justifying the ontological and epistemological perspectives. The research design approach is discussed alongside the methodology and data collection methods utilised to meet the research objectives. Data analysis processes are presented and critiqued.

Chapter six describes the specific procedures that were undertaken to collect and analyse the data within the study. This chapter gives an overview of the study design and details of ethical approval, as well as a description of how the questionnaires and interview schedules were developed. Recruitment procedures for each group of participants are described, along with details of the sampling processes for both physiotherapist and patient participants. The processes of data collection and analysis are described for the *data corpus* – the two video recordings, two interviews and three questionnaires for each patient participant. This chapter also explains how the data sets were brought together to answer the research objectives. Addressing rigour in qualitative research is addressed at the end of the chapter.

Chapter seven presents the findings regarding the content of SMPPs and the way in which they were provided by physiotherapists. These findings relate to the first two objectives

- to establish the content and dosage of SMPP's in routine MSK Out-patient physiotherapy
- to explore how physiotherapists provide SMPPs and if, and how, they address patients' capability, opportunity, and motivation to adhere to their physiotherapy SMPP

Chapter seven begins with presentation of the participant demographics and the context of the service delivery. The content analysis of the video recordings is used to describe the detail of the SMPPs. This includes both non-exercise and exercise strategies provided, and the time spent on providing these within the physiotherapy appointments. The chapter moves on to present themes arising from the thematic analysis of the observations of how physiotherapists provided and delivered SMPPs within the first two physiotherapy appointments. These are mapped onto the TDF (Cane et al 2012) to explore the underlying psychological constructs addressed by the physiotherapists. The chapter ends with a discussion regarding how these themes map onto the COM-B (Michie et al 2011a) components and the interplay between these components in the provision of SMPPs.

Chapter eight presents the results regarding patient adherence behaviours and physiotherapy health outcomes, alongside the thematic analysis of how patients experienced receiving and undertaking SMPPs. These findings relate to the third and fourth objectives.

- to explore patients' capability, opportunity and motivation to adhere to their SMPP
- to explore relationships between patient recall and adherence to their SMPP and patient outcomes

Patients' reported recall and adherence are discussed using synthesised findings from multiple sources, including videos, interviews and questionnaires. This is followed by the findings from the thematic analysis of patients' interviews regarding how they experienced undertaking SMPPs. These themes are mapped to the TDF and COM-B components to evaluate the psychological constructs underpinning adherence behaviours. Finally, a synthesis of the overall findings from both chapter seven and eight in relation to the TDF and COM-B models are presented which explore the interplay of behavioural and psychological components.

Chapter nine discusses the findings of this study in relation to the published research and attempts to explain any differences found. An analysis and comparison of how SMPPS were both delivered by physiotherapists, and experienced by patients, in relation to adherence behaviours is presented. This synthesis explores and evaluates the relevance of the findings in contemporary physiotherapy practice. The use of the TDF and COM-B as frameworks to evaluate and support physiotherapists in optimising patient's experiences and adherence behaviours are also discussed.

The original contribution to knowledge of this study is highlighted followed by a review of the study's strengths and weaknesses to illustrate key learning and development. Finally, the

implications of the research findings for physiotherapists, service leads, and educators are discussed along with areas for future clinical physiotherapy practice, education and research. Key summary points are outlined followed by conclusion.

## CHAPTER TWO - BACKGROUND

### 2.1 Introduction

This chapter provides context and a rationale for this study. Key topics are introduced and the background to the study is presented focussing on MSK out-patient physiotherapy and SMPPs within out-patient physiotherapy. Behaviour change and adherence are addressed with specific reference to SMPPs. Factors which influence the provision of SMPPs and patients' adherence behaviours are discussed as well as the relationship between adherence, implementation fidelity and outcomes. It is essential to understand the impact of MSK conditions and the role physiotherapy and SMPPs play. Understanding the evolution of thinking relating to adherence as a concept and its complexity provides context for the study of behaviour change and adherence in this setting.

### 2.2 MSK conditions

MSK conditions affected an estimated 18.8 million people across the UK in 2017 accounting for more than 22% of the total burden of ill health (morbidity) (Public Health England (PHE) & Versus Arthritis 2019). MSK health is critical for human function, enabling mobility, dexterity and the ability to work and actively participate in all aspects of life (Briggs et al 2018). In the 2017 Global Burden of Disease (GBD) study, MSK conditions were the highest contributor to global disability (accounting for 16% of all years lived with disability), and lower back pain remained the single leading cause of disability (James et al 2017). Disability-adjusted life years for MSK conditions increased 19.6% between 2006 and 2016 (Briggs et al 2018). In the UK in 2017, MSK disorders resulted in 27.2 million lost working days (Versus Arthritis 2019). Inactive people are at increased risk of developing a painful MSK condition and exercise generally reduces overall pain for people with a MSK condition (Versus arthritis 2019).

MSK conditions include more than 150 diagnoses that affect the locomotor system (Briggs et al 2016). Epidemiological studies commonly divide MSK disorders into five categories namely; low back pain (LBP), Osteoarthritis (OA), rheumatoid arthritis (RA), gout, and 'other MSK disorders' (Hoy et al 2014). This latter group of other MSK disorders includes a wide range of conditions such as neck pain, tendinopathy, neuralgia, bursitis, nerve entrapments, frozen shoulder and shoulder impingement (Babatunde et al 2017a). Some MSK disorders such as carpal tunnel syndrome and disorders resulting from trauma and injury are included within other categories within the Global Burden of disease studies, which suggest an underestimation of the impact of MSK disorders worldwide (Hoy et al 2014).

### **2.3 MSK Disorders and Physiotherapy**

MSK disorders make up approximately 30% of consultations in primary care practice (Department of Health 2006). Best practice guidance promotes MSK care that allows fair and early access to an appropriately trained, multi-professional team that can provide the right care at the earliest point in the patient pathway (NHSE 2017). Physiotherapists are experts in MSK conditions and play a central role in delivering quality MSK assessment and management (Chartered Society of Physiotherapy (CSP) 2009, Desmeules et al 2012). Early access to physiotherapy in the patient pathway has been associated with increased patient satisfaction and improved patient outcomes (National Institute Health Research (NIHR) 2018).

Patients are traditionally referred to NHS physiotherapy out-patient departments either via secondary care orthopaedic teams, from general practitioners (GPs) or clinicians in primary care, or in some cases patients may have direct access to physiotherapy services via self-referral services (Bishop et al 2017). Patients usually present with a range of conditions, including acute problems (e.g. ankle sprain, shoulder dislocation) or insidious, gradual onset problems (e.g. tendinopathies, OA). Many MSK disorders will resolve within several weeks however, a significant proportion will go onto to develop chronicity (symptoms lasting more than 12 weeks) (NIHR 2018). Many MSK conditions are considered as long-term conditions (LTC), such as OA or chronic LBP.

Effective management of MSK disorders initially focusses on conservative (non-surgical) treatments including pain management, advice and education, exercise and physical activity. This can include manual (hands-on) therapy, pharmaceutical management (prescribing and injections), hot and cold therapies, acupuncture, electrotherapeutic modalities (e.g., ultrasound treatment), water-based therapies and aids and devices such as splints and braces (NICE 2014, Babatunde et al 2017a, Lin et al 2020). Self-management strategies are considered essential for the management of MSK conditions to support individuals to achieve optimal long-term condition management (Hurley et al 2007, National Health Service England (NHSE) 2017). Optimal, sustained self-management usually requires significant behaviour change, including engagement in exercise and lifestyle modifications (Hurley et al 2007, Beinart et al 2013, NIHR 2018).

Physiotherapists are autonomous practitioners and can assess and diagnose MSK disorders and develop and deliver treatment plans (CSP 2011a). Currently, most out-patient physiotherapy services are based on a long-established, post-war service delivery model which was designed when physical and electrotherapeutic 'hands on' care predominated within physiotherapy practice (Shaik & Shemjaz 2014). In this traditional model, a longer face to face first assessment appointment is

usually followed by a series of shorter follow-up appointments over the subsequent weeks (often up to six sessions). Some patients may also be treated in group physiotherapy sessions with patients with similar rehabilitation needs (O’Keeffe et al 2017, NIHR 2018). More recently, best practice MSK management has been suggested as that which focuses on education, assessment of psychosocial factors, physical activity interventions and return to work, with manual therapy and electrotherapy only being provided as an adjunct where necessary (Lin et al 2020).

Within clinics, a physiotherapist will usually see a diverse range of patients with a variety of MSK conditions within a single clinic session. This poses challenges for physiotherapists to continually adapt and tailor treatments for individuals with different conditions, ages and psychosocial circumstances. Treatment and goal planning is used to help individuals to understand their diagnosis or condition, identify a treatment plan and maximise function and quality of life, whilst also aiming to support longer term self-management (Stevens et al 2017). This requires physiotherapists to have excellent communication skills, as well as expert clinical knowledge in order to adequately tailor treatment and fully engage all individuals in the rehabilitation process (Besley et al 2010).

#### **2.4 Patient Education and Self-management**

In the last decade there has been an increased focus, both in the UK and internationally, on patients taking more responsibility for their management, particularly in chronic, long-term conditions such as OA (Hurley et al 2010, NICE 2014) and LBP (deSilva 2011, Beinart et al 2013). Self-management aims to enhance patients control over their own condition, reduce demands on healthcare services, and build resilience for individuals and communities (Bodenheimer et al 2002, Novak 2011).

Investing in self-management for long-term conditions has shown to be worthwhile in terms of patient satisfaction and improving efficient use of healthcare resources (deSilva 2011).

Physiotherapy SMPPs have been reported to include advice and education, home exercises, movement or activity modification (e.g. postural changes), lifestyle changes (e.g. increased physical activity, weight reduction), application of aids and devices (e.g. wearing of a splint), applying cold therapy or applying self-massage techniques (NICE 2014, Hall et al 2015, Scott et al 2015, Peek et al 2016a, Peek et al 2017). At the time of starting this study no definition existed for SMPPs. Novak (2011), described rehabilitation home programmes as “those completed by the patient either as a form of stand-alone treatment or between treatment sessions to reinforce learning” (Novak 2011 p1037). Miles et al (2011) described SMPPs in MSK pain as those programmes requiring multi – component interventions. For this study, SMPPs were defined as “unsupervised activities provided



by physiotherapists to facilitate or maintain improvements in pain or function”. Peek et al (2017) later defined physiotherapy self-management strategies as;

*“Any strategy that the physiotherapist prescribes to the patient specifically for them to complete independently, away from the clinic”* (Peek et al 2017, pg. 358).

The role of patient education in physiotherapy practice has been evolving (Cooper et al 2008, Rindfleisch 2009, Harman et al 2011, Forbes et al 2017, Horler et al 2020) with physiotherapists valuing it as an integral and extensive part of their role (Caladine 2013). In an early seminal study exploring patient education, Sluijs (1991), analysed 227 audiotaped MSK physiotherapy consultations over the entire course of treatment for 25 patients in the Netherlands to evaluate the nature and timing of physiotherapy education and advice. From this work, Sluijs et al (1991) defined five educational activities which can be planned and carried out systematically in physiotherapy (see table 2.1).

1	Teaching or informing the patient about their illness or complaint.
2	Giving instructions on home exercises.
3	Giving advice and information (e.g. on posture or movement).
4	General health education (e.g. on a healthy lifestyle).
5	Counselling on stress-related problems and giving care and support.

**Table 2.1 - Educational activities given to patients in physiotherapy consultations (taken from Sluijs, 1991)**

Bartlett (1985) defined patient education as;

*‘a planned learning experience using a combination of methods including teaching, counselling and behaviour modification techniques which influence patient’s knowledge and health behaviours’* (Bartlett 1985 as cited in Sluijs 1991).

Horler et al (2020) cited this definition in their recent study which evaluates how patients and physiotherapists view the role of education as a treatment in patients with LBP. However, education alone is unlikely to result in behaviour change (Kelly and Barker 2016). Horler et al (2020) consider education as just one part of the physiotherapy approach and an important part of self-management. A more recent study identified nine self-management strategies being used in Australian private physiotherapy practice with some overlapping approaches. Strategies not explicitly referred to in Sluijs et al’s (1991) list included the use of aids or devices and the use of self-

massage or mobilisation treatment (Peek et al 2017). Peek et al (2017) did not report on teaching patients about their condition. No studies have directly observed the provision and content of SMPPs in routine UK physiotherapy practice. Sluij et al's (1991) concept of patient education illustrates how thinking in this area has moved on. Self-management is now considered an all-encompassing term relating to supporting and educating patients to develop the knowledge, skills, behaviours and motivation to engage in activities away from the clinic setting (deSilva 2011). This is in contrast to a paternalistic view where patients are given 'things to do', but instead both parties consider a range of strategies and agree together a plan in pursuit of achieving the patient's desired outcomes.

Home exercises are reported as the most common component of SMPPs (Peek et al 2017) where patients undertake exercise unsupervised, away from the clinic environment (Roddy et al 2002). A systematic review concluded that home programme interventions were more effective in improving clinical outcomes than no intervention (Novak 2011). They also found that home programmes were as effective as expert-provided, supervised therapy except where the physiotherapist carried out specific treatment modalities that only a physiotherapist could deliver (Novak 2011). This led Novak (2011) to conclude that SMPPs were more cost effective than supervised, clinic based programmes due to savings in staff costs and clinical space despite not undertaking a cost benefit analysis. Also, consideration must be made that patients not experiencing benefit from home programmes may have sought treatment elsewhere. It is also important to note that despite SMPPs being described as unsupervised, patients may be still attending physiotherapy appointments which provide ongoing support, feedback and motivation which could be considered as supervision. Once patients are discharged from the physiotherapist's care they may be required to continue their SMPP long-term to manage their condition. This requires sustained behaviour change which can be difficult to achieve (Sluijs & Knibbe 1991, Bassett 2015).

Despite many MSK conditions being considered as an inevitable part of ageing there is still much that can be done to encourage a positive approach to life-long MSK health and, as life expectancy rises, healthy ageing should be promoted (PHE & Versus Arthritis 2019). Despite this huge potential, many physiotherapists do not fully engage in health promotion due to constraints in time and a lack of skills and confidence (PHE & Allied Health Professions Federation (AHPF) 2015, Bassett 2015). Interestingly Sluijs et al (1991) found that health education advice (e.g. lifestyle advice) was the element of patient education addressed least often. An increase in the provision of lifestyle advice will only add to the volume of patient education programmes potentially making programmes unwieldy (Bassett 2015).

## **2.5 Adherence**

In order to benefit from SMPPs, it seems logical that individuals must adhere to recommended programmes (Bassett 2015, Bailey et al 2020) however adherence is complex and increased adherence may not always result in improved outcomes (Nicholson et al (2019). Thus, here are several considerations when discussing adherence including the relationship between adherence and outcomes, adherence measurement, barriers and facilitators, interventions to increase adherence and the role of memory and recall in adherence. Adherence has been defined by the World Health Organisation (WHO) as;

*"The extent to which a persons' behaviour (taking medication, following a diet or exercise plan and/ or executing a lifestyle change), corresponds with agreed recommendations from a healthcare provider." (WHO 2003, pg. 3)*

Adherence is known to be sub-optimal in many areas of self-management including physical activity levels, smoking cessation, dietary advice and adherence to medication which contributes to poor patient health and inefficient use of health resources (Bodenheimer et al 2002, WHO 2003, de Silva 2011, Ogden 2016). Adherence, if optimised, can produce positive gains in health and wellbeing, financial efficiency, improvements in patient safety, and health service effectiveness (Kolt & McEvoy 2003, Beinart et al 2013, NIHR 2018). It has also been stated that increasing the effectiveness of adherence to interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments (WHO 2003).

Although adherence is now the preferred term, previously other synonymous terminology has been used including the terms 'compliance' and 'concordance'. In 1976, Sackett and Haynes defined compliance as:

*"The extent to which behaviour complies with the prescription provided by members of the health team." (Sackett & Haynes 1976)*

Later, in 1995 a similar definition was referred to in relation to adherence to SMPPs by Taylor (1996) in (Basset & Petrie 1999, pg. 130). However, the use of the word compliance was superseded as it implied a lack of patient involvement. Holm (1993) argued that if patients are to be involved as equal partners in decisions concerning their health care, then doctors will have to adjust their role from being the sole decision-makers to being the expert advisers. It was suggested that a move to 'co-operative behaviour' or 'adherence to treatment' be adopted to reflect this more balanced therapeutic relationship (Holm 1993). The word concordance was then suggested in 1997 by The

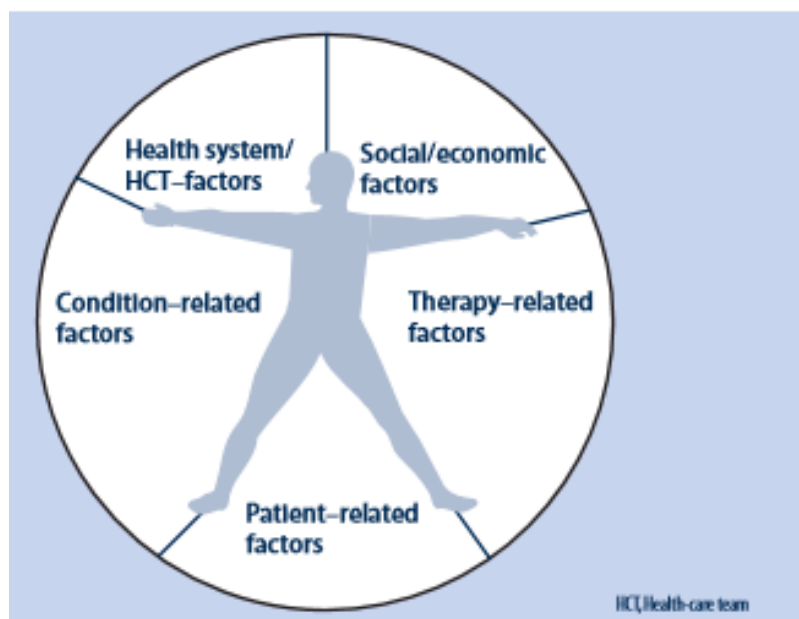
Royal Pharmaceutical Society (RPS) RPS Working Party (1997) to involve the patient in the treatment process concerning the use of medicines. This is defines as;

*“A negotiated, shared agreement between provider and patient concerning treatment regimen(s), outcomes, and behaviors; a more co-operative relationship than those based on issues of compliance and noncompliance. “ (RPS Working Party 1997, pg. 8)*

Concordance suggests that patients are involved with decision-making and are partially responsible for monitoring and reporting back to the team (Marinker and Shaw 2003). Concordance is used particularly in the field of prescribing and enhancing adherence to medicines but has not been adopted in the fields of exercise, physical activity and physiotherapy (Bailey et al 2020). This term shifts further towards a more desirable, inclusive approach, whereby the clinician, or physiotherapist, is considered as a partner in the patients’ care, rather than vice versa. This supports the shift of the power dynamic from the clinician to the patients which is in line with the ethos of self-management and personalised care approaches (deSilva 2011, NHS 2021).

A systematic review investigated the definitions of adherence used in relation to therapeutic exercise and found that most studies did not provide a definition possibly because the term is already well understood (Bailey et al 2020). Frost et al (2017) developed a definition of adherence from the WHO (2003) recommendation in relation to therapeutic exercise in stroke rehabilitation adding in aspects of frequency, duration, intention and accuracy. This definition expands on the elements of the intervention relating to what is described within the WHO (2003) definition as ‘agreed recommendations’ and is in line with calls to specify the detail of interventions (Carroll et al 2007). The terms adherence and non-adherence will be used preferentially in this current study, in line with current literature (McLean et al 2010, Jack et al 2010, Meade et al 2019). The terms compliance, non-compliance and concordance will be used when discussing published literature which uses these terms to ensure the correct context of published research. Adherence has been adopted as an alternative term to compliance and concordance in an attempt to emphasise patient’s freedom to behave as they choose and a lack of adherence should not result in blame (Bassett 2015, Bailey et al 2020).

The World Health Organisation (WHO 2003) suggest that adherence is a multidimensional construct which goes beyond the idea that the patient is solely responsible for adherence. They present a model of adherence which displays five interacting dimensions. These include factors relating to the patient, socio-economic, the treatment itself, the condition for which they are being treated and wider factors within the healthcare system (see Figure 2.1).



**Figure 2.1 - World Health Organisation Five dimensions of Adherence (WHO 2003).**

2.5.1 Adherence to SMPPs and outcomes

Desired outcomes from physiotherapy SMPPs may include improvement in symptoms such as pain, or maintenance of symptoms or function (Friedrich et al 2005, Basset & Prapavessis 2011, Vong et al 2011, O’Brien et al 2013, Bennell et al 2014a, Bennell et al 2020). Positive outcomes may also include the prevention of secondary associated problems such as metabolic or cardiovascular dysfunction or strength loss (Hurley et al 2007, Novak 2011). For SMPPs to be effective and produce the intended health outcomes, an individual needs to adhere to the SMPP (van Gool et al 2005, McLean et al 2010). Several studies evaluating adherence to MSK SMPPs have demonstrated less than optimal adherence, reporting between 50 and 70% of patients adhering to home exercise programmes (Sluijs and Knibbe 1991, Taylor and May 1996, Alexandre et al 2002, Bassett 2003, Yardley and Donovan Hall 2007, Bassett and Prapavessis 2011, Peek et al 2016b). The effectiveness of the SMPP is not only dependent on the content of the SMPP but also on the degree of adherence

to the recommended plan, which is known as treatment or implementation fidelity (Peek et al 2016b, Bailey et al 2020). Carroll et al (2007) present a conceptual framework for implementation fidelity (CFIF) which outlines the elements required to assess implementation fidelity. These include; content (the active ingredient that needs to be delivered for optimal outcomes) and the coverage, frequency and duration of the treatment which are commonly referred to as dosage. For exercise interventions this may include the number of exercises, intensity, sets, repetitions and frequency (Brody et al 2012). While there is evidence that exercise therapy is effective for many disorders (Hayden et al 2005), there are few studies investigating the optimal dosing parameters associated with the best outcomes (Young 2018). No studies have explored the specific content or dosage of SMPPs or home exercise programmes provided to patients with MSK disorders in real-world physiotherapy practice. Carroll et al (2007) describe adherence as 'the bottom-line' in measurement of implementation fidelity (Carroll et al 2007).

Within the CFIF, Carroll et al (2007) also describe moderators of implementation fidelity. These include the complexity of the intervention or programmes, facilitation strategies (e.g. use of printed exercise sheets), quality of delivery intervention (is it delivered in a way appropriate to achieving what was intended) and participant responsiveness (how participants perceive the relevance of the intervention to themselves). When providing SMPPs all of these elements of implementation fidelity are relevant to understanding adherence and health outcomes.

Patient-reported outcome measures (PROMs-short, self-completed questionnaires designed to capture patient views about patients' health status), have been proposed as being suited to MSK health where disease impact is not easily captured using biomarkers (Hill et al 2016). However, if implementation fidelity is not measured then it is impossible to ascertain the extent to which the SMPP has contributed to the outcome. Therefore treatment adherence and implementation fidelity need to be considered alongside any MSK outcome measures.

### 2.5.2 Difficulties Measuring Adherence

The issue of accurately measuring adherence to SMPPs is widely recognised (Basset 2003, McLean et al 2010, Beinart et al 2013, Hall et al 2015, Peek et al 2016b, Newman-Beinart 2017, Frost et al 2017, Bailey et al 2020). There is currently no 'gold-standard' for adherence measurement and recent reviews have found between 61 and 200 plus measures of adherence with almost all void of psychometric validation (McLean et al 2010, Bollen et al 2014, Frost et al 2017). Measurement of adherence to a home-based SMPP and actual physical activity participation are difficult (Jack et al 2010, Babatunde et al 2017c) and are often subject to bias through self-reporting measures such as diaries and log books (Schwarzer et al 2008, Frost et al 2017). Physiotherapy research frequently

only considers and measures adherence to clinic appointments or self-reported adherence (Kolt et al 2007, Grindley et al 2008, Newnham-Beinart et al 2017, Frost et al 2017). Sluijs et al (1993) also argued that adherence is difficult to measure because people tend not to report non-compliance and also it is often considered as a binary 'all or nothing' concept when in reality it has many graduations.

Newman-Beinart et al (2017) developed and validated the six-item exercise adherence rating scale (EARS) which has been used in subsequent adherence trials (Bennell et al 2020). This tool considers nuances of adherence measurement but it does still hold inherent limitations of self-report measures, including memory lapses and social desirability bias (Beinart et al 2013, Newman-Beinart et al 2017). More recently, Bailey et al (2020) identify the problem as 'values of adherence' whereby if no specific dosages are specified in an SMPP then it is unclear how someone is deemed adherent or non-adherent. If adherence is to be measured then attention needs to be paid to ensuring there are agreed parameters for treatment fidelity that provide a baseline by which to measure adherence (Carroll et al 2017, Peek et al 2016a, Newnham-Beinart et al 2017, Bailey et al 2020).

### 2.5.3 Adherence and Behaviour Change

Adherence to SMPPs usually requires some form of behaviour change (Michie et al 2005, Ryan et al 2008, Basset 2015). Behaviour plays an important role in people's health, and interventions to change behaviour have enormous potential to alter current patterns of disease (National Institute of Clinical Excellence (NICE) 2007). However, many attempts to do this have been unsuccessful, or only partially successful (Peek et al 2016a). Understanding behaviour change and what drives health behaviours is complex (Kelly and Barker 2016). Many health behaviour theories and cognitive behavioural models have been developed with the aim of understanding and predicting human health behaviours (Sirur et al 2009, Michie et al 2011a, Ogden 2016). It is imperative that psychological theory is utilised and evaluated effectively within physiotherapy to ensure optimal behaviour change and adherence to physiotherapy management (Basset 2015, Peek et al 2016a, Alexanders & Douglas 2016). Chapter four provides a review and evaluation of these health behaviour theories and models and their application within a physiotherapy context.

Behaviour change techniques are the active parts of interventions designed to optimise health behaviours (Michie et al 2014). The behaviour change taxonomy has been developed to provide clarity and consistency when reporting behaviour change interventions (French et al 2010, Michie et al 2014). No single behaviour change intervention can be universally applied to influence all behaviour and all people, as universal interventions do not have uniform effects, and may be more effective in some groups or settings than others (NICE 2007, Kelly and Barker 2016). Also, for an

individual to improve their health in the medium and long-term, behaviour change must be habitual and ensure people can deal with relapses (NICE 2014).

Historically physiotherapy as a profession has not utilised psychologically informed theory into practice or education (Bassett 2015). However, in recent years there has been a sea change, with evidence of health behaviour theory and behaviour change techniques being applied to many areas of physiotherapy research and practice (Connell et al 2015, Room et al 2017, Eisele et al 2019, Willett et al 2019). Physiotherapy professional standards clearly outline that physiotherapists should understand psychological, social and cultural factors of behavioural science that influence an individual (HCPC 2013). However, although some research utilises health behaviour theory, anecdotally physiotherapists do not routinely acknowledge or relate behaviour change theory to interventions in practice (Hay-Smith et al 2016).

The curriculum framework for physiotherapy undergraduate education states the need for physiotherapy programmes to include psychology content and development of understanding of health inequalities and person-centred approaches (CSP 2015). Non specific recommendations on what psychology content should be included in undergraduate and postgraduate education makes standardised implementation difficult. However, it seems essential that a profession such as physiotherapy, which is underpinned by development of a patient-therapist relationship, communication and behaviour change should examine and explicitly understand psychology theory and its application to practice (Heaney et al 2012).

#### 2.5.4 Barriers and enablers to Adherence

Literature exploring barriers and facilitators of adherence support the notion that adherence is a multi-dimensional construct, identifying a broad range of influencing factors (Peek et al 2016b, Jack et al 2010, Karnad and McLean 2011, Essery et al 2016, Peek et al 2020). Barriers to adherence identified include depression, anxiety, helplessness, poor social support, low baseline activity levels, and increased pain levels during exercise (Jack et al 2010, Essery et al 2016). Intentions to engage in home based physical therapies, self-motivation, self-efficacy, previous adherence to exercise related behaviours and social support all have supported adherence to home based physical therapy programmes (Peek et al 2016b). Some factors act as both barriers and facilitators, such as pain response (Campbell et al 2001). Similarly, factors such as high baseline physical activity levels seem to predict adherence (Peek et al 2016b) to exercise, whereas low levels of activity at baseline are seen as a barrier to adherence (Jack et al 2010). Systematic reviews by Peek et al (2016b) and Jack et al (2010) both highlight the difficulty in drawing strong conclusions from studies in this area due to methodological limitations, heterogeneity of participants, poor measurement of adherence and a



lack of investigation of other potential predictors. Qualitative research investigating both patients and physiotherapists views regarding adherence also suggests that there are a broad range of factors both inhibiting and facilitating adherence (Campbell et al 2001, Dean et al 2005, Escolar-Reina et al 2010). This wide range of barriers and enablers illustrates that adherence is a complex, multifactorial concept and thus creates great challenges for designing interventions to improve adherence (WHO 2003, Jack et al 2010, McLean et al 2010, Essery et al 2016, Kelly and Barker 2016, Ogden 2016).

### 2.5.5 Interventions to Improve Adherence

Several interventions to improve adherence to SMPPs have been developed, implemented and evaluated (McLean et al 2010, Peek et al 2016b). However, criticisms have been made at the lack of specific social or behavioural cognitive theory used to underpin the development and testing of these adherence interventions in physiotherapy (Sirur et al 2009, Room et al 2017). When designing complex interventions, calls have been made to use best available evidence and appropriate theory (Eccles 2005, Sirur 2009, Craig et al 2008). Utilising theory allows for systematic identification of relevant factors and can guide implementation and evaluation to provide a greater understanding of the behaviour change process (Phillips et al 2015). Barriers to using psychological theory include the sheer number of theories available, their overlapping constructs and some health behavioural theories can be difficult to access and understand by health professionals without a psychology background (Michie et al 2005). In the last few decades there had been increased systematisation and alignment of behavioural science theories (Michie et al 2011a). There has been recommendations that these theories are continually developed and informed by practice rather than seen as fixed constructs (Kislov et al 2019). Ogden (2016) calls for the limitation of the use of systemisation of theories, fearing that it risks health psychology development through restricting variability, creativity and critical thinking.

Some of the interventions to increase adherence in MSK physiotherapy are based on health behaviour models and cognitive behavioural theories (Friedrich et al 2005, Gohner & Schlicht 2006, Pisters et al 2010, Bassett & Prapavessis 2011, McGrane et al 2014). Others are focussed more on practical areas of delivery, including the format in which information is given (Schneiders et al 1998, Roddey et al 2002, Schoo et al 2005). At the time of designing and starting the study several reviews of interventions to improve adherence to SMPPs had been published (Jordan et al 2010, McLean et al 2010, McGrane et al 2014, Peek et al 2016b). McGrane et al (2014) and Peek et al (2016b) both included a broad range of physiotherapy specialities including cardiac, neurological, MSK and other rehabilitation areas, where participants varied widely in their condition and treatment setting.

McGrane et al (2014) reviewed studies where motivational based interventions were provided with the aim of increasing adherence to SMPPs. This review also included physiotherapy in a variety of settings beyond MSK out-patients, as well as physical activity interventions in asymptomatic individuals. McLean et al (2010) focussed on patients with MSK disorders but also included post-operative, ward-based patients and excluded any interventions provided by other professionals even in a physiotherapy out-patient setting. Since undertaking this study further reviews have been published. Nicolson et al (2017) reviewed interventions to increase adherence to therapeutic exercise in older adults with LBP and/or arthritis and Willet et al (2019) reviewed the effectiveness of behaviour change techniques in physiotherapy interventions to promote physical activity adherence in lower limb arthritis patients. Both these studies looked at specific groups which do not reflect the diversity of patients presenting to routine out-patient MSK physiotherapy in the UK. Peek et al (2016a) also carried out a systematic review of interventions to aid adherence to wider self-management programmes across wider physiotherapy disciplines.

McLean et al (2010) concluded that there was conflicting evidence that adherence interventions delivered by physiotherapists improve adherence in the short-term and strong evidence that they are not effective in the long-term. Peek et al (2016b) concur, outlining that there is insufficient data to endorse the use of interventions to improve adherence in both the short and the long-term. Peek et al (2015, 2016a) also highlight the focus on adherence to exercise programmes rather than including non-exercise based SMPPs. McGrane et al (2014), in a broader systematic review across all areas of physiotherapy, concluded that motivational interventions can help long-term adherence to exercise, improve self-efficacy and reduce levels of activity limitation. A recent systematic review and meta-analysis has also shown that interventions using behaviour change techniques have also been shown to be effective in enhancing medium-term physical activity adherence (Eisele et al 2019). The reviews suggest that due in part to insufficient quality evidence, single adherence interventions have not demonstrated significant effectiveness in short- and long-term adherence for populations attending MSK out-patient services however motivational based interventions may offer some benefit to wider exercise and physical activity provision.

#### 2.5.6 Memory and recall of the SMPP

For patients to adhere to a SMPP they must be able to remember what is asked of them. This highlights the important role of cognitive function, remembering and understanding the instructions given (Fortun et al 2008, Bankoff & Sandberg 2012). Sluijs (1991), when studying patterns of patient education delivery, discovered that physiotherapists gave much more information (almost twice as much) within the first two sessions as they did for the rest of the course of treatment. Ley (1982)

found that the more information patients received the more they forgot, and that roughly half of all information received was forgotten. The early, classical psychology study by Miller (1956) suggested the human capacity for information processing is a limit of seven (plus or minus 2) items of information. Henry et al (1998) support this, concluding that in asymptomatic older individuals, recall and self-reported adherence was higher in those prescribed two exercises compared to those prescribed eight exercises. A more recent study confirms that patients' memory for medical information is often poor and does not always correlate to that of the health practitioner (Misra et al 2013). It is unknown how many items of information are presented in a routine physiotherapy consultation but based on work by Sluijs (1991) it is estimated to routinely exceed seven items. Sandberg et al (2012) identified that during pre-operative consultations, patients were consistently presented with 50 to 100 items of medical information. Kessels (2003) proposed in a review that patients tend to focus on diagnosis-related information and fail to register instructions on treatment. Kessels (2003) went on to suggest that patients can be helped to remember medical information by use of simple and specific instructions and provision of written or visual material. Physiotherapists need to be able to provide SMPPs in a way that supports recall and therefore potentially adherence for all patients presenting to an out-patient MSK clinic. It is important to consider that recall is a factor that may limit adherence (Peek et al 2020).

## **2.6 Summary**

MSK conditions are a considerable burden on individuals and wider society. Physiotherapy treatment usually includes patient education and some form of SMPP. Treatment can be delivered in one to one or group settings. There are no recent descriptions of the provision, content or dosage of SMPPs given to patients with MSK disorders in routine UK physiotherapy appointments.

Adherence to SMPPs (usually home exercises) is sub-optimal (approximately 50-70%) (Peek et al 2016b), suggesting an unmet potential in rehabilitation treatment outcomes (Bennell et al 2014b, Bailey et al 2020). Treatment fidelity also needs to be better understood to bridge the gap in understanding of how recommended SMPPs are experienced in practice (Toomey et al 2019). Adherence has been presented as a complex, multifactorial concept which requires some form of behaviour change either in the short or longer term. Optimising behaviour change and adherence to SMPPs is likely to have positive effects on both an individual's health and outcomes, as well as cost efficiencies in the health and global economies (de Silva et al 2010).

Interventions to improve adherence to out-patient SMPPs have been developed and implemented in a range of specific settings with a variety of different participants which creates significant challenges with heterogeneity of patients (Peek et al 2016b). Some of these interventions are based fully, or in part, on specific psychological health behaviour models and cognitive behavioural theories however many are not. Several barriers and facilitators have been identified which may help inform future development of adherence enhancing interventions. However, in order to better understand adherence and thus develop effective strategies to optimise adherence, the multi-factorial nature of adherence must be explored further (NIHR 2018, Bailey et al 2020). To date there has been no integrated review of quantitative and qualitative research on adherence to out-patient MSK SMPPs. It is proposed that a review of this nature will identify gaps in the literature and develop understanding of short and longer term adherence in this setting. Providing SMPPs is a cornerstone of MSK physiotherapy management and adherence is necessary to achieve optimal outcomes (Bennell et al 2014b). More research is needed to understand human behaviours in this complex, nuanced topic.

*“Self-management is a long-term strategy for patients with MSK conditions and we still do not know enough about what works to sustain long-term adherence to ensure benefits of exercise are maintained”. (NIHR 2018, pg. 9).*

## CHAPTER THREE - LITERATURE REVIEW

### **3.1 Introduction**

Chapter two provides a background for the study including physiotherapy management approaches for patients with MSK disorders and the concepts of behavioural change and adherence. This chapter presents a review of the quantitative and qualitative literature which evaluates adherence to MSK out-patient SMPPs. The literature review was undertaken between August 2016 and January 2017 and underpinned the rationale and design for the research study which began in 2017. An additional rapid review of the literature published between January 2017 and January 2021 is presented at the end of the chapter to provide an update and contemporary context. This literature is also integrated and discussed considering the findings in Chapter nine.

Grant & Booth (2009) described 14 types of literature review that can be undertaken. Several review types could have been utilised here including narrative review types such as, a systematised review, scoping review or critical review, or alternatively a structured systematic review or meta-analysis. Because adherence is complex, and underpinned by many processes and human factors, it was important to consider both quantitative and qualitative literature. A narrative review was chosen as this allowed a broad overview to identify specific gaps in current knowledge, compared to a focussed systematic review of only interventions which was considered too limited (Higgins et al 2011). Narrative reviews are considered a useful approach to explain and summarise reasons for differences in findings between studies and identify themes across studies (Petticrew et al 2013). A broad, combined narrative review of the qualitative and quantitative literature was undertaken and the findings are synthesised at the end of the chapter.

#### **3.1.1 Literature Review Aims**

The aim of the literature review was to identify, explore and appraise existing quantitative and qualitative literature which evaluates adherence interventions and experiences of those undertaking SMPP in MSK out-patient SMPPs. The objectives of the literature review were:

- To review the effectiveness of specific interventions to improve adherence to MSK out-patient SMPPs
- To review the barriers and predictors of adherence
- To review and evaluate patients' and physiotherapists' experiences and attitudes towards adherence to MSK out-patient SMPPs.

- To identify gaps in the current literature about factors or interventions to improve adherence to MSK out-patient SMPPs

### 3.1.2 Search strategy

An online search of published literature was conducted from inception to January 2017 using the EBSCO host platform. The search strategy is outlined in Figure 3.1. Databases searched were the Allied and Complementary Medicine Database (AMED), Cumulative Index for Nursing and Allied Health Literature (CINAHL), Excerpta Medica database (EMBASE), National library for Medicine (MEDLINE), PubMed, Psychology Information (PsychINFO), SPORT Discus, Physiotherapy evidence database (PEDro) and Cochrane databases. These databases were chosen as they are the established databases used in the field and provide variety as many index different, but often overlapping, sets of research publications (Elkins et al 2010).

Medical subject Headings (MeSH), CINAHL headings and their explosions were searched alongside keywords within title and abstracts (Baumann 2016). MeSH terms are official words or phrases selected to represent particular biomedical concepts. When labelling an article, indexers select terms only from the official MeSH list – never other spellings or variations. Using MeSH and CINAHL search terms provides a robust thesaural based search which searches for matching content and concepts rather than text (Salvador-Olivian et al 2019). It also avoids highlighting irrelevant articles that mention key words rather than being based on indexing relating to the content of papers (Baumann 2016). Terms were chosen based on key concepts relayed to the topic. However, limitations may include the failure to use sufficient synonyms or truncations, missing MeSH terms and failure to retrieve more specific terms through non-explosion of terms (Salvador-Olivian et al 2019).

MeSH terms used included: physical therapy, physical therapy modalities, musculoskeletal rehabilitation, musculoskeletal diseases, treatment adherence, patient compliance, mental recall, health behaviour. Additional keywords included non-adherence, non-compliance, motivational, behaviour, out-patient, patient experience, memory, instruction, concordance. Multiple combinations of search terms were used using BOOLEAN operators to combine terms, initially focussing on searching title and abstracts (Chang et al 2006). Internet searching of PubMed (using MeSH terms) and Google Scholar were also carried out. Citation checking was also used which includes searching of reference lists and identify studies that have cited key papers (Greenhalgh et al 2005). This is considered a useful supplementary tool to database checking (Wright et al 2014b). All types of study that focussed on adherence to SMPPs that had been published in peer reviewed journals were considered for inclusion in this review (Whittemore and Knafelz 2005). Searches for full

text articles, and keyword analysis within the title and abstract were also completed (Baumann 2016). The use of a clear inclusion and exclusion criteria informed the selection of articles for review. Hand searching of identified relevant journals and screening of cited papers was also utilised to increase the likelihood of all relevant literature being identified. This is particularly important as indexing for qualitative articles can be deficient (Shaw et al 2004). Literature was then further screened in detail by the researcher and critically evaluated. Identification and selection followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines which is outlined in Figure 3.1 (Moher et al 2009). Table 3.1 outlines the search strategy used.

Search Strategy	
Date	03/08/12016
Databases	AMED, MEDLINE, PubMed, PsychINFO, SPORT Discus, PEDro and Cochrane Central register of \controlled Trials (CENTRAL).
Population	#1 MeSH term; #1 musculoskeletal rehabilitation OR musculoskeletal diseases, #2 Keyword; Musculoskel* disorder OR low back pain OR osteoarthritis or Orthopaed*,
Intervention	#3 MeSH term; physical therapy OR physical therapy modalities OR musculoskeletal physiological phenomena, OR rehabilitation OR exercise therapy AND/ OR Self-care, self-management #4 Keyword; home exercise AND/OR self-management, or home programme
Outcomes/ evaluation	#5 MeSH terms; treatment adherence and compliance OR patient compliance AND/ OR mental recall AND / OR health behaviour.
Study design /characteristics	#6 Empirical research; Qualitative research OR hermeneutics; AND/OR Study characteristics; Case reports; OR comparative study OR clinical study; OR

	observational study OR randomised clinical trial OR systematic review OR meta-analysis
Search combination	#1 and #2 and #3 #1 and #3 and #5 #1 and #5 and #6 #2 and #4 and #5 and #6 #3 and #5 and #6
Language	English

**Table 3.1 Outline of Search Strategy**

**3.1.3 Inclusion Criteria**

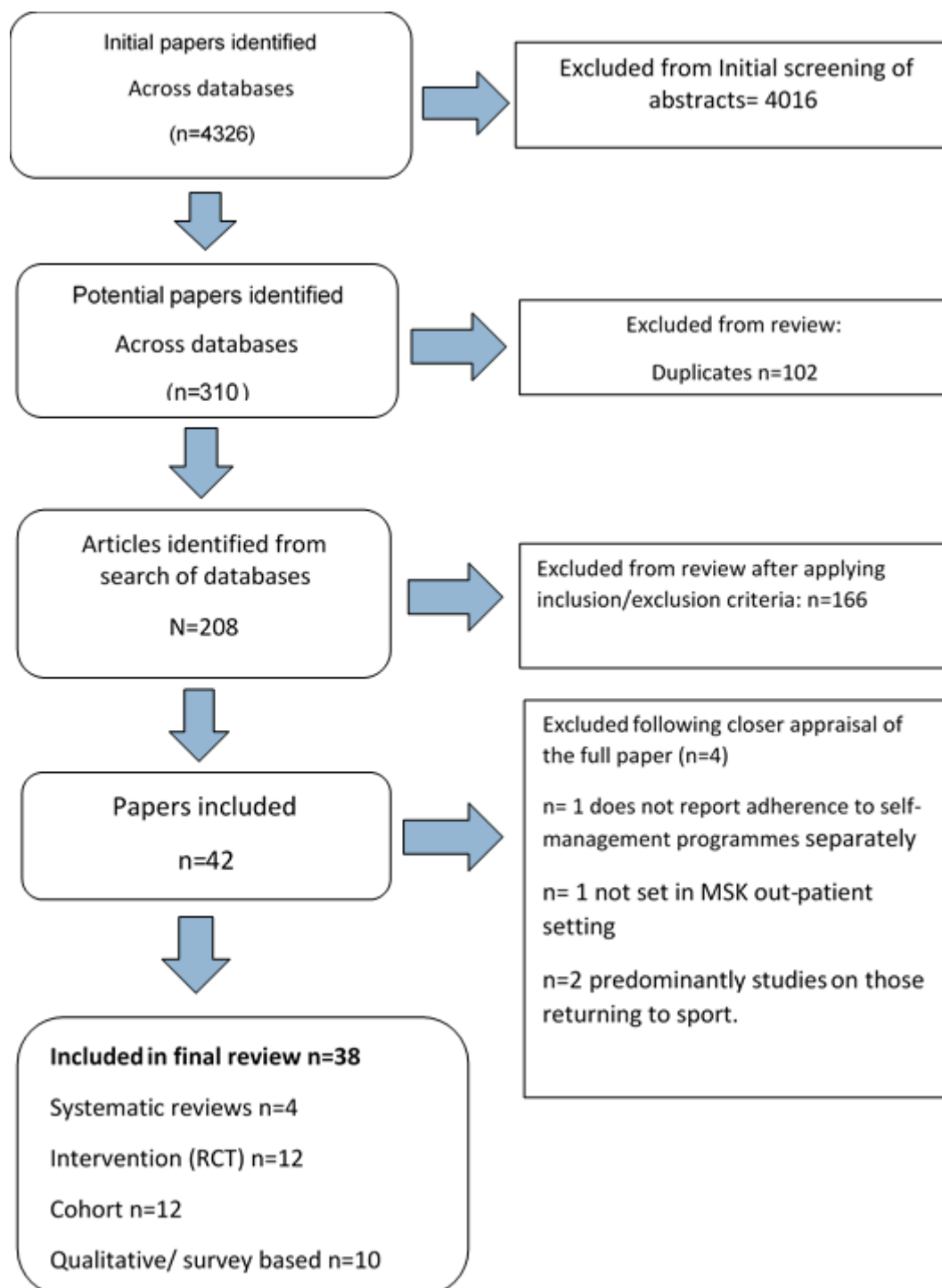
- All primary research studies and systematic reviews or meta-analyses which focussed on improving adherence to SMPPs
- For quantitative studies; those with primary or secondary outcomes measuring adherence to a physiotherapy self-management programme
- Published in English in peer reviewed journals
- Adult participants with an MSK disorder studied in an MSK out-patient physiotherapy setting

**3.1.4 Exclusion Criteria**

- Studies using participants without an MSK disorder (asymptomatic or 'healthy' volunteers)
- Those including participants under 16 years
- Studies using athletic participants whose rehabilitation is focussed on returning to performance sport







**Figure 2.1** Flow chart illustrating the process used to identify papers for inclusion in the literature review using PRISMA guidelines.

### 3.1.5 Assessment of Study Quality

In order to draw accurate conclusions, the potential limitations of the included studies were considered. This 'quality' relates to the extent to which its design, conduct, analysis, and

presentation were appropriate to answer the research question (Higgins et al 2011). Several tools are available to assess the quality of studies including checklists, items and scales but most are specific to one type of study design (Zeng et al 2015). The eight Critical Appraisal Skills Programme (CASP) tools were developed to allow assessment of all types of study although it does not provide a quantitative 'score' (CASP 2021). The CASP programme has been critiqued for creating an overly narrow view of what qualitative research is (Chenail 2011). However, the tools lend themselves to a narrative review, providing a systematic method of considering different types of studies and multiple areas, including methodological quality and wider external validity (Zeng et al 2015, Long et al 2020).

A quality assessment tool was also used in addition to the CASP tools to provide objective scoring of the study quality for randomised controlled trials (RCT's and provide a more detail objective critique). Several options were available including The Cochrane risk of bias tool version 2 (Higgins et al 2011) and the Physiotherapy Evidence Database (PEDro) Scale (de Morton et al 2009). The Cochrane risk of bias tool was developed to allow a judgment of multiple areas of bias rather than a scoring system alone (Cochrane Bias Methods Group 2019). This has been criticised as the tool combines aspects relating to the quality of reporting with aspects of trial conduct and assigns weights to different items in ways that are difficult to justify (Higgins et al 2011). It has been suggested that the reliability of the risk of bias tool is still unclear (Hartling et al 2013). The PEDro score was instead used to assess the methodological quality of the RCT's (de Morton et al 2009). This is an 11 item score of methodological quality of RCT's and has been used in similar reviews (Peek et al 2016b). This scale allows key features of RCT designs to be evaluated and is a tool that has been shown to be reliable for use in systematic reviews of physiotherapy RCTs (Maher et al 2003). There is evidence for its construct and convergent validity, discriminative validity, face validity, and content validity (Olivo 2008, de Morton et al 2009, Macedo et al 2010). GRADE scoring (Grading of Recommendations, Assessment, Development and Evaluations) was considered to support the evaluation of the review findings as this is a framework for developing and presenting summaries of evidence and provides a systematic approach for making clinical practice recommendations (Mustafa et al 2013). However, as the aim of this review was not to present recommendations for practice it was not used in this literature review and therefore may be considered a limitation.

Qualitative study review findings were also considered using the Confidence in the Evidence from Reviews of Qualitative research (CERQual) Approach (Lewin et al 2015). CERQual assists in assessing the degree of confidence which can be put in the findings from a qualitative study. Assessment is based on four components: the methodological limitations of the qualitative studies contributing to

a review finding, the relevance to the review question of the studies contributing to a review finding, the coherence of the review finding, and the adequacy of data supporting a review finding. These components are outlined in Table 3.1.

<b>Component</b>	<b>Definition</b>
Methodological limitations	The extent to which there are problems in the design or conduct of the primary studies that contributed evidence to a review finding
Relevance	The extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context (perspective or population, phenomenon of interest, setting) specified in the review question
Coherence	The extent to which the review finding is well grounded in data from the contributing primary studies and provides a convincing explanation for the patterns found in these data
Adequacy of data	An overall determination of the degree of richness and quantity of data supporting a review finding

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**Table 3.2 - Components of the CerQual approach taken from Lewin et al (2015).**

### 3.1.6 Studies Identified

Thirty-nine original research studies were included. These included 28 quantitative studies: RCT's (n=12), cohort studies (n=12) and systematic reviews (n=4). Eleven studies were also identified which evaluated either or both patients' and physiotherapists' experiences of adherence to MSK SMPPs using qualitative designs or survey approaches. For the purposes of this review the literature is evaluated and discussed separately as outcomes-based literature (quantitative) and experience-based literature (qualitative). The findings are then synthesised to provide a comprehensive overall view of the evidence base. Details and characteristics of the individual studies are presented in Appendix 1.

### 3.1.7 Reflections on Literature Review Methodology

Designing an effective, transparent and inclusive search strategy is an essential step in the review process (Cooper et al 2018). Including searches for qualitative literature can hold specific challenges due to less robust indexing processes and therefore search strategies may need to be over-inclusive to ensure papers are not missed (Shaw et al 2004). The review was undertaken early in the research process and reflective insights aided learning and immersion in the topic area. Literature searching was an intensive, time consuming and iterative process. The processes used allowed the aims of the literature review to be met. The CASP tools proved useful to explore the detail of the studies to inform inclusion and critical review. Although this was a narrative review and not a systematic review and meta-analysis, it is still essential that a thorough and systematic approach is taken (Cooper et al 2018). On reflection, using a narrative review provided a broad, inclusive approach to

critically evaluate the breadth of literature within this complex topic. A later rapid review was undertaken using the same search terms and databases to identify literature published after January 2017 and no new literature was identified from within the original literature review period.

## **3.2 Description of the Outcomes Literature**

### **3.2.1 Study Design**

Twelve studies were identified which evaluated interventions aimed at improving adherence to self-management physiotherapy programmes. Of these, 10 studies were RCT's (Friedrich et al 1998, 2005, Schneiders et al 1998, Bassett & Petrie 1999, Schoo et al 2005, Gohner & Schlicht 2006, Basler et al 2007, Pisters et al 2010, Basset and Prapavessis 2011, Vong et al 2011, Bennell et al 2014a), one was a feasibility study (O'Brien et al 2013) and one was an interventional cohort design (Clark and Bassett 2014). Two papers reported on the same trial with shorter (1 year) (Friedrich et al 1998) and longer term (5 year) (Friedrich et al 2005) follow-up data. For the purposes of this review, these two papers will be considered as part of the same study. A further twelve studies were either prospective or retrospective cohort studies. In addition to these original research papers, four systematic reviews were also identified looking at predictors of adherence (Beinart et al 2013, Essery et al 2016) and effectiveness of interventions to improve adherence (McLean et al 2010, Peek et al 2016a).

### **3.2.2 Quality of Studies**

All twelve RCTs met the criteria for randomisation using the Physiotherapy Evidence database (PEDro) which gives a score out of 10 (eligibility criteria was not included in the final scoring). Cohort studies were not scored for methodological quality or 'risk of bias' which is a limitation of this literature review. Cohort studies present interesting findings and potential associations of predictors and barriers of adherence however they do not allow any firm inferences or conclusions to be drawn as they are not controlled.

### **3.2.3 Setting**

Studies were geographically diverse (see Appendix 1). International healthcare systems vary widely from private and insurance contribution-based systems (e.g. USA and Canada), through to fully government funded systems (UK). These variations may affect patient demographics and adherence to self-management (Ingleby 2012). Further differences are seen between the studies as the interventions were delivered in a range of out-patient clinic settings. These included private practice

(Gohner & Schlicht 2006, Bennell et al 2014a), primary care (Basset & Petrie 1999, Schoo et al 2005, Basset & Prapavessis 2011, Pisters et al 2010, O'Brien et al 2013) and secondary care (Friedrich et al 1998, 2005, Basler et al 2007, Vong et al 2011). This variation may alter interpretation across settings, as demographics and patients' attitudes, experiences and motivations may vary (Yeowell 2010, Hiller et al 2015).

#### 3.2.4 Participants

Adult participants had a range of MSK problems, namely LBP (Friedrich et al 1998 & 2005, Hartigan et al 2000, Kolt & McEvoy et al 2003, Gohner & Schlicht 2006, Basler et al 2007, Mannion et al 2009, Vong et al 2011), neck or back pain (Escolar-Reina et al 2009), OA of the hip and/or knee (Seckin et al 2000, Schoo et al 2005, Pisters et al 2010, O'Brien et al 2013, Bennell et al 2014a), acute ankle sprain (Basset & Prapavessis 2011), shoulder soft tissue injury (Clark & Basset 2014), upper limb injury (Chen et al 1999), any limb injury (Basset & Petrie 1999), hand injuries (Kirwan et al 2002) or a combination of MSK conditions (Engstrom & Oberg 2005, Deutscher et al 2009, Wright et al 2014). All of these conditions reflect those commonly seen in UK MSK physiotherapy out-patient services.

Four of the intervention studies (Friedrich 1998, 2005, Gohner & Schlicht 2006, Basler et al 2007, and Vong et al 2011) and four of the cohort studies (Hartigan et al 2000, Alexandra et al 2002, Kolt & McEvoy 2003, Mannion et al 2009) evaluated participants who had chronic LBP. Patients experiencing chronic LBP often with no clear cause, can experience significant distress, anxiety and depression (Bogduk 2004, Keeley et al 2008). This can make rehabilitation challenging and thus adherence and outcomes may vary in those with chronic LBP compared to those with other MSK conditions (Beinart et al 2013).

The average age of participants ranged from 35 years (Bassett & Prapavessis 2011), where participants had experienced ankle sprain, through to 70.5 years where participants had OA of the knee or hip (Schoo et al 2005) or longstanding LBP (Basler et al 2007). These variations in age, condition and chronicity, create a heterogeneous population sample which makes pooling and comparison of the data difficult (Elkins et al 2010, Peek et al 2016b). However, this variation does however represent the diversity of conditions seen in routine MSK clinics.

#### 3.2.5 Content of SMPPs

In all the studies, home programmes consisted solely of exercise regimes except for two studies. Basset & Prapavessis (2011) included the application of ice, elevation of the affected limb and strapping and Escolar-Reina et al (2009) included rest, application of heat/cold and postural and lifting advice. These findings align with Peek et al (2015a) who found that all studies focussed

predominantly on exercise strategies despite physiotherapists regularly prescribing a range of non-exercise strategies.

Content and dosage of the exercise programmes varied and was difficult to establish in many of the studies. Some studies gave good detail of home exercise programmes (Schneiders et al 1998, Kolt & McEvoy 2003, Schoo et al 2005, Bennell et al 2014a) whilst others gave no specific detail (Basset & Petrie 1999, Kirwan et al 2002, Deutscher et al 2009, Basler et al 2010, Clark & Basset 2014). The number of exercises provided also varied from four specific exercises for LBP (Schneiders et al 1998) to nine exercises for knee OA (Schoo et al 2005). Two studies provided specific exercise instruction details for patients about the exercise intervention. Kolt & McEvoy (2003, Bennell et al 2014a). In comparison, several studies used a more pragmatic approach where physiotherapists were able to individualise a programme from a specific list of exercises (Friedrich et al 1998, 2005, Hartigan et al 2000, Seckin et al 2000, Kolt & McEvoy 2003, Gohner & Schilt 2006, Vong et al 2011, Wright et al 2014). This individualised, approach reflected 'real world' MSK physiotherapy practice where physiotherapists can tailor programmes for patient's needs. However, this increases the number of variables within the interventions making comparison between difficult. Measuring implementation fidelity and adherence is difficult if there is no clear information or instructions given (Carroll et al 2007). It is recognised that articulating dosage of therapeutic interventions (number of repetitions, sets and frequency) can be difficult (Hayward et al 2021) and reporting of exercise interventions is often poor (Wood et al 2020). The studies reviewed reported varying SMPPs dosage ranging from specific regimes of 300 repetitions of exercises daily lasting approximately 25 minutes (Mannion et al 2009), to three exercises carried out daily (Schneiders et al 1998) through to a general approach of exercising three or more times per week (Hartigan et al 2000). This content and dosage of SMPPs may affect adherence through patients not fully recalling programmes or participants may feel overburdened, not having the time or resources to carry out the programme to the required intensity (Essery et al 2016). In RCT studies where SMPP dosages are controlled to reduce confounding variables this may not reflect the content of real world SMPPs and understanding the 'active ingredients' in the intervention is difficult (Carroll et al 2007). Calls have been made to better standardise interventions (Hoffman et al 2014). However, Hawe et al (2004) argue that in complex interventions such as exercise, the function and process should be standardised rather than the components themselves.

### 3.2.6 Adherence Measures

All studies used self-report scales to measure adherence to SMPPs. Likert type scales were used by six studies to measure adherence (Gohner & Sclicht 2006, Basset & Prapavessis 2011, Pisters et al

2010, O'Brien et al 2013, Bennell et al 2014a). There are potential limitations of analysis of 'Likert type' scales (Jamieson 2004). Although they provide ordinal data they are sometimes interpreted as interval data to allow parametric statistical analysis but this could have marked effects on results and interpretation of findings (Norman 2010). For example, Gohner & Schlicht (2006) measured behavioural aspects (i.e. adherence to home exercises on a 4-point scale. "*How often did you perform ....exercises in the last 3-6 weeks?*") (Gohner & Schlicht 2006). Answer categories ranged from 1 (I did not perform), 2 (I performed once a month, 3 (I performed once per week), 4 (I performed... almost every day, at least 5 times per week). This is ordinal data and should not be analysed using parametric testing as it is not usually normally distributed (Jamieson 2004). Using 4 or 5 point Likert scales can also create a ceiling effect if there is not enough sensitivity within the options to detect change and could be a source of bias (Gohner & Schlicht 2006, O'Brien et al 2013).

Most studies measured adherence using a home exercise diary or exercise log (Chen et al 1999, Friedrich et al 1998, 2005, Schneiders et al 1998, Bassett and Petrie 1999, Hartigan et al 2000, Seckin et al 2000, Roddey et al 2002, Engstrom & Oberg 2005, Schoo et al 2005, Basler et al 2007, Mannion et al 2009, Vong et al 2011, Clark & Basset 2014, Wright et al 2014). Although these studies all used a diary method, the specific details of what participants were asked to record varied widely. Self-reported measures of adherence are inherently open to bias. If someone did not do the exercises because they forgot, they may also 'forget' to fill in the diary. Clark and Basset (2014) found that only 50% completed the self-report diary and Chen et al (1999) found that 60.7% completed their diaries accurately. Self-report diaries are also subject to over-reporting as some individuals do not like to admit non-adherence hence displaying social desirability bias which could lead to over reporting (Sluijs et al 1993, Campbell et al 2001).

Several studies calculated mean adherence (Schneiders et al 1998, Schoo et al 2005, Pisters et al 2010) by calculating a percentage of the number of exercises performed compared to the number prescribed. This measure assumes a specified target dosage of prescribed exercise and also relies on accurate self-report which may be a source of bias. Interestingly, Schneiders et al (1998) withdrew two patients (based on statistical advice) who did more exercise than recommended. This infers that patients were not adherent to the recommended programme when in reality they did more than required which, in the case of exercise, would normally be considered beneficial. This again raises the question of what quantity of completed exercise is considered as achieving implementation fidelity and being adherent (Toomey et al 2019, Bailey et al 2020). Schneiders et al (1998) prescribed four exercises, compared to Schoo et al (2005) who prescribed 10 exercises. If participants had only completed half of Schoo et al 's (2005) 10 exercises they would have been recorded as 'non-



compliant', even though they had completed five exercises. If participants had completed all four exercises prescribed by Schneider et al (1998) and been classed as fully compliant they would still have completed less than Schoo et al's (2005) participants. Without adherence values or thresholds measuring adherence is inherently problematic (Bailey et al 2020).

### 3.2.7 Adherence Rates

Adherence rates to home exercises varied greatly amongst the studies. In those studies reporting mean adherence, rates ranged from 33% (Pisters et al 2010) to 93% (Schoo et al 2005) in non-intervention groups. This variation may be due to the heterogeneity and variation in adherence measurement methods which also makes meta-analysis difficult (McClean et al 2010). For example, Wright et al (2014) found that 89% of participants said they had completed 100% of exercises given, yet the same participants reported that 73% had completed at least 80% of their exercises, suggesting there is some discrepancy and potential inaccuracy in this adherence self-reporting. Chen et al (1999) also found issues with self-reporting and potential accuracy bias as they found that 74% of participants said they were 100% compliant to their home exercise programmes. However, when asked to recall their adherence compared to their actual documented daily charting of exercises (completed by the patients) adherence was only 35%. Others found similarly high adherence rates with Seckin et al (2000) reporting 85% compliance at 3 months. Kolt & McEvoy (2003) found that 71.6% of participants reported completing their home exercise programmes. Mannion et al (2009) measured adherence as a percentage of exercises, then grouped them. They reported that 50% of patients completed between 76-100% of their home exercises.

### 3.2.8 Barriers and Predictors to Adherence Identified Within Cohort Studies

Several barriers and facilitators to adherence have been identified in the cohort studies. Facilitators of adherence identified included an internal health locus of control (Chen et al 1999), increased perceived self-efficacy (Wright et al 2014, Kolt & McEvoy (2003), satisfaction with therapist (Wright et al 2014), positive beliefs about treatment efficacy (Engstrom & Oberg 2005), previous use of physical therapy strategies (Escolar-Reina 2010) and attendance at clinic appointments (Kolt & McEvoy 2003). Kolt & McEvoy (2003) also found a significant correlation between frequency of attendance at physiotherapy appointments and likelihood of completing home programmes. This led them to conclude that physiotherapists may be able to predict those less likely to adhere to home programmes by identifying those with lower attendance rates in clinic and thus offer greater support during the treatment period. However, this has inherent challenges if the patient chooses not to engage in treatment (intentional non-adherence). Two studies utilised approaches which provided

further support through offering additional 'booster' sessions after completion of the programme (Pisters et al 2010, Bennell et al 2014a).

Patient related factors, such as increased self-efficacy and internal locus of control, could be enhanced by developing the patient-therapist relationship, as demonstrated by Wright et al (2014). A systematic review by Essery et al (2016) concurs with these findings emphasising that self-motivation, self-efficacy, and previous adherence to exercise related behaviours are key factors to facilitating adherence. However, they included studies in other areas of physiotherapy beyond MSK out-patients which may affect the translation of findings to the MSK out-patient setting. Essery et al (2016) also found that intentions to engage and increased social support were additional predictors of adherence.

Barriers, or factors likely to reduce adherence, included being female, those in poorer health (Engstrom & Oberg 2005) and those with increased pain and disability (Seckin et al 2000). Engstrom & Oberg's (2005) conclusions were drawn from a large study evaluating completers and non-completers of physiotherapy with various MSK conditions. Those who completed were asked about their home exercise compliance in terms of number of times they exercised per week. However, there were limitations with adherence measurement as the authors classified exercising once weekly or less as non-adherence. An exploratory and correlational questionnaire study by Kirwan et al (2002) asked both physiotherapists and patients about their perspectives on adherence to out-patient hand therapy. Although they did not measure whether patients were adherent, they asked about multiple variables that may affect adherence. They concluded that patients and physiotherapists had quite different perspectives on adherence, as 24 of 33 items regarding compliance differed between patients and therapists. Patients and physiotherapists cited similar reasons for non-adherence as including not enough time, discomfort or pain, interference with social life and forgetting as key reasons for non-adherence but hand therapists reported these as occurring much more frequently than patients reported this. This may be due to methodological reasons using a non-validated measure and of statistical pooling of 'yes' and 'maybe' answers. Also the authors suggested that views between patients and therapists may differ because therapists were answering based on their experience of all patients they had seen who had attended hand therapy, whilst patients are likely to base their answers solely on their one experience of attending, making comparisons difficult. These findings suggest that there are numerous factors relating to patients', physiotherapists', the treatment itself and the social setting that may influence adherence supporting the notion that adherence is complex and multifactorial (WHO 2003, Basset 2015).

### **3.3 Interventions to Improve Adherence**

Thirteen studies evaluated interventions aimed at improving adherence to home exercise programmes. Six of these studies used cognitive behavioural or motivational interventions with the aim of increasing adherence. These included motivational enhancement therapy (MET) (Vong et al 2011), booster sessions after discharge (Bennell et al 2014a), trans-theoretical model-based counselling (Basler et al 2007), a motivational programme (Friedrich et al 1998 and 2005), cognitive behavioural therapy (Gohner & Schlicht 2006) and a behavioural programme combined with graded exercise (Pisters et al 2010). Three studies used planning interventions, namely the use of action and coping planning (O'Brien et al 2013, Clark & Basset 2014) and goal setting (Bassett and Petrie 1999). Bassett & Prapavessis (2011) applied the protection motivation theory (PMT) model as a basis for their intervention. In comparison, instead of using a cognitive or motivational based intervention, three studies (Schneider et al 1998, Roddey et al 2002, Schoo et al 2005) examined the effect of changing the mode of exercise instruction (e.g. written, audio and video-taped instruction) to investigate affects adherence to home exercise programmes.

#### **3.3.1 Cognitive Behavioural and Motivational Based Interventions**

Cognitive behavioural 'motivational based' studies included different interventions. Terminology in these studies is inconsistent and confusing where similar words and phrases are used interchangeably with different meanings. For clarity a description of interventions is provided according to the authors see Table 3.2.

		Description of intervention				
Author	Cognitive-behavioural Intervention	Enhancing each patients' internal locus of control	Assessing readiness for behaviour change	Developing self-efficacy	Reducing barrier perceptions	Reinforcement of positive behaviours
Basler et al (2007)	Trans-theoretical model based counselling		√	√		
Friedrich et al (1998)/ (2005)	Motivational programme	√				√
Gohner & Schlicht (2006)	Cognitive behavioural therapy			√	√	
Vong et al (2011)	Motivational enhancement therapy	√		√		√
Bennell et al (2014a)	Additional physiotherapy sessions after discharge; booster sessions				√	

**Table 3.3 - Description of cognitive behavioural 'motivation' based interventions as described by authors.**

In five studies physiotherapists delivered the motivational theory-based interventions as well as the generalised physiotherapy care (Friedrich et al 2005, Basler et al 2007, Pisters et al 2010, Vong et al 2011, Bennell et al 2014a). The physiotherapists had received additional training to deliver the interventions which ranged from 'brief training' (Bennell et al 2014a), to eight hours (Basler et al 2007, Vong et al 2011) to two days (Pisters et al 2010) although the provider of the training was not always documented. The RCT that used psychologists to train the physiotherapists to deliver the motivational enhancement therapy intervention was the only RCT to find significant improvements in motivation and compliance (Vong et al 2011). Vong et al (2011) found improvements in motivation and compliance at one month suggesting physiotherapists can be successfully trained by psychologists in these techniques. The other RCT which used a clinical psychologist to provide the additional motivational intervention separate to the physiotherapy intervention also found positive effects on adherence in their motivational theory-based intervention group (Gohner and Schlicht 2006). These two studies were of moderate (Gohner and Schlicht 2006) and high methodological

quality (Vong et al 2011). These findings may indicate that motivational theory-based interventions have greater effectiveness when there is input from a trained psychologist, compared to without (Pisters et al 2010).

In several studies the same physiotherapists provide both the intervention and control treatments which may lead to treatment contamination whereby participants receive where participants in the control group receive elements of the active intervention (Torgerson 2001). (Gohner & Schlicht 2006, Basler et al 2007, Pisters et al 2010). There may be enhanced therapeutic benefits of control treatments through increased therapist and patient interaction. Physiotherapists are still likely to engage and motivate patients regardless of RCT group allocation. Using educational approaches, exploration of biopsychosocial factors and goal setting are considered routine elements of quality physiotherapy practice (HCPC 2013). This may have potentially lessened the effect of the additional motivational intervention in the intervention groups. Implementation fidelity was not measured so it is also difficult to know how consistently interventions were applied (Toomey et al 2019). Also, the time taken to deliver the intervention varied, with two studies providing extra treatment time in the intervention group (Gohner & Schlicht 2006, Pisters et al 2010) which may result in enhanced treatment effects. Basler et al (2007), controlled for the addition of a 10-minute motivational counselling session prior to their physiotherapy exercise treatment session by providing a sham ultrasound treatment. The authors suggested the possibility of treatment diffusion as the physiotherapists in the non-intervention groups were able to talk to the patients' during ultrasound which could have had a motivational behavioural effect. Bennell et al (2014a) added two additional 'booster sessions' after 10-14 previous sessions. Physiotherapists had some brief training in behaviour change however, it is impossible to ascertain if the actions of the physiotherapist or the additional time likely to influence outcomes. It is therefore difficult to establish whether any change in treatment effect is due to the time spent with the physiotherapist or a specific motivational intervention. Also, physiotherapists are usually autonomous in determining the length of time of the episode of care so providing 'additional' sessions is a difficult concept to apply in practice.

Other interventions used in the studies include a behavioural graded exercise approach which combines cognitive and physical interventions. This was broader than motivational interviewing or CBT and involved motivational aspects, as well as a structured incremental increase in physical activity irrespective of pain levels (Pisters et al 2010). Pisters et al (2010) found this intervention resulted in better adherence to home exercises and activities compared to the control group in both the long and short term (13 weeks and 65 weeks respectively).

Understanding differences in short- and long-term adherence is important. Adherence is not a uniform or consistent concept (Bailey et al 2020). It includes many variables which need to be considered when selecting interventions to optimise and measure adherence (Sluijs et al 1993, WHO 2003). Although Pisters et al (2010) do not mention it explicitly, they also included specific goal setting as per Basset & Petrie (1999) and O'Brien et al (2013). Friedrich et al (1998, 2005) and Vong et al (2011) also agreed a treatment contract as part of their motivational intervention. The motivational interventions used in these studies are broad and aim to affect many variables, including increasing self-efficacy and control-efficacy, building intentions and barrier planning which may explain some of their success as they are multifaceted and dynamic interventions. However, it is potentially difficult to know which element of a motivational approach may be affecting outcomes (Beinart et al 2013).

Friedrich et al (1998 and 2005), Gohner & Schlicht (2006), Basler et al (2007), Vong et al (2011) and Bennell et al (2014a) all compared the addition of motivational interventions to usual physiotherapy care. Adherence rates ranged from 33-93% across the five studies. Bennell et al (2014a) added two booster sessions with a sometimes-different physiotherapist after discharge at eight and 16 weeks and found no significant increase in adherence. It is questionable whether this is considered a motivational intervention as a longer episode of care could be considered usual care although being seen by a different physiotherapist would potentially differentiate the 'booster' sessions. The use of multi-faceted motivational interventions delivered by physiotherapists did not appear to increase adherence in MSK patient physiotherapy settings (Friedrich et al 1998 and 2005, Basler et al 2007). However, there is some evidence to support the use of physiotherapist delivered motivational enhancement therapy (Vong et al 2011) and psychologist delivered cognitive behavioural therapy (CBT) (Gohner & Schlicht 2006) in increasing adherence in participants with LBP. It must be noted that these results are from interventions with patients with LBP who often have significant levels of distress and anxiety (Keeley et al 2008) and therefore this subset of patient may respond better to more specialised psychological based interventions compared with the wider MSK patient population. Neither Friedrich et al (1998 and 2005) nor Basler et al (2007) measured anxiety and depression levels at baseline making evaluation difficult.

Vong et al (2011) measured compliance as a secondary outcome which is why it may have been excluded from Peek et al's (2015a) systematic review. By the first data collection point (after session 5) they found the intervention group had completed nearly double the amount of exercise compared to the control group and this was maintained within groups until one month follow up. Thus, they concluded that motivational enhancement therapy was superior to standard care in

increasing exercise compliance. Vong et al (2011) chose standard care to be interferential electrotherapy which is not considered to be an evidence-based modality for LBP management (Lin et al (2019) and therefore evaluating whether MET works alongside evidence-based interventions for LBP would be useful. Gohner and Schlicht (2006), using cognitive behavioural therapy (CBT) intervention also found statistically significant, increased reported levels of exercise in the intervention group. This is in contrast to the other cognitive behavioural and motivational intervention studies who found no statistical improvement in adherence in the intervention groups compared to usual physiotherapy (Friedrich et al 1998 and 2005, Basler et al 2007).

