REVIEW ARTICLE

Importance of physical activity in people with multiple sclerosis

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Summary

Physical activity (PA) in people with multiple sclerosis (pwMS) is related to positive effects on numerous bodily functions such as mobility, balance, fatigue, cognition and improves their overall quality of life. Recent research pointed out possible effects of PA on disease progression and even on the risk of developing the disease. Despite these facts, pwMS are still less active than general sedentary population, so improving their participation in PA should be one of the very important goals in their treatment.

In order to adequately tailor PA goals, pwMS should be referred to rehabilitation specialist from the initial stage of the disease. It appears that programs that include walking are much appreciated by pwMS, so perhaps they should be prioritized in all patients with mild and moderate disability levels. Special attention is needed for the group of patients with severe disability in order to improve availability of venues and trained assistants that can help them stay maximally active.

Barriers to reduced PA stem from the patient's health status, cognitive and behavioral factors on one hand, and the physical and social environment on the other. For that reason, it is very important to include patient's preference for a modality of PA when proposing PA plans. Long-term adherence to PA programs remains insufficiently studied, so further research is needed to address this important issue, which appears to be a key step toward improving PA engagement in pwMS.

Keywords: physical activity, multiple sclerosis, exercises.

INTRODUCTION

Physical activity (PA) is related to multiple health benefits, physical and psychological, demonstrated in the general population as well as in patients with different chronic diseases (1). General health benefits include lower risk for cardiovascular diseases, diabetes mellitus, obesity, cognitive dysfunction, and in the elderly population, PA is related to diminished risk of falls and frailty (2-4).

Physical activity is defined as bodily movement produced by the contraction of skeletal muscles, which causes substantial energy expenditure compared to the resting state (5). It includes activities related to work, household, leisure time, transport, sports activities, and exercise. Exercises are a form of PA that is planned, structured, and repetitive, with a goal of improving or maintaining physical fitness (5). So far, there is no clear evidence on the different effects of exercises compared to PA, and they are generally considered to have comparable effects if performed at moderate to high intensity, as has been shown for outcomes of physical function in older healthy individuals (6).

People with multiple sclerosis (pwMS) are less physically active than the sedentary general population (7), which is to be expected, considering their difficulties in walking, balance, and fatigue. Insufficient PA additionally worsens their physical condition by causing muscle weakness and deconditioning, but also leads to more pronounced neurological symptoms and signs of disease, which could be influenced by engaging in PA. Furthermore, in order to obtain and preserve the health benefits of PA and exercise, regular activity throughout one's life is necessary. For this reason, much of the research in recent years has been oriented towards a better understanding of the preferences of pwMS for PA, barriers, and strategies for improving it (8, 9).

Our research aimed to synthesize existing knowledge on this topic, both the benefits and barriers, in order to offer a comprehensive review for healthcare practitioners.

METHODS

A search of PubMed and PEDro databases was performed in order to identify studies related to the effects of PA in multiple sclerosis, including recommendations, facilitators, and barriers to PA, published in the English language within the last 15 years. This encompassed experimental and clinical trials, as well as reviews on the topic.

EFFECTS OF PHYSICAL ACTIVITY AND EXERCISE

The effect of exercises on symptoms and signs of disease (tertiary prevention) has been well known for years and is a mainstay of rehabilitation programs. There is a large body of evidence on the positive effects of different types of exercises on mobility, balance, muscle strength, endurance, fatigue, and quality of life (10, 11). Data from available systematic reviews and meta-analyses suggest that general exercises can positively influence most of the bodily functions listed by pwMS as most important (fatigue, pain, walking, balance, cognition) (11). When analyzing separate effects of different exercise modalities, there is a positive effect of resistance and aerobic training on most of the bodily functions (12), while evidence for yoga and Pilates is still scarce (13, 14).

Furthermore, the impact of exercise and PA might extend beyond influencing symptoms and signs of disease. There is emerging evidence for its potential secondary and even primary prevention effect (11). Disease-modifying effect of exercise and PA (secondary prevention) is mainly shown in studies on animal models (15-17). In pwMS, few interventional studies demonstrated brain MRI changes related to exercise, such as improved functional connectivity, viscoelasticity, and white matter plasticity (18-21). Some clinical studies have shown a decreased relapse rate, but this effect was inconsistently reported, as it was not the primary outcome in any of the studies (22).

The relationship of PA and decreased risk of developing MS (primary prevention) is shown in two extensive case-control studies, where moderate to high intensity physical activity was related to a lower risk of developing multiple sclerosis (23, 24). Although the causality can be questioned, these results are valuable, as they highlight a strong association that warrants further analysis.

