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Research Article

Defining Criteria for Quality and Equity in Prehabilitation Services Before Cancer Surgery: A Delphi Study Informed by Lived and Professional Experience

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Background: Prehabilitation before cancer surgery has been recommended for implementation in clinical practice to improve patients' functional and psychological wellbeing to improve outcomes. Currently, in the United Kingdom, cancer prehabilitation interventions vary in how and where they are offered, potentially widening health inequalities and little is known about patient preferences. This first of a kind study aimed to invite both people with lived experience of cancer and healthcare professionals to define a set of criteria for quality and equitable prehabilitation interventions for cancer treatment.

Methods: A modified Delphi technique was implemented over three rounds of online questionnaires with prehabilitation professionals (experts by profession, $n = 8$) and people with lived experience of cancer (experts by experience, $n = 14$) in the United Kingdom. The first round of criteria statements was developed in a series of co-design workshops. In each Delphi round, participants were asked to rank the statements on a 5-point Likert scale and make suggestions for refinement or additional statements. Consensus was defined as at least 75% of participants voting to indicate agreement on each statement.

Results: A total of 22 participants voted in Delphi questionnaire with a 76% response rate. 63.6% of participants were 'experts by experience' and 36.4% were 'experts by profession'. The questionnaire started with 54 statements and through three rounds of voting, refinement and addition, 56 statements reached consensus. Over three rounds, six statements did not reach consensus. Criteria were grouped into seven themes: *developing and delivering prehabilitation* (covering prehabilitation definitions, safety and evaluation processes and interactions with patients), *emotional health, nutritional, physical and multimodal interventions, integrating community-based care and addressing inequalities*.

Conclusions: This is the first research to develop a set of criteria for evaluating and designing equitable prehabilitation before cancer surgery in the United Kingdom. The results will be of interest to researchers, healthcare professionals and service providers interested in designing, evaluating and delivering prehabilitation before cancer surgery.

1. Introduction

There are around 375,000 new cancer cases in the United Kingdom (UK) every year, and one in two people with cancer will have surgery as their primary cancer treatment [1]. While survival is strongly linked with the stage at diagnosis, it is also dependent on the success of the treatment and subsequent recovery [2]. Prehabilitation (sometimes referred to as 'prehab') has been defined as a process on the cancer continuum of care that enhances a patient's functional capacity between the time of cancer diagnosis and the beginning of acute treatment to improve postoperative outcomes [3]. Prehabilitation before cancer surgery typically includes physical, nutritional and psychological interventions, which are delivered alone or in combination (referred to as 'multi-modal') to improve patients' functional and psychological capacity before surgery to improve outcomes [4]. Interventions are universal (suitable for all people with cancer), targeted (for people with cancer with acute chronic or latent adverse effects from the disease or treatment) or specialist (for patients with complex needs, including disabilities) [4].

Prehabilitation has the potential to reduce the length of hospital stay by 1–2 days [5] that can reduce healthcare costs. Indeed, the Prehab4Cancer initiative in Manchester, UK, has shown a threefold return on investment in prehabilitation in saved healthcare costs [6]. Prehabilitation can reduce severe postoperative complications (17.1% prehab vs. 29.7% standard care) [7], improve quality of life and long-term health after treatments [8, 9], and prehabilitation programmes are increasingly recommended as part of the cancer pathway [4, 10]. Principles and guidance for prehabilitation for cancer developed by Macmillan Cancer Support, National Institute for Health and Care Research (NIHR) and The Royal College of Anesthetists (RCoA) [4] were launched in the UK in 2019 and have been welcomed by many National Health Service (NHS) sites [10]. The guidance called for action in several areas including integration of prehabilitation into clinical pathways for people with cancer, examples of implementation and the development of quality assurance and improvement frameworks [4].

Currently in the UK, cancer prehabilitation interventions vary in how and where they are offered to patients and the evidence base for prehabilitation in cancer care is inconsistent [10–13]. Many UK healthcare providers offer prehabilitation programmes as part of cancer care, many of which prepare patients for surgery. Implementation of prehabilitation is often supported by local cases for change, aiming to integrate personalised care in cancer diagnosis and treatment pathways [14–17]. For instance, Prehab4Cancer in Manchester, UK, is one of the first cancer prehabilitation programmes to describe their implementation strategy, programme evaluation and intervention details [18]. The complexity of prehabilitation interventions in cancer care, limited evidence of (cost)-effectiveness, limited resources and unawareness of the importance of prehabilitation by both patients and healthcare professionals has been recognised as a gap and barrier to implementation [19, 20]. Facilitators of prehabilitation have been found to include personalised programmes, considerations for accessibility [19] and peer support [19, 20]. A recent editorial in the British Medical Journal by Giles and Cummins [20] highlighted the potential widening inequalities resulting from prehabilitation due to disparities in how interventions are delivered to patients and how they gain access. Furthermore, patient preferences for prehabilitation have been found to vary [21] and very little is known about what patients want from prehabilitation interventions [22].