Cognitive behavioural and motivational interventions provide conflicting results regarding improving adherence to SMPPs when delivered by physiotherapists and there is some evidence (moderate quality), of improved adherence in patients with LBP with psychologist delivered CBT interventions (Gohner and Schlicht 2006). A behavioural graded exercise programme with additional booster sessions after discharge does appear to have positive effects on adherence (Pisters et al 2011). This RCT highlights that adherence needs to be considered in both short term, whilst individuals are still attending physiotherapy sessions and receiving support, and ongoing long-term adherence after discharge from physiotherapy services. There are also limitations in RCT quality around blinding, treatment delivery, and consistency and quality of adherence measurement tools although it should be noted that all these studies scored as moderate to high quality when using the PEDro quality assessment tool.

### 3.3.2 Planning Interventions

Those studies evaluating interventions which supported patients to plan their adherence behaviours including action and coping planning (O'Brien et al 2013, Clark & Basset 2014), and goal setting (either by the physiotherapist alone or in conjunction with the patient) (Basset & Petrie 1999) showed no significant improvement in adherence for intervention groups. These three studies concluded that action and coping plans (implementation plans) and goal setting were not useful in improving adherence to physiotherapy programmes in patients with OA, Shoulder pain and generalised injury respectively (Basset & Petrie 1999, O'Brien et al 2013, Clark & Basset 2014,). This contrasts with Novak (2011) who, in a review of home exercise programmes, concluded that goal setting was one of the favourable characteristics of successful unsupervised home exercise programmes. These interventions may work in other areas of physiotherapy rehabilitation but do not appear to be a useful tool in the MSK out-patient physiotherapy based on studies presented here. However, caution must be applied as these studies are only of fair (Basset & Petrie 1999) and moderate (O'Brien et al 2013) methodological quality. It is also noteworthy that Clark & Basset's

(2014) study was a cohort trial and therefore this intervention was not compared to a control group meaning that the findings must be interpreted with caution (Constantino et al 2015). Other reviews (Levack et al 2006) also found only limited evidence for goal setting in a rehabilitation setting. However, Bassett et al (2015) argue that although goal setting can provide the incentive, it is not enough to bridge the behaviour- intention gap. Goals need to be set, then specific behavioural change techniques are needed to implement these (O'Brien et al 2013). Considering this approach, alongside growth in technology, alternative methods of communicating goals, agreements and treatment plans could also be considered. Current interventional studies do not support goal setting in MSK out-patient settings and further evaluation is needed. It may be that some patients respond well to goal setting whilst others do not and that one intervention may not suit all individuals.

### 3.3.3 Mode of Exercise Instruction

Other studies evaluated the effect of changing the mode of exercise instruction to investigate if this affects adherence to their home exercise plan (Schneiders et al 1998, Roddey et al 2002, Schoo et al 2005). Schneiders et al (1998) concluded that adding written and pictorial instructions of exercises to verbal instruction alone resulted in significant improvements in adherence (38.1% in control group compared to 77.4% in the intervention group) after 14 days. However, Schoo et al (2005), despite finding overall high adherence rates (71-91%), concluded that the addition of audio or videotape instruction did not significantly affect exercise performance, or adherence rates, above that of using written and verbal instruction alone. This was in keeping with a previous RCT by Roddey et al (2002) who concluded that the use of videotaped exercise programmes provided no benefit over written materials in terms of adherence or outcomes. In the RCT by Schoo et al (2005), it was not clear if or how frequently participants accessed the audio or videotapes at home, and it is assumed they had the required technology to access them. Therefore it is impossible to ascertain if the mode of delivery was superior. As the average age of participants in the study by Schoo et al (2005) was 70.5 years it could be a potential issue that more technologically advanced modes of instruction (video and audiotapes) were not fully utilised by this age group. However, recent advances in technology mean video can be made more readily available via mobile technology, and video may be a useful tool to improve adherence in a different format with different population groups. Bassett and Prapavessis (2011) also chose to use video format for their PMT information, citing its popularity and ability to target people with a broad range of literacy skills. They controlled for their video intervention by also using a control video (with non PMT information), and had a control group who only received written information. No differences were found between groups in intentions to adhere, or actual adherence, to their home exercise programme. However, this was a 'one off' viewing in clinic, rather than an aid to supporting ongoing home exercises (Roddey et al 2002, Schoo



et al 2005). Bassett & Prapavessis (2011) made no reference within their study as to whether participants could recall the exercises and information given to them after they had watched the video.

The other reviewed studies also had to 'teach' the patient their home programme or exercises at some point before patients were advised to do this unsupervised at home. Details of the method of teaching the home physiotherapy programme was variable between studies. Some studies refer to providing illustrations or pictorial diagrams with instructions using 'PhysioTools' software (Kolt & McEvoy 2002, Mannion et al 2009) whilst others referred to patients being given written material (Hartigan et al 2000, Basler et al 2007). Basset & Petrie (1999), Vong et al (2011) and O'Brien et al (2013) referred only to patients being 'taught to perform the exercises correctly' whilst others gave no information regarding teaching methods or supplementary teaching materials (Chen et al 1999, Seckin et al 2000, Kirwan et al 2002, Engstrom & Oberg 2005, Deutscher et al 2009, Escolar-Reina 2010, Pisters et al 2010). When measuring adherence to home programmes it is essential that participants can remember the programmes for them to perform the exercises. Although this should be controlled for between groups in RCT's, it may be a factor which could affect overall adherence outcomes. Carroll et al (2007) outline that approaches to facilitate adherence are key in understanding implementation fidelity.

Providing supplementary teaching materials including video and audiotapes do not appear to improve adherence to MSK SMPPs. Physiotherapy practice regarding the teaching of exercise is varied and it is proposed that the most effective methods may vary for different populations and individuals.

#### 3.3.4 Clinical Outcomes and Adherence

Studies measured a variety of health and wellbeing outcomes as well as adherence measures. These include pain scales (Friedrich et al 1998, 2005, Vong et al 2011, Bennell et al 2014a), functional or disability scales (Basset & Petrie 1999, Friedrich et al 1998, 2005, Basler et al 2007, Basset & Prapavessis 2011, Vong et al 2011, O'Brien et al 2013, Bennell et al 2014a) and physiological measures such as range of movement scores (Basler et al 2007). Three studies using cognitive motivational interventions, found that functional scores improved in those receiving the intervention despite no significant improvement in their adherence compared to control groups (Friedrich et al 1998, 2005, Vong et al 2011, O'Brien et al 2011). Resolution of pain may have resulted a reduced motivation to adhere. Two studies (Gohner & Schlicht 2006, Vong et al 2011) observed that following cognitive motivational based interventions, exercise compliance increased but pain levels remained unchanged. These findings suggest that increased adherence is not always

associated with improvement in clinical outcomes (Sluijs et al 1993, Friedrich et al 2005). This is contrary to other evidence (McLean et al 2010, Foster et al 2014) therefore other factors, such as treatment fidelity or intensity, may have influenced outcomes. Basset & Petrie (1999) found when using goal setting that those with no formally set goals (control group) had the highest levels of compliance, particularly if they had greater limitations in movement or muscle strength. These findings may indicate that levels of pain or function influence adherence. This is supported by Engstrom & Oberg (2005) and Escolar-Reina (2009) who found that those with more pain and disability exercised less. Alternatively this could be due to issues with adherence measurement and its validity (Bollen et al 2014, Hall et al 2015).

Basset & Prapavessis (2011) found that applying protection motivation theory (PMT) in individuals with acute ankle sprain did appear to positively impact treatment efficacy beliefs and perceived risks of not engaging but there was no significant change in behaviour intention and adherence. However, a sizeable proportion of patients (n=27) had experienced a previous ankle injury and had received physiotherapy previously. This may be a reason affecting the lack of intention and adherence as ankle sprains often recover well with minimal intervention in the short term. Patients may have recovered previously without adhering to exercises and thus were less motivated to comply, although ironically, they had suffered recurrent ankle sprain in the longer term.

### **3.4 Description of the Experiences Literature**

Literature that explored physiotherapists and /or patients experiences or attitudes towards adherence in MSK out-patients physiotherapy were reviewed. Ten studies were identified. Seven of these explored patients' attitudes and experiences of adherence to their physiotherapy programme (Sluijs et al 1993, Campbell et al 2003, Veenhof et al 2006, Medina-Mirapeix et al 2009, Escolar-Reina et al 2010, Smith-Forbes et al 2016, Peek et al 2016b). Three studies explored physiotherapists' perspectives of adherence to SMPPs (Marwaha et al 2010, Karnad &McLean 2011, Stickler 2015) and one study explored both physiotherapists and patients' perspectives (Dean et al 2005).

#### **3.4.1 Methodological Considerations**

Methods included focus groups (Medina-Mirapeix et al 2009, Marwaha et al 2010, Escolar-Reina et al 2010), interviews (Campbell et al 2003, Dean et al 2005, Veenhof et al 2006, Karnad &McLean 2011, Stickler 2015, Smith-Forbes et al 2016) and questionnaires (Sluijs et al 1993, Peek et al 2016b). Studies were undertaken in various settings with a range of participants. These included patients with OA in the UK (Campbell et al 2001) and the Netherlands (Veenhof et al 2006). Patients with neck pain and LBP in Spain (Medina-Mirapeix et al 2009, Escolar-Reina et al 2010), upper limb problems in the USA (Smith-Forbes et al 2016) and LBP in New Zealand (Dean et al 2005) were

studied. One study surveyed patients with a wide range of MSK conditions attending for physiotherapy in the Netherlands (Sluijs et al 1993) and (Peek et al 2016b) surveyed Australian MSK Physiotherapists views on patient adherence. Views have also been gleaned from physiotherapists working with those with chronic MSK disorders in both the UK Karnad & McLean (2011) and India (Marwaha et al 2010).

Underpinning theoretical approaches used within the qualitative studies were phenomenology (Dean et al 2005, Medina-Mirapeix 2009, Karnad & McLean 2011, Stickler 2015, Smith-Forbes et al 2016) and grounded theory (Veenhof et al 2006, Escolar-Reina 2010). Campbell et al (2001) described using an inductive thematic analysis approach. Sluijs et al (1993) directly described written barriers but gave no explanation of their data analysis from qualitative survey results.

Qualitative research designs lend themselves to smaller sample sizes where the focus is on achieving rich insightful, exploration of an individual's experiences, attitudes, and beliefs. Two studies were undertaken as part of exploring patient experiences within RCTs (Campbell et al 2001, Veenhof et al 2006). Studies using in-depth interviews with patients had sample sizes ranging from nine patients (Dean et al 2005) to 20 patients (Campbell et al 2001). Medina-Mirapeix et al (2009) and Escolar-Reina et al (2010) both describe the same participant group of seven focus groups with a total of 34 patients but appear to separate out the research aims within the publications. All the studies using in-depth interviews and focus groups described using purposive or deliberate sampling to gain heterogeneity in the sample (Dean et al 2005, Veenhof et al 2006, Medina-Mirapeix et al 2009, Escolar-Reina et al 2010, Marwaha et al 2010, Karnad & McLean 2011, Smith-Forbes et al 2016,). Data analysis approaches were described in all studies with varying degrees of detail. Most studies outline an inductive analysis approach using coding, thematic analysis, and constant comparative methods (Campbell et al 2001, Dean et al 2005, Veenhof et al 2006, Medina-Mirapeix et al 2009, Escolar-Reina et al 2010, Karnad & McLean 2011, Smith-Forbes et al 2016,). Sluijs et al (1993) and Peek et al (2016a) provide descriptions of qualitative and descriptive data gleaned from their surveys but do not provide any evidence of analysis processes. Description and characteristics of these studies are summarised in Appendix one.

Findings from the studies exploring patients and physiotherapists' experiences identify several common themes around adherence;

- Therapeutic relationship
- Ongoing support and feedback
- Recall of information

- Self-efficacy and motivation to adhere
- Symptoms and perceived benefit of treatment
- Time needed and impact on lifestyle of treatment programme
- Support from friends and family

#### 3.4.2 Patient Therapist Relationship

All five qualitative studies identified patients' beliefs about adherence that related to the patient–therapist relationship. Veenhof et al (2006) identified that patients with OA (of moderate to severe) valued early opportunities to be involved in treatment planning and this influenced, and was influenced by, a strong physiotherapist-patient relationship. This is perhaps not unexpected as patients were receiving physiotherapy in the form of a graded behavioural exercise intervention which requires significant time and therapeutic investment. Smith-Forbes et al (2014) identified that many patients who felt they trusted their therapist were more inclined to adhere, and positive feedback from physiotherapists was also seen as important for fostering adherence (Sluijs et al 1993). Medina-Mirapeix et al (2009) identified that patients wanted to feel that therapists understood their beliefs and priorities and hence develop appropriate and realistic treatment plans to support the therapeutic alliance. In support of this, Peek et al (2016b) concluded that physiotherapists felt they should adopt a collaborative approach to address any barriers to adherence. Physiotherapists also felt the importance of the therapeutic alliance with patients needing to take ownership of their problems and not rely on the physiotherapist to 'fix' the problem (Karnad and McLean 2011). However, the physiotherapists in this study were predominantly in UK private practice where physiotherapists' expectations of patients may differ to those receiving care in the NHS (Hiller et al 2015).

*'my belief is that it's their (the patients'') life that created the problem (condition)... if they are not going to take it (advice) home...perhaps change their lifestyle by incorporating exercise into it then you are not going to get them right... you need to educate them in terms of the importance of home exercise programme. (Karnad and McLean 2011, pg. 3).*

Also, this view of the patient needing to take responsibility does not necessarily consider other factors such as patients' beliefs and attitudes, social circumstances, capabilities and freedom to choose whether they wish to adhere or not.

Campbell et al (2001) identified that some patients, again receiving physiotherapy as part of an RCT intervention, felt an initial sense of loyalty and obligation to their therapist which motivated them as they did not want to 'let their therapist down'. This was seen as particularly relevant in the early stages of compliance particularly when people are new to therapy and are still receiving support

from attending physiotherapy appointments. This sense of loyalty to please therapists may influence self-reporting within adherence measures. It could be argued that patients volunteering for research trials may have an innate altruism and sense of obligation of wanting to please. Maintaining the patient-therapist relationship through ongoing support via some medium (for example, face to face contact, short messaging service) could play a useful role in supporting long-term adherence once patients' have been discharged from physiotherapy however more research is needed in this area (Hamine et al 2015).

Some physiotherapists felt that their place in the hierarchy of healthcare professionals was a barrier to patients' adherence as they perceived they lacked power and influence on patients compared to doctors for example (Karnad & McLean 2011). Interestingly this issue was not raised in any of the patient experience literature suggesting this may be a self-efficacy issue for physiotherapists not perceived by patients. The physiotherapists participants in Karnad & McLean's (2011) study were volunteers from the university setting (n=5) and only four were practising. This could represent a perceived lack of confidence by physiotherapists working in isolation from medical staff rather than a true power imbalance.

#### 3.4.3 Ongoing Support and Feedback

Receiving feedback from their therapist was important to patients in several studies (Veenhof et al 2006, Medina-Mirapeix et al 2009, Escolar-Reina et al 2010). Medina-Mirapeix et al (2009) identified that patients valued feedback and monitoring on performance, something which many of the intervention based outcome studies provided as part of motivational programmes (Friedrich et al 1998, 2005, Gohner & Schlicht 2006, Basler et al 2007, Vong et al 2011, O'Brien et al 2013). Veenhof et al (2006) found that in adherent patients they reported that they were actively involved in the entire process and that in those who were adherent to their programme, the physiotherapist had taken on a coaching role. Similarly, Escolar-Reina et al (2010) identified several aspects of the care-providers style (physiotherapist) that may influence adherence including giving feedback on performance of exercises to build self-confidence, providing reminders and involving patients in the decision-making process. Karnad & McLean (2011) also concluded that from a physiotherapists' perspective there was an important need to negotiate ownership of self-management with patients and provide education about why home programmes were important.

Escolar-Reina et al (2010) found that all their participants reported that lack of feedback or information about the purpose and goals of exercise related to their condition was a barrier to adherence. Participants felt more motivated when they received an explanation about their clinical condition and were able to justify the treatment. This highlights the need for physiotherapists to

take a person-centred approach to ensure clear understanding and shared goals. This supports earlier work by Veenhof et al (2006) who emphasised the importance of early goal setting and shared decision-making which appears to have a positive impact on an individuals' self-efficacy. This need from some patients for ongoing support and feedback may be why Pisters et al (2011) found significant improvements in adherence in their intervention which included booster sessions with the therapist for up to a year after treatment intervention.

Support from friends and family also played a role with many patients reporting that encouragement and company from family and friends would enhance compliance with exercise programmes (Campbell et al 2001). Escolar-Reina et al (2010) also identified participants who felt they would be more adherent if supported by their family. Physiotherapists must also ensure socioeconomic factors such as cost and loss of income, social norms, family and social support and social opportunity to adhere to exercises are considered when delivering SMPPs (Sluijs et al 1993, Campbell et al 2001, Smith-Forbes et al 2016).

#### 3.4.4 Recall of Information

Sluijs et al (2003) identified forgetting as key factor in adherence. In line with this finding, Medina-Mirapeix et al (2009) and Escolar-Reina et al (2010) identified that patients value reminders in some form to enhance adherence. Escolar-Reina et al (2010) and Peek et al (2016b) found that all their study participants, patients, and physiotherapists respectively, specified that written or printed materials were good reminders and assisted with adherence.

*'If they gave me a personal handout with explanations of the exercises and what I needed to do each day, then seeing this reminded me and I got motivated to do the exercises'* (Escola-Reina et al 2010, pg. 6).

Physiotherapists agreed that communicating programmes effectively was essential for facilitating adherence as programmes can be difficult to understand. Patient education and methods of provision of SMPPs were seen as critical by some physiotherapists (Stickler, 2015). Diversity in the patient population and health literacy gaps may mean some patients do not fully understand or recall their programmes (Karnad & McLean 2010). This highlights the importance of ensuring that patients have the physical and psychological capability to recall and perform programmes independently both in the short and longer term.

#### 3.4.5 Self-efficacy and Motivation to Adhere

Campbell et al (2001) identified that some participants lose motivation as time goes by. They identified two phases; initial compliance, occurring whilst participants were still attending for

physiotherapy treatments and continued compliance, when they had stopped attending physiotherapy (where they were part of an RCT). Campbell et al (2001) found that initial compliance was greater, with participants displaying a sense of loyalty and obligation whilst they were still seeing their physiotherapist for treatment. They also felt motivated in the beginning by being part of the trial and feeling they were 'giving something back'. However, compliance reduced overall in the longer term with only seven out of 20 reporting to be regularly exercising three months later. The authors identified several issues in this latter period as beneficial including having a positive attitude towards exercise and being prepared to incorporate exercises into their everyday life. Barriers included lack of time for exercise, not wanting to exercise alone and lack of perceived benefit (Campbell et al 2001). The patients in this study had OA of the knee which is a chronic, long-term condition which may influence motivation differently compared to acute, transient conditions. Dean et al (2005) suggested that for those with LBP who found time to be a barrier, reframing pain as a normal part of being human re-sets self-management as part of normal activities which does not require separate motivation, time or effort.

Smith-Forbes et al (2016) identified a theme of ambivalence where individuals have contradictory beliefs about carrying out the desired action. This was identified as ambivalence about beliefs in their own illness, and when comparing oneself to others.

*'There is always someone who's worse off than me. It's kind of a realisation; don't kick yourself in the butt because it could be a lot worse.'* (Smith-Forbes et al 2016, pg. 4).

This highlights the issue that often people understand the perceived risks of not performing a certain behaviour or benefits of adhering, yet they choose not to adhere as per the findings in Bassett & Prapavessis (2011). Campbell et al (2001) when asking those with OA of the knee, highlights this point in that patients' decisions to modify or discontinue treatment are often reasoned and rational.

*'I was able to do the exercises pretty easily but they didn't seem to make a lot of difference to me. I carried them on during the programme but have dropped them since'* (Campbell et al 2011).

#### 3.4.6 Symptoms and Perceived Benefit of Treatment

Individuals may be less motivated if they feel their exercises are not having any perceived benefit or exacerbate their symptoms (Campbell et al 2003, Veenhof et al 2006, Escolar-Reina et al 2010, Smith-Forbes et al 2016). This was also supported by physiotherapists' experiences, some of whom felt that educating patients about pain and exercise and the fact that it was not always a harmful experience, was challenging and sometimes frustrating for patients to understand (Karnad & McLean 2011).

*'When they (patients) go home and...find the pain, they say okay I will not continue (the exercises)... Even if I've already explained that (pain perception) to them in detail in the clinic' (Karnad & McLean 2011, pg. 3).*

Some patients reported being motivated to continue even if symptoms are still present (Veenhof et al 2006).

*'Although I experience the same level of pain, I have learned to continue with the activities and I realise that I have achieved more because of that' (Veenhof et al 2006, pg. 275)*

Sluijs et al (1993) found that others stopped exercising if it caused pain. Veenhof et al (2006) and Medina-Mirapeix et al (2009) support this with some individuals feeling demotivated to adhere if they did not experience improvement in their symptoms.

Campbell et al (2001) found that some participants were motivated by increased severity of symptoms or disease, however in contrast others perceived reduced efficacy of exercises as a reason not to adhere. For example, if the cause of OA disease was 'wear and tear', any efforts to exercise would be futile. Smith-Forbes et al (2016) found that many participants anticipated a brief recovery initially but then were motivated as they realised rehabilitation was going to be a lengthy process.

#### 3.4.7 Time Needed and Impact on Lifestyle of Treatment Programme

Patients and physiotherapists both identified time as a significant barrier to adherence to exercises (Campbell et al 2001, Dean et al 2005, Escolar-Reina et al 2010, Karnad & McLean 2011, Smith-Forbes et al 2014) suggesting that programmes can be seen as lengthy and burdensome on everyday living. Sluijs et al (1993) reported that patients mentioned that exercising required too much time, and that exercises were not adjusted to their situation, which are considerable barriers for some patients undergoing SMPPs.

Smith-Forbes et al (2016) highlight that although patients may want to engage in physiotherapy they cannot stop living their lives, for example;

*'If we had an ideal amount of time we could go faster, but...in reality I can't spend all day doing these exercises because I have a life to live' (Smith-Forbes et al 2016, pg. 4).*

However, Campbell et al (2001) highlight that one participant who described time as a barrier also went on to state that

*'it's just excuses, I mean you know you could get up and do it between 6 and 7am or something like that' (Campbell et al 2001, pg. 135).*



Physiotherapists identified that when negotiating realistic plans the time burden of programmes and the complexity of programmes must be considered (Karnad & McLean 2011).

*'You need to negotiate with your patients as to how many exercises they think they can fit in... patients too really do have a busy life...'*(Karnad & McLean 2011, pg. 3)

Complexity of the treatment programme was also identified as an issue affecting adherence from both patients and physiotherapists' perspectives (Campbell et al 2001, Karnad & McLean 2011). Peek et al (2016b) suggested that physiotherapists are aware of this potential complexity of self-management programmes and that they must avoid complexity where possible. Physiotherapists are encouraged to tailor programmes to align with patients' everyday lives, yet complexity was a significant issue for some patients (Campbell et al 2001). Dean et al (2005) explored New Zealander patients' perceptions of undertaking physiotherapy home exercises as part of treatment for LBP and the physiotherapists' experiences of providing them. They described an overarching theme of 'managing time' in relation to adherence. Both physiotherapists and patients found challenges in managing their time, for physiotherapists lack of clinical time was suggested as a barrier to exploring an individual's beliefs and motivations and hence enhancing the likelihood of achieving adherence. Their interpretation suggested that 'lack of time' provides an acceptable excuse for poor adherence considering societies current perception of time as a commodity (Dean et al 2005). The average age of patient participants in this study was 39.5 years and therefore may reflect the time pressures on the working age population compared to older, retired patients where time may be less of a pressure. Patients were also interviewed in the acute stages of treatment and therefore may not be significant in longer term phases of self-management.

Smith-Forbes et al (2016) highlighted the impact of physiotherapy programmes on patients' daily activities, identifying that some individuals felt that they could not stop living because of rehabilitation.

*'I can't spend all day doing these exercises and wearing this stuff because I have a life to live.'*  
(Smith-Forbes et al 2016, pg. 5)

Whilst undergoing rehabilitation, people still need to fulfil work, family and childcare roles, therefore physiotherapists must ensure that physiotherapy appointments and programmes are achievable.

#### 3.4.8 Summary of Qualitative Experience Studies

##### **Methodological limitations**

All the interviews and focus groups studies provided a theoretical framework to underpin the design. Analysis processes were generally well described including ethical clearance, interview and focus

group schedules, piloting phases and data handling. Only one study (Karnad and McLean 2011) provided a reflexivity statement providing insight into the researcher's position and their relationship to the research and context which is considered essential in establishing trustworthiness (Dodgson 2019). Two studies referred to using member checking to establish the interpretation of findings (Medina-Mirapeix et al 2009, Smith-Forbes et al 2016). Four studies did not describe the numbers of researchers involved in the analysis processes (Sluijs et al 1991, Dean et al 2005, Stickler 2015, Peek et al 2016b). Studies failed to contextualise the background of the researchers and their role as insiders or outsiders in the research which will influence the construction of meaning from the data (Maharaj, 2016).

### **Relevance**

Although all the studies reviewed related to the management of patients with MSK disorders in the physiotherapy out-patients setting, eight were carried out outside the UK where health systems vary and patients' experiences, beliefs and expectations may be different (Hiller et al 2012, Ingleby et al 2015). The aims of the studies were pertinent to understanding barriers and facilitators to adherence in daily life and how patients and physiotherapists experience providing and undertaking home programmes. There is also little reference in any studies to the diversity of the views reflected in the studies. Almost all the studies reviewed were restricted to English (or the country's native language) speaking patients which highlights an issue in how representative the findings are for those from diverse communities and groups with protected characteristics that access physiotherapy in the UK. Selection bias and barriers to accessing research must also be considered as a limitation (Rockcliffe et al 2020).

### **Coherence**

Themes were generally complimentary and built an emerging coherent picture across the studies. These included barriers and facilitators; the patient therapist relationship, the role of on-going support and feedback, recall of information, self-efficacy and motivation to adhere, severity of symptoms, time and impact on lifestyle. From the literature reviewed it is evident that there is much synergy between physiotherapists' and patients' perspectives of adherence. Many common issues are raised across different qualitative studies despite them including a diverse range of participants across ages, geographical locations and with both chronic and acute MSK conditions. Quotes from patients build a picture of coherent themes regarding barriers and facilitators of adherence from patients across the world. Some themes did suggest contradictory issues such as the role of pain in patients' motivation to adhere to self-management programmes (Campbell et al 2001, Veenhof et al

2006, Medina-Mirapeix et al 2009) or time available to physiotherapists to support adherence behaviours (Dean et al 2005, Peek et al 2016). However, the identification of these themes are consistent but whether the factor acts as a facilitator or barrier may vary. This highlights the personal and complex nature of adherence and motivation and why an individualised approach to increasing adherence may be considered necessary (WHO 2003, West et al 2009). Adherence issues may also change over time and no one issue remains constant during a patient's lifetime or duration of their disease or condition (Sluijs et al 1993, Campbell et al 2001).

### **Adequacy of data**

Ten studies were identified. Samples sizes were small, but this is in keeping with qualitative methodologies (Green & Thorogood 2014). The qualitative studies generally used appropriate methods to address their research aims although these were sometimes broad and unlikely to be fulfilled with their scope and size of studies. For example, Karnad & McLean (2011) set out to explore 'UK physiotherapists views' but only interviewed 5 physiotherapists (one who was no longer practising) recruited from a single university setting where it is unknown how many hours they spent in clinical practice. Although they do acknowledge and discuss the challenge of rigour in qualitative work the implication of the work is inherently limited, and extreme caution must be made in extrapolating findings to be representative of 'UK physiotherapists'. The totality of work exploring physiotherapists' views is small overall which limits the adequacy of data from low to moderate.

Regarding patient experiences, two of the studies appeared to originate from the same study and participant group as they shared the same location, characteristics and authors but this was not overtly described (Medina-Mirapeix et al 2009, Escolar-Reina et al 2010). Therefore, although it appears that 68 patients have been included in two studies, it was likely the same 34 patient voices are represented in both studies; albeit with a different focus, but which limits the range and richness of the synthesised data.

Overall, seven studies evaluating patients experiences of adherence were reviewed which explored the views of 76 patients in interviews and focus groups in Europe and Australasia. The age of the literature is notable as significant advances in technology and societal changes mean that way physiotherapy care is delivered and experienced, as well as individuals' circumstances such as time available may have altered. Caution must be used in attempting to establish the trustworthiness and adequacy of qualitative data through quantitative accounting and translation of findings. The aim of qualitative research is to explore the phenomena of adherence within a specific context and is not necessarily intended to be extrapolated to wider populations (Denzin & Lincoln 2005). Qualitative

studies cannot indicate a cause and effect relationship for adherence but they do offer a rich insight into the patients' perspectives on facilitating adherence which must be central to the design or implementation of any study designed to facilitate improved adherence within physiotherapy (Green and Thorogood 2014).

### **3.5 Synthesis of Quantitative and Qualitative Study Findings**

Thirty-nine papers were included in this review that varied in design and quality: 24 quantitative, 11 qualitative and four review papers. Methodological limitations were evident across a number of studies and therefore caution must be applied when extrapolating findings. The combined information provided a varied and rich pool of information to inform adherence to SMPPs.

Participants varied in age and their MSK conditions revealing a heterogeneous population, although one which reflects the diversity of patients seen in daily MSK physiotherapy practice. SMPPs within the studies were not always well described and varied greatly in content and dosage. The content of 'real-world' physiotherapy consultations is not fully known. This could be a factor influencing adherence as individuals may not be able to remember and act on all the information given to them. This was supported by some patient experiences. Reported adherence rates to MSK out-patient SMPPs vary from 33-93%, however caution must be used when comparing figures which are subject to various self-report measures across heterogeneous participant populations.

Many barriers and predictors of adherence were identified including patient, physiotherapist, treatment and social factors which supports the notion that adherence is complex and multifaceted (WHO 2003). These barriers and predictors were identified from cross sectional observational cohort studies and qualitative papers, which evaluated both patients' and physiotherapists' experiences of adherence at a single point in time. Barriers and predictors were common both between studies and between therapists and patients' experiences. Factors varied depending on the individual's circumstances which suggests that reasons for adherence are different for individuals and may change over time. Key facilitators identified were the development of a positive therapeutic relationship, support and feedback for the patient, social support, understanding the reasons for doing the programmes and having positive treatment efficacy beliefs. Recurrent barriers were time, lack of motivation, forgetting, and disability. Interestingly, pain seemed to act as both, for some it was motivating when they knew symptoms would persist (Smith-Forbes 2016) for others when faced with a longstanding condition were less inclined to continue (Sluijs et al 1993).

The use of multi-faceted motivational interventions does not appear to increase adherence in MSK out-patient physiotherapy settings although there is some evidence to support the use of psychologist delivered and supported interventions for those with chronic LBP (Gohner & Sclicht

2006, Vong et al 2008). This is in keeping with other reviews (McLean et al 2010, Peek et al 2016b). Findings presented here are contradictory to those by McGrane et al (2015) who concluded that motivational interventions can help increase adherence to exercise, improve self-efficacy and have a positive effect on long-term exercise behaviour. This could indicate that there are specific issues relating to MSK out-patient populations that do not respond to motivational interventions in the same way as other areas and hence different approaches are necessary in this setting. Alternatively, this could be explained by adherence requiring a multifaceted approach. Studies that reviewed motivation and behavioural interventions were varied and often lacked explanatory detail of content. This makes it difficult to establish which elements of these programmes may have resulted in the outcomes seen.

Goal setting or action and coping plans also do not produce significant improvements in adherence to home programmes although further research is needed in well-designed RCT's. A behavioural graded exercise programme with booster sessions appears to have positive effects on adherence (Pisters et al 2011). The booster sessions may have worked by providing feedback and support to the patient, thus building self-efficacy or alternatively may have helped bridge the intention-behaviour gap (Sniehotta et al 2005a). Self-efficacy is a key factor in adherence (Rhodes & Fiala 2009). Studies using motivational or behavioural interventions did not demonstrate improvement in self-efficacy. Coping planning and positive reinforcement may help increase self-efficacy and adherence (Gohner & Sclight 2006). Interestingly, the patient experience literature did not identify self-efficacy as a key issue.

Providing written instructions for exercises as part of SMPPs appears to enhance adherence compared to verbal instruction alone. However, video or audiotape instruction does not further enhance adherence in older people. Patients' experiences suggested that some individuals value written instructions and reminders. Further research is needed in this area to fully explore the method of exercise instruction and adherence, particularly considering technological advances (Peek et al 2016b).

Adherence behaviours are multidimensional and complex which makes designing, measuring, and evaluating the effects of adherence interventions difficult. It has been suggested that it is not an 'all or nothing concept' and that the thresholds for optimal adherence and outcomes needs to be established (Campbell et al 2001, Bailey et al 2020). Adherence measurements are ad hoc and lack a well-defined construct. They are also subject to bias through self-reporting (Hall et al 2015). More rigorous adherence measurement methods and study methodologies need developing so adherence can be properly evaluated and appropriate interventions developed, although it is acknowledged

that measuring actual behaviour in an accurate way that is acceptable to individuals is challenging (McLean et al 2009, Bollen et al 2014, Peek et al 2016a).

### **3.6 Update of literature since review was completed (Jan 2017-present)**

Since the initial literature review was undertaken from August 2016 to December 2016, further literature relating to adherence in MSK self-management has been published. The literature identified is outlined in Table 3.4 and described in further detail in Appendix one. This research includes five randomised controlled trials (RCTs) (Lonsdale et al 2017, Bennell et al 2017, Chen et al 2017, Lambert et al 2017, Bennell et al 2020), two cohort studies (Peek et al 2017, Noon et al 2019), four qualitative studies (Meade et al 2019, Rizzo & Bell 2019, Moore 2020, Hall et al 2020a) and two systematic reviews (Nicolson et al 2017, Bunting et al 2020). These additional papers are summarised in Appendix one.

In recent years adherence intervention studies have seen a distinct shift towards digital interventions including motivational SMS messages (Chen et al 2017, Bennell et al 2020), internet based interactive programmes (Bennell et al 2017), gamification (Steiner et al 2020) and apps or web-based interventions (Lambert et al 2017, Lee et al 2017). Several of these are aimed at supporting physiotherapists to be able deliver and support a more personalised approach to behaviour change rather than a one size fits all approach (Bennell et al 2017, Bennell et al 2020). Many studies evaluating the use of digital interventions and Apps are also methodologically weak (Bunting et al 2020). This includes an RCT which only used a home exercise programme and measured adherence in the intervention group thus making comparison impossible (Lee et al 2017). Two studies suggest that the use of semi-personalised, motivational SMS messages support increased self-reported adherence (Chen et al 2017, Bennell et al 2020) however, there are limitations with only short term follow up (Chen et al 2017) and potential adherence reporting bias (Bennell et al 2020). The use of a home exercise programmes provided via an app was valued by participants in Australia and reported higher rates of adherence and functional improvement than printed information, but this was not clinically significant (Lambert et al 2017). A systematic review and meta-analysis of digital interventions to increase adherence in those with chronic MSK disorders highlighted that non-homogenous data limited meta-analysis (Bunting et al 2020). They concluded that two comparable studies using digital interventions produced no significant increase in adherence. Three studies in their narrative review claimed to increase adherence but lack of control data make this difficult. Lack of clarity around adherence thresholds and self-report measurement continue to be problematic in adherence studies (Bennell et al 2017). Future high quality studies

with standardised approaches to adherence measurement are required (Nelligan et al 2019, Bennell et al 2020).

A single cohort study (Noon et al 2017) used case reviews (n=3) and a questionnaire survey (n=64) to record adherence and barriers for patients with LBP. The aim was to explore gender differences and adherence. The authors concluded there were no differences in gender and adherence but that time and health were more significant factors. This study was of poor methodological quality including a small sample size, the use of case reviews and a shift in eligibility criteria mid-way through to include the wider community and not those attending physiotherapy (Noon et al 2019). Findings should be interpreted with caution.

Themes emerging from the qualitative studies build on the themes identified within the earlier review. These included the importance of the therapeutic relationship (Meade et al 2019, Rizzo & bell 2019, Moore 2020, Hall et al 2020a), time (Meade et al 2019, Moore 2020), the support and influence of others (Meade et al 2019, Rizzo & bell 2019, Moore 2020, Hall et al 2020a) and the influence of, and beliefs about symptoms and response (Meade et al 2019, Rizzo & bell 2019, Moore 2020, Hall et al 2020a).

The therapeutic relationship has continued to gain credence as an influential factor in adherence (Meade et al 2019, Rizzo & bell 2019, Moore 2020, Hall et al 2020a). Although Rizzo and Bell (2019) did not refer to this as the therapeutic alliance they described the role of social support. This included the patients feeling that the physiotherapists constant monitoring facilitated them to keep on with the therapy illustrating the role of ongoing support and feedback. Moore (2020) when exploring patients' experiences of undertaking physiotherapy-led physical activity within a RCT (Foster et al 2014), identified key themes relating to change in knowledge, therapeutic alliance, time, and place (environment) and support and supervision emerged.

Ongoing support and feedback were also valued by patients in these more recent studies (Meade et al 2019, Rizzo & Bell 2019, Moore 2020, Hall et al 2020a). Hall et al (2020a) identified that positively worded feedback was considered by both physiotherapists and patients to be a way in which patients' competence was developed. Physiotherapists in this study also identified that verifying progress and giving assurance was also a valuable tool in building patients' competence and self-efficacy. Moore (2020), studying those with knee pain following participation in an exercise intervention trial, identified support and supervision as a theme. Patients particularly noted the support of family and friends but also others in the community such as local gym instructors in adhering to exercise in the longer term. The themes of support and feedback and social support are

interrelated as often it is those close to patients such as family and friends who provide support and motivation for individuals to continue (Meade et al 2019). Rizzo and Bell (2019) took a slightly different approach interviewing individuals initially in respect of a behavioural change they had made in their daily routine, followed by an interview which compared this with the experience of undertaking a series of at least five physical therapy sessions and a home exercise programme. They explored mental models and how previous experiences of other behaviour change influence and compare with adhere to SMPP adherence.

Hall et al (2020a) used the social determination theory (SDT) as the basis for their study to explore competence, autonomy and relatedness which are considered the basic psychological needs to underpin an individual’s motivations (see chapter 4 for a fuller explanation of SDT theory). Hall et al (2020a) report the physiotherapist’s views on the importance of educating patients about their SMPP and ensuring they are competent. Moore (2020) also observed that patients noted variability on the supervision, individualisation and progression of exercise programmes which are key in building capability and competence. Hall et al (2020a) reported the need for patients to feel challenged and programmes to meet their patients’ ability and link to salient goals. Meade et al (2019) develop this further discussing the need for patients to feel that exercise prescription is tailored and that they are considered as an individual.

Nicolson et al (2017) undertook a review of interventions to increase adherence in those with CLBP and or OA of the knee or hip and again found insufficient evidence to draw any significant conclusions. Two additional physiotherapy led booster sessions added at the end of a programme at 8- and 16-week intervals did show some potential benefit (Bennell et al 2014a). It is important to consider that a caseload in a routine MSK out-patients physiotherapy clinic is likely to be mixed with a range of individuals with varying conditions and chronicity and therefore a personalised approach is likely to be needed

Study/ Type	Quantitative literature			Patients Experience literature	
	RCT	Systematic Review	Cohort studies	Qualitative exploratory (physiotherapists)	Qualitative exploratory (patients)
Bennell et al (2017)	x				
Lonsdale et al (2017)	x				
Chen et al (2017)	x				
Lambert et al (2017)	x				



Bennell et al (2020)	x				
Noon et al 2019			x		
Nicholson et al (2020)		X			
Bunting et al (2020)		X			
Meade et al 2019)				X	x
Rizzo and Bell (2019)				X	x
Hall et al (2020)					x
Moore et al (2020)					x

**Table 3.4 Table of studies identified since the original literature review**

### **3.7 Summary**

Interventions designed to increase adherence to physiotherapy SMPPs are varied and no single intervention has been shown to significantly improve adherence rates in patients seen in the MSK out-patient physiotherapy setting. Difficulties in designing and evaluating interventions include patient heterogeneity, a lack of underpinning theory, difficulties establishing adherence thresholds, treatment fidelity and adherence measurement bias. Physiotherapists and patients have identified multiple barriers and facilitators to adherence in cross sectional studies. However, there are no studies evaluating how SMPPs are provided and experienced by patients longitudinally during their physiotherapy rehabilitation. The volume, dosage and content of home programmes also needs to be better understood so it is clear what patients are being asked to do and what constitutes ‘adherence’.

A plethora of health behaviour theories have been developed to explain health behaviours and some have been applied in physiotherapy MSK out-patients setting. Often there is no clear rationale for their selection. There are several psychological health behaviour theories (HBT) that could inform a study exploring the provision of and adherence to SMPPs in practice. The next chapter will review pertinent health behaviour theories and outline the rationale for the theoretical framework which underpins this study.

## CHAPTER FOUR - IDENTIFYING A THEORETICAL FRAMEWORK; A REVIEW OF HEALTH BEHAVIOUR THEORIES

### 4.1 Introduction

The previous chapter explored the current literature which evaluates adherence to SMPPs in MSK out-patient physiotherapy.

*'If adherence to prescribed home programmes is to be increased, adherence behaviour must be understood.'* (Sirur et al 2009, pg. 69)

Explanations of adherence take the form of theories. This chapter considers relevant health behaviour theories (HBT) which could be used to provide a framework to explore SMPPs as well as explore mediators of patients' adherence behaviours. Key HBT are presented before discussing the behaviour change wheel (BCW), COM-B model and theoretical domains framework (TDF) which were used to underpin the study design and evaluation. At the end of the chapter the aims and objectives of the study are presented. A full review and evaluation of HBT is beyond the scope of this chapter and the reader is referred to specialist texts for further detail.

### 4.2 Health Behaviour Theory

HBT has been applied across healthcare practice (Munro et al 2007, Rejeski et al 2019). When designing complex interventions there are calls for the use of appropriate theory and evidence to inform the development of an intervention (National Institute Clinical Excellence (NICE) 2007, Craig et al 2008, O'Caithain et al 2019) including home physiotherapy interventions (Sirur et al 2009). Application of HBT to MSK physiotherapy is limited and it can be questioned as to whether physiotherapists are maximising opportunities to utilise HBT to influence patients' behaviours effectively (Heaney et al 2012, McGrane et al 2014). Physiotherapy professional standards clearly outline that physiotherapists should;

*'Understand the following aspects of behavioural science: – psychological, social and cultural factors that influence an individual in health and illness, including their responses to the management of their health status and related physiotherapy interventions...'* (HCPC 2013, Standard 13.9)

Various theories and models attempt to explain individuals' health behaviours and could be used to explore SMPP adherence behaviours (Sirur et al 2009). These include social cognitive models, such as the health beliefs model (Rosenstock 1974), the theory of reasoned action (Ajzen & Fishbein 1980) and theory of planned behaviour (Ajzen 1985), protection motivation theory (Rogers 1975, Taylor & May 1993, Grindley et al 2008, Plotnikoff and Trinh 2010, Bassett and Prapavessis 2011), the health action process approach (Schwarzer 2008), social cognitive-theory (Bandura 1997a, 1997b) and self-

determination theory (SDT) (Ryan et al 2008). Stage models include the trans-theoretical model (Prochaska and DiClemente 1983, Adam and White 2001, Coulson et al 2016). This plethora of models have come under scrutiny with some being flawed for their processes (Sniehotta et al 2014) and lack of consideration of wider influencing factors such as an individuals' unconscious influences and habits (Sheeran et al 2013, Coulson et al 2016). Stage models such as the TTM have also been criticised; a greater understanding of the drivers which move individuals through the stages is needed and there are also difficulties in accurately classifying individuals according to stage (Andre and Agbangla 2020). There has also been a call for greater evaluation and comparative studies evaluating of the application of TTM within physical activity behaviours (Adam and White 2001, Coulson et al 2016).

More recently a synthesis of HBT theories has resulted in an integrated model known as the behaviour change wheel (BCW) (Michie et al 2011a). The BCW is underpinned by the theoretical domains framework (TDF) (Cane et al 2012) and the COM-B model (Michie et al 2011a).

#### 4.2.1 Intention Behaviour Gap and Self-Efficacy

Several models including the health belief model, theory of planned behaviour and protection motivation theories, suggest that an individual's intention to change is the best predictor of their actual behaviour (Schwarzer 2008). It is suggested that increased knowledge and understanding of the benefits of an intervention may result in increased adherence (Medina-Mirapeix et al 2009, Escolar-Reina et al 2010) although education alone is often insufficient to drive behaviour change (Kelly & Barker 2016). Improved cognition of the perceived threats and benefits of behaviours and increased self-efficacy may lead to positive behavioural intentions but what a person intends to do and what they actually do are, in fact, often different. This difference in behaviour is often referred to as the behaviour-intention gap (Sniehotta et al 2005a).

Sniehotta et al (2005) concluded that models to enhance behavioural intentions in relation to physical activity promotion in patients with coronary heart disease, were not sufficient to result in behavioural change. They concluded that the focus should shift to improving behavioural intenders' action planning, self-efficacy and action control skills. Schwarzer (2008) proposed the health action process approach model as a mechanism to implement action planning, self-efficacy and action control skills and help bridge this behaviour-intention gap. In physiotherapy this could involve keeping exercise/ participation diaries, anticipation and planning to overcome perceived barriers as well as goal setting (Veenhof et al 2006, Clark and Bassett 2014, Basset 2015).

Self-efficacy refers to a person's confidence or belief in their ability to successfully perform a behaviour (Bandura 1977b). Self-efficacy has been the subject of much research and is considered to be a key element in achieving behaviour change (Bandura 1997a, Basset 2015). A self-efficacy type construct now resides in almost all psychological health behaviour models (Rhodes & Fiala 2009, Sirur et al 2009). Self-efficacy is at the heart of Bandura's social cognitive theory which emphasises how cognitive, behavioural, personal, and environmental factors dynamically interact to determine motivation and behaviour (1997a). The social cognitive theory offers opportunities for improving efficacy beliefs, self-regulation, minimising external barriers, and increasing positive outcome expectancies, as well as modelling the interplay between underlying transient biological states (Rejeski & Fanning 2019).

Five of the studies reviewed in the literature review (see Chapter 3) included self-efficacy measures in some form (Gohner & Slicht 2006, O'Brien et al 2013, Basset & Prapavessis 2011, Vong et al 2011, Clark & Bassett 2014). All of these studies used motivational based interventions which aimed to influence self-efficacy. Basler et al (2007) and Pisters et al (2010) both aimed to influence self-efficacy through their interventions but did not measure this.

Despite this focus on self-efficacy as a key mediator within adherence behaviours, evidence of its effects are weak (Basset and Prapavessis 2011, O'Brien et al 2013). O'Brien et al (2013) measured task, maintenance and recovery self-efficacy. Self-efficacy was included as an outcome measure because action and coping plans are aimed at improving self-efficacy and building confidence in one's ability to perform the recommended programme (Sniehotta et al 2005). Interestingly O'Brien et al (2013) found no significant differences in self-efficacy, either within groups or between groups. Bassett & Prapavessis (2011) found a similar result when measuring self-efficacy after their protection motivation theory intervention with no significant difference in self-efficacy found. Both O'Brien et al (2013) and Basset and Prapavessis (2011) failed to increase self-efficacy beliefs and also adherence was not significantly improved. In contrast, Clark & Basset (2014) in their cohort study, found a significant correlation between increased self-efficacy and intentions to adhere, although there was no control group. In contrast, self-efficacy was not identified as a mediator of adherence in qualitative studies. This raises questions about the complexities of how individuals perceive and report self-efficacy and the measurement of self-efficacy in practice. The COM-B model (Michie et al 2011, Cane et al 2012) incorporates self-efficacy as a construct within the capability component however, this is only one of many constructs likely to influence behaviours and focusing on this in isolation is unlikely to result in a sound understanding of behaviour change.

Motivation is also an important concept within human behaviour and adherence. Self-Determination theory (SDT) is an important theory of motivation that addresses issues of extrinsic and intrinsic motivation (Ryan and Deci 2000) (See Figure 4.6). The theory is based on the premise that individuals have innate psychological needs: competence, relatedness and autonomy (Ryan and Deci 2000) and it has been proposed as a the framework for an intervention to increase adherence in physiotherapy MSK settings (Picha and Howell 2018). When promoting exercise for example, using a motivational instruction style that addresses' individuals' basic psychological needs for autonomy (i.e. a sense of choice and ownership over one's own behaviour), competence (i.e., clear instructions, information, practice and feedback and self-efficacy) and relatedness (interpersonal skill and building of the therapeutic relationship and peer support) this will enhance intrinsic motivation and longevity of the engagement (Ng et al 2018). In contrast the model suggests that motivations driven by extrinsic factors, such as guilt and coercion, are likely to thwart motivation and are associated with reduced behaviour change (Rejeski and Fanning et al 2019). These further constructs highlight that behaviour change is complex and are influenced by many factors all of which need to be addressed and considered when supporting behaviour change (Michie et al 2011).

#### **4.3 A New Direction for Health Behaviour Theory**

Despite the proliferation in health behaviour theories much work in health subjects remains absent of any theoretical constructs. Noar and Zimmerman (2005) examined the progress of health behaviour theory research and questioned whether the proliferation in theories was in fact progressing our understanding of health behaviours. They postulated various directions for health behaviour research, including the possibility of more research which compares health behaviour theories to better understand their strengths and weaknesses. Several authors have also called for models demonstrating insufficient efficacy to be withdrawn (Ogden 2003, Sniehotta et al 2014). Rejeski & Fanning (2019) discuss some of the limitations of the existing models highlighting how health behaviour models are too static and reliance on conscious processes when, in fact, behaviour is highly dynamic and 'in the moment process'. Emerging digital tools which give 'in the moment' feedback may be pivotal in changing health behaviours.

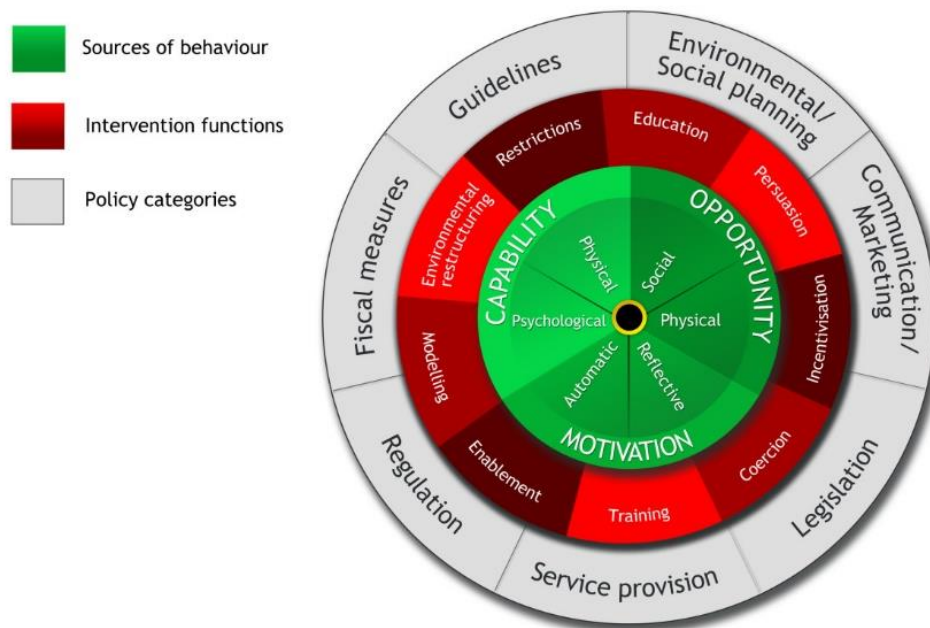
Noar and Zinnerman (2005) also questioned whether integration of health behaviour theories could be possible but feared that lack of agreements between health psychologists and researchers would be likely to prevail. In an attempt to integrate HBT, Fishbein (2001) worked with colleagues to agree similarities and differences between theories but this was not fully resolved and work undertaken was published for a psychologist readership (Noar and Zimmerman 2005). Michie et al (2004) called for a 'clarification and simplification' of the numerous behavioural change models and interventions

described which is illustrated by the varied application of models in the physiotherapy literature. Michie et al (2011a) suggested that the future of implementation research would likely be enhanced by psychological explanations rather than models that simply predict behaviour. Michie et al (2011a) outlined that none of the single HBT encompassed all of the components identified in their synthesis. The key objective of Michie et al's (2011a) work was to simplify psychological theory relevant to behaviour change for use by all parties involved in evidence based medicine implementation. This integration work was developed further to inform the development of the behaviour change wheel (BCW) (Michie et al 2011a) and theoretical domains framework (TDF) (Cane et al 2012).

#### **4.4 The Behaviour Change Wheel (BCW), COM-B and Theoretical Domains Framework (TDF)**

Michie et al (2011a) published the behaviour change wheel (BCW); a new framework for characterising and designing behaviour change interventions (see figure 4.1). This tool was designed to allow a range of professionals to analyse a target behaviour and identify causal areas to inform the selection of appropriate intervention functions (Michie et al 2011a). The COM-B model (C-Capability, O-opportunity and M-motivation, B-behaviour) sits at the centre of the BCW which is designed to support a behavioural analysis and diagnosis. Once a behavioural diagnosis is made, the next layer (intervention functions) outline possible interventions which may be applied to facilitate the required behaviour change. The outer grey layer comprises of wider policy-based changes which may also be required to facilitate change at population level. The model can be used to support behavioural change from individual to population level (Michie et al 2011a). Michie et al (2011a) propose that creating this comprehensive evidence-based model, promotes standardisation, rigorous, systematic evaluation and research and accessibility to HBT across disciplines.

The BCW was developed following a systematic review of 19 frameworks for classifying behaviour change, and from this the nine intervention functions and seven policy categories were discerned. Michie et al (2011a) describe a robust methodology for the development of the BCW involving three steps: a systematic literature review and evaluation of existing behaviour change intervention frameworks, development of a new framework, and a test of the reliability of the new framework. The BCW authors acknowledged the challenge in defining terminology and ensuring the behavioural and intervention components captured all the relevant meanings without omissions. The suitability of the model for evaluating all areas of behaviour change is a potential limitation of this model (Michie et al 2014). Michie et al (2011a) acknowledge that the BCW and COM-B is a starting point and evaluation in practice will lead to refinement.

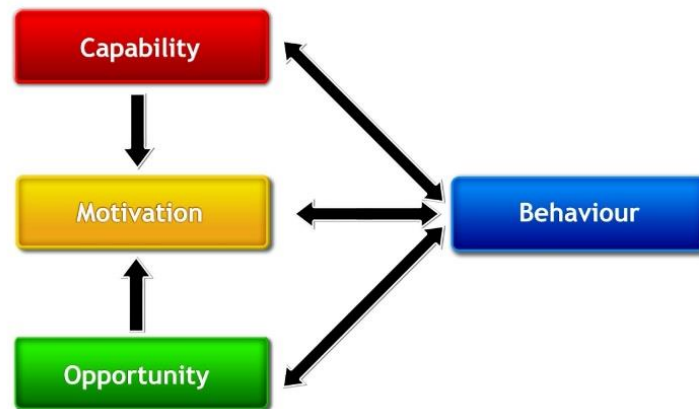


**Figure 4.1 - Behaviour Change Wheel (Michie et al 2011a).**

#### 4.4.1 Behavioural Diagnosis and the COM-B Model

Behavioural interventions to increase adherence to SMPPs are varied and often lack a clear rationale or theoretical base (Kunstler et al 2019, Willett et al 2019). Michie et al (2011a) argue that interventions are all too often designed and implemented without necessary evaluation of why the desired behaviour is, or is not, happening. Michie et al (2011a) refer to this required process as the behavioural diagnosis and suggest this should be the starting point for all behavioural intervention design.

The COM-B model, states that for an individual to perform a behaviour they require the capability (physical and psychological), opportunity (physical and social) and the motivation (automatic and reflective) (Michie et al 2014) (see figure 4.2). This concept was developed based on two principles; the first from a meeting of US behavioural theorists in 1991 which agreed that three factors were necessary to perform a certain behaviour; namely, the skill, a strong intention and no environmental constraints that prevent it. Secondly they adopted a principle of US criminal law that states, for an individual to be found guilty of a crime, they must prove they had the capability, opportunity and motive (Michie et al 2011a). This model is intended to place no specific priority on an individual, group or environmental perspective and components can, and are likely to, influence each other.



**Figure 4.2 - COM-B Model taken from Michie et al (2011a).**

Thus in MSK physiotherapy practice if physiotherapists are asking patients to perform a new behaviour (i.e. exercises within an SMPP) patients must have the capability (understanding, recall and be able to practically complete the exercises independently), the opportunity (physical space, equipment, time, social support) and the motivation (reflective –perceived positive benefits, self-efficacy; automatic-desire, overcome inhibitive habits).

The models and interventions that have been described in the physiotherapy literature have addressed only certain aspects of these three domains (Friedrich et al 1998 and 2005, Gohner & Schlicht 2006, Basler et al 2007, Vong et al 2011). For example, the physiotherapist may aim to improve adherence by addressing a patients’ psychological and physical capability by practising the exercises and providing a written information sheet (Schoo et al 2005) but is unlikely to benefit if the individual does not believe the intervention is likely to bring positive change.

Michie et al (2011a) argue that the main difference of this type of model, compared to predominantly socio-cognitive theories, is the consideration of both reflective and automatic motivation, the latter including processes such as habit, impulse and emotions. Many socio-cognitive models focus on systematic cognitive processes (Rejeski & Fanning 2019), whereas automatic processes central to motivation are at the heart of the COM-B model (Michie et al 2011a, West and Michie 2018).

#### 4.4.2 The Theoretical Domains Framework

In the study by Michie et al (2005), three groups of experts (health psychology theorists, health service researchers and health psychologists) carried out a series of tasks to identify, simplify, evaluate and validate the importance of theoretical domains underpinning health behaviour theories. This resulted in the initial theoretical domains framework (TDF) which included twelve



domains to explain behaviour change with 128 explanatory constructs. Cane et al (2012) validated and refined the TDF further using a three-step validation process using closed and open sorting methodology. This resulted in a refined framework of 14 domains with 84 component constructs that has added further empirical support for its use across implementation science and behaviour change (Cane et al 2012).

Cane et al (2012) mapped the TDF domains to the COM-B model (see table 4.1 and figure 4.3). Using the COM-B model to make a behavioural diagnosis then allows the identification of the underpinning TDF domains that are likely to be important in bringing about the target behaviour. This means designers can be selective about the domains they investigate to inform the nature of the interventions based on the behavioural diagnosis.

<b>Mapping of the Behaviour Change Wheel's COM-B system to the TDF Domains</b>		
<b>COM-B component</b>	<b>TDF Domain</b>	
Capability	Psychological	Knowledge  Skills  Memory, Attention and Decision Processes  Behavioural Regulation
	Physical	Skills
Opportunity	Social	Social Influences
	Physical	Environmental Context and Resources
Motivation	Reflective	Social/Professional Role & Identity  Beliefs about Capabilities  Optimism  Beliefs about Consequences  Intentions  Goals
	Automatic	Social/Professional Role & Identity  Optimism  Reinforcement  Emotion

**Table 4.1 - Taken from Cane *et al.* (2012) Mapping of TDF domains to the COM-B Model.**



**Figure 4.3 - Mapping of TDF domains against the COM-B categories.**

The COM-B model and TDF have been used to explore a range of both healthcare professional and patients' behaviours in a range of settings. These include implementation of guidelines for LBP management (McKenzie et al 2010, French et al 2012), implementation of smoking cessation advice in midwifery care (Beenstock et al 2012) and the implementation of children's health checks in Australia (Alexander et al 2014). At commencement of the study no studies had used the TDF and COM-B model to explore physiotherapists or patients' behaviours in relation to adherence. More recently these models have also been used to evaluate patient behaviours including barriers and enablers to physical activity participation in overweight and obese pregnant women (Flannery et al 2018) and physical activity participation in those living with HIV (Quigley et al 2019). Also, the TDF has recently been used to explore the behaviour change interventions from both caregivers and patients' perspectives to support increased activity levels in stroke survivors (Hall et al 2020b).

French et al (2010) proposed a four-step approach to designing successful behavioural interventions;

1. Identifying who needs to do what differently
2. Assessing the problem using a theoretical framework, to identify which barriers and enablers need to be addressed

3. Considering which intervention components could overcome the modifiable barriers and enhance the enablers
4. Evaluating the selected intervention

Using this approach when considering patients' adherence behaviours, means step one is to establish the detail of the target behaviour (step one; 'what needs to be done and by whom). This relates to exploring the specific detail of the patients target behaviour; SMPP including content and dosage. Step two requires the identification of barriers and enablers to adherence which requires a dynamic exploration of how patients experience undertaking a SMPP and their subsequent adherence. Understanding these elements over time will then form a basis for future work to consider interventions design and evaluation (steps 3 and 4) (French et al 2010).

The COM-B and TDF provides a suitable research design structure to meet the study's objectives as per previous studies which have used the frameworks to explore exercise related behaviours (Patey et al 2012, Connell et al 2015, Quigley et al 2019, Ellis et al 2019, Hall et al 2020b). French et al (2010) took this approach and concluded that this evaluation has resulted in a flexible process which could be applied across different settings. In MSK physiotherapy practice, much focus has been on changing the behaviour of the patient, in terms of them completing a home-based exercise programme or increasing their physical activity levels. However, it may be prudent to understand who and what behaviours needs to happen, and what barriers and enablers need to be addressed to enable the behaviour (steps 1 and 2) and only then design interventions to facilitate optimal patient adherence and patient outcomes (French et al 2010).

It could be argued that the COM-B model is not based on any sound empirical evidence any more than other psychological health behaviour models that have been discussed, and it attempts to over systemise health behaviours (Ogden 2016). However, it is a model which needs testing and evaluating in practice (Michie et al 2011a). It is potentially very appealing to MSK physiotherapy as it is broad yet simplistic in its psychological terminology making it very practical. It can be applied to a range of contexts and behaviours which is likely to appeal to physiotherapists for similar reasons that the transtheoretical model is popular. It also sits within a much wider framework of evidence-based theory of designing interventions and behaviour change taxonomy. Sluijs and Knibbe (1991) theorised that two key issues arose regarding non-compliance, the first is that current theories only partly explain non-compliance (adherence) and secondly, that health care providers do not always implement best practice identified from research. Considerable time has passed since this work and much behaviour change literature has been published, however these issues are still relevant and could potentially be addressed by the BCW and COM-B model.

#### **4.5 Summary**

There is a plethora of health behaviour theories, many of which could be applied to describe adherence behaviours to SMPPs. Despite this, many of the current studies apply a single behavioural intervention (e.g. goal setting or motivational interviewing) or theoretical approach (CBT) without a theoretical basis. HBT are often limited and do not provide the clinician with a specific approach to understanding what issues are relevant in driving and facilitating each individual's behaviour. The COM-B model, supported by the TDF, provides an inclusive framework based on a synthesis of HBT. It can be used to diagnose a specific behavioural problem in a specific setting (i.e. adherence to SMPPs in MSK out-patient physiotherapy setting) and identify the underpinning psychological constructs which are driving the target behaviours (adherence to SMPPs). Understanding the specific factors influencing adherence over a period of time can then potentially inform the design and development of personalised, evidence-based, interventions that are practical and effective, and that can be measured and modified (Beinart et al 2013).

#### **4.6 Rationale for Study**

Despite several studies investigating interventions to improve adherence there are mixed results in adherence outcomes. This suggests that one intervention does not suit all patients. This is important as a physiotherapist will see a range of patients within a daily physiotherapy clinic and adherence interventions need to be developed that can be modified and tailored to each individual patient.

Almost 30 years ago, Sluijs et al (1991) suggested that physiotherapists must explore the problems each patient experiences rather than assuming they know the reasons and subsequent intervention required to increase adherence. This was echoed by Veenhof et al (2006) who suggested that identification of subgroups is needed to effectively match adherence enhancing interventions with the clinical presentation. Not all factors identified as affecting adherence will be relevant for all individuals. The findings of this literature review in chapter three support these ideas.

HBT identifies a range of factors that influence and drive behaviour, including both intrinsically and extrinsically, which will vary between individuals. Campbell et al (2003) highlight that adherence is a reasoned and rationalised process and individuals can decide to continue or discontinue treatment accordingly. Sluijs et al (1993) previously outlined this issue as the differences between short- and long-term compliance which may not be comparable. This individualised and reflexive idea of adherence calls for a flexible and tailored approach. Understanding an individuals' attitudes and behaviours about adherence can then inform the provision of patient focussed interventions.

There is a plethora of psychological theories, yet a distinct lack of clarity as to how health behaviour models can be assimilated and compared in terms of behavioural outcomes. In 2004, Noar and Zimmerman posed a question asking if behavioural change science had moved on at all in the last ten years, and that question can still be asked today. Michie et al (2011a) has presented a model which assimilates current health behavioural theories, many of which are flawed in isolation. Although the BCW is relatively new, it is acknowledged that it is likely to evolve as it is tested in practice, across disciplines. The BCW outlines that a behavioural diagnosis needs to be made before interventions are planned and implemented (Michie et al 2011b). It is currently unknown if these COM-B and TDF domains are addressed in physiotherapy consultations when providing SMPPs and if so how, and in what proportion. It is hypothesised that a better understanding of the content and dosage of SMPPs and if, or how, patients' capability, opportunity and motivation domains are addressed, will allow design of effective, individualised adherence interventions. It is also important to investigate patients' experiences of receiving and carrying out SMPPs and to what degree the COM-B components affect patients' adherence behaviours. It is hypothesised the COM-B model could guide individualised interventions to promote behaviour change and adherence to SMPPs.

#### **4.7 Research Aim and Objectives**

##### **Primary Aim**

To explore the provision of, and adherence to, self-management physiotherapy programmes (SMPP) within MSK Out-patient physiotherapy.

##### **Objectives**

1. To establish the content and dosage of SMPP's in routine MSK Out-patient physiotherapy
2. To explore how physiotherapists provide SMPPs and if and how they address patients' capability, opportunity, and motivation to adhere to their physiotherapy SMPP
3. To explore patients' capability, opportunity and motivation to adhere to their SMPP
4. To explore relationships between patient recall and adherence to their SMPP and patient outcome

## CHAPTER FIVE– OVERALL RESEARCH DESIGN

### **5.1 Introduction**

In order to develop an original contribution to the knowledge and understanding of the provision and adherence to SMPPs, a rigorous, ethical and trustworthy research design must be employed. This chapter outlines the research paradigm and philosophical stance that underpins this study and the justification for the research design. Several research paradigms and methodological approaches are considered. These are discussed alongside a description and justification for the chosen approach of a qualitative, mixed-methods design, drawing on aspects of ethnography.

Exploration of the underpinning philosophy informs decisions about the methodology and methods that are appropriate for the aims and objectives of the research study (Jackson, 2014). Patton (2012) suggested that methodological appropriateness is about ensuring that the design matches the situation and the context, but also takes into consideration the costs and benefits of alternative designs, ethical considerations and utility.

### **5.2 Philosophical and Theoretical Paradigm**

When considering a research question, it is important to consider wider theory and philosophical assumptions which frame the approach to the research (Park et al 2020). These philosophical assumptions include ontology, which is the viewed nature of reality, and epistemology which is the way knowledge is known by an individual. Crotty (1998) describes epistemology as

*‘...What is entailed in knowing, that is, how do we know what we know?’ (Crotty 1998, pg. 8).*

New knowledge about phenomena, such as adherence and behaviour change, and the way researchers construct this knowledge will be influenced by their background, beliefs and philosophical assumptions (Cresswell and Poth 2018). The researcher's philosophical viewpoint will influence the way that this new knowledge is framed and analysed and to what degree information is needed to achieve ‘validity’ as new theories or ideas are generated (Green & Thorogood 2014).

#### **5.2.1 Justification of Pragmatic Approach.**

Pragmatism is an alternative philosophical worldview that is not committed to any one system of philosophy and reality. It proposes that truth is what works at the time and where ‘truth’ can be based in an external world, or within the mind, allowing for a flexible approach to research methods which suits to achieve the best understanding of the problem (Cresswell 2014). Cresswell (2014) describes the foundations of pragmatism from work of early 20<sup>th</sup> century philosophers Pierce, James, Mead and Dewey and later that of Patton (1990) and Rorty (1990). Pragmatism arises from actions,

situations and consequences rather than antecedent conditions such as in post positivism, and is therefore forward looking. Pragmatists argue that most philosophical topics, such as the nature of knowledge and science, are all best viewed in terms of their practical uses and successes. The philosophy of pragmatism emphasises the practical application of ideas by acting on them to actually test them in human experiences (Guttek 2014). This practical application and interpretation of meaning aligns well with the aims of this study where theory is being applied to real world practice.

Pragmatism also forms an ideal philosophical paradigm on which to mix both quantitative and qualitative research methods in order to look at what and how to research based on the intended consequences (Cresswell 2014). Pragmatism is the approach which fits most naturally with both the research study and the researchers own worldview and experiences. Initially an interpretivist approach was considered most appropriate to explore patients' adherence. However, the researcher's own experiences of working with a science based background in the physiotherapy profession and healthcare system inclined the researcher towards a more positivist standpoint. These contrasting approaches support the formulation of a study based on a pragmatic philosophical approach, looking forward, where mixed methods will allow an exploration of patients' adherence and their underpinning capability, opportunity and motivation to adhere to their SMPP in 'real world' physiotherapy practice. This in turn leads to a better understanding of if, and how, these components of the COM-B model works in practice and to inform how it may potentially be developed to facilitate improved adherence to SMPP in practice.

This study intends to take a pragmatic inductive, exploratory approach of patients' experiences, rather than taking a pure interpretivist viewpoint. When using an interpretivist approach, the researcher does not aim to establish the reality of the world, but the way in which people interpret it (Denzin & Lincoln 2011). A pragmatic approach allows for elements of an exploratory, interpretivist approach, using qualitative methods, where new knowledge can be constructed (Crotty 1998), whilst also considering findings in the context of an existing health behaviour model and its application in practice (Creswell 2014). It is also important to understand that even if the researcher aimed to take a purely interpretivist approach, their own experiences, training and cultural background would ultimately influence the interpretation and framing of the findings (Denzin & Lincoln 2011). An alternative positivist viewpoint assumes objectivity and seeks to find cause and effect (Park et al 2020). A positivist approach often employs quantitative methodologies to test a hypothesis underpinned by theory with little direct human intervention (Park et al 2020). The review of health behaviour models in chapter four illustrates the perceived complexity of human health behaviours and thus challenges this purist positivist viewpoint of the belief that there is a 'stable knowledge or



truth' waiting to be discovered. ). A pragmatic approach will allow an inductive exploration of patients' adherence and their underpinning capability, opportunity and motivation to adhere to their SMPP in 'real world' physiotherapy practice. This will lead to a better understanding of if, and how, the components of the COM-B model work in practice, its development as a model to facilitate increased adherence to SMPPs in practice.

### **5.3 Application of Philosophy and Methodology to this Research Study**

The primary aim of this study is to explore the provision of, and adherence to, SMPPs within MSK out-patient physiotherapy. This includes 4 research objectives

1. To establish the content and dosage of SMPP's in routine MSK out-patient physiotherapy
2. To explore how physiotherapists provide SMPPs and if, and how, they address patients' capability, opportunity, and motivation to adhere to their physiotherapy SMPP.
3. To explore patients' capability, opportunity and motivation to adhere to their SMPP.
4. To explore relationships between patient recall and adherence to their SMPP and patient outcomes

Several methodological approaches could be taken to explore these objectives. The research paradigm and objectives support a mixed methods approach. As objective one requires the understanding of the descriptive content of SMPPs programmes, a mixed-methods design allows quantitative methods to be used alongside a qualitative methods which can be used to explore the remaining objectives. Qualitative methods are suited to exploring human behaviour and experiences which are complex. Exploring the 'truth' is subjective and dependent on how the individual experiences the phenomena. Mixed-methods research design draws on the potential strengths of both qualitative and quantitative methods which is seen as particularly advantageous as healthcare delivery becomes increasingly complex (Shorten and Smith 2017). Creswell (2014) argues that blending or mixing methods creates a stronger understanding of the problem and can help overcome limitations of individual approaches.

An alternative approach would be to use a multi- methods design which is subtly different to 'mixed-method research' (Johnson et al., 2007). Where mixed-methods research combines qualitative and quantitative research in a single study, multi-method research involves data collection using two or more methods from the same paradigm (e.g., interviews and focus groups, surveys and questionnaires) (Andrew and Halcomb, 2009). Qualitative research is an enquiry in which 'researchers study things in their natural settings, attempting to make sense of, or interpret these phenomena in terms of meanings people bring to them (Denzin & Lincoln 2005, p.2). Qualitative

research has several broad orientations within its concept including naturalism, reflexivity, a focus on understanding and a flexible approach (Green & Thorogood 2014). Little is known about SMPPs provided in 'real life' and how these are provided by physiotherapists. How patients then make sense of these and experience them in their own contexts over a time requires an exploratory and observational approach of the physiotherapists and patients in their natural setting therefore this could be considered a useful approach. However, it does not allow for the quantitative elements required to evaluate the content and dosage of SMPPs.

