Understanding quality of life across different clinical subtypes of multiple sclerosis: a thematic analysis

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Abstract

Purpose: Multiple sclerosis (MS) is a neurological disease that has different clinical presentations and illness trajectories. The aim of this study was to explore factors that are important for quality of life (QoL) of people with MS (pwMS), and to understand how they may differ across three subtypes.

Methods: Both convenience and purposive sampling were employed. Semi-structured interviews were conducted with people with relapsing-remitting MS (n=16), secondary progressive MS (n=14), and primary progressive MS (n=13). All interviews were audio recorded and then transcribed verbatim for thematic analysis involving both inductive and deductive processes. A separate analysis for each subtype was made during the inductive process before examining for similarities and differences across the three subtypes in the deductive process.

Findings: Four factors were identified to have an important influence on QoL of pwMS: restricted and disrupted enjoyment, disturbed future, challenged sense of self, and well-being of significant others. The themes reflect how pwMS commonly perceived enjoyment as a purpose of life, while also illustrating how their QoL may be questioned because of new perspectives going forward with MS, challenges to their sense of self, and increased concerns

for their significant others as a result of MS. Subtype differences were attributed to different illness trajectories: relapsing or progressive.
Conclusions: There are subtype differences in the negative impact of MS on QoL. Clinicians are encouraged to understand the challenges of different illness trajectories, in particular the traumatic nature of relapses and steady worsening of symptoms amongst those with progressive subtypes of MS.

Keywords illness trajectories; identity; subtype; significant others; multiple sclerosis; qualitative method

Background

Multiple Sclerosis (MS) is a chronic inflammatory disease of the central nervous system. Clinical manifestations of MS vary since demyelination can occur in many parts of the central nervous system. The common symptoms of MS are sensory disturbances including pain, fatigue, walking and other movement difficulties, weakness, heat sensitivity, visual disturbances, bladder and bowel dysfunction, spasticity, cognitive impairment and depression. Disease onset is typically between 20 and 40 years, providing potentials for disrupting relationships, family planning, family life, career prospects and social life. There are three subtypes of MS based on the clinical disease course [1]: Relapsing-Remitting MS (RRMS), Secondary Progressive MS (SPMS) and Primary Progressive MS (PPMS). RRMS is the most common diagnosis at onset (80%-95%) [1] as the disease course is characterised by episodes of neurologic deficits (relapse) and phases of recovery (remission). Various studies have suggested that 25%-40% of those with RRMS develop a secondary progressive course (SPMS) after several years, characterised by deterioration in function occurring over at least 6 months [2]. 10%-15% present with a gradual worsening of symptoms over time without relapse or remission (PPMS) [2]. Clinically isolated syndrome (CIS) refers to a single clinical episode suggestive of an inflammatory demyelinating disorder of the central nervous system [3]. In the current study, we focus on the main three subtypes because CIS is, by definition, monophasic, with minimum duration 24 hours, often resolving without therapeutic intervention [3] and therefore having a very different illness trajectory than a diagnosis of MS.

There are both symptomatic and disease-modifying therapies available for people with MS (pwMS) with the former involving education, exercise, pharmacology, and psychological

intervention [4]. Most of the disease-modifying therapies (DMT) currently available are to reduce relapse frequency [5, 6].

Quality of life (QoL) is an important marker of clinical care adequacy in MS [4]. For the World Health Organization QoL is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" [7]. This definition reflects the complexity of QoL; QoL can be influenced by chronic health conditions as well as an individual's personal and social value systems [8, 9]. Based on WHO's definition, QoL is understood to be a subjective evaluation of life as a whole in relation to four domains: goals, expectations, standards and concerns. Furthermore, QoL researchers have argued that both affective and cognitive components are involved in making evaluations of QoL [10-15].

To date, QoL has been largely studied quantitatively to understand how the illness impacts on pwMS. A recent systematic review, examining risk and protective factors for QoL, based on 106 quantitative studies between 1 January 2014 and 31 January 2019 [16] reports QoL to be associated with number and severity of MS-related symptoms. Amongst symptoms, they found fatigue, cognitive impairment and pain to be the most commonly studied symptoms, and these symptoms are identified as risk factors for QoL.

Given the importance of QoL as mentioned in NICE guideline, QoL is now used as an indicator of effective treatment [17]. Subsequently, it has attracted many researchers to develop illness-specific QoL measurements, leading to at least 20 such measures [18, 19]. These measures usually consist of various domains to reflect QoL as a multifactorial concept, usually covering physiological, psychological, and social aspects. The challenge, however, is the assessment of 'subjective' life quality evaluation. Despite the consensus that QoL is a subjective concept, many measurements fail to include the subjective component of QoL. In other words, QoL is defined by the measurements [20]. It is therefore important that researchers interpret their findings carefully in view of their particular QoL measurement and what they measure. For instance, some previous studies with a focus on physiological well-being report progressive types of MS to negatively affect QoL [21, 22], whilst studies focusing on mental health have found no difference between MS subtypes [23, 24]. There are also studies which have argued that physical functioning, rather than MS subtypes, impact on people's overall QoL evaluation [25].

