

Locomotion and Activities of Daily Living of Patients with Multiple Sclerosis

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Key Words: activities of daily living, locomotion, multiple sclerosis, patients.

Summary. The aim of this study was to assess the locomotion of patients with multiple sclerosis and to explore the challenges they face in accomplishing the activities of daily living.

Methods. A quantitative study was performed at a teaching hospital in the Neurology Unit, during January through February, 2020. The inclusion criteria for patients were as follows: patients diagnosed with multiple sclerosis and illness duration of more than one year. In total, 80 patients participated in the study (response rate – 100.0%). A questionnaire was developed by the authors in accordance with the scientific literature. The study protocol was approved by the Centre of Bioethics at the Lithuanian University of Health Sciences, no. BEC-SL(B)-112.

Results. The majority of the patients with multiple sclerosis (75.0%) were women and the mean of age in the patients was 22.89 ± 3.97 years. Their illness lasted approximately 3.85 ± 3.01 years. The patients with a longer multiple sclerosis illness duration had various symptoms more frequently than those who experienced illness for a relatively shorter period of time: hand tremor (78.9% and 57.1%, respectively, $P = 0.03$), difficulties to stand with toes in (34.2% and 4.8%, respectively, $P = 0.01$), limited turning around for 360° (57.9% and 16.7%, respectively, $P < 0.001$). Almost half of the respondents (41.2%) were independent going to the supermarket; however, the patients with illness duration less than 7 years went to the supermarket on their own more often than the patients living with diagnoses of multiple sclerosis for a longer period of time (54.8% and 26.3%, respectively, $P = 0.01$).

Conclusions. Movement problems and dependency in activities of daily living are relevant to patients who are ill with multiple sclerosis. These problems are increasing with a longer duration of the disease.

Introduction

Multiple sclerosis is a chronic inflammatory disease of the central nervous system that usually occurs at the age of 20–40 years of life (1). Multiple sclerosis is one of the most common neurological disorders and it is considered in many countries to be the main reason of non-traumatic neurological disability in young, working-age people (2). The information on the epidemiology of multiple sclerosis is scarce and the availability of services for people with the disease in many countries is still limited.

The first Multiple Sclerosis Atlas was published in 2008 as a joint project of the International Federation of Multiple Sclerosis and the World Health Organization (WHO), which sought to fill the knowledge gap with information of the disease from 112 countries (1). According to the WHO, Lithuania belongs to a region of high prevalence and morbidity of multiple sclerosis (1). According to scientific data, multiple sclerosis is more common in women and their morbidity ratio to men is 2:1 in Lithuania. However, when it comes to children,

then boys and girls develop the same frequency; only when they reach sexual maturity, women are diagnosed with the disease twice as often as men (3).

Moving independently and being independent of anything are important aspects for every person (4). Comprehensive movement of human limbs is necessary in daily life activities: preparing, bathing, eating, drinking, writing, walking, etc. Decreased movement is one of the main direct consequences of the disease in people with multiple sclerosis (5). As the disease is most common in people of the working age (20–40 years), movement disorders complicate patients' daily activities and reduce their work capability, which is most often associated with muscle weakness, limb stiffness and tremor (6). The majority of these patients need help by another person to do the housework (7).

Once the disease of multiple sclerosis is diagnosed, most patients progressively develop motor problems, muscle weakness, limb stiffness and tremor, and in this case, the evaluation of movement activity in multiple sclerosis patients is important. As a result of these problems, their daily activities diminish. Patients find it harder to move around, do simple housework, shop or even dress themselves. Due to impaired mobility, patients with multiple sclerosis

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experience falls, resulting in physical, psychological and social trauma. In order for patients to be able to delay the progression of the disease as much as possible, they should be encouraged to engage in at least minimal physical activity. In nursing practice, it is important to know locomotion problems during the multiple sclerosis illness progress, assess nursing needs and problems and find the best solutions for patients in a multidisciplinary team.

The aim of this study was to assess the locomotion of patients with multiple sclerosis and to explore the challenges they face in accomplishing the activities of daily living.