This research is part of the national PARITY study: *Prehabilitation for Cancer Surgery: Quality and Inequality* (NIHR134282) [23]. PARITY aims to map prehabilitation services available before cancer surgery, discover best practices and identify how delivery can reduce inequalities in access and provision. Significant gaps remain in the prehabilitation evidence base—particularly regarding how prehabilitation is implemented, who is involved, its effectiveness and what matters most to patients. Ensuring fair and equitable access to prehabilitation is a key concern.

Here, we present findings from a modified Delphi study completed by people with diverse characteristics and lived experience of cancer, as well as healthcare professionals involved in prehabilitation. The findings informed subsequent stages of PARITY, including a UK wide mapping exercise and in-depth case studies. Together, these components will inform the development of recommendations for stakeholders (e.g., policymakers, healthcare providers and charities) filling gaps in what is needed to develop equitable prehabilitation services. The PARITY protocol was registered on Research Registry, ID: researchregistry8591 [24].

The Delphi technique is a structured process using iterative questionnaires to gather consensus of 'opinion, judgement or choice' [25]. It is widely used in healthcare to determine practice guidelines, assessment tools, treatment strategies, protocols and for selecting healthcare quality indicators [26, 27]. Delphi methods should allow anonymous participation across multiple rounds of questions and responses and provide feedback between rounds [28, 29]. A modified Delphi technique, as used in this study, begins with preselected statements [28] and is recommended for improving the understanding of problems, opportunities and solutions [30] and for when there is limited evidence on a particular research question [29]. This study follows established guidelines for planning, using and reporting on Delphi methods by Boulkedid et al. [27] and recommendations by Savic and Smith [29].

2. Methods

In a modified Delphi questionnaire, 22 participants with a lived experience of cancer ($n = 14$) and professional experience ($n = 8$) voted on a set of statements in a series of rounds to reach consensus on criteria to evaluate quality and equity in prehabilitation interventions before cancer surgery. The statements that were included in the first round of the Delphi questionnaire were created by 29 people in a series of co-design workshops. In the co-design workshops, the participants collectively decided that those with lived experience (through direct experience and being a friend, relative or carer to someone with cancer) would prefer to be known as '*experts by experience*' and the healthcare professionals would be known as the 'experts by profession'.

2.1. Participant Recruitment.

2.1. Participant Recruitment. The recruitment criteria are shown in Box 1.

Participants were invited opportunistically (via word of mouth, social media, NIHR Research for the Future, Be a part of Research) and purposefully through community networks (e.g. Cancer Care, Kind Communities) to reach commonly under-represented groups. A British Sign

Language invitation was also shared. Reimbursement for attending each workshop and participating in the Delphi questionnaire was offered in line with NIHR's guidance [31]. Professionals involved in prehabilitation were invited via emails, social media and the Centre for Perioperative Care (CPOC). Quota sampling, with a pre-registration demographic form, ensured a diverse group of participants.

Lancaster University Faculty of Health and Medicine Research Ethics Committee Approval was obtained (FHM-2022-1063-RECR-1).

2.2. Modified Delphi Process

2.2.1. Workshops. Participants attended three co-design workshops, which took place in November and December 2022, and January 2023. Initially, this included 17 experts by experience and 12 *experts by profession*.

In the first two workshops, the participants took part in a series of varied, interactive and flexible activities to formulate a set of statements to be transferred to a Delphi questionnaire. For the final workshop, the participants worked in groups to discuss, refine, edit, and remove or add statements. The methods used in the co-design workshops are reported in a separate forthcoming paper.

Following the workshops, participants categorised 54 statements into six themes: *emotional health, physical health, nutrition, community, service delivery* and *addressing inequalities*.

2.2.2. Survey Structure and Delivery. The co-designed statements were used to form an online modified Delphi questionnaire, shared with the same group of experts by experience and profession in three rounds of voting. The online method enabled participants from the co-design workshops to respond remotely from varied geographical locations at times that suited them. There is no optimum number of Delphi panellists in the literature [32]; however, a heterogeneous panel of over 20 was considered sufficient [33].

Participants were invited via email to complete an online questionnaire using Microsoft Forms [34]. Figure 1 shows the process used for preparing and sharing the questionnaire. Full questionnaires are included in the Supporting Information (available here). Participants rated the importance of each criterion item for evaluating prehabilitation services on a 5-point Likert scale (1 = not important; 5 = very important). Up to two reminder emails were sent, including round-specific response rates and summaries of statement changes based on previous rounds and feedback.

Participants were not made aware of their previous individual responses. All rounds included a free-text section for comments and suggestions. A £50 incentive was provided for completing all three rounds, requiring participants to provide their name at each round.

