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# **Inequalities in access to health and social care among adults with multiple sclerosis: a scoping review of the literature**

Conflict of interest statement:

All authors declare that they have no conflict of interest in submitting this manuscript.

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## **ABSTRACT (300 words unstructured)**

Variations in access to health care are known to contribute to differences in life expectancy, morbidity and health-related quality-of-life across population subgroups. We undertook a scoping review to identify what is known about in-country variations in access to services for adults with multiple sclerosis and to identify gaps in the literature to inform future research and national policies. We searched MEDLINE, CINAHL, EMBASE, PSYCHINFO, SocINDEX and Social Science Abstracts from inception to end of December 2016 for quantitative studies which had investigated differences in access to prevention services, healthcare services, treatments and social care between inequality groups, defined using the PROGRESS-PLUS framework. A total of 4959 unique abstracts yielded 36 papers which met our eligibility criteria. Only 3 studies were cohort studies and only 4 were population-based; most were from the United States (n=27). There were 6 studies on access to MS focused care and 6 on access to Disease Modifying treatments. There were 3 studies on access to prevention/lifestyle programmes and none on access to welfare services or information support. There were no papers examining inequalities in access for 'vulnerable' groups, such as, those with learning disability. In the available studies, there was evidence of inequalities in access to services with a trend for worse access among men, older age groups, those from lower socio-economic groups or the least educated, non-caucasians, those with mental health problems and those from rural areas. In the studies on access to disease modifying treatments, older age and lower socioeconomic status were consistently associated with a lower rate of uptake, while race and gender were not. Inequalities or disparities in access to all levels of services and treatments will need to be addressed through a strategic research agenda with an emphasis on population-based studies and development and evaluation of interventions to reduce inequality.

## 1 INTRODUCTION

2

3 Variations in access to health care are known to contribute to differences in life  
4 expectancy, morbidity and health-related quality-of-life across population subgroups  
5 [1-4]. When these variations are avoidable they contribute to inequalities or  
6 disparities in health experience [5] and have led to international and national  
7 strategies to reduce gaps in service provision, particularly, when there is evidence of  
8 lack of access to proven effective interventions or clinical variations in care [6-8].

9 The Multiple Sclerosis Atlas has demonstrated gross international differences in  
10 mortality in multiple sclerosis and access to disease modifying treatments [9].  
11 However, studies also suggest variations within countries, with some evidence that  
12 place of residence and sociodemographic characteristics (e.g., age, gender and  
13 ethnicity) have an influence on patient outcome [10-12]. There is also concern about  
14 variations in access to disease modifying treatments for some patient subgroups,  
15 which might be, in part, secondary to how health services are organised [13,14]. In  
16 chronic conditions like multiple sclerosis (MS), it is also important to consider  
17 inequalities in access to services and treatments which reduce morbidity across the  
18 care pathway, from secondary prevention to rehabilitation and social care [15]. The  
19 complex needs of many patients with MS **require** the input of many other services,  
20 such as physiotherapy, occupational therapy and mental health services, as these  
21 treatments/therapies have been shown to reduce morbidity in MS [16-18].  
22 Independence and participation may be maintained through social support, personal  
23 support and housing adaptations, and the employment consequences of an MS  
24 diagnosis through vocational rehabilitation [19]. More recently, there has been a  
25 greater focus on improving **well-being** through promoting healthy lifestyles among  
26 adults with multiple sclerosis, because of evidence that increased physical activity  
27 helps to maintain physical functioning and improve mental health in MS patients [20]  
28 and because smoking may raise the risk of disease progression [21]. Therefore,  
29 variations in access to lifestyle and prevention programmes is also important.