Regarding explanatory mechanisms of exercise-induced symptomatic, disease-modifying, and preventive effects, existing data are based on its neuroprotective role. The majority of research in this field has demonstrated a relationship between exercise-induced changes in reducing inflammation and/or increasing the expression of neurotrophic factors (brain-derived neurotrophic factor (BDNF), in particular) and the preservation of CNS structure and function (15, 16, 25). It is also believed that the effect of exercises could be through preservation of the brain blood barrier and cerebral perfusion; however, more data on this potential mechanism are still expected from future studies (26, 27).

PHYSICAL ACTIVITY RECOMMENDATIONS

Current recommendations for PA in pwMS suggest a minimum of 150 minutes of exercise per week and/or 150 minutes of lifestyle PA (28). Lifestyle PA includes at least 30 minutes of moderate intensity PA that is accumulated through different daily activities (29). Exercise or PA recommendations in this guideline (28) are stratified according to the Expended Disability Status Scale (EDSS), and the type and intensity of exercises vary depending

on the spectrum of neurological signs and symptoms. An early evaluation of patients is suggested for tailoring an individualized activity plan. The organization of physiotherapy in Europe differs a lot (30), so patients should first be evaluated by an available MS specialist (rehabilitation physician, physiotherapist, occupational therapist, or sport scientist, all experienced in this field), depending on the healthcare system organization. For people with lower disability levels, whose mobility and balance are not impaired, any kind of activity can be performed, with an emphasis on undertaking moderate to high-intensity activity within a sufficient time period. With the increase in disability, a specialist referral is necessary to obtain an appropriate exercise or activity plan prescription. When mobility is limited, exercise should be performed with the assistance of a trained professional. Progression towards the aimed PA levels should be gradual and in accordance with the patient's preferences, capabilities, and safety considerations (28).

PHYSICAL ACTIVITY FROM THE PATIENTS' PERSPECTIVE

Despite the acknowledged benefits of PA, there is still a substantial gap in its adoption by pwMS. Research directed towards patients' perspectives is therefore a valuable resource for the analysis of reasons related to such discrepancies. The study that showed consensus made PA preferences in community-dwelling pwMS (9) demonstrated that highly prioritized activities were self-care, daily life, and domestic activities, while stretches, physiotherapy, and non-weight bearing exercises were at the bottom of top ten activity list. Activities such as strengthening exercises, endurance training, yoga, and Pilates were eliminated during the first rounds of consensus. Looking for the reasons for engagement in PA, in the same study, the consensus ranking showed improving MS symptoms as the most important reason, followed by categories such as "out of necessity"," to keep active", and "to keep walking". Although including a relatively small number of participants, the data from this study offered, for the first time, consensus-based answers generated in the community-dwelling population of pwMS, underlining differences between recommendations given by experts and preferences of pwMS.

A large body of evidence on PA in pwMS was collected during the COVID pandemic from an extensive international survey study that included 11 countries and more than 3000 respondents (31-33).

During a pandemic, there was a concern that already reduced PA would further diminish due to restrictions and fear of contracting the infection, so much effort was put into research in order to minimize this potential negative impact. Although this study aimed to register PA during the COVID pandemic, it also gave us important data on pre-pandemic PA of pwMS. The majority of respondents (83%) reported being physically active pre-pandemic, mainly participating in PA of moderate intensity (31). The most practiced activity was walking for mild and moderate levels of disability, followed by exercises in the gym and physiotherapy as a dominant way of activity for severely disabled persons (31). As for the use of technology, the majority (65%) did not use any of it, and among those who did, only the use of wearable devices such as pedometers or smart watches was notable (31). Existing recommendations for minimum PA were fulfilled by 64% of patients with mild disability level, 51% of moderate disability, and only 39% of severely disabled (32). Special concern emerged regarding low percentage of patients willing to change their physical activity habits among the physically inactive (31).