Tables 1 and 2 show participant attrition across the workshops and the Delphi rounds. Reasons were not collected for attrition but anecdotally drop-off was linked to clinical pressures, ongoing cancer treatment and clashes in scheduling and COVID-19 isolation during workshop periods.

2.2.3. Data Analysis. Consensus was calculated using the proportion of participants rating each item as important (Likert scale rating 4 or 5) or unimportant (1 or 2). In line with previous studies, consensus was initially defined as at least 55% of participants rating an item as important or very important, or unimportant or not at all important [29, 35]. This was changed to 80% during analysis. The strength of consensus was ranked as adequate (75%–79%), strong (80%–84%), very strong (85%–89%) or overwhelming (90%–100%). Free-text comments were assessed and used to revise statement irrespective of consensus in rounds 1 and 2. Statements with adequate consensus (75%–79%) were included in the next round; those with strong, very strong or overwhelming consensus (80%–100%) were not included to enhance efficiency and focus on new statements or those that required further deliberation [36].

Revised statements were assessed for stability across rounds. The research team, including Patient and Public Involvement (PPI) researcher, reviewed comments to identify themes. Between-group tests were applied (experts by experience vs experts by profession), which showed no significant differences and were not reported. Ad hoc sensitivity analysis used interquartile range: where the range was less than 1 and the statements did not require revision, consensus was assumed. 'Prefer not to say' and missing entries were excluded from calculations. Final criteria were grouped into key themes for evaluating prehabilitation quality. All data analyses were performed using IBM SPSS Statistics Version 28 [37].

2.2.4. PPI. Seven public contributors with lived cancer experience as a patient, carer or friend of a cancer patient joined the PARITY PPI panel in October 2022. The PPI panel were not involved in co-design workshops or Delphi questionnaire. The PARITY PPI lead and project co-investigator AP was consulted throughout to ensure statements were accessible.

After the Delphi concluded (May 2023), the PPI panel reviewed the criteria. Further reflections from panel members included potential biases that might arise from the study limitations and dissemination of results. These insights are presented in the discussion, linking with a wider literature on prehabilitation in cancer care and NHS implementation.

3. Results

3.1. Participant Characteristics. Table 1 includes participant characteristics at each of the workshops, and Table 2 shows characteristics for each round of the Delphi questionnaire, including workshop attendance and questionnaire response rates. At the beginning of the Delphi questionnaire, the experts by profession stated that their roles in prehabilitation were as follows ($n = 1$ for each):

- Service Lead/Advanced Clinical Practitioner,
- Prehabilitation Dietitian,
- Clinical Psychologist,
- Specialist in Patient Advocacy and Engagement,

Experts by Experience:
- **Patients, carers, friends and family members interested in helping improve prehabilitation**.
- **People from anywhere in the UK**
- **People over the age of 18**
- **Participants did not have to be familiar with research projects or have direct experience of cancer treatment**.

Experts by Profession:
- **Healthcare professionals interested in improving prehabilitation services**
- **From anywhere in the UK**

People traditionally underrepresented, with one of more of the following, were strongly encouraged to take part:
- From an ethnic minority background
- Part of the LGBTQ + community
- Living with a disability or long-term health condition

Box 1: Recruitment criteria for participants.

Figure 1: Stages of the Delphi questionnaire process showing voting, analysis and communications to participants.

Table 1: Participant characteristics: codesign workshops.

	Experts by experience *N* = 17	**Experts by profession** *N* = 12
Age		
18–24	0	0
25–34	1	6
35–44	6	4
45–54	3	1
55–64	1	1
64–75	4	0
75–84	1	0
85 and above	1	0
Gender		
Male	9	0
Female	8	12
Ethnicity		
White/White British	8	10
Mixed/multiple ethnic groups	2	1
Black/African/Caribbean/Black British	0	0
Asian/Asian British	5	1
Other (Welsh, Italian)	2	0
Prefer not to say	0	0
Household income		
Less than £30,000	11	1
£30,000 to above £60,000	5	10
Prefer not to say	0	1
Missing	2	0
Employment status		
Employed (full time and part time)	6	12
Self-employed	4	0
Unemployed	2	0
Retired	3	0
Full time education/student	0	0
Prefer not to say	0	0
Missing	2	0
Long-standing conditions		
Deafness	2	0
Blindness	0	0
A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, lifting or carrying	4	0
A learning difficulty	0	0
A long-standing psychological or emotional condition	2	1
Other, including any long-standing illness	5	2
No long-standing illness	4	9
Marital status		
Single/never married	3	4
Married or domestic partnership	11	8
Separated or divorced	1	0
Widowed	1	0
Prefer not to say	0	0
Missing	1	0
Where did you find out about the study		
Facebook	0	0
Twitter	3	2
Word of mouth	3	5
NIHR be a part of research	5	0
Healthwatch	0	0
Other (local communities and networks)	6	6
HCP profession (role in prehabilitation)		
Patient engagement specialist	n/a	1
Clinical nurse specialist	n/a	2
Dietitian	n/a	3

Table 1: Continued.