Qualitative methods enable researchers to explore people's meaning making systems by addressing *how* and *why* enquiries [26, 27], and are therefore suitable to explore the subjective concept of QoL [14]. Although idiographic QoL measurements are available,

highlighting QoL as uniquely defined by each individual, they are restricted in understanding *how* and w*hy* people evaluate their life quality. To date, qualitative studies that have been conducted to understand the lived experience of pwMS report how pre-illness norms and standards are often unattainable, or violated, during the course of MS. This often challenges their sense of self and identity [28, 29], and the threat is perceived as ongoing due to their unpredictable future [28, 30], which can generate negative emotions [31-33]. People living with MS voice concerns for themselves, and also for their significant others [34, 35]. As for goals as an influential aspect of QoL, an uncertain future leads pwMS to live each day as it comes and make the most of the present moment [29, 34-36].

Whilst these studies give some insight into how MS may affect QoL, they do not consider whether the subtypes of MS affect people's QoL differently, although there are indications this may be so. For example, the sudden loss of bodily functions caused by relapses have been found to be depression and anxiety provoking [37-39]. These psychological burdens often lead patients towards DMT [36,40], generating a sense of control and hope of delaying the illness progression [40, 41]. There are reported benefits of symptom remissions in respect to preserved sense of self [42], and being able to regain some normality [43]. In contrast to RRMS, it has been suggested that progressive types of MS are associated with more losses and greater psychological distress [29]. This could be due to less information and treatment for these subtypes being available [44, 45].

Critically, previous qualitative research has often centred around relapse-effects, treatment availability, and transition from RRMS to SPMS. Hence, these are more relevant for people who have RRMS or those who experience relapses and remissions. Fewer studies have been conducted where the main focus has been to understand the experience of those severely affected [46, 47] and/or progressive types of MS [48-50]. This trend is also reflected in studies with unbalanced participant numbers across subtypes, typically with a much smaller sample size for PPMS. This is inadequate for understanding whether there are any differences between subtypes in terms of how their MS types affects their experiences. This raises the question of how and why QoL may differ according to MS subtype. The aim of this study then was to explore factors that influence QoL of pwMS and to understand how and why they may differ across subtypes.

Methods

The current study takes the research paradigm of constructivism because the fundamental question underlying QoL is understood to be a subjective meaning of life against which one's

life is evaluated. Based on constructivism, it is argued that pwMS are faced with a set of life circumstances following the onset of MS which may, or may not, lead to a reconstruction of their previously held beliefs about the meaning of life and the evaluation of their own life quality.

Participants

Both convenience and purposive sampling were employed to recruit at least 12 participants for each subtype of MS and support data saturation within each subtype [51, 52]. In particular, purposive sampling was employed in view of MS subtypes, illness duration, age, sex, and disability level. Inclusion criteria were diagnosis of MS, capable of informed consent, and able to communicate in English. The exclusion criterion was having a concomitant medical or psychiatric condition.

Potential participants were identified and approached by a consultant neurologist (CAY) at a routine MS outpatient clinic appointment. 87 individuals were initially interested in the study and provided with more details of the study by HA (not involved in their clinical care). Informed consent to participate was obtained from 61 people, however 18 subsequently withdrew, mostly due to time constraints. A small number were not feeling well enough to take part. Thus 43 participants were interviewed (see Table 1): 16 with RRMS, 14 with SPMS, and 13 with PPMS. Participants were categorised into one of four mobility levels related to the Expanded Disability Status Scale [53, 54]: fully ambulatory for ≥ 500m without aid or rest (0 – 4.0); mobile for 20-499m with aids if needed (4.5 – 6.5), unable to walk for more than 5m even with support (7.0 – 7.5), and chair or bed bound (8.0 – 9.5).

Table 1

Data Collection

Data presented in this manuscript were collected by the first author between February 2012 and November 2013 for a doctoral degree. Semi-structured interviews were used to allow the interviewer (HA) to explore any relevant information shared by participants. Interviews were conducted face-to-face at the outpatient clinic in the study site, or by telephone, depending on convenience for participants. Open-ended questions were developed by HA and RC. All interviews started with a question asking participants to define QoL: ‘Could you tell me what you mean by quality of life? What do you understand by it?’ Then, the interviewer proceeded by asking participants to describe their current QoL and to explain what positively and

negatively affected their QoL (e.g. 'What are the things which positively affect your quality of life?' 'How do they affect your quality of life?'). Prompts were made to understand how MS affected their QoL if this was not mentioned. When a participant indicated negative illness impacts on their QoL, they were then asked to explore further. Interviews also covered aspects of MS that were most difficult to cope with, and why: 'What has been the most difficult change to cope with? Why was /is it difficult?' Participants were also asked to reflect on their current QoL and whether the way they evaluated their life quality had changed following MS: 'Think back to when you didn't have the condition, has your definition of quality of life changed after the illness?' 42 participants were interviewed alone. One participant preferred to have their companion during the interview and this was accommodated. However, the companion did not contribute their views to the interview. Interviews lasted between 20-120 minutes. They were audio recorded and transcribed verbatim by the interviewer.