30 We undertook a scoping review of the literature to identify what is known about in-  
31 country variations in access to services for adults with MS and to identify gaps in the  
32 literature to inform future research and national policies. A scoping review uses  
33 systematic methods to identify the literature but addresses a broader question than a  
34 systematic review. As such, it is less concerned with the reporting quality of the  
35 papers or **meta-analysis**. In this scoping review, we identified and reviewed studies  
36 which used a quantitative methodology to investigate intra-national (in-country)  
37 variations in access across the care pathway and health systems of different  
38 inequality groups among populations of adult MS patients.

39

## 40 METHODS

41 Although this study was not focused on the effectiveness of interventions to reduce  
42 inequity, we used the Joanna Briggs Institute guidance on scoping reviews [22] and  
43 the Cochrane and Campbell Equity methods group checklist [23] to guide the

1 development of the study protocol, study implementation and presentation of  
2 findings. This study was funded by Salford Royal NHS Hospitals Foundation Trust.

#### 4 Definition of exposures (Inequality groups)

5 We used the PROGRESS-PLUS framework for determining inequality groups in this  
6 review [24]. These were used to guide terms in the search strategy and to stratify  
7 studies in the analysis. In this framework the PROGRESS inequality groups (place of  
8 residence, race/ethnicity/culture/language, occupation/employment status,  
9 gender/sex, religion, education, socio-economic status, and social capital) were  
10 supplemented by 'PLUS' inequality groups related to personal characteristics  
11 pertinent to MS patients: age, disability (physical +/- or cognitive), disease type,  
12 mental health conditions, and other 'vulnerable groups', e.g., learning difficulties,  
13 travelers, migrants. The 'PLUS' groups were chosen based on the potential for  
14 barriers to access of services and/or treatments following discussion within the  
15 review team, which consisted of clinicians and public health professionals. When  
16 considering social capital, we took a broad and inclusive approach to its definition  
17 and included all aspects of social networks and social cohesion under this umbrella  
18 term [25]. We also included a broad range of indicators of socioeconomic status, e.g,  
19 deprivation indices, income.

#### 21 Definition of outcomes (programmes/services/treatments)

22 À priori, we broadly categorised the programmes/services/treatments and, post-hoc,  
23 agreed subcategories for presentation when studies were found. The categories  
24 (and subcategories) included: prevention programmes (subcategories: primary and  
25 secondary prevention), diagnostic investigations, medical care (subcategories:  
26 medication general, disease modifying treatments, general health care, neurology  
27 services, MS specific services, health provider systems e.g., health maintenance  
28 organisation), mental health services, rehabilitation services, social and welfare  
29 services (personal support, housing, assisted devices or assisted living) and  
30 information support.

#### 32 Eligibility criteria

33 We included studies with a quantitative research design from any country and  
34 healthcare setting if they compared inequality MS groups as to uptake of, or access  
35 to programmes, services or treatments across the prevention/care/support pathway.  
36 Participants could have any type or stage of MS and be at any time following  
37 diagnosis. As the focus was on adult MS patients, we excluded any study in which  
38 more than 5% of the population was under 16 years of age. We also excluded  
39 studies comparing MS patients with the general population or with other patient  
40 groups, studies investigating uptake of alternative or complementary therapies, those  
41 that focused on uptake of lifestyles rather than the services which promote lifestyle

1 modification, those investigating DMT adherence rather than prescription and studies  
2 where the outcome was perceived or reported need, rather than comparative need.

3

#### 4 Search strategy

5 We searched MEDLINE, CINAHL, EMBASE, PSYCHINFO, SocINDEX and Social  
6 Science Abstracts from inception to end of December 2016 using the key terms for  
7 multiple sclerosis as recommended by the Cochrane Multiple Sclerosis and Rare  
8 Diseases Review Group [26] and search terms for inequalities/disparities and the  
9 inequality groups, adapted as appropriate for the different databases. The search  
10 was limited to English Language articles. The full search strategy for MEDLINE  
11 (EBSCO) is included in supplementary materials (supplementary table 1). The titles  
12 and abstracts were screened by teams of two authors independently and any  
13 conflicts resolved by a third reviewer.