Methods

Study Design and Organization. The quantitative study was performed at a teaching hospital in the Neurology Unit. The data were collected between January and February of 2020. The researcher collected the data in the most convenient time for patients and unit staff. Questionnaires were distributed in patient wards, primarily informing patients about the study and receiving their informed consent. Data collection for one patient took around 20 min.

The Sample. The patients diagnosed with multiple sclerosis and having illness for more than one year were included in the study. In total, 80 patients participated in the study with the response rate of 100.0%.

The Study Instrument. The general characteristics of patients with multiple sclerosis, their problems of locomotion and balance, and activity of daily living were assessed with the questions developed by the authors in relation to the scientific literature on the topic.

Ethical Consideration. The study protocol was approved by the Centre of Bioethics at the Lithuanian University of Health Sciences, no. BEC-SL(B)-112.

Statistical analysis was carried out on SPSS version 26.0. The data were analyzed using the χ^2 test and the z-test while making the comparisons between age groups. The difference was considered statistically significant when $P \leq 0.05$.

Results

General Characteristics of the Patients. The majority of the patients with multiple sclerosis were women (75.0%), and 86.3% of the patients were between 20 and 40 years old. The mean age of patients was 22.89 ± 3.97 years. More than a half (52.5%) of the patients were ill from 1 to 6 years and 47.5% had the multiple sclerosis disease longer than 7 years. The mean duration of illness was 3.85 ± 3.01 years.

Locomotion and Balance Problems. The most common health problem for the patients was stiffness in legs (73.8%) and hand tremor (67.5%). More than half of the patients (51.2%) had stiffness in their hands (Table 1). The patients diagnosed with multiple sclerosis for 7 years and longer had more

Table 1. Distribution of locomotion and balance problems in multiple sclerosis patients according to their illness duration (n = 80)

Locomotion and balance problems		Duration of illness, n (%)		Total, n (%)	P
		1–6 years, n = 42	≥ 7 years, n = 38		
Stiffness of hands	Yes	20 (47.6)	21 (55.3)	41 (51.2)	$\chi^2 = 0.46$, df = 1, P = 0.49
	No	22 (52.4)	17 (44.7)	39 (48.8)	
Hand tremor	Yes	24 (57.1)*	30 (78.9)	54 (67.5)	$\chi^2 = 4.32$, df = 1, P = 0.03
	No	18 (42.9)*	8 (21.1)	26 (32.5)	
Stiffness of legs	Yes	29 (69.0)	30 (78.9)	59 (73.8)	$\chi^2 = 1.01$, df = 1, P = 0.31
	No	13 (31.0)	8 (21.1)	21 (26.3)	
Difficult to stand with toes in	Yes	2 (4.8)*	13 (34.2)	15 (18.8)	$\chi^2 = 11.35$, df = 1, P = 0.01
	No	40 (61.5)*	25 (65.8)	65 (81.3)	
Difficult to stand on one leg	Yes	4 (9.5)	10 (26.3)	14 (17.5)	$\chi^2 = 3.89$, df = 1, P = 0.04
	No	38 (90.5)	28 (73.7)	66 (82.5)	
Hard to turn around himself 360°	Yes	7 (16.7)*	22 (57.9)	29 (36.3)	$\chi^2 = 4.67$, df = 1, P < 0.001
	No	35 (83.3)*	16 (42.1)	51 (63.7)	
Falls in the past six months	Yes	13 (31.0)*	22 (57.9)	35 (43.8)	$\chi^2 = 5.88$, df = 1, P = 0.01
	No	29 (69.0)*	16 (42.1)	45 (56.2)	
Use of walking aids	Yes	2 (4.8)*	14 (36.8)	16 (20.0)	$\chi^2 = 12.93$, df = 2, P = 0.002
	Sometimes	7 (16.7)	5 (13.2)	12 (15.0)	
	Not	33 (78.6)*	19 (50.0)	52 (65.0)	

*P < 0.05, compared with ≥ 7 years illness duration.

locomotion and balance problems than those with the early stages of the disease. The longer illness duration, in comparison with the period up to 7 years, causes more of other health problems for patients such as hand tremor (78.9% and 57.1%, respectively, $P = 0.03$), difficulty to stand with toes in (34.2% and 4.8%, respectively, $P = 0.01$) and restrictions in turning around for 360° (57.9% and 16.7%, respectively, $P < 0.001$). The patients with a longer illness duration more often had a history of falls in the past 6 months ($P = 0.01$) (Table 1).