An embedded design is a mixed-methods design in which one data set provides a supportive, secondary role in a study based primarily on the other data type (Creswell et al 2014). The premises of this design are that a single data set is not sufficient, different questions need to be answered, and that each type of question requires distinct types of data. A mixed-methods, embedded design was used as this design is particularly useful when a researcher needs to embed a quantitative component within a qualitative design. The embedded design mixes the different data sets at the design level, with one type of data being embedded within a methodology framed by the other data type (Greene & Caracelli 1997).

A deep, exploratory approach of patients' experiences who were attending physiotherapy was needed to evaluate both the provision of the SMPP, and their experiences of undertaking the SMPP. An in-depth, longitudinal approach meant that a small sample would be studied. Also, because the aim was to explore what physiotherapists actually provide, and not what they report they provide, direct observation of practice was needed. Therefore a mixed methods, embedded design study was considered most appropriate.

#### **5.4 Qualitative Methodological Approaches**

Several qualitative research approaches were considered as potentially suitable for this study, including phenomenology, grounded theory, action research and ethnography. These are discussed to provide justification and rationale for the chosen mixed-methods approach.

Phenomenology aims to describe the common meaning for a group of individuals of their lived experiences of a concept or phenomenon (Creswell & Poth 2018). Phenomenology is challenging as it requires the 'bracketing' of the researcher's personal experiences to separate the researcher's personal understandings and viewpoints from those expressed by those being studied. However, van Manen (1990) described this process as advantageous and a potentially transformative process where the researchers experience deep learning. Phenomenology could have been a suitable approach for this study to explore patients' experiences to allow development of understanding as

to how those who are given a SMPP, experience and 'live' this phenomenon. Adherence could be considered the 'phenomena' as it is a complex and multifaceted concept. However, the aim of this study was wider, to explore the reality of how SMPP's are delivered by physiotherapists and experienced by patients in a 'real' setting. Adherence within MSK physiotherapy is still poorly understood (Bailey et al 2020) and therefore, the phenomena under exploration may not yet be fully defined for a pure phenomenological approach. Moustakas (1994) describes a process for phenomenological research and suggests identifying a phenomenon and describing it, before collecting data from those who have lived the phenomena. Also, in this study, phenomenology did not allow exploration of the 'realities' of practice or observed behaviours from a broader viewpoint and would be better suited if the aim were to solely understand either the patients or the physiotherapists experiences of this phenomena.

The basic premise of grounded theory (Glaser & Strauss 1967) is to move beyond observation and description and to generate or identify new theories (Creswell & Poth 2018). Grounded theory is an inductive, iterative process whereby as data is collected from the 'ground' upwards. The researcher constantly compares the findings to look for emergent patterns or themes on which to generate new theories. Grounded theory is useful when there is no theory to explain or understand a process or phenomenon (Creswell & Poth 2018). Within the fields of health behaviours and adherence there are already multiple theories described which are discussed in chapter four. The aim of this study was not to attempt to generate new theory but to explore current practice. An existing theory could then be applied to explore how its domains are applied in practice. Therefore, grounded theory was not considered the most appropriate approach for this study.

The term action research was developed by Lewin (1946) to describe a method of generating knowledge about a social system, whilst simultaneously trying to change it. It is therefore used where evaluation is required but where intervention or change occurs within the process. It is a method used where improvements are the end goal (Bowling 2014). Stringer (1996) outlined key stages in action research; 'setting the stage, looking, thinking and acting'. These processes can include data collection and rapid appraisal and an inductive approach on which to develop an inductive change and improvement (Bowling 2014). As this methodological approach aims to inform and facilitate change and action within the process, it is not an appropriate method for this study. This study required an exploratory approach in which to understand the wider phenomena of adherence within the natural setting and whether existing theory could be used to underpin the findings.

Ethnography is the study of social interactions, behaviours, and perceptions that occur within groups, teams, organisations, and communities (Reeves & Hodges 2008). An ethnography focusses on an entire culture-sharing group that have developed shared patterns of behaviour, beliefs and language (Creswell & Poth 2018). In this research study the 'group' are the physiotherapists and patients who work and interact in an MSK physiotherapy out-patient setting. The physiotherapists who routinely work in the environment are likely to be culturally embedded as a group. However, the extent to which patients are embedded is likely to be more transient.

Ethnographic methods are perhaps the most naturalistic research methods whereby researchers study behaviour in its natural environment, often through direct observation, and allow individuals to tell their own stories. Naturalism allows the researcher to study the phenomena without intervention, however, it must be acknowledged that no observed experience will result in a completely naturalistic setting (Green & Thorogood 2014).

Realist ethnography is a traditional approach where the researcher takes a particular stance toward the individuals being studied. It provides an objective view of the situation where the researcher reports in the third person on what is said or heard. The researchers also attempt to separate their own views and philosophical viewpoint from the interpretation and presentation of the findings, although it could be argued that this is never wholly possible (Creswell & Poth 2018). Critical ethnography conversely includes the researchers as a critical voice and may include a value-laden orientation whereby the researcher, who may be politically minded, may pose concerns around issues such as power, control of dominance or inequality. A realist ethnographic approach will be taken as this allows the researcher, who is professionally embedded in the area of study, to observe and narrate on what is observed and discovered in an objective way.

This study will therefore draw on aspects of ethnography to allow broad observation and exploration of the actual behaviours and beliefs of physiotherapists and patients in this culture-sharing group over a period of time. This will include identifying the variety and provision of SMPP's and how, and if, physiotherapists assess patients' capability, opportunity, and motivation within the appointment. It will also allow exploration of patients' capability, opportunity and motivation to adhere to their SMPP and its relationship with adherence.

## **5.5 Data Collection Methods**

### **5.5.1 Observational Methods**

Observational methods are a key component of an ethnographic approach and spending time 'in the field' is a key method to explore, describe and evaluate the behaviours and experiences within a specific psychosocial and environmental setting (Fetterman 1998). Observation of behaviours, actions, activities and interactions can be used as a method to better understand complex situations (Bowling 2014), which in this case is a physiotherapy consultation, where there is a complex interplay between two human beings in a healthcare setting. In orienting themselves to the field, researchers seek to develop a full and rich account as they refine their research questions (Flick 2014).

Maharaj (2016) suggest that it is useful for researchers to consider three aspects of their role as a participant observer; their status as an insider or outsider; their location on the continuum of observer to participant and their subjectivity in the research process. The researchers' role and experiences will influence their interpretation of the situation and the tensions and relationships that will exist between these different perspectives. As an experienced and practising MSK physiotherapist the researcher has an insider perspective within the culture of a profession known as an *emic* perspective. However, they could be considered to have an *etic* perspective as an outsider who does not work in the setting directly (Green & Thorogood 2014). Agar (1996) refers to this *etic* perspective as that of a professional stranger. It is this tension and contrast between these *etic* and *emic* views that forms key influences on an ethnographical methodology (Green & Thorogood 2014). This study will use different geographical healthcare sites and will observe similarities or differences in both the researcher's perspective and that of the participants over time.

Gold (1958) in Green & Thorogood (2014), presented a typology of observational interactions describing a continuum where the researcher can act as a complete participant, fully immersed 'in the field', where they may describe their own experience or auto-ethnography. This contrasts with the researcher taking a role as a complete observer where they do not participate in the field at all. The use of observation with notetaking and /or audio-visual recordings of consultations would provide this type of observational data from an outsider's perspective. Physiotherapists are required to assess and diagnose patients and implement evidence-based guidelines (HCPC 2013). This potentially puts physiotherapists under great professional pressure when being observed by another physiotherapist. Direct observation via an AV recording would allow the physiotherapist: patient interaction to be observed 'from a distance' and may reduce social desirability bias or undue

pressure on the physiotherapist. Dean et al (2005) recommend from their interview study that recording patient-therapist interactions and subsequent interactions may offer greater insight into the therapeutic relationship and its role in adherence.

Establishing the content and dosage of SMPP's in the consultation could be achieved in several ways. Direct observation allows exploration of SMPP detail to be recorded, compared to asking the patient to recall information after the event (which will rely on recall memory) and may also be subject to reporting of social desirability bias. Green & Thorogood (2014) refer to this as a limitation of interviewing, when wanting to establish the frequency of an event as there may be a discrepancy between what people do and say they do. Therefore a direct observational survey method was needed to obtain this data. Peek et al (2017) undertook a study using direct observation of physiotherapy appointments to note the content of SMPPs. Sitting in the appointment and recording observations on a checklist, there were no recordings and therefore potential for recording errors. Human observation has the potential for being erratic as the observer responds to, and becomes familiar with the research setting. Researchers may selectively record, subconsciously or consciously, what is said in response to their own values and experiences and may become fatigued or lose concentration (Bowling 2014).

Audio-Visual (AV) recording is a powerful methodological tool which provides a record of events that can be viewed repeatedly. Many studies have used this method to evaluate and investigate different aspects of complex healthcare interactions. Talvitie & Raunanen (2002) and Parry (2004, 2009) both used video recordings of physiotherapy consultations in those who had experienced a stroke, to evaluate aspects of conversation, communication and patient interaction. Coleman & Manku-Scott (1998) used video recording of consultations to identify smoker's attitudes towards stopping smoking. Many studies have used video recording to evaluate patient centeredness and shared decision making (SDM) (Mead et al 2002, Pinto et al 2012). It is also an established method used in primary care consultation for training, evaluation and continuous professional development (Fukkink et al 2011, Eeckhout et al 2016). As there was a need to identify all activities and instructions within a complex conversation the use of AV recordings ensures that no qualitative data is lost as the researcher(s) can repeatedly watch the recording of consultations and validate findings.

AV recording allows both verbal and non-verbal encounters to be analysed, as well as allowing for any ambiguity over who is speaking to be avoided. However, AV recording without the researcher present does have limitations including not allowing the researcher to participate or ask questions directly within the consultations. AV recording is also a potentially intrusive methodology, and there are ethical considerations for participants which are discussed in the following chapter. One further

limitation of using AV recording is a high 'dross' rate where a large amount of irrelevant data is recorded (Bowling 2014). However, within a specific healthcare consultation all information is relevant to the context and phenomena being observed and the physiotherapy consultation has a demarcated beginning and end point which will limit copious amounts of erroneous information.

Audio recordings are an alternative to video recording and are a less invasive method of recording an encounter for playback purposes and potentially reduce some of the ethical issues raised with video recording. Because there is no visual recorded material, this may reduce patients concerns of privacy when they are required to get undressed, making it feel less intrusive. This may also be the case for the physiotherapists, whereby the audio recording may feel less intrusive in terms of watching them 'perform' as a clinician. However, there is a loss of a large aspect of communication regarding non-verbal cues and interaction that is lost when audio recording only. This non-verbal communication can be pivotal in many aspects of the patient consultation.

Taking field notes is also a critical part of recording and evaluating the interactions and context of the observed scenario (Emerson et al 2011, Maharaj 2016). They serve as an opportunity to make corrections, clarifications and enhance the researcher's own observational sensitivity by acknowledging and documenting their thoughts, feelings, ideas, and hunches (Lincoln & Guba 1985, Fook & Gardner 2007). Writing and reflecting during the observation and data collection phases within qualitative approaches are integral components during data collection and not simply done at the end when all the data has been collected (Flick, 2014). Field notes also serve as tools for exploring information that is contextually rich and developing explanatory insights regarding the phenomena under investigation (Charmaz 2006, Miles et al 2013). Notes recorded whilst observing incidents that are unsettling are often useful for stimulating critical reflection, thus, allowing for more complex ways of thinking about an event (Fook & Gardner 2007).

To collect data to meet objectives one and two, whilst minimising any negative effects of the researchers' presence, AV recording of consultations were used. The researcher was present in the physiotherapy department but did not sit directly within the consultations. AV recordings combined with the researchers' observations, field notes other pertinent documents such as information provided to patients regarding their SMPP were utilised and compared to build exploratory insights.

### 5.5.2 Exploring Patient Experiences and Attitudes

Patients' attitudes, experiences and intentions can be explored using a variety of methods including focus groups (Hills and Kitchen 2007) and interviews (k et al 2017, King 2018) and questionnaires (Hujig et al 2014). Interviews are considered one of the most important tools for data collection in

ethnography, putting into context what the researcher has observed in practice (Fetterman 1998).

The qualitative interview has been described as

*“an attempt to understand the world from the subject’s point of view, to unfold the meaning of their experience, to uncover the lived world.”* (Kvale 1996, pg. 3).

Individual interviews can be undertaken in person or via the telephone or online (Creswell & Poth 2018) and range from highly structured, survey style interviews to informal, open and in-depth interviews that resemble normal conversations in the field (Green & Thorogood 2014). However, it is the latter that are most relevant to this study which sought to make an in-depth exploration of patients’ views. Interviews have been used widely in studies exploring cognitive processes and behaviours using TDF and COM-B model (Patey et al 2012, Quigley et al 2019).

Undertaking a research interview is a specialist skill which needs to be practised and developed to hone the craft (DeJonckheere and Vaughn 2019). Many factors will influence the information and meaning constructed from an interview including the interviewer’s skills, the language used, interpretation of power and social position between the interviewer and interviewee, trust, and rapport (Somekh & Lewin 2011). The researcher was not experienced in research interviews but was very experienced in history taking with patients which also requires excellent exploratory communication skills. The researcher’s lack of interviewing skills is acknowledged as a potential limitation to the study but was minimised through practice interviews prior to data collection.

In contrast to individual interviews, focus groups are advantageous when the interaction among the interviewees is likely to yield the best information and when interviewees are similar and are likely to co-operate with each other (Flick 2014). Focus groups have been used successfully to explore behaviours and COM-B components and TDF constructs (Alexander et al 2014). In relation to this study, people attending for physiotherapy may be very different in terms of their socioeconomic and cultural backgrounds (Sharpe et al 2020). The research aims focussed on understanding an individual’s attitudes, beliefs and intentions and therefore a personalised, semi-structured interview was considered most suitable for this study. Interviews are well utilised and recommended method for exploring cognitive and behavioural processes and the COM-B components (Atkins et al 2017).

Both focus groups and interviews rely on patients volunteering to take part in an exposing process which, for some individuals, may feel embarrassing and invasive. This may lead to respondents answering in a socially desirable way (social desirability bias), where they wish to appear as a morally worthy person to the interviewer or other participants (Green & Thorogood 2014, Flick 2014). Self-selection bias may also result in recruiting participants who have specific issues or grievances (which



may dominate a focus group) or those who are more educated and articulate, thus excluding key sectors of the physiotherapy patient population (Somekh & Lewin 2011). Accessing 'hard to reach' parts of the population, such as those living in the lowest socio-economic areas and ethnic minority groups can be difficult (Rockcliffe et al 2020). Several studies outline the inverse care laws where those living in the most deprived socio-economic circumstances, often in the poorest health, receive least time from healthcare professionals (Willems et al 2005, Rockcliffe et al 2020). Both study locations included areas of high socio-economic deprivation. Carrying out individual interviews is perhaps more likely to engage a range of individuals when they know they are taking part in a private interview rather than a communal focus group. However, it is acknowledged that individuals with low self-efficacy and poor health literacy may be less likely to volunteer for the study, thus limiting the breadth and representation of the population sample (Rockcliffe et al 2020). Interviews allowed exploration of both the SMPPs and patients' views and behaviours including barriers and facilitators to adherence. Views were sought after patients had chance to reflect on and carry out their SMPP. Interviews also allowed exploration of issues specific to that individual compared to focus groups that require a group dynamic which may be off putting for some.

Questionnaires have been widely used with previous studies, including evaluating the theory of planned behaviour and moral norms (Juraskova 2011), stages of change model (TTM) (Kim 2007), behavioural intentions and planning control (Sniehotta et al 2005b) and the health action process approach (Schwarzer 2008, Clark and Bassett 2014). Self-administered questions have also been used to measure adherence to physiotherapy programmes (Bollen et al 2014), recall (Misra et al 2013) and overall outcomes from physiotherapy (Kamper et al 2009).

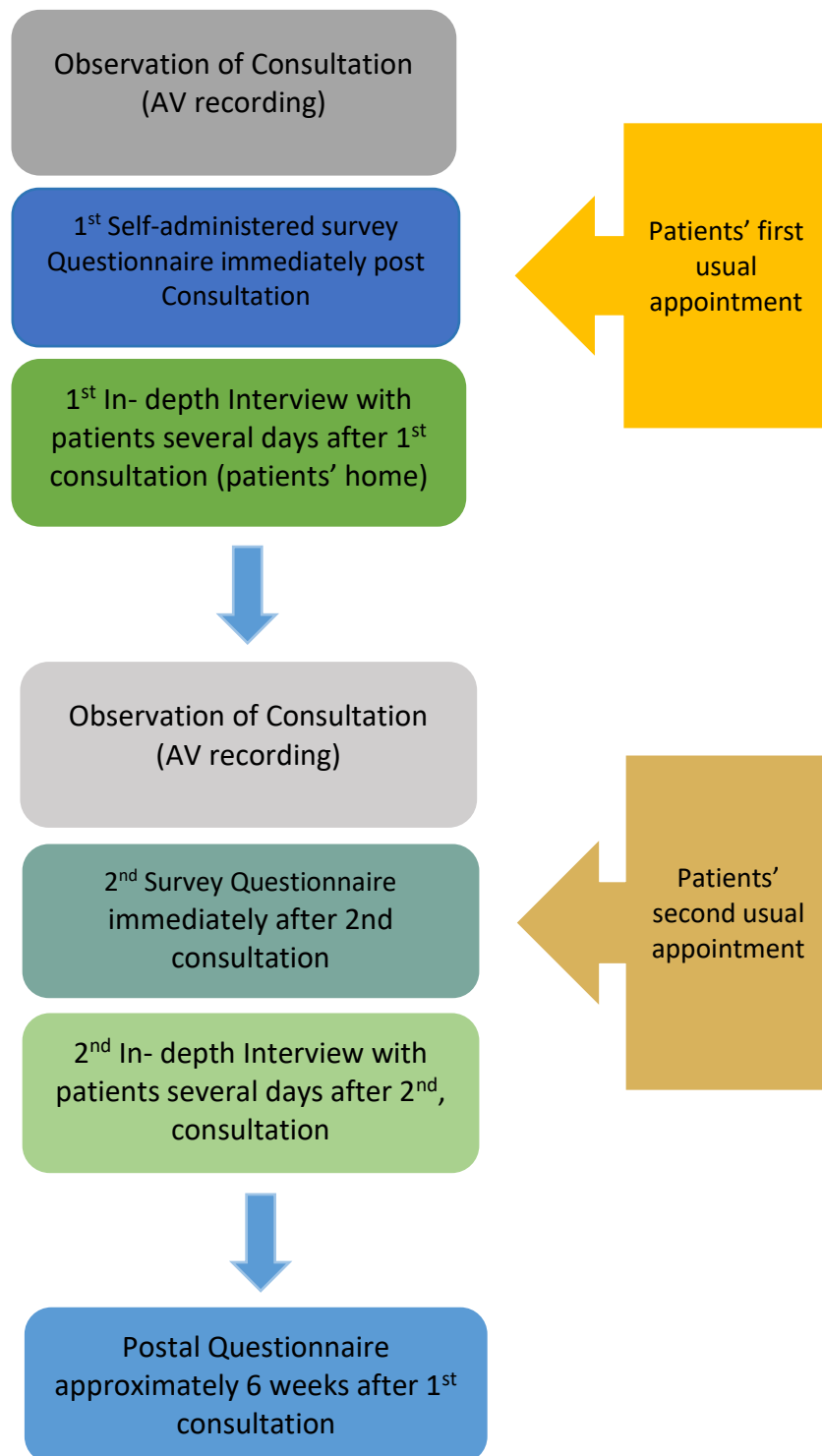
Questionnaires are a confidential, quick method to capture an individual's attitudes, thoughts, feelings and intentions towards certain behaviours (Fetterman 1998). Questionnaires are reproducible and consistent allowing systematic data collection and allowed comparison between different time points for patients. Also, using an anonymous, self-administered paper-based questionnaire may have facilitated different, or more 'honest' or open answers compared to those given in an interview setting where social desirability bias may be an issue. A further source of data from questionnaires allowed triangulation, where data can be compared, providing a greater richness, and improving validity. Self-administered questionnaires have been promoted as an accessible method to assess the COM-B components (Beenstock et al 2012, Ellis et al 2019) and TDF domains (Hujig et al 2014).

Questionnaires provide objective quantification of individuals' attitudes, beliefs and intentions to adhere, although within a deep, exploratory, qualitative design, small sample sizes will not allow

inferences to be made for other populations. However, they do provide information that can be evaluated and compared alongside the video recordings and interviews thus allowing validation and triangulation (Creswell 2014). Questionnaires can also be used for patients to record recall and memory of the programmes they have been given as well as including self-report outcome and adherence measures. A questionnaire designed for this study may also be a tool that could be developed at post–doctoral stage to further predict or evaluate adherence to SMPP in MSK physiotherapy.

### 5.5.3 Summary of Data Collection Methods

The proposed data collection methods for this study include AV recording observations of physiotherapy appointments, direct observations ‘in the field’ with accompanying field notes, review of relevant documents, patient semi-structured interviews and self-administered patient questionnaires. The use of mixed methods allows the researcher to build up a picture of the observed phenomena over time, and construct deeper insights. Comparison of data sources also allows for triangulation; the use of varied data sources to develop a comprehensive understanding of phenomena (Patton 1999). Triangulation is also described as a strategy to test validity through the convergence of information from different sources (Carter et al 2014). Figure 5.1 outlines an overview of the mixed-methods research design, illustrating the range of data collection methods and hence the opportunity for triangulation and comparison of data.



**Figure 5.1 - Overview of Research Design illustrating a mixed-methods approach**

### **5.6 Data Analysis**

Interview transcripts, field notes and observations provide a descriptive account of the study, but they do not provide explanations (Pope et al 1999). Therefore, the data must be interpreted and

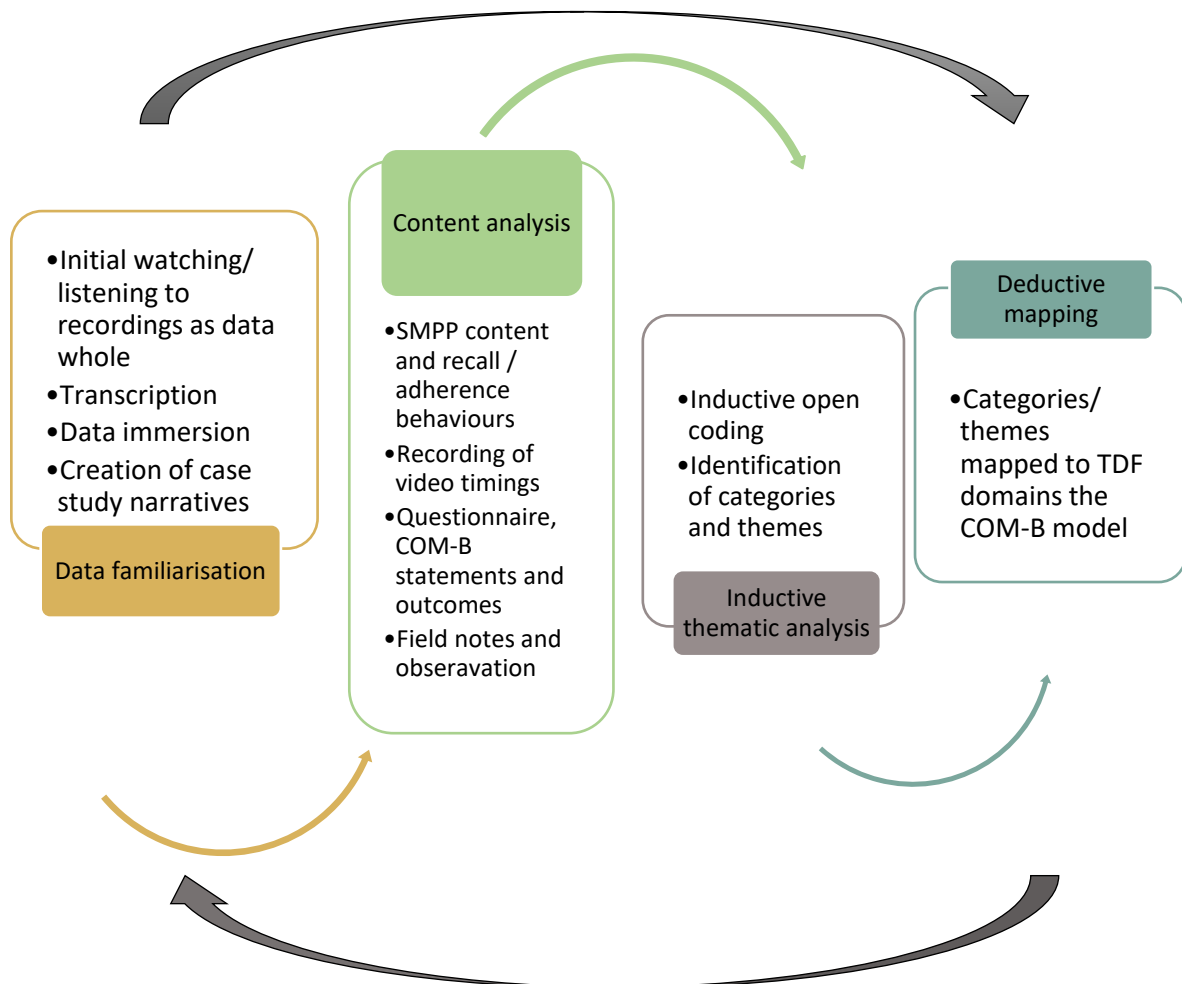
analysed to make sense of it in light of the research aims. A staged and integrated approach to data analysis was taken using the whole body of data (*data corpus*).

Four main stages of qualitative data analysis were considered necessary: data familiarisation, content analysis, thematic analysis and deductive framework mapping using the TDF and COM-B models (Braun & Clarke 2006, Fereday and Muir-Cochrane 2006, Cane et al 2012, Patey et al 2012, Vaismoradi et al 2013, Atkins et al 2017). Analysis can occur simultaneously with ongoing data collection. This iterative approach allowed the researcher to shape future recruitment, sampling and interviews. If data analysis occurs simultaneously, it is possible to continually balance the need for more participants with the burden of the data and consideration of when data saturation is achieved. Constant comparison across the data sets and discussion and reflection with the research team is important throughout the data analysis process. Although staged, it is a continuous, iterative, and cyclical process with movement back and forth to check the data interpretation and understanding (Fukkink et al 2011, Taylor and Francis 2013).

An alternative approach to analysis would have been to use a purely deductive template or framework method without undertaking an initial inductive thematic analysis (Fereday and Muir 2006, Gale et al 2013). Fereday and Muir (2006) explain how, by creating a unique coding template using a codebook or through using a pre-existing framework such as the TDF (Cane et al 2012), findings can be applied as a means of organising data for subsequent interpretation. This deductive approach was used by Nicholson et al (2014) when using interview data from stroke survivors. They highlighted the quotes in the text and assigned them to one or more of the TDF domains. This purely deductive approach risks missing the emergence of new or important findings which may emerge from an inductive approach. Fereday and Muir (2006) argue that an iterative approach can be used where the codebook is added to as new themes emerged. Factors influencing adherence to SMPPs have been published and identified in the literature review. However, confining coding to a pre-defined codebook using these pre-identified themes may bias identification of themes preventing identification of new themes that do not appear to 'fit'. Also, as the study evaluated participants over several time points, open coding allowed the evaluation of the nuance and iteration of the development of themes to emerge, rather than creating a checklist of whether specific codes were noted or not at a specific time point.

Descriptive reporting of questionnaire data is used to make overarching observations within and between patients. Nominal data obtained from Likert style questions cannot be treated as interval data as there is no measurable standard difference between two points on the scale (Norman 2010). Data in this format is best represented with median or mode and this was made between patients at

different points on their physiotherapy journey. The questionnaire data is triangulated with qualitative data as a validation method to test assumptions and to add further insight. This also highlights the difference in a mixed methods study and a multi methods study. The stages of data analysis are outlined in figure 5.2.



**Figure 5.2 - Diagram illustrating process for data analysis**

### **5.7 Overall Research Design Summary**

Evaluation of ontological and epistemological viewpoints are important when considering research design and how meaning will be formed and framed by the researcher. This study adopts a pragmatic philosophical standpoint using a mixed-methods embedded design. The design draws on aspects of ethnography, allowing the deep exploration and observation of ‘real world’ physiotherapy practice over time. Inductive exploration of the provision of SMPPs and patient’s attitudes and experiences of their capability, opportunity and motivation to adhere to their SMPP were able to be

explored. A mixed methods paradigm included direct observation, field notes, AV recordings of consultations, questionnaires and patient interviews allowed the study to address all the research objectives. A pragmatic worldview underpinned an iterative and layered analysis, including content analysis, inductive thematic analysis and deductive framework analysis onto the TDF (Cane et al (2012) and COM-B models (Michie et al 2011) allowed. The following chapter discusses the data collection and analysis methods employed as they were applied within the study.

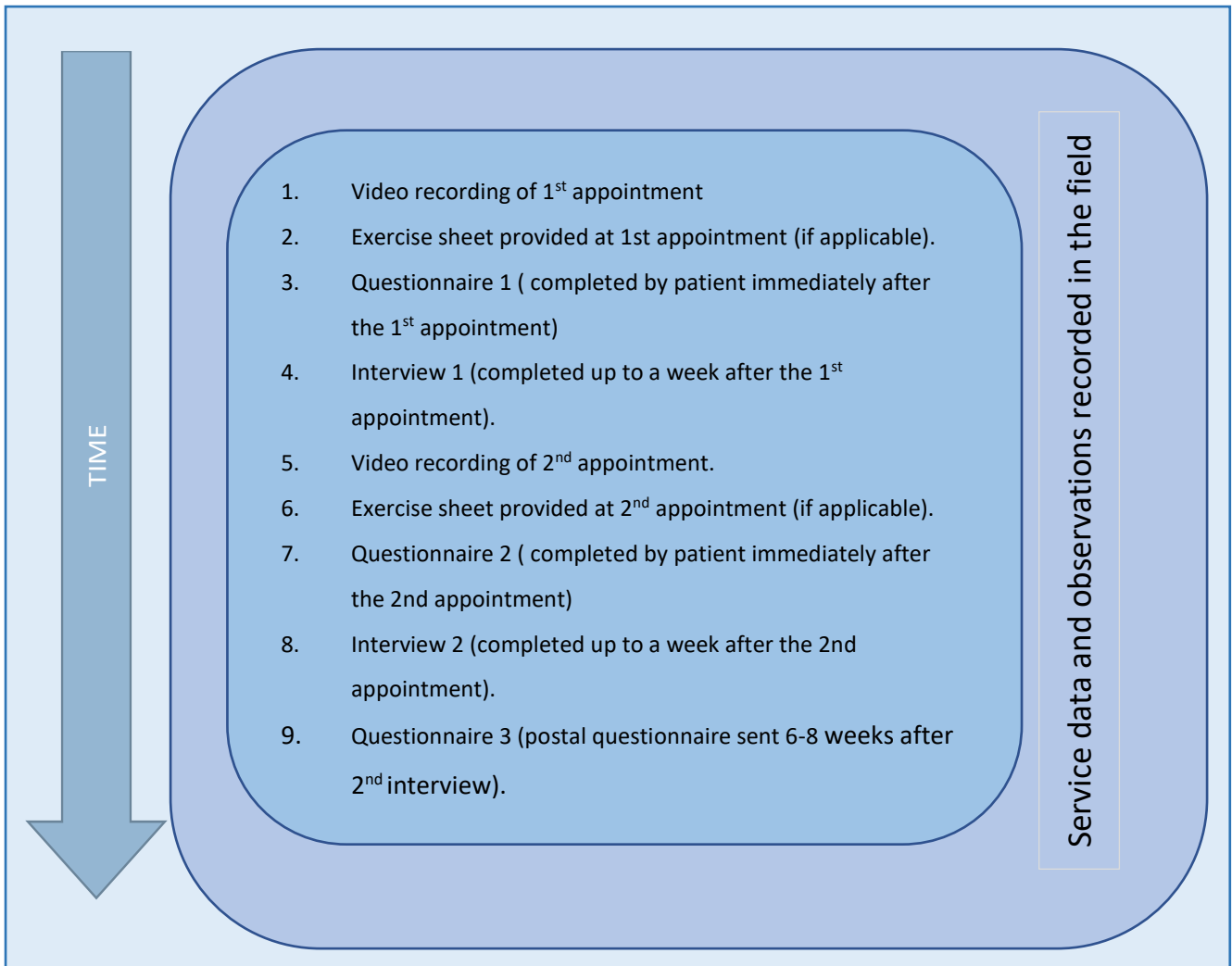
## CHAPTER SIX - METHODS

### **6.1 Introduction**

Chapter five provided the reader with a theoretical underpinning to the research approaches that were taken in this study. This chapter will describe the specific procedures used to collect and analyse the data within the study to meet the research objectives. The chapter begins with a brief description of the design, followed by information about ethical considerations and approval. The reader is then informed how the questionnaires and interview schedules were developed. Recruitment and procedures are explained, along with details of the purposive sampling of physiotherapist and patient participants. Processes of data analysis are explained for both the qualitative and quantitative data illustrating how data was compared and triangulated to answer the research questions. Discussion relating to rigour in qualitative and quantitative research is discussed at the end of the chapter.

### **6.2 Design**

As discussed in chapter five, a mixed methods design, drawing on aspects of ethnography was selected to investigate the research objectives. Patient participants were studied over a period, using a longitudinal approach. Figure 6.1 outlines the design and sequence of data collection for each patient's participant (see figure 6.1). In order to observe 'real world' physiotherapy practice and adherence behaviours the study was undertaken over the course of the patients' first two physiotherapy appointments. Adherence behaviours are known to reduce over time (McLean et al 2010, Kelly and Barker 2018). Undertaking a broader cross-sectional study at a single time point would not enable SMPP provision or adherence behaviours to be studied over time. This study therefore allowed participants to be studied at multiple time points over the course of their first two appointments and beyond. Contexts change and adherence behaviours fluctuate, therefore approaches to promote adherence may need to change over time (Campbell et al 2001, Peek et al 2016b, Bailey et al 2020).



**Figure 6.1 - Showing key data sources used during the study period**

### **6.3 Ethical Considerations**

Undertaking observational studies and interviewing is not only about gathering the information and knowledge that is sought, but also considering the participants and whether their situation will be improved and if they will come to any harm (Kvale et al 1996). The key ethical considerations related to potential harm, consent and confidentiality (Slowther et al 2006). Health Research authority (HRA) approval was granted for this study on 23rd July 2018 and the STEMH Ethics Committee, University of Central Lancashire, granted ethical approval in August 2018 (see Appendix 7).

#### **6.3.1 Potential Harm**

Cassell (1998) in Green & Thorogood (2014) suggest the key principle for informing ethical practice in social research should be respect for human autonomy, rather than focussing on harm which is



often considered foremost in medical ethics. Harm can be difficult to establish in social research as it is likely to result in feelings of vulnerability, embarrassment or invasion of privacy rather than physical harm.

An initial ethics application was submitted December 2017. Data collection was proposed to be undertaken at two NHS Trusts in the North West of England to allow access to a diverse range of geographical, socio-economic and physiotherapy practice locations. The proposed sites were an NHS trust in a coastal region with a large town (Blackpool, Fylde and Wyre NHS Trust), and a large integrated acute and community organisation (Salford Royal NHS Foundation Trust). At the time, the researcher was employed at the second site as an advanced MSK physiotherapy practitioner. Although the researcher did not work directly in the physiotherapy service, they had worked there previously, and were familiar to the setting (native). The selection of study sites was intended to provide a broader view of practice (etic and emic perspectives) in preference to using one site and highlight any differences and similarities between settings (Green & Thorogood 2014).

However, within the first ethics application, the Health Research authority (HRA) raised significant concerns that the physiotherapists at site two (where the researcher was employed) may be under excessive pressure to take part in the study. The HRA expressed concerns that physiotherapist participants may be exposed to unnecessary embarrassment or professional scrutiny by a senior physiotherapy colleague (the researcher). 'Backyard' research, which involves studying the researchers own work setting (Glesne and Peshkin 1992), may result in biased or incomplete findings and requires additional strategies for determining validity (Creswell 2014).

Therefore, a new second site was proposed which the researcher was not affiliated with. A second ethics application was submitted to the HRA and this was accepted on 23rd July 2018. This alternative second site (Lancashire Teaching Hospitals NHS Trust), also in the North West of England, was geographically adjacent to the first site but had a different demographic profile. The researcher had not worked at, and was not familiar with, either of the approved sites. However, it is important to note that the researcher was also working at the local university as a senior lecturer in physiotherapy and had some contact with these Trusts through their role in supporting clinical education of pre-registration physiotherapists. The researcher did not personally know any of the physiotherapist participants but may have been 'known' by the physiotherapists due to her role as a physiotherapy lecturer. Although the researcher did not know the physiotherapist participants, they could have felt professionally 'exposed' and vulnerable being observed by the researcher who was a senior physiotherapist/lecturer. Reassurance was therefore given by the researcher that observation

of competence or decision making was not the intention of the study. However, a potential power imbalance must be acknowledged (Thorogood & Green 2014).

It is also acknowledged that, when being observed and recorded, participants may have exhibited social desirability bias, saying and doing what they think they should do rather than it being a true reflection of their daily practice (Coleman & Manku-Scott 1998, Roberts & Bucksey 2007). The decision to not 'sit in' and observe appointments directly, aimed to reduce any undue pressure on physiotherapists and give some physical and metaphorical 'space' between the physiotherapists and observations. The video cameras captured the complexity and richness of the real-life encounter. The physiotherapist was on site to observe other nuanced aspects of the setting, for example, noise, physiotherapists' clinic schedules and presence of additional stresses such as telephone call distractions.

Sources of potential harm for patient participants within this study were considered low. However, it is acknowledged that patient participants may have felt exposed and embarrassed, particularly during video recordings of their consultations, as patients were sometimes in a state of semi-undress. During the appointments, patients were asked personal medical questions where sensitive information is elicited and discussed. Recording of appointments may have affected the patient's willingness to provide information therefore the physiotherapist and patient retained the right to turn off the camera at any time, although this was not necessary in practice.

### 6.3.2 Consent

Informed consent is the principle that individuals should not be coerced, persuaded, or induced into research against their will, but facilitated to partake in informed voluntarism (Green & Thorogood 2014). Achieving consent when using ethnographic approaches can be challenging as there can be many individuals who pass through the environment being observed. In this study private treatment areas were chosen to avoid recording neighbouring patient's consultations and only those individual patients and physiotherapists who provided written informed consent were included in the data collection.

All physiotherapist and patient participants provided informed written consent. One patient volunteer had learning difficulties and living alone independently but had financial and daily care support. Northway (2010) promotes the inclusion of people with learning disabilities in healthcare research in order to assist in shaping service provision that is appropriate for all service users. The researcher was unaware of the patient's learning disabilities until the patient arrived at the first appointment. The researcher took care to check with both the patient and carer that the patient had

capacity to consent and that informed consent was obtained (Flick 2014). However, ensuring all participants are suitably protected from coercion or harm within the research process is imperative and all participants must have capacity to consent appropriately (Slowther et al 2006). Researchers must use judgement and continually assess to support inclusive principles and maintain a duty of care (Abell 2007).

Participants were given a minimum of 48 hours to consider and question the study information. Patients and physiotherapists were able to withdraw their consent up to 48 hours after the recording of videos and interviews (as applicable), without this affecting their physiotherapy treatment and in such cases video recordings would be deleted. If any of the participants withdrew their consent the associated patients/ physiotherapists would also need to be withdrawn as consent from both parties was needed for the video recordings.

In order that clinical encounters and behaviours were as naturalistic as possible, physiotherapists and patient participants were not told the exact aims of the study as this may have altered their behaviour. Covert observation can be a source of ethical dilemmas particularly in ethnography (Flick 2014). For example, if patients were told that the study was about what they could remember and their adherence to their SMPP they may have focussed specifically on remembering all the components compared to an appointment where there is no specific focus on this topic. Instead, physiotherapists and patient participants were informed that the observation was about communication used within physiotherapy encounters. This concealment was considered necessary, however it is acknowledged that it does pose an ethical challenge when considering overt and covert observation in observational research (Lugosi 2006). It could be argued, however, that if patients and physiotherapists give their time to be involved in a study then the behaviours studied need to be as realistic and unbiased as possible for maximum impact.

### 6.3.3 Confidentiality

During a health consultation, patients are entitled to privacy and confidentiality and the Helsinki Declaration outlines that “every precaution should be taken to respect privacy of subjects and confidentiality of their information” (Green & Thorogood 2014). Observation and video recording of appointments requires participants to forgo this privacy and confidentiality in terms of the researcher’s access to this appointment (Coleman 1996). Participants were given unique identifiers and pseudonyms to protect their anonymity, but it is acknowledged that participants may still be recognisable via AV recordings. Data was stored electronically using a password protected system according to the University of Central Lancashire’s data storage policies and was only viewed by the research team. All hard copies of research data (e.g. consent forms, questionnaires, interview

transcripts) were scanned and will be retained electronically for a period of five years on a secure password protected drive at the host university. Original hard copies were destroyed. The researcher retains access to this data. All video and audio-recordings from consultations and interviews will be deleted at the end of the study. Confidentiality also extends to the writing up and dissemination phases, therefore all data is anonymised to ensure no participants were identifiable in the writing up stages.

Observing clinical encounters also poses challenges should researchers observe poor or harmful clinical practice. Deciding if and when confidentiality should be breached is a difficult decision and should be made in the context of the professional context and the researcher's own professional regulatory boundaries. In this situation, discussion was with the supervisory team whilst maintaining anonymity of those in practice.

#### **6.4 Interview Guide Design**

Face to face interviews were used to explore patients' in-depth experiences of their physiotherapy appointments, the content of their SMPP and their adherence behaviours. An interview guide was developed which explored the project's focus whilst inviting participants to give a spontaneous, relatively uninterrupted 'free flow of consciousness' responses (Taylor and Francis 2013). The interview opened with demographics questions including the patients' age, educational level, presenting condition and previous physiotherapy. This was followed by open, exploratory questions seeking to understand the patients' reasons for attending physiotherapy. Both sections were intended to assist in the establishment of trust and building of rapport which is vital to ensure the interviewee is comfortable, relaxed, and prepared to share their personal experiences and insights (DeJonckheere & Vaughn 2019) (see Appendix 2).

Taylor & Francis (2013) describe semi-structured interviews as needing some guiding questions, but not too many, when the intention is to draw out participants' descriptions of their lived experiences. The core questions used an exploratory, open questioning style using neutral and clear language. Initial questions focussed on the patients' overall experience and describing their SMPP, followed by 12 questions topics that were developed based on the TDF domains and constructs (Cane et al 2012). Questions were presented in line with the COM-B model (Michie et al 2011). These included core open questions as well as exploratory question prompts to elicit beliefs about each TDF domain and its role in influencing the target behaviour (adherence) (Patey et al 2012). The second interview guide initially mirrored the first in terms of length and layout. There was focus on any changes

affecting adherence behaviours since the second appointment (see appendix 2 for interview schedules).

#### 6.4.1 Interview Piloting

Two pilot interviews were carried out before the data collection commenced to guide pace, tone and adjust questions (DeJonckheere & Vaughn 2019). This also allowed the interviewer opportunity to practise interviewing skills specific to the topic and check meaning and understanding of the questions (Hall et al 2020a). The pilot interviews were carried out with two volunteers who were known to the researcher and who were both receiving physiotherapy treatment (one being part of the research supervisory team). The two pilot participants had different MSK conditions, were in different age brackets and one was working full time and one retired. Pilot interviews were transcribed. Reflection and feedback from the interviewees and research team helped to further refine the interview schedule and develop the researcher's interviewing skills. Feedback received related to included balancing an open and enquiring style with not overly interrogating or pressurising participants regarding their adherence behaviours and explanations. Ineffective questions were also rephrased or replaced to clarify meaning and encourage in-depth responses. The use of active listening, pauses, verbal agreement, reframing questions and summarising to check meaning were also used and practised in the pilot interviews (DeJonckheere & Vaughn 2019). Before interview guides were finalised they were also sense checked with several MSK physiotherapists to gain a clinical perspective and feedback on the clarity and relevance. During the ethical approval process the second interview schedule was modified and shortened at the request of the HRA ethics committee as some questions were thought to be leading. The second interview schedule was therefore shortened to include a total of eight open and exploratory questions intended to build on the information gained in the first interview (see Appendix 2).

#### 6.5 Questionnaire Survey Design

Three versions of the same questionnaire were developed to be administered at three different time points. The questionnaires needed to address four areas: patient's attitudes and behaviours regarding the 14 TDF domains (Cane et al 2012), patient's immediate recall of their SMPP and their self-reported adherence and outcomes. An established questionnaire was not already available therefore new questionnaires needed to be developed. A multi-stage approach was used; firstly, choosing the question formats then addressing the question content and finally piloting and refining the questionnaires. Questionnaires were divided into three parts. The first part of the questionnaire explored the TDF domains. For questionnaires see appendix three.

At the time of the questionnaire design, no previous questionnaires had been published, for use by patients, to explore the TDF domains. However, questionnaires had been designed based on the TDF to measure health care professionals' behaviours (Beenstock et al 2012, Alexander et al 2014, Huijg et al 2014). A new specific set of questions were developed for this study which were informed by this previous work and relevant to exploring patients' adherence behaviours. Only one question was developed to address each of 14 TDF domains (Cane et al 2012). In order to keep the questionnaire succinct. This contrasts with lengthier TDF questionnaires aimed at clinicians (Alexander et al 2014, Huijg et al 2014).

Questions presented a range of answer options using a Likert scale. Designed by Rensis Likert in 1932 (Likert 1932), Likert scales are considered a useful method to explore opinions and attitudes and are usually presented as five or seven point scales e.g. (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree) (Carifio & Perla 2007). In this format, respondents can choose a positive, negative or neutral response (Dawes 2008). Alternatively, even numbered scales can be used to force respondents to take a positive or negative view and do not allow undecided options. It is also important to consider offering respondents a 'don't know' option, allowing them to opt out of the questions entirely (Jamieson 2004). However, in order to gain opinions in relation to the statements, a 'don't know' option was not offered for questions exploring the TDF components. A five-point Likert scale was chosen to minimise options and provide focus whilst also providing a neutral option.

When designing questionnaires with multiple questions, the use of negatively worded questions, where a negative answer is scored higher (reversal items) can minimise acquiescence bias (Hinz et al 2010). That is whereby respondents become familiar with consistently agreeing or disagreeing with sequential statements, and therefore they may not fully read the questions but get into a routine of answering in a standard way. Thus, reversal items were used randomly to reduce acquiescence bias (Hinz et al 2010).

The second section of the questionnaires aimed to record what information patients could recall of the SMPP immediately after the appointment. Designing an approach for patients to write down their SMPP instructions was challenging as many of the movements and instruction details given to patients are complex and difficult to articulate. Several options to record this information were considered including a free text section or pre-determined questions with optional tick boxes (e.g. to describe instructions such as exercises, movement repetitions, and frequency). However, although easier to fill in, labelled tick boxes and tables may have prompted individuals to remember instructions they would otherwise have forgotten and hence introduce recall bias. In previous studies which assessed patients' immediate recall of consultations and self-management

instructions free text sections were used. These included studies in dentistry (Misra et al 2103), diabetes management (Parkin & Skinner 2003) and clinical trials (Fortun et al 2008). It was acknowledged that asking participants to write free text may have been intimidating or off-putting for those with limited writing skills or time pressures. It may also have been difficult for patients to write down and articulate complex movements and positions. However, because the researcher was going to be present whilst patients completed the first two questionnaires, assistance could be provided where necessary.

The third part of the questionnaire asked patients about their adherence to their SMPP during the preceding time periods. As discussed within the literature review, measuring adherence is a complex and challenging task in practice (Bollen et al 2014, Hall et al 2015, Frost et al 2017). Measurement of adherence to a SMPPs and physical activity participation are difficult (Jack et al 2010) and are often subject to bias through self-reporting measures such as diaries and logbooks (Schwarzer et al 2011, Frost et al 2017). Adherence measurement methods usually consist of clinic-based adherence, patient diaries or global rating scores of overall adherence (Bassett 2003, Essery 2016). Tools which measure clinic-based rehabilitation, such as the Sports injury rehabilitation adherence scale (SIRAS) (Kolt et al 2007), do not measure adherence outside of the clinic setting. They are therefore based on the physiotherapist's perception of how well the patient adhered rather than actual adherence and so this type of scale was not suitable for this study.

Other studies use daily or weekly self-reported diaries or logs where patients write down the exercises or interventions they have performed and these are calculated as a percentage of the amount of home exercises performed versus those prescribed (Chen et al 1999, Friedrich et al 1998, 2005, Bassett and Petrie 1999, Schneiders et al 1998, Hartigan et al 2000, Seckin et al 2000, Roddey et al 2002, Engstrom & Oberg 2005, Schoo et al 2005, Basler et al 2007, Mannion et al 2009, Vong et al 2011, Clark & Basset 2014, Wright et al 2014). This method, although more detailed, is onerous for the patient and it also relies on patients remembering to fill diaries in regularly and honestly. Due to the time commitment required for patients to complete them, they were not appropriate for study.

Other studies used shorter Likert style items where patients are asked to rate how much of their SMPP they have done over a preceding period (Gohner & Sclicht 2006, Chan et al 2009, Basset & Prapavessis 2011, Pisters et al 2010, O'Brien et al 2013, Bennell et al 2014a). These scales, although variable between studies, are shorter and were more appropriate for the context and aims of this questionnaire and wider study. Bassett et al (2003) described the 'Adherence to Physiotherapists Recommendations Scale,' which is a three-item, five-point Likert style scale which asks patients to report the extent to which they have followed the instructions from their physiotherapist regarding

self-management activities. This scale was later adapted by Chan et al (2009) who used the first two items from the scale and expanded them to a seven-point scale. This scale was later used by Lonsdale et al (2017) within their RCT in an MSK physiotherapy setting. Because this study aimed to explore all strategies of the SMPP, not just exercises, Basset's (2003) scale was utilised using a seven-point Likert scale described by Chan et al (2009) and Lonsdale et al (2012). This allowed more sensitivity in answer options and more closely replicated its use in the study by Chan et al (2009) where adequate internal consistency was found. However, it must be acknowledged that this scale, like most adherence scales, had not undergone any psychometric testing (Bollen et al 2013).

The final part of the questionnaire explored changes in the patient's overall outcome, in terms of the problem they had sought assessment and treatment for. Patient reported outcome measures (PROMS) have been discussed widely over the last decade in physiotherapy and several types of measures have been recommended (Kyte et al 2015). These include general scales of overall health and wellbeing, patient specific outcomes, and specific joint and disease scores (Kyte et al 2015). Because the patients in this study had a range of MSK problems no one disease or joint specific outcome measure was appropriate.

Patient specific measures such as the Generic Patient-Specific Scale (GPSS) (Stratford et al 1995) have been used to assess an individual's complaints and restrictions (Kromer et al 2010). It is based on a patient-centered approach, where patients identify their most problematic areas of functioning. The GPSS is a reliable and valid tool and also sensitive to detect change over time (Stratford et al 1995). The scale requires patients to choose specific task or problems they face then score difficulty with completing these tasks on a Likert type scale. This type of score usually requires some assistance from the clinician administering the tool so was not appropriate for the final postal questionnaire where the researcher would not be present.

Global rating of change (GROC) is a self-report of overall change of the patient's condition and is measured by a questionnaire item that asks, "How does your current condition compare to how it was before you started physical therapy treatment?" (Beattie et al 2011). Scales vary (from 9, 11 and 15 point scales), however all have a midpoint of unchanged and equal numbers of varying degrees of options for improved or worsened (Kamper et al 2009). Preston and Colman (2000) assessed patient preference for response options and found that they preferred those with 7, 9, or 10 categories and these appear to offer the best compromise between patient preference, adequate discriminative ability, and test-retest reliability.



Advantages of the GROC were that it is quick and easy to administer independently, although they have some limitations in that they rely on an individual's accurate recall of previous health states which can be problematic (Kamper et al 2009). Kamper et al (2009) also recommended explicit mention of the specific condition, construct, and time anchor point in the question. Because in this study, patient participants had a variety of conditions the question was reworded to; '*How does your current problem compare to how it was when you started physiotherapy?*' with a seven item response scale ranging from very 'much worse' to 'completely better' (see Appendix 3).

#### 6.5.1 Piloting of Questionnaires

Pilot testing is a crucial step in the design of questionnaires to detect flaws in terms of content, grammar and format and ensure it is relevant for the sample (Jenn 2006). After the first stage of questionnaire development, this short, structured survey-style questionnaire was developed and piloted with six volunteer participants with varying demographics: aged 18-74, from two physiotherapy clinics, with varying physiotherapy MSK problems. Two were new patients who filled in the first questionnaire, and four were patients who had follow up appointments who completed questionnaire two. During piloting, participants were asked to discuss their opinions and queries around the interpretation of questions, wording, and layout (Song et al 2015). This feedback informed a review of the design, layout, readability, and length of the questionnaire. No data was collected from these volunteers. Changes were made including altering the order of the sections, changing the layout of Likert type questions and alteration of wording of questions to clarify meaning. Initially some pilot responders felt the COM-B questions were repetitive but on reflection and checking back agreed they all had a slightly different focus. The GROC was also modified with patients recommending additional descriptors between the midpoints (same) and extremes to aid description for example, slightly worse and much worse.

#### 6.6 Data Collection

Data collection methods included video recordings of the first two physiotherapy appointments, each immediately followed by a self-administered questionnaire and then a semi-structured interview several days later. A final postal questionnaire was sent approximately six weeks after the second interview. Data was also gathered in the field including field notes, printed exercise sheets given to patients in their appointments, physiotherapy service data such as details of rearranged appointments, the clinic environment, and the source of physiotherapy referral. For each patient participant this provided a chronological data set (see case summaries Appendix 6).

### 6.6.1 Population and Sampling

Data collection took place at two geographically adjacent NHS trusts in the North West of England. Site one was an NHS trust in a coastal region with a large town with large health inequalities (Blackpool, Fylde and Wyre NHS Trust). This trust serves a population of 330 000. The second site was Lancashire Teaching hospitals NHS Trust which serves a population of 370 000. Both sites delivered NHS MSK physiotherapy out-patient services. Site one had four different physiotherapy clinic sites and site two delivered services from two separate hospital sites. A purposive sampling strategy was used to identify suitable participants that best reflected the diversity of those utilising physiotherapy services at both sites. Ethnicity data was not available on referrals so was not able to be considered when inviting patient participants.

When utilising a mixed methods approach, data is collected from several sources therefore it is difficult to select a specific sample size (Creswell 2014). When deciding on the sample size the desire to gain in-depth views and experiences from a large, diverse and representative sample over a period of time needed to be balanced with the practical considerations of the time and resources available from a single PhD researcher. Kvale (1996) advises the qualitative researcher to

*"Interview as many subjects as necessary to find out what you need to know"* (Kvale 1996, pg .101)

As a longitudinal approach was taken, rather than a shorter cross-sectional view of experiences, this produced a large amount of data for transcription and analysis for each participant (2 interviews, 2 videos and 3 questionnaires). The researcher was mindful that data collection and analysis would be an iterative process. Whilst new findings are emerging, further participants should ideally be recruited until data saturation is achieved, that is, where no new themes or topics are emerging (Charmaz 2006). The initial aim was to recruit five patients at each study (studied longitudinally over time), totalling 10 patient participants. Patients were restricted to those aged over 18 years and needed to be able to speak and understand English. Therefore, any patient requiring an interpreter (foreign language or sign language) was not eligible. This was due to a lack of resources available to provide interpreters and transcription of interviews and is acknowledged as a limitation of this study in representing all sectors of the population attending for physiotherapy treatment (Rockcliffe et al 2020).

In order to gain access to observe and AV record patient appointments, the treating physiotherapists also needed to be recruited. To explore 'real world' physiotherapy practice, a variety of physiotherapists needed to be included. Recruitment aimed to represent the demographic diversity of physiotherapists and those with differing experiences, approaches and communication styles. All

physiotherapists delivering clinics in the participating physiotherapy departments at both sites were invited and were self-selecting. Once physiotherapists had been recruited, patients that were already booked into their clinics could then be identified and invited to participate.

### 6.6.2 Participant Recruitment

Data collection started in January 2018 and lasted almost a year. The study involved selecting and recruiting physiotherapists and patients. See Appendix four for all participant information and consent forms.

#### **Recruitment of Physiotherapist participants**

Physiotherapy managers at both sites were asked to send out an invitation email to all MSK physiotherapists who saw patients within routine MSK out-patient services. A physiotherapist participant information sheet and consent form were attached to the invitation email.

Physiotherapists who were interested in taking part responded to the researcher and were then contacted by telephone to answer any questions. Purposive sampling was used with the aim of recruiting five physiotherapists from each NHS trust (n=10), with a range of experience and with a gender mix where possible.

#### **Recruitment of patient participants**

Both physiotherapy services only accepted patients referred from other healthcare providers. Patients were either invited to telephone and book an appointment or were contacted by the physiotherapy department to arrange an appointment. Once the clinics that were run by the participating physiotherapists were identified, patients could then be identified. Because patients were booked into clinics in an ad hoc way, most clinics proved to be relatively diverse in terms of gender, age, and their condition. Clinics blocks usually lasted several hours and included new and follow-up patients. As only new patients were required at the recruitment stage, this meant that between one and four patients per clinic were eligible, so all new patients in each clinic were identified to take part. This proved less resource intensive than selecting individual patients from different clinics as the researcher needed to be onsite when patients had been invited.

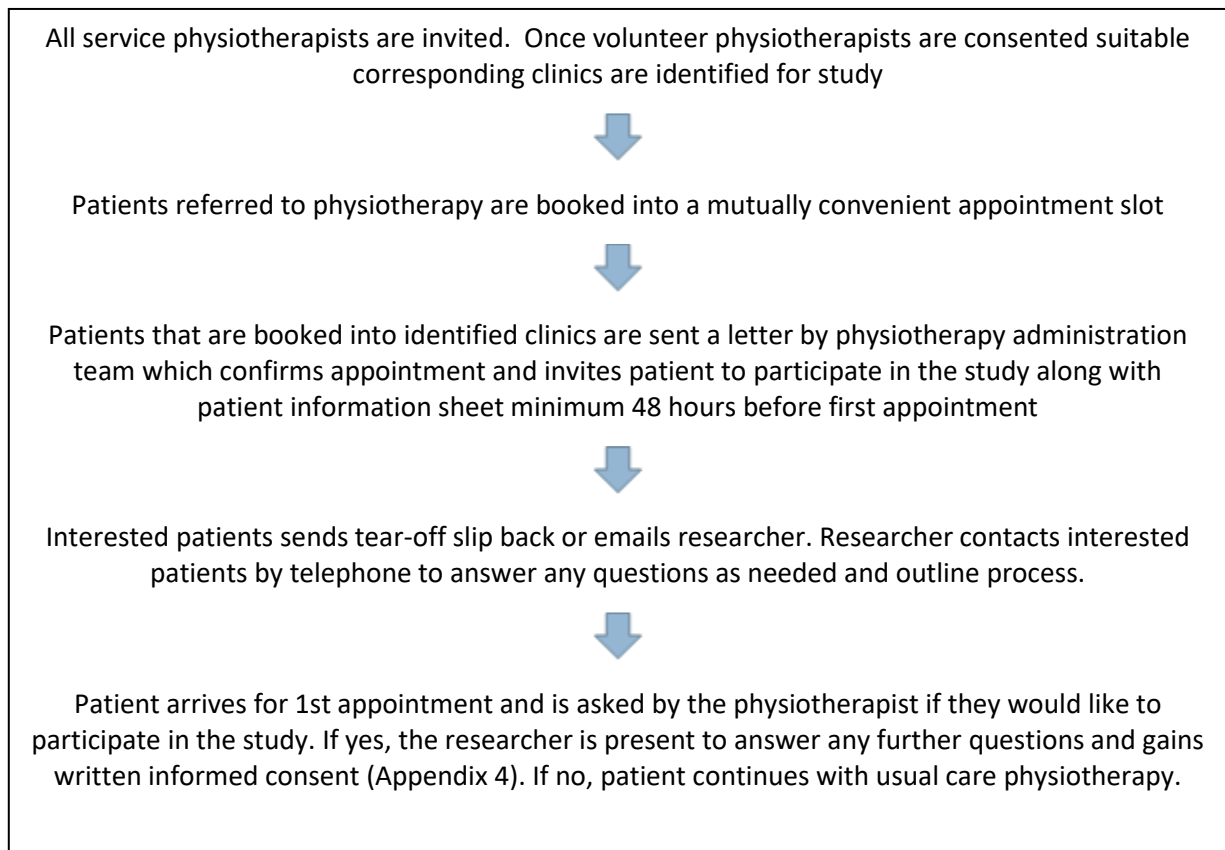
Three clinics were initially identified at site one. A letter and patient information sheet was sent by the department administrative staff to the patient confirming their physiotherapy appointment and inviting them to participate. Invites were sent a minimum of four days prior to the appointment to allow for postal times and patient consideration. A tear off slip and pre-paid envelope was included for patients to express an interest or ask questions (or patients could email the researcher). Only

two clinics (approximately 12 patients) were invited initially in order to avoid disappointing individuals if interest was high. See Appendix four for participant information and consent forms.

Patton (2012) discusses the benefits that achieving maximum variation within a sample can provide, particularly capturing the core experiences and shared aspects or impacts of a programme. It was anticipated that a self-selecting sample may emerge from a specific subset for example, retired individuals with more time to take part, however early recruitment indicated this was not the case. For several patients who returned the postal reply slip requesting to participate, the reply slip arrived after the date of their first appointment and therefore they were unable to take part. Most patients replied via post so the minimum time between the invite and appointment was increased to reduce this problem.

Maximum variation was optimised by using two different NHS providers and selecting patients from different geographical/ clinic areas. However, recruitment ultimately was dependent on those who volunteered. Approximately halfway through the data collection period it was identified that the sample was biased towards male participants. Three females had responded indicating a desire to take part but did not agree to be AV recorded so were not able to participate. This may highlight a specific limitation with this method of data collection (Howe 1997, Coleman 1998), but it is not possible to draw conclusions from this small response. Maximum variation sampling strategies were applied (Patton 2002). Mid-way through the data collection period more females were invited to redress the gender imbalance which was partially successful. All participants were from a white British background which is a limitation of this study. Ethnicity information was not available from the physiotherapy referral so purposive diversity sampling was not possible. Recruitment initially started primarily at site one but, then moved to site two.

For those patients who contacted and agreed to take part, they attended for their first appointment as per usual and met their physiotherapist who asked if they were still agreeable to take part. Arrangements were then made to meet the researcher and ask any further questions. Written informed consent was gained. Patients were required to consent to all stages of the study. If patients did not want to participate, they continued with their usual physiotherapy appointment. A summary of the overall data collection process is outlined in figure 6.2.



**Figure 6.2 - Participant Recruitment Process**

### 6.6.3 Physiotherapist Demographic Data Collection

Physiotherapists were asked to complete a short demographics questionnaire to gain information including gender, years of professional experience and role. This was used to illustrate potential relationships between provision and teaching of SMPP and patients' adherence.

### 6.6.4 Video Recording of Consultations

The researcher met patients at the physiotherapy department. Once participants had consented, a video and tripod were set up in the clinical area. Patients were seen by their physiotherapists in either a private consulting room or a curtained cubicle that was large enough for the video camera and which avoided overtly recording other patients' consultations in adjacent cubicles. The researcher operated the camera and was available onsite but did not stay in the cubicle for the appointment. Physiotherapists were aware how to turn the camera off if the patients wished to do so but this was not required in any appointments. Video cameras were set up to record both verbal and non-verbal information conveyed.

### 6.6.5 Completion of Questionnaires

Immediately after the appointment, patients were asked by the researcher to complete the relevant questionnaire. An initial screening question asked if the patient had been given an SMPP as those not receiving an SMPP were not eligible for continuation in the study. The fourth patient recruited did not receive a SMPP and did not have a second appointment due to need for medical investigation so he was withdrawn from the study and data was not used.

Questionnaires were self-administered by patients in the physiotherapy department, although the researcher was present and available to help if required. Several patients asked for an explanation and one patient did not want to write but was happy to dictate the answers. Another patient asked the researcher to complete the questionnaire for him as he could not read or write so the researcher read the questions and recorded answers verbatim.

The researcher was not privy to the first appointment recording prior to the questionnaire completion so was unaware if an SMPP had been provided or the detail. The researcher being present whilst the questionnaire was completed may have influenced patients' responses (social desirability bias). The final questionnaires were sent in the post but for the patient with poor literacy this was done via telephone at the patients' request. Postal questionnaires were sent out approximately six to eight weeks after the second interview.

### 6.6.6 Interview Process

Interviews were arranged with patients immediately following their first and second physiotherapy appointments at a mutually convenient date and location. All patients chose their home location except one participant who was interviewed at their carers' office and one participant at the clinic site. This minimised disruption for the patients and ensured participants were as comfortable as possible in their surroundings (DeJonckheere & Vaughn 2019). Where possible, interviews were carried out within five days of the physiotherapy appointment however, in several cases this was delayed due to participant availability, or participants contacting to re-arrange.

All interviews were conducted by the researcher and permission was given to audio record. Interviews broadly followed a framework outlined in the two interview schedules (see Appendix 2). Note taking was used throughout the interviews to capture non-verbal elements although was balanced with use of direct eye contact and non-verbal responses to avoid being detracting or obtrusive for the patient (Oltmann 2016).

Interviewing is an iterative process and was informed by early data collection and analysis. In qualitative studies data collection and analysis are interrelated (Miles et al 2013). Reflection and

reflexivity were important and discussions with the research team to review early interview transcripts proved useful in developing the researchers interviewing skills (Dodgson 2019). Learning opportunities were identified to further explore patient's experiences through more open and exploratory questions.

## **6.7 Data Analysis**

### **6.7.1 Overview of Data Analysis Approach**

The largest data sets were the video recordings and patients' interviews. However, other data was also gathered in the field including questionnaires, printed exercise sheets, field notes, and physiotherapy service data such as details of rearranged appointments, the clinic environment and the source of physiotherapy referral. The researcher also spent a considerable time in the physiotherapy departments at both sites, immersing themselves in the environment and inevitably getting to know the physiotherapists, managers and administrative staff. The researcher then visited patients twice, usually in their own home. This enabled the research to get to know the patients and their families and observe them in their own environment over time. The physiotherapist is an experienced physiotherapist and therefore these insights bring a range of conscious and unconscious motives, beliefs, experiences which are likely to have influenced the interpretation of research findings, (Fontana and Fey 2005, DiCicco & Bloom 2006).

### **6.7.2 Setting and Context**

“Nothing exists, and therefore can be understood, in isolation from its context, for it is context that gives meaning to what we think, say and do” (Bates 2019, pg. 3).

When analysing the findings, the setting or context in which the SMPP was provided needs to be considered. This is important in order to fully understand how physiotherapists provide SMPPs and how they are experienced by, and adhered to or not, by patients. Lack of concept and terminological clarity and definition of setting or context can make its interpretation difficult. Nilsen and Bernhardsson (2019) highlight that when studying behavioural analysis and implementation science, context can refer to many factors including organisational support, financial resources, social relations, support, leadership, culture, and climate.

When evaluating context in its broadest sense, it is important to consider that context is also both subjective and objective. That is, an individual will 'make sense' of what they feel and see, as well as what is physically perceived to be there (van Dijk 2009). Context is also considered to be a dynamic and interactive process which is ever-changing (Dopson and Fitzgerald 2005). Nilsen and

Bernhardsson (2019) outline how the TDF (Cane et al 2012) includes contextual determinants in relation to behavioural analysis within three of its domains, namely social /professional role and identity, environmental context and resources and social influences. In the analysis, the term 'setting' is used in preference to 'context' to consider the holistic setting in which SMPPs were provided and experienced. This aims to avoid confusion with the context terminology included within the TDF domains (Cane et al 2012).

### 6.7.3 Data Familiarisation

The first stage of analysis was familiarisation with the data which began in the field, continued during data collection and developed through transcription and reading/watching (Braun & Clarke 2006, Nowell et al 2017). Recordings were watched and listened to several times to gain a broad understanding and narrative overview of the data in relation to provision of, and adherence to the SMPPs. This immersive process allowed the researcher to become familiar with the depth and breadth of the content (Nowell et al 2017). Notes were made during this process including initial ideas, insights, and questions from the data (Lincoln and Guba 1985). Case summaries were developed for all participants which outlined a narrative of the patients' experiences, SMPP engagement and adherence behaviours (see Appendix 5). This important stage also ensured organisation and archiving of the data (which was done using Nvivo 12 software) and provided a clear audit trail and a benchmark for later comparison and testing of interpretations for adequacy (Nowell et al 2017).

Initially the researcher did not plan to transcribe the video recordings, mainly due to expected high amounts of irrelevant information contained within recordings. Instead, a checklist alone was planned to be used to record the SMPP content, provision and to record if, and how, physiotherapists had addressed the TDF domains. However, once the videos began to be analysed it became apparent that the richness and depth of the data was not fully captured using a simple checklist alone, and that more in-depth analysis was needed. For example, when physiotherapists demonstrated exercises, sometimes they replicated the exact movements whereas at other times they intoned or mimicked the movement with their hands. Therefore, it would have been difficult to definitively categorise this phenomenon using a checklist alone.

After discussion with the research team, a decision was made to transcribe relevant parts of the video where SMPP provision or adherence were being actioned or discussed. Transcription is often an overlooked stage in interpretation and analysis of data (Davidson 2009). Often being seen as purely a time consuming, administrative task, it holds a valuable opportunity for data immersion and can be a key phase of analysis within interpretative qualitative methodology (Bird 2005, Braun &



Clarke 2006). Video recordings offer a rich data source of 'real-life' healthcare practice which capture all modalities of interaction between participants (Coleman 1996, Roberts and Bucksey 2007) and therefore transcription allowed an in-depth, inductive analysis process to capture the nuance and detail of both verbal and non-verbal communication. The interview transcripts were also transcribed verbatim by the researcher. After transcribing the first four interview transcripts manually, the researcher attempted to use transcription software but found it to have a high error rate. It also missed the valuable step of listening and re-listening to every sentence of the audio and video recordings, so a decision was made to transcribe all the interviews and videos manually.

Although direct uploading and coding of video files is possible using Nvivo 12, the file size proved problematic therefore transcripts were uploaded as WORD documents for analysis and coding. It was important to annotate transcripts with non-verbal communication and events to ensure the richness of the video detail and interview process was not lost in the written analysis. For example, in one video the physiotherapist turned to the computer in the cubicle to point out some exercises to the patient, possibly whilst assuming the patient was watching, but in fact the patient was still lying down on the plinth with both parties unaware that the other was not attending to the information. Once transcribed, the transcripts were then re-read alongside the video to check for accuracy and nuanced detail (Braun & Clarke 2006).

#### 6.7.4 Content Analysis

Content analysis is a method to analyse data qualitatively whilst at the same time quantifying the data and allowing interpretation of quantitative counts of codes (Vaismoradi et al 2013). Content analysis was used to establish the SMPP content as well as describing recall patterns of the SMPP content and adherence behaviours. An iterative codebook checklist was developed as new SMPP content was observed. This approach facilitated the capture of the breadth of practice and did not pre-empt SMPP content. All advice or instructions were coded even if only conversational or lacking any specific instructions. This contrasts with Peek et al (2017) who, when observing 'live' physiotherapy consultations, did not record non-specific or conversational advice. They only recorded SMPP strategies when it related to a specific activity or actions which the physiotherapist had requested the patient to complete. However, if advice is given, even 'in passing', it is assumed that the physiotherapist is intending the patient to consider taking that advice, otherwise it would not be mentioned. Because videos could be watched repeatedly, the dialogue could be studied closely to identify this content. The detail of the SMPP strategies used were noted including specific exercises, advice, starting positions for exercises as well as instructions relating to completion of the SMPP. For example, the number of repetitions and frequency of interventions.

Starting positions for exercises or movement were described using the five fundamental positions of exercise (lying, sitting, kneeling, standing, and hanging) along with their derivatives (Gardiner 2005). Exercises were counted as separate exercises if they required different anatomical movement patterns or directions (even if using the same starting position and part of the body), because they still needed to be recalled and carried out as separate, individual exercises by the patient. Progression of exercise was categorised as the addition of new exercises or the modification of an existing exercise to increase the difficulty through position change, increase in load, repetitions, or frequency (Hollis 1998). The use of any specific equipment needed was also recorded. The researcher had to use their experience and knowledge as an MSK physiotherapist to make a judgement when coding content that was contentious. Data was continually compared across sources and reviewed with the research supervisors. When describing the SMPPs the conceptual framework for implementation fidelity (CFIF) was used as a guide which outlines the elements of an intervention; content (active ingredients of the intervention) and the coverage, frequency and duration (collectively known as dosage) (Carroll et al 2007). This provided structure to consider the SMPP and the degree to which it was accurately implemented (implementation fidelity) and adhered to (Toomey et al 2019).

