Assessing Personal Experiences and Preferences in Physical Exercise for Multiple Sclerosis

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ASSESING PERSONAL EXPERIENCES AND PREFERENCES IN PHYSICAL EXERCISE FOR MULTIPLE SCLEROSIS

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Assessing Personal Experiences and Preferences in Physical Exercise for Multiple Sclerosis

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Abstract

The effectiveness of any physical exercise (PE) program is elementary based on one's interest, while that interest depends on personal experience. This study explored the PE-preferences and -experiences of individuals with Multiple Sclerosis (MS). Study included 79 individuals (13 males, and 66 females) diagnosed with MS, aged 38.99±10.72 years. The PE-preferences and -experiences were evaluated using the newly developed Physical Exercise Preferences in Multiple Sclerosis Questionnaire (PEPMSQ). The reliability of the PEPMSQ was checked with Intraclass Correlation Coefficients (ICC), while the validity was checked by determining the differences in PEPMSQ scores between males and females and between individuals who are exercising and those who are not exercising, all using the Mann-Whittney U test (MW) and Receiver Operating Characteristics curves (Area Under the Curve – AUC). The PEPMSQ demonstrated acceptable test-retest reliability (ICC values of 0.71 to 0.95 for most of the items). Analysis of differences evidenced no gender differences in PEPMSQ scores, while exercising-participants perceive: (i) greater health benefits (MW=-2.57, p=0.01), and (ii) benefits from strength exercises (MW=-2.75, p=0.01; AUC=0.71), compared to non-exercising participants. It seems that strength training should be a key component of exercise programs tailored for MS patients. Future studies are encouraged to refine the PEPMSQ and explore the dynamic relationship between MS symptoms, exercise preferences over time, and various health-indices.

Keywords: *personalized exercise, chronic illness, adapted physical activity, rehabilitation, physical fitness*

Introduction

Multiple Sclerosis (MS) is a chronic neurological condition that affects the central nervous system (CNS), which includes the brain and spinal cord. It is an autoimmune disorder (i.e. the body's immune system mistakenly attacks healthy tissue) (Dalgas, Stenager, & Ingemann-Hansen, 2008; Hunter, 2016). Specifically, the immune system targets the protective myelin which covers nerve fibers, leading to inflammation and subsequent damage. The exact cause of MS is unknown, but it is generally believed to result from a combination of genetic predisposition and environmental factors. So far it is known that certain infections (i.e., Epstein-Barr Virus, Human Herpesvirus 6, Cytomegalovirus), low vitamin D levels, and smoking may increase the risk. Four types of MS are specified so far including: relapsing-remitting MS (RRMS), secondary progressive MS (SPMS), primary progressive MS, and progressive-relapsing MS (PRMS) (Hunter, 2016).

Symptoms of MS vary widely depending on the location and extent of CNS damage, but most commonly include fatigue, numbness or tingling in limbs, muscle weakness or spasms, vision problems (e.g., double vision, partial or complete loss of vision), difficulty with coordination and balance, cognitive impairments (e.g., memory problems, difficulty concentrating), bladder and bowel dysfunction (Hunter, 2016). Diagnosing MS involves a combination of neurological examinations, magnetic resonance imaging to detect lesions in the CNS, and lumbar puncture to analyze cerebrospinal fluid. Currently, there is no cure for MS, but various treatments can help manage symptoms and slow disease progression, including disease-modifying therapies, steroids, phys-

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ical therapy and rehabilitation, and lifestyle modifications (i.e., healthy diet, stress management and physical exercise). Physical exercise (PE) plays a crucial role in managing MS, and it has been shown to have numerous benefits for individuals with the condition. Despite the challenges posed by MS symptoms, engaging in regular PE can help improve physical and mental well-being, as well as overall quality of life (Motl & Sandroff, 2015).