Study results revealed that 65.0% of the participants did not use walking aids in their daily living and 15.0% of the patients used walking aids occasionally. The comparative analysis showed that the patients with diagnosed multiple sclerosis 7 years ago and earlier used walking aids more often than the patients with the early stage of the disease (36.8% and 4.8%, respectively, $P = 0.002$) (Table 1).

Locomotion and Activity of Daily Living. Almost a half of the respondents (41.2%) reported that they went to the supermarket on their own, and this was more relevant to the patients with illness duration less than 7 years than to those patients with diagnosed multiple sclerosis for more than 7 years

(54.8% and 26.3%, respectively, $P = 0.01$). The patients with diagnosed multiple sclerosis were rather independent to take a morning toilet (75.0%) and a bath (82.5%) and were able to dress themselves (81.2%). The patients with illness duration less than 7 years do not need help by someone else while bathing or dressing, although for 15.8% of the patients with a longer illness duration such help was needed (Table 2).

Discussion

Once an incurable and progressive disease is diagnosed, all patients more or less feel the dependence they have' on others. The patients' social life changes, as well as opportunities to take care of themselves on a daily basis. After acquiring disability, individuals feel a change in communication with loved ones, they feel that they are trying to help as much as possible, and patients begin to feel increasingly weak in relation to others (8).

Our study revealed that the patients with multiple sclerosis had locomotion and balance problems, especially after 7 or more years of illness duration. The ability of a healthy person to move without assistance is considered to be understandable as long

Table 2. Patients' activities of daily living distribution by duration of illness

Activities of Daily Living			Duration of Illness, n (%)		Total n (%)	P
			1–6 years, n = 42	≥ 7 years, n = 38		
Shopping	Goes to the supermarket on his/her own	Yes	23 (54.8)*	10 (26.3)	33 (41.2)	$\chi^2 = 6.66$, df = 1, $P = 0.01$
		No	19 (45.2)*	28 (73.3)	47 (58.8)	
	Another person buys commodities	Yes	4 (9.5)*	15 (39.5)	19 (23.8)	$\chi^2 = 9.88$, df = 1, $P = 0.002$
No	38 (90.5)*	23 (60.5)	61 (76.2)			
	Order online	Yes	17 (40.5)*	6 (15.8)	23 (28.7)	$\chi^2 = 5.93$, df = 1, $P = 0.01$
		No	25 (59.9)*	32 (84.2)	57 (71.3)	
Cooking, housework	Due to movement problems, it takes longer to cook	Yes	27 (64.3)	18 (47.4)	45 (56.2)	$\chi^2 = 2.32$, df = 1, $P = 0.12$
		No	15 (35.7)	20 (52.6)	35 (43.8)	
	Movement causes problems with housework	Yes	14 (33.3)*	4 (10.5)	18 (22.5)	$\chi^2 = 5.95$, df = 1, $P = 0.01$
		No	28 (66.7)*	34 (89.5)	62 (77.5)	
Bathing	Performs the morning toilet independently	Yes	40 (95.2)*	20 (52.6)	60 (75.0)	$\chi^2 = 19.31$, df = 1, $P < 0.001$
		No	2 (4.8)*	18 (47.4)	20 (25.0)	
	Is able to bathe himself/herself	Yes	41 (97.6)*	25 (65.8)	66 (82.5)	$\chi^2 = 14.0$, df = 1, $P < 0.001$
No		1 (2.4)*	13 (34.2)	14 (17.2)		
	Needs the help of another person while bathing	Yes	0 (0.0)	2 (5.3)	2 (2.5)	$\chi^2 = 2.26$, df = 1, $P = 0.132$
		No	42 (100)	36 (94.7)	78 (97.5)	
Dressing	Can dress independently	Yes	40 (95.2)*	25 (65.8)	65 (81.2)	$\chi^2 = 11.35$, df = 1, $P < 0.001$
		No	2 (4.8)*	13 (34.2)	15 (18.8)	
	Chooses clothes without buttons	Yes	11 (26.2)	15 (39.5)	26 (32.5)	$\chi^2 = 1.60$, df = 1, $P = 0.20$
No		31 (73.8)	23 (60.5)	54 (67.5)		
	Needs the help of another person while dressing	Yes	0 (0.0)*	6 (15.8)	6 (7.5)	$\chi^2 = 7.16$, df = 1, $P = 0.007$
		No	42 (100)*	32 (84.2)	74 (92.5)	