	Experts by experience $N = 17$	Experts by profession $N = 12$
Physiotherapist	n/a	2
Service lead	n/a	2
Anaesthetist	n/a	1
Speech therapist	n/a	1
Number of participants attending each workshop		
Workshop 1	17	12
Workshop 2	17	6
Workshop 3	14	2
Online workshop	n/a	8

Table 2: Participant characteristics: Delphi rounds.

	Delphi round 1	Delphi round 2	Delphi round 3
Total *n*	22	17	22
Role in PARITY			
Expert by experience	14 (63.6%)	13 (76.5%)	14 (63.6%)
Response rate	82%	76%	82%
Expert by profession	8 (36.4%)	4 (23.5%)	8 (36.4%)
Response rate	67%	33%	67%
Age (years)			
25–34	5 (22.7%)	4 (23.5%)	5 (22.7%)
35–44	8 (36.4%)	6 (35.3%)	6 (27.3%)
45–54	4 (18.2%)	2 (11.8%)	4 (18.2%)
55–64	0	0	1 (4.5%)
65–74	3 (13.6%)	3 (17.6%)	3 (13.6%)
75 and above	2 (9.0%)	2 (11.8%)	2 (9.0%)
Missing	0	0	1 (4.5%)
Sex			
Man	9 (40.9%)	7 (41.2%)	10 (45.5%)
Woman	13 (59.1%)	10 (58.8%)	11 (50%)
Missing	0	0	1 (4.5%)
Ethnicity			
White	13 (59.1%)	10 (58.8%)	12 (54.5%)
Asian/Asian British	6 (27.3%)	3 (17.6%)	5 (22.7%)
Mixed	1 (4.5%)	2 (11.8%)	2 (9%)
Other (participants reported nationalities Welsh and Italian for this section)	2 (9%)	2 (11.8%)	2 (9%)
Missing	0	0	1 (4.5%)

- Clinical Nurse Specialist for Gynae Oncology,
- Nurse,
- Prehab Physiotherapist and Project Manager,
- Speech and Language Therapist in a pre-treatment clinic,
- Working 'directly involved in patient care/delivering informal prehabilitation interventions'.

In total, 22 people took part in the Delphi process at least once out of the initial 29 people who took part in the PARITY study co-design workshops in line with best practice [29, 32, 38] and equating a 76% overall response rate.

3.2. Delphi Process Results. A summary of the consensus reached at each stage can be found in Table 3. The statements and the proportion of consensus reached each round can be found in the Supporting Information (available here).

3.2.1. Round One. Of the 54 statements included in the first round, an overwhelming majority reached a consensus of over 75%, leaving only four statements that did not reach consensus (7.4%). Among those with consensus, there were 14 statements considered as reaching adequate consensus (77.3%). Seventeen statements had an overwhelming consensus of over 90% (one item had 100% consensus), and 18 statements had very strong consensus of 80%–89%. Free-text comments resulted in revisions to 24 statements and the generation of 10 new statements. Due to the high number of statements reaching consensus, a decision was made at this point to raise the consensus rate to 80% and the reintroduction of those with a consensus below 80% were re-introduced. As a result, only 20 statements out of 54 (37%) reached consensus (over 80%) and were removed from the next rounds as they were to be included in the final criteria.

Table 3: Summary of the number of statements in each round.

Round number	Number of statements	Number of statements requiring revisions	Number of new statements requested for next round	Number of statements reaching consensus and removed
1	54	24	10	20
2	42	10	—	23
3	18	—	—	13

3.2.2. Round Two. There were 42 statements in round two. In total, four statements (9.5%) did not reach consensus and six statements (14.3%) reached adequate consensus and had an interquartile range greater than one. Thirty statements (73.8%) reached consensus with an assigned importance over 80%; however, 10 statements had proposed revisions. As a result, only 23 statements out of 42 (55%) reached consensus and were removed from the next round.

3.2.3. Round Three. There were 18 statements included in round 3. In total, five statements (27.8%) did not reach consensus and only one item remained at adequate consensus. The remaining 13 statements (66.7%) reached a consensus. The comments from the participants were further considered for revisions only if they clarified the statements further. No major revisions were carried out in round 3.

In total, 56 statements were selected to create the evaluation criteria. The combined Delphi consensus criteria are available in the Supporting Information (available here).

3.3. Synthesis of the Results. A summary of consensus results is presented under seven co-created thematic headings: developing and delivering prehabilitation, emotional health interventions, nutritional interventions, physical health interventions, multi-modal interventions, integrating community-based care and addressing inequalities.