Data analysis

The current study employed a thematic analysis [55] using both inductive and deductive processes [56]. A hybrid process [56] was chosen to reflect constructivism as the philosophical underpinning of the study; new knowledge was incorporated into the existing knowledge to gain more informed understanding. The analysis therefore involved two full analyses of the whole data set (see Figure 1).

Figure 1

During Stage 1 of the thematic analysis, a codebook based on six interviews was developed by the first author for each subtype. This modifications to thematic analysis has been previously described in full [51]. Briefly, coding for the inductive analysis was conducted manually involving colour coding before all the codes were printed out and cut so that it was easier to manually group them. The codes were organised into groups before they were entered into Word document as three tables of codes – one for each subgroup. Stage 2 involved applying these codebooks to the rest of the interviews, making modifications as required, to ensure all extracts for codes were consistent within codes, and there were distinctions between codes. A record of modifications made to codebooks was kept separately for each codebook according to the subtypes of MS. These codes were then deductively re-examined taking into consideration existing literature at Stage 3. More specifically, codes from the inductive analysis were reviewed in view of: previous qualitative literature in this population, the concept of QoL as a subjective life evaluation, and WHO's

definition of QoL. For instance, the understanding that QoL is subjective evaluations involving both affective and cognitive components led to the revision of code employing two levels of life evaluation (i.e. affective and cognitive). In addition, Watson and Tellegen's [57] model of two-factor structure of affect was employed to capture the dimensions of mood and emotions. In terms of WHO's definition, this was used as a working definition to group codes from the inductive analyses into four domains (i.e. goals, expectations, standards, and concerns). Any codes not perceived to fall into provisional grouping of QoL framework were retained for further analysis. The revised codes were then applied to all transcripts with necessary code modifications taking place where necessary. Nvivo software for Mac (version 11.2.1) was utilised to facilitate this process. At Stage 4, potential themes were identified, reviewed and examined before the whole data set was re-read. During the identification and examination of themes, codes related to affective (e.g. positive affect) and cognitive evaluation of life quality (e.g. dissatisfaction) were retrieved to explore how they were linked with other codes – in particular with those identified to reflect WHO's definition of QoL (e.g. standard). Any codes identified as not fitting into the WHO's definition of QoL were also retrieved if they were found to be linked with codes for affective or cognitive life evaluation. Crucially, these initially isolated codes were later identified to fall into the concept of QoL, as defined as WHO, or the concept of coping. A summary table covering all subtypes with participant identifiers was created at this point to map the link between codes. The themes were then defined at Stage 5 to shape the findings, and to provide an understanding of why certain aspects are important for QoL, how they contribute to QoL in MS, and how MS subtypes may influence their life evaluation.

The first author carried out all the coding. In view of the philosophical underpinning of this study (i.e. constructivism), trustworthiness was sought through focusing on sample adequacy, researcher-participant relationships, reflexivity, and rigour of analysis. More specifically, a reflective journal was kept by the first author throughout the study process (i.e. from before data collection until the end of writing her doctorate thesis). In terms of rigour in the analysis, the initial coding was checked by the second author, who also provided regular supervisions to discuss the progress of data analysis and theme development. The final analysis was discussed and critically reviewed by the second and third authors. Consolidated criteria for reporting qualitative studies (COREQ) for this study is available as a supplementary file.

Findings

Participants shared their views on their QoL and data analysis identified four themes: restricted and disrupted enjoyment, disturbed future, challenged sense of self, and well-being of significant others. These themes reflected how participants perceived the goal for their QoL, their new outlook (i.e. expectations), how their standards were challenged, and their concerns. The analysis for each theme is elaborated upon below, and illustrated by quotes from interviews in the associated theme table. Each numbered quote is followed by information on participant's sex, age-group, MS subtype and illness duration.

Restricted and Disrupted Enjoyment

Living an enjoyable life was identified as an essential aspect of QoL for pwMS. Nevertheless, participants reported restricted engagement in activities which had previously given them pleasure. For example, dancing was an activity loved and enjoyed by one participant - particularly as a shared experience with her husband, (see Table 2, Q1). Following the onset of MS this participant had to give up dancing due to fatigue and loss of balance, which disrupted her enjoyment of life. Participants described restrictions in particular activities, and in general aspects of their lives they had previously enjoyed. When someone has previously had a busy social life, the mobility restrictions caused by MS prevent the same level of socialising, which negatively impacts upon their QoL (Q2). Participants shared their comparable experiences, which extended to decreased engagement of pleasurable activities, leading them to feel as if their world had 'gone so small [F; 50s; RRMS; 19y]'. Also depicted in Q3 and Q4.

