

## The physical and occupational activity of patients with multiple sclerosis depending on the form of clinical disease

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### ABSTRACT

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**Introduction:** The progressive nature of multiple sclerosis (MS) is associated with numerous neurological deficits, leading gradually to deteriorating health and to disability.

**Purpose:** The aim of this study was a subjective assessment of the physical and occupational activity of individuals with MS depending on the clinical form of the disease.

**Materials and methods:** We used the original to conduct the research, with 28 closed questions. The study was carried out from December 1, 2018, to January 31, 2019, following approval by the Bioethics Committee of the Medical University of Białystok, among persons belonging to the Association for Helping Sick People for Multiple Sclerosis in Białystok and patients of the Neurology Department of the University Clinical Hospital in Białystok. The study sample comprised 50 people diagnosed with MS, 41 women and 9 men.

**Results:** The most frequently occurring clinical form of MS was relapsing-remitting (68%). In this form, most participants had good physical fitness (44%). In those with the progressive-recurrent form (50%), very poor physical fitness was subjectively noted. Of those with the relapsing-remitting type of MS, 50% were professionally active, while none of the participants with the progressive-recurrent form were. Both the physical and occupational activities of MS patients were frequently limited by fatigue, balance disturbances, and movement difficulties. Fatigue was the most common symptom for most individuals with MS (82%).

**Conclusion:** MS has a significant impact on both the physical activity and occupational functioning of patients. In the clinical form of MS, relapsing-remitting, patients' physical fitness was better.

**Keywords:** Multiple sclerosis, physical activity, occupational activity

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## **INTRODUCTION**

Multiple sclerosis (MS) is a chronic, inflammatory, autoimmune, neurodegenerative disease of the central nervous system, the essence of which is demyelination and disintegration of myelin sheaths of nerve cells. Progressive MS is divided into primary progressive MS (approximately 15% of all patients) and secondary progressive MS that follows a period of relapsing-remitting disease course [1]. Demyelinating lesions occur at different times in the brain stem, cerebellum, spinal or optic nerve [2].

The most frequently occurring symptoms in the course of MS are: spastic paralysis or limb paralysis, cerebellar ataxia, tremor, sensory disturbances, vegetative disorders, cognitive impairment, fatigue, depression and pain [3,4].

In the past, patients with MS were advised to avoid physical exercise. However, recent studies have shown that physical activity in patients with MS improves general fitness, quality of life, reduces fatigue and alleviates symptoms of depression and general exhaustion [5-7].

Increasing patient understanding of the benefits of using physical activity as a means to control MS symptoms may result in long-term physical activity adherence. MS can significantly limit the functioning of the patient in various aspects of life, including occupational activity. On the other hand, maintaining a job, even in a limited dimension, can be crucial in combating the effects of the disease [1,2].

Studies assessing employment parameters among MS have shown that 20-45% of the patients were not working (unemployed, retired or receiving workers' compensation benefits) after the initial five years of MS. This number increased to 78-96% after ten years of the disease [8-10].

MS may limit the functioning of the patient in various aspects of life, including occupational activity [9,11]. On the other hand, maintaining a job, even in a limited dimension, can be crucial in combating the effects of the disease. Forcing this activity can counteract social isolation and apathy, as well as improve the patient's self-esteem and improve his material status. Therefore, the professional activity of people with MS should be perceived as part of the broadly understood rehabilitation

It is estimated that 45-60,000 people suffer from MS in Poland. Almost 1300-2100 new cases are being diagnosed in Poland each year. In females, the prevalence of MS is about two-fold higher than in males [12]. Therefore, evaluation of physical and occupational activity in people with MS is necessary not only from the point of clinical but also social.

The main aim of the study was to assess the physical and occupational activity of patients with multiple sclerosis depending on the clinical form of the disease.

Specific objectives included:

- To examine the relationship between subjective assessment of physical activity and the clinical form of the disease.
- Determination of the most common barriers to the physical activity and exercise professional treatment group.
- To investigate whether the work activity in the test group is determined by the variables (sex, clinical form, duration of the disease).

## **MATERIALS AND METHODS**

The survey was carried out from December 1, 2018, to January 31, 2019. The study was conducted among people who belong to the Association for Helping Sick People with Multiple Sclerosis in Bialystok and patients of the Neurology Clinic of the University Clinical Hospital in Bialystok. The study sample comprised 50 people diagnosed with MS, 41 women and 9 men.

The study was approved by the bioethics committee of the Medical University of Bialystok, Poland R-I-002/526/2018.

A diagnostic survey method using an original questionnaire was used to assess the physical and occupational activity of patients with MS. The surveys contained information about the purposefulness of the study, its anonymous character, as well as compliance with the Act on the Protection of Personal Data.