14

#### 15 Data retrieval, extraction and analysis

16 Full text papers for all potentially eligible studies identified by the search, and when  
17 there was insufficient detail in the title/abstract to determine eligibility, were retrieved  
18 and screened for inclusion by two researchers, with a third reviewer resolving any  
19 conflicts. Data was extracted for each of the identified studies using a specially  
20 designed proforma. Data was extracted on the study design, country and setting,  
21 definition of MS, sample size, population characteristics, setting, data source,  
22 exposures (PROGRESS-PLUS categories), outcomes (uptake/access) and key  
23 findings for each exposure/outcome relationship reported. Data was extracted by  
24 one researcher and all data was checked by a second researcher, with conflicts  
25 being resolved by discussion. The dataset was synthesised narratively after  
26 discussion with the full review team.

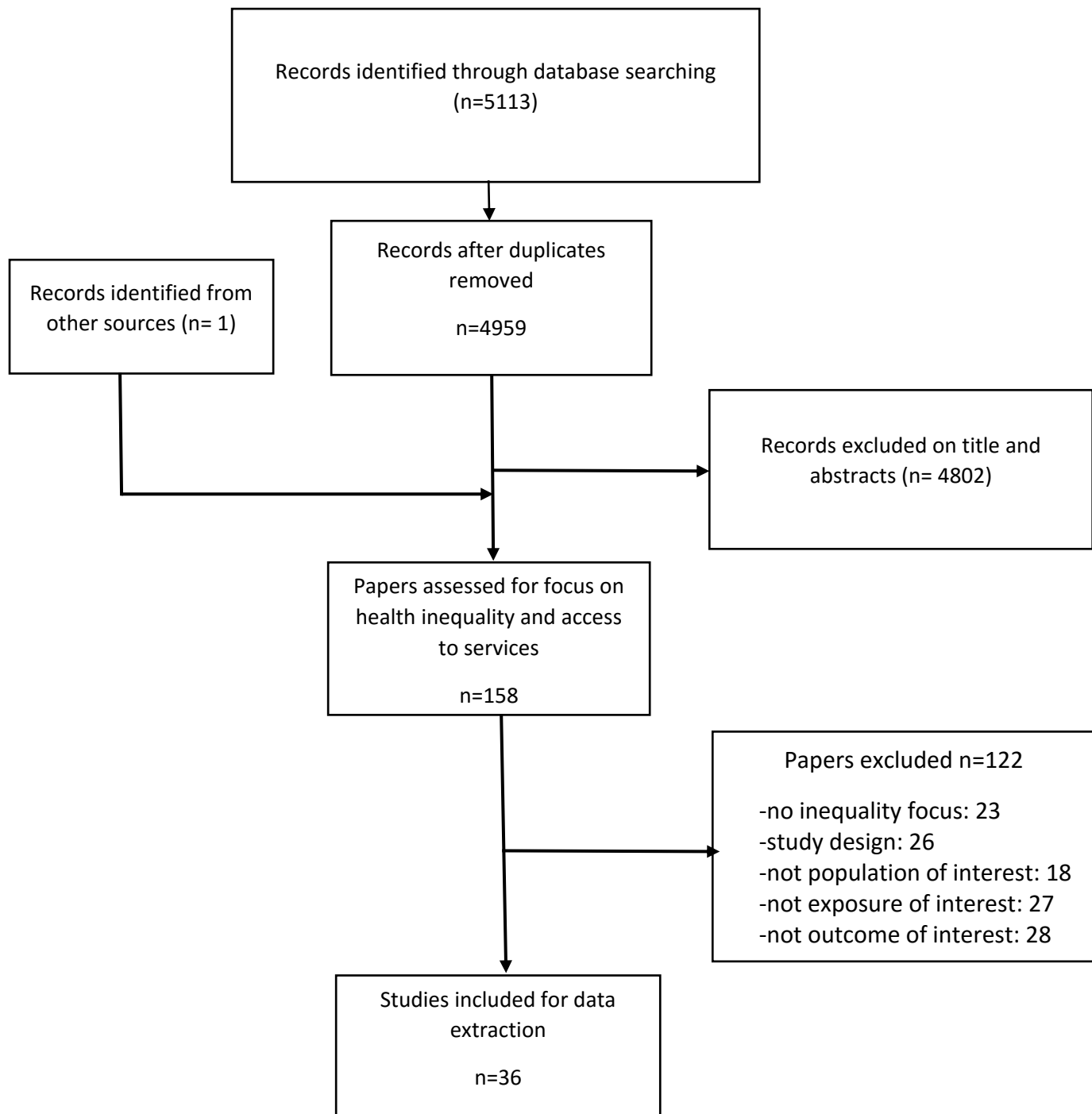
27

## 28 **RESULTS**

29 A total of 4959 unique abstracts were identified from the databases following  
30 automatic removal of duplicates. This yielded 157 full text papers for eligibility  
31 screening and a further paper was identified from other sources [15]. A total of 36  