Once the SMPP content was coded, appointments were then time coded to analyse the overall length of appointments and to establish what percentage of the appointment was related to provision of the SMPP strategies. Large amounts of communication and information transfer occurred throughout the appointment. For example, physiotherapists spent time assessing patients and providing information. There were also large sections of conversational discussion about unrelated issues. If information relating to the rationale for the SMPP or instructions on how and when to complete the SMPP were provided, then this was counted as part of the SMPP. This proved complex as the conversation changed quickly therefore the researcher needed to study the full consultation and used clinical expertise to make a judgement about the observed communication. The videos could be watched repeatedly which meant this information could be checked and rechecked (Coleman 1996). Provision of SMPP content was recorded to the nearest second.

Adherence and recall behaviours were also evaluated by using content analysis with comparison of data sources within and between patients. To analyse recall, video recordings were compared with what patients had written in the free text sections of the questionnaires and then what was later described in the interviews. Described levels of self-reported adherence were also described and triangulated with the questionnaire video and interview data.

### 6.7.5 Inductive Thematic Analysis

Once transcribed, a thematic analysis approach was then taken to analyse all the data sets including the interview and video transcripts (Boyatzis 1998, Attride-Stirling 2001, Braun & Clarke 2006 Nowell et al 2017). Braun and Clarke (2006), argue that thematic analysis should not just be seen as a tool used in other qualitative methodologies but a method in its own right with concise guidelines and clear explanation of how the method was utilised. All the transcripts, scanned questionnaires and printed exercise materials were analysed using Nvivo 12. Nodes, annotations, and memos were used to code and integrate all the data. Transcripts were reviewed line by line to examine similarities and differences (Flannery et al 2018). Open coding was used to identify and group all notable, pertinent, and recurring and interesting words, sections, and paragraphs. Boyatzis (1998) describe a “good code” as one that captures the qualitative richness of the phenomenon. Encoding the information organises the data to identify and develop themes from them (Braun and Clarke 2006).

Throughout the coding process, whilst listening and analysing the information, the focus of the study was kept in mind; that is, the content and provision of the SMPP and the patient’s experiences of it and their adherence behaviours. This ‘data driven’ coding process refers to noting initial ideas about what is in the data and identification of patterns or interesting features (Braun & Clarke 2006). This meant all observations and data were included to ensure that information was not omitted. Over 50 codes were identified across the data. Once coded, categories and themes were identified from the codes which the researcher felt captured the overall meaning and substance of the data (Attride - Stirling 2001). Boyatzis (1998) defined a theme as “a pattern in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon” (p. 161). Fontana and Frey (2005) highlight the importance of remembering that the researcher brings their own view, experiences and world view to the interpretation and there is no absolute in exploration of meanings.

*“The spoken or written word has always a residue of ambiguity, no matter how carefully we word the questions and report or code the answers”* (Fontana and Frey 2005, pg.361).

Once coded, the data was then analysed separately with two specific foci. The first, evaluating how the SMPP was provided, included the setting and the physiotherapists’ behaviours. The second part focussed on the patient’s experiences of receiving an SMPP, their adherence and the factors affecting adherence.

Eight themes were developed from the analysis which related to the provision of the SMPPs. King (2004) highlights that knowing when to stop modifying and defining themes is one of the most difficult decisions in thematic analysis. These themes were not refined further to preserve the detail

and nuance of the physiotherapists approach to SMPP provision and to allow these behaviours and actions to be fully interpreted in relation to the TDF domains. Twenty sub-themes were identified relating to the patients’ experiences and the factors affecting adherence behaviour. These themes were further refined into four themes which aim to provide a core principle metaphor that encapsulates the main phenomena in the grouping (Attride-Stirling 2001). Peer debriefing with the supervisory team was used to discuss the themes and expose parts of the research that may be missed by a single researcher (Guba & Lincoln 1985, Nowell et al 2017).

6.7.6 Deductive analysis; Mapping of themes to TDF domains and COM-B components

Once the themes had been identified a deductive approach was taken to map the identified themes and sub-themes to the domains within the TDF framework (Cane et al 2012, Patey et al 2012, Alexander et al 2014, and Atkins et al 2017). Firstly, the eight themes relating to the provision of the SMPP by the physiotherapists were mapped onto the TDF domains to evaluate the physiotherapists’ behaviours in relation to provision of the SMPP and whether they addressed the TDF domains. Secondly, the twenty sub-themes which captured the patient’s experience of receiving an SMPP and their adherence behaviours were mapped separately onto the TDF domains. The sub-themes were mapped in preference to the four overarching themes to utilise the detail of the TDF and to allow a more detailed behavioural analysis (Cane et al 2011, Michie et al 2011a, Patey et al 2012). This deductive mapping process provided two TDF mapping documents which allowed for comparison of how the SMPPs were provided by physiotherapists and the patients’ experiences and adherence behaviours. The same process was taken for both mapping processes.

Each theme was taken in turn and analysed to identify where it best fitted within the TDF. The TDF domain definitions taken from Phillips et al (2015) were used alongside the domain constructs to help guide interpretation and understanding of the domain meanings. Additional operational definitions were developed for both physiotherapists’ behaviours and patients’ behaviours adapted from Quigley et al 2018) to guide the mapping process (see Table 6.1).

<b>TDF Domain</b>	<b>Description</b>	<b>Operational definitions related to physiotherapists behaviours in how they provided SMPPs</b>	<b>Operational definitions related to patient's adherence behaviours (adapted from (Quigley et al 2019)</b>
<b>Knowledge</b>	An awareness of the existence of something	Provision of rationale for SMPP strategies and how and when to	Understanding rationale for SMPP strategies and how

		undertake SMPP strategies	and why to undertake them
<b>Skills</b>	An ability or proficiency acquired through practice	Physiotherapists addressed patients Techniques and abilities required to participate in exercise programmes and SMPP	Techniques and abilities required to participate in exercise and SMPP
<b>Social/professional role</b>	An identity a coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	Physiotherapist's consideration of patients personal, inter-personal, and work-related attributes that influence patients' ability to exercise	Personal, inter-personal, and work-related attributes that influence ability to exercise
<b>Beliefs about capabilities</b>	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Physiotherapist's consideration of patients' physical, mental, and psychological beliefs about ability to exercise	Physical, mental, and psychological beliefs about ability to exercise
<b>Optimism</b>	The confidence that things will happen for the best, or that desired goals will be attained	Physiotherapists' consideration of patients' Confidence about health status and ability to maintain their current level of activity	Confidence about health status and ability to maintain their current level of activity
<b>Beliefs about consequences</b>	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	Physiotherapists' consideration of patients' assumptions about of the effects of not exercising or adopting a healthy lifestyle.	Assumptions about of the effects of not exercising or adopting a healthy lifestyle.
<b>Reinforcement</b>	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Physiotherapist's consideration of patients' Perceived incentives of participating in exercise	Perceived incentives of participating in exercise

<b>Intentions</b>	A conscious decision to perform a behaviour or a resolve to act in a certain way	Physiotherapist's consideration of patients' level of readiness or motivation to exercise	Level of readiness or motivation to exercise
<b>Goals</b>	Mental representation of outcomes or end states that an individual wants to achieve	Physiotherapist's consideration of patients' Objectives of participating in exercise	Objectives of participating in exercise
<b>Memory, attention and decision processes-</b>	The ability to retain information, focus selectively on aspects of the environment, and choose between two or more alternatives	Physiotherapist's consideration of patients' current cognitive status on their ability to exercise	Influence of current cognitive status on ability to exercise
<b>Environmental context and resources</b>	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour	a. Physiotherapist's consideration of patients' contextual factors (e.g., time, location, money, weather, injuries, medications, comorbidities) that influence their ability to exercise  b. contextual factors (e.g., time, location, money, weather, injuries, medications, comorbidities) that influence physiotherapists provision of SMPP	Contextual factors (e.g., time, location, money, weather, injuries, medications, comorbidities) that influence ability to exercise
<b>Social influences</b>	Those interpersonal processes that can cause an individual to change their thoughts, feelings, or behaviours	Physiotherapist's consideration of effects of others on patients' ability to exercise	Effects of others on patients' ability to exercise
<b>Emotion</b>	A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal	Physiotherapist's consideration of patients' Affective factors that influence ability to exercise	Affective factors that influence ability to exercise

	with a personally significant matter or event		
<b>Behavioural regulation</b>	Anything aimed at managing or changing objectively observed or measured actions	Physiotherapist's consideration of patients' Ability to develop and maintain an exercise routine	Ability to develop and maintain an exercise routine

**Table 6.1 - definition of TDF Domains taken from Phillips et al (2015) with additional operational definitions for both physiotherapists' behaviours and patients' behaviours adapted from Quigley et al 2018)**

Although the TDF and COM-B were designed for use by non-psychologists (Atkins et al 2017) the language used within the TDF is rooted in psychological theory and terminology. The researcher does not have a psychology background and therefore ensuring understanding of the terminology is key in utilising the framework effectively. In a study exploring the experiences of those using the TDF in research, some non-psychologists felt disadvantaged by a lack of familiarity with terminology and its complexity of language (Phillips et al 2015).

Relevant domains were identified by the researcher and confirmed with the research team which included a health psychologist and a researcher familiar with using the TDF and COM-B model in practice-based physiotherapy research (Connell et al 2015). Patey et al (2012) described three factors for consideration when establishing TDF domain relevancy when analysing interview data: frequency of the beliefs across participants, presence of conflicting beliefs and perceived strengths of beliefs acting on the behaviour. Atkins et al (2017) also remind researchers when using the TDF to ensure that all codes and categories specifically relate to the target behaviour. On reviewing the open coding, some codes created did not specifically relate to the target behaviour (adherence to SMPP). For example, discussion about health promotion approaches were not included in the final determination of themes as they did not directly relate to actions that patients were being asked to take as part of an SMPP.

Some themes felt easy to 'fit' within the TDF framework. For example, where physiotherapists overtly used strategies to help patients remember their SMPP such as asking patients to recall elements of the SMPP they had just been given, this clearly mapped to the memory, attention and decision-making processes domain. Other examples were less obvious and required exploration of the content of the interview or conversation within the video to best understand the meaning of the phenomena. For example, one patient who was doing facial exercises (for a Bell's palsy), talked

about the emotional distress caused by repeatedly seeing her facial disfigurement when constantly exercising in front of the mirror. She explained how she had stopped doing the exercises in this way because of this. This was only one participant (no other participants were doing facial exercises) and therefore could not be considered a theme in itself however it did highlight emotional affect (Cane et al 2012) of exercise and resulted in a change in adherence behaviour. After discussion with the research team this finding was considered to best fit within the subtheme whereby patients modified their SMPP to suit their own preferences and feelings which was mapped into the behavioural regulation category.

Some codes did not obviously fit into a domain at first and although all these situations were resolved through research team discussion, Atkins et al (2017) note that such occurrences effectively test the capacity of the TDF to account for all information as the TDF is an evolving tool (Cane et al 2012). Some codes appeared to fit into multiple domains. For example, many codes appeared to fit into the environmental context domain as many factors can constitute 'context' including the 'therapeutic relationship' between the physiotherapist and patient. Initially, the researcher felt this to be part of the environmental context as it set the tone and 'feel' for the consultation. For example, some appointments felt rushed whereas for others a sense of empathy and understanding was felt. However, following discussion with the research supervisors and after re-reviewing the data it was agreed that this more accurately related to the social support domain as it was influenced and dependent on a social interaction between two individuals. This iterative process of mapping, cross checking and discussion with the research team continued throughout the data analysis periods.

Following the separate thematic analysis of the physiotherapists' behaviours and patients' adherence behaviours, a further stage of analysis allowed mapping of the themes to the capability, opportunity, and motivation components of the COM-B model (Michie et al 2011a). Synthesis of the findings to compare how the physiotherapists and patients' approaches were similar or different was then undertaken. A study using the COM-B and TDF model to co-produce interventions to reduce sedentary behaviour after stroke also focussed on mapping different individuals' behaviours (Hall et al 2020b). They focussed on the carers' behaviours in encouraging the target behaviour and the patients' behaviours themselves (Hall et al 2020b). This analysis of different individuals' behaviours allows comparison of the behaviours within the therapeutic relationship and their role in influencing the target behaviour.



### 6.7.7 Questionnaire Analysis

Questionnaire data was analysed separately and was used to complement and compare with the observational and interview data. Questionnaires included a five-point Likert scale for 18 statements relating to the TDF components (see Appendix 3) which were repeated at the three time points. The responses were number coded and analysed using an SPSS package for data entry and analysis. Reverse answers were reverse coded. The five points on the scale were condensed into three categories as sample sizes were small in each individual category. The categories 'strongly agree' and 'agree' were combined as were the categories 'strongly disagree' and 'disagree'. The category 'neither agree nor disagree' was unaltered.

Descriptive reporting was used to make overarching observations within and between patients. Comparison was made between patients at different points on their physiotherapy journey. Nominal data obtained from Likert style questions cannot be treated as interval data as there is no measurable standard difference between two points on the scale (Norman 2010). Data in this format is best represented with median and inter quartile range (IQR). Because participant numbers were small, the questionnaire data could not be statistically analysed for correlations and therefore was triangulated with qualitative data as a validation method to test assumptions and to add further insight. For example, where a patient suggested in an interview that they would not set goals, this was compared with the information given in the appointment and questionnaires regarding goal setting. This informed the narrative using both intra and inter patient comparisons. Self-reported adherence and outcome data was also analysed as descriptive data using histograms.

### 6.8 Rigour in Qualitative Research

There has long been discussion as to how to ensure quality and rigour within qualitative work. Some argue that reality is constructed by individuals in a specific moment in time and place whereas others argue that robust processes must be applied to qualitative research to ensure its external validity and quality (Novell 2017). Guba & Lincoln (1985) propose that trustworthiness of a research study is important to evaluating its worth. Trustworthiness involves establishing:

- **Credibility** - confidence in the 'truth' of the findings
- **Transferability** - showing that the findings have applicability in other contexts
- **Dependability** - showing that the findings are consistent and could be repeated

- **Confirmability** - a degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest.

This process of combining research results is called triangulation (Denzin 1989, Kimchi & Stevenson, 1991). The aims of triangulation are to improve the credibility of a study and to facilitate a deeper understanding of the phenomena under investigation, enriching the findings and adding value by explaining the phenomena from multiple viewpoints (Mays & Pope 2000, Johnson & Christensen 2012). Triangulation is a method by which credibility can be determined. Guba and Lincoln (1985) stated that credibility within qualitative research comes from ensuring that the multiple realities of the phenomena presented by the participants are represented accurately and tested within various groups of similar participants. Sandelowski & Barroso (2007), suggested that a qualitative study is more credible when other people who share experience of the phenomena would recognise the descriptions and interpretations that are presented. Member checking was considered as a method to increase credibility and confirmability (Birt et al 2016) but had not been included in the ethics application so was not possible, but on reflection could have been utilised. Combining the research findings from the videos, observations, interviews, and questionnaires in this study allowed the findings from each to be compared with the other for trustworthiness and credibility. All the data was compared to identify key themes within, and between, patients (Carter et al 2014). This allowed for deeper analysis, validation, and triangulation of data (Rothbauer & Paulette 2008). This was important when identifying themes and consideration of all data sources.

### 6.8.1 Reflexivity

Reflexivity refers to understanding the role of self in the research and considerations of the pre-conceived assumptions that the researcher brings to the research (Dodgson 2019). It is a crucial process within qualitative research and the gold standard for establishing trustworthiness (Teh & Lek 2018). Exploring and identifying the contextual intersecting relationships (e.g., race, professional status, socio-economic status, age, cultural background) between the participants and the researcher, it not only increases the creditability of the findings (Berger 2015) but also deepens understanding of the work (Dodgson 2019). Reflexivity is a process that permeates the whole research endeavour and should be ongoing (Dodgson 2019).

Researching as an outsider always requires a reflection on power (Karnieli-Miller et al 2009) as power differentials are always inherent with the researcher/participant relationship. As an experienced physiotherapist observing the practice of other physiotherapists there was a clear power dynamic within the present study that must be acknowledged and critically reflected upon. This power dynamic has been evidenced and acknowledged throughout the research process

including within the non-approval of the initial ethics application, the choice of AV recordings as a method over direct observations and within the data analysis process. Maintenance of field notes and a reflective log throughout the reflective process aiding this critical reflection (Emerson et al 2011, Pacheco-Vega, 2019).

A full reflective and honest account explores and reflects on my growth and development as a researcher including how I was positioned in the research study and how I interacted with participants including both physiotherapists and patient (see reflexivity statement Appendix 6).

*Specific examples taken from field notes include reflections on conversations when a junior physiotherapist participant discussed their anxieties about their diagnostic and treatment approaches with me. Also, the personal reflection of how I felt when I observed the AV recording and saw something that made me feel uncomfortable. At these moments I had to reflect on what my preconceived assumptions, experiences and knowledge brought to the process and how this would affect my thoughts and construction of knowledge.*

To summarise, and to provide confidence in the results of this study, research suggests that “there are four characteristics that are necessary to assess the trustworthiness of the researcher” (Krefting, 1991, p220).

*Firstly, I am familiar with the phenomena under study, and have experience of the setting and context, both for the physiotherapists and as a patient. Secondly, I have a long-established interest in the subject area, knowledge base and the published literature and have been able to conceptualise large amounts of qualitative data as part of this study. Thirdly, I hope to have demonstrated the ability to examine the phenomena from several different perspectives, not only by including data from the physiotherapists and patients, but also by considering the behavioural theory when interpreting the results of the study. Finally, although my investigative skills are continually being developed, I have applied rigorous and transparent processes to my collection, analysis, and interpretation of the data. I do have beliefs, values and opinions that have influenced my approach to this research however....*

*“Subjectivity is the strength of interpretive work, and to remove the researcher from it would be undesirable” (Galdas, 2017, pg.2).*

## **6.9 Summary**

Data collection used mixed methods underpinned by strong ethical principles. Studying ten participants longitudinally across the course of the first two physiotherapy appointments allowed more detailed study of individuals' experiences of receiving and undertaking an SMPP compared to a larger cross-sectional design. Data analysis used a staged, robust, comprehensive, but iterative approach, designed to best construct meaning of the data in relation to the study aims. The ethical approval, data collection and analysis stages were all iterative and dynamic processes which developed through a reflexive approach of learning and reflection. The next two chapters present the findings in relation to the study aims. Chapter seven presents the findings relating to the content and provision of the SMPPs and chapter eight presents the findings relating to the patients experiences and their adherence behaviours towards SMPPs.

## CHAPTER SEVEN - FINDINGS PART 1; CONTENT AND PROVISION OF SELF-MANAGEMENT PHYSIOTHERAPY PROGRAMMES

### **7.1 Introduction**

In the previous chapter the methods, data collection and analysis processes for the study were described. This chapter presents the findings relating to the first two research objectives; an analysis of the content of the SMPP, and observations of how SMPPs were provided by the physiotherapists. After describing the participants, a content analysis of the SMPPs is presented. This includes the SMPP strategies given, instructional methods and the time spent by physiotherapists on SMPP provision and their modification over the period of the patients' first two appointments. Although data is primarily gleaned from the appointment videos, all the data sources are drawn on and compared, including questionnaires, interviews and wider field notes including printed exercise sheets. The themes identified from the inductive thematic analysis of the physiotherapists behaviours taken from the video observations and transcripts are then mapped to the TDF domains (Cane et al 2012). This allows analysis of if, and how, physiotherapists addressed patients' capability, opportunity and motivation to adhere when providing SMPP programmes. It is important to note that physiotherapists were not asked to address the TDF domains, and the findings are observations of 'usual' practice. A summary of the key findings relating to the objectives are presented at the end of the chapter. Patient participant names are replaced with pseudonyms for anonymity.

### **7.2 Data collection**

Eleven patient participants and seven physiotherapist participants took part in the study between January 2018 and October 2018. Twenty-two video recordings of consultations were made and 22 semi-structured, face to face interviews were conducted (2 videos and 2 interviews per participant). All eleven patients completed 3 questionnaires over the course of their first two appointments except one participant who did not return the final postal questionnaire. The average time between first appointment and first interview was five days and four days between the second appointment and second interview.

#### **7.2.1 Physiotherapist Participants**

Physiotherapists were recruited first. A total of 13 physiotherapists initially volunteered to participate in the study (5 at site 1 and 8 at site 2) but seven physiotherapists took part (3 at site 1 and 4 at site 2) as only physiotherapists who were seeing the patients who agreed to take part were needed. Three physiotherapists volunteered at site one (two male and one female) with a range of

experience levels. These three physiotherapists covered three clinic sites, so initially one clinic for each physiotherapist was chosen to cover a range of clinic types, times and days to maximise the diversity of patients recruited. Four female physiotherapists volunteered at site two and all saw one patient in the study. These physiotherapists worked across two hospital sites and had varying levels of experience (NHS Agenda for Change bands 6 and 7).

Five physiotherapists were female and two were male. The physiotherapists were from band five to seven (NHS Agenda for Change) and their experience of working in MSK ranged from one year to 24 years with an average of 10 years MSK experience (see Table 7.1). Mean years of MSK experience did not necessarily increase with those in higher band roles. Two physiotherapists saw more than one patient in the study, with one physiotherapist seeing four different patients in the study.

Physiotherapist ID number	Site	Gender	Agenda for Change Pay Band	Number of years MSK experience	Number of patients participants seen within the study
1	1	F	6	16	4
2	1	M	7	7	1
3	1	M	5	3	2
4	2	F	6	25	1
5	2	F	6	8	1
6	2	F	7	12	1
7	2	F	6	9	1
				Mean MSK experience Band 5 staff=3 years Band 6=14.5 years Band 7=9.5 years.	

**Table 7.1 - showing the demographic profile of physiotherapist participants**

### 7.2.2 Patient Participants

Recruitment initially started at site one but, as recruitment increased, the focus moved to site two. A total of 80 patients were invited at site one and 23 patients were invited at site two (see table 7.2). Volunteer rates were initially higher at site two where four patients initially volunteered (3 female and one male). Further invites were then sent out across both sites, predominantly to females with

the aim of achieving the target of 10 participants. Two more participants volunteered; one male and one female (both at site 1).

Recruitment exceeded the target of 10 participants. However, if patients were not given an SMPP they were not be able to continue in the study. This acted as a contingency to mitigate against non-attendance or drop out. A total of 13 patients (8 at site 1, 5 at site 2) consented to take part however, one failed to attend the first interview (site 1) and did not respond to a request to rearrange and was therefore withdrawn. A second participant (site 1) did not receive an SMPP at the first appointment as he required further medical investigation and therefore was withdrawn from the study. Uptake rates were higher in men with approximately one in seven patients volunteering compared to approximately one in 14 women. The total numbers invited and volunteering as participants at each site are outlined in Table 7.2.

NHS Site	No. Patients invited		Participants	
	Male	Female	Male	Female
<b>site 1</b>	38	42	6	1
<b>site 2</b>	10	13	1	3
<b>Total</b>	<b>48</b>	<b>55</b>	<b>7</b>	<b>4</b>

**Table 7.2 - Number of patients invited to take part and volunteering to participate at each site**

Eleven participants were recruited ranging from 34-91 years with an average age of 59 years. Seven were male and four were female. All participants were of white British ethnicity. Patient participants were attending physiotherapy with a range of upper limb, lower limb and spinal MSK problems. Patients were from both GP and consultant referrals. The demographic profile of patient participants can be seen in Table 7.3.

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>
Nationality	White British	11
Age	30-39	2
	40-49	1
	50-59	2
	60-69	4
	70-79	1
	90-99	1
	Gender	Male
Female		4
Marital Status	Married/ cohabiting	4
	Divorced/ separated	3
	Widowed	2
	Single	2
Employment status	Working full time	4
	Working part time	1
	Unemployed	2
	Retired	4
Highest Educational level	Degree/ Higher degrees	4
	Vocational qualifications/ A levels	3
	GCSE/ O levels	2
	No formal	2
Previous Physiotherapy	Yes	8
	No	3
Condition	Neck	2
	Lower back/spine	5
	Upper limb	1
	Lower limb	2
	Facial	1



Referral source	GP	9
	Consultant	2

**Table 7.3 - Profile Characteristics of patient participants (n=11)**

### **7.3 Physiotherapy Service and Appointment Structure**

Physiotherapists at both sites ran continuous clinics in blocks and saw patients with a range of conditions. This was except for one physiotherapist at site two who only saw patients with spinal conditions. Patients were referred from GPs and NHS consultants and were booked into physiotherapy appointments based on the patients' preference for the location, time or date of the appointment. New patient appointment slots ranged from 40 minutes to one hour and the follow up appointment slots were 20 minutes in length. Physiotherapists did not have any breaks between appointments within a clinic block and needed to complete all documentation within the appointment time.

All patients saw the same physiotherapist at both of their appointments. One patient also had a student physiotherapist present in the first appointment. There was an average of 20 days between the first and second physiotherapy appointments and physiotherapists did not contact patients in between appointments. Two patients rearranged their second appointments.

The first physiotherapy appointments were all new patient appointments, and all included a subjective (clinical history) and objective (physical examination) assessment. The duration of the first appointments ranged from 23 to 59 minutes with a mean duration of 40 minutes. All patients were provided with a SMPP. None of the participants received any other forms of physiotherapy treatment at their first appointment.

The second appointments were shorter, ranging from 11 minutes to 32 minutes with a mean duration of 18 minutes. During the second appointments, all patients had a review or discussion regarding their SMPP programme. At the second appointment, two of the 11 patients received treatment from the physiotherapist in addition to review of their SMPP; these treatments were trigger point release, and cervical spine manual therapy (one participant at each site).

## 7.4 Content of SMPPs

To partake in the study patients had to be given an SMPP at the first appointment. Ten patients received exercises as part of their SMPP and six patients also received non-exercise strategies. Home exercises were the most common strategy given, followed by heat application and activity modification advice. One patient declined exercises and was given a non-exercise strategy to wear heel inserts (orthotics). Frequencies of the SMPP strategies provided are outlined in figure 7.1. Case summary narratives were created for each participant and provide a descriptive summary of the SMPP given during treatment (for case summary examples see Appendix 5).

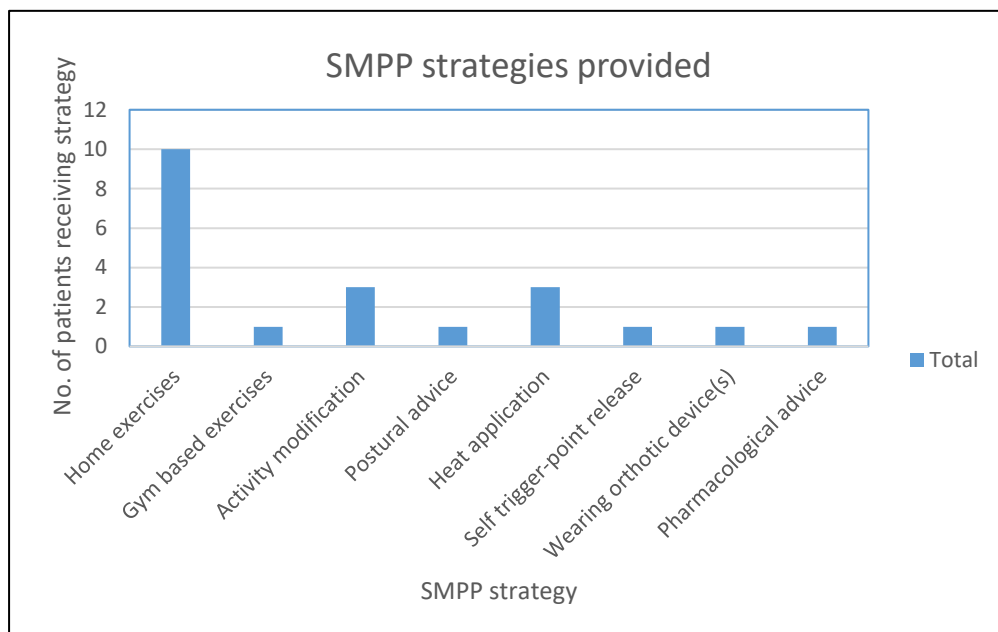


Figure 7.1 - Graph showing frequency of SMPP strategies provided

### 7.4.1 Non-Exercise Strategies

Non-exercise strategies given within the SMPP included continual wearing of heel inserts (orthotics), activity modification (e.g., increasing or decreasing walking distance or speed), postural correction, advice on the application of heat, use of pharmacological analgesics and self-administered trigger point release techniques (massage technique). These strategies were generally poorly described, ranging from detailed instructions through to non-specific advice. For example, one patient was given a long explanation as to how to undertake self-trigger point massage.

*“So this is called a trigger point release technique, so what you are trying to do is within the quads, your quads is made up of four big muscles, and within each of the muscles you have tiny little fibres that contract now if you’ve got an area of spasm, where you got a small proportion where it’s in spasm, we call it a trigger point, and it has the ability to give you pain, on its own. So, to try and release the trigger point, what you do is warm it up, so.... you*

want to hold the pressure, not to where you are getting lots of extra symptoms. Then you would release it". (Physiotherapist in Chris video 1)

Other patients were given more vague conversational advice. None of the advice regarding heat application discussed specific instructions of when or how long to apply heat, safety checks or how to prevent burns.

"So initially all I'm going to give you to do is put a bit of heat around it, and I want you to try and keep it moving, ok?." (Physiotherapist in Sam video 1)

Physiotherapists spent considerably less time teaching non-exercise strategies in the appointment compared to provision of exercises. None of the patients were given printed materials relating to instructions or explanations of non-exercise strategies.

#### 7.4.2 Exercise strategies

The number of individual exercises given within the first appointment ranged from one to eight (median = 3) per patient. The total number of items given within the first appointment, including the number of individual exercises and non-exercise self-management strategies varied from 2-8 (median= 5). Seven patients were given additional exercises at their second appointment. Four patients were asked to continue with the same exercises and had no progression of exercises at the second appointment. Two patients, who were given additional exercises at the second appointment, also had existing exercises replaced with different exercises. The number of exercises given to each participant at the two appointments is outlined in figure 7.2.

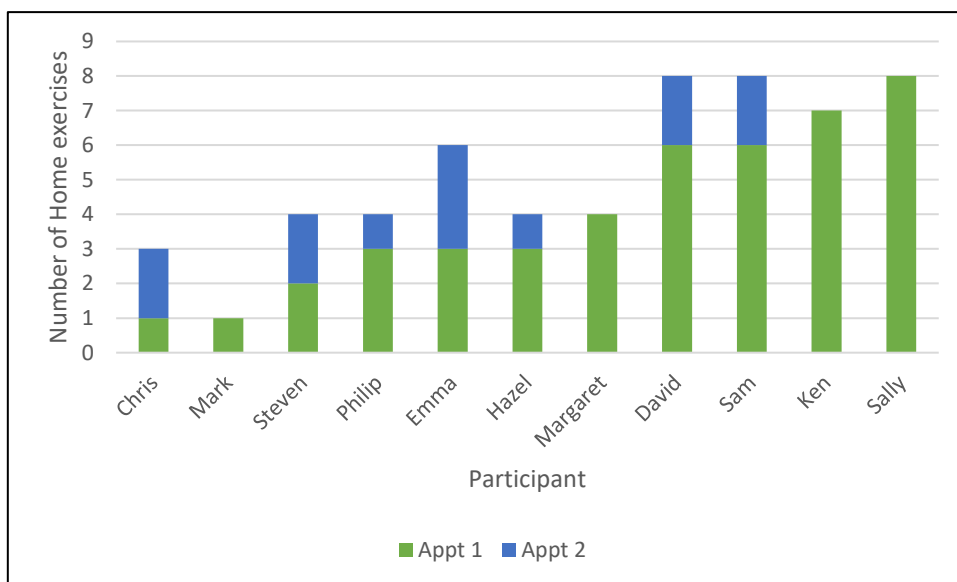


Figure 7.2 - Number of exercises provided for each participant at first and second appointments

Patients were provided with a range of different exercise types; from specific therapeutic exercises through to general physical activities. For example, one patient was asked to do a specific neural gliding exercise with specific instructions on body position and timings. Others were asked to complete general movements with less concern for the specific position and more focus on doing movement however it best suited the patient.

Table 7.4 outlines the exercises provided for each participant and starting position at both appointments. One patient was given multiple movements for the same anatomical region (several neck movements), whereas others were given varying exercises for different anatomical areas with different starting positions. Exercises done in derivatives of the lying position; prone (front) or supine (back) lying, could potentially be done on either the floor or the bed depending on patient's choice, but this was not always outlined to the patient. The number of starting positions needed to be achieved by each patient varied from one, where all exercise could be done in the same starting position/ place (e.g., sitting), to four positions required; sitting, standing, standing on the edge of a step and supine. Only two patients required equipment; one needed a rolled up towel and another patient required a small cushion, an elastic resistance band (provided by the physiotherapist) and a flat wall area. Another patient, who described having access to a private gym, was asked to do exercises at the gym using fixed weights machines.

Patient	Appointment 1			Appointment 2		
	Exercise provided in SMPP	No. of exercises	No. of starting positions	Exercise provided in SMPP	Total No. of exercises	Total No. of starting positions
<b>KEN</b>	Sitting or standing; Cervical spine flexion and extension Cervical Left and right side rotation Cervical Left and right side flexion Cervical Retraction	7	1	No change	7	1
<b>PHILIP</b>	Sitting; lumbar flexion  Lying or long sitting; Knees side to side.  Alternate knees to chest	3	2	Add in;  Crook lying ; pelvic tilting	4	3
<b>EMMA</b>	Sitting; Cervical retraction Standing; stepping forward with one leg and opposite arm up into flexion whilst maintaining core and neck position. Side lying; Hip abduction (clam)	3	3	Add in  Crook lying; pelvic tilt-bridge  Standing; Dumb waiter (shoulder external rotation stretch)  Sitting; cervical lateral flexion Cervical rotation	7	4
<b>STEVEN</b>	Standing; Shoulder flexion slide against wall in standing Active lateral rotation shoulder stretch with pillow Sitting; Pillow under arm. Isometric Lateral rotation -	3	2	Stops exercise 2. (Lateral rotation stretch) as too painful. Adds;  Standing or Supine; Bilateral external rotation with yellow Thera band  Sitting; Lateral rotation with weight in sitting with arm in approx. 60 degree abduction.	4	2

<b>CHRIS</b>	Prone lying or Standing; Quadriceps stretch (physio prefers patient to do in prone to fix hip position).  Prone lying ; knee flexion and extension (neural glide)	2	2	No change	2	2
<b>HAZEL</b>	Standing; Transfer weight side to side.  Sitting; waterfall exercise .Let arms 'float' upwards Taking arms forward into 90 degrees flexion and lowering down as breathe out.	2	2	Added in  Crook lying (on bed) (does not expect patients to lie on floor) Push feet into floor –posterior pelvic tilt-bridge as able.  Sitting; Tai chi exercise Spring to Autumn: arms flex to 90 then out to side and lower down.	4	3
<b>MARK</b>	Sitting; foot dorsi-flexed; extend and flex knee. (neural glide)	1	1	Stop gliding exercise as making it worse  Start gym sessions LL weights machines  Sitting; Single seated leg press  Prone; hamstring curl	2	2
<b>SAM</b>	Sitting ; Shoulder flexion Shoulder abduction Thoracic rotation Standing; lumbar/thoracic side flexion Standing on step; foot on edge of step calf stretch Calf raises Supine; Hamstring stretch	7	4	Increase repetitions	7	4
<b>SALLY</b>	Sitting or standing in front of mirror;	8	1	No change	8	1

	8 facial exercises; Smiling, eyebrow lift,					
<b>MARGARE T</b>	Cr Lying; Pelvic tilt. Bridging Side lying; hip abduction -Clam hip abduction	4	2	No change	4	2
	<b>Median</b>	<b>3</b>	<b>2</b>		<b>4</b>	<b>2</b>
	<b>Mode</b>	<b>3</b>	<b>2</b>		<b>4</b>	<b>2</b>
	<b>Range</b>	<b>1-8</b>	<b>1-4</b>		<b>2-8</b>	<b>1-4</b>
	<b>IQR (interquartile range)</b>	<b>5</b>	<b>2</b>		<b>3</b>	<b>2</b>

**Table 7.4 - Numbers and descriptions of exercises provided within the SMPP (and associated starting positions) and any changes over the course of the first two physiotherapy appointments for each participant**

### 7.4.3 Time Spent on SMPP

The majority of the duration of the first appointments was spent on assessment of patients. The average time spent on teaching exercise strategies of the SMPP at the first appointment was five minutes and 52 seconds (13% of the total consultation) and four minutes 30 seconds in the second appointment (25% of total consultation). The time spent on teaching non-exercise elements of the SMPP was one minute 30 seconds in the first appointment (4% of total appointment) and one minute and seven seconds in the second appointment (7% of total appointment). The total appointment times and times spent on delivering SMPP elements are outlined in tables 7.5. Table 7.6 outlines the time spent (and percentage) on non-exercise strategies (minutes and seconds) within each appointment for relevant participants (n=6).



Patient Participant	Appointment 1			Appointment 2		
	Total appointment time	Time spent on teaching exercise (minutes and seconds)	Time spent on teaching non-exercise	Total appointment time	Time spent on teaching exercise (minutes and seconds)	Time spent on teaching non-exercise SMPP
KEN	33'36'	2'02' (6%)	1'00 (3%)	17'02'	3'10' (19%)	1'00 (6%)
PHILIP	55'37'	5'56' (11%)	1'35' (11%)	31'47'	8'20' (26%)	1'00' (3%)
EMMA	33'50'	8'05 (24%)	1'33' (5%)	17'41'	9'45' (55%)	2'40' (15%)
STEVEN	36'20'	8'30' (23%)	n/a	19'21'	9'30' (49%)	n/a
DAVID	38'50'	2'55' (8%)	0'50' (2.1%)	15'30'	3'45' (25%)	0'30' (3%)
CHRIS	59'12'	4'23' (7%)	2'20' (4%)	15'09'	2'05 (14%)	n/a
HAZEL	34'33'	4'36 (12%)	n/a	12'33'	6'26' (30%)	n/a
MARK	42'52'	4'25' (10%)	n/a	21'58'	7'30' (34%)	n/a
SAM	49'14'	3'37' (7%)	0'40' (1%)	13'52'	2'55' (14%)	n/a
SALLY	22'40'	5'20 (24%)	n/a	10'41'	2'15 (21%)	n/a
MARGARET	35'22'	11'00' (31%)	n/a	13'36'	1'40' (12%)	n/a
% of total appointment time		14.8 %	4.4%		27%	
Median	36'20'	4'36	1'33'	15'30'	15'30'	
IQR	15'24	4'28	1'30'	5'45'	5'30'	

**Table 7.5 - Table outlining total appointment times and time spent (minutes and seconds) within each appointment on delivering all SMPP elements for each participant.**

Appointment 1 (time spent on SMPP strategies)							Appointment 2 (time spent on SMPP strategies)						
Participant	Total appt time	Heat	Postural advice	Activity advice	Self-massage	Orthotics	Total Appt time	Heat	Postural advice	Activity advice	Self-massage	Orthotics	
KEN	33'36'	1'00' (3%)					17'02'			1'00' (6%)			
PHILIP	55'37'			1'35' (11%)			31'47'	1'00' (3%)					
EMMA	33'50'		1'33' (5%)				17'41'		02'40' (15%)				
DAVID	38'50'			0'30 (1.3%)		0'20' (0.8%)	15'30'					0'30' (3%)	
CHRIS	59'12'				2'20' (4%)		15'09'						
SAM	49'14'	0'40' (1%)					13'52'						

**Table 7.6 - Table outlining breakdown of time spent (and percentage) on non-exercise strategies (minutes and seconds) within each appointment for relevant participants (n=6)**

### **7.5 Provision of the SMPPs**

This section presents the themes derived from the inductive analysis of observations and video transcripts relating to the way in which SMPPs were provided to patients by the physiotherapists. The identified themes were deductively mapped onto the TDF domains and then to the COM-B model.

#### **7.5.1 Mapping of Themes to Theoretical Domains Framework**

Eight themes were identified from the observations of the way that the SMPPs were provided. These themes were deductively mapped onto the TDF framework (Cane et al 2012). When mapping themes it was apparent that two themes related to the physiotherapists own capability, opportunity and motivation to provide the SMPPs (physiotherapists' role and confidence and physiotherapists' environment). The remaining themes reflected how the physiotherapists addressed the patients' adherence behaviours namely their capability, opportunity and motivation to adhere.

All themes mapped to TDF domains but not all domains had themes mapped against them. Table 7.7 sets out the themes and how they map to the TDF domains. The domain constructs are included to provide clarity for the reader and were used to help guide the mapping process. For completeness, all domains are included, including those that did not have themes mapped to them. The themes are presented in the order of the TDF framework (Cane et al 2012) and not in order of frequency or importance. Patients' and physiotherapists' quotations are used to illustrate the main points. The themes are discussed in relation to the TDF domains to which they mapped.

<b>THEME</b>	<b>TDF DOMAIN</b>	<b>CONSTRUCTS</b>
<b>1. PROVISION OF INFORMATION</b>	Knowledge	Knowledge (including knowledge of condition /scientific rationale) Procedural knowledge Knowledge of task environment
<b>2. INSTRUCTION STYLE</b> <b>3. PROGRAMME FLEXIBILITY AND SELF-REGULATION</b>	Skills	Skills Skills development Competence Ability Interpersonal skills Practice Skill assessment
<b>4. PHYSIOTHERAPISTS' ROLE AND CONFIDENCE</b>	Social professional / role and identity	Professional identity Professional role Social identity Identity Professional boundaries Professional confidence Group identity Leadership Organisational commitment
<b>5. PATIENTS' CAPABILITY AND SELF-EFFICACY</b>	Beliefs about capabilities	Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence
	Optimism	Optimism Pessimism Unrealistic optimism Identity
	Beliefs about consequences	Beliefs Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequents

	Reinforcement	Rewards (proximal /distal, valued /not valued, probable /improbable) Incentives Punishment Consequents Reinforcement Contingencies Sanctions
	Intentions	Stability of intentions Stages of change model Trans-theoretical model and stages of change
	Goals	Goals (distal / proximal) Goal priority Goal / target setting Goals (autonomous / controlled) Action planning Implementation intention
<b>6. REMINDERS</b>	Memory, attention and decision processes	Attention Attention control Decision making Cognitive overload / tiredness
<b>7. PATIENTS' ROUTINE AND ENVIRONMENT</b> <b>8. PHYSIOTHERAPISTS' ENVIRONMENT</b>	Environmental context and resources	Resources / material resources Organisational culture /climate Salient events / critical incidents Person x environment interaction Barriers and facilitators
	Social Influences	Social norms Group conformity Social comparisons Group norms Social support Power Intergroup conflict Alienation Group identity Modelling
	Emotion	(A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event) Anxiety Affect Stress Depression Positive / negative affect Burn-out
	Behavioural regulation	Self-monitoring Breaking habit Action planning

**Table 7.7 - The 8 themes identified relating to the provision of SMPP programmes and mapping to TDF domains (Cane et al 2012).**

## TDF domain; Knowledge

### **Theme 1; Provision of information**

Information was given to patients in both appointments relating to their condition, prognosis and the rationale for the SMPP. This information was provided in a variety of ways with varying depths of detail and complexity. Large parts of the appointments involved information exchange with verbal communication alongside demonstrations and opportunities for patients to practice the movements whilst in the appointment.

The amount of information provided relating to the diagnosis and rationale for the SMPP was generally low. Three patients already had a medical diagnosis provided by their GP (Bell's palsy and partial rotator cuff tear and hip OA). Four patients had no explicit discussion about their diagnosis but the physiotherapist seemed aware of the cause of the problem. For the remaining four patients there was diagnostic uncertainty. Three of those patients where the diagnosis was unclear were referred for further investigations by the physiotherapist.

Generally, even if the patients had a diagnosis there was little discussion or explanation of the diagnosis or problems within the consultations. When problems were discussed, explanations were vague and there was confusion, inconsistency and contradictions in the language used. Four of the patients received non-specific descriptions of the problem based on an impairment or dysfunction (e.g. back stiffness). Several words such as stenosis, femoral nerve tightness and degenerative change were mentioned in passing but not explained.

*"The hip joints themselves don't feel too bad, so I think a lot of it, is just that your back is really tense, so when you're trying to move your hips you're finding a bit of pressure..."*  
(Physiotherapist in Philip video 1)

There appeared to be assumptions that the patients understood the diagnosis. For example, one patient had 'degenerative change' in his neck (cervical spondylosis) but this was not explicitly discussed, leaving the patient confused and thinking he had whiplash.

*"Yeah, there is a muscular element but there's also an atrogenic element, there's a bony and a joint element. We've got that degenerative change haven't we?"* (Physiotherapist in Ken video 1)

Most physiotherapists gave some rationale for the SMPP but this varied, as did the technicality of the language used. Some physiotherapists provided this in the context of the anatomical and physiological rationale whereas for others it was related to the expected outcomes and how it may

be experienced by the patient. One physiotherapist explained an exercise using jargon and complex medical explanations.

*“So that’s all you’re going to do. The idea is that the brain is attached to the spinal cord, nerves are attached to cord, if you’re doing both at the same time you’re going to put a lot of tension through the system, the theory being, and they’ve shown it on MRI as well. So, you’re going to do it alternate. The idea is that when you do the other side, it can allow some micro movement of the cord (rubs hands together) to release, not release, and lessen any pressure that’s there is there.”* (Physiotherapist in Mark video 1)

Five patients were given printed information sheets by the physiotherapist which provided information regarding their SMPP. One patient had already been given a printed sheet of exercises from a medical condition website by the referring GP and declined an updated sheet. Of the six patients who received a printed sheet, four were produced specifically for the patient with bespoke exercises using the PhysioTools® (physiotherapy exercise software package). All physiotherapists had access to this software. Two patients had materials printed from medical condition websites (one by a GP and one by the physiotherapist). No patients were offered or provided with video materials.

Of the seven physiotherapist participants, three physiotherapists gave printed information. Physiotherapists appeared to have a preferred style of either giving printed information routinely or alternatively, offering the printed information right at the end of the consultation and letting the patient decide if they wanted to take the information sheet (all of whom declined).

*“So what I’ve actually printed out is a few simple exercises (shows patient printed sheet). So can I give you a copy of this?”* (Physiotherapist in Sally video 2)

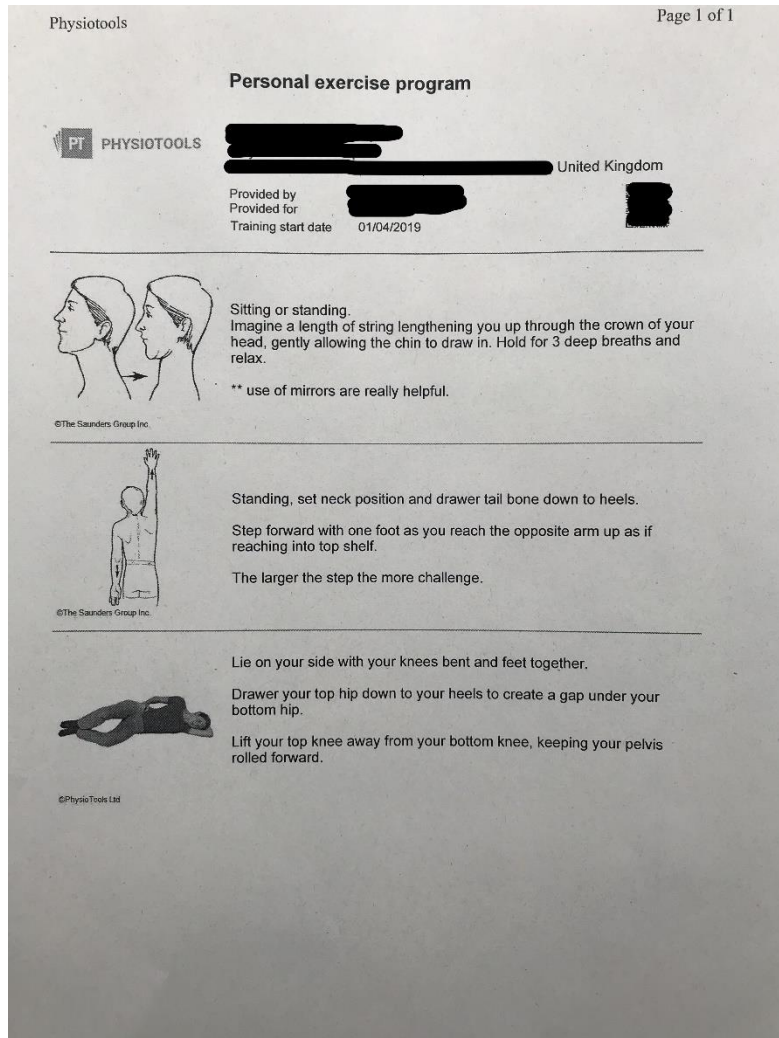
Five patients all who were asked briefly, in passing (at the end of the appointment), if they wanted printed information all declined. One physiotherapist (working with a student), after providing the SMPP the programme and spending time demonstrating and summarising the exercises, then added in unplanned additional exercises at the very end of the consultation when selecting exercises to put on the printed sheet based on previous selections for other patients on the PhysioTools® programme.

*“Ah ok, put that one in, try that as well. There’s a couple of calf stretches, you could try those as well (physiotherapist and student laugh) dah! These are already on from another patient. There’s a couple of calf stretches, you could try those because your calves are tight and your hamstrings are really tight, we’re slightly freestyling aren’t we”* (Physiotherapist to student in Sam video 1)

All the printed materials had pictures and some level of written instruction of when or how to complete the exercises (for examples see figures 7.3 and 7.4). All were printed in black and white. Some physiotherapists also referred to providing the printed materials to act as a reminder for

patients to complete the exercises once they had left the clinic. No printed information was given relating to the non-exercise SMPP strategies.

*“So I have written what we’ve done so hopefully that will jog your memory when you get home”*. (Physiotherapist in Emma video 1)



**Figure 7.3 - Example of a bespoke PhysioTools exercise sheet provided to a patient at appointment one.**

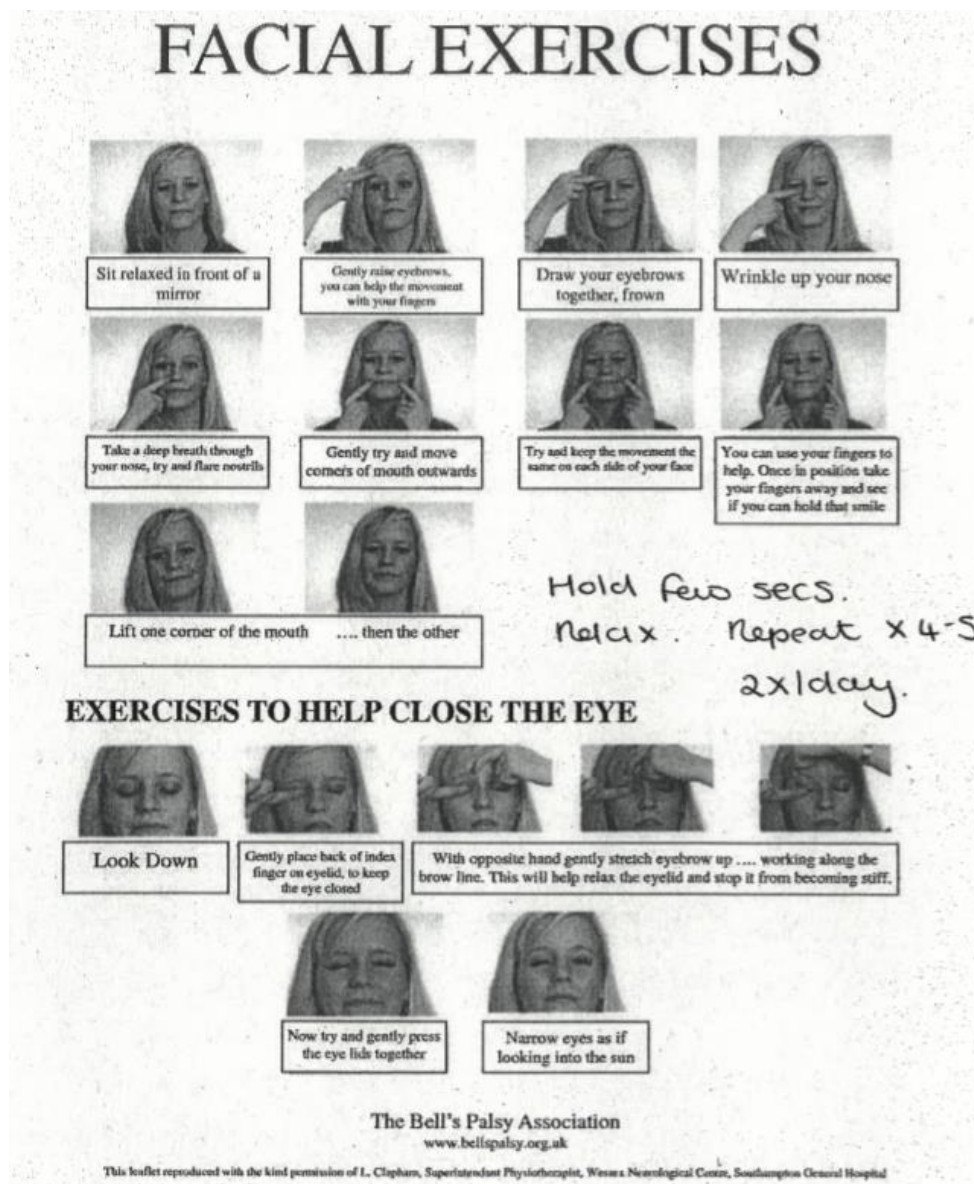


Figure 7.4 - Example of pre-printed sheet from a medical website provided to a patients at appointment one.

### TDF domain; Skills

#### Theme 2; Instruction Style

The instruction formats used to provide the SMPP varied, and included verbal instructions, demonstrations by the physiotherapists, feedback and opportunities for patients to practice. Verbal instructions were sometimes short and succinct and at other times were very lengthy and interspersed throughout the consultation. Language used was varied, with some physiotherapists explaining information and exercises in layman's terms whilst others used complex medical jargon.



*“We’re [physiotherapists] looking at that graded exposure as we discussed last time. Adding compression, tension, stretch to nerves in a normal standpoint in a graded way if you can but doing too much can have a negative impact.” (Physiotherapist Mark video 1)*

Two physiotherapists used an analogy or narrative to teach exercise; for example, using phrases such as, ‘*imagine someone is pulling a cord up through the crown of the head*’, ‘*imagine squashing a pea*’ and ‘*lifting a pearl necklace off the bed*’. This was accompanied with patients practising the exercises and being asked to visualise or feel a sensation or experience.

*“So just relax for me, so what we’re going to do is squash that pea. Then we’re going to squeeze your bottom and you’re going to see if you can peel your spine up off the bed, ok, so I want you imagine your spine a little bit like a pearl necklace, if you grabbed the end pearl and you slowly lifted it up the pearls would follow slowly.” (Physiotherapist in Emma video 2)*

The other physiotherapist using narratives or stories taught Tai Chi exercises included an exercise named ‘Spring to Autumn’ which, as the patient moved their arms, followed the order of a tree growing and blooming and then its leaves falling. Both of the physiotherapists who used analogies and narrative tended to use more lay language and combined verbal instruction with practical demonstration or opportunities for patients to practise the strategy.

In order to aid understanding and skill development, several physiotherapists demonstrated the exercises for the patient. Practical demonstration was used in some way by physiotherapists for 10 out of the 11 patient participants. The physiotherapist demonstrated movements to provide visual cues to complement verbal instruction. The demonstrations varied from an exact technical demonstration of the exercise through to the physiotherapists mimicking or intoning at the movement. Physiotherapists only demonstrated the exercises fully when they were carried out in sitting or standing positions. No exercises performed in a lying position were demonstrated by physiotherapists.

*“So I’m going to do these two exercises, I’ll show you them first.” (Physiotherapist in Hazel video 1) (Both exercises in sitting)*

Three of the physiotherapists showed a movement that mimicked the actual movement, for example moving their hands up and down to represent the heels raising up and down or taking the hands/arms side to side to represent rolling the knees from side to side in crook lying. Three physiotherapists inadvertently demonstrated exercises when patients were getting dressed after the consultation or were not looking at the physiotherapist and therefore could not see the demonstration.

*“So what I’m going to do now is a few postural bits, erm, I’m just going to get you start doing some chin tucks.” (Physiotherapist demonstrates cervical retraction exercise in*

*standing whilst patient is sitting and looking down putting clothes/ watch back on)*  
(Physiotherapist in Emma video 1)

Five patients were invited to practice the exercises within the appointment and this allowed the physiotherapists to see if they were physically capable of doing them and how their symptoms responded as well as patients knowing they had the capability and competence to perform them (see figure 7.5).



**Figure 7.5 - Photograph illustrating one of the physiotherapists teaching an exercise by giving the patient opportunity to practice (permissions granted).**

Other patients who were not asked to practise the exercises often chose to join in and have a go at the exercise whilst the physiotherapist was demonstrating and explaining.

Several physiotherapists were concerned with the ability of the patient to perform the correct exercise technique. They used verbal prompts and ‘hands-on’ facilitation to correct patients’ technique and reinforce correct exercise performance. Sometimes this opportunity to practise the movements led to the physiotherapists altering or omitting exercises based on the patients capability.

*“It might be a bit much with the lift so we’ll stick with the tilt, it’s just to see where it’s at. So what we’ll do, just let that settle for a minute, so we’ll just stick with the tilt, keep your knees like this and everything just nice and straight, tighten slowly just think bottom of your stomach”.* (Physiotherapist in Philip video 2)

Several physiotherapists gave positive feedback and praise in response to the patient’s performance or asked patients for feedback as to how they had experienced doing the exercises.

*“If you put your legs completely straight, and then you almost want to keep on your side and this one you squeeze that muscle [touches lateral hip upper leg] and you’re going to lift that leg up, and down. You don’t have to lift it high; is that too hard?” (Physiotherapist in Margaret video 1)*

### **Theme 3; Programme flexibility and self-regulation**

Physiotherapists gave varying guidance on dosage. This included how many times to carry out each exercise (repetitions), how many sets of repetitions to do (sets), and how many times per day (frequency). Some guidance was very flexible with advice to do exercises as much or as little as patients wanted to, through to defined, specific numbers of repetitions, sets and instructions to exercise at specific times of the day.

Most physiotherapists did not prescribe any specific intensity for the exercises and encouraged patients to determine the intensity and frequency of the exercises themselves. This was dependent upon the time they had available to exercise, their routines and symptoms, which empowered patients to align the programme to suit their lifestyle, preferences and symptoms. This was particularly evident in those with long-term pain conditions. Some physiotherapists gave guidance for a baseline level of exercises but left it up to the patient to decide the number of repetitions and frequency of the exercises as they progressed.

*“If you can move it that way, you know do a few, you don’t have to do loads, you can do 5 of each you know, just when you’re in bed do a few knee rolls, and when you’re sitting in the chair just do a few slides, you just need to do 5 and just relax into it.....And if you can do them just do them” (Physiotherapist in Philip video 1)*

Some guidance was variable and gave wide parameters for duration of exercises such as how long to hold stretches for without an indication as to how to select the exercise duration.

*“Hold it for 10-45 secs, and relax, rest for a minute then you’d do it again” (Physiotherapist in David video 1)*

In contrast to vague and flexible instructions, one physiotherapist gave very specific parameters for the exercise to two patients, even stating a daily pattern of alternate days and the specific time of day that the patients should exercise.

*“So, (physiotherapist demonstrates) you can sit on the side at home, and what you’re going to do is, foot up, straighten, down... (Physiotherapist demonstrating) and you’re going to do it both sides. Each leg 10 repetitions, twice a day..... Every other day. So a day on, a day off. And not within 2 hours of going to bed of an evening, purely because as we’re challenging the nerve.” (Physiotherapist in Mark video 1)*

Almost all the patients were asked by physiotherapists to gauge and moderate a level of activity that they could manage, usually based on their symptom response. This ranged from patients being asked to use a subjective feeling of their symptoms on that day, through to use of a self-reported pain rating scale to determine the level of exercise for that particular session. One physiotherapist who used this latter approach, gave the patient a threshold range of pain scores which to work between in order not to flare symptoms.

*“Where about is your pain before we start? (Patient points to central neck.) And on a scale of nought to 10; 10 being unbearable, nought being ok? ... (patients says 5) 5, OK, so if it goes anywhere up to a 6ish, that’s ok, anything higher than that and you’re going to stop.”*  
(Physiotherapist in Emma video 1)

Several patients had chronic pain conditions and physiotherapists appeared to use the principle of patient-led pacing where patients controlled the intensity of exercise, although it was not specifically referred to as pacing by the physiotherapists. Some physiotherapists provided information in the context of expected outcomes and how the programme should feel and be experienced.

*“Tai Chi can be really nice... Now the exercise I’ll show you today shouldn’t make anything feel worse. They should feel nice and gentle, nice and calm and nice and relaxed. They shouldn’t make anything feel any worse, if they do, back off a little bit.”* (Physiotherapist in Hazel video 1)

For most patients there was an indication from the beginning that the complexity of the physical and cognitive skill would increase over time.

*So you’ve got that one and floating your arms up [physiotherapist demonstrates again in standing] arms up as you breathe in and letting them down as you breathe out [patient joins in], and that’s very basic so we can make them technical as we go, ok?”*  
(Physiotherapist in Hazel video 1)

All patients who were given exercises in the first appointment then had their exercises reviewed or progressed in some way at the second appointment. Four patients were asked to demonstrate their exercises at the second appointment to check how they were performing the exercises. For some there was a reminder of specific technique and detail and correction of movements as the patient performed the exercises.

*“I think we mentioned this last time, just think about what that rib cage is doing, so there is that tendency when we lift our arms up to stretch our ribcage upward..., so what we don’t want is to find you’re extending through your body, as you irritate your back then so I want you to try and use those tummy muscles to hold that ribcage down.”* (Physiotherapist in Emma video 2)

Several patients were given guidance for increasing their repetitions or frequency of the exercises. For some this was vague, advising patients to do more as they felt able.

*“Ok so we want you to do more than 10, 15 then 20, try and really increase it and if you can, to progress it a little bit more.” (Sam Video 2)*

Others were provided with specific repetitions and explanations to underpin the rationale for progression of the exercises including an explanation of the overload training principle to maximise gains in strength, function and improvement. However, patients were still given some flexibility in determining the exact repetitions, intensity and frequency depending on what they were able or willing to do.

*“and then if you feel able you could do then maybe do 8 , 4 times a day, and then up to 10, 4 times a day, and then if its more convenient, you could maybe do twice a day and just maybe increase the numbers to 12, twice a day and then 15 twice a day? It’s whatever you can fit in, but what you’re trying to do is increase the number all of the time, ok, because that’s what gets you your strength. But if you just always stick at 5 then that might be quite comfortable, and you won’t gain that sort of strength.”(Physiotherapist in Steven video 2)*

#### **TDF Domain; Social and professional role/ identity**

#### **Theme 4; Physiotherapist’s role and professional confidence**

Physiotherapists varied in their preparation to see the patients, with most accessing and reading the medical referral in anticipation of the consultation. One physiotherapist spent time explaining to the researcher how the next patient she was due to see had been referred with a condition she was not familiar with. This seemed to instil a sense of apprehension in the physiotherapist as she discussed being unsure of how to assess and manage the condition. In preparation the physiotherapist chose to do some brief reading and also printed off an exercise sheet from a website in readiness before the appointment.

This sense of confidence and preparation varied and appeared to be linked with the physiotherapist’s level of knowledge and expertise. Some physiotherapists appeared to be more comfortable with not knowing what the problem was in advance whereas for other physiotherapists this seemed to heighten anxiety. Several less experienced physiotherapist participants also attempted to discuss and justify their approaches with the researcher who was onsite in the department, particularly those where they felt they were unsure of the problem or management plan. All physiotherapists had access to discuss cases with senior colleagues.

Despite lack of confidence for some, physiotherapists made all the initial decisions about treatment for all patients. All but one patient was given an exercise programme as the main part of their treatment. When one patient found it difficult to perform and remember the exercise the physiotherapist wanted to prescribe, they enquired if the patient felt comfortable doing the exercise and if they wanted to continue. When the patient expressed that they did not want to do the exercise, the physiotherapist chose to omit the exercise and then opted to provide an orthotic (shoe insert) instead.

*“Shall we leave the exercise for now or do you want to do this?” (David Physiotherapist video 1)*

No other physiotherapists gave patients direct choice over the treatment decisions within the appointments observed, although there was some discussion of options being available in subsequent treatments.

*“We need to try rehab first and see if things do well, if pain continues injection would be an option, but we need to try exercises first though.” (Steven Physiotherapist video 2)*

One physiotherapist discussed the importance of there being a collaborative relationship with the physiotherapist and patients working together.

*“So what we’re going to do is I’m going to give you a couple of different exercises. It is key though that we sort of work together.” (Physio in Mark video 2)*

No physiotherapists specifically asked about patients’ goals for treatment and recovery. One physiotherapist asked about her patient’s expectations and hopes of attending physiotherapy and found the patient’s main goal was to return to previous walking activities. None of the physiotherapists formally explored whether patients wanted an SMPP or exercise programme. Several physiotherapists asked patients briefly at the end of their appointment or after giving instructions, if they felt happy or satisfied with what they had been asked to do, if they had done something similar before, and their feelings towards doing the SMPP. This was often a brief comment in passing at the end of the instructions.

### **TDF Domain; Beliefs about capabilities**

#### **Theme 5; Patients’ capability and self-efficacy**

There was a noticeable pattern where physiotherapists engaged, to varying degrees, with patients to understand and facilitate increased patients’ self-efficacy and capability to carry out the programme. Most physiotherapists also sought to give patients control over how much they did and when. Almost all physiotherapists were keen to ensure patients felt comfortable with the plans they

proposed and were physically able to complete the exercises they had chosen, within their physical capability and symptom tolerance.

*“So we’re going to start with some exercises maybe some different things that you’ve not tried before? So I don’t know if any of the physios have tried Tai chi based exercises with you before?”* (Physiotherapist in Hazel video 1)

Although none of the physiotherapists formally explored whether patients wanted an SMPP or exercise programme before they were given one, some physiotherapists were keen to find a level of exercise that suited the patients capability and symptom level.

*“But we need to stretch it a little to build and strengthen it up. But, I need to find exercises that you can do that don’t aggravate it.”* (Physiotherapist in Steven video 1)

Some physiotherapist asked patients, albeit briefly, about how they felt about what they had been asked to do, possibly eluding to their perception of how physically or psychologically capable or comfortable they felt to perform the task.

*“ What I’d say is just make sure when you’re set off make sure the shoulders are relaxed, they are today, but another day if you’re busy you might find the shoulders rise up, so just check that position before you start and make sure you’re in that nice position. Ok are you happy with that?”* (Physiotherapist in Emma video 1)

The majority of physiotherapists referred to being careful to avoid too much complexity when providing SMPP and exercise programmes in an attempt not to overload patients, to increase adherence and to avoid increasing symptoms or pain which may decrease adherence. Some referred to keeping the individual exercises simple whereas others referred to not giving too many exercises overall to avoid complexity.

*“So that’s it, I don’t want to give you too many things; so there’s the exercise lying down, the weight transference side to side that you were doing and this one we’ve just added; that adds a bit of an opener”* (Physiotherapist in Hazel video 2)

There were many references to the SMPP being simple and straightforward and not overwhelming with one physiotherapist directly referring to simplicity suggesting adherence was more likely.

*“So that’s one exercise and I know that’s very easy but that’s the point, it’s easy so hopefully you’ll do it. A lot of people say I didn’t do it ‘cos it was just too easy but the point is we’re trying to work muscles nicely and kindly so they’re not getting nipped so they will then become stronger.”* (Physiotherapist in Steven video 1)

## **TDF domain; Memory, attention and decision making processes**

### **Theme 6; Reminders**

Six physiotherapists used techniques to remind patients of the programmes and check recall. Techniques used included physiotherapists summarising the information provided and asking patients to recall what they had been asked to do. These opportunities were often used to remind patients of specific instructions and technicalities relating to positions and movements.

*“So, I’m just going to summarise, we spoke about your walking and you’re going to see if you can maybe do shorter and more often and just listen to your symptoms. From an exercise perspective, you’re going to keep doing the ones you are with your reaching up and think about that rib position and we’ve added an extra one lying down, just squeezing your bottom and lifting up which I’ll print off for you along with (physiotherapist demonstrates) in standing” (Physiotherapist in Emma video 2)*

Several patients were asked to recall or summarise what they had been asked to do. One physiotherapist who saw two patients in the study used this strategy with both patients. They were both asked to recall the instructions they had just received to check their immediate recall and understanding. The patients were asked to recall the description of the exercise(s) as well as the number of repetitions and frequency of the exercise that they needed to do. After both patients made some mistakes in recalling the exercises they were asked if they wanted the information writing down but both patients declined and it was not provided. One of these patients had additional learning needs and later revealed he was unable to read or write so had declined the information.

Physio      *“How often are you going to do it?”*

MARK      *“Err every other day, twice a day?”*

Physio      *“How many reps?”*

MARK      *“10”*

Physio      *“Can you show it me? (Physiotherapist points to bed and the patient demonstrates lifting legs out alternately)*

MARK      *“Yes?” (Patient does exercise and looks at physiotherapist for approval)*

Physio      *“Yes, after a week, if there’s no change in your symptoms, so it’s not worse, I want you to try it 3 times a day. Ok?” (Mark video 1)*

One physiotherapist, whose patient declined printed information, then summarised the exercises and asked the patient to demonstrate again to try and ensure the patient could remember the exercises.

*“Ok if you can remember those? So that nice gentle sway side to side, just stand up and show me that one, ok so standing up tall, just moving your weight from one side to the*



*other, perfect, because your hips and shoulders are moving together. Does that feel ok?*  
(Physiotherapist in Hazel video 1)

### **TDF Domain; Environmental Context and resources**

#### **Theme 7; Physiotherapy environment**

All patients were seen within the main MSK out-patient physiotherapy department in cubicle areas partitioned by curtains or within private consulting rooms (see figures 7.6 and 7.7). No patients were seen in open clinical areas or physiotherapy gyms although private rooms were requested for videoing purposes. Two patients were seen in private consultation rooms due to excessive noise from other consultations and the need to video the consultation (see figure 7.6). Physiotherapists at site one had fully electronic notes systems and entered records directly onto computer as well as access within the cubicle to the PhysioTools® programme. Physiotherapists in site two used paper records and accessed PhysioTools® programme on a computer in a separate shared office within the department. All physiotherapist had access to PhysioTools and a printer.



**Figure 7.6 - Photograph showing private consultation room at site 1.**



**Figure 7.7 - Photograph showing cubicle area for a consultation at site 2.**

At both sites, several physiotherapists referred to being under time pressure. For example, one physiotherapist explained to the researcher that she was leading an exercise class starting in 15 minutes when she was beginning a follow up appointment with one of the participants who had a 20 minute appointment. She therefore had to cut the appointment short. Although the physiotherapist did not refer to this in the appointment they did mention this to the researcher. Another physiotherapist commented on being under pressure with 'back to back' new patient appointments. Some physiotherapists saw patients for longer than the allotted appointment time whereas others saw them for less time. The business of the departments varied across days of the week. Some clinic days there were many physiotherapists working in the department which tended to mean more interruptions particularly for senior physiotherapists including phone calls, and conversations and questions from colleagues. Site one also had a radio playing in the background whereas site two did not. Several patients were left alone in the cubicles during the appointments (longest time 16 minutes) whilst physiotherapists went to get equipment, deal with interruptions or print off exercise sheets. All patients remained in the cubicle areas where they were seen and were not taken to other areas in the department.

### **Theme 8; Patients' routine and environment**

Several physiotherapists referred, directly or indirectly, to the patients' social or environmental opportunity to exercise within their daily routine and/ or home environment. These were specifically in relation to the type of surface on which to exercise and access to stairs. None of the physiotherapists asked if there were any likely barriers to exercising within the home environment or daily routine.