The survey questionnaire contained a total of 28 closed questions, which concerned the demographic characteristics of the studied population and the formulated main problem. The questions examining the main problem concerned: a disease entity (clinical form, duration of the disease, symptoms), physical activity, rehabilitation (e.g., type of treatments) and functioning in the profession. The respondents had the opportunity to select one or several answers. Surveys were distributed to respondents in paper form.

The empirical data obtained in this way were generalized using Microsoft Excel and subjected to statistical analysis. Statistical analysis was performed using the Chi-square test. The critical level for all tests of significance was  $p = 0.05$ . The calculations were made using the Statistica (PL) Data Miner + QC PL software.

## **RESULTS**

Women accounted for 82% (41 people) and men accounted for 18% (9 people). In the studied group, 61 and over were (32%). The same percentages were in the age group 51-60 (32%). Most people with MS lived in the city - 82% and 18% in the countryside. The majority of respondents had a higher education (50%), and only one person

had a primary education. Half of the respondents had MS over 15 years, and only 12% have been ill for less than five years. The first symptoms of the disease appeared in the age group of 21-30 years in 38% of respondents; 24 % of respondents began to be ill at the age of 31-40. The most common form of MS was relapsing-remitting (68%), and the rarest form was secondary-progressive (6%). Details are shown in Table 1.

**Table 1.** Clinical types of multiple sclerosis (MS) in the studied group

Types MS	Percentage
Relapsing-remitting	68%
Secondary progressive	6%
Primary progressive	14%
Progressive relapsing	12%

The better the prognosis is the clinical form of MS, the better the physical fitness is statistically better. Most respondents with relapsing-remitting thought that their physical fitness was good (44%). It is also the only group of respondents who have very good physical fitness (9%). The subjects with secondary progressive clinical form rated their physical fitness as bad (67%) in the majority, and with the primary progressive character as average (57%). Very poor physical fitness occurs only in the group of subjects with progressive-relapsing form. Most respondents defined their physical fitness as average (38%). Details are presented in Table 2.

The most frequent physical activity of the respondents was a walk (74%). The next physical activity was riding a stationary bike (28%), then gymnastics (22%). Nearly half of the respondents reported that physical activity has a good (42%) effect on their well-being.

**Table 2.** Assessment of physical fitness depending on the clinical type of multiple sclerosis (MS)

Physical fitness \ SM type	Very good	God	Moderate	Bad	Very bad	$\chi^2$ p value
Relapsing-remitting	3 (9%)	15 (44%)	12 (35%)	4 (12%)	0 (0%)	34,45278 p=0.00057
Secondary progressive	0 (0%)	0 (0%)	1 (33%)	2 (67%)	0 (0%)	
Primary progressive	0 (0%)	1 (14%)	4 (57%)	2 (29%)	0 (0%)	
Progressive relapsing	0 (0%)	0 (0%)	2 (33%)	1 (17%)	3 (50%)	
Total	3	16	19	9	3	

Thirty-four percent respondents thought that this was an average impact. A small percentage of respondents reported that physical activity has a bad (4%) or very bad (4%) effect on their well-being. According to the respondents, the fatigue (68%), balance disorders (52%) and depression and mobility difficulties (28%) affected physical activity.

Table 3 shows the impact of the disease on occupational activity depending on the clinical type MS. No significant the relationship between the clinical type of MS and the occupational activity was found ( $p = 0.539$ ,  $p > 0.05$ ). Only 38% of the respondents with relapsing-remitting MS, one person with secondary progressive MS, and one person with progressive-relapsing MS did not change their professional situation due to illness. The occupational activity was limited by the disease mainly in people with primary progressive MS (57%) and progressive-relapsing MS (50%). Due to illness, 43% of the respondents with primary-progressive MS interrupted their job. Also, people with other clinical types of MS stopped their professional work to a similar degree.

## DISCUSSION

The study included a group of 50 people diagnosed with MS. The vast majority, 82%, of the surveyed group were women. Similar results were observed in a study by Brol et al. [13], where women dominated (2.1:1) in a large group (3199 people). In a study by Przychodzka et al. [14] women were almost three times more likely to suffer from MS (72.5%) than men.

In the analysed group, the majority of respondents were age 61 and older. Similarly, in the study by Kędra et al. [15] the largest percentage of patients with MS (44%) was over 50 years of age.

In the studied group, the majority of respondents had a secondary education. Similar data were presented by Tasiemski et al. [16].

**Table 3.** The impact of multiple sclerosis (MS) on occupational activity depending on the clinical type of the disease

The impact of the disease on occupational activity					$\chi^2$ p value
Occupational activity MS type	No effect	Limited	Caused interruption	Total SM type	5.0368 p=0.539
Relapsing-remitting	13 (38%)	10 (30%)	11 (32%)	34	
Secondary progressive	1 (33%)	1 (33%)	1 (33%)	3	
Primary progressive	0 (0%)	4 (57 %)	3 (43%)	7	
Progressive relapsing	1 (17%)	3 (50%)	2 (33%)	6	
Total occupational activity	15	18	17	50	

Krajewski et al. [11] showed that the average age of MS onset was about 32 years. In the present study, the respondents' first symptoms were noted between 21 and 30 years of age.