32 papers were deemed eligible for further analysis [15, 27-61]. Reasons for exclusion  
33 for the other 122 papers included: a lack of focus on inequality (n = 23); non-eligible  
34 study design (n= 26); non-eligible study population (n=18); exposures inconsistent  
35 with the PROGRESS-PLUS framework (n=27) or lack of data on access to a service  
36 or treatment (n=28). Figure 1 shows the flow diagram of search results.

37 Figure 1: Flow chart of search

38



1  
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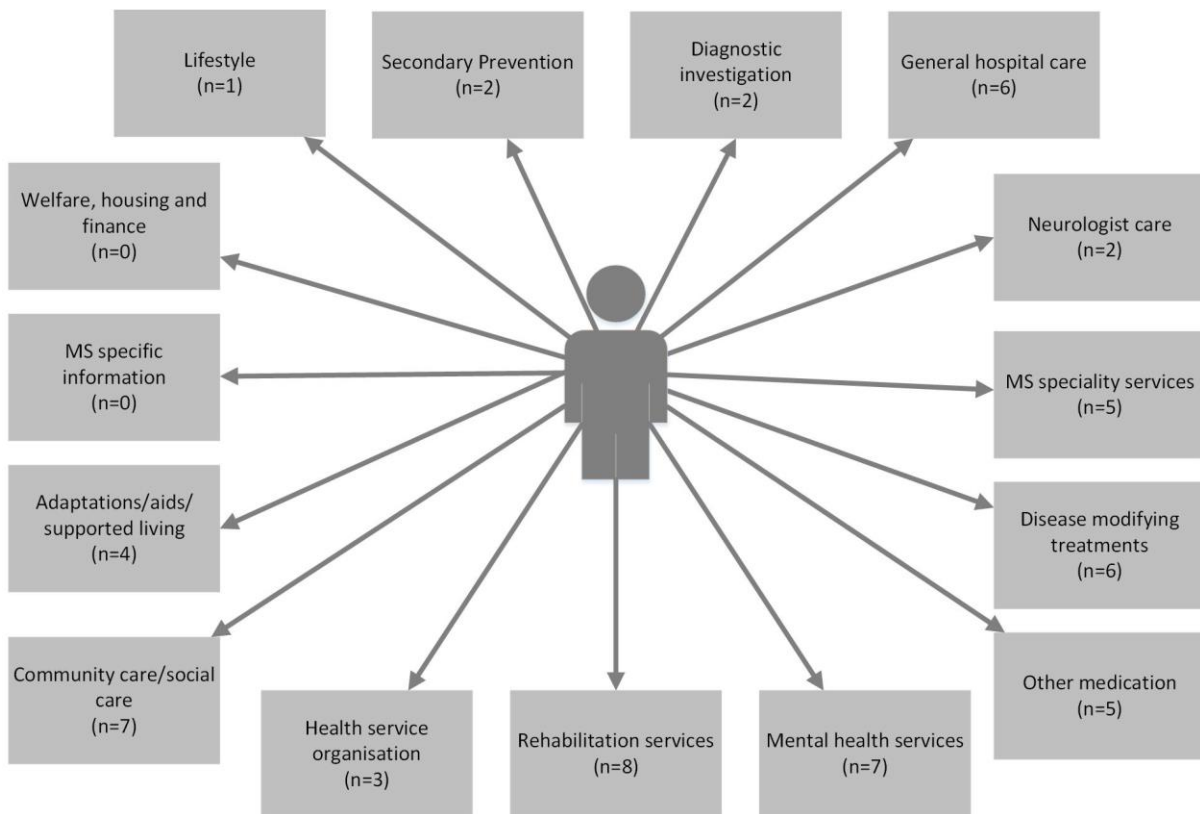
3 The full characteristics of the 36 studies is shown in supplementary table 2. Only 3  
4 studies were cohort studies [28, 47, 55] and only 4 were population-based [46, 47,  
5 52, 58]. The data source for 12 of the 36 was in full, or in part, from the members of  
6 National Multiple Sclerosis Society [32, 33, 36, 37, 41, 42, 43, 48, 49, 53, 54, 56] and  
7 for 4 studies the North American Research Committee on Multiple Sclerosis  
8 (NARCOMS) register [30, 44, 45, 56]. There were also 4 studies which used the  
9 Minimum Data Set (MDS) for Medicare/Medicaid certified Nursing Homes (two of  
10 which used the same sample) [29, 31, 34, 35] and 3 which drew on a single survey  
11 ("Aging With MS: Unmet Needs in the Great Lakes Region" survey) [38, 39, 40]. The