Specifically, resistance-based training (strength training) was shown to be beneficial for improving muscle strength, functional capacity, and overall quality of life in people with MS (Dalgas et al., 2008; Schulz et al., 2004). Further, studies collectively show that endurance training (aerobic exercise) can have profound benefits for individuals with MS. For example, in one of the early studies, Petajan et al. established the positive effects of aerobic exercise on MS patients, with the improvements of cardiovascular fitness, muscle strength, and overall quality of life in individuals with MS (Petajan et al., 1996). Supportively, studies confirmed that aerobic exercise significantly improves fitness, mobility, fatigue, and quality of life in adults with MS (Latimer-Cheung et al., 2013). More recent review highlights the various benefits of aerobic exercise in MS patients, including improvements in cardiovascular fitness, walking speed, and quality of life, emphasizing that regular aerobic exercise can reduce the severity of common MS symptoms such as fatigue and depression (Motl & Sandroff, 2015). Last, but not least, the effects of flexibility exercising (including yoga as a form of flexibility training) in MS patients were also examined. In brief, it has been reported that such exercising can improve flexibility, reduce spasticity, and enhance overall quality of life, while participants reported less fatigue and better physical function after engaging in regular yoga practice (Cramer, Lauche, Azizi, Dobos, & Langhorst, 2014). Supportively, results showed that consistent stretching helped maintain or improve flexibility, reduced muscle stiffness, and had a positive impact on spasticity, contributing to better overall mobility and comfort in MS patients (Halabchi, Alizadeh, Sahraian, & Abolhasani, 2017).

It is well known that effectiveness of any PE program is elementary based on one's interest, while it is repeatedly confirmed that interest depends on personal experience (Kastrati & Georgiev, 2020). First, when individuals have direct experiences with a subject or activity, they are more likely to develop an interest in it, while positive emotions associated with an experience (i.e. enjoyment, excitement, or satisfaction), can reinforce interest, while negative experiences may diminish interest (Versic, Idrizovic, Ahmeti, Sekulic, & Majeric, 2021). Further, repeated exposure to a particular subject can lead to familiarity, which often fosters interest, while familiarity reduces the cognitive load associated with engaging in an activity, making it more enjoyable. Off course, the importance of personal experience on interest is additionally aggravated by different influences (i.e. social and cultural, community, peers), but also with feedback and reinforcement (Hofstetter, Hovell, & Sallis, 1990; Rodrigues, Teixeira, Cid, & Monteiro, 2021). Therefore, it is of particular importance to identify most accepted types of PE for specific participants, considering personal interest, opinions and experiences on certain types of PE. There is no doubt that it is of utmost importance for participants with certain health problems, including MS patients.

Studies repeatedly identified importance of PE and emphasized the clear benefits of various PE types in MS patients. Collectively, regular PE is found to be a vital component of managing MS, can help improve physical strength, mobility, and mental well-being, as well as reduce fatigue and enhance quality of life. However, there is an evident lack of research where personal experiences about different types of PE were established among MS patients. This study examined the personal opinions about effectiveness and benefits of various types of PE in MS patients. For this purpose, we aimed to evaluate reliability and validity of the newly developed tool aimed at evaluation of the personal experience and interest for different forms of PE in MS patients. Initially, we hypothesized that newly designed tool will be: (i) reliable and (ii) valid in evaluation of PE preferences in MS patients.

Materials and methods

Participants

This study included 79 individuals (13 males, and 66 females) diagnosed with MS, aged 38.99±10.72 years. Illness was diagnosed 10.00±8.44 years ago. The majority (83.54%) of participants had the relapsing-remitting type of MS, 10.13% had a primarily progressive form, 2.53% had secondary progressive, and 1.26% had benevolent form of MS. The written consent was taken before the start of the study. The Ethical board of Faculty of Kinesiology, University of Split approved the study.

Variables and procedures

This study included demographic characteristics (age, gender), training experience (years of involvement in organized exercise programs/sports), and the newly designed questionnaire on exercise preferences in MS patients. According to the training experience, participants were divided into two groups; individuals who were exercising, and individuals who did not participate in any of the organized exercise programs/sports.

The newly designed questionnaire (Physical Exercise Preferences in Multiple Sclerosis Questionnaire – PEPMSQ) was sent to the target group via email and other social media and answers were collected on the online survey tool (SurveyMonkey). The PEPMSQ consisted of 9 items.