At the beginning of round 1, participants were asked to vote on or suggest terms used to refer to patients and the team working in prehabilitation services. The majority of the participants voted to use the term ‘patients’ (12 votes) and ‘care team’ (8 votes).

3.3.1. Criteria for Developing Prehabilitation Services (n = 18). Originally labelled ‘service delivery’, this category was renamed as additional statements were added during the Delphi process. After round 3, only two statements did not reach consensus. There are recommendations defining services for users and providers, evaluation metrics and considerations for patient safety. Key elements include aligning services with patients’ lives and values, supporting empowerment, continuity of care and clear communication before, during and after prehabilitation.

3.3.2. Criteria for Delivering Emotional Health-Based Interventions (n = 6). Most statements in this category were revised after round 1 for clarity around who, why, where and for whom the intervention is being delivered. The main revisions to statements in this group were to define the appropriate timing of psychological assessments and the aims of interventions. Statements were categorised into universal (for every patient), targeted or specialist. Behaviour change interventions were included as a universal intervention. Statements cover aims, timing, understanding worries and enabling patients to continue living their lives and coping with diagnosis and treatment. The inclusion of tailored support is referenced three times in this category.

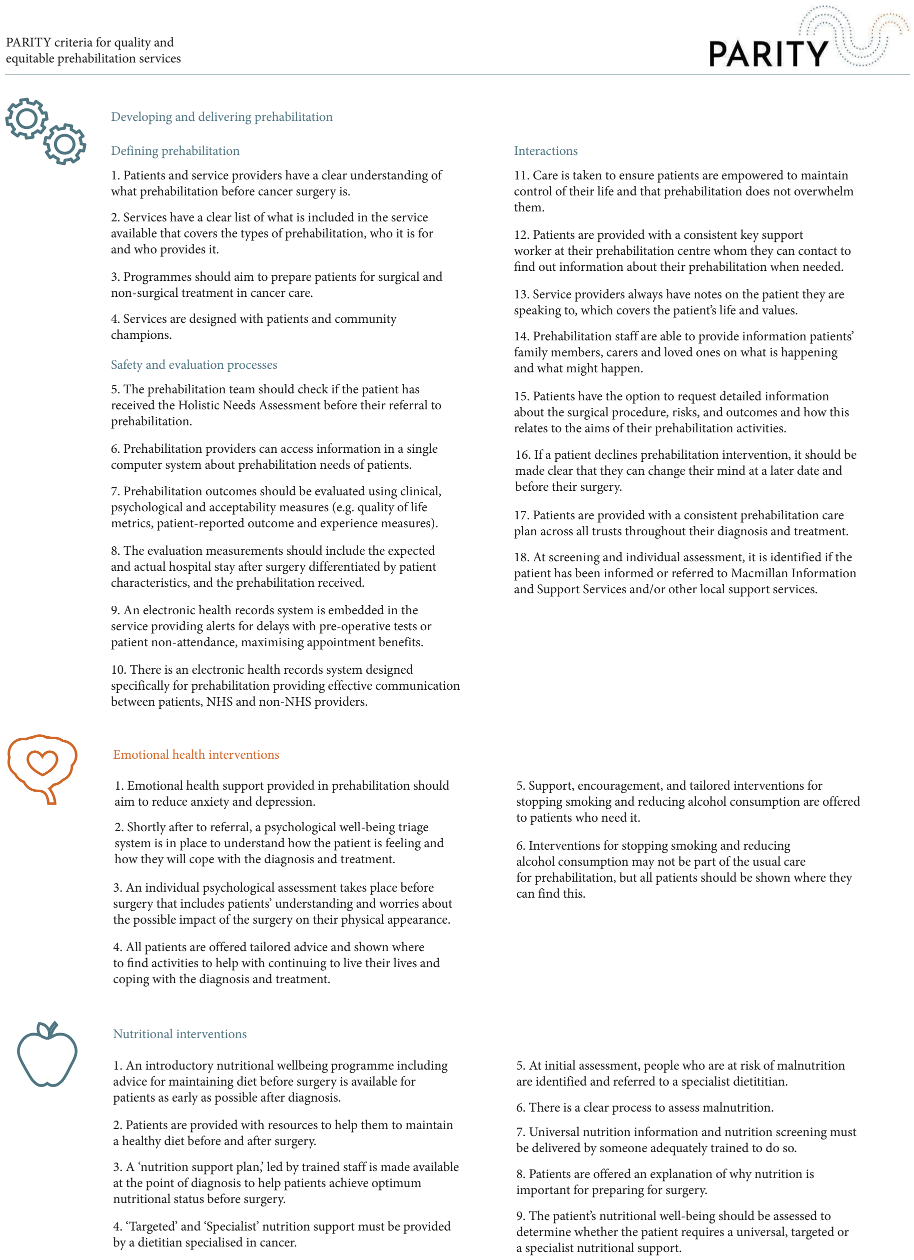
3.3.3. Criteria for Delivering Nutritional Interventions (n = 9). Statements were revised after round 1 to provide clarity on roles, purpose and eligibility. Participants highlighted the use of appropriate language noting that a healthy diet does not always result in optimum nutrition for people with cancer. Two statements were combined in round 2 and reintroduced in round 3 as new statements and not reported in the final criteria. Statements cover considerations for programmes, resources, plans and specialist support, and timing when preparing for surgery.