1 studies were published between 2000 and 2016 with 10 studies published since  
 2 2010 [30, 38, 39, 46, 47, 51, 53, 55, 56, 61]. Most of the studies were undertaken in  
 3 the US (n=27) and all studies were undertaken in North America or Western Europe.

4 Figure 2 and table 1 show the numbers of studies focusing on the different access  
 5 outcome categories and subcategories. There were 10 unique studies on access to  
 6 medical services, of which, six studies were on access to MS focused care. **Eight**  
 7 unique studies focused on access to medications, of which, 6 were on access to  
 8 Disease Modifying **treatments**. A similar number of papers were on access to mental  
 9 health services (n=7), rehabilitation (n=8), and social support/care (n=7). There were  
 10 a few studies on diagnostic services (n=2), access to prevention/lifestyle  
 11 programmes (n=3) and on housing adaptations or aids (n=4), but no studies on access  
 12 to welfare services or information support. All three studies about inequalities in  
 13 access to health provider systems were from the United States.

14 Figure 2: Number of papers by access subcategory

15



16

17

18 Table 1 summary of findings here (see separate file)

19

20 The effect of gender was examined across all access subcategories for which there  
 21 were studies, and disability and socioeconomic status across all but one. Gender  
 22 (n=25), age (n=21) and disability (n=18) were most frequently included as exposure  
 23 factors. In contrast, mental health status (n=9), occupation, i.e., employment status,



1 (n=9), and disease type (n=7) were less frequently examined. Given the setting of  
2 most of the papers, the 15 studies about race mainly focused on differences  
3 between Caucasian, African American and Hispanic populations. Those on place  
4 (n= 13) compared urban and rural populations and all the papers categorised under  
5 social capital (n= 14) were on marital status or living arrangements. There were no  
6 papers examining 'vulnerable' groups or religion as factors affecting access to  
7 services/treatments.