*“The thing to be conscious of when you’re at home, obviously our beds (in physiotherapy department) are quite flat and hard, if you’re doing it on your bed at home it can feel quite soft, so you might be better on the floor if you can manage it?... Ok happy with that one?”* (Physiotherapist in Emma video 1)

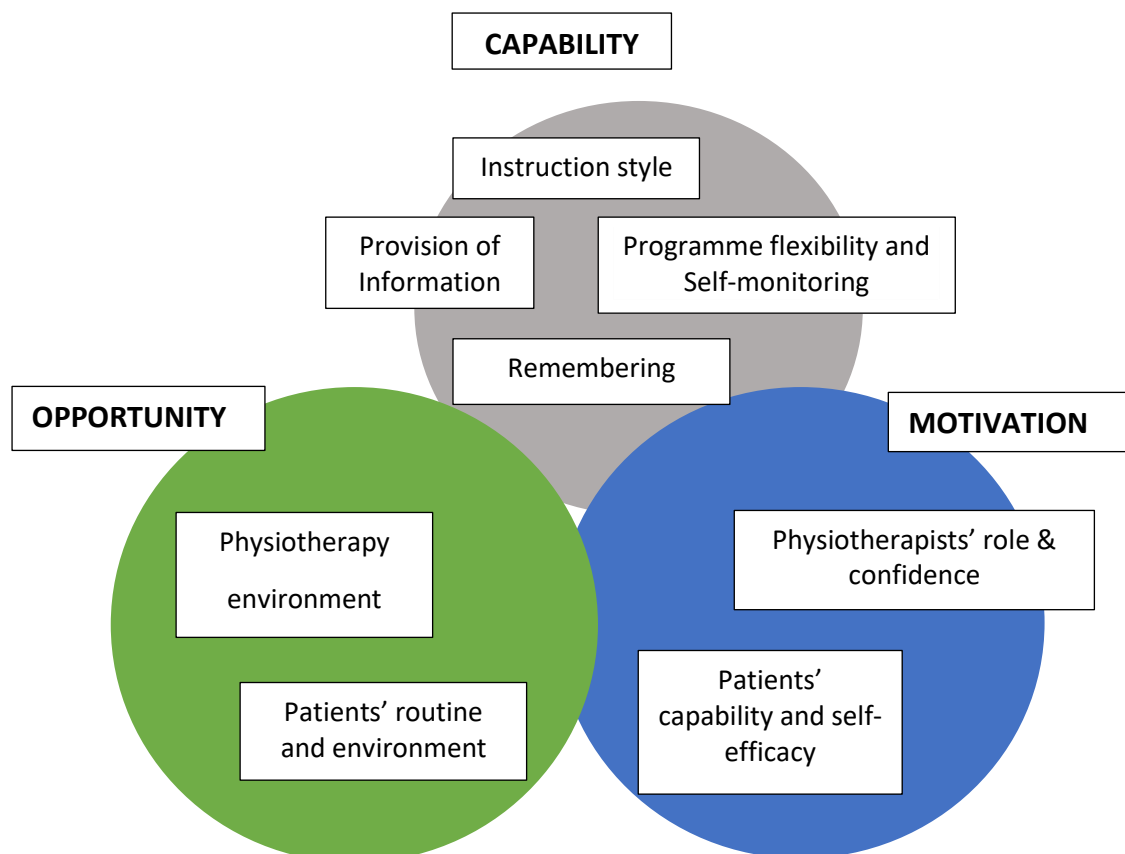
*“Do you have stairs at home?”* (Physiotherapist in David video 1)

One physiotherapist specifically acknowledged the possible difficulty in exercising three times a day when working full time due to not having the time or space to do this in the middle of the day.

*“Yeah and a little bit in the middle (of the day) if you can? Spread it out a bit. It’s hard with work I suppose?”* (Physiotherapist in Sam video 1)

### 7.5.2 Mapping of Themes to COM-B model

The eight themes were then mapped via the identified TDF domains to the corresponding COM-B mode (Michie et al 2011a). Four themes mapped to the capability domains, two to opportunity domains and two to motivation domains. Figure 7.8 illustrates mapping of the TDF themes to the COM-B model domains.



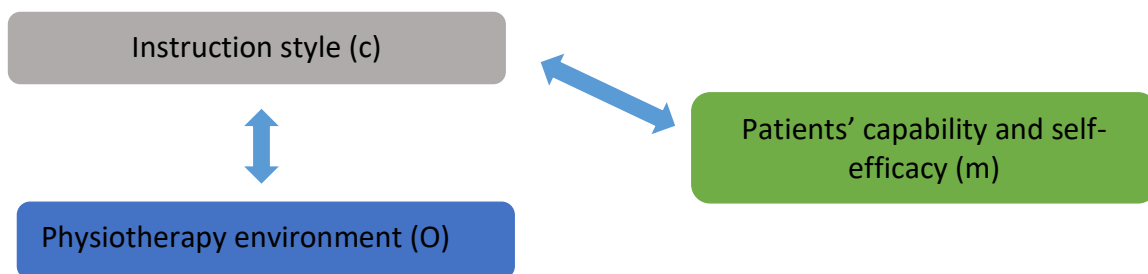
**Figure 7.8 - Diagram showing themes of how programmes were provided mapped to COM-B domains.**

The overriding analysis from the video observations illustrated that consultations were relatively formulaic. Physiotherapists spent considerably more time providing information and addressing the patients' capability aspects compared to the time spent addressing patients' opportunities to perform the SMPP or their motivations to do so. For example, the physiotherapists consistently provided verbal explanations and for many provided additional information including demonstrations, opportunities to practice or summaries of what they had been asked to do. Most physiotherapists asked if patients wanted printed information however only half of were given them. In contrast, the physiotherapists spent very little time, if any, addressing the themes identified in the opportunity and motivation domains. Minimal time and attention was given to the patients' opportunity to carry out the SMPP, their environment or access to equipment needed. None of the physiotherapists addressed the patients' intentions, goals or motivations to adhere, although they did, in the majority afford flexibility in the SMPPs to patients regarding dosage.

The themes were also inconsistently applied between the physiotherapists in terms of how frequently approaches were taken e.g. the use of demonstrations or summarising. Also the variation in the physiotherapists' behaviours may not have always meant that they have been applied in a way that positively enhanced the target behaviour. For example, there was variation in how

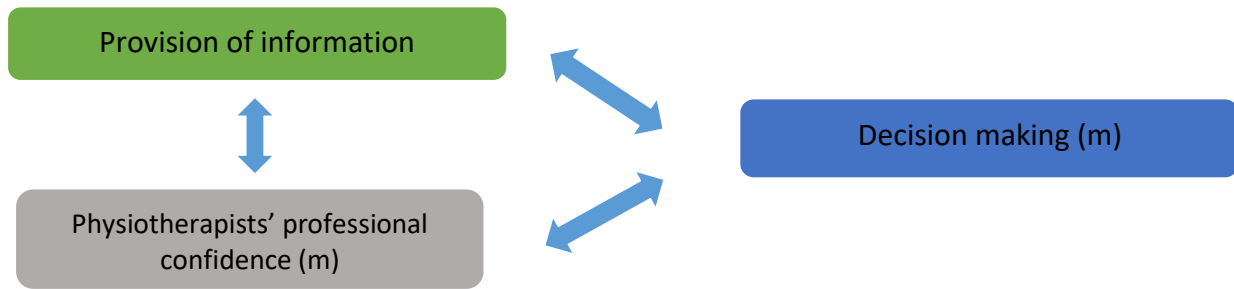
physiotherapists asked patients about, or provided written information (printing it before asking and giving it anyway versus asking patients at the end if they wanted it printing out). It is not known if this approach enhanced or inhibited the target behaviour.

The themes were also observed to be interdependent which is in line with the COM-B system that is considered to be an interplay of functions which drive, and are driven by the behaviour (Michie et al 2011). For example, when physiotherapists appeared to have less time within the appointment, their instruction style became more directive and offered the patient less opportunities to explore or question how or when to do the exercise. This resulted in the physiotherapists not spending time addressing the patients' self-efficacy in carrying out the programme, with no opportunities to practice or observe demonstrations as illustrated in figure 7.9.



**Figure 7.9 - Illustration of interplay between physiotherapist behaviours.**

Another example identifies where the physiotherapist explained (to the researcher) before the first appointment that they felt unsure about the patients' condition stated on the referral. In preparation for the appointment the physiotherapist pre-printed an online exercise sheet. They appeared to have made decisions regarding the treatment plan and content of the SMPP before the appointment had started. This illustrated that when the physiotherapist felt less confident they adopted a style where there was less opportunity for the patient to engage in decision-making both with regard to the treatment intervention planned and how they received the information relating to the SMPP (see figure 7.10). This may have enabled the physiotherapist to feel more confident in retaining control of the consultation and less opportunity for questions of challenge.



**Figure 7.10 - of interplay between physiotherapist behaviours.**

It is important to reiterate that these observations are of how the physiotherapist provided programmes and that physiotherapists were not interviewed so were unable to provide explanations of their practice.

### **7.6 Summary**

Both exercise and non-exercise strategies were provided within the SMPPs with exercises being the most common strategy. Ten patients received exercises and seven received additional instructions to apply heat or self-massage techniques, modify their posture or activity and wear orthotics. The average number of exercises given in the first appointment was 4 (range 1-8) and the average time spent on teaching exercises was greater than on non-exercise SMPP strategies (5'31 and 1'30 respectively). The percentage of the time spent on overall provision of the SMPP within the consultation was 17% in the first appointment and 32% in the second appointment. Patients were mainly given therapeutic exercises with defined starting positions and specific movement patterns although many movements were deliberately replicated in everyday movements. Some patients were given exercises with up to four different starting positions. Only two patients required equipment to do their exercise and one was given exercises to do using the equipment at a private gym.

Eight themes were identified from observations of the physiotherapists providing the SMPPs to patients. All eight themes mapped to TDF and COM-B domains but varied in how they were addressed by each physiotherapist within the consultation. Although equal numbers of themes mapped to capability and motivation domains of the COM-B model (Michie et al 2011a), the predominant overall observation was that the appointments were formulaic with physiotherapists focussing on addressing the patients' capability. This was in contrast to their opportunity or motivation to adhere. Dynamic interplay was seen between the themes when observing physiotherapists' practice, with themes influencing, and being influenced by each other over the course of the appointments. The following chapter presents the findings relating to the experiences and adherence behaviours of patients and

how both the physiotherapists' behaviours and patients' behaviours interact to influence adherence behaviours.

## **CHAPTER EIGHT – FINDINGS PART 2; PATIENTS’ EXPERIENCES OF RECEIVING A SELF-MANAGEMENT PHYSIOTHERAPY PROGRAMME AND ADHERENCE BEHAVIOURS**

### **8.1 Introduction**

The previous chapter presented findings relating to the content and provision of the SMPPs. This chapter focusses on the third and fourth research objectives which relate to the patients’ experiences of receiving and undertaking an SMPP. The chapter starts with a description of the patients’ recall and adherence followed by an analysis of the patients’ experiences of undertaking the SMPP and the factors affecting adherence. These findings relating to how the SMPPs were provided were then analysed and mapped onto the TDF and COM-B model. Throughout this chapter, direct quotations from participants are used to illustrate key qualitative findings. A summary of the key findings relating to the overall findings is presented at the end of the chapter.

### **8.2 Patient Recall and Adherence to the SMPP**

#### **8.2.1 Recall and Memory of the SMPP**

Overall, almost all patients were able to recall all the exercises they had received but the non-exercise strategies were rarely recalled. Although patients generally remembered all the exercises, several were unable to recall the specific details and movement patterns. Having had opportunity to practice the exercises in the appointment and receiving feedback on performance, seemed to increase recall of the specific detail of the exercises. Dosage was described in general terms. Four patients referred vaguely to doing the exercises ‘as often as I want’ or ‘until it is uncomfortable’. One patient referred to the starting positions of the exercises as ‘the one lying down, the standing one and the sitting one’. For the few where specific dosage was prescribed, but not provided on a printed sheet, the dosage specifics were not generally recalled. Those who had received printed materials often referred to being asked to do ‘what was written on their exercise sheet’ or ‘as many times as written on their exercise sheet’ (see case summaries Appendix 5).

Several days later, during the interviews most patients were able to recall the exercises and chose to demonstrate the exercises they had been given although they were not directly asked to do this. All six patients who had printed information located it, and referred to it, during the interview explaining they needed to refer to it to remember the exercise details.



During the interviews, none of the patient participants recalled their non-exercise strategies involving the use of heat or self-massage. One patient did describe being given orthotics to wear and one patient referred at the second interview to advice they had received to improve their posture and taking regular walks, although they did not recall this when asked in the questionnaire immediately after the appointment.

Five patients had exercises added to their original programme at their second appointment and all the patients remembered at least some of these additional exercises although again, sometimes lacking specific detail. Three of these five patients referred to their printed sheet in the second interview to aid their recall.

### 8.2.2 Adherence to SMPP

Patients' adherence levels were recorded within the questionnaires and were discussed at the interviews. All patient participants reported that they had adhered, either partially or wholly, to the home exercise elements of their SMPPs. Only one patient participant was given specific instructions regarding the exact number and frequency of the exercises they needed to do. The other patients were advised to do the exercises as much or as little as they liked, so therefore there was not a specific threshold number of exercises that constituted partial or full 'adherence'.

*"Yeah, I make sure I do 'em at least once a day, sometimes twice a day."* (Philip Interview 1)

The one patient, who was given heel inserts to wear continually, reported that he wore the orthotics daily after they had been put in his only pair of shoes, at the first appointment. He therefore was not required to actively remember to put them in his shoes or move them between shoes. None of the patients who were advised to self-administer a heat treatment or self-trigger point release, referred to doing so in the interviews. One patient who was advised to modify their posture and pace their walking levels referred to doing this when asked about it by the physiotherapist at the second appointment.

The one patient that had received instructions to perform a specific number of exercises reported doing more exercise than he had been prescribed. All those given less than three exercises reported doing more than they felt had been prescribed or reported adding in new exercises of their own. For example, if they had been advised to do a few exercises twice a day, they referred to doing them up to four or five times a day. This was often because the exercises they had been given were reported as being easy, boring and menial or because patients felt that doing more exercise would result in greater or faster improvement.

### 8.2.3 Questionnaire Adherence Self-report Scales

Patients were also asked to report adherence on a seven-point scale (1 = completed none to 7= completed all). This question was asked immediately after the second appointment (questionnaire 2, time point one) and at the third follow up postal questionnaire (time point 2). The table below (Table 8.1) shows the patients' adherence reports at time points one and two. Self-reported adherence was generally high with none of the participants reporting adherence below five and the majority reporting full adherence (7-completed all). At time two (average 8 weeks post first appointment) the overall mean score remained largely unchanged with some participants reported doing marginally less and some slightly more. Statistical analysis was not possible due to small numbers.

Participant	Since you started physiotherapy how much of what you have been asked to do by your physiotherapist have you completed? 1-7 (1-completed none-7-completed all)	
	Time point 1	Time point 2
KEN	5	Not returned
PHILIP	7	7
EMMA	7	7
STEVEN	6	7
DAVID	7	5
CHRIS	7	7
HAZEL	7	5
MARK	7	7
SAM	6	7
SALLY	6	7
MARGARET	7	4
Median Scores	7	7

**Table 8.1 - Table showing self-reported adherence scores from questionnaire one and two.**

### **8.3 Self-reported Outcomes**

Patient's symptom response and outcomes were evaluated in two ways. Patients' reports of their symptoms when asked by the physiotherapist at the second appointment were recorded and also the patients were asked to rate their global rating of change at the final postal follow-up questionnaire (see Table 8.2).

Six patients described an increase in pain at their second appointment. All had carried out exercises and had no other physiotherapy intervention. One patient who had a Bell's palsy and no pain symptoms reported no change in her facial weakness or eye discomfort symptoms. Two patients reported an improving picture, and two patients reported no change. One patient who had two different problems (back pain and foot pain) reported an improvement with his back pain but worsening of his foot problem.

At the final appointment almost all described some improvement. One patient was worse, and one had experienced no change.

Patient	Pain response described by patients to the physiotherapist at appointment 2 after starting SMPP	Final Questionnaire 3. GRC-How does your problem compare now to when you started physiotherapy treatment?  On scale 1-7 (1-very much worse- 4-unchanged, 7-completely better) (numbers in bold indicate improvement)
KEN	Improving	<b>5</b>
PHILIP	Worse, has to do minimal exercise to manage pain (pacing)	<b>5</b>
EMMA	Worse initially then settled slightly (pacing)	<b>5</b>
STEVEN	Worse (one specific exercise caused the problem)	<b>6</b>
DAVID	No change	4
CHRIS	Pain worse at night	1
HAZEL	No change	<b>6</b>
MARK	Pain worse- stopped the exercise	<b>5</b>
SAM	Back- Improved  Pain in Feet-worse	<b>7</b>
SALLY	No pain (Bell's Palsy) no change	<b>6</b>
MARGARET	Improving	<b>6</b>

**Table 8.2 - Showing patient reported change in symptoms reported to the physiotherapist at 1<sup>st</sup> appointment and GROC score at final questionnaire.**

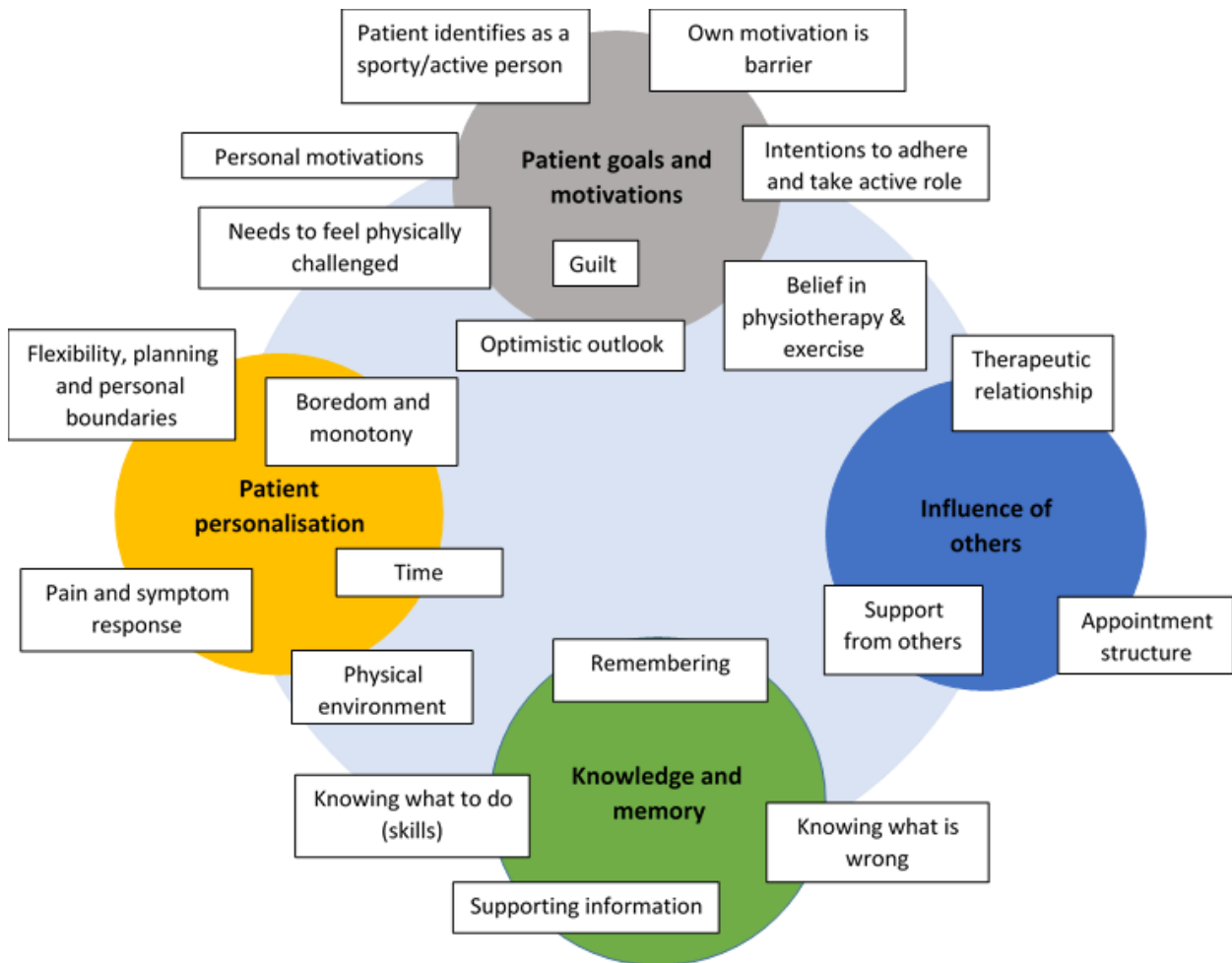
#### **8.4 Thematic Analysis of Patients' Experiences of Receiving an SMPP and Their Adherence Behaviours**

Inductive analysis led to four themes and twenty sub-themes being identified from the patient's experience of receiving an SMPP and their adherence to carrying out the SMPP. A cluster diagram illustrates the sub-themes and themes (see figure 8.1).

These four themes were:

- knowledge and memory
- influence of others
- goals and motivations

- patient personalisation



**Figure 8.1 - Illustrates how the 20 underpinning sub themes cluster to create the four overarching themes.**

#### 8.4.1 Theme 1; Knowledge and Memory

Patients' understanding of their MSK problem and SMPP varied, with some patients understanding their problem and the rationale for their SMPP whereas others were unsure. Most patients referred to the importance of 'knowing what was wrong' and what was causing their symptoms. Phrases such as 'wanting get to the bottom of it' and knowing 'what is going on' were used. Once patients knew what the problem was there seemed to be a sense of acceptance that, even if the problem would not resolve completely, it could be dealt with, and the patients could move forward and 'live with it' or 'work with it'. This was important for those with long-term conditions and chronic pain who understood that they were unlikely to make a full recovery. They appreciated that someone had examined them, provided a treatment plan or had given them information.

*"... When you've got something that's niggling... it's finding it....so, to know what it is half the battle and obviously, now that we know what potentially it may or may not be we can deal with it or if it can't be dealt with at least learn to live with it or work round it. Like I say, so, half the problem was not knowing." (Chris Interview 1).*

Where the diagnosis was not able to be made at the first appointment, patients valued the physiotherapist's time spent arranging further investigations, including blood tests, MRI scans and second opinions. Most were still willing to continue with physiotherapy in the meantime in the knowledge that further information was being sought.

*"I will continue. I'm hoping she's going to try and get some sense of actually what's happening to me. I'm hoping she will be able to get those scans done and whatever and give me more clarity maybe?" (Hazel Interview 1)*

The majority of the SMPPs involved exercises. Patients generally felt physically capable of performing their exercises, mainly because they felt they had been taught well and the exercises were simple, familiar movements. Approximately half of the patients were given the opportunity to physically practice the exercises during the appointment in order to ensure they were capable and understood the movement and this seemed to aid recall.

*"No, she explained them and we did them together ... well I made sure I did them right so that I knew what I was doing." (Margaret Interview 1)*

For some the information about their condition or the rationale for the SMPP, was unclear and confusing, with some patients mentioning terminology or jargon as an issue in limiting their understanding. A lack of communication and agreement between healthcare practitioners was also a source of confusion for some including both the diagnosis and understanding of the rationale for the SMPP.

*"I think it (arthritis) was mentioned with my GP and it was mentioned by the physiotherapist, that it could be a little bit of arthritis there because you've damaged the joint, but it seems as though it has been assumed that it was whiplash rather than anything else?" (Ken Interview 1)*

For those who were not given the opportunity to practice the exercises within the appointment, when they encountered some difficulties at home, they tended to modify the exercise. One participant referred to the fact that she would have preferred an opportunity to have gone through the exercises with the physiotherapist.

*"I just thought I would've had a little trial to see how I can I do them proper. Because I found as I've done them that I am struggling on a couple of them." (Sally Interview 1)*

Supplementary information detailing the SMPP was provided to approximately half of the patients in written format. All patients found this to be helpful; either because the paper itself acted as a physical reminder to complete the exercises or because it helped patients recall of the detail, positioning, intensity and frequency of the exercises.

*“Unless I look at my list I can’t think of the others (exercises) ... because sometimes my memory’s not very good and I have to look to see what I’m doing”.* (Margaret Interview 2)

Some found that once they had got into a routine, they relied less on the printed sheet but would refer to it after a lapse or break in adherence.

*“No, no, no, she printed that out and gave that to me without me asking for it. To be truthful if I hadn’t have had that I probably would not have remembered it. I mean I do now because I’ve been doing it every day but for the first couple of days and stuff, I probably wouldn’t have remembered what she actually asked me ....”* (Steven Interview 1)

Generally, diagrams were perceived as helpful in illustrating written instructions, although some diagrams were thought to be confusing and not clearly laid out. Two patients found it difficult to follow multiple pictures and were unsure if they related to the progression of the same exercise or depicted separate exercises.

*“It could be improved upon, they should have like a better diagram because it’s not as clear as what you’re supposed to be doing on the diagram as what it could be, so if it was illustrated a bit better then maybe it would be better. I mean I got what I was supposed to be doing from what’s written but not from the diagram, so the diagram is a little bit simplistic?”* (Sam Interview 1)

One patient felt that the diagrams could be interpreted differently to how the physiotherapists had described the exercises.

*“Yes, for me so that I was doing them properly because when you go off a paper and you read it sometimes you can read it different to what the physiotherapist tells you.”* (Sally Interview 1)

Some physiotherapists annotated sets and repetitions, which patients also found helpful. One patient who did not have any dosage instructions written on the printed sheet described having to guess how many exercises to do. Another participant who had identified learning disabilities, declined a printed sheet highlighting reading difficulties as an issue. In the video of the first consultation, he did not inform the physiotherapist that this was the reason he declined the offer of a printed sheet. He later explained that an alternative format would have helped but he had not wanted to ask.

*"It wouldn't have worked because I can't read. On a PC I can read 'cos it's not that light. Like that (points to white paper) I can't read a thing. But if it's like that or a bit darker, I can read it but on white I can't."* (David Interview 1)

None of the patients received videos or digital materials as part of their SMPP instruction despite many patients suggesting that this format would have been useful. Two patients accepted that there were likely to be limitations with providing videos to patients, including the volume of exercises to cover and the time taken to do this.

*"I mean you could say having like demonstrations like as a YouTube channel or something for you to be able to do it but you're looking at ... Yeah but then you've got ... how many injuries are out there for how many exercises you've got to do and all that so it would be difficult."* (Steven Interview 1)

If they were to have used videos, three patients referred to preferring to see patients reflecting their own situation and conditions in the videos. In contrast, one described preferring to watch 'normal people' or actors carrying out the exercises rather than perfect models or fitness professionals as this would feel more achievable.

*"I think watching somebody else do it ... maybe if there was a YouTube channel that you could go on with somebody else just in plain clothing doing the exercises. Just an average person doing it.... So, if you was given a video of a normal bloke or a normal person doing it, instead of somebody absolutely shredded [fit] ... proper like top of the league fit, I'm never gonna be able to do it but if you see somebody just a normal person doing it, you'll think well this is alright, this is easy, I can knock this out, I'm fine."* (Sam Interview 1)

Most patients referred to being willing and able to use the internet to access information about their condition. However, not all patients were able to use technology and one patient explained that this would not be her preference with it being 'too modern' for her to use. One patient had already searched for further information online and had subsequently learnt a new self-massage treatment.

*"Yes, because I have been on (the internet) with this I've looked at it loads of times and there is a massage one on which I've started doing, that's just to massage your face as well"* (Sally Interview 1)

Remembering the detail of the SMPP and remembering to do the exercises were both discussed. Many patients were confident that it was easy to remember the information and exercises due to them having a good memory. Remembering the SMPP was linked with having only a few exercises to remember and the exercises being quite simple and straightforward. Several factors were referred to as supporting memory and recall. These included being given the information via multiple methods (including visual and verbal information), opportunity to practice, listening properly within the consultation and when movements were already familiar.



*“Oh, very easy. Very, very easy [to remember]. She said to me did she want to write them down and I said no, I can remember them. It’s just like walking just from one leg to the other [laughter]” (Hazel Interview 1)*

However, despite most patients feeling confident in their ability to remember the information and instructions, this did not always translate into the accurate recall of information and behaviours.

*“I must admit I haven’t done that exercise. I’ve done the turning, up, and down and so on. I can’t remember whether he said do, or don’t do the rotating your head.” (Ken video 1)*

One participant, who declined an offer to have the exercises printed (because he thought he could remember the exercises), later said he could not remember if he was given a printed sheet so assumed he had been given one and had lost it.

*“I think he wrote them down but... I don’t know where the piece of paper is. I tend to lose pieces of paper.” (Mark Interview 2)*

Repeatedly practising the exercises and creating a routine also assisted with remembering the exercises. Daily activities and routines acted as prompts to commence and complete exercises, as did the experience of symptoms.

*“Yeah, to me, it needs to be a routine otherwise I’ll just forget so that’s why I’ve incorporated it in mornings, getting up, brushing my teeth, in my bedroom, I’m always like I’m gonna brush my teeth, I always make sure I’m doing that one so I can incorporate it in my duties too.” (Emma Interview 2)*

Almost all the patients felt that technology, including SMS reminders and alarms could, in principle, be deployed to act as reminders. However, most felt that because exercise programmes were simple that this was not necessary.

*“No, I think just because they were quite basic, they were quite simple things so it’s fairly straight forward to remember them....I don’t know.... Unless somebody wants to set an alarm and things like that, but I don’t need to.” (Emma Interview 1)*

#### 8.4.2 Theme 2; Influence of Others

The influence of others played a large part in patients’ adherence. Those influencing patients included the physiotherapist as well as other healthcare professionals, family members, friends, work colleagues and social networks. This influence was, in the main, positive, and empowering, but for some it felt competitive or induced a sense of obligation or fear that they would be letting others down if they did not adhere. Most felt supported by their social networks, either explicitly or implicitly. Almost all patients expressed a preference for the opportunity to engage in group physiotherapy and exercise, referring to the positive benefits of spending time with others with similar problems.

Those patients who lived with family members found them supportive, but not essential, to enabling their adherence. Six of the patient participants lived with relatives who were aware they had a SMPP, but none of the patients were explicitly dependent on their support. Patient's spouses, sons and daughter, parent and siblings were generally aware that patients had an SMPP but did not get involved. Patients saw it as 'their business' in the main and this was not a problem for participants.

*"Yeah, everyone, the kids do it with me sometimes if they come in and catch me doing it, they do it as well.... that's all that's around me really. My mum knows I do them, but she just knows I do them and doesn't really say anything, that's fine." (Emma Interview 1)*

For those with no direct family living with them, most had social networks who were supportive of them completing their SMPP. Those that lived alone, with fewer social networks were more isolated, but this did not seem to obviously affect adherence. One patient who lived alone relied more heavily on networks of friends rather than family members.

*"I tell my daughter, but I don't think they're not that interested really. It doesn't matter, I've got friends, I talk to them and we discuss our arthritis and what exercises, we all do different ones." (Margaret Interview 1)*

Several participants discussed exercising away from home, including at work or when staying with others, and how others responded to them completing their SMPP. There appeared to be a level of exercise that was personally acceptable when in the presence of others. This was based on several factors including the exercise itself, the position and where it needed to be carried out, as well as the patients' personality type and fear of embarrassing themselves. One patient described being willing to do basic neck exercises at work in front of others but unwilling to do anything standing up or requiring larger movements as this would make them feel foolish. Another patient would exercise in the communal shower at work but only when there were no other people present.

*"Yeah, definitely, definitely, 'cos somebody in my office that was in a car crash and he's got neck problems now and he does his [exercises] in the office. But he likes to do them at work, I don't really wanna do them at work [laughter]. But he feels he wants to so that's fine. He looks like a fool [laughter]! I look like a fool at home, that's fine!" (Emma Interview 1)*

Some patients also felt an obligation and responsibility to their physiotherapist or consultant to complete their exercises, expressing feelings that they would be letting them down or wasting their time and resources if they did not adhere and make the expected improvements. Some felt they did not want to be embarrassed by not being able to do what they had been asked to do when they saw their physiotherapist again.

*"I'd be wasting [name of consultant] time. He asked me ... or ... he said I'd prefer you to do this, what do you think about it? Well, if you think it'll help then yeah let's go for it... No, it's just like I say,..I can't see the point in doing anything half hearted."* (Philip Interview 2)

Almost all participants expressed a preference for group physiotherapy or exercise, especially those living alone; citing reasons such as being with others with similar problems who understood, social motivation, distraction from symptoms and an opportunity to socialise. One patient suggested that an opportunity to go to the physiotherapy department to do the exercises and be encouraged would be more beneficial and motivational than just going to the department to be asked if they had done the exercises.

*"'cos there's no motivation at home. I've taken it upon myself to do it but then if you've got to go somewhere and someone says "oh have you kept it up?" but then (with a group class) you're going somewhere to do it instead of going somewhere to tell them that you've done it."* (Sam Interview 1)

The relationship between the physiotherapists and patients was also a key influence on adherence behaviours. For patients where there was a positive therapeutic relationship there were strong beliefs in the physiotherapists' advice and they felt that the SMPP would be beneficial, which then resulted in positive adherence behaviours. One of the underlying principles of the positive therapeutic relationship was a feeling of trust and belief in the physiotherapist and their advice. Trust seemed to be built on two foundations: the patients' perceptions of the physiotherapists' expertise and qualifications and/ or of their interpersonal skills.

*"It's just ... you know ... you get on with your physiotherapist or whoever it is, it makes a bit of a difference. I felt comfortable with her."* (Margaret Interview 1)

For some, the faith in their physiotherapist was so strong that when asked if they would continue with their SMPP even if their symptoms worsened, they believed they would do so because they felt safe, at ease and comfortable, trusting that they were qualified practitioners who knew what they were doing.

*"I think I'd carry on with it because I know it is safe ... it's ... because it's given to me by somebody ... qualified yes but ... it's ... I know it's safe ... I just know it's safe for me to do it even if this pain does continue till eventually work itself through."* (Hazel Interview 1)

Patients also trusted other health practitioners such as their medical consultants or GPs, believing that because they were experts, their advice was likely to be beneficial and should be followed. For some patients this belief and trust resulted in a relationship where the patients were willing to do anything they were asked by their physiotherapist and believed they needed to 'do as they were told'.

*“I just put myself in her hands, cos she’s the expert, she’s the physiotherapist, she’s knows what it’s about so all I can do is just behave like a schoolboy and do what I’m told.” (Philip Interview 1)*

The timing of the appointments and opportunities for more contact with the physiotherapist between appointments was raised as an issue that may have influenced adherence behaviours. Many patients reported that they valued, and expected, the opportunity to have a follow up appointment soon after their first appointment as they felt it provided them with a focus and motivation to continue their SMPP.

*“Yeah, if the appointment had been miles off, I’d have probably done it for like a week and a bit or 10 days or something and then sacked it off but I carried on with it because I knew I had another appointment coming up and I knew I couldn’t lie and say I didn’t do it, so I had to.” (Sam Interview 2)*

Some patients reported that they would have felt more supported and motivated from additional, non-face to face contact with their physiotherapists between appointments. It was proposed that telephone or SMS text message contacts from the physiotherapists, or another member of staff, between appointments could be beneficial in providing additional support and encouragement.

*“Yeah, maybe someone, not necessarily (physiotherapist’s name) herself trying to keep up with her patients but someone maybe the like the receptionist who has access to it; just a phone call or text just to say how are the exercises doing, you know on a scale of 1 to 10 how painful are things and have like an advice person to keep you motivated.” (Steven Interview 1)*

#### 8.4.3 Theme 3; Patients’ Goals and Motivations

Patients referred to having a strong belief in physiotherapy as an intervention to improve their symptoms or function. Most patients had experienced physiotherapy directly themselves previously and had positive experiences and they therefore associated adherence with improvement and positive outcomes.

*“I found him (previous physiotherapist) very good he would say yes it will take 10 days for it to start to heal and then up to then I want you to do so and so, after that you can do a little bit more exercise. I found that the programmes he (previous physiotherapist) gave me were very good and they usually worked in the end.” (Ken Interview 1)*

For those that had not had physiotherapy previously, most expected positive outcomes. This was either because they knew other who had benefited from physiotherapy or they trusted physiotherapists based on the perception of the expertise that physiotherapists would hold. Some patients who had not experienced physiotherapy directly had read about physiotherapy or knew people who were positive about the experience and were hopeful that being referred to physiotherapy, from within the health care system, would be beneficial.

*“Oh yeah, I do ... I am ... I am a believer in physiotherapy because my son recently has hurt his back and the first thing I did I said, look go to a physiotherapist I said I’ll pay for it and ... knowing the right exercise to me is very precious for the right area.” (Hazel Interview 1)*

All but one patient had positive beliefs about treatment outcomes. Patients believed the physiotherapy was likely to lead to improvements in their symptoms in some way, although they were unsure as to how long it would take to see improvements. Many patients only expected to see improvements in the longer term, which was referred to as one to three months. Several patients acknowledged that strengthening of muscles and improvements in mobility were seen as positive outcomes even if pain symptoms did not improve. Some patients also referred to these beliefs only being based on ‘having faith’; being referred to a hospital was an indicator of positive outcomes.

*“It’s hard to say at the minute ..., I do feel that in the long-run it will be strengthening the muscles around it to help support my weaker areas, but, at the minute it’s hard to say. I hope so, ‘cos I’ve got faith.” (Emma Interview 2)*

Those with chronic conditions such as arthritis did not see an end to their exercise participation and a maintenance approach to physiotherapy and exercise was necessary.

*“Because arthritis doesn’t get better. It’s up to yourself to keep it under control. It’s not as if it’s gonna get better and I have to stop exercising.” (Margaret Interview 1)*

The patients’ personal values of being an active or sporty person were evident, with many patients discussing exercise and physical activity as being part of their daily life. Several patients referred to not being the type of person to ‘sit around all day’ and that too many other people were lazy or inactive and did not want to take up the opportunity to recover.

*“I’ve got young grandkids, we foster young kids and I’m not one that just sits in the house, I can’t be doing that, I’m not one for just sitting around.” (Chris Interview 1)*

Some participants referred to physical activity and sport being a key part of their lives and experiences and injury as a normal part of that process.

*“Yeah, well, I mean I’ve been around sports all my life and you know being around it, playing rugby, football, karate, athletics, cricket, you know you’re gonna get injured, and you know that the only way you’re going to get better is by doing exercises.” (Steven Interview 1)*

Patients were frustrated when they were unable to take part in their regular activities or when seemingly simple activities caused problems, and some felt a loss of their identity which was difficult for them to reconcile.

*“Normally I do hill walking and stuff. In the lakes and Wainwright hills and things and I’ve only done like 3-4 miles flat and I’m in agony. Friday morning, and the next one was Sunday, I was in agony, it doesn’t take much. It’s ridiculous.” (Emma video 2).*

All participants also expressed strong intentions over the first few weeks of physiotherapy to adhere to exercises within their SMPP, with almost all seeing themselves as having a role to play in their own care with some stating that they thought physiotherapy was pointless if patients were not prepared to be active participants. All but one patient expected to be given an exercise programme and physiotherapy was seen by most patients as a partnership, where both the physiotherapist and patient had a part to play.

*“Yes, it's pointless going [to physiotherapy] otherwise if you go and they're going to give you something to do that's going to help the situation and you don't do it then it's your own fault. You can't solve the problem unless you do what you've been told to do.” (Sam Interview 1)*

For many, intentions were strong even if the patient did not fully understand their diagnosis or why they were doing the SMPP. Some who had not had a previous experience of physiotherapy also had strong intentions based on their belief in physiotherapy as an approach. Many patients referred to deciding to fully commit to the physiotherapy process and adherence to the SMPP whatever happened in their day or whatever it took in terms of time, effort, or inconvenience. They referred to committing fully, 100% and not doing things half-heartedly.

*“The intention is 100% and I intend going to every course and do every exercise and every bit of homework that needs to be done. If he (the physiotherapist) says jump, I'll say how high and I'll do it until the end of ... you know ... till he says you're right, go away.” (Mark Interview 1)*

Many patients acknowledged the need to make a commitment to putting physical effort into exercise compared with a passive approach, such as taking tablets or undergoing surgery. All patients were willing to commit this time and physical effort which was demonstrated in their strong intentions to undertake their SMPP.

*“I mean one or two people I've spoken to and I've told them that I'm doing all this stuff who are like why don't they just do an operation on you or just get the pills and just pop pills until it gets better and it's like, that's not how it works...” (Steven Interview 1)*

Patients intended, in the main, to adhere in the shorter term but when asked about longer-term intentions some participants acknowledged this was harder to predict. Some participants displayed ambivalence in relation to their intentions to adhere in the longer-term; with some avoiding thinking about the future and some acknowledging that their commitment may reduce in the longer term. For example, one participant fluctuated in her thinking about her future intentions. Firstly, she felt the exercise load would be likely to decrease over time and, therefore, would require less commitment from her, but then she went on to query whether her declining intention was really due to her own avoidance of the exercises as they became more challenging. Later in the interview,

she reflected, expressing her intentions to continue long-term as she saw it as a personal challenge to master the exercises, particularly if they became more challenging.

*“Oh, I don’t know. If she (physiotherapist) says forevermore then ... I’m sure I wouldn’t be as religious as I am about it now... ‘Cos, I don’t feel I’ll need to. As long as I keep on top of it, so I reckon I’d ... well, I don’t know.” (Emma Interview 2)*

Several patients referred to being optimistic and resilient in their nature, often like their family members, displaying physical and mental strength in the face of the ageing process and chronic pain. They referred to ‘never giving up’ and some referred to seeing decline in others which spurred them on to stay positive and resilient.

*“I’ve seen friends of mine that very quickly have lost their mobility and you don’t really get a second crack at the whip because when you get that far it’s hard to come up ‘cos there’s a huge mountain against you. I’m not saying I’m going to avoid these knocks, I won’t, but I think if you’re mentally strong and physically strong you’ve got some chance of keeping motivated.” (Hazel Interview 2)*

When patients were initially asked about whether they had set goals specifically with their physiotherapists as part of their physiotherapy, all patients reported that they had not set goals. Some patients reported not setting goals as they were focussed on the short term and did not want unnecessary pressure on themselves and had not thought specifically about goals in this way.

*“No, I’ve not thought about that (setting goals). I just take each day as it comes really.” (Sally Interview 1)*

However, on further exploration of patients’ motivations, all patients did reveal that they had personal goals that they wanted to achieve that were driving their intentions and behaviours. Although some patients had short term goals such as wanting to carry out their SMPP exercises a certain number of times each day, most had their own longer-term goals or motivations. These longer-term goals were split; they were either focussed on wanting to improve symptoms, pain, or function, or alternatively they were aimed at not wanting to regress or get worse. Those who had long-term pain conditions particularly focussed on the latter; with a focus on not wanting to return to previous levels of pain or disability, not returning to taking high levels of pain medication and on avoiding deterioration in terms of symptoms, pain or function.

*“‘Cos I just don’t wanna go back to where I was, no, that just pushes me through everything, at the minute, not going back to what happened last year.” (Emma Interview 2)*

Others focused on making improvements in their symptoms, pain and function. Motivations included wanting to return to usual activities, sports and exercise or wanting to combat the ageing process where possible.

*“My goal, mainly, is to be able to get back on my bike again. Because, like I said, I’ve got grandkids that like to go out on their bikes and if we have foster children as well, we have bikes there for them, so we take them out as well.” (Chris Interview 1)*

Two of the retired participants (aged over 60) were aware of getting older and were motivated by the desire to stay as fit and active as possible. Some patients noticed others around them getting older and less mobile and wanted to minimise this effect on themselves. The avoidance of other more significant interventions associated with ageing, such as joint replacement surgery, was also a motivator.

*“Yeah, because I see so many people get older, and they can’t walk and they’re housebound well I don’t want any of that. I enjoy my life too much. I just do whatever I can.” (Margaret Interview 1)*

When asked explicitly about any perceived barriers to adherence, several patients stated that there were no real barriers to completing their SMPP, only themselves and their own internal motivation and behaviours. There was a suggestion that although their intentions were strong, the reality was that this may not be as easy as it seemed.

*“There’s no real barrier apart from yourself. The only barrier is ourselves. Now, whether I’ll overcome that and do all of them, I don’t know.” (Chris Interview 2)*

Other potential barriers that may impact on intentions and behaviours included lack of time and effort, other priorities or commitments, experiencing ill health or an increase in other symptoms. Patients acknowledged that many barriers such as time are often just an excuse and are not insurmountable. Several patients highlighted that time is often used as an excuse by others when in reality exercises can be fitted into schedules if people are truly motivated to do it and are able to prioritise.

*“At the moment I can’t see anything getting in the way. The only thing is me to have to structure myself, I have to structure myself to certainly do the hard one. Sometimes, fair enough, I may not have the time to sit down but how can I honestly sit here and say I haven’t got the time to sit down and do this, that’s nonsense.” (Hazel Interview 1)*

Several patients referred to experiencing other medical problems, aches and pains or becoming unwell as perceived or real physical barriers to them adhering more generally. The amount of effort required was also recognised as a potential barrier to adherence. There was a variable personal threshold and choice within patients’ intentions as to how much to do each day. Tiredness was also identified as a barrier for non-adherence although it was not clear if this was mental or physical tiredness.



*“Sometimes I just get tired. Yeah, I’m tired later on in the day. I do get tired after 5 o’clock because I don’t have good sleep at night. I wake up in the night 3-4 times so, after a certain time in the afternoon I just don’t wanna do anything.”* (Margaret Interview 1)

Some patients began to see the exercise regime as a chore and although they still had strong intentions to complete the exercises, they just wanted to ‘get them done’ and tick them off their ‘to do’ list. Patients reflected that this sometimes resulted in sacrificing quality over quantity.

*“A lot of it is I want to get these ticked off my to do list, yes, but then at the end of the night I think well, maybe I did rush them this morning, maybe I should have spent more time with them..... The more I think about it I think quality is better isn’t it. Do them properly and maybe spend a bit more time with them but less throughout the day.”* (Hazel Interview 2).

Most patients felt very capable of completing what had been asked of them and expressed high levels of self-confidence and self-efficacy in being able to do the exercises that they had been asked to do. For those patients who only received three or fewer exercises they were sometimes frustrated at the perceived simplicity of the programmes.

*“Well actually I wasn’t asked to do very much...then it became pretty obvious what the ideas was, to keep the mobility in my neck turning it as much as I could in any direction and keep doing that, so it didn’t stiffen up.... No, there was nothing more than that.”* (Ken Interview 1)

Most felt the programmes were basic, easy, uncomplicated, and unchallenging. Patients often felt that their fitness levels were well beyond the level of the exercises that were being asked of them within the SMPP.

*“...Absolutely yes (I could do more than 1 exercise) ....if you can do an hour and 20 minutes on a cross trainer then yes!”* (Mark Interview 1)

Some participants felt they were unchallenged by the SMPP as the exercises were already familiar as movements of everyday activities rather than new, unfamiliar or difficult movements. When patients received exercises that were part of everyday movements there was a suggestion that patients expected more challenging exercises that constituted ‘physiotherapy’ as they saw familiar everyday movements as easy and ‘nothing new’ as they were already part of their daily routine.

*“Then this one, where you go like that, dead easy. But I do them basically every day anyway with everything that I incorporate in the day.”* (Margaret Interview 1)

For those patients who were given progressively more challenging exercises and techniques, such as Pilates based exercises, there was a sense that individuals built their confidence and capability through practice and through the therapeutic relationship and trust that developed with their physiotherapist.

*"I felt now was the right time to build on them and make them a little bit more challenging. 'Cos the other ones were quite basic ... but I kinda feel like I'm ready to ... I've got that confidence now to go a little bit further, a little more technical." (Emma Interview 2)*

Despite some patients initially feeling that exercises were simplistic and unchallenging, some patients indicated that there would be an upper limit or barrier to their self-perceived confidence or capability in carrying out the SMPP depending on how difficult or technical the exercises became.

*"I think I'd be happy to do them (more exercises) provided they're not too strenuous. ... I mean like lifts and this sort of stuff. I wouldn't do anything like that. .... In a safe environment probably, I would but I wouldn't do lifts here (at home) I don't think...I'd think it's gone past my barrier." [laughter] (Hazel Interview 1)*

Several patients discussed feelings of guilt if they did not carry out the SMPP. A couple of patients indicated that they would feel guilty because they felt they had let themselves down and missed an opportunity to help themselves, whereas others were more reticent, acknowledging that life was busy, and things do not always go as planned.

*"Yeah, yeah, I would [feel guilty]. I'd be really angry with myself. Because it's up to me. I've got to help myself out, I really have. I've got to make myself stronger. All this is available to me, that's been given ... the physiotherapist for me to get myself better. I'd be mad at myself for like missing out on this opportunity. Yeah, I would." (Emma Interview 2)*

Most felt that they would not feel guilty *per se*, but some would feel annoyed with themselves or disappointed. Some felt that if they missed some exercises one day they could catch up by doing more at another time and it was not a reason to 'beat yourself up'. One participant felt that because they had already done more than asked, he had 'banked' extra exercises so it was less of an issue to miss some exercises. Some movements were replicated in everyday activities so this would also compensate for not doing the specific exercises.

*"You do sometimes [feel guilty] but I think, you can compensate with certain ones. So, stretching ones, because some of the jobs you're actually doing instead of you doing your exercises are stretching, so, one sort of counteracts the other". (Chris Interview 1)*

#### 8.4.4 Theme 4; Patient Personalisation

Despite strong intentions to adhere, all patients had boundaries and personal limitations on what, when and how much of their SMPP they were prepared to do. All patients modified their SMPP in some way to suit their own needs. This included their pain response, their own daily routine and time available, how they felt that day, location of exercises, use of equipment and their preferred timing and frequency.

How patients' pain and symptoms responded to the exercises influenced their future adherence behaviours. Six patients experienced worsening of their symptoms, three felt improvements and others saw no change. Most patients who experienced no change in their symptoms expressed a motivation to continue with their SMPP as they wanted their symptoms to improve and felt they needed to persevere for this to happen. For those who experienced an improvement in symptoms this was sometimes motivating because of the improvement. For others it was demotivating when reducing symptoms were also then a diminishing source of motivation.

*"I shall carry on with it I'm sure, but the motivation's beginning to just wane a little bit. Yes, I started to do them as soon as I got the paper from my GP but, as it started to have some effect, I tended to just let it tail off a little bit."* (Ken Interview 2)

One patient who had exercises for two problems was surprised by how effective his exercise proved for his back symptoms but found the feet exercises flared things up. His improvement in his back symptoms fuelled a motivation to continue exercising in the longer term.

*"I feel better because like my back's ... like I said the ache in my back's gone so I knew ... I know it's helped, and I know it's worked ... I think I'm more spurred on to either do something else or carry on doing it so it doesn't happen again."* (Sam Interview 1)

Seven patients experienced a significant increase in symptoms in response to undertaking their exercise programme. Their response to this varied with some reducing what they were doing, others persevered in the hope of improvement, some modified their programme and others sought direction from the physiotherapists.

*"If it makes it worse then obviously, I'm gonna be reluctant to do it but I will talk to (physiotherapist) about that. I know sometimes it [the pain] hits ... like when we did it on Monday, in the cubicle I could feel the pain while ... but it's a new thing isn't it, so we'll just play it by ear."* (Philip Interview 1)

When asked what they would think if their symptoms worsened following the exercises; some felt they would take advice from their physiotherapist, whereas others felt it depended upon the type or region of pain they were experiencing or referred to underlying beliefs driven by previous experiences.

*"But that's something I learnt from the breast exercises [previous physiotherapy experience]. You're not to do the exercises until like you've got pain because you're forcing, so I've remembered that."* (Sally Interview 2)

Three patients modified their exercise and two omitted them completely to cope with increased pain symptoms. This was done by changing the position, number of repetitions or equipment used in order to try and improve things before they saw their physiotherapist again.

*“I’ll just ditch one of them [foot exercise], but still do the others, I just don’t won’t do the one that’s causing me any problems.” (Sam Interview 2)*

Three patients whose pain and symptoms worsened during the exercises were motivated to continue with their exercises or do more in the hope of recovery. They either felt it would eventually help by ‘getting things moving’, ‘releasing a trapped nerve’ and exercising muscles that were not used to exercising, which in turn would be beneficial.

*“In the hope that we can ... if it’s sciatica ... we’re looking that it may not be now, if it will release this trapped nerve believing it was sciatica then yeah, I’ll do it with open arms and you know.” (Mark Interview 2)*

Three patients believed that the amount and intensity of exercises they did, and how difficult it felt to do, was related to the likelihood of improvement in their symptoms and a feeling of pain or effort was required for recovery.

*“I thought to myself the more I do would probably help myself to get better, so that’s why I did the 3 times a day (instead of 2 as prescribed) ...” (Sally Interview 1)*

Some patients referred to not all pain meaning the same thing with some suggestion of ‘good’ and ‘bad’ pain. Some ‘good’ pain was associated with improvement; with discussion of ‘things being released’ or ‘moving things that had not moved in a while’ and phrases such as ‘no pain, no gain’.

*“Sometimes you think pain can be a good thing so that’s how I feel, I hope I’m not wrong [laughter], I feel like when I do that I sometimes feel like a bit of a release, it’s a painful ... it’s not horrendous but it’s painful but I kind of feel like it’s a good pain, like things are just stretching and moving more so I’m ok with that.” (Emma Interview 2)*

One patient described this experience of the ‘hurt’: ‘hitting the spot’ with the perceived positive effects of undertaking the exercises surpassing her expectations of what would be beneficial.

*“I’m shocked to high heaven that something so simple could be so effective ... because again it’s the hurt ... it’s the exercise hurting ... I know the muscle is obviously being stimulated ... As I say it’s just hitting the right spots. I would never, ever think that that would exercise my arms, never... ‘cos I get the ache down here in to my arms and I am hoping it will help that.” (Hazel Interview 2)*

How patients responded to their exercises and SMPP in terms of pain was also a key factor that influenced how much and how often patients did their exercises. Pain and symptoms fluctuated through the day and patients often chose times when this was most manageable. Some were cautious of not doing too much (even if they knew they could do more) as they felt their symptoms may worsen and were worried about dealing with a sustained increase in symptoms. Others

however, had resigned themselves to the fact that they would always have pain so were willing to carry on regardless albeit in a more cautious way taking a maintenance approach.

*“first thing in the morning is a no no because I’m lay in bed, when I first start moving then it’s painful ... I wait a while before I start moving about a bit and I’m a bit more supple. So, probably do it ... maybe before I’ve had a shower or after I’ve had a shower ... and then sometimes I do ‘em at night.”* (Philip Interview 1)

Several patients found completing the SMPP menial, boring or monotonous. This had dichotomous consequences; some patients increased the intensity and frequency of the exercise or added in different exercises or activities to make it more fulfilling. Other patients reduced the number of exercises they were doing as they were perceived as boring, or they did not feel they were experiencing any improvement.

*“Because I think (doing any more repetitions) then it would be monotonous. I think it would put me off doing them to be honest. Yeah, because, I’m just about doing them now ‘cos like I said at the minute it’s getting a bit boring and repetitive.”* (Sally Interview 2)

Those patients who were given fewer exercises (three or less), tended to increase the frequency and repetitions because they found the exercises boring and thus felt they were ineffective and that doing more would increase the benefits. One patient, who was given very specific instructions to do his one exercise only twice per day to avoid risk of it flaring up his symptoms, chose to increase the repetitions as he found it menial and repetitive.

*“I thought it were very menial, it weren’t doing anything. I did it like you (physiotherapist) said before I increased it. I only increased it about 2 weeks ago. I’d done it for a week and a half, I thought I’d just see (what happened), but I suppose, you know what you’re (the physiotherapist) looking for (outcomes) by doing two reps a day.”* (Mark Video 2)

Several of those patients who had substantial amounts of exercises prescribed from the outset considered reducing their exercise intensity when they experienced a lack of improvement. Although the timescales in which they expected to see improvement varied, they had intentions to continue to exercise perhaps at a lower level or frequency for the longer term.

*“No, I probably wouldn’t stick to the 5 times a day.... I’d probably stick to maybe morning and evening. I know it’s sensible to do it and it’ll benefit me in the long run doing it, but I thought if I do it more often ...I might improve quicker.”* (Hazel Interview 1)

All but two of the SMPPs allowed patients the flexibility to self-determine the duration, intensity, and frequency of the exercises, but in fact all chose to modify things to suit their own needs irrespective of their instructions. Patients did value the flexibility and control afforded to them by choosing their own intensity and frequency of the exercises.

*“Cos I think everyone’s different I don’t know if you can have a specific number but ... I would’ve done them just the same, but, it’s good for me to know that I can control it myself as well and just listen to my own body, so, for me, that was fine.” (Emma Interview 1)*

Planning when to do the SMPP was not always a conscious decision but intentions were strong and some participants planned to regularly exercise each day, often linked to the time they had available and their daily routine.

*“I can probably have ‘em done in 15 minutes...it’s not as if it’s taking a massive amount of time. Four exercises, 10 of each, you know. I can sit here while we’re doing them, and I can have them done while we’re just ... you know...before you’ve had half a cup o’ tea or whatever.” (Philip Interview 2)*

Those patients who completed their exercises at a gym or in exercise classes needed more specific plans for when they would exercise, whereas others made no specific plans and did exercises in a haphazard way, facilitated by their flexible programmes.

*“I think a bit more haphazard; I think. ...I wouldn’t say I’m planning but I think oh God I’m going now, what time will I be back, I’d best do before I go and then I’ll do some when I come back. So, it’s in the mind to fit it in in my daily ... dailies ... my daily work somehow, so it is there but maybe I should be a bit more structured with it.” (Hazel Interview 2)*

Family commitments, work commitments and a busy lifestyle meant time was a barrier for some. All patients were still able to carry out the exercises to some degree, but sometimes had to limit the time spent on the exercises or be flexible in their approach. Some chose to integrate exercises into regular exercise classes. Those who were working and had children, often had variable schedules, and sometimes had days or weeks when they were time poor which affected their ability to complete their SMPP.

*“Well it’s easier to do it if I’m not at work. If I get in from work and I look at that (exercise sheet) I think arghh! But then most of the time I’ll give it a go ... It’s not like it’s taking a chunk out of my day it’s just on the days I’ve been working I’ve been on my feet all day ... I mean it’s just another thing to do when you’re tired and just got in.” (Sam Interview 1)*

Those patients who were retired or not working had significantly less issues with finding the time to complete their programme.

*“Like I say, when you’re retired you’d be surprised how much time you’ve got on your hands so I can ... I basically do it every day, there’s nothing to stop me.” (Philip Interview 1)*

Both working and retired patients highlighted how integrating exercises into their daily activities was time economical. Examples given included exercising whilst waiting for the kettle to boil or standing in a queue. This way they avoided having to find additional dedicated time for their SMPP. The ability to build exercises into daily activities also meant they were able to complete their exercises

when their routine changed e.g., they went away on holiday.

*“I felt quite comfortable going away because I don’t have to do them at a particular time. I do them as often as I can, when I can, and it can be done definitely at any part of the day in my daily routine. I don’t really have to take time out to do it, it can be done, as I say, standing at the sink or combing your hair or anything. It can be done if you want to keep doing it.”* (Hazel Interview 1)

Patients regulated their exercise level based upon time and location, how tired and fatigued they felt and the time it took to complete. Those experiencing fatigue or a busy lifestyle often self-regulated a level that they felt suited them at that time. Individuals had a pre-set frequency or intensity of exercise that was acceptable to them based on how they were feeling and how much time they were prepared to commit.

*“How I felt really. How tired I am. If I’m not too tired, I’ll do 10. If I’m feeling a bit tired I do 5.”* (Margaret Interview 2)

Exercises that required equipment could be considered inconvenient and were adjusted to suit. One patient felt that using basic equipment such as a towel to position the foot was an inconvenience and the exercise was modified to be completed without the towel.

*“The only one thing is she said roll up a towel under your feet to raise your feet up, but I’ve just skipped the towel bit out as it doesn’t seem necessary. I mean I could use the towel but like they’ve said on it just seems like it’s in the way, so I just scrapped the towel.”* (Sam Interview 1)

Several patients referred to unexpected or unplanned events happening to them during the study. Being admitted to hospital, being unwell, receiving notification of fostering responsibilities, needing to travel to hospital appointments and staying with friends, were all identified as events that changed patients’ regular routines and thus affected their adherence. All patients acknowledged that ‘things happen in life’ and therefore felt their exercise routines needed to be flexible enough to adapt accordingly. Several patients also acknowledged that there may be periods where it is not possible to adhere, stressing this should not be of concern. For example, one patient felt uncomfortable exercising whilst staying at his brother’s house and another patient who was admitted to hospital unexpectedly had to alter her routine and prioritise accordingly.

*“Well, no ‘cos circumstances rule don’t they. You can’t put everything on hold to do an exercise ‘cos an exercise can be done anytime of the day.”* (Philip Interview 2)

The patient’s physical environment also influenced how and when patients completed the SMPP. This included their ability to access the necessary space and other restrictions such as their clothing attire. Patients favoured performing exercises that were most closely aligned with their everyday

postures, positions and location. Exercises in sitting and standing were favoured over exercises that required the patient to lie down. This was particularly evident for those who were working as it was not often possible, or socially acceptable to lie down at work. Even for those who were retired and spent more time at home, lying down exercises either meant deliberately going into the bedroom to lie down, which was not part of their usual routine, or getting up and down from the floor which required more effort. One patient was given two alternative positions to perform an exercise and the patient chose the standing version over the lying down version for ease.

*“Any that can be done standing up or sat down, are easy ‘cos there’s always chairs, there’s always ... well, you’re always stood up aren’t you. Ones lying down, a little bit harder because you’ve gotta have the location ... the time as well as the location then as well haven’t you, and you don’t always have that (at work). Kitchen making a brew, I can do them. I can’t lie down and do the others (at work)” (Steven Interview 1)*

When the environmental context changed between home and work locations, this sometimes impacted upon their ability to carry out all the exercises either due to space, exercise position or their work attire. For example, one patient felt that her work clothing was not conducive to carrying out some of her exercises, although other patients preferred doing some exercises at work due to the environment.

*“I think the more basic ones I’d be ok doing but I think the lunge ones ... I don’t think I could in my work pants anyway, they’d probably split! I think so, I wouldn’t want to do that! But some of them I think I could do them at my desk whilst I was typing.” (Emma Interview 1)*

For others, the starting position of the exercises also influenced their plan as to when and where to carry out the exercises. Some began to plan their day ahead and where and when they would fit in their exercises.

*“cos I have a bit of a routine where I was doing it there and then going from there to the bottom of the stairs to do the one on my toes, and then lying behind me to do the lie down ones and then I go and get a brew when I was done.” (Sam Interview 1)*

### **8.5 Questionnaire Data Relating to TDF Statements**

Patients were asked to indicate their agreement with statements relating to the TDF domains and COM-B in relation to their intentions to adhere and their adherence behaviours. The combined responses to the statements are presented in line with the COM-B domains in Table 8.3. The first five statements related to the capability domain, the next three statements related to opportunity and the remaining ten related to motivation.



### 8.5.1 Capability

All participants (at the three time points) agreed with most statements relating to their capability (statements 1-5) including feeling that they understood what had been asked of them, feeling capable, making a plan and being physically able to carry out the SMPP. Responses to the statements asking if participants would use a reminder were more varied across the patients' responses. Approximately one third felt they would not use a reminder and the remainder were neutral or agreed that they would, although the number who would use a reminder fluctuated over the period of the study.

### 8.5.2 Opportunity

Almost all patients consistently agreed that they would have the time and physical resources to carry out their programme. However, the extent to which they felt friends and family would support them to do their SMPP varied. At the first appointment most (n=8) said they would get encouragement from friends and family. However, as time went on some participants (who all lived alone) then disagreed with the statement that they would get encouragement from friends and family.

### 8.5.3 Motivation

The latter 10 statements related to the automatic and reflective motivation domains of the COM-B model. Participants agreed in the main with statements, including agreement that they expected to receive an SMPP as part of their physiotherapy, and seeing it as their role to complete the programme. Most patients also agreed in having strong intentions to complete the SMPP and agreeing that completion of their SMPP was more important than other things. Most agreed to feeling positive about the likely outcomes of completing the programmes, although slightly fewer were positive about the future overall. Almost all participants agreed that setting goals would help complete their SMPP. Six participants reported that they agreed that they would feel guilty if they did not do what had been asked of them, however four disagreed with this statement and one remained neutral. Over the course of the treatment less participants agreed that they would feel guilty and more became ambivalent in their responses.

Statements from questionnaire reflecting COM-B domains (Pink= capability, Orange =opportunity, Green =motivation)

	Questionnaire 1 (n=11)			Questionnaire 2 (n=11)			Questionnaire 3 (n=10)		
	Disagree	Neutral	Agree	Disagree	Neutral	Agree	Disagree	Neutral	Agree
1. I understand what I have been asked to do by my physiotherapist.			11			11			10
2. I feel capable of doing what I have been asked to do by my physiotherapist.			11			11			10
3. I will use a reminder to remember to carry out what has been asked of me.*	3	7	1	2	3	6	3	4	3
4. I can make a plan to complete what has been asked of me.			11		1	10	3	7	10
5. I am physically able to do what has been asked of me.			11			11		10	1
6. My friends and family will encourage me to do what has been asked of me.*		3	8	1	2	8	1	3	6
7. I will have the space and / or equipment at home to do the things asked of me.	1	0	10		1	10			10
8. I won't have the time to carry what has been asked of me.	11			8		3	9		1
9. I expected to be given things to do as part of my physiotherapy.	1	1	9		2	9	1	1	8
10. I feel confident I can do what has been asked of me.			11			11			10
11. Regarding my problem, I am positive about the future*		3	8		3	8		1	9
12. I think doing the things that have been asked of me will be helpful.	0	1	10			11			10
13. I intend to do what has been asked of me.			11			11			10
14. Setting goals with the physiotherapist would/ will help me to do what has been asked of me.*		2	9			11			10

<b>15.</b> I do not think it is my job to do things in my own time as part of my physiotherapy.	11			11			10		
<b>16.</b> I feel I have other things that are more important to me that might interfere with doing what has been asked of me.	11			8	1	2	9		1
<b>17.</b> I think my problem will improve if I do what has been asked of me.		2	9			11			10
<b>18.</b> I feel guilty if I don't do what has been asked of me as often as required.*	4	1	6	4	1	6	2	6	6

**Table 8.3 - Data from statements relating to COM-B domains from the three questionnaires. (\* questions highlighting greatest variation in responses)**

#### 8.5.4 Summary

The data sources which were integrated and constantly compared and triangulated revealed a consistent set of themes. Patients' agreement with TDF statements aligned with the themes identified in the interviews and videos. The statements relating to the support from others, setting of goals and use of reminders were highlighted as areas of most variation between patients. This was in keeping with the thematic analysis from the videos and interviews where guilt was a dichotomous theme affecting three patients and not others. There was also variation in how patients utilised or viewed support from others based upon their social circumstances.

#### **8.6 Mapping of Themes to TDF and COM-B Model**

After the inductive analysis stage, the 20 sub-themes were deductively mapped onto the TDF domains (Cane et al 2012) to analyse if, and how the themes related to the TDF domains. The sub themes were mapped instead of the four overarching themes to capture the detail of the behavioural components within the TDF (Cane et al 2012). All the sub-themes mapped against the TDF domains however not all the TDF domains had sub-themes mapped against them.

The themes identified were often complex and multi-faceted. This sometimes made mapping the themes onto the TDF and COM-B domains difficult, with themes potentially mapping to multiple domains. One sub-theme; 'supporting information' was mapped to both knowledge and memory domains. This theme included printed information given to patients, which provided them with specific instructions as to how to complete the exercises (knowledge and skills), yet many patients also used the sheet itself as a reminder in the home, pinned on a noticeboard (memory). For this reason, it was mapped to both knowledge and memory domains as it was felt they were significantly different influences.

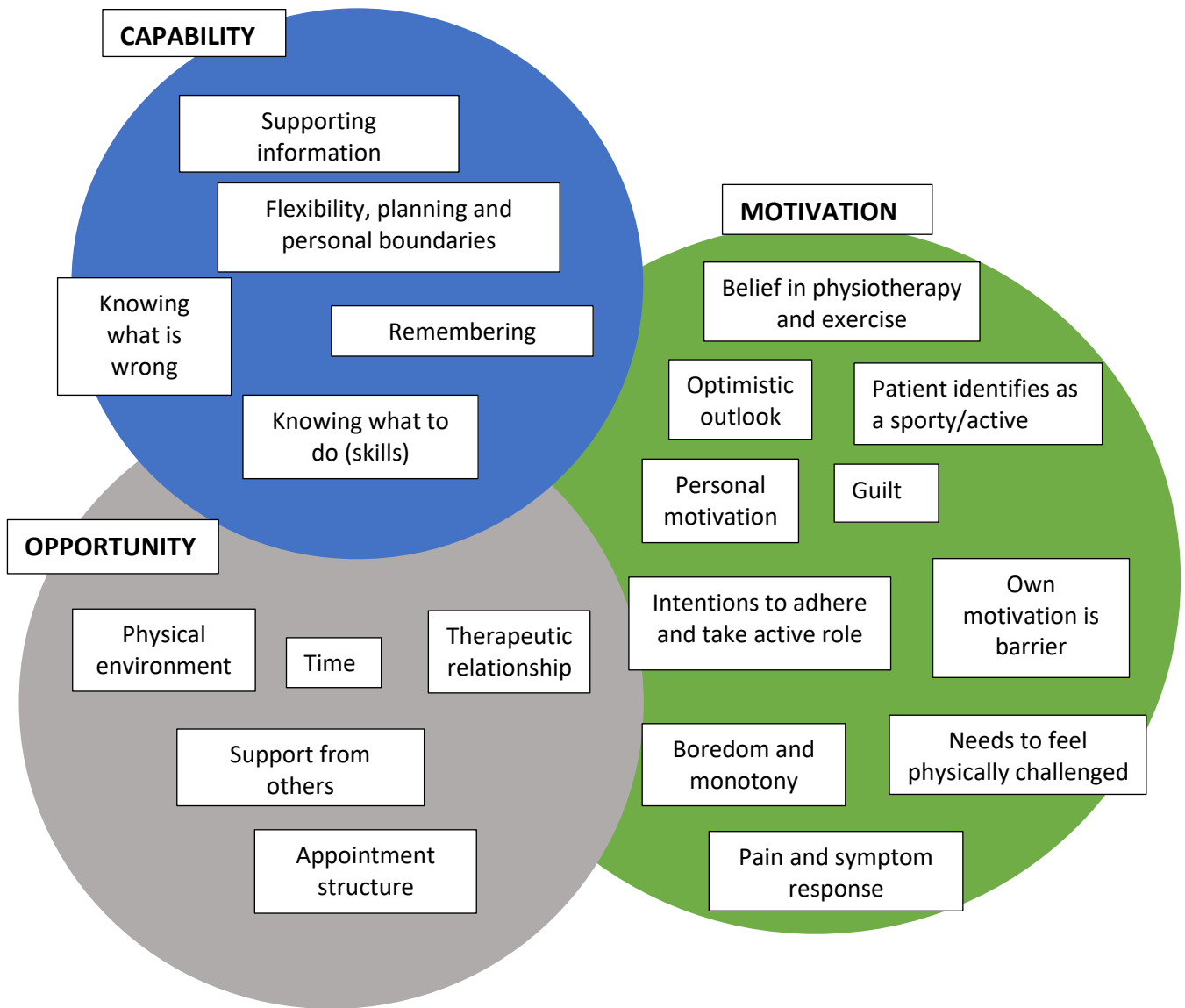
Another example, was flexibility, planning and personal boundaries where patients modified and adapted their programme to suit their own needs. Individuals modified programmes for varied reasons including their symptom response, emotional affect, and environmental factors and initially it was felt it could have mapped into several domains however further analysis, constant comparison and discussion with the supervisory team facilitated a decision of best fit into the behavioural regulation domain. The mapping of the themes to the TDF is shown in Table 8.4.

SUB-THEME	TDF DOMAIN	CONSTRUCTS
1. KNOWING WHAT IS WRONG 2. SUPPORTING INFORMATION*	Knowledge	Knowledge (including knowledge of condition /scientific rationale) Procedural knowledge Knowledge of task environment
3. KNOWING WHAT TO DO	Skills	Skills Skills development Competence Ability Interpersonal skills Practice Skill assessment
4. PATIENT IDENTIFIES AS SPORTY/ ACTIVE PERSON	Social professional / role and identity	Professional identity Professional role Social identity Identity Professional boundaries Professional confidence Group identity Leadership Organisational commitment
5. NEEDS TO FEEL PHYSICALLY CHALLENGED	Beliefs about capabilities	Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence
6. OPTIMISTIC OUTLOOK	Optimism	Optimism Pessimism Unrealistic optimism Identity
7. BELIEF IN PHYSIOTHERAPY AND EXERCISE	Beliefs about consequences	Beliefs Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequents
8. PAIN/ SYMPTOM RESPONSE 9. BOREDOM AND MONOTONY	Reinforcement	Rewards (proximal /distal, valued /not valued, probable /improbable) Incentives Punishment Consequents Reinforcement Contingencies Sanctions
10. INTENTIONS TO ADHERE AND TAKE ACTIVE ROLE 11. OWN MOTIVATIONS IS BARRIER	Intentions	Stability of intentions Stages of change model Trans-theoretical model and stages of change

<b>12. PERSONAL MOTIVATIONS</b>	Goals	Goals (distal / proximal) Goal priority Goal / target setting Goals (autonomous / controlled) Action planning Implementation intention
<b>13. REMEMBERING (SUPPORTING INFORMATION*)</b>	Memory, attention and decision processes	Attention Attention control Decision making Cognitive overload / tiredness
<b>14. APPOINTMENT STRUCTURE 15. PHYSICAL ENVIRONMENT 16. TIME</b>	Environmental context and resources	Resources / material resources Organisational culture /climate Salient events / critical incidents Person x environment interaction Barriers and facilitators
<b>17. SUPPORT FROM OTHERS 18. THERAPEUTIC RELATIONSHIP</b>	Social Influences	Social norms Group conformity Social comparisons Group norms Social support Power Intergroup conflict Alienation Group identity Modelling
<b>19. GUILT</b>	Emotion	Anxiety Affect Stress Depression Positive / negative affect Burn-out
<b>20. FLEXIBILITY, PLANNING AND PERSONAL BOUNDARIES</b>	Behavioural regulation	Self-monitoring Breaking habit Action planning

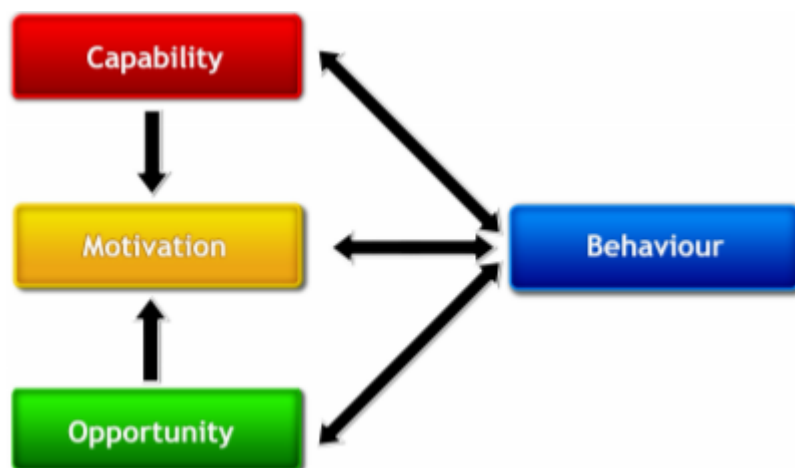
**Table 8.4 - Mapping of themes of patients experiences and adherence behaviours onto TDF domains and constructs (\*themes which mapped against multiple domains).**

The sub-themes were then also mapped to the COM-B domains based on the previous TDF mapping (Cane et al 2012). Half of the themes mapped to the motivation domains, with the other half mapping equally to the capability and opportunity domains. This mapping is outlined in figure 8.2.