First 4 items had responses on the 5-point Likert scale (Strongly negative, Negative, Neutral, Positive, Strongly positive). Item 1: "Considering my diagnosis, physical activity affects my general state of health"; Item 2: "Considering my diagnosis, prolonged physical inactivity affects my general state of health"; Item 3: "Given my condition, stretching exercises work on muscle spasm"; Item 4. "Given my condition, weight training and strength training work for me". The fifth item was "Sudden movements in training make me dizzy" had responses on the 5-point scale (1-5): I totally agree, I agree, Neutrally, I don tot agree, I completely do not agree. The sixth item stated: "Please rate on the scale below how much physical activity you think would be optimal for you personally", with answers weighting from 1 to 5: Physical activity should be avoided; Minimal physical activity is required; Moderate physical activity is required; Increased physical activity is required; Emphasized physical activity is required. The last 3 items included the question: Please evaluate how suitable you think certain types of exercise are in terms of your health condition: Strength exercises (Item 7); Stretching exercises (Item 8); aerobic exercises (Item 9), with answers on the following 5-point Likert scale from 1 to 5: Extremely unfavorable, Unfavorable, Neutral, Favorable, Extremely favorable.

Statistical analysis

The normality of the distribution was checked with the Kolmogorov-Smirnov test. The descriptive statistics included means and standard deviations for continuous variables, and percentages were displayed for categorial variables. Differences between gender and exercising categories were calculated by Mann-Whitney U test. Additionally, to determine the differences in exercise preferences between exercising/non-exercising groups we used the Receivers Operating Characteristics Curve (ROC), with the area under the curve values (AUC) of above 0.70 indicating good discriminative power. To determine the test-retest reliability we used intraclass correlation coefficients (ICC), with two-Way Random Effects Model with Absolute Agreement. ICC values are interpreted as follows: less than 0.5 indicates poor reliability, 0.5 to 0.75 suggests moderate reliability, 0.75 to 0.9 indicates good reliability, and greater than 0.9 signifies excellent reliability. The statistical package Statistica (TIBCO, CA) was used for all analysis, with the p-level of 0.05.

Results

Sample characteristics

The test-retest reliability is displayed in Table 1. Items 2 (physical inactivity) and 8 (stretching suitability) had poor reliability and were not included in further analysis. The rest of the items had moderate to excellent reliability values.

Table 1. Test-retest reliability of the newly constructed questionnaire (ICC – Intraclass Correlation Coefficient; CI – Confidence interval)

	ICC	Lower 95% CI	Upper 95% CI
Item 1	0.71	0.14	0.89
Item 2	0.38	-0.72	0.78
Item 3	0.75	0.19	0.92
Item 4	0.93	0.79	0.97
Item 5	0.77	0.33	0.92
Item 6	0.81	0.47	0.93
Item 7	0.95	0.84	0.98
Item 8	0.3	-1.1	0.76
Item 9	0.75	0.29	0.91

Note. Item 1: Considering my diagnosis, physical activity affects my general state of health; Item 2: Considering my diagnosis, prolonged physical inactivity affects my general state of health; Item 3: Given my condition, stretching exercises work on muscle spasm; Item 4: Given my condition, weight training and strength training work for me; Item 5: Sudden movements in training make me dizzy; Item 6: Please rate on the scale below how much physical activity you think would be optimal for you personally; Item 7: Please evaluate how suitable you think strength exercises are in terms of your health condition; Item 8: Please evaluate how suitable you think stretching exercises are in terms of your health condition; Item 9: Please evaluate how suitable you think aerobic exercises are in terms of your health condition; please see Materials and methods for more details on scoring.

The normality of the distribution is shown in Table 2. All variables except for age did not reach the normality of the distribution, therefore, non-parametric statistical tests were used in further analysis.