3.3.4. Criteria for Delivering Physical Health-Based Interventions (n = 6). Most statements reached consensus in round 1 and the remaining item reached consensus after revisions at round 3. Statements emphasise tailored and personalised physical health interventions for all patients irrespective of functional capacity at diagnosis, the importance of patient-led activities, achievable goals, shared-decision-making and accessibility.

3.3.5. Criteria for Delivering Multi-Modal Interventions (n = 4). Focused mainly on prehabilitation for frail and vulnerable populations, these statements emerged for people who require tailored multimodal approaches combining physical, nutritional and emotional support.

3.3.6. Criteria for Integrating Community-Based Care (n = 5). Statements include identifying local providers, access for community-based outdoor activities, social support and care beyond prehabilitation once discharged. They include considerations for assessments and provision based on social support, tailored peer support and accessibility of support for the inclusion of family members.

3.3.7. Criteria for Addressing Inequalities (n = 8). All reached consensus at round 2. The key focus for addressing inequalities in prehabilitation services is personalised and patient-centred services, reducing exclusion by design,



PARITY criteria for quality and
equitable prehabilitation services

PARITY

Developing and delivering prehabilitation

Defining prehabilitation

1. Patients and service providers have a clear understanding of what prehabilitation before cancer surgery is.

2. Services have a clear list of what is included in the service available that covers the types of prehabilitation, who it is for and who provides it.

3. Programmes should aim to prepare patients for surgical and non-surgical treatment in cancer care.

4. Services are designed with patients and community champions.

Safety and evaluation processes

5. The prehabilitation team should check if the patient has received the Holistic Needs Assessment before their referral to prehabilitation.

6. Prehabilitation providers can access information in a single computer system about prehabilitation needs of patients.

7. Prehabilitation outcomes should be evaluated using clinical, psychological and acceptability measures (e.g. quality of life metrics, patient-reported outcome and experience measures).

8. The evaluation measurements should include the expected and actual hospital stay after surgery differentiated by patient characteristics, and the prehabilitation received.

9. An electronic health records system is embedded in the service providing alerts for delays with pre-operative tests or patient non-attendance, maximising appointment benefits.

10. There is an electronic health records system designed specifically for prehabilitation providing effective communication between patients, NHS and non-NHS providers.

Interactions

11. Care is taken to ensure patients are empowered to maintain control of their life and that prehabilitation does not overwhelm them.

12. Patients are provided with a consistent key support worker at their prehabilitation centre whom they can contact to find out information about their prehabilitation when needed.

13. Service providers always have notes on the patient they are speaking to, which covers the patient's life and values.

14. Prehabilitation staff are able to provide information patients' family members, carers and loved ones on what is happening and what might happen.

15. Patients have the option to request detailed information about the surgical procedure, risks, and outcomes and how this relates to the aims of their prehabilitation activities.

16. If a patient declines prehabilitation intervention, it should be made clear that they can change their mind at a later date and before their surgery.

17. Patients are provided with a consistent prehabilitation care plan across all trusts throughout their diagnosis and treatment.

18. At screening and individual assessment, it is identified if the patient has been informed or referred to Macmillan Information and Support Services and/or other local support services.

Emotional health interventions

1. Emotional health support provided in prehabilitation should aim to reduce anxiety and depression.

2. Shortly after to referral, a psychological well-being triage system is in place to understand how the patient is feeling and how they will cope with the diagnosis and treatment.

3. An individual psychological assessment takes place before surgery that includes patients' understanding and worries about the possible impact of the surgery on their physical appearance.

4. All patients are offered tailored advice and shown where to find activities to help with continuing to live their lives and coping with the diagnosis and treatment.

5. Support, encouragement, and tailored interventions for stopping smoking and reducing alcohol consumption are offered to patients who need it.

6. Interventions for stopping smoking and reducing alcohol consumption may not be part of the usual care for prehabilitation, but all patients should be shown where they can find this.

Nutritional interventions

1. An introductory nutritional wellbeing programme including advice for maintaining diet before surgery is available for patients as early as possible after diagnosis.

2. Patients are provided with resources to help them to maintain a healthy diet before and after surgery.

3. A 'nutrition support plan,' led by trained staff is made available at the point of diagnosis to help patients achieve optimum nutritional status before surgery.