Table 2

People who experienced relapses had additional specific experiences of how MS served to hijack time in their lives. As described in Q5, during a relapse engagement in activities in a meaningful way was impossible, and life was effectively stopped. They were not alone in describing RRMS as disrupting enjoyment of life in this way (Q6). Nevertheless, although that participant described their relapses as an 'impossible' state, this impact on QoL was moderated by a good marriage (Q7). Similarly, the most commonly shared aspect of life that participants enjoyed was the presence of significant others. For some participants, significant others were their main source of enjoyment due to restrictions in other aspects of their life (Q8, Q9).

Disturbed Future

There was a general expectation that the future with MS would contain deteriorations and unpredictability. Deterioration, as a certain aspect of their condition, was more often shared by people with progressive types of MS, whilst unpredictability was more widely shared by people with relapses.

Table 3

For participants with progressive MS subtypes, deterioration was appreciated as continuous (see Table 3 Q10). Possible physical deterioration was also noted by people with RRMS, yet they were less preoccupied with their deterioration than those with PPMS and SPMS. One participant with RRMS perceived progressive types of MS to be more 'debilitating' and 'steadily worsening' [F; 40s; 14y] than her type of MS. The difference between progressive and non-progressive types of MS in relation to speed of deterioration was also referred to by a PPMS participant with a long duration of illness (Q11). He expressed his regret at having PPMS rather than RRMS, which he perceived to have little effect on physical well-being over time. As implied by this participant, illness deteriorations were often acknowledged and described based on visible symptoms, or the use of living aids (e.g. wheelchair). Furthermore, images of illness deterioration in the future were often introduced through encountering other pwMS, and this could give rise to negative emotions (Q12). For participants to have foresight of how they may one day become was shocking, upsetting and depressing. These images, and the associated indication of their own possible, even likely, future deteriorations, were thus despised. An intense reaction to their likely future deterioration was displayed by one participant, who was experiencing panic attacks following the loss of the capacity to walk (Q13). Although this participant was very distressed caused by the thought of death, most did not relate to MS as a life-threatening illness. Death was rarely mentioned, beyond a perceived irrelevance to their condition (Q14). In general, the future was discussed in terms of disease course, the unpredictable nature of MS, and participants described how their symptoms could vary day-to-day (Q15). The consequence of symptom changes ranged from rather inconvenient and annoying (Q15) to highly stressful if presented as relapses (Q16). Any sudden onset of symptoms which needed urgent medical attention was traumatic (Q16, Q17). Apart from the distressing experience and its lasting effects that needed addressing, Q17 provides a strong image of a lifeless period of time during relapse. It must be noted that different levels of relapses were observed, and some relapses were perceived to be less severe

than those described above. Nevertheless, these accounts suggest how demoralising relapses can be.

Unique to the illness trajectory of RRMS was the potential for the condition to develop into SPMS. Although on the mind of one participant (Q18), a concern over the transition was not commonly expressed. One possible reason for this is different levels of illness awareness and understanding.

Another cause of unpredictability in MS was the possibility of adverse side effects from DMTs, and in particular, apprehension where there was a possibility of developing progressive multifocal leukoencephalopathy (PML), a potentially life-threatening viral brain infection (Q19). Declining DMTs might result in more frequent relapses but commencing DMTs could lead to significant adverse side effects. The 'what does the future hold' question (Q19) sums up the unpredictable aspect of MS. Potential answers triggered fear, stress and anxiety.

Challenged Sense of Self

MS was found to affect participants' sense of self in relation to previous norms. In addition, an individuals' sense of self was vulnerable where they perceived minimum standards for certain roles and ages could not be met. *Sense of Self* as an important aspect for their QoL was expressed similarly across different MS subtypes.

Table 4

In terms of previous norms, any visible presentation of symptoms could create negative emotions and have a negative impact on how someone viewed themselves. For instance, one participant articulated how a particular symptom and its implications hindered her from feeling like a woman thus denying a certain aspect of her identity (see Table 4 Q20). Furthermore, MS challenged participants' sense of self by restricting them from engaging in their occupation (Q21). Although this quote suggests that the participant was occasionally working, she was not meeting her own previous standards and was thus failing to maintain her identity as a skilled worker, as she would define it. This undermined her existential value. This conceptualisation of their existential value being threatened by MS was also raised by other participants, and one even questioned the value of mere existence (Q22). For this participant, being useful through contributing to others was vital to provide her existential value.

The loss of independence was often noted. The significance of relinquishing a driving licence on one's independence was readily appreciated (Q23). When one measured their capability against a basic standard of activity in society – walking, then sense of self was critically challenged (Q24). This participant with SPMS emphasised that walking is a social norm, as confirmed to her by the physiotherapist trying to correct her abnormality i.e. not walking. Other participants also considered wheelchairs or other special aids were a symbol of abnormality (Q25).

Participants described limitations in their capability to meet the social standards for certain roles such as 'mother' or 'partner'. Participants held ideas about how one should behave in a certain role, explained how MS was preventing them from fulfilling the role description. For example, a participant with SPMS expressed how she felt she was failing her husband sexually, indicating a perceived responsibility as a wife to engage in physical intimacy with her husband (Q26). Another participant articulated how she was failing in multiple roles because she could not do what she 'should' (Q27). Two women – one SPMS and the RRMS both explicitly announced that they were not a good mother, not a good friend, not a good partner. These participants devalued themselves, and stated their dislike of the current self. MS restricted these participants from fulfilling, or achieving, a particular role that was valued, and this affected their sense of self.