8 The findings for each access category is shown in table 1. There was evidence of  
9 inequalities in access to services, but the relationship was not consistent across  
10 access subcategories. Broadly, there was a trend for worse access among men,  
11 older age groups, those from lower socio-economic groups or the least educated,  
12 non-caucasians, those with mental health problems and those from rural areas.  
13 **However** these findings were not universal, for example, women were less likely than  
14 men to see **a urologist** or have a powered wheelchair, and younger patients were  
15 less likely to be in receipt of personal assistance. In the studies on access to  
16 disease modifying treatments, older age and lower socioeconomic status were  
17 consistently associated with a lower rate of uptake, while race and gender were not.  
18 The relationship between severity of disability and levels of access across the care  
19 pathway was complex; with evidence of worse access to primary prevention and  
20 neurology services, no evidence of access issues to MS specific care and better  
21 access to rehabilitation, social care and assisted living.

22

## 23 **DISCUSSION**

24 In the limited number of studies identified, the findings of this scoping review support  
25 the existence of inequality, or disparity, in access to services among MS  
26 subpopulations within countries. The subpopulations experiencing inequality are  
27 similar to those experiencing access or uptake issues in other conditions. For  
28 example, in cancer screening men, minority ethnic groups and those from more  
29 deprived areas have lower rates of bowel screening [62]; older adults are less likely  
30 to receive proven effective treatments [63]; and rurality has been associated with  
31 lower access to specialist services [64]. However, this review also suggests that  
32 interpreting variations in access rates as an inequality or disparity is complex. There  
33 was some evidence that inequalities may be context specific. For example, women  
34 rather than men were less likely to be referred to a urologist. Urinary symptoms are  
35 very common in multiple sclerosis, but one study suggested that only two thirds of  
36 patients are asked about these symptoms by their clinician [65]. Gender disparity in  
37 referral to urologists has also been observed in general populations with haematuria  
38 and voiding difficulties, with women less likely to be referred and more likely to be  
39 treated for urinary tract infections [66,67]. Depending on the population subgroup, a  
40 higher or a lower uptake rate might be interpreted as an inequality for the same  
41 service. For example, in the study by Marrie [46], access to ICU was lower among  
42 those living in rural areas, which might suggest that because of the distance from  
43 specialist services those in rural areas could not obtain necessary management.  
44 However, access to intensive care units (ICU) was higher among men and older

1 patients. This could be interpreted as women and younger patients being less likely  
2 to benefit from necessary care; but equally could be interpreted that men and older  
3 patients are less likely to receive appropriate care to prevent overwhelming  
4 infections. Similarly, a lower rate of access to lifestyle interventions among those  
5 who are more disabled may be an inequality if they can benefit from these services;  
6 whereas a lower rate of access to home adaptations among those who are less  
7 disabled may not be an inequality, if they do not need such aids. These examples  
8 highlight the need for research to understand the reasons for differences between  
9 population subgroups: whilst some of these are likely to be similar to those  
10 experienced by adults with other co-morbidities [68], some are likely to be disease  
11 specific. Such research will also facilitate the development of strategies to reduce  
12 important variations.

13 Further difficulties in interpretation were introduced by the study designs. Few  
14 studies used a cohort design and therefore in most studies both exposure and  
15 outcome were measured at the same time. While this may not affect some  
16 exposures (such as gender), the interpretation of the direction of effect can be more  
17 problematic for exposures such as mental health or disability. So for example, in the  
18 study by Buchanan et al, nursing residents who were depressed were less likely to  
19 have occupational therapy (OT) [29]. As this was a cross-sectional study, it was  
20 unclear whether they had less OT because they were depressed, or not having OT  
21 made them depressed. Furthermore, there were other concerns about the quality of  
22 these studies: not all studies undertook a multivariate analysis to assess whether the  
23 exposures were independent risk factors. Few studies were population-based and  
24 many relied on members of MS societies: these groups might be less likely to  
25 include those from lower socio-economic groups, the less educated and minority  
26 groups [42, 43]. Finally, the generalisability of the findings may be limited because  
27 the majority were undertaken in US and all within western developed countries. Even  
28 then, the organisation and funding of health and social care systems in the US and  
29 the geography and racial breakdown are substantially different to that of, for  
30 example, the United Kingdom, where only 3 studies have been undertaken [15, 51,  
31 52].