Table 2. Normality of the distribution of study variables

Variable	N	max D	K-S	Lilliefors
Age	79	0.14	$p < 0.10$	$p < 0.01$
Years of training	79	0.30	$p < 0.01$	$p < 0.01$
Physical activity perceived influence	78	0.26	$p < 0.01$	$p < 0.01$
Stretching exercises perceived influence	77	0.25	$p < 0.01$	$p < 0.01$
Strength exercises perceived influence	75	0.26	$p < 0.01$	$p < 0.01$
Sudden moves and dizziness	78	0.25	$p < 0.01$	$p < 0.01$
Adequate physical activity perceived	78	0.37	$p < 0.01$	$p < 0.01$
Strength exercises suitability	78	0.31	$p < 0.01$	$p < 0.01$
Aerobic exercises suitability	78	0.30	$p < 0.01$	$p < 0.01$

Note. N – number of participants, K-S – Kolmogorov-Smirnov test

Differences according to gender are displayed in Table 3. There were no significant differences in any of the variables included in this study.

Descriptive statistics and differences according to exercising status are presented in Table 4. Participants who are involved in physical exercises consider that physical activity

Table 3. Gender differences in study variables

	Female (n=66)		Male (n=13)		Mann-Whitney U test		
Variables	Mean	SD	Mean	SD	U	Z	p-value
Age (years)	39.61	10.94	35.85	9.29	331.00	1.29	0.20
Years of training (years)	3.71	6.68	5.31	7.83	380.50	-0.63	0.53
Physical activity influence (score)	3.85	0.88	4.00	0.85	368.00	-0.38	0.70
Stretching exercises influence (score)	3.55	0.85	3.00	0.85	259.00	1.83	0.07
Strength exercises influence (score)	3.25	1.06	3.75	0.87	283.00	-1.37	0.17
Sudden moves and dizziness (score)	2.53	1.21	2.83	1.27	341.00	-0.75	0.45
Adequate Physical activity (score)	3.38	0.63	3.17	0.72	348.00	0.66	0.51
Strength exercises suitability (score)	3.64	0.89	3.58	0.79	371.50	0.33	0.74
Aerobic exercises suitability (score)	3.61	1.15	3.67	1.23	381.00	-0.20	0.84

positively influences their condition more than the non-exercising group. Furthermore, active group consider that strength exercises are more beneficial for their health condition more than does the non-exercising group.

Figure 1 shows the differences between non-exercising and exercising group by the Receiver operating characteristics curve (ROC). The most significant variable is Strength exercises influence (Item 4), with Area Under the Curve (AUC) of 0.71 (0.59-0.83 of 95% Confidence interval). Stretching exercises influence (Item 3) and aerobic exercises suitability (Item 9) did not reach statistical significance with AUC of 0.58 and 0.61, respectively.

Table 4. Descriptive statistics and differences according to exercising status

	Total sample (n=79)		**Not-exercising (n=39)**		**Exercising (n=40)**		**Mann-Whitney U test**		
Variable	Mean	SD	Mean	SD	Mean	SD	U	Z	p
Age (years)	38.99	10.72	38.85	10.70	39.13	10.88	769.50	-0.10	0.92
Years of training (years)	3.97	6.86	0.00	0.00	7.85	7.93	0.00	-7.64	0.001
Years of being diagnosed (score)	10.00	8.44	8.95	6.29	11.06	10.12	705.50	-0.17	0.87
Physical activity influence (score)	3.87	0.87	3.61	0.82	4.13	0.85	502.50	-2.57	0.01
Stretching exercises influence (score)	3.47	0.87	3.29	0.90	3.64	0.81	612.00	-1.31	0.19
Strength exercises influence (score)	3.33	1.04	2.95	0.98	3.73	0.96	408.50	-3.12	0.01
Sudden moves cause dizziness (score)	2.58	1.21	2.53	1.18	2.63	1.25	734.50	-0.25	0.80
Adequate Physical activity (score)	3.35	0.64	3.21	0.53	3.48	0.72	594.00	-1.65	0.10
Strength exercises suitability (score)	3.63	0.87	3.34	0.81	3.90	0.84	474.00	-2.85	0.01
Aerobic exercises suitability (score)	3.62	1.15	3.45	1.11	3.78	1.19	604.00	-1.55	0.12