**Figure 8.2 - Diagram showing influencing sub-themes mapped to COM-B domains**

The COM-B ‘behaviour system’ interacts to generate behaviour that in turn influences these components as shown in Figure 8.3 (the ‘COM-B’ system). The arrows represent potential influence between components in the system. For example, opportunity can influence motivation, as can capability, and enacting a behaviour can reciprocally alter these factors. This interaction was seen within the themes. For example, when a patient’s pain flared up in response to performing the SMPP exercises (target behaviour) for some it then demotivated them (decreased target behaviour) in an attempt to avoid further symptom flare up. For others, this response in symptoms only served to further to bolster their capability and motivation to do more exercises in the hope of eventual improvement.



**Figure 8.3 - The COM-B system illustrating the interdependency of the components.**

## **8.7 Synthesis of Findings from Chapters Seven and Eight**

### **8.7.1 Overview of Findings**

The findings from this study provide a rich description of the content and provision of SMPPs over time, within usual care contemporary MSK physiotherapy practice. Findings revealed that exercises were the most common SMPP strategy provided (average 4 exercises), although more than half also received a non-exercise strategy. There was a much greater focus (for both physiotherapists and patients) on exercise strategies compared to non-exercise strategies. SMPPs were the main, and often only, treatment approach observed in the physiotherapy appointments. How SMPPs were provided, and the length of time spent on SMPP provision varied between physiotherapists, particularly for exercise prescription, which was provided in a variety of ways. Eight themes were identified regarding the physiotherapists' behaviours when providing SMPPs, all of which mapped to the TDF domains. Three of these themes related to the physiotherapists' own capability, opportunity, and motivation to deliver the intervention and five themes related to how the physiotherapist addressed the patients' capability, opportunity and motivation to adhere.

Although the themes arising from the physiotherapists' behaviours mapped equally to capability and motivation components of the COM-B model, physiotherapists were observed to spend longer addressing the patients' capability aspects compared to motivations. For example, all the physiotherapists spent time providing verbal explanations, with many also providing demonstrations, opportunities for patients to practice and printed materials. None of the physiotherapists addressed patients' intentions, goals or experiences of undertaking the programme in their daily lives, although physiotherapists did, in the main, offer flexibility in how the programmes could be undertaken to support adherence.



In contrast, the analysis of the patients' interviews suggested that motivational components were most common in driving the target behaviour. Patients seemed less concerned about the specific detail of knowing what to do or where, but more so wanted to ensure that they took up their role in playing their part, trusting the physiotherapists' guidance, and that they were being challenged to meet their underlying goals and motives. Patients also personalised programmes to suit their own personal boundaries and needs despite the afforded SMPP flexibility offered by the physiotherapists.

### 8.7.2 Interplay of Themes and Behavioural Components

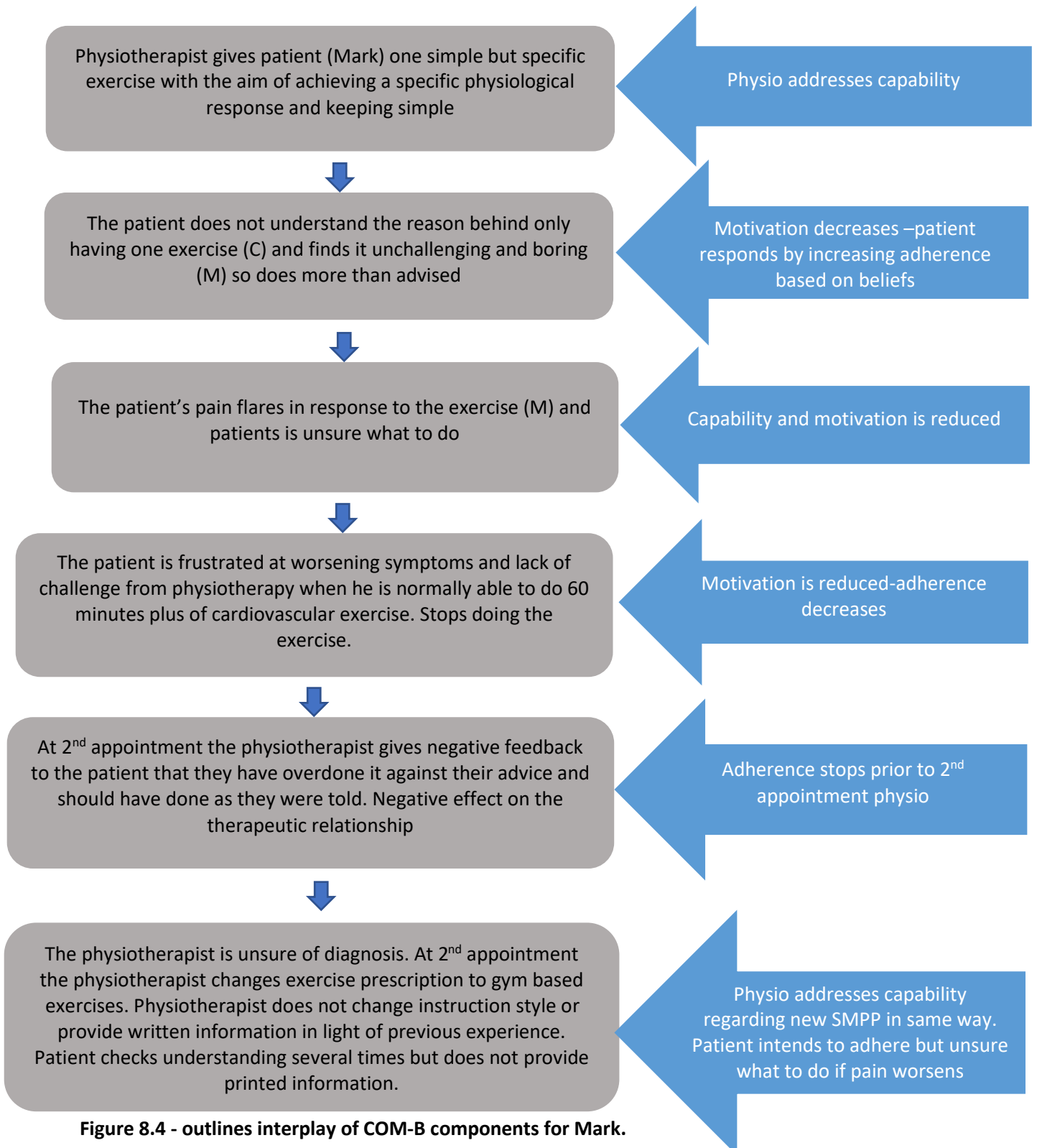
As discussed, the COM-B system is an interplay of functions which drive and are driven by the behaviour (Michie et al 2011a). Further synthesis of the findings demonstrated that adherence is not only an interplay of components within the patients or physiotherapists own behaviours (intra-relation), but also a complex interplay between both the physiotherapists' actions and those of the patient (inter-relation); each reacting to the actions of the other.

Examples of these interdependencies were seen in all the appointments to different degrees. Two case studies are presented to demonstrate this interplay of the behavioural components within the appointments and episode of care. These are formatted based on a subjective synthesis of the findings for each patient and field notes (see case summaries Appendix 5). The first example (participant Mark) illustrates where the interdependencies played out, sometimes with negative adherence effects, where patients and physiotherapist's expectations and behaviours were not aligned. Example one (participant Mark) outlines how COM-B components were influenced through the appointment. The second example illustrates where these interdependencies resulted in sustained adherence and positive outcomes (participant Emma).

#### *Example one - participant Mark*

*Mark was given one simple but specific therapeutic exercise (lower limb neural gliding exercise) to do at home. He was told to do it at a specific time, with a specific and strict number of repetitions with the aim of achieving a specific physiological response/outcome. This exercise was explained to the patient (using some jargon) and the patient practised it. The patient declined the offer at the very end of the appointment of a printed sheet. The patient began exercising at home but found the exercise monotonous and unchallenging, so he decided to increase the number of exercises he performed in the hope of getting better quicker. The patients' pain flared up in response, but he persevered hoping more exercise would help. The patient was now experiencing severe pain. At the second physiotherapy appointment the physiotherapist gave feedback to the patient that he had overdone it against what he had been told and the physiotherapist was unhappy their advice had not been followed. The patient*

*apologised. This affected the therapeutic relationship and changed the physiotherapists approach to the treatment and provision of further exercise. At the end of the second appointment the physiotherapist 'tested' the patient on what he had been given to do, but still did not provide printed information.*



**Figure 8.4 - outlines interplay of COM-B components for Mark.**

The second case study (participant Emma) highlights another example where this time adherence was high and appeared to be sustained. There was a strong therapeutic relationship and trust observed between the physiotherapist and patient. The patient had high levels of intrinsic motivation which led to strong intentions and adherence. These intentions were not specifically explored by the physiotherapists but were enhanced by the physiotherapists' behaviours and decisions, including the balance of a challenging programme with support strategies for management of symptom flare up. None of the themes or behavioural components appeared to operate independently on the target behaviour, either within, or between, the physiotherapist and patient.

*Example two - Emma*

*Participant Emma was given three Pilates exercises at the first appointment. The physiotherapist spent considerable time teaching the exercises through a combination of verbal instructions, demonstrations, and opportunities to practice. She used lay language and referred to keeping the exercises simple and basic with the aim of preventing pain or discomfort. The patient was given a strategy to evaluate her pain to ensure she was challenging herself but not overdoing it. The patient had strong positive beliefs about physiotherapy and strong intentions to play her part underpinned by her own personal goals. There was a strong relationship of trust observed and described. The patient began exercising at home and appeared to have high self-efficacy and adherence, building a routine, and planning daily exercises. She described feeling challenged yet supported. At the second appointment the patient reported full adherence and was committed to continuing the exercises. This positive feedback strengthened the therapeutic relationship further. The physiotherapist progressed the exercises and began to explore the patients' beliefs about pain and exercises and motivation strategies. This led to further advice and discussion aligned to her intentions, whilst also having a strategy and plans to manage any flare up of pain. As the therapeutic relationship grew, the patients' self-efficacy grew further, and her motivation and adherence continued despite the time demands and complexity of the SMPP increasing. After three appointments the patient talked about long-term engagement in a Pilates class outside of physiotherapy although long-term strategies were not discussed by the physiotherapist.*

8.7.3 Summary of Synthesis

The themes arising from both parts of the study were mapped separately to the TDF and COM- B domains. Mapping of the themes illustrated that the physiotherapists' setting, and environment

played a part in the provision of SMPPs. Although provision of the SMPP was varied between physiotherapists overall, there was a larger focus by physiotherapists on ensuring patients had the physical and psychological capability to carry out the programme compared with the consideration as to whether patients had the opportunity and motivation to adhere. In contrast to this, the 20 themes arising from the patients' experiences and adherence behaviours had a greater focus on the motivation domains. These findings highlighted a range of factors that influence adherence and a potential misalignment between how factors are addressed that influence adherence in the provision of SMPPs, compared with how they are experienced by patients. The themes were also considered to be interdependent, with behavioural components for both physiotherapists and patients (capability, opportunity and motivation) being observed as influencing, and being influenced, by each other and the target behaviour.

Although in this study the target behaviour relates primarily to the patients' actions, it is not only the result of the patients' behaviours and experiences that influenced adherence. The interplay between the physiotherapists' setting and behaviours when providing the SMPP, and how this is interpreted by, and influences the patients also affected adherence behaviours. Although the patients' and physiotherapists' behaviours were considered and analysed separately, it is the interdependency and influence of these components within the communication and therapeutic relationship that is key. In the final chapter the relevance of these findings will be discussed considering the published evidence and their relevance to contemporary physiotherapy practice will be considered.

## CHAPTER NINE – DISCUSSION

### **9.1 Introduction**

In Chapter seven, the findings describing the SMPPs content, dosage and provision were presented to the reader (research objectives 1 and 2). Chapter eight presented the results from the patients' experiences of receiving an SMPP and their subsequent adherence behaviours (research objectives 3 and 4). This was followed by a synthesis of the overall findings in relation to the TDF and COM-B models.

In this chapter, the results of the study are discussed in the context of previously published research. An analysis and comparison of how SMPPS were delivered by physiotherapists, and experienced by patients in relation to adherence behaviours, are synthesised to explore and evaluate their relevance in contemporary physiotherapy practice. The use of the TDF and COM-B as frameworks to evaluate and support physiotherapists in optimising a patient's experiences and adherence behaviours are also discussed.

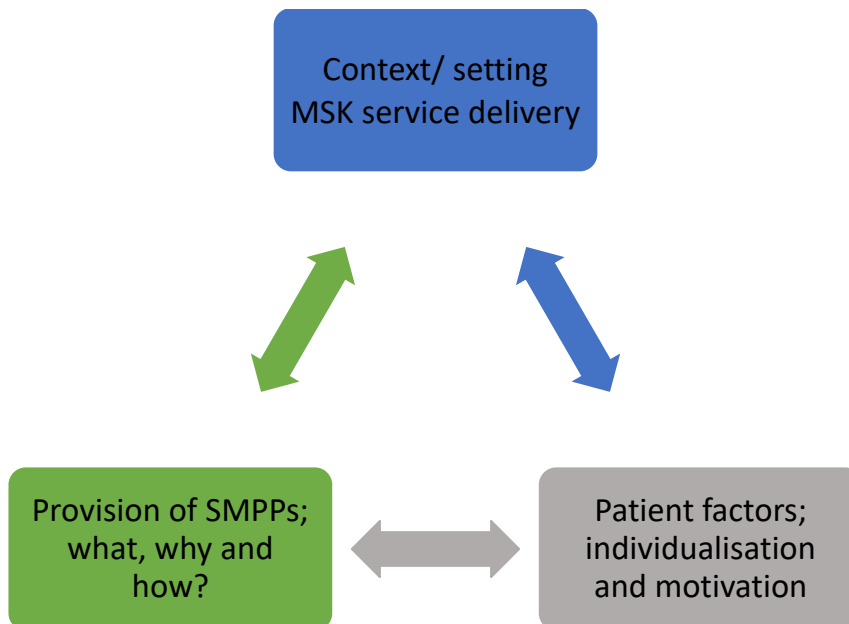
The original contribution to knowledge of this study is highlighted followed by a review of the study's strengths and weaknesses to illustrate key learning and development. Finally, the conclusions and implications of the research findings for physiotherapists, service leads, and educators are discussed, along with areas for future clinical physiotherapy practice, education and research.

### **9.2 Summary of Findings**

The key findings broadly focus on issues relating to the SMPP content and instruction, the context and setting and patient factors. These issues were interdependent and influenced, and were influenced by, each other as outlined in figure 9.1. The key considerations for physiotherapy professional practice are discussed.

- **Prescription and provision of SMPPs**
  - Decision making

- Understanding treatment fidelity and adherence; content and dosage of SMPPs
- The provision of SMPPs in practice; physiotherapists' focus on capability.
- **Context and setting**
  - Importance of the therapeutic relationship
  - The physiotherapists environment; MSK service delivery
  - Group exercise and social support
- **Patient factors; patients as individualisation and motivation**
  - Goals, motivations and action planning
  - Patients' exercise beliefs, identity and expectations
  - Motivation is fluid and interdependent – intention / behaviour gap



**Figure 9.1 - Diagram showing interdependence of findings**

The TDF and COM frameworks proved useful in providing a theoretical structure to evaluate adherence. The detailed framework of psychological constructs allowed deep analysis of the themes and the identification of specific concepts which influenced, and were influenced by, behaviours over the longitudinal period of study. When providing SMPPs physiotherapists placed a greater focus on addressing patients' capability compared to their opportunity and motivation whereas patients focussed most on aspects relating to their motivation. This real-life study of clinical practice illustrated the dynamic nature of the behavioural and motivation systems. This included how the COM-B components interplay within both an individual patient's behaviour, and between the physiotherapists and patients' behaviours. This illustrates that adherence behaviour is variable,

individualised, complex and dynamic and physiotherapy practice needs to be able to respond accordingly, delivering personalised care.

### **9.3 Prescription and Provision of SMPPs**

When providing SMPPs physiotherapists make many decisions about what to provide, how much and when. These treatment decisions affect adherence. Themes identified included the decisional balance between prescribing SMPPs that's are simple, memorable and flexible, versus achieving the challenge and therapeutic specificity and dosage needed for both short- and long-term adherence and outcomes. As physiotherapists were not asked about their decision-making processes it is not possible to understand how or why physiotherapists approached or made these choices. However, decisions were made and their effects and influence on patients' adherence behaviours are discussed.

#### **9.3.1 Decision Making within SMPPs**

Current NHS policy (NHS England 2021) strongly advocates an approach to personalised care and shared decision making (SDM). The clinician and patient should participate jointly in making a health decision, having discussed the options and their benefits and harms, and the patient's values, preferences and circumstances (Hoffman et al 2014). Within the current study, physiotherapists made all the treatment decisions and there were no explicit examples of SDM observed. These findings are in line with other research where low uptake of SDM was observed in MSK physiotherapy (Dierckx et al 2013, Jones et al 2014, Stenner et al 2016,), with physiotherapists feeling it was their role to provide exercises and self-management to empower patients (Jeffrey & Foster 2012, Dierckx et al 2013).

Despite this policy focus on SDM, none of the patients in this study specifically identified the need to be involved in choosing their desired treatment, explaining that they were in the 'hands of an expert clinician' who knew best. This illustrated a power dynamic, identified as a construct within the social influence domain in the TDF (Cane et al 2012). This is supported by Cooper et al (2008) who reported that although patients made the decisions, they still expected the plan to be accompanied by good explanations. SDM is not straightforward and problems of power inequalities, conceptualisation and lack of physiotherapists' skills and attitudes to share power and decision making have been identified as barriers to patient participation (Schoeb and Burge 2012.) In

engaging service users in the decision-making process, it may be acceptable to view a preference for a passive role as an autonomous choice in that individuals may be deciding not to decide.

Alternatively, it may be that individuals who are not presented with choices and who do not have expectations of being involved in decision making may well prefer a passive role because they are unaware of alternative roles (Beaver et al 1999).

### 9.3.2 Understanding Treatment Fidelity and Adherence

The conceptual framework for implementation fidelity (CFIF) was presented to describe the elements of the SMPPs that should be defined, namely the content (the active ingredient of what is to be delivered), coverage, frequency and duration (dosage) (Carroll et al 2007). The choice of the content and dosage of exercise prescription may have been impacted by multiple factors. These include the intended anatomical or pathophysiological effects, the individual patients' capabilities, the aims of the exercise intervention (Pederson et al 2015) and MSK management guidelines, which can often be vague (Lim et al 2019).

The findings regarding the provision of both exercise and non-exercise strategies within the SMPPs in the current study aligns with previous studies in Irish (Liddle et al 2009) and Australian private practice (Peek et al 2017). Peek et al (2017), when undertaking a direct observational study, also found that exercise was given to almost all patients (93%) followed by advice then heat application. Although the numbers in the present study (n=11) were lower than those investigated by Peek et al (2017) (n=113), the ratio of prescribed strategies mirrored these findings. Peek et al (2017) also found, as did the current study, that exercise was the only strategy to be prescribed in isolation. This focus on therapeutic exercise as the main SMPP strategy is not unexpected, as exercise is considered a cornerstone of physiotherapy practice (Novak 2011, Jeffrey & Foster 2012, Safron-Norton et al 2019, Bayattork et al 2020). Home exercise programmes are recommended in many exercise protocols and guidelines for MSK conditions including OA (Hurley et al 2010, Bennell et al 2014b, Willett et al 2019), LBP (NICE et al 2016), shoulder dysfunction (Littlewood et al 2016) and tendinopathy (Habets & van Cingel 2015). It is also important to note that SMPPs and exercises were, in almost all cases, the only intervention provided in the physiotherapy appointments observed and half of patients were discharged after the two appointments. This illustrates the central role exercise programmes and self-management approaches play in physiotherapy management (deSilva et al 2011, Lim et al 2019).

Non-exercise self-management strategies, such as the use of heat or cold therapy (Malanga, Yan & Stark 2015, Petrofsky et al 2016, Koppelaar et al 2020) and self-taping (Campbell et al 2001) are identified in the literature although literature supporting their efficacy as self-management



approaches is limited. It is unknown why non-exercise strategies had less time afforded to their instruction by the physiotherapists in this study. The effectiveness of some non-exercise strategies such as self-trigger point release has been challenged (Quintner et al 2015). The use of in-shoe foot orthoses for Achilles tendon pain has been studied (Munteanu et al 2015) but research is limited and adherence, which is essential, is sub-optimal (Davies et al 2020, Menz and Bonanno 2021). Overall, there is a paucity of research outlining treatment protocols for non-exercise strategies which perhaps is reflected in the lack of attention paid to their prescription or vice versa.

Peek et al (2017) proposed that the provision of multiple SMPP strategies may overburden patients resulting in reduced adherence. Only one of the six patients given non-exercise strategies in the current study recalled this strategy, compared to the recall of all exercise elements. These results align to those of Peek et al (2020) who found that almost all participants (97%, n= 113) recalled their exercise strategies compared to only 50% of those non-exercise strategies. This lack of attention to non-exercise strategies is important to note as interventions such as heat application can cause significant harm when applied incorrectly (Nadler, Weingand & Kruse 2004). Further research is needed to understand the prescription of non-exercise strategies and their adherence in practice (Peek et al 2017).

This research is the first to observe the detail of specific exercises physiotherapists prescribe in usual MSK practice. Although Peek et al (2017, 2020) noted on a checklist when exercises were provided, they did not describe the content or dosage of individual exercises and as there were no AV recordings to refer to, noting errors are likely. Findings from this current study suggest that the physiotherapists' tendency was to provide simple and flexible, patient-led programmes with low, dosage prescription. This seemed to be in an attempt to ensure patients' capability, memory and ultimately adherence. However, it may also have been affected by the time available to physiotherapists. That is, it was possibly service-led, rather than purely physiotherapist-led.

The technicality of exercise interventions varied with some patients receiving specific exercises with defined movement patterns such as those described by Littlewood et al (2013), whilst others received general exercises that replicated everyday activities (Bayattork et al 2020). There is increasing debate surrounding the content and dosage of exercise prescription, and its relationship to adherence (Escolar-Reina et al 2010, Babatunde et al 2017c, Smith et al 2019) and therapeutic effectiveness (Littlewood et al 2013, Young et al 2018). Familiar exercises that replicate daily activities are likely to be within the autonomous phase of motor learning, where movements are driven at cortical level with little reliance on attention-executive networks (Cacciola et al., 2018). Literature supports the principle of keeping programmes simple when providing SMPPs. Many

authors claim that simple regimens are more likely to be adhered to than complex ones (Henry 1999, Peek et al 2017, Babatunde et al (2017c) and patients with lengthy or complicated SMPPs may feel overburdened (Essery et al 2016). However, the findings of the current study challenge this notion as patients who were given simple, flexible programmes often found them too easy, boring and not meeting their expectations of what physiotherapy should entail. This ironically was demotivating and reduced adherence. Hall et al (2020a) reported in their exploratory study, that physiotherapist's recognised that matching the challenge of the SMPP to the patients' ability is important to build psychological capability. However, this practice was not observed in the present study. Recall and adherence are also likely to be influenced by exercise prescription choices as more complex movements require greater psychological and physical capability (Marinelli et al 2017) and complex interventions can result in lower treatment fidelity (Carroll et al 2007, Escolar-Reina et al 2010).

In this study SMPPs were usually provided with no specific dosage parameters of intensity or frequency, with the intention of affording patients flexibility to modify their programmes to meet their needs. This is in keeping with previous research (Jack et al 2010, Lim et al 2019). Providing flexibility within the SMPP was generally appreciated by patients however, physiotherapists also need to consider whether an individual has the cognitive skills to plan and regulate their own behaviours to achieve the desired therapeutic effect (West and Michie 2020). This study found the average number of exercises prescribed in the first appointment was four (range 1-8). No previous studies are available for comparison that evaluate the number of home exercises actually provided within usual physiotherapy care. Palazzo et al (2016), when interviewing patients with LBP, found that those exercising regularly preferred more exercises to provide variety but those not used to exercise preferred less than four exercises. Patients in this study identified being familiar with exercise and physical activity, which may explain why they felt less challenged by low numbers of exercises. Studies evaluating interventions to increase adherence and those evaluating MSK exercise interventions illustrate that the number of exercises within SMPPs varies widely. For example, Mannion et al (2009) provided lengthy programmes of up to 300 repetitions, whereas Schneiders et al (1998) prescribed just three exercises daily and Littlewood et al (2013) proposed just one exercise, twice daily. Other studies refer to exercising in longer blocks two or three times weekly (Hartigan et al 2000, Hurley et al 2007). When describing the number of exercises, it is also important to consider nuances that may exist for example, one patient in the present study was asked to do neck movement exercises which involved seven movements of the neck but could be considered simplistically as one exercise: neck range of movement exercises.

In the current study, the patients who received more complex movements, although they still adhered, tended to modify the exercise to suit and did not always focus on, or replicate, the specific details. Physiotherapists need to consider how to ensure patients can recall and perform the detail of the exercise, not just the number of exercises or repetitions if specificity is considered important to therapeutic efficacy (Carroll et al 2007, Young et al 2018). Lack of specificity within the technique may explain why adherence does not always result in improved outcomes (Bennell et al 2020). Understanding the core or active components of an intervention is crucial if the patient is to benefit. This illustrates the need for accurate reporting of complex interventions such as exercise in clinical trials so physiotherapists can accurately replicate efficacious interventions (Hoffman et al 2014). This often-complex concept of what constitutes 'therapy' has been described in stroke rehabilitation as the black box that is therapy (Ballinger et al 1999, Moore 2018). However, even if the optimal intervention is known, if this does not align with the patient's preferences and is subsequently modified by patients then this therapeutic threshold still may not be achieved (Cohen et al 2008). Hawe et al (2004) challenges those evaluating complex interventions (including those aimed at promoting health) to avoid trying to standardise all components, but instead to standardise the function and process of the components to allow for individualisation. Once efficacious interventions have been identified, the challenge for implementation is to balance the tension between treatment fidelity, flexibility and adherence (Cohen et al 2008) and several adaptive frameworks have been suggested to address this process (Escoffery et al 2018).

Physiotherapists are encouraged to consider measuring adherence in terms of both quantity and quality (Young et al 2018) to better understand treatment fidelity (Carroll et al 2007). Because some exercises were deliberately prescribed as they were already part of patients' normal activities, the lack of a separate specific programme makes defining an adherence threshold difficult. In this study no explicit adherence measurement tools were used by physiotherapists. Adherence to physiotherapeutic management is a complex concept (Hall et al 2015, Bailey et al 2020) and measuring adherence to SMPPs is difficult (Basset 2003, Jack et al 2010, , Beinart et al 2013, Bollen et al 2014, Hall et al 2015, Frost et al 2017, Naqvi et al 2020). It is often subject to bias through self-report measures (Kolt et al 2008, Grindley at al 2008, Schwarzer & Luszczynska 2015, Naqvi et al 2020). Frost et al's (2017) definition of adherence was developed for therapeutic exercise in order to capture the need to measure adherence against the parameters of exercise dosage rather than as a homogenous activity. However, if these parameters are not set by the physiotherapist as was the case for all but one participant in this study, then measuring adherence is impossible.

Adherence is also often denoted as a binary, 'all or nothing' principle; identifying patients as adherent or non-adherent, (Peterson 2018) when in reality it has many graduations (Sluijs et al 1993). This was highlighted in this study where patients' exercise levels fluctuated depending on their routines and life events. Some patients also did more than advised or integrated exercises into other activities. Peek et al (2020) highlight that labelling patients as adherent or non-adherent also pushes all the responsibility onto the patient and fails to acknowledge the part the physiotherapist plays in supporting adherence. Observations over a period of time illustrated that intentions, motivations and behaviours fluctuated hourly, daily and weekly which is a common phenomenon (West 2009, Bassett 2015) and therefore achieving 100% adherence every day is potentially unrealistic (Campbell et al 2001). Other physiotherapy interventions that have shown to be effective, describe supervised group exercise sessions in two hourly sessions a week (Hurley et al 2007). This may be a more realistic schedule than daily home exercises. This highlights the importance of the physiotherapists' role in balancing therapeutic benefits with sustained adherence and is a key reason why measuring fidelity in clinical trials is so important (Toomey et al 2019). This concept of achieving the optimal level of exercise; not too much and not too little, has been coined the 'goldilocks' principle' (O'Keefe et al 2018). Although O'Keefe et al (2018) discuss this concept in relation to optimal levels of cardiovascular exercise, the principal can be applied to MSK SMPPs. Consideration needs to be made regarding achieving a balance between the provision of therapeutically significant, challenging exercise programmes with those that are not too complex and overburdening for patients.

The current study illustrates that adherence cannot be considered as a straightforward, binary principle, but as it is an interplay of many capability, opportunity and motivational components both within and between the patients' and therapists' motivational systems (Michie et al 2011a). Further investigation is required to understand the concept of adherence specifically to therapeutic exercise, including the definition of adherence, therapeutic adherence parameters such as frequency and accuracy of the exercise, values and measurement of adherence (Bailey et al 2020).

It is proposed that physiotherapists should also consider the purpose of the SMPP in relation to the specific therapeutic goals of the SMPP, versus the physical health benefits of general physical activity. It is recommended that adults achieve 150 minutes of moderate physical activity per week plus strength training sessions (Department of Health 2019). In addition, for those with chronic MSK conditions such as LBP and OA, similar long-term therapeutic exercise requirements are recommended (Hurley et al 2007, NICE 201, 2016, Pederson et al 2015, Young et al 2018, Amorim et al 2019). Despite all patients in this study reporting being adherent during the first few weeks of

their physiotherapy treatments, most acknowledged that committing to longer term adherence would be more difficult. Patients anticipated barriers ahead, which is in keeping with previous studies exploring adherence behaviours in those with OA (Campbell et al 2001, Smith-Forbes et al 2016).

In the current study several patients still completed exercises given during previous episodes of physiotherapy care which they preferred as a longer-term solution, possibly due to high self-efficacy. Previous studies support this, reporting that patients undertook therapeutic exercises for three months to five years (Palazzo et al 2016). Hurwitz et al (2005) proposed that the effect of recreational exercise is better or at least as good as back exercises and supports a transition to more general exercise participation in the long-term. In the current study there was a lack of consideration by physiotherapists of longer-term exercise options. Physiotherapists should consider how best to support patients to transition from specific physiotherapeutic exercises to embedding therapeutically effective exercises into daily routines to support long-term adherence and optimal outcomes (NIHR 2018). These findings highlight the challenge of designing and delivering an intervention within the therapeutic window yet that can be personalised by individuals. It is suggested that when literature indicates that no one type of exercise is more beneficial then physiotherapists should work collaboratively with the patient to select a form or exercise that aligns with salient goals for the patient. Dean et al (2005) support the de-medicalisation of LBP and chronic MSK conditions so these are seen as consequences of normal life and allow patients to 'establish a new identity'. They suggest embedding exercise interventions to become part of normal activities or daily routines, meaning separate time to undertake additional physiotherapeutic exercises is not required. An example could include attending a regular Zumba or Pilates class and potentially incorporating specific exercises if required. This then becomes part of an individual's regular weekly social routine rather than being seen as separate 'physiotherapy' exercises on a printed sheet. However, this assumes patients wish to, and have the resources to engage in community activities. Interestingly, a patient in this study attended several exercise classes each week and specifically mentioned to the physiotherapists that they were replicating their SMPP exercises in the class however the physiotherapist did not discuss or endorse an integrated approach. This potentially misses an opportunity to embed therapeutic exercises for longer term adherence. Physiotherapists should take opportunities to work with patients to reframe SMPPs as part of regular, sustainable activities that align with patients' salient goals to support long-term behaviour change and adherence (Hurley et al 2010).

### 9.3.3 The Provision of SMPPs in Practice- Physiotherapists' Focus on Capability

A key overarching finding was that physiotherapists placed a greater focus on addressing patients' capability when providing programmes compared to opportunity and motivation. This was in comparison to patients who focussed more on motivation and opportunity. Capability constructs that map to the knowledge, skills, memory and behavioural regulation domains of the TDF (Cane et al 2012) were addressed in a number of ways. These included providing verbal information about the SMPP, using demonstrations and providing patients with opportunity to practice within the appointments all of which are in keeping with recommended practice (Jeffrey & Foster 2011, Brody 2012, O'Keefe et al 2012, Peek et al 2016b, 2016c, Forbes et al 2017, Babatunde et al 2017a, Hall et al 2020a). The physiotherapists' focus on addressing patients' capability has been seen in other literature. This includes a direct observational study of private physiotherapy practice in Australia (Peek et al 2017, 2020) and physiotherapists reporting of their own practice (Peek et al 2016b, Babatunde et al 2017c & Hall et al 2020a, Horler et al 2020). Guidance for the provision of SMPPs also suggests focussing on addressing patient's capability (Brody 2012, Babatunde et al 2017c,). Carroll et al (2007) highlight the importance of the role of facilitation strategies such as demonstrations and the quality of intervention delivery, as key moderators in ensuring treatment fidelity.

As well as increasing knowledge of the SMPP and facilitating memory of it, addressing capability domains is likely to increase self-efficacy which is an important factor in adherence (Jack et al 2010, Breland et al 2020). Bandura (1997a) suggest that self-efficacy is influenced by four types of experience; mastery of experience, vicarious experience, psychological state and verbal persuasion, which are developed when addressing capability constructs (Cane et al 2012). Picha & Howell (2018) used case studies to address these components of self-efficacy when providing SMPPs hypothesising they could increase self-efficacy and adherence. Strategies observed in the current study to address capability, including physiotherapists' demonstrations and the opportunities for patients to practice, may have increased self-efficacy via vicarious experience (watching demonstrations) and mastery (practice) of the skill (Picha & Howell 2018). Self-efficacy is a construct within the 'beliefs about capabilities' domain of the TDF (Cane et al 2012) which maps to the motivation component in the COM-B model. This illustrates the interplay of the COM-B components in relation to the target behaviour, where increasing capability can potentially increase self-efficacy, which can, in turn drive motivation (Cane et al 2012). A study evaluating physical activity participation in stroke survivors highlighted the relationship between motivation and capability (Morris et al 2017). Stroke survivor participants sometimes displayed dissonance; becoming frustrated at not being able to physically perform exercises (capability) despite being motivated. Morris et al (2017) highlighted the

importance of capability and motivation working synergistically and not in isolation. It is acknowledged however that dysfunction caused by stroke is different to that caused by MSK conditions.

Social determination theory (SDT) (Ryan and Deci 2000) highlights a connection between competence (capability-which is a basic need in the SDT), and the development of intrinsic motivation (Ng et al 2012, Lonsdale et al 2017, Hall et al 2020a). Hall et al (2020a), using SDT theory as a framework, found that physiotherapists reported that they build capability through several strategies. Some of these strategies were observed in the present study, including provision of opportunities for patients to practice, positive feedback, verifying patients' progress and educating about the rehabilitation process. Interestingly, Hall et al 's (2020a) other findings; matching challenges to patients' ability, aligning SMPPs with patient led goals and verifying patient progress not observed explicitly in the present study, but were highlighted by patients as important factors.

The observed use of practical demonstrations and opportunities for the patient to practice are considered important in building patients' capability and self-efficacy (Stickler 2015, Peek et al 2016c). Physiotherapists in previous studies have self-reported using these strategies but no previous studies have explored the reality of how these are enacted in practice (Peek et al 2016b, Babatunde et al 2017c, Hall et al 2020a). Learning to perform physical movements or exercises requires patients to undertake motor learning which is considered to consist of three main phases: cognitive, associative and autonomous (Marinelli et al., 2017). The physiotherapists in the current study were inconsistent when using these approaches. Without an opportunity to practice, patients in the current study sometimes reported feeling unsure if they were doing the exercises correctly and unsure how their symptoms should respond, which is supported by findings from other studies (Peek et al 2020, Hall et al 2020a). Patient's independence in performing exercises or 'mastery of experience' has been associated with a clinically important increases in self-reported adherence (Azevedo et al 2021). This led authors to recommend that physiotherapists should assess patients' independence in performing exercises when prescribing programs (Azevedo et al 2021). Teaching of exercises using video materials has been suggested as being preferable to face to face teaching in order to support exercise accuracy, although studies are limited in quality (Miller et al 2004). During practice attempts, most physiotherapists provided corrective feedback including touch and verbal feedback (Parry 2004, 2009). When patients gained an opportunity to experience the sensation and symptom response of practising the exercise(s), this built confidence, memory and self-efficacy. Within the cognitive phase of motor learning this feedback about errors and performance is needed to provide correction (Marinelli et al, 2017). As errors are usually high in this phase and there is high

variability in performance, high attentional demand is required from the patient (Nieuwboer et al., 2009). Findings from the present study suggest that if time is limited, providing patients with an opportunity to practice should be prioritised when providing SMPPs.

Approximately half of patients in the current study were also provided with printed materials which is long established and recommended practice in MSK physiotherapy settings (Schneiders et al 1998, Peek et al 2016a, 2019, 2020). Overall patients found them very useful, which echoes findings in previous studies (Medina-Mirapeix et al 2009, Escolar –Reina et al 2010, Peek et al 2016b, Peek et al 2020). Printed instructional sheets have also been found not to support recall in older people in an in-patient settings (Smith et al 2005), suggesting the way materials are provided may affect their efficacy. None of the printed information provided related to non-exercises strategies. This may explain why these strategies were rarely recalled compared with exercises. It is not known why printed information was not provided for non-SMPP strategies although most physiotherapy software packages tend to focus on exercise prescription. Interestingly, all the patients in this present study were offered printed materials, which suggests that physiotherapists thought it was a useful strategy. However, only half of the patients took up the offer, seemingly dependent on how and when they were offered. This highlights the importance of facilitation strategies in providing interventions like SMPPs to maximise implementation fidelity (Carroll et al 2007). It may also highlight a dissonance in practice between physiotherapists reporting something has been done, i.e., ‘ticking a box’ that printed information has been offered, compared to the reality of doing this in practice. This is a benefit of the research methodology which allowed direct observation of practice (Roberts & Bucksey 2007). One patient who declined printed information later explained in the interview that he was not able to read but he did not raise this as an issue with the physiotherapist. Accessibility of patient information is key if it is to have intended effect (Barton et al 2018). Understanding individuals’ health literacy is critical to ensuring patients can acquire and use the information provided to benefit their health (Baker et al 1996, Barton et al 2018). Accessibility of information should be considered and discussed with patients to ensure it is provided in the correct format and meets their individual needs (Yeowell 2010).

Several patients felt that the printed materials could be improved, and some found them confusing. The provision of printed materials does not ensure a sufficient level of information or detail (Smith et al 2005, Miller et al 2009) and Cooper et al (2008) noted that if pictures or diagrams seemed unrealistic, they may deter adherence. All the printed information provided in the current study included pictures, which have attributed to increased comprehension of health communications, especially in those with low literacy levels (Houts et al 2006). There has been significant growth of



digital and online physiotherapy resources designed to support exercise prescription and adherence (Nicholl et al 2017, Koppelaar et al 2020). All but the two oldest patients in this study voiced a preference for the use of digital materials, yet no digital or video-based materials were offered. Assumptions must not be made about how patients wish to access information on the basis of age (Noon et al 2019), or any other factor, but instead on individual's needs and preferences (Barton et al 2018). The preferences for digital health information observed in the present study are supported by previous work in physiotherapy (Miller et al 2004, Lambert et al 2017) and the emergency department (Atzema et al 2017). Miller et al (2004, 2009) also found that videotapes supported specific recall of exercises and provided someone to role model the exercises which echoed findings from this study. This also potentially supports self-efficacy development through vicarious experience (Breland et al 2020). Babatunde et al (2017c) advocate recording patients exercising on their own devices to support adherence, as online or video-based materials also have the advantage of being (re)watched as often as required. It is not clear as to why video or online materials were not offered to the patients in this study and further research is needed to explore the provision and uptake of digital material in NHS settings.

Despite there being an obvious preference for some patients to use digital and web-based materials there is little conclusive evidence, within physiotherapy, that these methods increase patient adherence compared to traditional paper information (Lee et al 2017, Bunting et al 2017). Studies comparing online or video resources have not shown significant increases in adherence over printed materials (Lysack et al 2005, Lambert et al 2017). Newnham et al (2017) found promising results in increasing recall of information when creating bespoke information videos within an acute medical care team, suggesting that whichever method is chosen, the content and delivery method need to be personalised to the patients' needs. Lambert et al (2017) compared adherence to home exercise programmes provided via an app with text message support, compared to a printed handout. No clinically significant changes in adherence were noted between the two interventions. Lambert et al (2017) did emphasise that satisfaction with Apps was high overall and adherence was slightly higher so physiotherapists should not be discouraged from them based solely on their study findings. Several patients in the present study supported this preference for digital materials, suggesting that apps or reminders may be useful to support adherence. Further research is needed to evaluate the effectiveness of online and digital interventions but as for all interventions, they should be tailored to patient's needs (NHSE 2021) and implementation fidelity is integral despite the method chosen (Carroll et al 2007).

Printed information not only conveyed information, but for some it also served as a reminder to exercise, which is a key requirement if patients are to adhere (Peek et al 2016c, 2020). Memory for medical information has shown to be limited however, no studies have explored recall of information given in physiotherapy consultations (Ley 1982, Misra et al 2013). In a seminal paper, Miller (1956) proposed that short term memory capacity is limited, suggesting an individual as only being able to retain seven items, plus or minus two. The number of exercises patients received in this study did not exceed this amount. Patients' generally found programmes were easy to remember, due in part to being short, simple and familiar movements and also when they had opportunity to practise. Research and anecdotal opinion in physiotherapy practice historically refers to not prescribing more than three exercises at one time (Henry et al 1999). Babatunde et al (2017c) supports Henry et al's (1999) recommendations of limiting exercise prescription to a minimum of two to five exercises but they do not provide new research or a rationale for this. There is some evidence to support greater adherence with lower numbers of exercises (Medina-Mirapeix et al 2009) but it is the overall amount and dosage required that is likely to be more relevant (Essery et al 2016).

Increased age has long been highlighted as a factor impeding memory for medical information (Ley 1979, Henry et al 1999, Rastall et al 1999, Bankoff & Sandberg 2012) however, in this study no pattern emerged, with both the oldest and youngest patients forgetting some elements of their programme. Other factors affecting recall include pain and anxiety (Bankoff & Sandberg 2012) which affected many of the patients in the present study. However, remembering the number of exercises is insufficient if patients cannot remember the specific details of the exercise. The current study was the first to explore patients' recall of the specific details of their SMPP strategies immediately after the appointment. Although Peek et al (2017, 2020) evaluated patients' recall of self-management strategies, they did not ask patients about the specifics of the exercises given. In the current study, patients' recall of specific exercise detail was often lacking. Forgetting the programme affects treatment fidelity which, is problematic for measuring adherence and may influence outcomes (Carroll et al 2007, Peek et al 2017, Bailey et al 2020). This again highlights the complexity of exercises as an intervention and the need to consider the role of memory and recall when providing SMPPs.

Behaviour is not just initiated by an individual, but it is something that happens at the interface between a person and the environment (West 2009) therefore the social and physical environment must afford it (West and Michie 2020). In order to carry out an SMPP patients must have the physical space and resources to complete the programme (Meade et al 2019). Patients in the

present study supported this notion, identifying their environment as important in influencing adherence. For some this was particularly noticeable when the environment changed, for example between home and work. Miller et al (2009) highlighted the importance of finding time and the physical and metaphorical 'space' to exercise and reported similar findings to the current study where some patients found exercising at work embarrassing or physically difficult.

'Choice architecture' is a concept that relates to 'nudging' behaviour change through restructuring of the physical environment to encourage specific behaviours (Forberger et al 2019). No research of choice architecture has been done in relation to undertaking SMPPs. In the present study, choice architecture was directly observed in patients' homes during the interviews for example, when individuals chose to leave exercise equipment in a visible location or prepare a dedicated exercise area in their homes. Werner and Milyavskaya (2019) propose that restructuring the physical environment is used by those with 'need to' goals compared with 'want-to' goals in pursuit of their desired outcomes. They suggest that individuals who choose to purposefully change the environment using situation modification are more likely to enact the behaviour.

Noticing cues in the physical environment can facilitate or nudge behaviours to occur (Thaler and Sunstein 2008). Several patients in the current study referred to being reminded to do their exercises after physically seeing the printed exercise sheet in their home, an approach recommended by Peek et al (2016c). Performing a behaviour on encountering a contextual cue reinforces an association between the cue and the behaviour, which can elicit more consistent and persistent behaviour known as habit (Gardner & Lally 2018, Stawarz et al 2020). This dual purpose of printed materials supporting knowledge transfer and acting as a visual cue was also identified by Peek et al (2020). Considering the patients' environment(s) and how this shifts between home and work is important to ensure the environment affords the opportunity to adhere. Encouraging patients to use principles of choice architecture and visual cues, such as placing their printed sheet or exercise equipment in an opportune place, may be useful in supporting adherence to SMPPs.

#### **9.4 Context and Setting**

The context and setting for the provision and completion of the SMPP was seen to influence adherence. Several themes emerged from patients' experiences, including the therapeutic relationship and the patient's own physical and social environment. The service structure and physiotherapists' environment was observed to play a role in how SMPPs were provided. This included how much time physiotherapists had with patients and access to space and equipment.

When implementing treatment protocols or programmes in practice Escoffery et al (2018) highlight that adaptations are common and are likely for a variety of reasons. Common reasons for adaptations include responding to participants' attributes, needs or culture, constraints such as limited time or resources and accommodating practice or setting circumstances/context (Cohen et al 2008).

#### 9.4.1 The Importance of the Therapeutic Relationship

The therapeutic relationship between the caregiver and the patients has been studied extensively within medicine and healthcare, although its evaluation in physiotherapy practice is less developed (Besley et al 2010, Babatunde et al 2017b). The development of the therapeutic relationship was observed to start from the first moment the physiotherapist and patient met. Although it developed and changed over time, it underpinned all the interactions and influenced behaviours both in and away from the clinic setting. This included a considerable effect on patients' adherence behaviours which is in keeping with other studies (Campbell 2001, Cooper et al 2008, O'Keefe et al 2015, Smith-Forbes et al 2017, Bernhardsson et al 2017, Babatunde et al 2017b). Meade et al (2019) interviewed patients with persistent pain to explore their adherence behaviours and similarly found a theme recognising the collaborative partnership between the patient and physiotherapist. Besley et al (2010) identified eight themes relating to the therapeutic relationship three of which; patient expectations, communication and relational aspects, were identified as themes in the present study. Interpersonal and communication skills are core to physiotherapy and a cornerstone of developing a strong therapeutic relationship (Hills & Kitchen 2007, Besley et al 2010, Josephson et al 2015, Allen and Roberts 2017). Patients in this study reported valuing the relationship with their physiotherapist, particularly trust and communication elements, noting attributes including kindness and empathy. Less effective aspects of communication were also noted which undermined the therapeutic relationship, such as lack of clarity, use of jargon and malalignment of expectations, which is in keeping with previous studies (Besley et al 2010).

Verbal communication of information was the core method used by physiotherapists in this current study. This aligns with a study where 95% of physiotherapists reported using one to one discussion to provide information (Forbes et al 2017). Previous studies have reported a conversational bias towards physiotherapists compared to patients (Roberts & Bucksey 2007, Roberts et al 2013), with one study also using video observations, finding that physiotherapists spoke almost twice as much as patients (Roberts and Bucksey 2007). Analysis of conversational dynamics was beyond the scope of this study but on reflection this level of analysis would have likely revealed interesting communication dynamics which may influence adherence (Allen and Roberts 2017). Previous studies

have also noted the use of jargon in practice (Roberts et al 2013) with some patients finding it limits communication and patients' understanding of their problem and their SMPP (Cooper et al 2008). A study exploring health literacy and communication amongst general practitioners (GPs) found that GPs often overestimated their patients' health literacy and understanding, often failing to modify their communication accordingly (Baker et al 1996, RCGP 2014). Babatunde et al (2017c) suggest using non-technical language when providing home programmes in their SIMPLETIPS mnemonic to support improved adherence. This was illustrated when two physiotherapists in the current study used lay terms throughout and focussed instead on analogies and storytelling whilst teaching Pilates and Tai chi exercise, which was well received and adhered to by patients.

Knowledge is considered a pre-requisite for adherence to a SMPP, including both knowledge of the SMPP itself, and its rationale (Stickler 2015, Peek et al 2016c). Patients in the current study were given little or no information about their condition or the rationale for doing the SMPP, focussing instead on teaching the SMPP itself. This contrasts with recommended management for common MSK conditions such as LBP (NICE 2016, Foster et al 2018,) and previous work where physiotherapists reported using medical theory or anatomical models to explain patients' symptoms (Jeffrey & Foster 2011, Peek et al 2016b, Forbes et al 2017, Babatunde et al 2017c). However, patients in this study did not seem perturbed about the lack of specific information about their condition, instead they were satisfied that someone with expertise had assessed them and had planned interventions. This contrasts with previous studies (Escolar-Reina et al 2010) where patients felt a lack of clinical knowledge about their problem was a barrier to adherence. Lim et al (2009) also found that those patients with LBP wanted a specific diagnosis and clear, consistent and personalised information on prognosis, treatment options and self-management strategies. In the current study patients reported trusting their physiotherapist and being satisfied that an 'expert' had looked at them. This level of trust is likely to vary between individuals and their experiences. As the participants in the current study were all white British and from one region in the UK, there is a need to explore the beliefs and needs of individuals from diverse backgrounds.

Several studies have highlighted the value of effective use of language and evaluative communication skills in physiotherapy (Josephson et al 2015, Allen & Roberts 2017). Physiotherapists have been reported to focus on judgement and appreciation evaluation of clinical goals and tasks and less likely to follow up on affect evaluations such as empathy and communication about emotional effects (Josephson et al 2015, Allen and Roberts 2017). Similarly, physiotherapists in the current study focussed on practical elements of addressing patients' capability compared to the exploration of goals, intentions, emotions and beliefs (Josephson et al

2015). It is not known why this was the case and further evaluation of physiotherapists decision making and behaviour's is needed to explore and understand this further.

Lonsdale et al (2017) postulate that effective communication by physiotherapists is critical to increasing adherence. They evaluated the use of an eight-hour communication skills training course as an intervention to increase adherence for patients with chronic LBP. The communication training intervention resulted in short term gains in patient adherence compared to those not receiving additional training (Lonsdale et al 2017). The mechanisms for physiotherapists' acquisition and development of empathetic communication skill are unclear and may be related to the physiotherapists' previous experience, age, and personality (Allen & Roberts 2017). No conclusions can directly be drawn regarding the reasons for the varied communication skills observed in this study. However, there is agreement that communication skills development is a critical component in establishing an effective therapeutic relationship and enabling behaviour change (Hurley et al 2010, Wright et al 2014, Josephson et al 2015, Lonsdale et al 2017, Allen and Roberts 2017).

Effective communication also fostered the sense of trust. Previous studies support this notion of patients trust in their physiotherapist affecting adherence behaviours (Wright et al 2014, O'Keefe et al 2015, Bernhardsson et al 2017). Bernhardsson et al (2017), when exploring patients' preferences for physiotherapy, found a surprising but strong theme that trust in the physiotherapist fosters an active enjoyment in therapy. Patients in this study referred specifically to trusting in the expertise and direction of their physiotherapist and the fact they were 'qualified' which is supported by previous qualitative research (Smith-Forbes et al 2016). Interestingly the physiotherapist's confidence levels did not always match the patients' perception, with two of the less experienced physiotherapists (a band 5 and a newly appointed band 6) directly expressing anxieties to the researcher at not being sure of the diagnosis or best treatment approach. These anxieties appeared to result in them taking a more directive approach to the provision of the SMPP. Doody and McAteer (2005) noted similar findings that the expertise (number of years spent in MSK) appeared to be related to the ability for the physiotherapists to tailor the treatment to fit the needs of each patient. The range of experience level of the participating physiotherapists in the current study varied, with most physiotherapists in band six roles compared with band five and seven roles. This is reflective of the MSK workforce (CSP 2011b) and similar to other studies (Roberts et al 2013, Stickler 2015). However, it is important to note that the greatest mean years of MSK experience was in those in band six roles compared to those in band seven. It is unclear whether the skills and knowledge required of higher banded roles translates in 'superior' physiotherapy practice, compared to number of years' experience.

This focus on trust in the physiotherapists' actions again illustrates the interdependencies of the COM-B domains. When patients trusted and believed in their therapist (social influence) they were happy to be given less detailed knowledge about how or what they were being asked to do. Providing a rationale and addressing patients' beliefs in MSK physiotherapy is considered essential to increasing adherence (Hurley et al 2010). Peek et al (2016b) suggest that providing a rationale for the SMPP is the first step to increase adherence. Beliefs may be influenced more by the status of the provider of the information rather than the quantity or quality of information itself. This trust and influence patients expressed extended beyond just the relationship with the physiotherapists. It was also seen with patients also reporting a sense of duty and not wanting to 'let down' their physiotherapists, medical consultant or GP who had referred them for physiotherapy. Campbell et al (2001) described similar findings of a complex reciprocity within the therapeutic relationship, with patients not wanting to 'let their physiotherapist down'. Peek et al (2020) concur, identifying from the literature that a duty to others was a source of motivation. A sense of duty can be considered a source of extrinsic motivation, which has been linked with poorer long-term adherence (Smit et al 2011, Hall et al 2020a). This illustrates the dynamic interplay of the COM-B components, where the social opportunity and influence by both the physiotherapist and others can affect motivation and vice versa. Physiotherapists should therefore consider the degree to which the influence of themselves and others shapes a patients' beliefs and expectancies to better understand motivation, adherence and support mechanisms needed.

#### 9.4.2 The Physiotherapists' Environment; MSK Service Delivery

In this study all consultations were delivered face to face with an average first appointment of forty minutes and a follow up average of 18 minutes. Within this service delivery model several physiotherapists overtly referred to being behind schedule or having limited time. Dean et al (2005) identified 'time' as a theme affecting physiotherapists' approaches to managing patients with LBP. Dean et al (2005) found that therapists reported that time pressures, fatigue and a focus on NHS patient throughput can affect the quality of the physiotherapists' performance. Conversely Peek et al (2018) found that Australian physiotherapists did not perceive time or limited resources to be a barrier, which may be due to differences in physiotherapy service provision between UK and Australian practice. Bennell et al (2020) described usual physiotherapy practice in Australia as 10-12 sessions over 12 weeks, which is significantly greater than average treatment episodes in the UK (CSP 2011b). This illustrates the importance of observing real life practice as wider pressures within the setting may mean actual practice is different to that which is planned or perceived by physiotherapists. In the current study several physiotherapists (from both sites) did appear to have more time than others, taking considerably longer teaching, demonstrating and correcting exercises

with some extending the appointment beyond the allocated time. Time with the physiotherapist was valued by patients. Cooper et al (2008) concur with these findings highlighting that access to the physiotherapist and sufficient, timely physiotherapy appointments were key concerns for patients with LBP. A lack of time may potentially affect multiple aspects of the consultations, including time spent teaching or demonstrating exercises, creating information resources and exploring goals, motivation or patients' beliefs. Ensuring clinicians have sufficient time with patients to deliver optimal care is critical (Rawlinson and Connell 2021). Calls have been made to increase the time for GP consultations in response to the focus on providing personalised patient care and shared decision making (Royal College General Practitioners (RCGP) 2021).

There are many reasons why clinicians do not follow best practice guidance however, time pressured clinics and fatigue and burn out are real concerns for physiotherapists (Rogan et al 2019). Time pressures are a concern when overall time with patients is decreasing (CSP 2011b) and yet the aim is to deliver higher quality personalised care (NHSE 2021). It could be argued that physiotherapists already get significantly more time with patients than GPs, and it may be quality of care that needs to be considered rather than quantity. The purpose of the care episode needs to be considered. If the aim is to triage and signpost patients to the appropriate care then shorter appointments may be sufficient, but if the care episode is to support patients to engage in treatment and develop sustained behaviour change then this requires investment in longer periods of time. Length of appointments may be a factor or more frequent appointments may be a more suitable alternative. Many MSK physiotherapy clinics see patients 'back-to-back' with minimal time for debrief, reflection and consultation housekeeping. Neighbours model of consultation highlights that within the housekeeping stage there is a need to reflect and prepare for the next consultation that is; 'being in good cognitive and emotional shape for the next patient' (Neighbour 2004) and this must be ensured in MSK service delivery models whether virtual or face to face.

Time was not the only environmental factor identified for physiotherapists within the current study. The physiotherapists' access to resources and infrastructure also potentially influenced their practice. Despite videos and digital materials being available to support exercise prescription these were not observed in this study (NHS Apps library [NHS Apps Library - NHS \(www.nhs.uk\)](https://www.nhs.uk) accessed [January 2021](#)). Cost may be a prohibitive factor in providing these digital materials although many apps and digital resources are available free of charge (<https://www.nhs.uk/Conditions/nhs-fitness-studio/?tabname=other-fitness-plans>). Lambert et al (2017) argue for the use of freely available apps to be utilised ahead of paper-based materials. In the present study the author observed that time pressures or access to IT equipment and software may have influenced decision making. However,



as physiotherapists in this study were not asked about their practice more research is needed to understand physiotherapists' behaviours regarding the provision of patient information and use of digital materials.

Since the COVID-19 pandemic there has been a seismic shift to deliver remote consultations using telephone or video calls (Turolla 2020). Service delivery developments, post COVID-19, should be cautious in replacing the existing appointments with remote consultations. Instead, considering how we use resources including time, the physical environment and digital technologies to optimise the delivery of evidence based, personalised care (Tack et al 2020). The post COVID-19 'new normal' phase and advancement in technologies provides physiotherapy services with opportunities to design physiotherapy services to better support self-management and adherence (Rawlinson & Connell 2021).

Patient engagement and motivation are considered to be a limitation of telehealth (Eccleston et al 2020) and therefore models of service delivery need to consider how this can be best supported whilst utilising technologies to suit patients' choice. In contrast, Pugliese & Wolff (2020) highlight how telerehabilitation has refocused physiotherapists on interpersonal communication, patient education and self-care and now provides an opportunity for a re-examination of physiotherapy practice. Peterson (2018) suggest tele-rehabilitation booster sessions, which were implemented to support ongoing engagement in response to the COVID-10 pandemic may afford opportunities for more virtual contact with patients which could enhance behaviour change. Self-management and behaviour change is not easy (Ogden 2016) and physiotherapists need time and skills to support and build patients' capability, opportunity and motivation. Physiotherapists and service managers have an opportunity following the pandemic to utilise advances in technologies and to rethink and re-design and deliver services. Services need to be delivered in a way that the health and wellbeing of physiotherapists is optimised so they can do their best with every patient, every time (Rawlinson and Connell 2021).

#### 9.4.3 Group Exercise and Social Support

The influence of others was a theme identified from the patients' interviews, with social influences and group identity constructs being identified (Cane et al 2012). In the current study patients particularly expressed a strong desire for opportunities for peer support and group exercise which aligns with previous research (Jack et al 2010, Essery et al 2016, Room et al 2017, Meade et al 2019, Hall et al 2020a). As discussed, if exercise strategies are to be continued long-term, then SMPPs and MSK service delivery need to transition patients to a scenario where the exercises is a habitual part of their daily routine (Dean et al 2005). Within the current study no patients were offered group

exercises despite this being identified as something most patients would have liked to be offered. One patient had previously attended the educational group-based ESCAPE pain OA programme at site one (Hurley et al 2007, Hurley et al 2010) and therefore requested a similar approach for his new problem, but this was not an option. O’Keefe et al (2016) identify that group delivery of physiotherapy usually results in more time being spent on exercise which is known to have positive effects and longer sessions may be more likely to reach a therapeutic dosage (Young et al 2018). Group exercise may also increase adherence as it can offer opportunities for monitoring and feedback (Room et al 2019). Some patients expressed a preference to attend physiotherapy to carry out the physiotherapy exercises however, there is debate as to whether reliance on attending physiotherapy increases passive dependency on health services compared to building active self-management skills (Karnad & Mclean 2011). Group exercise provides opportunity for a transition between supported intervention and building of independent activity and self-efficacy (Hurley et al 2007) and has been shown to be as effective as individual physiotherapy and hence more cost effective (O’Keefe et al 2017). Evidence based group exercise should be developed consistently, as accessible, cost effective services providing opportunities to build capability, self-efficacy and motivation for sustained long-term adherence (Hurley et al 2007, Jack et al 2010, , NIHR 2018). This highlights the need for physiotherapists to be clear on the purpose and aims of an SMPP in both the short and longer term and to consider how sustainable, group exercise opportunities can be embedded into SMPP delivery and support adherence.

### **9.5 Patient factors; Patients as Individuals and Personalisation**

Although an individual must have the capability and opportunity to undertake a behaviour it is motivation which ultimately causes us to do things or not to do them at a particular moment (Michie et al 2011a, West & Michie 2020). Several themes emerged from patients including the role of goals and motivations, patients’ beliefs and expectations and the dynamic nature of motivation.

#### **9.5.1 Goals, Motivations and Action Planning**

The human motivation system provides the capacity for individuals to form mental representations, based on previous experiences, of possible future outcomes which allow individuals to formulate goals; that is wanting or needing to experience that outcome (West 2009). There is considerable body of research supporting the efficacy of goal setting to achieve behaviour and lifestyle change (Stevens et al 2017, Melin et al 2019). Goal setting is a core component of collaborative, SDM within physiotherapy (Jesus et al 2016, Babatunde et al 2017c) but its role in increasing adherence is unclear. Veenhof et al (2006) concur with the findings from their qualitative study of those engaging

with behavioural change interventions, noting that long-term goals of patients are a key motivator in enduring adherence. Working with patients to explore motives and set goals is a core expectation within physiotherapy professional standards (HCPC 2013, CSP 2019). In the present study almost all patients described goals of motivations to adhere, including returning to previous activities or maintaining an existing level of function. Despite this, and although some physiotherapists referred briefly to aspects of patients' lives, hobbies and work activities, no formal collaborative goal setting was observed. Published literature supports this observation highlighting that goal setting practice takes time and is challenging in clinical practice (Schoeb 2009, Stevens et al 2017). Using direct conversation analysis from MSK out-patient physiotherapy settings, Schoeb (2009) found that goal setting in practice is variable and requires considerable effort.

In studies specifically relating to increasing adherence to SMPPs in patients with MSK disorders, goal setting (either by the physiotherapist alone or in conjunction with the patient) showed no significant improvement in adherence for intervention groups (Basset & Petrie 1999). Other reviews also found only limited evidence for goal setting in a rehabilitation setting (Talvitie & Reunanen 2002, Veenhof et al 2006, Levack et al 2006, Trede 2012, Room et al 2017). In contrast, goal setting has been shown to be a favourable characteristic of successful unsupervised home exercise programmes (Novak 2011).

Several barriers have been identified to goal setting in physiotherapy practice. These include time (Parry 2004), a lack of communication skills, change in routine for some and a lack of identified process (Alexanders 2018). Mudge et al (2013) suggest that one of the barriers may be that physiotherapists lack the ability to adapt or respond to the needs of the patients' preferences; prioritising 'doing' over 'being with'. A literature review to evaluate how person-centred goal setting was operationalised in physiotherapy identified two themes; firstly, physiotherapists must seek mutual understanding of what is meaningful to the patient and secondly refine their physiotherapy interaction skills (Melin et al 2019). The former theme discusses some of the difficulties that are encountered when trying to engage in true collaborative goal setting. These include patients being unrealistic, some patients finding it hard to make goals after sudden or serious MSK problems, or finding it difficult to describe how they feel or lack confidence in expressing this (Melin et al 2019). These barriers were not evident in the current study as when asked by the researcher, patients were forthcoming about their goals, wants and needs. It is possible that physiotherapists envisaged they were setting or working towards goals in their practice, but this was not explicit to an observer or the patients. This again highlights the importance of longitudinal observation of real-life physiotherapy practice (Roberts et al 2013).

Bassett (2015) argue that although goal setting can provide the incentive, it is not enough to bridge the behaviour- intention gap as specific behavioural change techniques need to be implemented to achieve these goals (O'Brien & Basset 2013). Action planning is a construct which sits within both behavioural regulation and goal setting in the TDF, and therefore maps to both capability and motivation components of the COM-B model (Cane et al 2012). Planning to undertake specific activities is a concept frequently used to prioritise tasks and form the overarching structure for daily activities (West 2010). Planning as a concept was not overtly described by patients in the current study however, on questioning, many patients did subconsciously make plans to undertake exercises at a specific time of day. For example, patients planned to exercise whilst in bed before they got up or whilst brushing their teeth. Research utilising the health action process approach (HAPA) model (Schwarzer 2008) (see chapter 3 for a fuller discussion) suggests that action and coping planning do not increase adherence (O'Brien et al 2013, Clark & Basset 2014). No overt action or coping plans were observed to be developed or utilised by physiotherapists in the present study. Planning appeared to occur but was implicit in the patients' prioritisation of daily activities and adherence and further research is needed to understand the role of planning in adherence.

The findings of the current study provide evidence that patients have underlying goals and motives which are important in driving their behaviour yet no explicit goal setting was observed. Many reasons exist for the absence of goal setting including the dynamics of the appointment, service structure, patients' expectations and experiences, as well as the physiotherapist's knowledge, skills and capabilities. More research is also needed to understand goal setting and action planning in increasing adherence in MSK physiotherapy.

#### 9.5.2 Patients' Exercise Beliefs, Identity and Expectations

Almost all the patients in the current study expressed positive beliefs about exercise and physiotherapy or identified as someone who currently exercised. Studies highlight a potential link between current physical activity levels and increased adherence (Schoo et al 2005, Jack et al 2010, Wright et al 2014, Essery et al 2016), as well as beliefs and attitudes about exercise (Campbell et al 2001, Schneider et al 2011). This could be because self-efficacy is greater when an individual is familiar with the exercises or SMPP strategies (Picha and Howell 2018). Alternatively positive beliefs and outcome expectancies may drive motivation. Motivation has shown to be higher when one is living out their values and identity and the more salient one's identity is, the more likely that an individual will engage in behaviours associated with that identity (Ntoumanis et al 2018). West and Michie (2020) also refer to the concept of identity and its role in motivation as it is a particularly

important source of wants or needs because a sense of self is essential for the generation of plans. In the current study none of the physiotherapists explored patients' current exercise behaviours or beliefs explicitly. Some patients explained that they already took part in physical activity and were embedding the activities but this was not overtly discussed further. Not only could a better understanding of patients' identity and beliefs help explore patients' motivations, but also ensure that SMPPs provide sufficient challenge. The importance of aligning patients' abilities with the SMPP was highlighted earlier as a mismatch in practice between what SMPPs prescribed and patients' expectations. Generational, gender and cultural differences exist in general physical activity levels within the UK which could affect adherence to SMPPs. For example, south Asians have lower physical activity participation levels than white British individuals (Bhatnagar et al 2015). Gender has also been proposed as a factor affecting adherence levels however literature does not support this notion (Noon et al 2019). In the current study, gender, age or generational differences did not appear to be a determining factor to adherence. However, all participants were of white British ethnicity and therefore considerations of possible variance in attitudes and behaviours towards physical activity for other ethnicity, age, and non-binary gender groups must be considered as a potential factor affecting adherence.

In the current study, patients' beliefs and expectations about physiotherapy were generally positive. Patient expectations have been identified as an important factor in motivation and adherence behaviours (Bernhardsson et al 2017, Meade et al 2019). Beliefs and expectations can also influence clinical outcomes and patient satisfaction and therefore should be addressed within physiotherapy consultations (Barron et al 2007, Bialosky et al 2010, Hush et al 2011). Findings of the current study revealed that many patients expected some form of 'physiotherapy' or hands on treatment, but this was always paired with an equal expectation that the patients would also participate in a home exercise programme. When patients' expectations were not met, they report feeling disappointed and demotivated. Interestingly several patients also felt that because exercises replicated activities of daily living (which ironically was an intentional strategy to increase adherence by physiotherapists), patients did not always consider that this constituted 'physiotherapy' as the exercises were not different or challenging enough compared to daily activities. Hall et al (2020a) found that physiotherapists reported the importance of ensuring exercises are sufficiently challenging to match the ability of the individual in order to build self-efficacy and intrinsic motivation. Challenge is important as simple tasks can lead to low arousal levels resulting in the activity not being undertaken (Teigen 1994). This observed lack of alignment with patients' expectations and beliefs about physiotherapy and their own capability, and what is prescribed, reinforces the need to better understand individuals' needs and preferences. Physiotherapists need

adequate time and skills to address patients' beliefs about physiotherapy and ensure suitably challenging SMPPs are prescribed which maximise motivation (Barron et al 2007, Biolosky et al 2010, Hurley et al 2010, Meade et al 2019).

Patients' beliefs about pain and symptoms and their responses to changes were key considerations for both physiotherapists and patients. For some patients pain was a motivator and even if symptoms increased, patients would continue adhering, whereas for others pain was demotivating and reduced adherence. Pain has previously been shown to play a dual role in motivation (Campbell et al 2001) whilst other studies found pain to be a barrier to adherence (Sluijs et al 1993, Veenhof et al 2006, Medina-Mirapeix et al 2009, Jack et al 2010, Gaikwada et al 2016, Meade et al 2019). Pain is a complex phenomenon, and it is unsurprising that it is not a straightforward predictor of adherence (Morley 2008, Smith et al 2019). Research into pain responses to exercises often focusses on individuals with chronic pain and managing fear avoidance beliefs to help patients understand that pain does not always equate to tissue damage (Moseley 2002). For those patients with long-term (chronic) spinal pain conditions, physiotherapists in the current study offered patients a flexible approach to 'pace' their activity. Patients valued this ability to maintain control of their activity levels which is in line with a behavioural approach to chronic pain management (Gatzounis et al 2012). Patients experiencing chronic pain often describe a cycle of pain and inactivity (Hadi et al 2019). Karnad & McLean (2011) suggest that some physiotherapists perceive that patients do not follow what they have been told regarding pain; finding that educating patients about pain and exercise is a challenging and sometime frustrating concept for patients to understand. In contrast some patients in the current study expected exercises had to be challenging or even painful to be effective, using the 'no pain, no gain' analogy. Previous studies found similar results suggesting that individuals may be less motivated if they feel their exercises are 'too gentle' or not having any perceived benefit (Campbell et al 2003, Veenhof et al 2006, Cooper et al 2008, Escolar-Reina et al 2010, Smith Forbes et al 2016).

Pain response to exercise is a subject of much debate (Smith et al 2017). It is acknowledged as an inevitable outcome of some exercise programmes, but pain should remain manageable (Littlewood et al 2013). Painful exercises have even been suggested to produce greater gain in health outcomes in comparison to non-painful exercise (Smith et al 2017). It is how patients experience and perceive the meaning of the pain response, and how it then affects their motivation and adherence, that is critical if self-management programmes are to be successful. Findings from the current study suggest that patients have a critical pain level, after which they become demotivated to continue even despite strong intentions and positive beliefs. Pain was also interdependent with other factors

such as tiredness and fatigue. Patients in the current study, who had longstanding pain conditions such as OA, understood that pain was likely to persist during exercise. They considered adherence to exercise was important in the longer term, but this still needed to be within a manageable pain level. This acceptance of pain during SMPPs is in keeping with previous studies (Veenhof et al 2006, Hurley et al 2010) however in this study an upper pain threshold was evident.

West's (2009) PRIME model of motivation supports this finding. Even if patients have wants and needs to overcome the pain to achieve their goal, and higher beliefs that pain is inevitably needed, they must have the motivation at that particular moment to experience that pain against competing priorities such as resting. Preventing worsening pain and keeping pain under a critical coping threshold whilst exercising was observed to be a key factor in maintaining adherence (Jack et al 2010, Hadi et al 2019). Therefore, when prescribing SMPPs the focus should not only be on ensuring that the patient has the capability and opportunity to adhere but also to explore patients' beliefs system relating to pain responses and the prognosis of their condition (Hurley et al 2010, Smith et al 2019).