4. 'Targeted' and 'Specialist' nutrition support must be provided by a dietitian specialised in cancer.

5. At initial assessment, people who are at risk of malnutrition are identified and referred to a specialist dietitian.

6. There is a clear process to assess malnutrition.

7. Universal nutrition information and nutrition screening must be delivered by someone adequately trained to do so.

8. Patients are offered an explanation of why nutrition is important for preparing for surgery.

9. The patient's nutritional well-being should be assessed to determine whether the patient requires a universal, targeted or a specialist nutritional support.

Figure 2: Criteria statements for service development, emotional health and nutritional interventions.

including training to develop cultural competencies, understanding of health inequalities and wider determinants of health statements also call for patient advocates to support engagement with underserved groups.

Figures 1 and 2 show all criteria that met consensus. Full details are in the Supporting Information (available here).

4. Discussion

This study is the first in the UK to develop criteria for cancer surgery prehabilitation with an emphasis on addressing inequalities. It successfully enabled both people with lived experience and professionals to co-create and reach consensus on 56 criteria statements across seven categories (Figures 2 and 3), using a co-design process and modified Delphi method. Previous studies have mainly included healthcare professionals with a role in prehabilitation [39, 40], with patient inclusion only recently recommended [39].

Consensus was reached on the need for a clear definition of prehabilitation, which should be clearly communicated to patients. Over 90% agreed on the first two criteria, reflecting the breadth and complexity of interventions and the difficulty of defining prehabilitation for stakeholders. The PPI panel emphasised patient choice and personalised care. Themes like shared decision-making, innovation and continuity of care into community-based care were prominent. Tailoring prehabilitation to patient condition and individual life circumstances was highlighted, echoing prior research [19, 41, 42]. The quality of interactions between care teams

Physical health interventions

1. Physical activity-based prehabilitation programmes are patient-led and include achievable goals.
2. Patients with specific symptoms are offered tailored physiotherapy to improve functioning before surgery.
3. Physical activity support, such as exercise classes, is offered both in-person and online, and at various times of the day.
4. Personal exercise plans include shared decision-making between the patient, physiotherapists, anaesthetists, oncologists, and occupational therapists.
5. Access to specific musculoskeletal/neuro services should be made available if problems arise that might limit patients' ability to receive prehabilitation care before their treatment.
6. All patients are shown where they can find and attend physical health support workshops.

Multi-modal interventions

1. Patients who do not meet the criteria for targeted or specialised care can also receive advice on behaviour change, self-care and maintaining health from primary care and/or community-based providers if specific universal care on physical health, nutrition and psychological wellbeing are not included and delivered by the prehabilitation services run by the NHS Acute trust hospitals.
2. Specialist pre-treatment clinics are available for patients who are considered frail to provide multi-modal personalised prehabilitation based at the hospital.
3. Specialist pre-treatment clinics are available for patients who are considered vulnerable to provide multi-modal personalised prehabilitation based at the hospital.
4. Where possible, community link worker visits are arranged to monitor progress and well-being of vulnerable and frail patients.

Integrating community-based care

1. Community-based services that meet the patients' needs but do not fall under prehabilitation are identified and made available across the cancer pathway at their trust and local area.
2. Community-based and outdoor activities that improve well-being are offered as part of prehabilitation.
3. There is an assessment of social support that someone has available at home or in their community to help support prehabilitation requirements.
4. Information, advice, and ideas are available to equip friends and families support to their loved ones throughout prehabilitation.
5. A prehabilitation discharge plan is developed for patients to continue accessing services and facilities outside of their prehabilitation care in community-based settings.

Addressing inequalities

1. Regardless of where they live, there is a conversation to understand how patient's prehabilitation care plan and subsequently cancer surgery will affect their life.
2. Interpreters are always provided for those who need them at each appointment.
3. Communication for patients is made easy to understand, easy to use, and accessible to everyone, including those with protected characteristics.
4. Tailored support is provided to help people get ready for appointments at the hospital (e.g. transport, directions and information on what to expect at the appointment).
5. The care team is trained to improve their understanding of equality and diversity issues.
6. The service has a group of 'key contacts' to provide advice for caring for patients with protected characteristics and vulnerable people when they are referred.
7. Prehabilitation is tailored to patients' cultures and religions.
8. Care is taken to ensure that activities do not exclude people who have less time to take part, such as those with caring responsibilities and self-employed people.

FIGURE 3: Criteria statements for physical and multimodal interventions, community-based care and addressing inequalities.

and patients—considering empowerment, avoiding overwhelm and consistency—was another major focus, as were timing and accessibility.