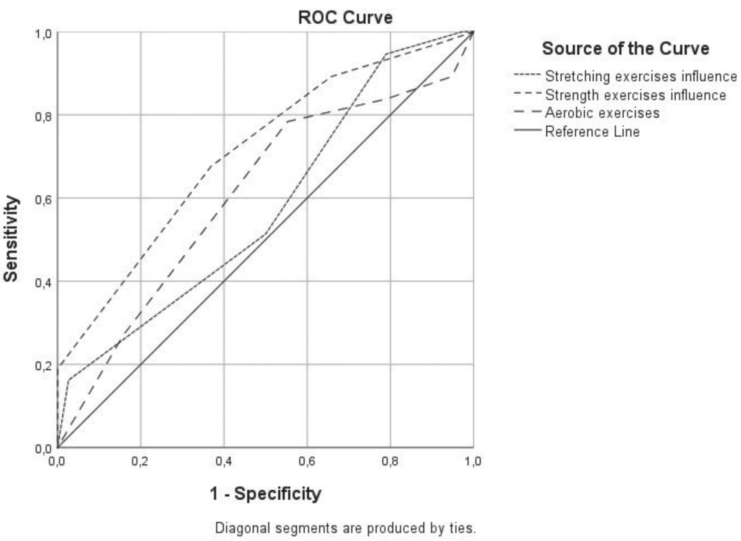

FIGURE 1. Receiver operating characteristics curve for differences between non-exercising and exercising group

Discussion

There are several main findings of the study. First, the newly developed questionnaire had acceptable test-retest reliability, with only two items not reaching satisfactory reliability level. Second, there are no gender differences in the opinions about effectiveness and benefits of various types of PE in MS patients. Third, participants who are involved in physical exercises are considering that physical activity has positive influence on their condition more than the non-exercising group does. Finally, participants who are involved in physical exercises perceive strength exercises as having the best effect on their health condition more than the non-exercising participants.

One of the aims of this research was to check the test-retest reliability of the PEPMSQ. The evaluation of test-retest reliability guarantees the stability and temporal consistency of the questionnaire in assessing the advantages and efficacy of PE among MS patients, hence contributing to more precise research conclusions, enhanced clinical decision-making, and better patient outcomes (Akbiyik et al., 2009; Mathiowetz, 2003). Generally, good test-retest reliability means that the same outcomes are reliably measured by the questionnaire after several administrations (Mathiowetz, 2003). In other words, a questionnaire must produce similar responses when filled out by the same patients at different times and under the same circumstances in order to be deemed reliable. Nevertheless, as MS is a progressive, chronic illness, its symptoms might vary from patient to patient, but answers to the questionnaire should be consistent within the individual (Hosseini, Homayuni, & Etemadifar, 2022). Notably, majority of the items included in the PEPMSQ had satisfactory test-retest reliability values, which means that this questionnaire has temporal stability.

However, two items did not reach the satisfactory level of test-retest reliability (i.e., two items had ICC values lower than 0.5), which could be explained as follows. MS symptoms tend to vary within the individual, which can influence how patients view the effects of inactivity or the benefits of stretching exercises (Motl, Mullen, Suh, & McAuley, 2014; Saedmocheshi, Yousfi, & Chamari, 2024). For instance, on a day when a patient feels less fatigued, they might find stretching helpful. However, on a day when their symptoms are more intense, their perspective might change, leading to different answers each time they're asked. Such variability can result in inconsistent responses over time in these two items. On the other side, these items might not be formed precise enough which can lead to subjective interpretations of the question (Choi & Pak, 2005). For example, a patient might see "inactivity" as a routine rest period during the first survey administration time but view it as something negative during another, depending on their mood, energy levels, or recent experiences. Moreover, there is a possibility that some external factors influence the responses to certain items of the questionnaire. Namely, changes in a patient's environment, stress levels or recent physical activity experiences can influence how they view inactivity and stretching exercises (Stults-Kolehmainen & Sinha, 2014). Nevertheless, these items should further be refined for greater clarity which could lead to adequate reliability, but the greater deal of questionnaire is reliable and can be used as such.