#### 9.5.3 Motivation is Fluid and Interdependent: Intention / Behaviour Gap

The essence of self-management is that individuals actively participate in maintaining and improving their own health (Lorig & Holman 2003). A phenomenon of active participation and motivation to adhere was observed in the current study. Patients displayed strong intentions to adhere, with many suggesting that they could not expect to improve without active input. These findings contrast with a study where physiotherapists suggested that patients all too often take a passive role in their physiotherapy (Dean 2005). Active participants are deemed to have an internal locus of control (where one believes they can alter their own life situation) and this has been associated with increased self-management in those with MSK disorders (Wahl et al 2018). As the patient sample was self-selecting it potentially attracted patients with high levels of self-motivation or activation. Patient activation is a concept gaining significant attention (Kearns et al 2020). As an element of a personalised care approach, patient activation is used to describe a patient's knowledge, skills, and confidence in managing their health conditions (Hibbard and Gilbert 2014). Patient activation incorporates elements of self-efficacy and a readiness to play an active part. Those with higher activation levels are reported to be more likely to participate actively in the behaviours that maintain their health, such as SMPPs (Hibbard and Gilbert 2014). Self-reported patient activation measures (PAM) can be used to assess patients' knowledge, skill and confidence in managing their own health or chronic condition' (Kearns et al 2020). This study did not measure patient's activation directly however patients described and displayed high levels of intentions to adhere and motivation

to play an active role in their rehabilitation (Kearns et al 2020). Measuring patient activation may be a useful strategy in understanding patients' likelihood of adherence to SMPPs and further research is required to explore this. Hutting et al (2019) suggest that the provision of active self-management strategies such as exercises, as seen in the current study, are preferable to passive modalities such as heat packs in supporting active participation in healthcare.

Most patients in the current study displayed strong intrinsic motivation. That is, where the individual undertakes an activity for the pleasure of the activity itself, underpinned by patients' needs of competence (capability), autonomy (self-efficacy and control) and relatedness (social support) (Ryan and Deci 2000). Motivation was seen to be a dynamic concept, and there were times when patients acknowledged that their motivation was challenged which was a point identified by Campbell et al (2001). In the current study feelings such as lethargy and fatigue and the urges and desires to do other activities sometimes prevailed. These components of intrinsic motivation, outlined by Ryan and Deci (2000), broadly map to the themes arising from the patients' perspectives in the current study; competence (knowledge and memory theme), autonomy (personalisation and goals and motivation themes) and relatedness (influence of others theme). West (2009) argue that all behaviour occurs in the moment, due to a play off between the management of impulses, inhibitions and habits, where urges and impulses may override planned behaviours in the moment.

However, the intention–behaviour gap means that strong intentions do not always result in the desired behaviours (Schwarzer et al 2003, Sniehotta 2005a). Several patients in the current study were very aware of the potential barriers to adherence. Most patients were content in the recognition that modern life, competing priorities and fluctuations in mood and motivation were likely and adherence would fluctuate. These findings are in line with those of Smith-Forbes et al (2016) who found patients reported that they could not stop living their lives because of an exercise programme.

Extrinsic motivation sources, which are driven by external factors and are less effective in sustaining long-term adherence (Ryan and Deci 2000, 2002) were also identified in the current study. These included guilt and a sense of duty to the physiotherapist or medical practitioner. These can be compared to intrinsic motivation where motivation is due to the inherent enjoyment of the activity itself (Ng et al 2012, Hall et al 2020a). Motivation was observed to be a dynamic concept and therefore considering adherence needs to take consideration of the fact that this is a normal occurrence and full adherence, all of the time, is unlikely (Campbell et al 2001). Building intrinsic motivation, whereby patients want and need to carry out the SMPP is considered the ultimate aim (Hall et al 2020a).



## **9.6 Adherence and the Relationships between Adherence and Patient Outcomes**

This study used a triangulated mixed methods design to explore recall and adherence rather than using self-report scales alone, which mirrors a similar approach taken by Peek et al (2020). Findings from this study illustrated that patients reported high adherence to exercise strategies compared to non-exercises strategies. This is unsurprising considering that patients rarely recalled the non-exercise strategies they had been given.

Evidence suggests that patient outcomes are enhanced when patients adhere to prescribed SMPPs (Campbell et al 2001, Hall et al 2020a). Australian physiotherapists agreed that adherence to both non-exercise and exercise strategies were important in improving treatment outcomes (Peek et al 2016). Almost all patients in the current study reported improvements in symptoms over time however it is not possible to attribute this improvement to adherence behaviours. SMPPs are provided with the intentions that they will improve outcomes for patients, and it is considered that those outcomes will not be achieved without adherence. However, the prescription of the exercise programmes is likely to be dose-dependent and therefore enough exercise must be completed in the correct way to achieve optimal outcomes (Carroll et al 2007, Young et al 2018).

Many MSK conditions are long-term and therefore SMPPs may be aimed at maintaining current levels of symptoms and slowing or halting deterioration (NICE 2014, Hurley 2007). This makes defining and measuring outcomes difficult when improvement gains are not always measurable. Patient-reported outcomes measures (PROMS) (see chapter 4) are used to measure improvements in quality of life, pain and physical functioning (Hill et al 2016, Kamper et al 2009) but none of these were observed to be used in practice in the current study. In this study, four patients with chronic LBP and OA were aware of the long-term nature of their problem. They believed that not all symptoms would be likely to resolve but that adherence was important to avoid deterioration. Tai et al (2020) evaluated the role of PROMs in supporting adherence with patients attending a falls prevention group and found PROMs were motivating for some patients when used to track their own progress. For others it was less interesting and seen as something for health professionals to use. This emphasises the importance of understanding the aim of the SMPP and the intended outcomes, treatment fidelity and anticipated adherence thresholds likely to be needed to achieve these desired outcomes (Bailey et al 2010, Hill et al 2016). More research needs to be undertaken to explore how outcomes measures can be embedded alongside adherence measures to understand treatment fidelity and monitor effectiveness of interventions (Carroll et al 2007, Hill et al 2016).

### **9.7 Experience of Using the TDF and COM to Analyse SMPP Programmes**

This study is the first to use the COM-B model (Michie et al 2011a) and TDF (Cane et al 2012) to evaluate physiotherapy encounters in MSK physiotherapy. It is also the first to use these frameworks exploring both clinicians' and patients' behaviours synonymously. The COM-B and TDF provided a workable structure on which to design and analyse the research data to meet the study's objectives. This is in keeping with previous studies which have used the frameworks to explore exercise related behaviours (Patey et al 2012, Connell et al 2015, Quigley et al 2019, Ellis et al 2019, Hall et al 2020a).

In the current study, all the themes emerging from the inductive analysis were able to be mapped to the TDF domains, which aligns with similar studies (Beenstock et al 2012, Alexander et al 2014, Flannery et al 2018). Several themes could have been mapped to multiple domains. Themes identified included both enablers and barriers to the target behaviour (patient adherence to SMPP) with some themes, such as pain, acting as both. Themes arising from physiotherapists behaviours mapped to TDF domains in all three COM-B components but predominantly to capability. Themes arising from the patients' experiences again mapped to all three components but predominantly to motivation. The number of themes was not counted, and themes were not necessarily equal in term of quantity of codes mapped to them. Quigley et al (2019) who carried out a similar study quantified the number of content items mapping to each of the TDF domains. This may, on reflection, have been a useful approach to take in this study to quantify the focus on specific domains although taking a quantitative approach contradicts the epistemology of this exploratory study which seeks to understand how adherence behaviours are lived and interpreted. However, considering the exploratory nature of this study taking a more inductive and iterative approach allowed the research questions to be answered.

Although many of these barriers and enablers identified in the current study have been identified previously (Jack et al 2010, Essery et al 2016, Smith–Forbes et al 2016), the current study illustrated their dynamic complexity and interconnectedness via the use of the TDF mapping analysis. Barriers and enablers when described by patients' and physiotherapists in previous studies are often reported as separate themes, as if existing in isolation (Karnad & McLean 2011, Peek et al 2016b, Meade et al 2019). As the current used longitudinal evaluation of patients' experiences, the barriers and enablers were seen to create interdependencies both within the patients' behavioural system and between the physiotherapist and patient. For example, the interplay between capability and motivation was seen to play out as a patient practised and became more capable, this then increased intrinsic motivation which drove patients to do more exercises which then enhanced their

capability further. This two directional interplay between capability and motivation is highlighted in West and Michie's (2020) change in the diagrammatic representation of the COM-B model with the arrow directions changing from a single to double headed arrow from capability to motivation (Michie et al 2011a, West & Michie 2020).

This dynamic interplay between domains demonstrated that addressing one component in isolation e.g., goal setting or imparting knowledge is unlikely to be sufficient to result in sustained behavioural change. Previous work utilising the TDF has also found a similar dynamic interplay between COM-B components (Ellis et al 2019). Beenstock et al (2012) noted that 11 domains were highly correlated highlighting that the domains are descriptive and integrated. The current study also highlighted the dynamic nature of the motivation system on a daily, if not hourly, basis. Motivation fluctuated more than capability and opportunity components which, remained relatively static once achieved. Motivation varied depending on other factors such as tiredness, daily activities, influence of others and affect. This study also highlighted that not only did the COM-B components influence each other but they were also influenced by the relationship and dynamic interaction between the physiotherapist and patient over the course of the two appointments and intervening period. Ogden (2016) highlights that patient variability is a key challenge in health psychology and the reason one intervention for a specific behaviour will never create widespread and sustained behaviour change across a patient group.

Once barriers and enablers to the target behaviour have been identified this should then drive the selection of an appropriate behavioural change intervention (French 2002, Michie et al 2011b). However, as with previous research (Connell et al 2015, Hall et al 2020b) because a wide range of TDF domains were identified (6 domains for physiotherapists' behaviours and 14 domains from the patients' findings), this makes it difficult to select the most suitable intervention(s) functions. In this study, the broad range of domains identified may be because the data collection methods were designed using the TDF framework and preferentially focussed on exploring issues relating to the TDF domains. However, including an inductive analysis should have minimised this, ensuring that all new emerging themes are captured. Many of the interventions that have been designed to date to increase adherence to SMPP in MSK physiotherapy have taken a 'one size fits all' approach where a single intervention is applied to a cohort of patients with the aim of increasing adherence (McLean et al 2010, Peek et al 2016, Nicolson et al 2017). However, this is at odds with a policy shift towards taking a more personalised approach, working with patients to plan and design healthcare interventions together, in partnership (NHS 2019). Behavioural science has frequently identified that

accounting for patient variability is essential in designing effective behaviour interventions (Ogden 2016).

The COM-B model is usually applied at a macro level, as is the case in the current and previous studies, evaluating a specific target behaviour and trying to understand which behavioural components can be addressed (intervention) to change the behaviour (Beenstock et al 2012, Alexander et al 2014, Flannery et al 2018, Quigley al 2019). However, this means considering the individuals (in this case patients attending physiotherapy departments with MSK conditions), as one homogenous group, when in fact they are a series of individuals with different conditions, needs, experiences, knowledge, beliefs and circumstances. Therefore the COM-B potentially needs to be applied at micro level to understand behaviour needs for each individual. Previous studies have suggested templates and models on which physiotherapists can structure consultations with patients to increase adherence, including the SIMPLE TIPs mnemonic (Babatunde et al 2016c) and the uCAN behavioural model (Peek et al 2016a). These proposed models have not been tested in practice and although they present new theory, they are not based on any underpinning existing empirically tested theories.

It has been argued that the TDF and COM-B models risk dominating and over simplifying health psychology as a profession through over systemisation and removing, rather than celebrating, patient variability by coding behaviours into fixed 'boxes' and stifling creativity and exploration (Ogden 2016). However, for a profession such as physiotherapy, which is inherently underpinned by psychological constructs, motivation and therapeutic relationships, this systematisation of complex psychological theory provides a useful starting point (Alexanders & Douglas 2016). This model could help physiotherapists as non-psychologists, to understand their patients' attitudes and behaviours as a superior alternative to avoiding the complexity of health psychology.

### **9.8 Original Contribution to Knowledge**

This study makes an important contribution to our understanding about the content of SMPPs and how they are provided by physiotherapists in clinical practice over time. This study was the first to provide an in-depth longitudinal analysis of both the content and provision of SMPP programmes alongside the experiences and adherence behaviours of the patients who received the SMPPs within 'real time' NHS physiotherapy practice in the UK.

Although previous studies have explored the prescription of home programmes (Peek et al 2017), none of these have specifically evaluated prescription of SMPPs in UK NHS practice. In addition,

none have explored the specific type, amount, or detail of SMPP strategies given across more than one appointment. This study provides new insight into how clinical consultations 'play out' in practice with respect to the provision of SMPPs. The study details the type, content and volume of strategies patients are asked to do away from the clinic setting, including both exercise and non-exercise strategies. Exercises were observed to be the most prevalent home exercise strategy however the detail, dosage and complexity have not been evaluated or reported in previous observational studies. This study highlights how SMPPs are actually used with patients with a variety of MSK conditions, across two different NHS physiotherapy out-patient settings. It also illustrates the prevalence of non-exercise strategies provided within SMPPs and the lack of attention they are given by both physiotherapists and patients with respect to adherence.

This study provides practical insights for physiotherapists, particularly those working in an MSK Out-patient setting, into how physiotherapists provide SMPPs and what they provide, as well as how these are received by patients. The findings highlight that practice varies and how some approaches that are seen as best practice, such as shared decision making (SDM) (Hoffman et al 2014) and goal setting, were not observed to be carried out by the physiotherapists in this study. This provides a basis on which to further explore and understand physiotherapists' practice in relation to the provision of SMPP and the influencing factors.

This study is also the first to utilise the TDF (Cane et al 2012) and COM-B models (Michie et al 2011a) to evaluate adherence behaviours in MSK physiotherapy practice. This study provides an in-depth analysis of both the physiotherapists' behaviours in how they provided programmes, alongside the adherence behaviours of patients. This longitudinal 'real world' approach allows for the integrated observation of the influencing factors as well as considering if, and how known barriers and enablers to adherence are manifested in practice. This study observed that physiotherapists overall placed a greater focus on addressing patients' capability compared to addressing patients' opportunity or motivation to adhere to the SMPP. In contrast, patients discussed more factors relating to both their opportunity and motivation to undertake the programmes. This incongruence between the physiotherapists' behaviours and the patients' views and experiences may highlight gaps in practice which could potentially be addressed to increase adherence and ultimately patients' outcomes.

This study supports the consensus that many factors influence adherence. The study design allowed for evaluation of these factors and the interplay between them for both individual, patients and between the physiotherapists and patient interaction. Previous standardised interventions have failed to significantly improve adherence. The findings of this study suggest a need to take an

individualised approach to supporting intervention design in view of the individualised, dynamic and complex interplay of factors seen to affect adherence.

This study adds new knowledge regarding the use of the TDF and COM- B models in exploring both physiotherapists and patients' behaviours in relation to patients' capability, opportunity and motivation to adhere to their SMPPs. The TDF framework and COM -B model have been shown to be able to be used as a framework for deductive analysis and in evaluating behavioural diagnoses within physiotherapy. It also provided new insights into how factors affecting adherence, particularly human motivation, are fluid and may change over time. The TDF and COM-B models are suggested as a framework to further explore SMPP provision. They could also be used to develop service delivery models post COVID-19, which effectively utilise resources and maximise adherence behaviour and patient outcomes.

## **9.9 Strengths and Limitations**

This section focusses on the strengths and limitations of the study which will help develop a critical understanding of the findings.

### **9.9.1 Strengths**

#### **Using aspects of ethnographic methodology to observe actual clinical practice of physiotherapist providing SMPPs**

Observational studies in clinical practice evaluating actual situations are widely recognised as gold standard (Roberts & Bucksey 2007, Parry 2008, Roberts et al 2013). In 2016, Peek et al highlighted that research should focus on the extent to which physiotherapists address SMPPs to understand if there is consistency between what physiotherapists perceive they do and what they actually do in practice. This study therefore used aspects of ethnography to directly observe and explore clinical practice and patients' experiences of undertaking SMPPs. These methods included direct observation via video recordings of appointments and observing patients in their own homes. This gave great detail and insight into the wider factors influencing the behaviours of both patients and physiotherapists and their interactions. This is in comparison to other studies that asked physiotherapists to report their behaviour or patients reporting their environment (Peek et al 2016). Human behaviours are complex and interactive. This study design allowed the nuance and interaction of behaviours to be directly observed. What people say they will do and what is actually done may differ in the context of the situation and it is this nuance that is important in

understanding when studying human behaviours and increases the validity and richness of the findings.

### **Comprehensive sample selection**

The study also accessed a range of participants with a variety of MSK conditions, from two different NHS trusts. This allowed the exploration of physiotherapist behaviours and patients experiences in more diverse settings adding richness and meaning the findings. The age range of patients also varied widely and included those with different home circumstances including those living alone and those cohabiting as well as some working patients and some retired. Many factors known to influence adherence such as time, social environments, physical environment, which vary between those with different lifestyles, ages and commitments. This study included a patient living alone but with care support due to learning difficulties, single parents with young children, retired Individuals living alone and use those working including one with fostering responsibilities. Patients lived in a variety of home types including flats and houses. This diversity strengthens the credibility of the findings when considering how SMPPs are experienced and adhered to in settings away from the clinic.

### **Study design**

This study employed a triangulation research design which combined video observations, questionnaires and repeat interviews with patients. It also employed a longitudinal method which allowed the study of the phenomena over time, which is critical when studying adherence which is known to fluctuate and often diminish over time. Using mixed methods facilitated the building of a picture of physiotherapy practice in relation to adherence to SMPPs, cross checking of findings and exploring alternative meanings. Understanding how and what programmes are provided is inherently related to understanding how patients experiences them and adherence behaviours. Using a triangulated design allowed a more coherent, trustworthy and robust understanding of the topic to be constructed, which increased validity of the findings. It is known that adherence is a complex phenomenon which is influenced by multiple factors. These factors include interpersonal, environmental, social and physical components which are likely to be influenced by the context at any given moment.

### **Using a robust framework to design and analyse the study findings**

The study also used a robust framework in which to guide and inform design and analysis of the study. When designing behaviour change interventions, the Medical Research Council guidance

(Craig et al 2008) and NICE (2007) call for the use of appropriate theory and evidence to inform the development of an intervention. Often adherence interventions are developed without a sound theoretical base and many are said to lack sound theoretical underpinnings (Davies et al 2010). Michie et al (2011a) propose that all too often, behavioural interventions are designed and implemented without necessary evaluation of why the desired behaviour is, or is not, happening, suggesting the use of a behavioural model to analyse specific behaviours. The COM-B model (Michie et al 2011a) formed a central part of the study and was used design the questionnaires and interview schedules and then provided a framework for analysis. The TDF (Cane et al 2012) which underpins and informs the COM-B model provided further detailed structure within which to analyse the results. However, taking an inductive interpretative approach initially ensured that findings were not confined to only what was within the framework. Once all the themes had been identified a deductive framework mapping of the themes to the TDF and COM-B allowed for deeper behavioural analysis.

### 9.9.2 Limitations

#### **Approach to Literature Review**

A narrative literature review was chosen to allow a broad evaluation and discussion of a complex, multifaceted topic (Pae 2015). Several systematic reviews had already been undertaken which reviewed interventions to increase adherence, albeit each with a slightly different focus. Although a systematic review would have provided a rigorous review process of a specified area of adherence it was, at the time, felt to be too narrow, and could not facilitate a broader integration of both quantitative and qualitative literature which is an advantage of a narrative review (Pae 2015). As many interventions have been designed to increase adherence with limited success, it was felt a broader review of the topic was needed to explore not only the quantitative literature, but also the experiences of those patients undertaking a SMPP. However, as the review needed to be manageable for a single PhD student a systematic review of the quantitative literature and meta-synthesis of the qualitative literature were not considered achievable within the current scope of the single researcher completing a PhD.

Whatever the review method chosen, the goal should be to ensure that the methods of all reviews should be explicit, transparent, clearly stated and reproducible by interested readers (Collins and Fauser 2005). On reflection, despite setting out to do a broad narrative review, in order to manage the search, the inclusion and exclusion criteria were narrowed. This may have meant that some studies, which explored related adherence concepts were potentially missed. Also, although the intention was not to undertake a systematic review, efforts were made to systematise the



methodological processes for the review by using the PeDRO scale alongside the CASP evaluation tools and CerQual in an attempt to increase rigour (Collins and Fauser 2005). However, GRADE criteria were not used to give an overall appraisal of confidence, as it was not felt appropriate, as this was not a systematic review. This inconsistency may have meant that inferences drawn from the quantitative literature review were inherently flawed.

The literature reviewed included that published up to January 2017, and it is acknowledged that a significant number of relevant articles were published after this time. Studies published after this date may have been missed as the rapid review undertaken at the end of the study (December 2020) was not undertaken with the same systematisation and rigour of the original review. However, it is noteworthy that many of the relevant studies are considered in the discussion chapter.

On reflection, undertaking an all-encompassing systematic review and, or a meta-synthesis are likely to have produced a more robust, systematised and reproducible evaluation of the literature but were not permissible within the resources available. On reflection, a broader inclusion criteria for the narrative review is likely to have identified studies which are important when considering the complexity of evaluating and understanding adherence. This potential to have missed important publications within the review is a limitation of the study and should be considered when evaluating the application of the findings in this context.

Collins and Fauser (2005) discuss the challenge of deciding between systematic and narrative reviews. They suggest that whilst systematic reviews are more appropriate for focused topics and traditional narrative reviews are better suited to comprehensive topics (such as adherence), either approach can be adapted to clinical or scientific subjects. If the breadth of the objectives had been narrower this may have lent itself better to a systematic review or meta-synthesis and may have been easier to synthesise the information in a reproducible way. However, several systematic reviews had been carried out on the topic and undertaking another focussed systematic review or meta-synthesis felt that it would fail to capture the breadth and multi-faceted nature of the topic (Collins and Fauser 2005). On reflection the balance between rigour, reproducibility and focus had to be balanced with that of breadth and understanding of nuance and complexity in what is a comprehensive topic. Systematisation and the use of tools such as PeDRO, and CerQual were intended to minimise whilst keeping wider objectives to broaden the review however aiming to combine two approaches may have meant that pertinent literature was not always included or that rigor of analysis was compromised.

### **Selection Bias**

A purposive sampling strategy was used in order to gain access to representative range of patients. Large numbers of patients were invited from relevant clinic so those taking part were self-selecting. As selection bias may exist with this type of sampling, the sample may not be representative of all those using MSK physiotherapy services (Cooper et al 2008). The nature of the study being focussed on adherence to SMPP may also have been biased towards those who were motivated to undertake programmes and potentially had higher levels of self-efficacy and active participation. Care must be taken when considering the extent to which the findings can be applied in other settings. As patients were recruited, an iterative purposive sampling strategy was used to monitor the diversity of those volunteering and specific patients (e.g., more female patients) were invited in an attempt to rectify this. The patient sample was all white British with no ethnic diversity which is a limitation of this study. It was not possible to purposively sample using diversity data.

Health systems are considered ethnocentric and favours the majority and ethnicity has been reported as a factor contributing to low take up of physiotherapy referral albeit in the USA where health systems vary (Sharpe et al 2020). Yeowell (2010) undertook a study exploring needs of Pakistani women in North West England where this study was undertaken. They found physiotherapy services were not meeting the needs of Pakistani women, noting language barriers, gender issues and high failure to attend. Therefore, the findings of this study need to be interpreted with caution in relation to more diverse populations undertaking SMPP programmes. Greater efforts need to be made in research design to proactively access difficult and hard to reach population groups in research and practice. On reflection, strategies to increase diversity and access to individuals' could have been used, including follow up calls, active diversity sampling, and recruitment through community groups or financial incentives (Rockcliffe et al 2020). Also, the present study did not fully evaluate the influence of socioeconomic status. Although patients came from a range of geographical areas and educational levels from across the region, the effect of these factors on the findings are not known. These effects may be considerable as patients' socio-economic status is a factor in the healthcare they receive (Willems et al 2005).

### **Study design**

This study, although a longitudinal design, did not follow people beyond the first two appointments (8-10 weeks) and the observation of future appointments and longer-term adherence may have revealed different findings. The decision to observe the first two appointment with a longer term follow up questionnaire was mainly undertaken considering the study aims and resources available. However, five patients were discharged after the two appointments and did not have any further

physiotherapy appointments, so the study covered the duration of their attendance at physiotherapy.

Within the study the researcher deliberately chose not to watch the consultation videos before the patients' interviews as not to bias or lead the interview. Although from one aspect this likely reduced bias, it also meant that the researcher was unable to probe to explore how patients felt about SMPP strategies they had received but not recalled, including the non-exercises strategies. This meant the prescription of non-exercises strategies was not known by the researcher until the data had been collected.

The TDF was used as a coding framework to understand and analyse behaviours. The coding was applied by one researcher and evaluated by a health psychologist expert in behaviour change and a physiotherapist researcher with experience of using the TDF in practice. Considering the challenges when making coding decisions between the TDF domains (Phillips 2015), independent dual coding using the TDF may have strengthened the methodological rigor of this work and aided research evaluating the utility of the TDF in understanding behaviour.

#### **Limitations of design and analysis; Questionnaire administration**

The questionnaire was designed to be self-administered. However, as the researcher was present for the appointments and gave the questionnaire to patients some patients asked the researcher for assistance in completing it. It was unethical to refuse this offer, but it is acknowledged that this varying level of support particularly in relation to the free text area (to complete what they had been asked to do in the SMPP) may have assisted recall. The researcher attempted to transcribe verbatim what the patients said onto the questionnaire, however when patients asked for clarity on what the question meant the researcher did prompt patients for detail if not provided. This prompting may have facilitated some patients to recall more than others and is a limitation of this study.

This study created large amounts of audio-visual data, questionnaires and interview data. Initially the plan was to analyse the videos using a checklist and not to transcribe them, however it became clear that the richness of the video observation would be lost if they were not transcribed and analysed thematically. This analysis could have been taken further using conversational analysis and discourse analysis to further explore the therapeutic relationship and content of the consultations (Schoeb 2009). This study did not use conversational analysis as this was beyond the resources for this study, but this may have gleaned further insight into the physiotherapists and patients' communication, relationship and behaviours. Further future analysis of the data could be undertaken assuming all the relevant ethical and consent processes were in place.

### **Lack of physiotherapists' perspectives**

It is acknowledged that the physiotherapists' perspectives were not included in the study. The study aim and research objectives focussed on the SMPPs that were provided and the experiences of patients and their adherence. However, although physiotherapists were central to the study they were not given the opportunity to explain or discuss their practice. It is therefore important to use caution when making assumptions or interpretation about why and how they were provided. Further work exploring the physiotherapists' views and approaches to supporting adherence and behaviour change in practice is needed.

### **9.10 Recommendations and Implications**

In this section recommendations for future research are presented followed by implications for physiotherapy practice, policy and education.

#### **9.10.1 Recommendations for Future Research**

In order to undertake an in-depth, longitudinal evaluation, this study explored the practice of SMPP provision and experiences of only a small number of patients and physiotherapists. Although based at two different NHS sites the findings of this study are not generalisable to other physiotherapy settings and therefore further research to explore how patients experience and undertake programmes in UK physiotherapy practice are needed. This study, which was self-selecting, found high levels of patient motivations and adherence which may not be representative of all groups. More research exploring adherence and experiences of undertaking SMPPs with more diverse, less motivated and 'hard to reach' groups is necessary although ethical implications of accessing these groups need to be considered (Rockcliffe et al 2020). Further research of how the COM-B domains are addressed in wider physiotherapy practice would also help strengthen the understanding of adherence in physiotherapy practice.

Further research needs to establish which intervention components could overcome the modifiable barriers and enhance the enablers that have been identified in this study (French et al 2014). This could include research to evaluate the use of a tool to evaluate patients' capability, opportunity and motivation at every appointment to ensure an individualised behavioural diagnosis and optimisation of behavioural interventions to promote adherence (McLean et al 2010).

Consideration also needs to be made as to how adherence interventions could be effectively measured, considering the complexities of SMPP programmes and the need to balance flexibility

with optimal therapeutic dosage and adherence measurement. Further research regarding the implementation fidelity and the complexities of adherence in physiotherapy SMPPs is also needed. Clearer agreement as to what constitutes meaningful adherence measurement that promotes both quality and quantity of adherence, optimal outcomes and efficient use of healthcare resources is also needed.

The questionnaire in this study could be developed in future research to understand and develop its validity and reliability. Although questionnaires have been developed to explore COM-B domains previously (Huijg et al 2014), more work needs to be done to understand their reliability and validity in the context of patient behaviours in physiotherapy. The measurement of recall is also fraught with challenges and further work to establish and understand immediate recall of physiotherapy and medical information is needed in practice.

The TDF and COM-B models are a relatively new concept and its creators are clear that it needs to be used, tested and continually refined (Cane et al 2012). Further research to understand if and how the COM-B models can be used as a tool to support the provision of SMPPs with individual patients to increase adherence behaviours is now needed (see figure 9.2). This would support a shift of perspective from theory informed work, where frameworks are seen as final and comprehensive to a more iterative and two-way process of knowledge advancement (Kislov et al 2019).

#### 9.10.2 Implications for Physiotherapy Practice, Education and Service Delivery

This work has implications for physiotherapists, education and physiotherapy leaders. Key summary points are also presented.

For Physiotherapists;

SMPPs in MSK physiotherapy vary in their content, dosage and frequency. Their purpose and specific detail is not always clear. Although patients appreciated a flexible approach to undertaking their programme, without specific dosages it is difficult to know if a satisfactory level of adherence had been reached. When providing the SMPP physiotherapists should work with patients to consider the purpose, type, content and dosage of the SMPP that considers both short term and long-term goals. It is important that both the physiotherapist and patients consider adherence as a concept and jointly establish a threshold of adherence that is therapeutically meaningful, which can then be monitored accordingly. Adherence should also consider quality and quantity.

Delivering quality interventions in a way which embraces true shared decision making and supported self-care is challenging within current MSK service delivery models. NHS appointment times are

often limited to fifteen or twenty minutes as was the case in this study, and there are many pressures on the physiotherapists' time. However, if the main aim of physiotherapy treatment is to support patients to engage in a SMPP, as was the case in most of the patients in this study, then the physiotherapist must use strategies to optimise this adherence. Several practical recommendations are outlined for physiotherapists as a guidance toolkit to promote patients' adherence to SMPPs.

Physiotherapists must consider the optimal use of the allocated appointment time in taking the opportunity to understand an individual's problems, desires, goals and intentions when agreeing an outlining a SMPP. This may mean prioritising conversations which allow physiotherapists and patients to participate in the development of mutually agreeable care plans.

Within a time limited episode of care there are professional obligations on physiotherapists to undertake a thorough assessment and exclude serious pathology or the need for onward referral of care. The physiotherapist should also plan and deliver care which aims to improve the patients' outcomes and functional status in pursuit of them achieving their goals and improved quality of life. The findings from this study suggest several strategies that physiotherapists could consider during their consultation to maximise personalised care and facilitate increased adherence and engagement with SMPP. Based on the findings of this study and the current literature, the mnemonic ACCOMPLISH is presented as an aide memoire to prompt physiotherapists when providing SMPPs (see Figure 9.2). Further research and evaluation is needed to evaluate the use of this mnemonic in practice.

<b>A-sk</b>	<ul style="list-style-type: none"> <li>ask whether a patient wishes to partake , <i>or not</i>, in a SMPP and to what degree, based on their desires needs and available resources.</li> </ul>
<b>C-ollaborate</b>	<ul style="list-style-type: none"> <li>Consider yourself a partner with the patient. You should work with principles of SDM to collaborate and agree a way forward. Let the patients' needs and wishes lead the conversation. You are there to assist them not vice versa!</li> </ul>
<b>C-apability</b>	<ul style="list-style-type: none"> <li>Does the patient have the physical capability and psychological capability e.g. memory, cognitive processing to undertake the programme?</li> </ul>
<b>O-pportunity</b>	<ul style="list-style-type: none"> <li>Will the patients have the social support and environemnt to undertake the programme? Will they have the space, time and resources? ( physical environment).</li> </ul>
<b>M-otivation</b>	<ul style="list-style-type: none"> <li>is the patient motivated to do the programme and what/ who is motivating them? Are they internally motivated and what aret their wants, needs, goals and desires?</li> </ul>
<b>P-rovide</b>	<ul style="list-style-type: none"> <li>routinely provide printed information -Supplementary information should be consistently provided in a format acceptable to patients' health literacy and preferences. eg paper, digital, accessible resources.</li> </ul>
<b>L-isten</b>	<ul style="list-style-type: none"> <li>Listen to what the patients needs, what are their likely challenges and barriers in adhering to the programme?</li> </ul>
<b>I-Individualise</b>	<ul style="list-style-type: none"> <li>make sure the programme suits the patients' needs and desires; is it sufficiently challenging and achievable compared to their current activity levels? Jointly establish a threshold of adherence that is therapeutically meaningful, which can then be monitored accordingly. Adherence should consider quality and quantity.</li> </ul>
<b>S-ustainable</b>	<ul style="list-style-type: none"> <li>how long is the programme needing to be continued and how can it be built into patients normal behaviours in a sustainable, long-term way into patients lives? eg regular physical activity preferences,</li> </ul>
<b>H-human behaviour</b>	<ul style="list-style-type: none"> <li>Human behaviours and motivation are complex , dynamic and interactive. What people say they will do and what is actually done may differ in the context of the situation. No one will comply all of the time and patients will modify programmes to suit their needs. Relapse is normal!</li> </ul>

**Figure 9.2 The ACCOMPLISH mnemonic; designed as a prompt to support and facilitate physiotherapists to address key considerations to promote adherence when providing and supporting patients with SMPPs.**

The COM-B model has shown to be useful frameworks with which to undertake a behavioural diagnosis regarding adherence to SMPPs in MSK out-patient physiotherapy. The ACCOMPLISH mnemonic highlights the need for the practitioners to consider using the COM-B components as a tool to systematically explore the patients' capability, opportunity and motivation to adhere to their SMPP. This should be done alongside consideration of the patient's personal values and context as part of a personalised care approach (NHS England 2021). Capability, opportunity and motivation components are complex and the TDF has been shown to provide a rich narrative to explore the COM-B domains. Figure 9.3 suggests a possible framework to further prompt physiotherapists in their explorations of patient's capability, opportunity and motivation.



Does the patient have the CAPABILITY to adhere to the SMPP?

- Does the patient know what to do and why?
- Has the patients had opportunity to practice?
- Provide printed or video materials that's suits patients preferences and health literacy?
- Will the patient remember the SMPP including both exercises and other strategies?
- Has the patients got the skills to plan and prioritise the SMPP strategies into their daily activities?

Does the patient have the OPPORTUNITY to adhere to the SMPP?

- Do patients have the space, time, equipment to do this SMPP?
- Where will they do the exercises?
- Do they have the social environment to do this, e.g. supportive friend family, peers
- Frequency of appointments and contact **patients between appointments** to support them to stay engaged.
- **Consider group exercise** opportunities for patients to gain peer support and enhance long term adherence

**Remember- Patients ARE LIKELY to modify programmes** to suit their own situation

Does the patient have the MOTIVATION to adhere to the SMPP?

- Do they want to or intend to do this SMPP?
- What are their goals or motivation to do this?
- How is their pain or symptoms likely to respond and how will they feel about this?
- Is the SMPP sufficiently challenging compared to what they normally do- i.e. will it be too hard or boring?
- Are they familiar with exercise and physical activity?
- What will be their likely barriers to adherence and can plans be put in place to minimise these?
- Explore patients' beliefs regarding physiotherapy, exercise and their perceived outcome of the SMPP
- Are external factors motivating them such as others telling them too do it or guilt?
- How do they feel when they undertake the SMPP?
- What is likely to happen when they are too tired or busy to do the SMPP?

**Figure 9.3 - Proposed prompts for physiotherapists to explore the COM-B components within the ACCOMPLISH model when providing of SMPPs in routine MSK out-patient physiotherapy**

**For physiotherapy education;**

Physiotherapy pre-registration curricula should integrate psychological and behavioural theory and practice (Stickler 2015). This should be done to support the development of the future physiotherapy workforce to better understand adherence and behaviour change strategies alongside person centred care (Alexanders & Douglas 2016). Teaching of the TDF and COM-B models would provide a useful theoretical basis to increase familiarity with health behaviour theory, psychological constructs and behaviour change concepts. This approach is needed if physiotherapists are to possess the necessary skills, knowledge and behaviours to support personalised care (NHS England 2021) and facilitate optimal behaviour change and adherence and effective utilisation of resources (Kunstler et al 2019). Development of communication skills and skills in shared-decision making and goal setting should also be prioritised as transferable skills that can be used to understand patients' values, beliefs, attitudes and identity and to maximise adherence to SMPPs. The use of the ACCOMPLISH mnemonic and underpinning framework to explore the COM-B components are (Figure 9.2) are suggested as an aide memoire to support physiotherapists in achieving maximal outcomes with patients when providing SMPPs. Further research is needed to explore their application in practice across sectors.

**For Physiotherapy out-patient service design and delivery;**

Sufficient time and environmental considerations need to be provided within physiotherapy services to maximise the development of the therapeutic relationship and support patients sustained self-management using the ACCOMPLISH mnemonic where appropriate (see Figure 9.2). This is particularly important in the context of the recent seismic shift to virtual consultations during the COVID-19 pandemic and post pandemic service re-design opportunities this provides (Rawlinson & Connell 2021). Service leaders should take opportunities to (re)design MSK service models that enable physiotherapists' time and skills to support exploration of patients' capability, opportunity and motivation to adhere, and enabling sustained behaviour change. MSK service design should consider the needs and preferences of patients and physiotherapists including both face to face and virtual contacts. Clinics should also be designed with sufficient time for physiotherapists to reflect and debrief between patients to maximise their effectiveness and minimise physiotherapist burn out (Rogan et al 2019).

Considering best evidence for patients with MSK disorders (NIHR 2018), services should consider how social and peer support mechanisms can enhance short- and long-term adherence and behaviour change. Group physiotherapy sessions should be offered consistently, considering the evidence base. Services should consider how their design can support patients to transition from

physiotherapy supervised care to long-term self-management in the community and leisure sector. Unwarranted variation in practice should be reduced whilst balancing this with the need for a personalised approach to care which considers adherence and behaviour change.

### **9.11 Key Summary Points**

- SMPP programmes vary in their detail and complexity and contain both exercise and non-exercise strategies however, exercise strategies are provided more frequently than non-exercise strategies
- Physiotherapist's prescription and teaching of SMPPs varies and strategies including verbal instructions, demonstration, opportunities for patients to practice and flexibility within programmes were all valued by patients
- Printed information is likely to enhance adherence and preferences for visually enhanced digital materials should be actively provided for both exercise and non-exercise strategies considering patients' health literacy and personal preferences
- When providing SMPPs the level of engagement (quality and quantity) that would constitute therapeutic adherence is not always clear which means adherence is difficult to establish in MSK out-patients physiotherapy practice
- Physiotherapists placed greater focus on ensuring patients had the capability to undertake the SMPP compared to their opportunity or motivation to partake whereas patients raised more themes relating to their motivation and opportunity thus highlighting a potential mismatch when providing SMPPs.
- Patients' adherence issues focussed on four themes: knowledge and memory, patient personalisation, goals and motivations and influence of others.
  - Knowledge and memory; patients needed to know and understand the SMPP and how to undertake it.
  - Personalisation; patients tended to personalise programmes to suit their needs including particularly exercises done in lying positions.
  - Goals and motivations; all patients had underlying goals and motivations but these were usually not explored by the physiotherapists
  - Social interactions played a part in adherence particularly the therapeutic relationship. Peer support of others was preferred (e.g. group exercise).
- Patients are influenced by their capability, opportunity and motivation to adhere and these components appear to be interdependent and focussed on the patients' personal context.

- The TDF and COM-B models were applied successful to identify barriers and enablers to adherence to SMPPs
- When considering adherence to SMPPs, the COM-B components and TDF domains interplay both within the patient's own behavioural system and between that of the physiotherapists and patient (therapeutic relationship).
- Physiotherapists should focus on ensuring they work collaboratively with patients to understand and address patients' capability, opportunity and motivation when providing SMPPs

### **9.12 Plan for Dissemination of Findings**

The findings of this study will be presented back to the physiotherapy departments where they took place to share and reflect on practice. Some of the work from this thesis has already been disseminated in a platform presentation at the Physiotherapy UK scientific conference (Nov 12-13<sup>th</sup> 2020) entitled; An exploration of adherence to Self-Management Physiotherapy Programmes in MSK Physiotherapy using the COM B model and TDF framework. It has also been presented in part at a presentation at the Manipulative Association of Chartered Physiotherapist (MACP) behaviour change conference (Nov 2020). An editorial paper was commissioned regarding the findings and implications for service delivery in MSK out-patient physiotherapy post COVID (Rawlinson & Connell 2021).

Further academic journal articles are in development stages to share findings with the relevant audiences. These include MSK physiotherapy audiences as well as those interested in behaviour change and utilisation of the TDF and COM-B frameworks. Conference attendances are also planned to disseminate findings in the UK and internationally. The researcher also has opportunity to disseminate findings through strategic policy and planning work in their role at the Chartered Society of Physiotherapy (CSP). This strategic approach is supported and promoted by the CSP Charitable Trust who have part funded the study. The thesis will also be available as a resource on a shared repository.

### **9.13 Conclusion**

MSK disorders constitute a significant healthcare burden and SMPPs are central to their management (NIHR 2018). Like many interventions, SMPPs rely on adherence, which is often suboptimal (WHO 2003, Bailey et al 2020). Interventions to improve adherence in those with MSK

conditions have failed to show the desired benefits, possibly because they tend to adopt a 'one size fits all' approach (McLean et al 2010, Peek et al 2016b). This is at odds with taking a personalised care approach (NHS 2021). Health behaviour theory has recently been synthesised into a single framework to support non-psychologists to better understand behaviour change (Michie et al 2011a). This provided a robust theory to underpin the study design.

This study, set in a pragmatic research paradigm, set out to explore the content and provision of SMPPs by physiotherapists, and to explore if, and how, patients experienced and adhered to them. Using a mixed methods design, using aspects of ethnography, it was successfully implemented to achieve the research objectives. Insight into the content, dosage and provision of SMPPs was gleaned from a range of physiotherapists over the course of the first two physiotherapy appointments. Video analysis, in depth interviews, field notes and questionnaires combined to allow a rich and deep exploration of patients' attitudes, experiences and behaviours when undertaking SMPPs.

Inductive and deductive analysis processes allowed open, exploratory and iterative analysis. The TDF and COM-B were successfully used to deductively map the emergent themes in terms of the psychological domains and constructs (Cane et al 2012). Findings support the existing literature that adherence is complex and affected by numerous barriers and enablers. This study demonstrated how those factors should not be viewed in isolation but as interdependent, individualised and dynamic. There is also considerable interplay of the behavioural components between the physiotherapists' and patients' behavioural systems, which highlights further the known importance of the therapeutic relationship.

This study has provided the researcher with a rich, immersive learning experience to develop the knowledge, skills and reflexivity required to undertake trustworthy and rigorous research in the field. This study has contributed new knowledge to the understanding of SMPP content and provision. It has also allowed the exploration of patients' experiences of undertaking and adhering to SMPPs during real-life physiotherapy practice. The COVID-19 pandemic, which occurred post data collection, has provided the physiotherapy profession with new challenges and opportunities within MSK physiotherapy, and the findings of this study can be used to inform future practice developments. The recommendations from this study propose strategies that could increase patients' adherence and potentially health outcomes. Increased awareness of behaviour change theory and adherence is needed for physiotherapists to maximise their outcomes. The TDF and COM-B models are proposed as suitable frameworks to enable physiotherapists to utilise behavioural science, working with patients to deliver high quality, personalised

## CHAPTER TEN- PERSONAL LEARNING AND REFLECTIONS

### Context

This PhD study was undertaken over a five year period from 2016-2021, which allowed time for considerable reflection and learning. During this period I also experienced significant change in my professional life, moving from a senior lecturer and advanced practice MSK physiotherapist to a full time senior leadership role within the professional body for physiotherapy (Chartered Society of Physiotherapy). I also undertook significant professional development alongside my research and PhD training, including an inter-professional senior leadership programme. All of these experiences not only facilitated my growth and learning as a researcher and as a physiotherapist, but shaped my worldview as to how physiotherapy is perceived externally and its impacts and limitations on the health and wellbeing of those living with MSK conditions. In addition, in January 2019, during the writing up phase, the world experienced a global Coronavirus pandemic which changed the practice and delivery of healthcare and physiotherapy in the UK and worldwide forever.

### **The role of physiotherapy for of those with MSK disorders.**

As a physiotherapist who has worked in the field of MSK care for many years, I have always believed that physiotherapy has a central role to play in the management of MSK conditions; invasive surgical options should generally be a last resort and physiotherapy is therefore a core primary treatment. The context for this study, and introduction to this thesis, are based on this premise that physiotherapy is central to MSK practice and on reflection presents a physiotherapist centric worldview. Conversely it can be argued that the treatment effects of physiotherapy interventions, including both hands-on and exercise based therapies, are weak at best and ineffective or harmful at worst. Also, despite enormous investment in physiotherapy provision in the UK, MSK disorders still pose an enormous, increasing burden for individuals and healthcare economies.

Despite my central belief in the value of physiotherapy, this study design was born from a personal view that physiotherapy is not always practised to its optimum and is all too often based on didactic, historical practice by a relatively non- diverse physiotherapy workforce. I believe that physiotherapists hold unique skills and knowledge that can contribute to improved health outcomes for those with MSK disorders however, whether physiotherapy maximises its potential to do this is questionable. Observing physiotherapists failing to truly engage in patient centred care, goal setting and shared decision-making is disheartening. Calling out this observed ineffective care can feel like whistle blowing on one's own profession. During, this research experience I have often felt inherently critical of my own profession however, my study findings and exploration of the literature

has affirmed that this critical evaluation and reflection is essential if the physiotherapy profession is to develop and demonstrate impact.

My learning throughout this PhD has highlighted the need for me to challenge my own thinking and for physiotherapy as a profession to reflect on its effectiveness. We must identify where changes need to be made and we must challenge our professional and cultural assumptions, ways of working and limitations if we are to drive continuous improvement. It may be that emphasis should be less on the 'what' physiotherapists do or the intervention but on 'how' it is delivered. That is, the way physiotherapy is offered, experienced and engaged with, and how an intervention is tailored to the patient rather than a paradigm which is driven by the needs of the physiotherapist.

### **Physiotherapy and Person Centred Care**

Within the therapeutic relationship both the physiotherapist and patients are holders of knowledge and this creates a power dynamic. Physiotherapists may traditionally see themselves as the expert who imparts their knowledge on patients. Findings from this study illustrated also that patients trust physiotherapists as experts who hold knowledge and about their condition. However, it is the patients who live with, and manage, their MSK condition every hour of every day, and they modify what they are asked to do accordingly. Patients hold greater knowledge and power regarding their condition than is routinely recognised in practice.

My observation and own reflections within this study highlighted that physiotherapists were not always fully embracing a person centred approach. All too often treatments are being 'done to' or 'given' to patients with insufficient reflection on who's behaviour needs to change. My initial thinking at the beginning of the study was rooted in supporting patients to change their behaviours and ultimately adherence. However, on reflection it is perhaps the emphasis on physiotherapists' behaviours that is of greater concern. The therapeutic relationship and interpersonal skills are core to physiotherapy yet in the cases observed in this study, there was little or no exploration of the patients 'wants, needs or circumstances' influencing to engage in a self-management programmes.

The concept of self-management challenges this power balance, as supporting patients to change their behaviours and take on new activities becomes the focus of the intervention. The definition of SMPPs used for this study was; "unsupervised activities provided by physiotherapists to facilitate or maintain improvements in pain or function". On reflection this chosen definition, where the physiotherapy 'provides' activities, supports a paternalistic relationship which is at odds with a supportive partnership. Perhaps the definition adopted in this thesis supports paternalism, undermining the concept of patient-led self-management. It is likely that this reflects an inherent

trait within physiotherapy education and practice, whereby physiotherapists, explicitly or implicitly see themselves as the providers of expert advice and information and hence holders of power or knowledge.

Over the period of this study I have become increasingly aware of the need for a shift in this power balance. If patients are to be truly considered as equals, or more importantly the experts on their condition, then physiotherapists should be partners working with patients. This is in contrast to patients being seen as supporting the physiotherapist in their aspirations. My earlier view of this paternalistic culture is reflected by several references throughout the thesis to SMPPs being 'given to patients' and these references illustrate my inherent cultural trait of a power balance which needs to be reframed. My thinking has shifted, and future research and practice needs to robustly challenge the way physiotherapists are educated and practice in relation to facilitating personalised care, if we are to optimise physiotherapy's contribution to the improvement of lives of those living with MSK conditions.

The COVID-19 pandemic in March 2020 shifted the way physiotherapy is delivered with greater use of telehealth consultations. As physiotherapy services restart and adapt we must seize the opportunity to reframe our relationships with patients and not only seek to change patients' behaviours but also that of physiotherapists. We have an opportunity to truly place patients at the centre of their care and offer our knowledge and expertise to understand their needs, goals and desires to provide support in a meaningful way. We must acknowledge that how patients experience receiving physiotherapy is variable and our future ways of working must embrace and accept the dynamic complexities of human behaviours. The use of health behaviour change models must be utilised to ensure personalised and integrated behaviour change.

This research study used a pragmatic, mixed methods design to observe real life practice. Observing real life practice was a key strength of this study and gave great insight into the challenges faced by physiotherapists and patients. Significant time was also spent exploring patients' perspectives as per the study's objectives. However, my reflections also highlight the importance of better understanding the physiotherapists' perspectives. This could be considered particularly pertinent as physiotherapy services adapt to new ways of working after the COVID pandemic. As a physiotherapist myself, with an insiders perspective in terms of the profession, my likely biased interpretation of the power dynamic between the physiotherapist must be considered. Interestingly, as I progressed through the PhD, I felt I became less aligned with the physiotherapists I observed, and more removed, almost as an outside observer. Future research carried out by non-physiotherapists which explores the effects of the therapeutic relationship and power dynamic on



adherence behaviours should be undertaken. Peer reviewed video analysis could also be a useful tool to allow physiotherapists to review consultation footage with researchers and / or patients to explore the complexities of therapeutic relationships *how* physiotherapy is delivered. Digital technologies, now increasingly used to deliver consultations and physiotherapy care during the pandemic, offer opportunities to easily record patient interaction and evaluate new ways of working. I still believe that physiotherapy can offer great benefits for those living with MSK disorders however, we must better understand *if*, and *how* patients want to receive and engage with physiotherapy and how physiotherapists can be supported to deliver effective supportive behaviour change interventions utilising sound behaviour change theory.

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## APPENDIX 1 - TABLE OF LITERATURE REVIEW STUDY CHARACTERISTICS AND RESULTS

Intervention Studies (n =13) (Friedrich et al 1998/ 2005, papers included as one study)

Author	Participants	Home Exercise programme	Adherence measure	Intervention(s) group	Control group	Other outcome measures	Results	Conclusion
Basler et al (2007)	Prospective RCT Germany  Older adults 65+ with cLBP  n=170	30 minutes self-administered physical activity per day  Including stretching, strengthening and endurance exercises (no specific dosage or description given).	Seven day self-report diary for physical activity.	IG; TTM/ Motivational 10 mins counselling prior to every stage based on TTM (stages of change) (education, CBT, social support)  5 weeks x 10 Treatment sessions	10 mins placebo  Ultrasound prior to TTM group (to control for contact time)  5 weeks x 10 Treatment sessions	Baseline, Immediately after treatment and 6/12, self-report function, ROM lumbar spine spine.	Both IG and CG spent increased time on physical activity and increased function but IG showed no additional benefit.	No difference with regard to self – reported physical activity/ exercise levels between groups
Basset & Prapavessis (2011)	Prospective RCT,  New Zealand  people with ankle sprains  N=71	Exercise, advice, ice, brace, elevation.	Self-report Likert (1-5 scale)	IG group A; protection motivation theory (PMT) education video  IG group B; Non-PMT education video	CG group C; No formal intervention	SIRAS  PMT based beliefs developed specifically for study 7 point scale. Intention to adhere -7 point Likert scale. Based on TPB scale PMT intervention	No sig diff between groups for their adherence to home exercise	Suggest positive treatment outcome – adherence relationship.

						1/12 follow up. (Ajzen1991)		
Bassett & Petrie (1999)	Prospective RCT / New Zealand  MSK Physio Upper and lower limb injuries  (n=66)	Exercise	Self-report adherence exercise diary	IG Exercises: 3 groups  A physio and patient collaborative goals,  B; Physio set goals	CG C: No formally set goals		No sig differences between groups on overall adherence.	Goals may not be a suitable motivational tool for all people.
Clark & Bassett (2014)	Prospective, one group design pilot study,  New Zealand  Adults with soft tissue injury of shoulder,  n=24	Prescribed home exercise programme for soft tissue injury of shoulder,	Home exercise diary, patients answered yes or no to 2 questions; 'Did you complete the exercise?' and 'Did you complete the number of repetitions requested?'	IG Action and coping plans with the patients and related them to an overall goal. The plans addressed when, where, how and how often the intervention would be done. Formulated on wallet sized, brightly coloured cards to aid as prompts.	No control group	DASH shoulder function score and P4 pain scale,	Those reporting highest outcome scores had lowest self-report of adherence	This study supports the use of the Health Action Process approach model to explain behavioural processes and contribute to treatment adherence.
Friedrich et al (1998)/ (2005)	Prospective RCT / Austria.	Exercise	Self-report adherence to	IG Combined exercise and motivation grp (behavioural	Standard exercise grp (CG)	Disability  Pain	Mean adherence at 4/12;  (IG 76.7%	No sig difference in long-term



	Patients with cLBP >4/12 (n=93)		exercises after treatment.	contracting, positive feedback, education, reward strategies, self-monitoring) (IG)		Physical impairment Working ability Motivation	CG 69.4%) sig diff in attendance in CG but no sig difference in adherence.  At 5 yrs; sig improvement in function and pain for IG compared to CG but no difference in adherence.	compliance between MG and CG
Gohner & Schlicht (2006)	Prospective RCT Germany patients with cLBP n= 47	Exercise	Self-reported activity (4 point Likert scale)	Exercise treatment plus cognitive behavioural training (IG) (positive feedback, planning, self-monitoring, barrier planning and severity discussion)	Physio Exercise treatment only (CG)	before first PT session -after last PT session -3/12 -6/12	Both groups improved adherence over time. Significant increase in adherence in IG compared to CG. Scores remained consistent in CG.	CBT enhances patients' self-efficacy and severity perceptions and reduces perceived barriers which improved adherence to exercise in IG.
O'Brien et al (2013)	Feasibility study RCT, New Zealand Hip or knee OA	Exercise ; stretching and walking	Likert self-report (5 point scale)	Action and coping plans (IG)	No action or coping plans (CG)	SIRAS Self-efficacy Functional performance.	Stretching IG; 75% CG 78% Walking IG 72%	Exercise adherence was not sig improved by use of action and coping plans

	n=27						CG 70%	
Pisters et al (2010)	Cluster RCT Patients with hip/knee OA (n=200)	Tailored home exercise programme	Likert self-report (5 point scale)	(IG) 18 sessions behavioural graded activity over 12 weeks. Tailored behavioural exercise programmes up to 7 sessions with booster sessions over following year.	(CG): 18 sessions of usual care over 12 weeks. Generic exercise programme (no booster sessions)	Exercise measured using questionnaire Physical activity: SQUASH questionnaire: Baseline, 13 and 65 weeks.	Adherent participants at week 13; IG – 75% CG-44% At week 65 IG- 59% CG-34%	Improvement in IG programme in Physical activity and exercise adherence in short and long-term.
Roddey et al (2002)	RCT Texas, USA Rotator cuff shoulder injury n=129.	Exercise; active range of motion exercise, strength training and weight bearing exercise.	Exercise logs; self-report. (4 logs given at 6 week intervals, categorised at fully compliant 70% or more, partially compliant (50-69% of time), Non-compliant (less than 30% of time)	Home exercise programme with video instruction only (IG) Home programme with personal instruction (IG2) (both groups had access to a physiotherapist)	No specific control group.	Shoulder pain and disability index (SPADI), pain score.	No difference in compliance between 2 intervention groups. Outcomes improved in both groups with no differences between interventions.	No difference in compliance between intervention groups. Compliance did not affect outcome measures.
Schneiders et al (1998)	Prospective RCT/ Western Australia	Exercise; (4 exercises)	Self-report diary (#exercise performed / # exercise prescribed x100)	Home exercise with verbal, written and illustrated instruction (IG)	Same exercises ;verbal instruction only (CG)	No of consultations, frequency of exercising and dose of exercise.	Mean adherence WG 77.4% CG 38.1%	Mean percentage compliance was significantly better (p<0.001) in the

	Patients with LBP. n=96.							intervention group compared with CG
Schoo et al (2005)	Prospective RCT Older adults OA knees and hips n =115	Exercise	Home exercise log sheet, (self-reported adherence)	(IG) B Brochure and audiotape C; Brochure and videotape.	A-Face to face verbal instructions from physios and brochure only	Correctness of exercise scale.	Mean adherence between 1-4 weeks A;93% B; 92% C:89%	No additional benefits to adherence from audio tape or video for older people with OA.
Vong et al (2011)	Prospective RCT, Double blinded. Hong Kong Chronic LBP physio Out-patients n= 76	Exercise	Exercise logbook: number of exercise sessions completed = no of sessions per day x times per week.  After sessions 5, 10 and one month after discharge.	(IG); 10 sessions Motivational Enhancement Therapy (MET) plus physiotherapy interferential electrotherapy treatment.	CG; Physio including interferential treatment and exercises	Motivational status PRES PSEQ  pain and functional measures	Compliance after 10 sessions was IG 13.9 sessions CG 6.2 sessions  Significantly better outcomes in IG in physical capability, general health and compliance at 1 month follow up.	Motivational enhancement therapy was superior to standard care in increasing exercise compliance
Bennell et al (2014a)	RCT , OA Knee pain Australia n=74	One of two randomly allocated knee exercise programmes within RCT	Self-reported logbook: no of exercise completed each day as % of prescribed	(IG) Booster sessions  Two additional 30 minute visits to physiotherapist after standard 10-	No additional Intervention. Pts advised to continue with 4x weekly	Knee Pain VAS WOMAC  No booster sessions attended	No significant difference in adherence between groups. Mean adherence	2 additional booster sessions with a physiotherapist did not influence adherence, pain or physical function in

<p>x 4 weekly sessions</p> <p>1). 6 x weight bearing neuromuscular exercises (with specific reps and sets) knee, hip strengthening and balance exercises.</p> <p>2). 5 x non-weight bearing quadriceps strengthening exercises. (3 sets x 10 reps )</p>	<p>exercise. Performed over 2x 1 /52 periods.</p> <p>Self-reported adherence to prescribed programme NRS 0=not at all-10=completed all (average for previous 8 weeks)</p>	<p>14 sessions within RCT.</p> <p>Physio reviewed exercises, progressed dose, corrected exercise and discussed barriers and strategies for adherence.</p>	<p>home exercise programme.</p>	<p>IG 56%+/-34%</p> <p>CG 51% +/-37%</p> <p>No change in Pain or function score (WOMAC).</p>	<p>patients with OA knee.</p>
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Bennell et al (2017)	Prospective pragmatic RCT , Australia Knee pain	Education, physical activity advice and progressive home exercise programme; 4-6 knee/ hip exercises	3/12 postal questionnaire how many home exercise sessions were performed in the previous 2 weeks?  And 11 point numerical rating	IG; Physiotherapy sessions as per CG plus 6-12 weeks telephone coaching sessions by additional clinician trained in behavioural	CG; 5 x 30 min physiotherapy sessions over 6/12	Knee pain intensity/ WOMAC , physical activity	Addition of telephone coaching did not increase outcomes compared to physiotherapy alone.	Self –reported adherence measure s favoured coaching at 6 months but no significant improvement
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		performed 3 times per week.	scale (NRS) for adherence over previous 12 months incl. (0= not at all and 10= completely as instructed.)	change techniques.			14% addition in adherence was not enough to produce clinically meaningful results in IG	
Lonsdale et al (2017)	Prospective RCT.  Ireland	(n=235) Patients with CLBP.	Usual care physiotherapy (no restriction on number of treatments)	CONNECT communication training for physiotherapists (8hrs training)	1 hr training on evidence based practice for CLBP.		Patient-reported adherence (1, 4,12,24 weeks) overall adherence 1-=completed none) to 5 (completed all)  Proportion completed (completed/prescribed) & leisure time Physical activity	Weak positive effect of CONNECT training at week 1, 4 and 12 but not at week 24. On self-reported home adherence. No effect on clinical adherence
Chen et al (2017)	Chronic idiopathic frozen shoulder  RCT  Taiwan	<i>'Two simple, effective shoulder exercises'</i> (forward flexion and external rotation)  2 exercises for 5minutes after showering or hot compress application.	Self-reported compliance with shoulder exercises.	IG; In addition to CG; Also given mobile phone reminders, encouragement and educational text messages.	CG; Instructed how to do shoulder exercises and given instructional leaflet of exercises.	Shoulder ROM and satisfaction with intervention.	IG had greater adherence with shoulder exercises than CG after 2 weeks.	Text messages increased self-reported adherence to 2 shoulder exercises in 2 week period.

Lambert et al (2017)	Upper limb and lower limb MSK disorders, Australia	4 week prescribed home exercise programme. Typically 3-6 exercises, 1x daily, 3-7 times per week.	Self-reported adherence on numeric scale; 0=never performed exercises-10= always performed exercises.	Received home exs programmes on an app. Using free web-based software. Sent to patients via link. Pts asked to dispose of any printed handout and solely use app.	Prescribed home exercise programmes using printed handout information only.	Patient Specific Functional Scale, disability assessment, global report of change and assessor reported adherence. App satisfaction.	App participation was high. Adherence and function greater in those using app compared to printed materials but not clinically significant in IG.	Patients using App based exercises reported higher adherence and improvements in function than using printed information. Remains uncertain whether this effect on adherence is clinically worthwhile.
Bennell et al (2020)	Prospective pragmatic RCT , Australia OA knee and obesity	n=110 One of two randomly allocated knee exercise programmes within RCT (TARGET trial) to carry out 3x per week.  (as per Bennell 2014a)	Two measures of adherence collected at 24 weeks.  Exs adherence rating scale (EARS) section B - 6 items scored on 5-point scale from strongly agree –strongly disagree (0-24) higher score=higher adherence.  -	2-5 times per week semi-interactive SMS messages.  SMS messages were developed based on behaviour change wheel and mapped to TDF. SMS were targeted and personalised according to pts responses.	No SMS interventions. Advised to continue same TARGET exercise programme 3x per week.	Pain, fictional scores, quality of life, self-efficacy, kinesiophobia and physical activity.	Semi-interactive SMS messages improved self-reported adherence to prescribed home exercise programme over 24 weeks compared to no SMS.  Greater adherence to home exercises did not translate into improvements in pain, function or other secondary measures.	Behaviour change theory informed SMS program increased self-reported adherence but did not result in improved health outcomes.

**Quantitative Cohort Studies (non-interventional designs) n=11**

Author	Study type / location	Participant Population	Home exercise Programme	Adherence Outcomes measure	Results	Conclusion
Chan & Can (2010)	Cross sectional study, Turkey.	n=85 patients receiving out-patient physiotherapy given home exercise programme	Various home exercise programmes for MSK injury. No specific details or dosage provided.	Two item self-report measure on 5-point Likert scale; a) times exercises performed per week b) number of exercises per session c). overall exercise performance pooled.	Minimal results provided. 100% adherence in 39% of patients 50% moderate or good adherence 42% gave reasons for no adherence ; 14 % -pain 3% physiotherapists advice 51% lack of time 3%	Physiotherapists should rethink how they teach exercises to patients. More than 80% of participants had moderate or higher adherence levels.
Chen et al (1998)	Prospective cohort study, USA	62 patients attending Upper limb rehab centre (average age 47.8 years)	Home exercise programmes requiring active participation from patient.	Self-report, patients were asked to document each exercise, reps and sessions per day that were recommended by PT as well as actual number completed (reps and session. Categorized as low (0-33%), mod (34-66%),	Actual Recorded exercises 35% were 100% compliant compared to 74% who thought they had done what was recommended.	Perceived self-efficacy correlated with compliance and internal health locus of control. (P≤0.1)

				high (67-100%) compliance.		
Deutscher et al (2009)	Prospective cohort study, Israel	22 019 patients who completed episode of MSK PT, diagnosed with Lumbar spine, knee, shoulder or cervical spine impairment.	Home exercise programme (no specific details given)	Home Exercise compliance – measured only by PT at episode closure (good, moderate not good, irrelevant).	Better outcomes were achieved when patients were more compliant with Physiotherapy attendance.	Poor measure of compliance but large number of patients and strong indicator that increased adherence leads to better treatment outcomes.
Engstrom & Oberg (2005)	Prospective cohort study, Sweden.	N= 353 (mean age 40yrs) patients from a Physiotherapy clinic (279 completers and 74 non-completers.	Home exercise programme 2-3 times per week,	Exercise frequency; adherent-twice weekly or more, partly adherent more than once weekly but less than twice. Non-adherent-once weekly or less.	On average all patients exercised 1.6 times per week. Health beliefs variables differed between those with low exercise frequency compared to those who exercise more than once / week.	Individuals' beliefs about treatment effect adherence. Women, those in poorer health, more pain and more disability and less belief in treatment exercised less.
Escolar-Reina et al (2009)	Longitudinal observational study, Spain.	184 patients with chronic neck or back pain,	Two aspects; Non-pharmacological self-management strategies-rest, application of heat/cold, exercises.  And neck/back care in ADL's; posture/positioning/movement / lifting advice.	Measured used 5-point Likert scale of use of strategies. Considered good overall adherence if used half or more of the strategies provided.	Rest was the most used strategy for pain, most strategies had adherence of below 80%.	Overall adherence was higher for non-pharmacological pain relief strategies than for back/ neck care advice. Previous use of physical therapy strategies and pain characteristics were good predictors of adherence. Provision of information in clinical encounters e.g., about illness and need to employ strategies increased adherence,



Hartigan et al (2000)	Prospective cohort trial, USA	122 patients (mean age 41 years) with cLBP who had participated in 8-week intensive rehab programme,	Individualised, written exercise programmes including daily stretches, and aerobic and weight training sessions (three times per week).	Four item self-report; for four types of exercise; stretching, lifting weights, back strengthening, aerobic exercise patients reported how often they completed them using 0-5 times per week.	Significant increase in exercise frequency over 12 months for all types of exercise.	Exercise behaviours can be increased and maintained in cLBP patients without adversely affecting pain & function.
Kolt & McEvoy (2003)	Prospective cohort, New Zealand.	105 patients with LBP attending private clinic (mean age 39.7 years)	Printed PhysioTools programme (diagrams and instructions) x 3 exercises (out of a selection of 10 for LBP). Estimated completion time 12 mins.	Home exercise compliance assessment (HECA) participants recorded no of exercise sessions completed of the 14 prescribed sessions (2 sessions / day per week.	Mean adherence 71.6%. Correlation between SIRAS and home exercise adherence. No gender difference or difference between those receiving financial compensation.	Adherence rates possibly higher because printed instructions were provided. Physios may be able to predict adherence to home exercise by their attendance to clinic appointments.
Kirwan et al (2002)	Exploratory and correlational questionnaire study, Australia n = 41 participants receiving hand therapy from 69 Hand therapists	Hand therapy home exercise programme (no specific details).	Questionnaires (one for patients and one for therapists). No specific measure of actual adherence to home exercise adherence	Questionnaires (one for patients and one for therapists). No specific measure of actual adherence to home exercise adherence	24 of 33 items measuring perception of compliance differed at a statistically significant level between patients and therapists. Patients cited not enough time, discomfort or pain, interference with social life and forgetting as key reasons. Hand therapists reported	Patients and therapists have differing perceptions of compliance to hand therapy

					these as occurring more often than patients.	
Mannion et al (2009)	Prospective cohort study, Switzerland	37 patients with chronic LBP (mean age 44yrs)	Lumbar spinal stabilisation; 10 exercises x 10 reps x10 times per day. (approx. 25 mins per day) with written and verbal instructions. Given different starting positions so people could accommodate exercise easily into everyday life.	Self-report daily diary adherence measured as % of exercise completed compared to number exercises prescribed.	Mean adherence 68% at 9 weeks	Overall adherence was combined and compared with demographic and other factors.
Seckin et al (2000)	Prospective observational study, Turkey	120 adults with OA knee mean age 57.3 years	3-month home based daily exercise programme; aims to improve balance, flexibility, strength, endurance and range of movement.	Patient self-report: how many days they had done exercise, repetitions and sets per day.	Mean adherence 87% over 3 months. Positive correlation between duration of disease, swelling and ROM. negative correlation with pain and educational level.	Pain and disability were a significant predictor for adherence.
Wright et al (2014)	Cross sectional study, Australia.	87 patients with various MSK problems. Mean age 43.8 years.	Individualised home based physiotherapy exercise	Three item self-report, asking if completed all exercises	Self-efficacy was a significant predictor of adherence (r= 0.27) (no p value reported),	Patient–practitioner relationship is best predictor of adherence to home exercise rehabilitation.

programmes for MSK problems

recommended? (yes/no)

satisfaction with physiotherapist.

Improving patients' perception of clinician productivity, communication of information and trust may improve adherence.

How much effort they put in? (Lot of effort-no effort), % or exercises completed.

Also measured self-efficacy.

Noon et al (2017)	Cross sectional, observational study, Australia	N= c case reviews from exercise journals  Patients over 18 and seeking physiotherapy for LBP. Private practice.  Later the general population was asked to complete the survey based on experiences of doing exercises for LBP. N=64 survey responses (wider community population).	No details provided. Normal physiotherapy protocols.	1. Self-reported exercise journal.  Patient survey. 2. Adherence was defined by participants' indication of adherence or reason for inability to adhere.	No difference between in adherence in males and females.  Health and time were recorded as most frequently recorded barriers to adherence.	No gender differences in adherence but significant limitations in study design.
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Qualitative papers n=10 (Patient and physiotherapists' experiences literature)

Authors	Method	Setting	Participants / sampling / timing	Aims of study	Theoretical approach/ analysis	Results	Conclusions
Medina-Mirapeix et al (2009)	Focus groups x7,	Spain, Out-patient physiotherapy in primary healthcare centres,	n=34 patients with chronic neck or LBP. Purposive sampling age 28-70 average 48yrs	To explore patients' perceptions with the purpose of identifying those beliefs and perceptions that patients perceive to influence their adherence to a home exercise programme during exacerbation and remission of pain in the course of chronic pain.	Phenomenology approach.  An inductive iterative 5 step approach was described involving 4 researchers. Data was checked back with physiotherapists to serve as 'external audit'.	<p><i>When pain or disabilities appear</i></p> <p>Beliefs about illness, Prognosis expectations, Beliefs about adherence, Outcome expectations with exercises</p> <p><i>When pain or disabilities decrease</i></p> <p>Perceived barriers, Lack of time for exercises, Tiredness, Forgetting, Adverse effects of exercises, Comorbidities, Perceptions of support social, Incentives from family, Interactions with people exercising, Perceptions of physical environment, Entertainment, Recreational centres, Beliefs about adherence, Self-efficacy</p> <p><i>When pain disappears for long time</i></p> <p>Beliefs about illness, Vulnerability to relapse,</p>	Adherence is a reasoned response to multiple factors e.g. symptoms and education is key part

						Beliefs about adherence, Distance between adherence and its benefits or costs	
Escolar-Reina et al (2010)	Focus groups x7	Spain. Out-patient physiotherapy in primary healthcare centres,	(? same participants as Medina-Mirapeix et al 2009)  n= 34 patients with chronic neck or LBP.  Purposive sampling Receiving physio treatment and home-based programme. Average age 48yrs.	To explore how the intrinsic characteristics of home-based physiotherapy programmes or care providers style affects chronic neck or LBP patients' adherence to prescribed exercise. Thematic analysis.	Grounded theory. Detailed analysis involving three rounds of coding and three researchers.	2 Themes; home-based programme conditions- positive and negative considerations re time, complexity, and effects of exercise.  2), care providers style- better when educated about disease, promotion of feedback and motivation during instruction, reminders to exercise, monitored results and adherence to exercise.	These themes should be addressed when providing home exercise programmes.
Dean et al (2005)	In-depth interviews	New Zealand, out-patient physiotherapy  Ethical approval.	<b>Patients</b> n=9 purposive sampling, recent acute exacerbations of LBP (details give re patient participants). Prescribed tailored home exercise programmes. Avg age 39.5yrs  Interviewed between 1 <sup>st</sup> and 2 <sup>nd</sup> appointments.	To investigate the experiences of patients with a recent exacerbation of LBP in the context of primary care out-patient's physiotherapy and why they choose to adopt, or not, the advice and exercises being prescribed.  In addition, the study included experiences of the health	Interpretive phenomenological analysis (IPA)  Inductive analysis.  No detail regarding number of researchers.	Identified an overarching theme of time across both participant and patient groups.  Sub themes revealed differences and tensions between physiotherapists and patients  Several phenomena discussed.  <i>Managing time; is it the patients' problem? The</i>	Suggestion that lack of time provides an acceptable excuse for not adhering  LBP is medicalised and therefore not considered normal part of human existence. If de-medicalised and becomes part of normal activities, then time should no longer be needed to manage.

(Eight pilot interviews)

professionals providing the treatment for the LBP.

*bargaining process, managing time-the professionals' problem?*

**Physiotherapists n=8**

2 yrs+ experience dealing with LBP/MSK disorders. All females with average experience 7.8 yrs.

Pressure on time and conflict between expectations of provision of treatment and self-management principles.

Challenge of prioritising time, e.g., physios recognised importance of explaining and exploring patients' beliefs but challenging within time constraints.