Sometimes there were assumptions of the normal self, and what someone of their age should be able to do challenged their sense of self (Q28). This participant's comparison of herself with RRMS, and her elderly mother, made her unmet standards even more apparent. Further, urinary incontinence was repeatedly found to challenge participants' age-related beliefs about their self (Q29, Q30). The participant of Q30 emphasised the devastation of an incident through repeatedly describing how negative and damaging the event was. In particular her description of it as 'soul destroying' summarises the adverse impact on the self.

Well-being of Significant Others

The well-being of significant others mattered to the participants. They were keen to do their best to secure the QoL of significant others even at their own expense. Similar to the last theme, this aspect was voiced in similar fashion by participants across different subtypes. One participant suggested that this was because their significant others' QoL was intimately related to her own well-being (See Table 5, Q31). Nevertheless, a sacrificial attitude for the sake of others was more frequently reported. Participants voiced their keen sense of lowering

others' QoL, insofar as their MS restricted significant others from engaging in certain activities, which was a worry (Q32).

Table 5

The potentially greater psychological impact on significant others was attributed to changes in their physical functioning (Q33). An RRMS participant reported the distress experienced by her husband because of relapse. Witnessing incapacity was anticipated to affect the significant others' psychological well-being because they cared about the participant. This participant's reference to 'without getting upset' implies emotional control is practiced by significant others, presumably to avoid a negative impact on the participant but indicating an additional psychological burden for them.

Participants felt that their MS caused restrictions for others looking after them, and this was not good, especially when they had a young family (Q34, Q35). One participant argued that she was sad for her daughter rather than sad for herself, and emphasised that the focus of her concern was on her daughter's well-being rather than her own identity as a mother.

Participants acknowledged that MS-related changes made for constraints on their family in various ways. Some explicitly stated its negative impact (Q36), which in turn caused negative emotions (Q37).

Although shared by only two participants, an important concern expressed in relation to significant other's QoL revolved around the hereditary nature of MS. These participants expressed its significance for them (Q38), and emphasised that their children's QoL was of greater priority than their own QoL.

Discussion

This study was conducted to understand factors that are important for QoL of pwMS. We specifically considered whether there were differences among the three main subtypes of MS in terms of how QoL is affected, addressing a gap in the literature. Using WHO's QoL definition as a guiding compass [58, 59] we found four domains influencing the QoL of pwMS: restricted and disrupted enjoyment, disturbed future, challenged sense of self, and well-being of significant others. We found there were similarities across the sample, but also subtype differences. Of note, for people with progressive types of MS the impact of the steady worsening of MS was the most relevant perception of their prognosis, while people with relapses were more concerned about the unpredictable nature of their MS symptoms.

In line with previous studies we found pwMS wanted an enjoyable life [29, 34, 36], however the disease restricted their engagement in activities they had enjoyed previously and this opposed their notions of QoL. The analysis further highlighted an experience unique to people with relapses. We found that MS relapses were experienced as a major disruption to individuals' lives during which time no meaningful engagement in activities could be made, apart from the presence of significant others. This finding of the impact of relapses on people's ability to enjoy life therefore adds to the previous knowledge of traumatic experience of relapses [37-39]. Another subtype difference highlighted in the current study was with regard to how participants viewed their future. The unpredictability of MS [29, 47, 60] was found to have multiple facets. These included uncertain prognosis [29, 36, 61], side effects of DMTs [62, 63], and transition from RRMS to SPMS [35]. We also showed how the day-to-day uncertainties of MS may differ according to subtype, suggesting the importance of paying closer attention to the psychological impact on people experiencing unpredictable relapses.

In line with previous studies [63, 64], we found that MS posed challenges to previously held norms due to symptoms, and/or restrictions caused by the symptoms. Of note, the current study provides insights into how age may affect QoL [65] through symptoms violating age-related standards. Clinicians should, therefore, pay attention to how a person with MS are reacting to their diagnosis and/or symptoms to understand any age-related challenges they may be facing. For example, clinicians may want to understand what the peers of a young person with MS are spending their time on and how MS may hinder the person to engage with these particular activities. In the current study, physical impairments were described as disabilities, indicating that norms emerged from a medical model [66]. Nevertheless, there is still a need for further understanding on whether this societally constructed view actually reflects human unconscious goals of being well, and whether there can be successful adaptation to long-term illness [67].