One of the approaches in studying validity of the newly developed tool (PEPMSQ) was the identification of the eventual differences between genders in evaluated variables/questionnaire items. In the realm of assessment and measurement, validity evaluation aims to determine whether a test or assessment tool truly measures what it claims to measure. The concept of "groups of interest" becomes crucial in this process, as validity is often examined in relation to how well the assessment performs for different groups of people. In our case, the most logical scenario was evaluation of the differences between males and females, since differences in gender might affect how certain questions or tasks are interpreted or performed, impacting the validity of an assessment for both males and females. Indeed, such an approach is frequently applied in studies evaluating validity of the measurement tools intended to be used in both genders, irrespective of the field of science (Carragher et al., 2016; Pesce, Masci, Marchetti, Vannozzi, & Schmidt, 2018). Evidently, no significant gender differences were observed, indicating that PE preferences and experiences are generally consistent across male and female MS patients. While it is generally expected that existence of significant differences between groups indicate proper validity of the measurement tool, in our study this is not the case. Quite contrary, lack of differences between males and females indicates appropriate validity of the PEPMSQ. There are several reasons for such conclusion.

It's possible that similar healthcare advice, shared experiences with the condition, and shared aspirations between male and female patients account for the lack of gender variations in perceptions regarding the efficacy and advantages of PE in MS patients. Namely, MS affects both sexes equally in terms of the physical difficulties and symptoms that both men and women face, such as exhaustion, muscle weakness, and problems with mobility (Pau et al., 2020). Regardless of gender, such similar experiences may result in comparable opinions about the efficacy and advantages of PE. Moreover, another potential reason could be the fact that healthcare professionals frequently prescribe the same PE regimens to all MS patients, regardless of gender; emphasizing exercises that enhance total strength, mobility, and endurance (Kalb et al., 2020). Therefore, male and female MS patients may have similar priorities for health. This could result in divergent opinions about the kinds of exercises that are most helpful and this common approach to PE recommendations may lead to similar results and perceptions of efficacy between genders (Kalb et al., 2020; Learmonth & Motl, 2021). Finally, another potential reason is that men and women with MS may be motivated to participate in PE for similar reasons, such as enhancing their mobility and quality of life, which may result in similar evaluations of the activity's preferences and effectiveness (McCarty, Sayer, & Kasser, 2022). While we are not able to define which of the previously stated reasons contributed to our findings (e.g., similar results in both males and females), it is clear that there are no valid reason for genders being different in PEPMSQ scores, which consequently highlights the proper validity of the measurement tool.

The results of this study reported that physically active MS patients (i.e., exercising group) are more likely to recognize and report the benefits of physical activity on their health condition compared to individuals who are not exercising. This can be explained by several factors. The most important one is the fact that the familiarity with PE seems to reinforce its perceived value, suggesting the importance of encouraging physical activity participation among MS patients (Peralta et al., 2021). Namely, active individuals get to experience the benefits of PE firsthand. By staying active, they might notice improvements in their symptoms, mood, or overall well-being, which encourages them to keep exercising and reinforces the value of staying active. Moreover, active individuals might feel the benefits of PE such as reduced stiffness, improved mobility, improved strength and higher energy levels, which can all lead to increased awareness about the benefits of physical activity (Dalgas et al., 2008).

One important thing which is crucial for long involvement in PE and perceptions of its benefits is psychological improvement. Namely, physical activity offers numerous psychological benefits, which improve the well-being of individuals dealing with chronic conditions like MS. One of the most significant psychological benefits is increasing self-efficacy (i.e., the belief in one's ability to successfully carry out tasks and achieve goals). When MS patients make exercise a regular part of their lives, they often feel more in control of their health and physical abilities which helps them stay committed to their exercise routines, even when facing the difficulties that come with their condition. Indeed, study found that MS patients who were regularly active had higher levels of self-confidence and reported a better quality of life compared to the less active ones (Motl & McAuley, 2014). Likewise, it was proven that exercise can reduce feelings of depression and anxiety and lift mood, largely by boosting self-efficacy and getting a stronger sense of control over health (Imayama et al., 2013).