32 There were a relatively high number of studies investigating access to disease  
33 modifying treatments. This is perhaps unsurprising, given the controversies around  
34 funding of these effective but expensive drugs; particularly when they first came to  
35 market [51]. More recent studies suggest that in addition to concerns about  
36 socioeconomic disadvantage having an impact on access to first line **Disease**  
37 **Modifying Treatments** (DMTs), there still remain concern about access of patients  
38 from lower socioeconomic groups to second line treatments [69]. There were very  
39 few studies about prevention programmes, which might reflect the relative recency of  
40 the interest in lifestyle interventions to promote **well-being** in MS populations.  
41 Nevertheless, promotion of physical activity, safe alcohol consumption and smoking  
42 cessation are incorporated into some national guidelines for MS care [70], and  
43 further work on access to these interventions overall and across inequality groups is  
44 warranted. It is perhaps more surprising that there were no studies on access to  
45 vocational rehabilitation services, and few on the impact of unemployment on access

1 to services, given the considerable research on the difficulties encountered by adults  
2 with MS within the workplace and the detrimental impact of unemployment on their  
3 well-being [71, 72]. We also found no studies about access to informational support.  
4 There is increasing interest in developing self-management programmes including  
5 digital technology for patients. While such programmes are important to promote  
6 well-being and patient engagement [13], there is the potential for introducing further  
7 health inequalities, as access to and use of the internet or mobile devices differs  
8 across socioeconomic and racial groups [73].

9 As well as the difficulties in interpretation, there were other limitations to our scoping  
10 review. Because of resource limitations, only studies in the English language were  
11 included. This may in part account for the observation that there were relatively few  
12 countries included among the eligible studies. We specifically excluded studies  
13 which focused only on perceived or expressed needs, as these are subjective.  
14 Studies reporting objectively measured needs were included, but perceived or  
15 expressed needs may under represent genuine inequalities as they may represent  
16 wants, although studies have shown that these can vary across inequality group [74].  
17 We did not include qualitative studies as the objective was to compare across  
18 inequality groups, but these types of studies would give greater depth of  
19 understanding of why inequalities exist. Finally, the concluding step in Arksey and  
20 O'Malley's original structure for scoping reviews includes a discussion with  
21 stakeholders of the findings [75]. This has not been formally undertaken with  
22 external stakeholders, but was addressed internally by the review team which  
23 included both researchers and clinicians. A recent scoping review on the conduct  
24 and reporting of scoping reviews suggests relatively few published scoping reviews  
25 undertake this step [76].

26

## 27 **CONCLUSION**

28 This scoping review was essential to benchmark the current evidence base and to  
29 demonstrate the paucity of published studies to date for this population. It has  
30 identified that inequalities exist throughout the prevention, care and support pathway  
31 for adults with MS, but the interpretation of these findings are limited by the lack of  
32 consistency between studies and across different types of care or support. In part,  
33 this may be because inequality is likely to be context specific and, in part, because of  
34 the limitations of the study design. There were also some specific research gaps  
35 identified, particularly in relation to prevention, vocational support and patient  
36 information and within inequality groups, learning disabilities and other 'vulnerable'  
37 groups. Inequalities or disparities in access to all levels of services and treatments  
38 will need to be addressed through a strategic research agenda. Further research to  
39 explore these areas requires large-scale population-based databases to ensure that  
40 participants are representative. Longitudinal studies also need to be responsive to  
41 changes in evidence about the management and treatment of MS. Further research  
42 is needed into understanding the reasons for differences in access to develop  
43 strategies to address any inequality. The findings of this scoping review will help to  
44 inform the prioritisation of future research for this population internationally.

1

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