Significant others mattered to our participants because of the influence of their well-being and their existential values. There were many examples which suggested that they ascribed greater existential value to others than to themselves. To date, the most commonly studied aspect of the impact of significant others on MS has been in terms of social support and is thus more relevant to the concept of coping [68, 69]. Therefore, the current study provides rich information on why significant others matter to pwMS. Our findings also suggest that the traumatic experience of relapses may be experienced not only by people with RRMS, but also by their significant others. This is supported by a recent review on caregiver burden of MS

which reports psychological burden of the unpredictability related to relapses [70]. In view of this finding of significant others, it is suggested that clinicians and researchers consider the well-being of significant others to understand the QoL of a person with MS. Clinicians may also suggest a range of recreational activities for both pwMS and their significant others to engage together to promote good health while encouraging their quality time together.

Limitations of the current study

Interviews for the current study were conducted before DMT became widely available in the UK as a treatment for progressive MS. It is thought that the availability of the DMT would positively affect the way people perceive their prognosis in view of previous studies reporting DMTs generating the sense of control over the illness and hope for better prognosis [36, 41]. However, the limited availability of the drug may also aggravate the sense of abandon [44, 45] among those who cannot get it or are perceived not suitable for the benefit of this DMT. Qualitative studies are recommended to explore the experience of patients with PPMS in view of newly available DMTs. Also, the summary table as a result of deductive analysis was not created for each subtype – the inclusive summary table may have limited the identification of subtype differences. Whilst codes for coping were included in the analysis, the findings of the current study reflect the research questions. Further studies are necessary to qualitatively explore the concept of coping and how they enable pwMS to maintain and improve their QoL.

Conclusion

This study was conducted to explore influential factors for QoL of pwMS and how they may be influenced by MS subtypes. Conducting sufficient interviews to separately provide data saturations for each subtype of MS, the findings highlighted unique challenges for both progressive and relapsing MS. A sensitive approach needs to be made by clinicians when attending to people with PPMS and SPMS in view of progressive nature of their condition and less treatment availability. In contrast, the traumatic nature of severe relapses and their impacts on QoL are relevant when caring for those with RRMS. Regardless of different illness trajectories, the study promotes care that supports pwMS to maximise their opportunities to be able to enjoy life, make a sense of self that is unaffected by MS, and to contribute to the well-being of significant others.

Declarations

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Conflicts of interest/Competing interests

The authors declare no potential conflicts of interest.

Availability of data and material

The data supporting the findings of this study are available within the article.

Code availability

Not applicable

Author's contributions

HA, RC and CAY contributed substantially to the design of the work. HA collected data and made initial analysis of the data. RC and CAY critically evaluated the interpretation of data. HA drafted the article and all authors revised for further intellectual content, and gave their final approval of the version to be published.

Ethics approval

Ethical approval for this study was granted by the National Research Ethics Service (NRES) for the North West region of the United Kingdom (11/NW/0743).

Consent to participate

All participants provided their signed written informed consent.

Consent for publication

Not applicable

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Table 1. Characteristics of participants.

	RRMS (n=16)	**SPMS** (n=14)	**PPMS** (n=13)
Demographics			
Male	37.5%	29%	46%
Mean age (Range)	47.8 (20-75)	57.8 (39-75)	59.6 (34-75)
Illness Characteristics			
Mean illness duration (Range)	13.2 yrs (5m-45yrs)	19.2yrs (4yrs-31yrs)	14.5yrs (2yrs-40yrs)
EDSS			
0-4.0	8	0	2
4.5-6.5	8	7	6
7.0-7.5	0	2	1
8.0-9.5	0	5	4

EDSS, Expanded Disability Status Scale; PPMS, primary progressive multiple sclerosis; RRMS, relapsing-remitting multiple sclerosis; SPMS, secondary progressive multiple sclerosis

Table 2. Quotes to illustrate the theme *Restricted and Disrupted Enjoyment.*

Q1	Even with him [husband] adapting it [dancing routine] I just couldn't do it. So, that's one of the saddest things really. That I've had to stop dancing. […] I'm getting upset [pause] because we've done everything together really. [F; 40s; RRMS; 14y7m]
Q2	It [MS] does get on my nerves because it has stopped my life. It's stopped all my social life. […] I was always out pubs, friends, wherever. I went – I was always out. [F; 50s; RRMS; 19y]
Q3	I can no longer use my arms properly. I can't turn pages of a book. Even simple things like that. […] I don't particularly like watching the television a great deal so it can be a bit of an empty life. [M; 70s; PPMS; 34y]
Q4	I get out just to a day centre twice a week. [...] That is really my week so it can be quite boring. I would like to do something else, but I'm not able to do anything now. [F; 40s; SPMS; 24y]
Q5	At one point I couldn't even stand the MP3 player or anything on. I was just literally lying there. […] People would pop in but I wasn't even at the point when I didn't want [a visitor] – not because I was feeling sorry for myself – not at all. My brain didn't want to do any chatting or talking. So even if you had visitors coming just to see how you were, it would literally be a 5-minute call and that would be enough. So, just life stopped. […] no interest in eating or anything. I love my food. I really love my food so yes your taste buds go for a while, so there's just no – there's just nothing that you can actually get any pleasure in at all. [F; 40s; RRMS; 14y7m]
Q6	It was just like getting hit by a brick wall. You're running along, living your little life, and then it stops you and that's what it was [a relapse]. [F; 50s; RRMS; 19y]
Q7	No matter how bad you're feeling [because of relapses] if [husband] had turned up – you know that side I'd be happy; in the depths of feeling life shit, I would still be happy that [husband] would turn up. [F; 40s; RRMS; 14y7m]
Q8	I love having her [girlfriend] by my side. She is brilliant. She makes me happy – she really does. [M; 20s; RRMS; 7y].