This study builds on prior UK guidance from Macmillan, NIHR and RCoA [4], contributing user-informed criteria that reinforce themes like promoting healthy behaviours including exercise, nutrition and psychological interventions, service development and equity. Previous research has highlighted variation in how and where prehabilitation services are delivered [10–13], as well as the need for greater understanding of how prehabilitation can equitably improve experiences, access and outcomes for all [43, 44]. However, this study goes further by addressing barriers such as geography, culture, communication and life responsibilities, filling a gap in prehabilitation research. The criteria also highlight non-traditional elements like peer support and the inclusion of family and friends. Socially prescribed activities were also valued, which, while beneficial, are not typically classed as prehabilitation [45–47].

Given PARITY's focus on inequalities, the study proposes eight essential recommendations for equitable service delivery (Box 2).

Further PARITY stages will assess implementation of these elements in UK services, finalise best-practice recommendations and develop e-learning for practitioners. Further evaluation is needed on access variation and risks of defining other interventions under prehabilitation that may face funding issues.

5. Strengths and Limitations

A 76% response rate met standards for rigour [48, 49]. Participant diversity (sex, disability, ethnicity and age) supported the development of equity-focussed criteria. The on-line format enabled UK-wide participation, but results may limit applicability to the UK health system.

Including both lived and professional experience strengthened the study, leading to more reliable results [50]. The absence of general practitioners, surgeons or anaesthetists narrowed professional representation. Balanced consensus was achieved through strong consistency, driven by neither professional nor lived experience experts. Participant numbers dropped slightly in round 2, likely due to the Easter holiday period.

1. Regardless of where they live, there is a conversation to understand how patient's prehabilitation care plan and subsequently cancer surgery will affect their life.
2. Interpreters are always provided for those who need them at each appointment.
3. Communication for patients is made easy to understand, easy to use and accessible to everyone, including those with protected characteristics.
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8. Care is taken to ensure that activities do not exclude people who have less time to take part, such as those with caring responsibilities and self-employed people.

Box 2: Eight essential recommendations for equitable prehabilitation services.

Some criteria reflected general good practice and care rather than prehabilitation specifically. Frustrations with services and experiences influenced by current NHS pressures may have shaped priorities. A lower number of healthcare professionals participated than originally anticipated by the research team, which was likely impacted by the workloads of the professionals.

The co-design approach was a key strength and unique feature of the study. However, it may have introduced bias, as the same participants shaped and assessed the statements. It is possible that inviting a wider population of patients currently undergoing cancer treatments and healthcare professionals who provide prehabilitation, different importance could have been assigned to each criteria statement. Anonymity was affected by payment logistics, possibly limiting critical feedback [39].

Clarity of language in the statements was a barrier. In the last co-design workshops, some participants commented that the statements were too complex and used words used in professional contexts. Statements were improved; however, the PPI panel still stated that the criteria were difficult to understand and needed to be tailored for target populations, leading to simpler, easy-read versions in Figures 2 and 3.

5.1. Future Implications. This Delphi study provides evaluation criteria for prehabilitation before cancer surgery, which will guide the assessment of quality and equity of prehabilitation services throughout the PARITY study [23]. PARITY will build on these findings through a UK-wide questionnaire to map current prehabilitation provision and carry out in-depth case studies. Results from these stages will inform best practice guidelines for standardising prehabilitation services. Prior to this research, limited insight existed into what matters to patients or how to address unequal access. This research begins to address that gap and advocates for involving patients in defining the scope and content of prehabilitation.

6. Conclusion

This paper presents a modified Delphi study that enabled both experts by experience and profession to reach consensus on 56 criteria for evaluating prehabilitation for cancer surgery in the UK. It addresses the need to engage both groups in shaping equitable access to effective prehabilitation. The criteria highlight the need for clearer definitions of prehabilitation, consistency of care and quality patient interactions. They emphasise personalisation, shared decision-making and accessibility while also recognising the value of non-traditional components, including community-based care, peer support and the inclusion of family and friends.

Further research is needed to explore the range and definition of services considered part of prehabilitation and to improve inclusive approaches to Delphi studies.

The criteria will inform further research into prehabilitation delivery across the UK, leading to the creation of best practice principles, offering a framework for design and evaluation of prehabilitation interventions.

Data Availability Statement

The data that support the findings of this study are available in the Supporting Information of this article.

Ethics Statement

The Lancaster University Faculty of Health and Medicine Research Ethics Committee Approval was obtained (FHM-2022-1063-RECR-1).

Disclosure

A preprint has previously been published [48].

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

C.S., L.A., C.G., A.S., A.P. and J.R.-M. conceived the study idea. L.A., L.W. and Y.H. led the ethics approval applications. L.A., L.W., Y.H. and A.P. carried out recruitment, data collection and data analysis. Y.H. wrote the first draft of the manuscript. All authors reviewed and commented on the drafts. L.W. finalised the manuscript and L.A. edited the manuscript in response to reviewer feedback.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. *(Supporting Information)*

The Delphi Questionnaires for each round and a full set of questionnaire results are available.

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