Veenhof et al (2006)	In-depth interviews	Netherlands	N=12 Patients with OA, based on their success with using behavioural graded activity within intervention group of RCT, 1-6 months after last assessment Purposive sampling. Age range 55-80yrs.	Interview 3 main themes; discussion about content of behavioural graded activity, experience with the physio, characteristics of the participant	Grounded theory Inductive analysis using constant comparison method. One researcher analysed all interviews and second researcher checked random sample. Explanation of triangulation process	Two factors identified which influence long-term adherence. <ul style="list-style-type: none"><li>• initial long-term goals,</li><li>• active involvement in intervention process</li></ul>	Active involvement in behavioural graded activity seems to be key to adherence, Physios should gain a clear understanding of patients' initial motives for undergoing intervention.
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Campbell et al (2001)	In-depth interview in patients' homes	UK, 3/12 post out-patient NHS physiotherapy attendance. Prescribed exercise and home taping programme. 8 compliant patients were interviewed 1 yr later (nested within RCT).	n=20 patients with patello-femoral OA interviewed 3/12 after finished physio (From intervention arm of RCT). Age 45+. No avg age given	Thematic analysis: method aligned with constant comparative method. 2 researchers coded data.		Split into 1), initial compliance sense of obligation to physio and contributing to research etc., preferred exercise to drugs, and 2). Continued compliance: 7/20 reported complying 3/12 later. Positive attitude to exercise and ability to incorporate into daily life, increased perceived severity of symptoms more likely to comply, ideas about cause, no point carrying on as not going to improve, perceived effectiveness of intervention 'did it if thought it worked' No discussion re; home taping compliance	<ul style="list-style-type: none"> <li>• Patient choice to cont. or discontinue exercise programme should be seen as reasoned and rational</li> <li>• non-compliance is common, continued compliance depends on patient's perception of severity of problem and usefulness of intervention, s</li> <li>• should consider wider psychosocial issues,</li> <li>• compliance may change over time,</li> </ul>
Sluijs et al (1993)	Questionnaire survey plus audio recordings of consultations	Netherlands, Patients attending private practice physiotherapy,	N=222 patients returned the questionnaire (74%) and 28% also sent audio recordings of their consultations from physiotherapy in private practice physiotherapy.	One open question; "do you encounter problems in doing your home exercise and if so, what kind of problems do you encounter?"	No analysis detailed for qualitative components of the survey.	Three main factors for non-compliance. <ul style="list-style-type: none"> <li>• barriers patients perceive and encounter (strongest correlation)</li> <li>• lack of positive feedback</li> <li>• degree of helplessness</li> </ul>	Physios should carefully explore which problems patients encounter in their efforts to comply and that seek solutions in collaboration with their patients.

Smith – Forbes et al (2016)	In-depth Interviews,	USA, Patients attending physiotherapy with upper extremity problems (arm),	N= 10 (Age 21-66yrs avg 49 years.)  Purposive sampling of patients receiving upper extremity physiotherapy showing discrepancy between outcomes measure (QDASH) but not perceiving improvement in a global rating of change scale.	Describe rehabilitation experiences and expectations of people who demonstrated a discrepancy in outcomes and their decision to adhere with treatment. Progress and desire to adhere to treatment programme.	Phenomenology  Detailed multi step analysis is detailed following Colaizzi’s phenomenological method.  Member checking was used (n=7 responded).  Peer review and reflexive methods also described.	5 key themes identified.  <u>Desire to return to normal</u> – some less inclined to adhere if though would not get fully better, i.e., needed to believe treatment would work (treatment efficacy)  <u>Initial anticipation of brief recovery</u> ; when people realise was going to be a long recovery, they knew they had to stick with it. Patient-Physio collaboration was also important.  <u>Trust of therapist</u> -if they believed and valued the physio, they were more likely to adhere (Therapist's efficacy)  <u>Cannot stop living</u> –still must do normal life so if rehab programme must fit around this. Links with time barriers etc.  <u>Feelings of ambivalence</u> -some people knew it was the right thing to do but were ambivalent links with beliefs about illness comparison with others, feeling hopeless	Patients wanted a therapist to work with them collaboratively to set realistic patient - centred goals and to support realistic expectations of recovery. May be discrepancy between what is clinically important change and reasonable expectation for home regimen. Treatment complexity can affect adherence.
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						that would not improve even with adherence	
Karnad & McLean (2011)	Interview	UK, MSK out-patients physiotherapy setting,	Convenience sample (n=5) experienced MSK physiotherapists (staff and students from university) were interviewed.  3 private setting, 1 non-private and one not practicing) Avg clinical experience 13 years.	The study explores UK physiotherapists' perceptions of exercise adherence and their interventions to tackle it in clinical practice.	Interpretative Phenomenological Analysis (IPA)  Detailed staged approach to analysis with examples of theme development provided.  Unknown how many or which researchers undertook analysis.  Reflexivity statement provided for lead researcher and their role and relationship with research setting.	Identified themes.  <ul style="list-style-type: none"> <li>• Patient-therapist collaboration in chronic rehabilitation.</li> </ul> Subordinate themes were negotiating ownership and self-management, <ul style="list-style-type: none"> <li>• education and pain,</li> <li>• professional power</li> <li>• Patients' attitudes and communication.</li> </ul>	
Stickler (2015)	In-depth interviews	USA	Sample n=5  A judgment sample used. Participants were selected based on their years of experience as a PT; sample	The purpose of this study is to determine (1) the beliefs PTs hold about non-adherence, (2) the strategies that are used by PTs to increase adherence, and (3) the PTs' beliefs	Phenomenology  Thematic analysis process described but not number of researchers	Identified themes building self-efficacy, the Therapist-patient alliance, outcome expectancies, positive and negative reinforcement, and characteristics of the HEP. Also, participants did state that emotional distress was a	The information given by PTs suggests that the field of physical therapy needs to re-evaluate how to increase adherence and examine training programs to include training PTs to

			representation of a wide range in the years of experience was desirable.	about the success of those strategies		factor influencing adherence.	prevent or manage non-adherence.
Marwaha et al (2010)	Focus group x 1	India	N=6 physiotherapists	Explored reasons and barriers for non-adherence to physiotherapy.	Grounded theory Inductive analysis approach described	6 key themes; Factors identified e.g., forgetfulness, time and cost of treatment. Factors unique to India and to date have not been identified in western cultures e.g., the familial obligations of many Indian women, bonds within the family, the stigma of disability, a belief in other forms of alternative treatment unique to Indian culture. many psychological and sociodemographic factors e.g., anxiety or low levels of activity, were not identified indicating that physiotherapists may not be aware of all the potential barriers which  May prevent patients from adhering with treatment recommendations.	Patient and family education considered important by physios for increasing adherence.
Peek et al (2016)	Web-based national survey,	Australia, Physiotherapists identified	N= 353 MSK physiotherapists 21-30yrs qualified	To assess physiotherapists' perceptions of.	Likert scale data was analysed as frequency and percentage (95%CI)	>89% strongly agreed or agreed that adherence to SMPP was important in influencing patient outcomes	Physiotherapists perceive that patient outcomes can be positively influenced by

via Australian Physiotherapy Association database. Eligible physiotherapists had an adult caseload of >80% and worked clinically >15 hrs per week.

64% female.  
81% working in private practice

- the importance of patient adherence to self-management programmes in increasing outcomes,
- rate of patient adherence encountered in practice
- importance of methods employed to increase adherence
- barriers to employing methods to increase adherence.

of first rank, the mean score of importance

Patients suggested self-management strategies that increase outcomes incl. self-massage, postural advice, cognitive-behavioural advice, weight management and group exercise.

Mean perceived rate of adherence was 70% exercise, 64% self-taping, 75% brace wearing and following advice 55%.

Physiotherapists ranked methods to increase adherences, personalising the SMPP, providing patient education, and practising the strategy in the consultation.

Physiotherapists reported they had time (83%), skills (84%) and access to patient education materials (92%).

patient adherence to a range of self-management strategies. Physiotherapists should be encouraged to assess patient adherence and implement methods to increase patient adherence in practice.

Meade et al (2019)	Semi-structured interviews.	UK	n=22 patients with persistent MSK pain (>3/12).  Physiotherapists n=10.	TDF used to analyse results.  HAPA model seen as possible action	Four themes identified: the roles of the environment, the therapeutic relationship facilitating engagement with self-management and the
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	2x focus groups					influence of pain and negative affect.	
Rizzo and Bell (2019)	USA	Out-patient physical therapy clinic	n=10 patients. Each had 2x semi structured interviews.  1. Focussed on prior experiences where patients had adhered to other behavioural regimens.  2. Occurred after at least 5 physical therapy sessions and focussed on experiences of adherence to prescribed home exercise programme.	The study explored mental models of adherence to prescribed home exercise programmes and how they related to mental models of adherence to other types of personal regimens.	Applied interpretive design. Analysis via constant comparative method.	Findings revealed similarities in perceptions, values and expectations and informed individuals' mental models of adherence to both other personal regimens and home exercise programmes.  Perceived results, perceived social supports and value of convenience characterised mental models in adherence	Parallels between mental models for adherence to prescribed home exercise programmes and other personal regimens suggest that adherence behaviours may be affected by adherence experiences across other parts of their lives.  Clinicians need to tailor supports that increase adherence to individuals.
Hall et al (2020a)	Semi-structured interviews.	USA Patients undergoing rehabilitation with varied MSK conditions.	n=9 physical therapists and n=9	Gain insight into the perceived strategies that physical therapists use to potentially support basic psychological needs within the physical therapy context.	Content analysis using social determination theory as a framework.	Themes –matching specific competence matching challenges with patient abilities.  Autonomy support strategies e.g. active decision-making.  Relatedness need support.	Understanding the strategies physical therapists use to support patients' psychological needs may have significant implications for patient motivation and adherence.

Moore et al (2020)	Semi-structured interviews	UK, Qualitative embedded in RCT design	N=30 patients with OA knee. In BEEP trial.	2x interviews per patient. 1st shortly after physiotherapy intervention and 12/12 later.	Themes; supervision, progression, individualisation long-term barriers to exercise, long-term facilitators; change in knowledge, therapeutic alliance, time and place, support, and supervision.; More regular physio reviews.
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#### Systematic Reviews n=4

Author	Aim	Inclusion criteria	Scoring tool / evaluation	Results	Conclusion
Beinart et al (2013)	Systematic review of studies evaluating factors relating to adherence to home exercise in adults with LBP	n= 14 (11 RCTS's, one cohort study, two qualitative)  Inclusion criteria: 18-65 yrs, 1980-2013, English language, BP. Excluded if did not measure adherence to home exercise, or patients managed primarily by drug therapy or multidisciplinary teams.	No suitable tool identified therefore a modified the 16-item Quality assessment tool was developed.  No pooling of data for statistical analysis due to participant and methodological heterogeneity.	Moderate evidence found for sub factors; greater health locus of control, Supervision of programme, participation in an exercise programme alongside the home programme and in a general behaviour change programme which incorporates motivational strategies.	Patient and intervention related sub factors identified. Interventions poorly described so difficult to understand which components were effective. Suggest using taxonomy of behaviour change. Lack standardised measures for adherence.
Essery et al (2016)	Systematic review to evaluate predictors of adherence to home based physical	N= 30, Included studies of any design, English, reported quantitative measurement of adults' adherence to	Narrative synthesis. No pooling of data for statistical analysis due to participant and methodological	Relatively strong evidence for several predictive factors; intention to engage, self-motivation, self-	Range of factors identified, which should be used to inform design of interventions to improve adherence.

	therapies for people with MSK disorders.	movement-based home programme (not just MSK problems) and at least one predictive factor of adherence. Excluded under 18's and those doing non-specific physical activity e.g., for weight management.	heterogeneity. A non-scoring quality assessment tool developed from the STROBE (Strengthening the reporting of observational studies in Epidemiology) checklist was used. Studies were assessed across three domains: control of bias appropriate measurement, and control for confounding variables.	efficacy, previous adherence to exercise-related behaviours and social support.	
McLean et al (2010)	Systematic review of interventions to increase adherence to MSK out-patient physiotherapy	N=5 Studies which measured adherence to clinic attendance and home exercise exercise-based physiotherapy programmes with acute chronic or post-op dysfunction, RCT's, in English.	Studies were scored using a standardised quality assessment tool (Cochrane). Trials scoring 6 or more were considered high quality.	Conflicting evidence that adherence strategies improve short term adherence and strong evidence that intervention strategies are not effective at improving long-term adherence to exercise.	Interventions in two studies were delivered by physiotherapists who had limited training in cognitive behavioural training. Adherence to home exercise was measured using self-report diaries where compliance and accuracy may be a problem. Due to the multifactorial nature of adherence single strategies may not be effective at improving adherence.
Peek et al (2016 a)	Systematic review of interventions to aid patient adherence to physiotherapists prescribed self-management strategies,	N=12 studies, RCT's investigating adults receiving a physiotherapist prescribed self-management programme. Not limited to exercise programmes but excluding preventative strategies.	The quality assessment tool developed by Physiotherapy Evidence database (PEDro) was used (score out of 10). Interventions were grouped according to the behaviour change taxonomy.	All 12 studies met the methodological quality criteria cut point and were therefore included. 50% of studies scored fair (4 or 5 out of 10), with 42% scoring moderate and 8% (one study) receiving a high score.	Potential adherence enhancing interventions includes and activity monitoring and feedback system, written exercise instructions, behavioural graded exercise programme with booster sessions and goal setting. All RCT's aimed at exercise strategies rather than other physiotherapy prescribed strategies, advice etc. Insufficient data to endorse use of published intervention strategies in clinical practice.

Nicholson et al (2017)	Systematic review and meta-analysis of interventions for promoting adherence in older adults with low back pain and/or knee/hip OA pain.	N=9 studies	Cochrane risk of bias tool Random effects meta-analysis was applied 2 studies included in meta-analysis.	High risk of bias in 2 studies (lack of blinding) and unclear in 3 studies. Four were considered low risk of selection bias and 4 at low risk of detection bias.	Meta-analysis provides moderate quality evidence for booster sessions. With a physiotherapist. Some evidence that patient motivational strategies and behavioural graded exercise is effective, but effect sizes declined over time.
Bunting et al (2020)	Systematic review and meta-analysis of digital interventions for promoting adherence in chronic MSK pain.	N=5 studies	Cochrane risk of bias tool Random effects meta-analysis 3 were included in narrative synthesis and 3 for meta-analysis . Included study by Lee et al (2017) that only measured adherence in IG.	Overall study quality was poor with moderate-high risk of bias. Measurement of adherence was considered high risk of bias.	Meta-analysis suggest that digital interventions produce no significant increase in adherence. Three studies in narrative review claim increased adherence but lack of control data makes this unclear Treatment fidelity is poorly reported with heterogeneity of effects and measures used. Lack of evidence makes it difficult to draw conclusions.

Key; cLBP = Low back pain, OA =osteoarthritis, IG =intervention group, CG=control group.

## APPENDIX 2 - INTERVIEW SCHEDULES

Patient participant # \_\_\_\_\_

Stage 1 –complete patient socio-demographic form

### Interview One

Opening general questions, establish rapport.

Demographics. Can I ask you a bit about yourself, complete demographics section (above)?

Tell me about your physiotherapy appointment today. *How long did it last? What happened during the appointment? Was it what you expected? Tell me about what you expected and what actually happened. Was there anything you liked about the appointment? Was there anything you didn't like? What could have been done better?*

Were you given anything to do at home by the physiotherapist...e.g., exercises, activities, any instructions? Anything you should do or not do?

If so, can you share with me what you were asked to do, how often and how many times? What you think about being given a programme/ exercises to do at home?

*Psychological capability:* Was /is it easy to remember what you were asked?

Do you think you've remembered everything you were asked to do? Tell me about this. Do you think anything would /or has help(ed) you remember what you've been asked to do?

*Prompts; Physical capability;* tell me about how physically capable you feel about doing what's been asked of you? does anything you've been asked to do cause pain or discomfort?

*Physical opportunity:* Tell me about when you will have the opportunity in your daily life to do this programme (think about time, space, equipment, social support). Have you got time to do the programme? Have you got all the equipment etc. you need to do what's been asked of you?

*Social opportunity;* Tell me about how you'll fit your programme into your daily routine. Do you think your family and friends will support you to do your SMPP? Tell me about this.

*Motivation-*Tell me about your motivation to do this programme? What motivates or demotivates you? Would anything help or have helped to motivate you better?

Did you expect to be given things to do at home? Do you see this as your job to do this as the patient?

Tell me about how important it is for you to do this physiotherapy programme / exercises? Explain why or why not this is the case.



Tell me about your intentions to carry out the things you've been asked to do. Do you intend to do what's been asked of you?

Can you describe any things that made it difficult or easy barriers of challenges to carry out your programme?

Are there any things that might help you stick with the programme in the short term/ longer term, tell me about these and why?

Do you think carrying out the physiotherapy programme will help your problem? Tell me about this and why. Do you think it will be painful to do the programme?

That's everything I wanted to talk to you about today and that's the end of the interview unless there's anything else you'd like to add that you haven't had chance to say?

Thank you for your time.

**Interview Two -schedule**      Patient participant # \_\_\_\_\_

#### **Thinking about the time between your first and second appointments**

1. Since I last saw you, can you tell me how you've got on with your exercise programme.
2. Was it physically harder or easier than you expected? Please tell me about this.
3. Were you able to remember the programme?
4. Did you manage to fit the programme in to your daily life? If so, how did you do this?
5. Did you have any help or encouragement to complete the programme?
6. Since we last talked, has your motivation towards your exercise programme changed?
7. Is there anything that would have helped you in completing what has been asked of you?
8. How was the second appointment? Has anything changed in what has been asked of you?

## APPENDIX 3 - QUESTIONNAIRES

### Questionnaire 1

**We want to know about any exercises or instructions you have been given to do at home by your physiotherapist.**

If you **have not** been given anything to do at home by your physiotherapist please box and hand the questionnaire back to your physiotherapist.

tick this

If you **have** been given a home programme to do please continue to answer all the questions.

### PART 1

Whether you are still attending physiotherapy or not, please state how you feel about the following statements now, by circling the appropriate number for each question.

I understand what I have been asked to do by my physiotherapist.	1	2	3	4	5
I feel capable of doing what I have been asked to do by my physiotherapist.	1	2	3	4	5
I will use a reminder to remember to carry out what has been asked of me.	1	2	3	4	5
I can make a plan to complete what has been asked of me.	1	2	3	4	5
I am physically able to do what has been asked of me.	1	2	3	4	5
My friends and family will encourage me to do what has been asked of me.	1	2	3	4	5
I will have the space and / or equipment at home to do the things asked of me.	1	2	3	4	5
	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
I won't have the time to carry what has been asked of me.	1	2	3	4	5

Please turn over

<b>I expected to be given things to do as part of my physiotherapy.</b>	1	2	3	4	5
<b>I feel confident I can do what has been asked of me.</b>	1	2	3	4	5
<b>Regarding my problem, I am positive about the future.</b>	1	2	3	4	5
<b>I think doing the things that have been asked of me will be helpful.</b>	1	2	3	4	5
<b>I intend to do what has been asked of me.</b>	1	2	3	4	5
<b>Setting goals with the physiotherapist would/ will help me to do what has been asked of me.</b>	1	2	3	4	5
<b>I don't think it's my job to do things in my own time as part of my physiotherapy.</b>	1	2	3	4	5
<b>I feel I have other things that are more important to me that might interfere with doing what has been asked of me.</b>	1	2	3	4	5
<b>I think my problem will improve if I do what has been asked of me.</b>	1	2	3	4	5
<b>I feel guilty if I don't do what has been asked of me as often as required.</b>	1	2	3	4	5

Please turn over

PART 2

Please write down instructions/ activities that you have been given today, that you have been asked to do by your physiotherapist.

**What were you asked to do?**

If you have any further comments, please write them here:

That is the end of the questionnaire. Thank you for taking the time to complete it.

For any help or questions regarding this questionnaire please contact the lead researcher Gill Rawlinson XXXXX or email [xxxxxx@uclan.ac.uk](mailto:xxxxxx@uclan.ac.uk)

Questionnaire 2

**We want to know about any exercises or instructions you have been given to do at home by your physiotherapist as part of your treatment.**

Please continue to answer all the questions.

PART 1

Whether you are still attending physiotherapy or not, please state how you feel about the following statements now, by circling the appropriate number for each question.

<b>I understand what I have been asked to do by my physiotherapist.</b>	1	2	3	4	5
<b>I feel capable of doing what I have been asked to do by my physiotherapist.</b>	1	2	3	4	5
<b>I will use a reminder to remember to carry out what has been asked of me.</b>	1	2	3	4	5
<b>I can make a plan to complete what has been asked of me.</b>	1	2	3	4	5
<b>I am physically able to do what has been asked of me.</b>	1	2	3	4	5
<b>My friends and family will encourage me to do what has been asked of me.</b>	1	2	3	4	5
<b>I will have the space and / or equipment at home to do the things asked of me.</b>	1	2	3	4	5
	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
<b>I won't have the time to carry what has been asked of me.</b>	1	2	3	4	5
<b>I expected to be given things to do as part of my physiotherapy.</b>	1	2	3	4	5

Please turn over

I feel confident I can do what has been asked of me.	1	2	3	4	5
Regarding my problem, I am positive about the future.	1	2	3	4	5
I think doing the things that have been asked of me will be helpful.	1	2	3	4	5
I intend to do what has been asked of me.	1	2	3	4	5
Setting goals with the physiotherapist would/ will help me to do what has been asked of me.	1	2	3	4	5
I don't think it's my job to do things in my own time as part of my physiotherapy.	1	2	3	4	5
I feel I have other things that are more important to me that might interfere with doing what has been asked of me.	1	2	3	4	5
I think my problem will improve if I do what has been asked of me.	1	2	3	4	5
I feel guilty if I don't do what has been asked of me as often as required.	1	2	3	4	5

Please turn over

PART 2

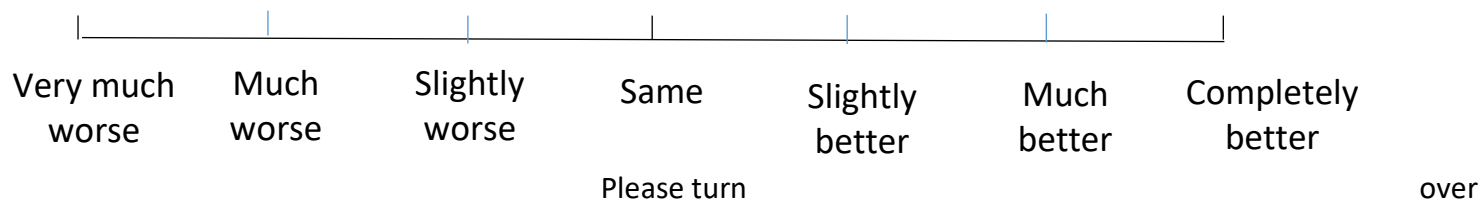
1. Please write down instructions/ activities, that you have been asked to do by your physiotherapist.

What were you asked to do?

2. Since you started physiotherapy how much of what you have been asked to do by your physiotherapist have you completed? (please circle the number below)

1	2	3	4	5	6	7
Completed none						Completed all

3. How does your problem compare to how it was just when you started physiotherapy treatment? (please circle the best description)



If you have any further comments, please write them here:

That is the end of the questionnaire. Thank you for taking the time to complete it.

For any help or questions regarding this questionnaire please contact the lead researcher Gill

Rawlinson xxxx or email [xxxxxxx@uclan.ac.uk](mailto:xxxxxxx@uclan.ac.uk)

### Questionnaire 3

**We want to know about any exercises or instructions you have been given to continue to do at home by your physiotherapist.**

**Please answer all the questions as honestly as you can.**

PART 1

Whether you are still attending physiotherapy or not, please state how you feel about the following statements now, by circling the appropriate number for each question.

I understand what I have been asked to do by my physiotherapist.	1	2	3	4	5
I feel capable of doing what I have been asked to do by my physiotherapist.	1	2	3	4	5
I will use a reminder to remember to carry out what has been asked of me.	1	2	3	4	5
I can make a plan to complete what has been asked of me.	1	2	3	4	5
I am physically able to do what has been asked of me.	1	2	3	4	5
My friends and family will encourage me to do what has been asked of me.	1	2	3	4	5
I will have the space and / or equipment at home to do the things asked of me.	1	2	3	4	5
	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
I won't have the time to carry what has been asked of me.	1	2	3	4	5
I expected to be given things to do as part of my physiotherapy.	1	2	3	4	5



I feel confident I can do what has been asked of me.	1	2	3	4	5
Regarding my problem, I am positive about the future.	1	2	3	4	5
I think doing the things that have been asked of me will be helpful.	1	2	3	4	5
I intend to do what has been asked of me.	1	2	3	4	5
Setting goals with the physiotherapist would/ will help me to do what has been asked of me.	1	2	3	4	5
I don't think it's my job to do things in my own time as part of my physiotherapy.	1	2	3	4	5
I feel I have other things that are more important to me that might interfere with doing what has been asked of me.	1	2	3	4	5
I think my problem will improve if I do what has been asked of me.	1	2	3	4	5
I feel guilty if I don't do what has been asked of me as often as required.	1	2	3	4	5

PART 2

Please turn over

Please write down instructions/ activities that you have been asked to do by your physiotherapist.

**What were you asked to do?**

4. Since you started physiotherapy how much of what you have been asked to do by your physiotherapist have you completed? (please circle the number below)

1	2	3	4	5	6	7
Completed none						Completed all

5. How does your problem compare to how it was just when you started physiotherapy treatment? (please circle the best description)

Very much worse	Much worse	Slightly worse	Same	Slightly better	Much better	Completely better

If you have any further comments, please

write them here:

That is the end of the questionnaire. Thank you for taking the time to complete it.

For any help or questions regarding this questionnaire please contact the lead researcher Gill

Rawlinson xxxxxx or email xxxxxxxxxxxx@uclan.ac.uk

## APPENDIX 4 - PARTICIPANT INFORMATION, INVITATION & CONSENT LETTERS

### Study Title

**An exploration of self-management physiotherapy programmes (SMPP) in Musculoskeletal Physiotherapy**

**INTRODUCTORY EMAIL TO INVITE PHYSIOTHERAPISTS TO PARTICIPATE. TO BE SENT BY PHYSIOTHERAPY MANAGERS AT BOTH SITES TO ALL MSK PHYSIOTHERAPY STAFF WITHIN THEIR TEAM.**

*Dear Physiotherapist,*

*I have sent you this invitation email on behalf of Gillian Rawlinson as I think you may be eligible to take part in their research project. Gillian is a physiotherapy lecturer at UCLan and also an advanced practitioner physiotherapist at Salford Royal NHS Foundation Trust. Gillian does not know who I have contacted and no information about you, nor your contact name or details have been given to or shown to Gillian.*

*Her study is exploring the provision of, and patients' adherence and experiences of self-management programmes in MSK physiotherapy. The research is not intended to assess individual physiotherapists' clinical performance. Gillian would like your help to recruit patients for her study. For this study patients agree to video recording the first and second appointments, completion of questionnaires and semi structured interviews. Gillian will be present in the department at the time to answer questions and operate the video camera but will not be present during the consultations. All patients will have had to consent to take part in the study. Recordings will be made of appointments within regular clinic times and locations so should not disrupt normal diaries or schedules.*

*There is no obligation to take part. The study has ethical clearance from the health research authority and Trust R &D. I have attached an information sheet and a consent form for your information.*

*If you would like more information, or would like to volunteer to take part please email [[email address](#)] or telephone XXXXXXXX.*

*Many thanks*

*Signed physiotherapy manager/ team leader*

## An exploration of self-management physiotherapy programmes in Musculoskeletal Physiotherapy (Physiotherapists Information)

We would like to invite you to take part in our research study. Before you decide, we would like you to understand why the research is being done and what it would involve for you as a physiotherapist.

### *Why is the study being carried out?*

This study aims to explore the physiotherapy consultation, particularly focussing on the provision of self-management programmes for patients. We aim to explore patients' attitudes, behaviours and experiences of carrying out self-management programmes

### *Who is doing the research?*

The research is being carried out by a senior physiotherapist (Gillian Rawlinson) as part of a PhD Degree at the University of Central Lancashire (UCLan), Preston.

### *How are participants (physiotherapists) selected?*

**MSK PHYSIOTHERAPISTS IN YOUR PHYSIOTHERAPY SERVICE HAVE BEEN INVITED TO TAKE PART. IF MORE PHYSIOTHERAPISTS VOLUNTEER THAN ARE REQUIRED, THEN A RANGE OF PHYSIOTHERAPISTS WITH DIFFERENT LEVELS OF EXPERIENCE, WHO DELIVER CLINICS OVER A RANGE OF DAYS AND TIMES WILL BE SELECTED. THIS WILL ALSO HELP ENSURE THAT THE PATIENT PARTICIPANTS REPRESENT A RANGE OF PATIENTS WHO ATTEND ON DIFFERENT DAYS/ TIMES (E.G. WORKING AND RETIRED PEOPLE).**

### *What is involved in this study?*

We are asking your consent to video record the first and follow up physiotherapy consultations with a small number of your patients. We will also ask you to fill in a short demographic form about your experience as a physiotherapist. The video recordings will be used to explore and evaluate the use of self-management programmes given in physiotherapy.

Your treatment time/ diary should not be affected by this recording and no one else will be present in the consulting room, just you and your patient. The recording will be watched by the researcher (Gillian Rawlinson) who will analyse the communication between you and your patient within the appointment. Your name will not be attached to the recording but you will be identifiable by watching the video. The study is looking at aspects of communication and is not evaluating your assessment skills.

The video will only be used for this study and will not be discussed with, used by or passed onto others outside of the research team unless you specifically give additional permission for us to use the video for teaching purposes at UCLAN (this is separate to consent to take part in the study).

### *What will happen to the video recordings and demographic information?*

All information collected during the study will be confidential and anonymised, although you may of course be identified from the video-recording of the consultation (your name will not be attached to the saved recording). The evaluation of the recordings will become part of the researcher's thesis and may be presented at conferences and in research journal papers. UCLAN is the sponsor for this study based in Lancashire, UK. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. UCLAN will keep identifiable information about you for 3 years after the study has finished until 2023.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

UCLAN will use your name, and contact details to contact you about the research study, and make sure that relevant information about the study is recorded, and to oversee the quality of the study. Individuals from UCLAN and regulatory organisations may look at your video recordings and research records to check the accuracy of the research study. [NHS site] will pass these details to UCLAN along with the information collected from you. The only people in UCLAN who will have access to information that identifies you will be people who need to contact you to invite you to arrange the recordings of the consultations, or audit the data collection process. The people who analyse the information will not be able to identify you and will not be able to find out your name or contact details.

UCLAN will keep identifiable information about you from this study for 3 years after the study has finished/ until 2023. You can find out more about how we use your information from UCLAN's information governance manager by emailing or (XXXXXXXXXX)

### ***How much time will it take?***

We may need your help in selecting and inviting suitable patients to take part. Video recordings will be incorporated into your normal clinics and should not require additional time, although in some circumstances we may need to ask you to turn the video camera on and off at the beginning and end of your patient appointment(s) or during the consultation should the patient request this.

### ***When and where is the research taking place?***

The video-recording of consultations is expected to start in August 2018 and end by April 2019. The recordings will be done at your usual place of work in your routine clinics and treatment rooms.

### ***What are the possible risks and benefits of taking part in this study?***

**Possible risks:** The audio-video recordings of your consultations with patients will include your confidential discussions and clinical examination of the patient; you may feel uncomfortable or sensitive about this. This recording will only be used by the research team and will be stored securely and without your or your patient's name.

**Possible benefits:** The study findings will help us to continue and develop the musculoskeletal physiotherapy service and improve how we communicate with patients and better understand their needs and experiences, particularly how they engage with self-management programmes. Everyone who takes part will be given the option to receive a summary of the study findings if they so wish.

### ***Do I have to take part?***

No, it is up to you to decide whether you want to take part or not. You are welcome to discuss your participation and what is involved with Gillian Rawlinson. We want everyone to have at least 48 hours to consider their decision. If you agree to take part, we will ask you to sign a copy of the consent form (see form attached).

### ***What will happen if I don't want to continue with the study?***

You can decide not to take part at any stage – even if you have signed the consent form. You don't have to tell us why you have changed your mind. If you change your mind, any information that has been collected prior to withdrawal will be kept and may still be used for analysis.

**If you would like to take part, please contact Gillian Rawlinson [XXXXXX@uclan.ac.uk](mailto:XXXXXX@uclan.ac.uk) or telephone XXXXXX**

### ***What can I do if I am not happy with the study?***

If for any reason you are not happy with any aspect of the study please ask to speak to one of the research team who will answer your questions.

Researcher Director of Studies -Professor Kinta Beaver (*details withheld*)

Research supervisor -

If you remain unhappy and wish to complain formally, you can contact the University officer for ethics.  
(University officer for ethics, Research office, UCLAN, Preston PR1 2HE). Email [officerforethics@uclan.ac.uk](mailto:officerforethics@uclan.ac.uk)  
Tel 01772 892735

# Consent form for Physiotherapists

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**Title of Project** An exploration of self-management physiotherapy programmes (SMPP) in Musculoskeletal Physiotherapy

**Researcher:** Gillian Rawlinson **Academic Supervisors:** Prof Kinta Beaver, Dr Rachel Tarling, Dr Jessie Janssen

## Please initial in box

1. I confirm that I have read and understand the information leaflet (v3, 16/07/2018) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. Data collected before I withdraw may still be used for analysis.
3. I give consent for the AV recording of my physiotherapy consultation with patients that have provided consent.
4. I understand that all data gathered during the study will be stored in accordance with the Data Protection Act (2018) and retained for a period of 3 years in secure data archive at the University of Central Lancashire
5. I understand that reports from this study will not contain any identifiable personal information. Direct quotes may be used, but will not be attributable to any participant.

\_\_\_\_\_  
Name of participant physiotherapist      Date      Signature of participant physiotherapist

### ADDITIONAL REQUESTS:

I would like to receive a summary of the study findings

\_\_\_\_\_  
Name of participant physiotherapist      Date      Signature of participant physiotherapist

\_\_\_\_\_  
Name (person taking consent)      Date      Signature (person taking consent)

Dear Patient

We are writing to confirm your appointment with the physiotherapy team.

On \_\_ (Date) \_\_\_\_\_ at \_\_\_\_\_ (time) \_\_\_\_\_ at \_\_\_\_\_ (location) \_\_\_\_\_.

Also, we would like to inform you of a research study that is currently taking place in the physiotherapy department which aims to explore patients' experiences of physiotherapy. The research team would like to invite you to take part in the study. Further information is attached. The study has ethical clearance from the Health Research Authority.

Taking part is optional. If you are interested in taking part please contact Gill Rawlinson, the lead researcher for this study. Gill will be able to answer any questions you may have. You can contact Gill by e-mail at [XXXXXX@uclan.ac.uk](mailto:XXXXXX@uclan.ac.uk) or telephone XXXXXXXX. Alternatively you can complete the reply slip below and post back it back in the prepaid envelope provided and Gill will get in touch with you.

Kind regards

Signed

The Physiotherapy Team

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REPLY SLIP

*If you would like to speak to Gill to ask questions about the study or register your interest please complete this slip, tear off and post back in the prepaid envelope provided.*

Name \_\_\_\_\_

Physiotherapy appointment date \_\_\_\_\_

Preferred method for Gill to contact you;

**Telephone** Please provide a contact number \_\_\_\_\_

**Email** Please provide an email address \_\_\_\_\_



## **An exploration of self-management physiotherapy programmes (SMPP) in Musculoskeletal Physiotherapy**

I would like to invite you to take part in my research study. Before you decide if you would like to take part, I would like to explain why the research is being done and what it would involve for you.

### ***Why is the study being carried out?***

This study aims to explore physiotherapy care, looking at the communication between you and your physiotherapist and anything you were asked to do at home by the physiotherapist.

### ***Who is doing the research?***

The research is being done by a senior physiotherapist (Gillian Rawlinson) as part of a PhD Degree at the University of Central Lancashire (UCLan), Preston. Gillian does not work at this hospital. The study has been approved by the Health Research Authority

### **Who is being asked to take part?**

Your assigned physiotherapist has already agreed to take part in this study and a selection of their patients have been asked to consider taking part. However, you are under no obligation to take part and your decision will not affect your physiotherapy treatment in any way at all.

I would like to video record your first two physiotherapy treatments then talk to you about your experiences and also ask you to fill in 3 questionnaires. If I have a lot of people wanting to take part I may not be able to talk to everyone but I will let you know this at the time of your first physiotherapy appointment.

### ***What is involved?***

The purpose of this study is to understand patients' experiences of physiotherapy so that I can better support people to get the most out of their physiotherapy care. There are a number of different stages to this study and I would like to ask you to agree to all the stages. The different stages are listed below.

- 1. Video recording your appointment.** I would like to video record your first two physiotherapy appointments. Your physiotherapy treatment will not be affected by this and you will receive your normal physiotherapy care. Please be aware, dependent upon your problem, you may be in a semi-undressed state during the examination by the physiotherapist but you will be advised to bring suitable clothing to change into e.g. shorts or a vest top, if appropriate. No-one else will be present in the consulting room, just you and your physiotherapist. I will look at your videos. I will look at what exercises and advice you were given. Your name will not be attached to the videos but you could be recognised by watching the videos. The videos will only be used for this study and will not be passed onto anyone outside of the research team.
- 2. Filling in questionnaires.** Immediately following your first two appointments, I would like you to fill in a short questionnaire about your thoughts towards what you have been asked to do by the physiotherapists and your attitudes towards these. This should take less than 10 minutes. I will ask you to fill in the same questionnaire again 6 weeks after your second interview. It will be posted to you and I will send you a pre-paid envelope so that you can post it back to me at no cost to you. I will telephone you to remind you to do this in case you forget.
- 3. Talking to you about your experiences.** I would also like to arrange to talk to you several days after your first physiotherapy appointment and again a few days after your second physiotherapy

appointment (a total of 2 interviews). The discussions can take place at a location of your choice, either at the physiotherapy clinic, at another convenient community setting or in your home, whichever you prefer. The interviews will be informal and will last about 45 minutes but may be shorter or longer depending on what you would like to say. You will be asked questions about your physiotherapy appointment. I would like to audio record the interviews then type up what is said.

#### ***4. What will happen to the video recordings, interviews and questionnaire information?***

All information collected during the study will be confidential and your name will be removed, although you may be recognisable from the video-recording of the appointment (your name will not be attached to the saved video recording). The data will be kept securely by the University of Central Lancashire (UCLAN) for up to 5 years. Some of your quotations may become part of the researcher's report and may be presented at conferences and in research journal papers but you will not be able to be identified from any information reported in this way.

#### ***How much time will it take?***

Video recording your appointment will not take any extra time. Immediately after your appointment you will be asked to fill in a questionnaire that will take about 10 minutes to complete. You will be then asked to arrange a convenient time and place for an interview with myself (Gillian Rawlinson) within the next few days. The interview will take approximately 45 minutes but may be shorter or longer depending on what you would like to say.

The same will happen at your second physiotherapy appointment, if you need one. I will video the appointment with your physiotherapist and then ask you to fill in the short questionnaire again after the appointment. I will then arrange a time for your second interview, again this can be at the clinic or at home. About 6 weeks after the second interview I will post you a final questionnaire to complete. I will ask you to post it back in a pre-paid envelope. I will telephone to remind you in case you forget.

#### ***When and where is the research taking place?***

The research is expected to start in January 2018. The overall study will be completed by September 2019.

The video recordings and first two questionnaires will be done wherever you are receiving your physiotherapy treatment. The interviews can be done at the clinic (in a private room) or at your home address, whichever you prefer. The final questionnaire will be done by you at home and sent back in the post.

#### ***Will I receive "out of pocket" expenses?***

Unfortunately, I am not able to pay expenses.

#### ***What are the possible risks and benefits of taking part in this study?***

Possible risks: The video recordings of your physiotherapy consultations will include your confidential discussions and examination by the physiotherapists where you may be in a semi-dressed state, which could make you feel uncomfortable or sensitive in some cases. You will be advised to bring suitable clothes to protect your modesty. The videos will only be looked at by myself and will be stored securely without your name.

Possible benefits: There are no direct benefits for those who chose to take part however it will provide people with a chance to have an opportunity to give feedback and information about their experiences. It is hoped this information will be useful in helping me to understand and improve

communication with patients and in helping people with their physiotherapy treatment. Everyone who takes part will be asked if they would like to have their contact details retained for me to send a summary of the study findings.

### ***Do I have to take part?***

No, it is up to you to decide. Whether you choose to take part or not, it will not affect your physiotherapy care in any way at all. Please take time to read the information. You are welcome to speak to me or your physiotherapist if you have any questions. I want everyone to have at least 48 hours to consider their decision. Please post the reply slip back to me if you are interested in taking part, or email me at [xxxxxxx@uclan.ac.uk](mailto:xxxxxxx@uclan.ac.uk)

If you agree to take part, I will ask you to sign a consent form when you arrive for your first appointment. I will also be available to answer any questions that you may have.

**If you are interested in taking part, please complete the reply slip on the bottom of the letter and post back in the pre-paid envelope. Or you can call Gillian on xxxx or email [xxxx@uclan.ac.uk](mailto:xxxx@uclan.ac.uk)**

### ***What will happen if I don't want to continue with the study?***

You can decide not to take part at any stage – even if you have signed the consent form. You don't have to tell me why you have changed your mind. If you change your mind, you will have up to one week after the collection of the information to ask for this to be withdrawn. If it is within one week, any information that you wish which is already collected will be destroyed and not used. After one week has passed any information that has already been collected up to that date will be kept and used for the study.

### ***What can I do if I am not happy with the study?***

If for any reason you are not happy with any aspect of the study please ask to speak to me or one of the academic supervisory team who will answer your questions. Alternatively you can contact your hospitals' Patient advice and Liaison service (PALS) (see contact below ) (Insert study site Patients advice and Liaison service (PALS) of relevant NHS Trust)

**Researcher's Director of Studies** –*Contact details provided*

Second Research supervisors - *Contact details provided*

If you remain unhappy and wish to complain formally, you can contact the University officer for ethics (University officer for ethics, Research office, UCLAN, Preston PR1 2HE).

Email [officerforethics@uclan.ac.uk](mailto:officerforethics@uclan.ac.uk) Tel 01772 892735)

## **Consent form for patients**

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**Title of Project:** An exploration of self-management physiotherapy programmes (SMPP) in Musculoskeletal Physiotherapy

**Researcher:** Gillian Rawlinson **Academic Supervisors:** Prof Kinta Beaver, Dr Rachel Tarling, Dr Jessie Janssen

I confirm that I have read and understand the information leaflet (v 1 Mar 2018) for the above study. I have had the time to think about whether I would like to take part and I have been given the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without affecting my care. I understand I have up to one week after the event to request that any data already collected is destroyed and not used.

I give consent to take part in all three parts of the study:

the video recording of my first physiotherapy appointment, completion of a questionnaire and a face to face interview:

The video recording of my second physiotherapy appointment, completion of a questionnaire and a second face to face interview;

completion of a third postal questionnaire.

I give consent to the principal researcher gaining access to relevant aspects of my physiotherapy and medical records.

I understand personal identifiable information will be removed from all data gathered during the study and then stored in accordance with the Data Protection Act (1998) for a period of

5 years in a secure data archive at the University of Central Lancashire.

I understand that reports from this study will not contain any identifiable

personal information. Direct quotations may be used, but will not be attributable to any participant.

\_\_\_\_\_  
Name of patient participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of patient participant

\_\_\_\_\_  
Name of person taking consent

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of person taking consent

*1 copy for patient, 1 copy for researcher, 1 copy for NHS notes (original)*

#### OPTIONAL EXTRA REQUEST

If you would like to receive a report of the end of study findings, please place a

Cross in the box and write your correspondence address below.

## APPENDIX 5 - EXAMPLE CASE SUMMARIES

**Participant;** Fred                      **Condition** Chronic back/ leg pain (spinal stenosis)

**Age** 68

	Total time	Time spent on SMPP
Consultation 1	55' 37	05'56' (11%)
Consultation 2	31'47'	9'20'
Other treatments given in first two sessions	Yes <b>No</b>	1 <sup>st</sup> apt Physio Said <i>"we'll try manual therapy next time"</i> but didn't mention it at 2 <sup>nd</sup> appointment. Arranged hydrotherapy for next treatment.
Previous physio	Yes	Expectations – Didn't know what to expect. <i>"I went in open minded"</i> .
Total numbers of items given in 1 <sup>st</sup> appointment	3 exercises (Crook Lying or reclined sitting) + advice to do brisk short walks (4)	
2 <sup>nd</sup> apt	Added pelvic tilt in crook lying.	

Timepoint	SMPP	Equipment needed	Teaching method
Video 1	Exercises <ol style="list-style-type: none"> <li>1. Sitting; Forward flexion- 'whenever you can'</li> <li>2. Lying or long sitting; Knees side to side.</li> <li>3. Lying or long sitting; Alternate knees to chest <i>"5 'ish' of each-'not too many'"</i></li> </ol> <p>Advised to walk short brisk walks on flat surface to get CV benefit without flaring pain – no duration or frequency given</p>	None	Verbal instruction once patient was dressed again, physio demonstration (similar movement but not in lying). At end patient asked physio to summarise and physio re-capped and gave modified demo and patient tried to join in with exercises whilst sitting on edge of plinth (bending forward and knee to chest- minimal movement)

No opportunity for patient to practice exercises in teaching but tried modified version when physio recapped.

Written sheet

Given

Offered

Accepted?

Yes No

Not offered x

Q1 recall written comments

Given me muscle exercises leaning forwards sitting down

Leg movements side to side.

Lay down; knees/legs up –all 3 as often as I want

Going to do some hydrotherapy and back exercises

Interview 1

3 exercises;

None

1. *Sitting –bending forward.*
2. *Lying knees to chest*
3. *Lying/ long sitting; knees side to side.*

Do it once or twice a day depending on how feel. Usually x 10

Consultation Video 2	<p>Checks previous 3 exercises (patient recalls all 3; was struggling with knees side to side as increased pain)</p> <p>Physio adds in pelvic tilting in crook lying –little and often</p> <p>Trials bridging with patient but causes pain so keeps exercise as a simple pelvic tilt.</p> <p>Keep exercises nice and gentle.</p> <p>Also mentions brisk walks on flat surface but no discussion</p>	<p>Verbal; physio does a similar movement to demo but not in lying. Patient practices with facilitation from patient –couple reps only.</p>
Written materials	<p>None</p> <p><i>Q2 (written comments )</i> Carry on with previous exercises. Added one more; lying on back legs slightly bent tensing and lifting until feels uncomfortable. Do as often as I want.</p>	
	<p>7/7 completed all</p>	
	<p>Same</p>	
Interview 2	<p>3 existing plus added new exercise</p> <p><i>Lying down legs slightly bent, tighten up and move up, try and stop yourself from having a pee! Using lower tummy area</i></p>	
Q3	<p>Movement to my back/ hips</p> <p>Stretching exercises.</p> <p>Moving legs from side to side.</p> <p>Stomach exercises Various movement on hydro pool.</p> <p>Balance exercises in hydro pool. Hip exercise in hydro pool.</p>	

Completed 7/7

Slightly better



**Participant Steven**

**Condition** Shoulder pain

**Age** 41

	Total time	Time spent on exercise strategies	Non exercise strategies
Consultation 1	36'20 secs	8' 30' (23%)	n/a
Consultation 2	19'21secs	9'30' (49%)	n/a
Other treatments offered	Yes <b>No</b>		
Previous physiotherapy–	x	Expectations –thought would get SMPP but thought would get some 'hands on' treatment.	

**Time point    SMPP**

- Video 1
- 8. Shoulder flexion slide against wall in standing -*'do these a few times'*
  - 9. Active lateral rotation stretch with pillow under arm. Aim for 10 times – *'do these a few times'*.
  - 10. Isometric Lateral rotation -45 sec hold. Then 2 minutes rest x 5 reps, at least once a day if not twice. (later says *'little and often'*)

Written sheet      Bespoke Physio tools sheets with annotations

Q1 recall written comments      *"I have been given 3 exercises to do at home along with an instruction sheet for said exercises".*

- Interview 1      Described three exercises as above
- 1. Stretch arm up as high as possible against wall and hold it for 'so many 'seconds?'
  - 2. Lateral rotation against wall (exercise 3)
  - 3. Using a broom handle to push arm out with little cushion under arm ( this is making pain worse but still doing it)

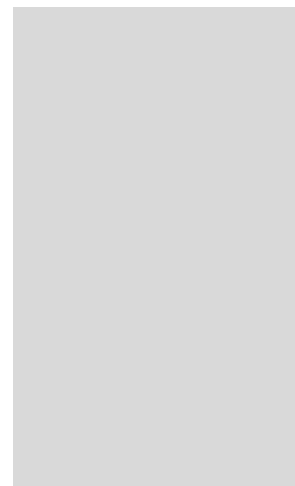
**Equipment needed**

- 1. Smooth wall, Use a ball or duster if no smooth wall
- 2. Small pillow or cushion under arm. Use also a walking stick broom handle (optional)
- 3. Wall to push against

Does exercise no 1. At work as no smooth wall at home.

**Teaching method**

Explained Rationale,  
Verbal instructions,  
Practical demo,  
patient practice x 2 repetitions.



Video 2	Stops exercise 2. (Lateral rotation stretch) as too painful. Adds;		
	4. Bilateral extension rotation with yellow Thera band ; can do in both standing and lying positions)	4. Physiotherapist provided yellow Thera band	Verbal
	5. Lateral rotation with weight in sitting with arm in approx. 60 degree abduction.	Physiotherapist asks patient if they have a weight at home	Practical demo Patient practice

Q2 (written comments) *"I have been advised to stop one of the exercises as it was causing pain. We have started 2 different activities to help strengthen the area before going back to the original exercise".*

Interview 2 *Got another 2 exercises; one with a band that do, both lying down (4) and sitting up and one with a 2.5Kg weight Doing all exercises twice a day.*

Q3 *'Though my physio is over I am trying to build strength into the shoulder so the same injury doesn't happen again.'*

Adherence

Global rating of Change

## APPENDIX 6 - REFLEXIVITY STATEMENT

In Chapter One, I introduced myself as a physiotherapist; qualifying in 1997. I specialised in MSK and have worked in NHS settings, sport, education and now in a strategic leadership position within physiotherapy's professional body. Chapter One also described how the research question arose, experience of seeing and hearing patients' stories of those that had experienced physiotherapy including things such as "all I got was a sheet of exercises" and when I explored if they had done them many patients spoke about issues with adherence.

It is essential to be self-aware and reflexive about my role in the process of collecting, analysing and interpreting the data, and in the pre-conceived assumptions, I brought to the research (Mauthner & Doucet 2003). This reflective and honest account explores how I was positioned in the research study and how I interacted with participants including both physiotherapists and patients.

*I was born and brought up as the youngest of four children on a farm in rural Lancashire. My upbringing was happy and privileged in the sense that I travelled extensively and had a good education and I enjoyed playing sport. We were encouraged to play out, be creative, brave and take responsibility and had a keen sense of right and wrong. It is in these early years where I feel developed my resilience and 'never give up' attitude role modelled by my parents. I have always had self-determination, motivation and have been focussed on what I want to achieve.*

*When I was 13 years old, I attended a hospital appointment with my granny who was having physiotherapy after breaking her wrist. It was that experience that ignited my early desire to become a physiotherapist. It seemed to be the perfect combination of my love for science and human anatomy with people and sport and exercise. I was the first to go university in my family and I thrived on the opportunity to live in a big city, meeting new people and understanding how other people lived and experienced the world; something that has continued into my career. I graduated from the University of Liverpool as a Chartered physiotherapist in 1997. I spent the early years of my careers specialising in MSK physiotherapy and sports medicine before moving into a split clinical and academic role. During this time as I was now a busy working mother of three and I began reflecting on the physiotherapists relationship with patients and I became increasingly interested psychology of communication, human behaviour and adherence. I shared an office in the university with an occupational therapist and this gave me insight into some of the cultural stereotypes of physiotherapists; sometimes as bossy, dictatorial clinicians telling people what to do and on reflection it sometimes was not far from the truth in both my own practice and that which I observed.*

*I reflected on this moment regularly and I increasingly came across patients for whom physiotherapy had not worked and when asked them what had happened in their physiotherapy appointment people gave responses such as 'I was just given a sheet of exercises' and when asked if they had done the exercises the responses were mixed. At this time, I was becoming increasingly interested in public health, and health inequalities. My awareness of the contrast between my own privilege and the lives of many of my patients increased. I worked in one of the most deprived areas*

*of the UK where I continued to see a range of people with increasing levels of complexity. It was evident that people made choices differently to me because they had their own experiences, beliefs, challenges and circumstances. Physiotherapists often were presumptuous that everyone thought and behaved the way they did and thus would potentially miss out on treatment that they needed and deserved.*

*As I studied my research aims and objectives I became increasingly aware of the role of health psychology and aware of the huge deficit in mine, and my student physiotherapists, training in health behaviours. Even though most of physiotherapy relies on patients engaging with treatment, teaching and addressing behavioural theory and adherence is often under delivered in physiotherapy education.*

*During the journey for my PhD I have learnt an enormous amount, about human behaviour adherence, health inequalities and my own work ethic, values and bias. Change has been a constant during my five years whilst studying for this PhD both in my supervisory team and in my career, but this has all allowed for continuous reflection and learning.*

*In the latter years of my PhD, I left academia to take up a strategic leadership role at the Chartered Society of Physiotherapy. Here I could influence physiotherapy education, practice, and development at a national level. Also, during this time I undertook the Athena Women in Leadership Programme at the Kings Fund. This afforded me an invaluable opportunity to meet and learn with other women in senior health and social care leadership. This afforded me time to learn from inspirational leaders in healthcare and take time to explore my own values, beliefs and experiences and understand how they shape me as a physiotherapist, a researcher a clinician and a leader.*

*I am a pragmatist, an active learner who likes to get on and make things happen. Although I enjoy reflecting, I tend to do this 'in action' as I tend to spend little time formally preparing or thinking before undertaking tasks, unless they are very new or unfamiliar. After the first year of my PhD my first supervisor who was a similar pragmatist left and I gained a new clinical supervisor. She was an experienced qualitative researcher and encouraged me to pause, think, plan and write much earlier in my PhD journey. Initially I found this containing and frustrating. I described it like being put in a box where I could not get on and do or try things out. I felt like I was losing ground and almost going backwards. On reflection however it was invaluable. It made me slow down to enable me to speed up. It made me think about the bigger picture, immerse myself in the literature and most probably avoid further pit falls further down the line. I also noticed that my director for studies (DOS) also recognised my frustration and flexed her style which allowed us to slowly begin to better understand our conflicting working preferences. Soon after my first DOS left the university, another physiotherapy supervisor left, leaving only one of my original team that has stayed with me. Although she too left the organisation she stayed on the supervisory team and her constant has been invaluable. She is a health psychologist and has brought enormous insight and a unique perspective to my work and thinking. In the final year, my new DOS retired. Although this was a huge disappointment and a loss to me and our team, I felt I had come far enough to take learning and thinking from her as I take the last months forward with one of my team who*

*is now my DOS. I feel I have coped well with the changes as I thrive on change, difference, and new perspectives. I get easily bored and therefore I feel I have gained not the support and insight from three supervisors but five experiences clinicians and researchers along the way and for that I will be eternally grateful. Many students would have been frustrated or even derailed at the amount of change but my resilience and optimism and passion for my profession and my patients has kept me steady.*

*I do not naturally spend time writing formal reflections, but I do regularly reflect in action. However, Barratt et al (2020) challenge that reflexivity is beyond the process of reflection, which is more goal oriented, stating that reflexivity is a continual process that involves reflection to continuously construct (and shift) our understanding and social realities. My workload during my PhD has been incredibly high at times, which left sometimes left me little time for thinking space. However, I found regularly making audio voice recordings of my thoughts and feelings throughout the process and these will be integrated into this reflexivity statement alongside notes from interviews and observations (Korstjens & Moser 2017).*

*My research question emerged over time, following reflection on both my clinical, academic and personal experiences. I initially wanted to develop a model to better support communication, engagement and adherence to physiotherapy but as I searched the literature, I began to realise that there was already many studies looking at interventions to increase adherence (that had not proved particularly effective). More research was needed to understand what people were being asked to do and how adherence played out in practice before thinking about potential interventions.*

*I explored health behaviour theory to choose a suitable model or framework in which to structure my work and to ensure I had a broad-based understanding of the topic. I had become aware of the behaviour change wheel from a conference on low back pain and after discussing it with my supervisors became interested in exploring its use. This illustrated the power of networks and experiences as I so was able to talk to other researchers who had used the model to provide me with wider insights as to how it could be used. At this point I also became aware of my moving into unknown territory of health psychology and being afraid I would be out of my depth with no formal psychology training. I was conscious of being seen as an imposter trying to utilise theory designed by psychologist when in fact, I was a physiotherapist. However, on reflection I enjoyed the challenge of learning something new and stepping out of my comfort zone. I could see that the much of this work on behaviour change was intended to support the improved delivery of health services across professions.*

*After undertaking a review of health behaviour models and a literature review, I planned to begin designing my study, gaining ethical approval, and beginning data collection. It was at this point that my DOS first changed, and this provided me with an opportunity to reflect on my learning to date. I was guided to undertake a review of philosophical positions and research approaches. Initially this was frustrating as I am an active learner, easily bored and wanted to progress with data collection and I saw this as a backward step. The writing was time consuming, but I*

*knew I was capable and needed to stay focussed and take a systematic approach. Once I had done this and had developed my thinking, I was able to turn my attention to designing a study that met my objectives and addressed gaps in the literature. One of my biggest challenges was keeping the size of my study manageable for a single-handed PhD researcher whilst ensuring maximum validity and credibility.*

*I moved onto completing my NHS Health Research Authority (HRA) ethics application. This was the first time I had done this. I enjoyed this process as it enabled me to plan and work through the specifics of the protocol and processes for data collection. As discussed in the methods chapter, ethics approval was a challenging process lasting almost a year. My initial ethics application was not approved on the basis that I could not collect data at an organisation where I worked for fear of colleagues being coerced into participation and potentially being judged. Despite at the time being very frustrated, and my supervisory team challenging the decision on my behalf, on reflection it was the right decision. We found out that the person on the ethics committee who was challenging the application was a physiotherapist and it felt like they were being deliberately obstructive considering they were a physiotherapist. Later, when I came to collect data and review the videos of physiotherapists within the appointments, one of my lasting feelings was that I experienced feelings of judgement of my physiotherapy peers and their practice and that made me feel guilty and uncomfortable. On reflection that ethics committee had made the right decision.*

*I was excited to start my data collection, the first phase of which was visiting the departments building identify patients and beginning recordings of the appointments. My presence in the department as a physiotherapist and as a researcher was noticeable. Knowing I was a physiotherapist myself, the physiotherapist participants would often share their feelings on how their clinics were panning out that day, the decisions they had made and how they felt about the patients. This initially felt difficult as I did not want to be part of the process just an observer externally, however I could not be rude or ignore conversations and it became clear that I could not entirely divorce myself from the situation. I always aimed to reiterate that I did not want to observe the appointments directly as I wanted to minimise the social observer effect and allow practice to continue as normally as possible. Giltrow, Gooding, Burgoyne & Sawatsky (2009) consider that it is impossible for the researcher to be disembodied from the research process. It was naïve of me to think that my own values and beliefs and experience as a clinical and academic physiotherapist would not affect my interpretation, even if I perceive that am a fair and objective individual. I chose to be in the departments at the time of the video and for the first few appointments sat amongst the physiotherapists. Early on I noticed I easily got into conversations, being asked about what I was doing and what I was finding. I knew that I could not discuss findings this at this stage, so I began to deliberately distance myself in the department, observing at a distance during the appointments to avoid conversations that got difficult or risked increased bias.*

*I began to realise that my immersion in the department also helped me to understand and 'feel' what was happening in the departments. I observed how practice changed when physiotherapists were busy or behind schedule, the mood in the department listening to radio on in the background or feeling and that this was all part of the context or*

*setting. I made a conscious decision not to watch any of the videos before the interviews as I did not want to influence recall or patients discussions by being aware of what SMPP programmes entailed.*

*As I eluded to, I also noted some feelings of judgement about the physiotherapist's practice on watching the videos for the first time. I was sometimes shocked and surprised by what I saw but purposefully tried to detach myself and remember the wider context of practice that I was not privy to and my need to stay distant from judgements about what happened. I also increasingly felt that I was missing the physiotherapists' voice in the research. Originally, I did intend to interview physiotherapists, but I was limited in what was possible. I have reflected on this as a limitation and an area for further research.*

*As I moved onto the interviews, I was confident that I would undertake these well. Being a physiotherapist means taking a clinical history, interviewing the patient about their condition and I had also recently spent time training others in motivational interviewing approaches using techniques including open questions, summarising, and reflecting back. I had practised with my director of studies and others but one of the first few interviews was particularly difficult. I found it difficult sometimes not to engage in conversation as a physiotherapist as patients often asked my opinion on what had happened or what I thought about their future. It was ethically important to share with patients that I was a physiotherapist however on reflection I wonder if I had not disclosed this the interviews would have taken a different path. I often found myself wanting to empathise with people and sometime struggled to gain deeper understanding of why patients felt a certain way about things as it felt awkward when they said nothing. I tried to rephrase and felt I was not getting anywhere. At the second interview I explored deeper into the patient thinking and beliefs using open questions and felt I gained a greater depth of understanding.*

*I spent time reading further and researching interviewing skills. I refined my notes and listened back to my two interviews to date and developed some key prompts to help if it ever felt as if I was over probing and not getting the information I needed. I was advised to research police interviewing styles and this helped me step back and think about my style of questions and tendencies to step in and not leave uncomfortable pauses.*

*One thing I had not anticipated was how much insight I gained from being in the patients' home to do the interviews. It revealed a lot about the patients beyond what they said. I was able to see inside their homes and how they functioned in their own environments. Many chose to demonstrate the exercises they had been given or show me where their exercise sheets were kept. I was able to get insight into how and where they exercised as well as meet patients' families and friends who often also commented on their physiotherapy progress. On reflection I had not anticipated this richness of interviewing people in their own homes in relation to how they engaged in their home based SMPPs. It was interesting to reflect on how well I got to know patients in a short time. Because I was in their home environment, it felt familiar, being able to notice discussions from the last time or hearing patients' personal situations. In contrast on occasions, I also felt vulnerable. I started interviews in the winter and often went to see people after I, or they, had finished work. Arriving at someone's home in an unfamiliar area, not knowing them was*

*sometimes uncomfortable and I realised the vulnerabilities of being a lone researcher out in the field. I utilised a system to text both my DOS and my husband to ensure people knew where I was but the balance of the richness of seeing people in their own homes and knowing they were comfortable was balanced with times of me as a researcher feeling very vulnerable and exposed.*

*The next step on the PhD journey was data analysis. I enjoyed this stage, watching the videos and discovering what had 'really happened' in the appointments that the patients had been telling me about. I had anticipated that the presence of the video and knowing they were being observed would have changed the physiotherapists' behaviours. My first reflection on watching the films was that the appointments felt familiar and 'normal compared to the many years I have spent working in and observing MSK out-patient physiotherapy departments. At no point did I get the sense that a physiotherapist was 'performing' which surprised me. I also got a keen sense of the departments, the culture, and the physiotherapists. I also reflected on the how much I relied on administrative staff who gave me time and effort to support patient recruitment. My analysis was immersive initially then I began to see how I needed to take a more structured approach to my analysis. Analysing the videos took a large amount of time and my planned approach changed. Initially I planned to take checklist approach not transcribing the videos however I felt that this approach did not capture the richness of the video recordings. As I continued my analysis at times wished I were able to take a more conversational analysis approach noting affective language, emotions, and discourse however it was beyond the scope of the study and allowed me to see that there was much more to my data that could potentially be explored at a later date. My analysis took the longest period and was an iterative process, moving forwards and backwards.*

*I feel as though I have grown significantly as a researcher during this journey, and this particularly struck me when I came to consider the research findings in the context of the Practice. I realised that I had tended to initially be confined by the frameworks and models that I was using but then began to see that the complexity of human interaction played a much bigger part. I grew in confidence in taking more analytical steps and exploring psychological theories. Focussing on a specific time and person suggests that adherence factors may be independent, detached from the world around them. However, the consultations illustrated the interface between two different people with distinct roles, experiences, and beliefs. The way the patients and physiotherapist interacted was dynamic and was influenced by each other and the context they were in.*

*Another overriding reflection is the struggle I sometimes had to slowdown. I often wanted to plough on but learnt as I progressed to understand the balance in between taking time but staying focussed on goals and outcomes and moving forward. Doing a PhD has felt a very lonely journey at times, particularly in my last years when I left my academic role and needed to fit in my PhD on top of my full-time job. Despite being surrounded by people, few people are interested in the detail and carrying around this mental thought of all your data, findings, and knowledge, trying to make sense of it whilst carrying on normal life was at times surreal. My final years were through the coronavirus pandemic which at times was mentally challenging, working long hours from home then working long hours on my*



*PhD with little respite. I have reflected as have others on my resilience to never give up and to keep going. I have learned an enormous amount about myself, the research process, my research skills and developmental needs and my own self-determinations and resourcefulness. Perhaps most rewarding is that I have never lost interest or enjoyment in my research as subject or my passion for physiotherapy and supporting patients. I will be eternally grateful for those patients, physiotherapists and administration teams at the NHS organisations and my academic supervisors who have given me their time.*

## APPENDIX 7 - CONFIRMATION OF ETHICAL APPROVAL



Health Research  
Authority

**North West - Haydock Research Ethics Committee**  
3rd Floor - Barlow House  
4 Minshull Street  
Manchester  
M1 3DZ

Telephone: 0207 104 8012

23 July 2018

Mrs Gillian Rawlinson  
Senior Lecturer Physiotherapy  
University of Central Lancashire  
Brook Building  
Preston  
PR1 2HE

Dear Mrs Rawlinson

**Study title:** An exploration of self-management Physiotherapy programmes (SMPP) in musculoskeletal (MSK) out-patient physiotherapy.  
**REC reference:** 18/NW/0439  
**Protocol number:** not applicable  
**IRAS project ID:** 245772

The Research Ethics Committee reviewed the above application at the meeting held on 10 July 2018. Thank you for attending with Ms Jessie Janssen to discuss the application.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact [hra.studyregistration@nhs.net](mailto:hra.studyregistration@nhs.net) outlining the reasons for your request.

Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

### Favourable opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

### Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for HRA and HCRW Approval (England and Wales)/ NHS permission for research is available in the Integrated Research Application System, at [www.hra.nhs.uk](http://www.hra.nhs.uk) or at <http://www.rdforum.nhs.uk>.

**Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.**

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

#### Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database. This should be before the first participant is recruited but no later than 6 weeks after recruitment of the first participant.

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact [hra.studyregistration@nhs.net](mailto:hra.studyregistration@nhs.net). The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

#### Ethical review of research sites

##### NHS Sites

The favourable opinion applies to all NHS sites taking part in the study taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office **prior to the start of the study (see "Conditions of the favourable opinion" below).**

#### Summary of discussion at the meeting

##### Social or scientific value: scientific design and conduct of the study

A discussion was had about whether the study was scientifically robust or whether it was scientifically weak, but good enough for a PhD. The Committee concluded that a PhD study should be held to the same standards as any other piece of research when it came to scientific integrity. A PhD study could not be allowed to waste participants' time on studies with dubious science.

Videotaping the meeting between therapists and patients might lead to therapists being on their "best behaviour" which could confound the study. The Committee discussed this and concluded the only way for observations to not affect what was being observed was to do them without consent which would not be ethical. Therefore, this was the only acceptable way.

The second concern raised was whether the third questionnaire, asking patients about their adherence to the plan, would give meaningful results. The Committee asked what role this measure would play in the study.

The researchers explained that this questionnaire was not being used to provide an accurate measure of adherence. Rather it was being used to gain another perspective and another time point to compare with the recorded appointment.

The Committee considered the role of the third questionnaire and concluded it was acceptable in this study.

The Committee asked how confident the researchers were that the study would provide robust evidence.

Since the study was predominantly qualitative, the researchers said they were confident of meaningful results. There would be a lot of data to explore, from the videos, questionnaires and interviews, which would give a very good picture of patient self-management.

The Committee asked if 20 patient participants would be sufficient to provide data saturation.

The researchers said that was the intent, but if new themes were still emerging then they would look to recruit more patients.

The Committee considered the science of the application in light of the researchers' responses. The conclusion was that the science was robust and that the researchers were aware of the limitations and would reflect those in the study write up.

#### **Recruitment arrangements and access to health information, and fair participant selection**

The study had previously been given two unfavourable opinions. The first reason was concern over the potential for coercion since the Chief Investigator would recruit from her own patients. The Committee did not see that as an insurmountable issue, since many researchers recruited from their own patients, and asked the researchers what changes had been made to the study as a result of the unfavourable opinions.

The researchers said they had removed the site at which the Chief Investigator had been employed. That was now actually a moot point as the CI no longer worked there.

The Committee were satisfied that the potential for coercion had been reduced but asked if there was anything else about the recruitment process that might make participants feel coerced into taking part.

The researchers confirmed they would not know any of the people being asked to take part in the study.

The Committee was satisfied that the potential for coercion was as low as possible.

The Committee asked if there would be diversity among the patient cohort.

The researchers acknowledged that the patient cohort might not be as diverse as would be ideal. However, the study was limited by there being a single researcher. With that in mind, the inclusion and exclusion criteria had been designed broadly to enable as many patients as possible to be eligible to take part. At the end of the study, the diversity, or non-diversity, of the patient group would be reflected upon in the write up.

The Committee concluded everything possible had been done to make the patient group as diverse as possible.

Please contact the REC Manager if you feel that the above summary is not an accurate reflection of the discussion at the meeting.

#### Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [sponsor indemnity insurance]	1	01 May 2018
Interview schedules or topic guides for participants [appx 8 interview schedule 1]	1	01 May 2018
Interview schedules or topic guides for participants [appx 9 interview schedule 2]	1	01 May 2018
IRAS Application Form [IRAS_Form_24052018]		24 May 2018
Letter from sponsor [lone worker guidance ]	1	01 May 2018
Letters of invitation to participant [appx 3 email to physio participants]	1	01 May 2018
Letters of invitation to participant [Patients]	1	01 May 2018
Non-validated questionnaire [apx 7.1 questionnaire 1]	1	01 May 2018
Non-validated questionnaire [appx 7.2 questionnaire 2]	1	01 May 2018
Non-validated questionnaire [appx 7.3 questionnaire 3]	1	01 May 2018
Non-validated questionnaire [appx 10 Physio demographics form ]	1	01 May 2018
Non-validated questionnaire [appx 10 patient demographics form ]	1	01 May 2018
Other [previous unfavourable opinion ]	1	01 May 2018
Other [appeal opinion ]	1	01 May 2018
Other [Application clarification]		27 June 2018
Participant consent form [appx 2 physio consent form]	1	01 May 2018
Participant consent form [appx 7.2 questionnaire 2]	pt consent form	01 May 2018
Participant information sheet (PIS) [appx 1 physiotherapists]	1	01 May 2018

participant information sheet]		
Participant information sheet (PIS) [appx 4 patient participant invitation letter]	1	01 May 2018
Research protocol or project proposal [protocol ]	v1	01 May 2018
Summary CV for Chief Investigator (CI) [PI CV]	1	01 May 2018
Summary CV for supervisor (student research) [supervisor cv]	1	01 May 2018

#### Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

#### After ethical review

##### Reporting requirements

The attached document "**After ethical review – guidance for researchers**" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

#### User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: <http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/>

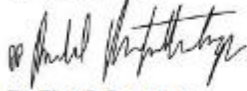
#### HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at <http://www.hra.nhs.uk/hra-training/>

18/NW/0439	Please quote this number on all correspondence
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**With the Committee's best wishes for the success of this project.**

Yours sincerely



**Dr Tim S Sprosen**  
Chair

E-mail: [nrescommittee.northwest-haydock@nhs.net](mailto:nrescommittee.northwest-haydock@nhs.net)

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments

**"After ethical review – guidance for researchers"**

Copy to: Prof Cathy Jackson, UCLan  
Ms Michelle Stephens, Blackpool Teaching Hospitals NHS Trust

North West - Haydock Research Ethics Committee

Attendance at Committee meeting on 10 July 2018

Committee Members:

Name	Profession	Present	Notes
Mrs Moyra Ann Baldwin	Retired Senior Lecturer - Oncology	No	
Miss Isabelle Butcher	PhD Researcher	Yes	
Mr Stephen Edgar	Designer	No	
Dr Michael U Eshiett	Consultant Physician in Neurological Rehabilitation	No	
Mrs Lesley France	Statistician	Yes	
Mr Simon Hill	Pharmacist	Yes	
Dr Ben Johnson	Vice-Chair - Consultant Psychiatrist	Yes	
Dr Ezzat Kozman	Consultant Gynaecologist	Yes	
Mr Charles Otim	Research Support Officer	Yes	
Dr David Pilling	Consultant Radiologist	Yes	
Miss Anna Sekula	Nurse	No	
Dr Valerie E Siddall	Retired Senior Manager - Pharmaceutical Industry	No	
Dr Tim S Sprosen	REC Chair - Epidemiologist	No	

Also in attendance:

Name	Position (or reason for attending)
Ms Rachel Katzenellenbogen	REC Manager
Ms Emily Robinson	Student Observer

Written comments received from:

Name	Position
Dr Tim S Sprosen	REC Chair - Epidemiologist