Q9	I have two kids which give me a lot of pleasures. […] I guess my quality of life is centred around the children really because my health is not good so I don't get much from that. So yeah, the pleasure is centred around the kids. [M; 40s; SPMS; 4y]

Table 3. Quotes to illustrate the theme *Disturbed Future*

Q10	Next year, I will be worse. Won't I? That's MS for you. Next year I will be worse whereas this year… alright I'm worse than last year, but I'm better than next year. [M; 50s; 4y]
Q11	There is a small group of us, who have the progressive deterioration. So, we have to cope with it on a daily or weekly, or monthly basis. And 2 or 3 years on, you are a lot worse than you were 2 or 3 years before. And you've got friends who don't seem to have changed. And I think that is quite depressing to feel that. [M; 70s; 34y]
Q12	I walked into the room and there were loads of people in wheelchairs. And that really shocked me because I didn't know anything about MS and then I was confronted by all these people in wheelchairs. It was quite upsetting. [F; 40s; SPMS; 24y]
Q13	I'm scared of dying. I'm scared of being… [exhale] scared of waking up in a coffin and nobody realises that I'm awake – like you know being buried alive? I'm thinking, 'What's the best way to go? Be buried or be burned?' Because there is no chance of waking up if you are burned. [F; 30s: SPMS; 15y7m]
Q14	Well, thank God', you know. I mean I could have cancer, I could have the - you know, you could be dying of cancer. [M; 70s; PPMS; 31y]
Q15	There is no way I could guarantee that every day from 3 till 6 [that] I was capable of picking up the children from school and being well enough to look after them and you know what I mean? That… that is annoying. [F; 60s; SPMS; 18y]
Q16	Because I was having an episode [relapse] and the last episode I had was a major one where I needed to be taken by ambulance to the hospital. So, ever since that I was extremely nervous that I was going to have another problem. I was more worried about being on my own for quite a while. [M; 20s; RRMS; 3y 11m]
Q17	I'm grateful that I've got my life back and I know I don't want to go back to that [relapse] again. But, I'm still very traumatised from that time. And that's what all the counselling has been about. [F; 40s; RRMS; 7y]
Q18	I'm probably feeling it more now because I've got to the 15-year mark, and when you read anything it says that's the time when relapsing remitting people are turning

	into secondary progression if they are going to. So, that's on my mind a lot at the moment, thinking, 'Am I moving into that category?' [F; 40s; 14y]
Q19	[Side effects are] sort of scary because of the […] – they found that […] a virus in the brain, I think. It is that it increases the risk of PML by 2%, which is unsettling, to say the least. That obviously puts another big question of 'What the future holds.' [M; 40s; RRMS; 18y]