BARRIERS AND FACILITATORS OF PHYSICAL ACTIVITY

Although research data showed high adherence to exercises in a short-term training period (12), data on adherence in a long-term period are scarce. As pwMS are insufficiently physically active, adherence to exercise is one of the main questions to address, in order to improve PA. Rehabilitation, PA, and exercises are behavioral interventions that include educational and interactive treatment in order to promote healthy behavior change. Very little data are available on approaches for initiating and then sustaining change in PA, proposing different models such as: group training, socializing via internet exchanges, application of gaming settings, health education, financial motivation, but with no apparent efficacy of any of them (34). Some research pointed out the importance of patient–clinician interaction and knowledge translation into clinical practice by health care providers, as one of the most essential ways for the promotion and maintenance of PA in pwMS (12). It is shown that pwMS are interested in getting information about exercising, searching for materials supporting home and community-based exercising and seeking for interaction with health care providers, particularly trough face to face interaction, in initiating and maintaining PA (35). On the other hand, health care providers identified having opportunities for exercise promotions and were looking for educational resources, protocols and guidelines for promotion of behavior change in people with multiple sclerosis (36). Therefore, there is an emerging need to put effort in better organization of health care system, to enable dissemination of information in order to enhance PA of pwMS.

Barriers to PA are numerous and should be carefully assessed when making PA plans. They are put in six categories and include: physical and social environment, health condition, cognitive or behavioral components, costs, and time (28, 37). Physical environment includes

rural versus urban environments, home environment, community facilities, parking access, transportation, and temperature (climate) (28). Social environment is related to limited support from providers or family, exclusion, dependence, social stress, attitudes of others, cultural factors, and socioeconomic factors (28). Cognitive /behavioral factors include fear, poor self-management, frustration, low confidence, depression, impaired memory, planning, prioritizing, and focus (28). Research conducted during the COVID-19 pandemic identified several factors that contributed to increased physical activity (PA), including public messaging on the importance of staying active, increased free time, greater family support, improved daily structure, and reduced costs (31). These findings reinforce the previously identified barriers to PA.

CONCLUSION

Based on existing data, it is obvious that there is still much to be done in order to improve PA level among pwMS. Staying active is one of the most important messages that should be presented to all patients, from the initial contact with the specialist, with all the benefits clearly explained. In order to help patients, preserve a physically active lifestyle, the importance of specialists and institutional support, and collaboration between them is crucial. It seems that programs that include walking are much appreciated by pwMS so maybe they should be prioritized in all patients with mild and moderate disability levels. Special attention is needed for the group of patients with severe disability in order to improve their physical activity level. This includes better availability of outpatient physiotherapy centers, as well as local community and patients'organization engagement in ensuring venues, equipment, and trained assistants. Patients' preferences regarding the modality of PA have to be taken into account, as there are still many discrepancies between experts' recommendations and patients' perspectives. Therefore, much work lies ahead, especially to warrant long-term adherence to proposed physical activity plans, as it seems to be one of the biggest challenges for improving PA in pwMS.

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VAŽNOST FIZIČKE AKTIVNOSTI KOD OSOBA OBOLELIH OD MULTIPLE SKLEROZE

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Sažetak

Fizička aktivnost (FA) osoba sa multiplom sklerozom (oMS) je povezana sa brojnim pozitivnim efektima na telesne funkcije kao što su mobilnost, balans, zamor, kognicija i poboljšava sveukupni kvalitet života obolelih. Skorašnja istraživanja ističu i mogućnost uticaja FA na progresiju bolesti, pa čak i na smanjenje rizika od njenog nastanka. Uprkos ovim činjenicama, oMS su i dalje manje fizički aktivne od opšte populacije sa sedentarnim načinom života., te poboljšanje FA treba da bude jedan od važnih ciljeva u sklopu njihovog lečenja.

U cilju adekvatnog kreiranja ciljeva vezanih za poboljšanje FA, oMS treba uputiti specijalisti rehabilitacione medicine od samog početka bolesti. Programi koji uključuju hodanje, jedan su od vidova FA koji oMS preferiraju i trebalo bi ih prioritizovati kod obolelih sa lakim i srednjim stepenom onesposobljenosti. Posebnu pažnju takođe treba usmeriti na obolele sa teškim stepenom onesposobljenosti u smislu poboljšanja dostupnosti prostora i pomoći, što bi omogućilo veći stepen fizičke aktivnosti ove grupe pacijenata.

Prepreke vezane za smanjenu FA potiču sa jedne strane od zdravstvenog stanja obolelih, njihovih kognitivnih i bihejvioralnih karakteristika, a sa druge strane, vezani su za uslove sredine i socijalni kontekst. Zbog svega toga, pri planiranju fizičkih aktivnosti veoma je važno uključiti obolele i uzeti u obzir njihove afinitete ka određenom modalitetu FA. Adherenca obolelih za programe FA u dužem vremenskom periodu nije dovoljno ispitana. Ovaj faktor smatra se jednim od najvažnijih za povećanje FA i fokus budućih istraživanja treba usmeriti ka njegovom ispitivanju.

Ključne reči : fizička aktivnost, multipla skleroza, vežbe

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