Most of the respondents had relapsing-remitting MS (68%), while 14% were diagnosed with the primary progressive form of MS; 12% had progressive-relapsing MS; and only one person had secondary progressive MS. Similar findings were presented by Broła et al. [13] in a large population of patients with MS (3,199 people); the majority of patients (66.2%) had the relapsing-remitting type; 24.2% were diagnosed with secondary progressive MS; and 9.6% had primary progressive MS.

Fatigue can significantly interfere with one's ability to function at home and at work and may be the most prominent symptom in a person who, otherwise, has minimal activity limitations [17]. MS fatigue is commonly described as a feeling of "exhaustion" or being "wiped out," with reported worsening in mid-to-late afternoon that is unrelated to the level of exertion.

Physical activity and exercise decrease the risk of heart disease and resting blood pressure, strengthen bones and increase endurance; they can also elevate one's sense of well-being [7].

The most frequent MS symptoms in the analysed group were fatigue (82%), loss of mobility (64%) and muscle weakness (60%). Przychodzka et al. [14] also demonstrated that the dominant symptom in MS was fatigue, which occurred in 84% of patients. The next most frequent symptoms were mobility problems (75%), followed by stiffness and spasticity (70%). According to Tasiemski et al. [16], fatigue was also the most frequent symptom, reported in 90% of those with MS. In contrast, Greeke et al. [18] found that 16% of patients with MS had fatigue according to the Modified Fatigue Impact Scale. Furthermore, 15% suffered from depression as well as fatigue. In a study by De Rodez

Benavent et al. [19] of patients with a mean disease duration of 2.6 years, 48% had fatigue.

Many people with MS experience difficulty walking [1-3]. Walking impairment is one of the most ubiquitous features of MS and is a sentinel characteristic of later or advanced stages of the disease. The majority of respondents (70%) were able to move independently using crutches (18%) or a wheelchair (4%). Similar results were obtained by other authors [20]; most respondents moved independently (49%) or using balls (27%). Only one person was unable to move even with support.

Exercise training and physical activity are strategies for managing many of the consequences associated with MS, and their benefits have been demonstrated in many studies [21,22]. Exercise training is associated with improved quality of life and reduced fatigue in persons with MS. Other benefits in this population include improved muscle strength, cardiorespiratory improvements and fitness as well as better management of symptoms such as anxiety and depression. However, patients with MS frequently reduce their activities due to their fear of symptom exacerbation [23,24], and limited activity has been shown to increase disability, unfitness, immobility, quality of life, abnormal gait and lack of stability and muscle strength.

In the present research, the majority of respondents engaged only in walking during the previous month (74%). The next forms of physical activity most often engaged in were riding a stationary bike (28%) and gymnastics (22%). Tasiemski et al. showed that patients with MS rarely chose to participate in physical activity and usually spent their free time being sedentary [16].

According to the respondents, physical activity was limited by fatigue (68%), vertigo (52%), pain and difficulty moving (28%). Almost half (42%) reported that physical activity has a positive effect on their well-being; only 4% reported that

physical activity has a negative impact on well-being.

In the studied group, the most significant number of people were on retirement (32%) and retired (30%). Working people accounted for 30%. Among 40% of professionally active respondents, most of them were engaged in intellectual work (50%), followed by 35% who did physical work (35%). In contrast, in a study by Kędry et al. [15], most subjects with MS were professionally active (60%). Similarly, Krajewski et al. [11] found that the vast majority of people (85%) did intellectual work. Men (45%) were more professionally active than women (21%) [14].

There is a correlation between the duration of MS and work activity. Most people who did not work reported having suffered from MS for more than 15 years [25]. In the present study, 67% of the male participants were professionally active and 34% of the females were. A statistically significant relationship was also found between occupational activity and disease duration. Half of the working respondents (50%) had the relapsing-remitting type of MS, and 43% had primary progressive MS (43%). No persons with secondary progressive or progressive relapsing MS were working.

Dworzańska et al. [26] reported that more than half of patients (50–60%) described fatigue as the most troublesome symptom and the main reason for their inability to perform work and for their social isolation. These data are confirmed by the present study, which shows that fatigue is the most common symptom in the study group and constitutes a barrier that limits the performance of both occupational and physical activities. Other researchers have also emphasized the importance of this problem [27].

## CONCLUSIONS

MS exerts a great influence on both physical activity and the occupational functioning of patients. The more prognostic is the clinical form of MS, the better the physical fitness of the patients. The physical and occupational activity of MS patients is most often limited by - fatigue, balance disorders, and mobility difficulties. The duration of the disease determines occupational functioning of people with MS.

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## Conflicts of interest

The authors declare that they have no conflicts of interest.

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