Strength exercises are perceived as particularly beneficial for health condition by MS patients, compared to other exercise types. The perception that strength exercises are most beneficial when compared to other types of exercise is probably related to some specific physiological background. Due to nerve damage, MS leads to numerous motor symptoms including muscle stiffness, and weakness which lead to difficulties with mobility, coordination and balance (Hunter, 2016). All of these factors can be improved by targeted strength training. Indeed, 12-week strength training intervention on lower extremities in MS patients led to improvements in strength level and functional capacities (Dalgas et al., 2009). Supportively, experimental evidence confirmed that 12-week intervention of high-intensity interval training along with resistance training led to improvements in muscle strength and quality of life in MS patients (Zaenker et al., 2018). Moreover, an 8-week maximal strength training intervention led to improved balance in MS patients (Karpatkin et al., 2016). Collectively, the positive effects of strength training in MS patients has been synthesized in one study which reported that individuals with MS experienced notable improvements, including an 8.2% reduction in fatigue, a 21.5% increase in functional capacity, an 8.3% boost in quality of life, a 17.6% gain in muscle power, and a 24.4% increase in electromyography activity after strength training altogether supporting previous discussion (Cruickshank, Reyes, & Ziman, 2015).

It is also important to note that strength training has been reported to have significant influence on improving gait performance through improving the strength level of the muscles included in walking (Mañago, Glick, Hebert, Coote, & Schenkman, 2019). This is of particular importance as it is well known that one of the most common issues that people with MS have is difficulty walking; up to 93% of MS patients report having trouble walking ten years after diagnosis (van Asch, 2011). Therefore, strength training improves walking performance and reduces the risks of falls which is high among MS patients. Notably, guidelines recommend that adults with MS should aim for at least 30 minutes of moderate aerobic exercise twice a week, along with strength training for major muscle groups twice a week, indicating that following this routine can help reduce fatigue, improve mobility, and boost overall quality of life (Latimer-Cheung et al., 2013). Therefore, given the evidence-based facts that strength exercises have significant impact on MS patient's quality of life, it is not surprising that patients who were exercising experienced these benefits and afterwards reported positive perception of the strength exercises on their health condition.

It is important to recognize the limitations of this study. Because of the small sample size, it may be harder to extrapolate the results to the entire MS population. Furthermore, the study used self-reported data, which is prone to bias especially when it comes to symptom intensity and frequency of exercise. It is also impossible to determine a causal relationship between exercise preferences and reported benefits because of the study's cross-sectional nature. Furthermore, additional validation is required to establish the PEPMSQ's sensitivity and applicability across varied MS populations, including those with varying degrees of disability, even though it displayed adequate test-retest reliability.

Notwithstanding these limitations, the study has several strengths. An important development in determining exercise preferences among MS patients is the creation and preliminary validation of the PEPMSQ. The study has the potential to enhance the quality of life and management outcomes for people with multiple sclerosis (MS) due to the utilisation of a dependable questionnaire and the focus on an individualised approach to exercise.

Conclusions

The findings suggest that the PEPMSQ is a reliable tool, with most items demonstrating acceptable test-retest reliability, which supports its use in both clinical and research settings. Importantly, the study highlights that individuals with MS who regularly engage in PE perceive greater benefits from PE, particularly strength exercises, compared to those who are less active. This emphasizes the role of personal experience in shaping exercise preferences and underlines the necessity of tailoring exercise programs to the specific needs and interests of MS patients to enhance adherence and improve outcomes. Overall, this research contributes valuable insights into the personal exercise preferences of MS patients and underscores the importance of personalized exercises. Future studies are encouraged to refine the PEPMSQ and explore the dynamic relationship between MS symptoms and exercise preferences over time.

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Conflicts of interest
The authors declare that there are no conflict of interest.

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