Table 4. Quotes to illustrate the theme *Challenged Sense of Self*

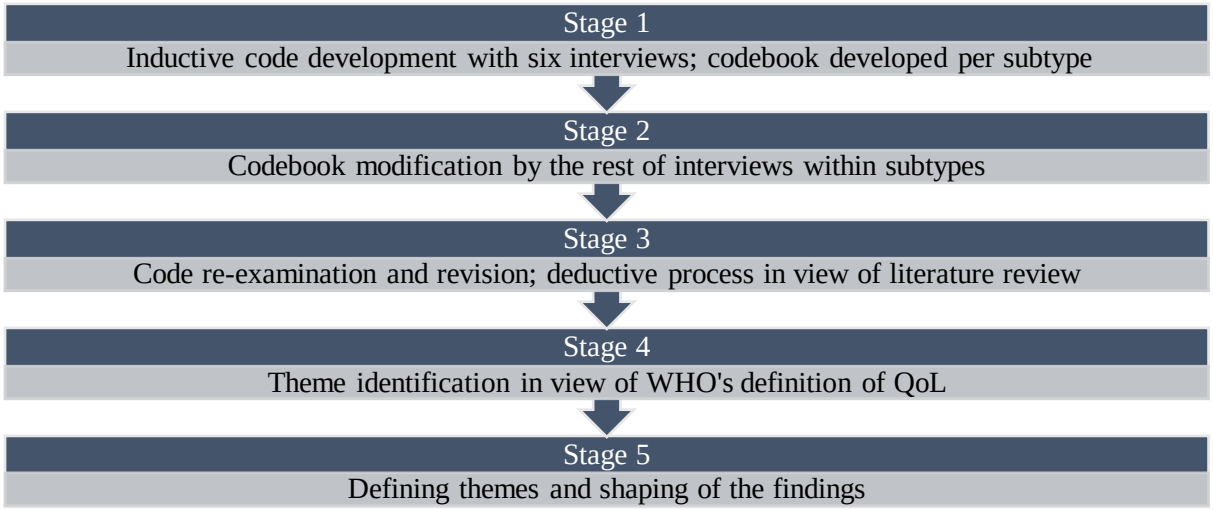
Q20	I still want to feel like a woman. I don't feel particularly sexy or like a woman now that I have to do that [catheterisation]. I have a lot of infections. I'm incontinent. [F; 40s; RRMS; 7y]
Q21	I miss working. I know I do bits and pieces now, but it's not [skilled labour] like I used to do. It's not travelling like I used to and it's not you know do stuff I used to – I'm not that person anymore. […] I just feel like I'm just existing rather than you know having a job. [F; 30s; SPMS; 15y]
Q22	You just don't care anymore, and what's the point you know? Who cares? You are not doing any good to the world. You are not helping anybody. It doesn't make any difference whether you live or die. [F; 60s; SPMS; 18y]
Q23	At the moment [my QoL is] very poor. I'm completely dependent on other people to do everything for me. The big loss in all of that, I mean the first thing that hits you is when you have to give up driving. [M; 70s; PPMS; 34y]
Q24	If I can keep walking, I'd have a better quality of life [exhale]. I can't explain very well. I think it's because you see that for people – see, the walking is the thing to do and er… and if I go into the wheelchair, I'm not doing what I should have been doing. Do you know what I mean? So, that's how I see it as a failure. You should be walking because that's what people say. You know I've got a physio over in [place] and she said she is trying to get me to walk and stand up straight, so I think if I don't do that I'm a failure. […] But I think it's because you know the society thinks that the walking – I think people do see the wheelchair as the option to go down that route so I think that's how I see it as a failure. I would be seen as no longer normal. [F; 50s; SPMS; 21y]
Q25	That [a left footed automatic car] just seemed just like a big stamp saying you're disabled because it was totally – I don't know it just seemed wrong. That's when it starts to dawn on you that there's actually something wrong with you, when you have to get things specially made for you. [M; 50s; PPMS; 4y]
Q26	I think one of the things I do feel about – sexually, I feel like you know, "Oh, I'm failing [husband]". [F; 50s; SPMS; 21y]

Q27	I feel boring and not a good mum, not a good friend, not a good partner and not a good – you know I just don't feel I can do what I should be doing. [F; 30s; SPMS; 15y7m]
Q28	I feel as though I should be able to do more [pause]. I should be able to ... you know I just keep thinking – my mum is 80, nearly 80, and I'm nearly half of her age and she does much more than I do even when I am not fatigued – she still does more than I do. [F; 40s; RRMS; 14y]
Q29	When you can't control your bladder when you wet yourself or whatever – that gives me personally the most… It's most degrading thing. Baby in a nappy. A young child, maybe, wets themselves or whatever. But I'm an adult. I hope to be able to control my bladder for Christ's sake. [M; 50s; SPMS; 22y]
Q30	I fell flat on the floor, wet myself on the floor and that's it – the degrading bits of it and I had to lie there until they come back. Crying my eyes out because I felt, 'This is ridiculous. I'm in my early thirties. This is not right. How can I be in this state? Oh God.' And it was just horrible. […] It was just – awful. I just felt so down and so useless and oh God it was so soul destroying as well. I just - and to actually lie on the floor and wet yourself you know it was just horrible, horrible. [F; 50s; RRMS; 19y]

Table 5. Quotes to illustrate the theme *Well-being of Significant Others*

Q31	I'm allowing him [husband] a space to do that which makes him happier and then I feel better because he is happier. [F; 50s; SPMS; 21y]
Q32	I feel like I'm holding [husband] back out of a lot of things. He was working in [city] quite a lot. Now, we've moved up here, we've moved away from his friends and his work and his studies and places where he can get a lot of work and do things, so it's a lot harder to do his kind of work. [F; 30s; SPMS; 15y7m]
Q33	[You can change from] 'looking alright to suddenly completely incapacitated'. […] When you're so bad, I always say it's harder for the people that are seeing you like that than you are actually going through it yourself because sometimes you're so out of it. But, somebody that cares about you without getting upset is watching you be like that – so it's not fair. [F; 40s; RRMS; 14y7m]
Q34	My children were a lot younger [when I was diagnosed with PPMS] and so it was the panic over being unable to take care of them [F; 40s; PPMS; 12y].
Q35	Things like doing [daughter]'s hair in ponies you know that's no big deal, but it was. And she used to go to school with horrible hair and all that. [F; 50s; RRMS; 19y].
Q36	I think their [family's] quality, where I'm involved, will get worse' [M; 50s; PPMS; 4y].
Q37	I hate when I have to affect the boys that really frustrates me. [F; 40s; RRMS; 2y8m]
Q38	The only thing I have ever worried about is whether MS is hereditary; whether I could pass it to my two girls. So, I mean I would rather suffer any – anything that MS throw at me if that meant the girls wouldn't get it. [F; 40s; SPMS; 24y]

Figure 1. Analysis procedure



QoL, quality of life; WHO, World Health Organization