* $P < 0.05$, comparing with ≥ 7 years illness duration.

as certain circumstances do not adversely affect the musculoskeletal system and its associated pathways. People who suffer from chronic physical disability need help to make their limited mobility as little as possible in their daily lives. If a patient has lost the ability to move due to an illness, the most important thing is to adapt to the reduced ability to exercise and not lose the joy of life (9).

If muscles do not move, they begin to weaken and fade (atrophy) and this muscle deterioration, in turn, reduces the ability to move, resulting in increased atrophy. In our study, the majority of the patients with multiple sclerosis had stiffness of legs, and near half of them felt it in the past 6 months. LaRocca (2012) described how patients faced movement problems: felt tired, felt unpleasant changes and an imbalance, responded that their mobility impaired their daily activities (7).

For a person with multiple sclerosis, adaptive equipment is often recommended and necessary for safety and independence during activities of daily living and functional transfers (10). In our study, the patients with a duration of 7 years of illness more often used different types of walking aids. Movement helps maintain muscle tone and patients can exercise muscles on their own or with the help of a healthcare professional. As muscles contract, their strength increases and blood circulation improves. When muscles do not move for a long time, bone degeneration also begins (9). Impaired movement is very common among patients with multiple sclerosis and is one of the leading causes of disability (4). Daily activities, communication and socialization positively affect the quality of life of people with multiple sclerosis.

A change in the physical, mental, emotional, and behavioural dimensions that arose from the disease was a challenge of daily living for the multiple sclerosis patients in our study. Other studies also examined the perspective of participants and found that multiple sclerosis disease causes many problems, including fatigue, imbalance, weakness, anxiety, frustration, boredom, excessive sensitivity, etc. (11). Independent living and movement depend on how a person is able to use various objects in daily life. Disorder of limbs during movement is assessed by central nervous system damage or damaged nerves.

Morning toilet, bathing, housework, shopping, transportation, getting dressed, eating are important daily skills for a person. Comprehensive movement of human limbs is necessary in daily life activities: preparing, bathing, eating, drinking, writing, walking, etc. (4). In our study, we analysed what problems patients with multiple sclerosis had in activity of daily living. Results revealed that daily living activities such as shopping of the patients with

multiple sclerosis worsened within illness duration. A person with a disability becomes less and less self-sufficient; they start to need help with even the smallest tasks like washing dishes, tidying up the house, etc. (8).

Decreased movement is one of the main direct consequences of the disease in people with multiple sclerosis. Tremor, muscle weakness and imbalances are often observed in these individuals. Tremor caused by multiple sclerosis can affect the head, the neck and limbs, but it is more common in upper extremities. Tremor further impairs a person's functionality and daily activities. In our study, near a half of the patients with illness duration of 7 and more years performed the morning toilet independently. When fatigue is felt, patients experience hand tremors, imbalances, and dependence on other people, i.e., patients become physically disabled to take care of themselves (12). When movement is disrupted and not improved, it becomes difficult to perform the activities independently, making people with multiple sclerosis increasingly dependent on others (13).

After the diagnosis of multiple sclerosis, a decrease in social life, family life, and housework responsibilities was observed among the patients. Einarsson et al. (2006) found that more than a half of patients became dependent on other people in their daily activities and were unable to take care of themselves at home or on their own (14). Dalga et al. (2012) reported that social and daily activities had a significant impact on the patients' quality of life (4).

Locomotion activity and its assessment in patients with multiple sclerosis is a pressing issue. To assess and evaluate locomotion and activities of daily living problems, a multi-disciplinary team approach is needed. It is also important to pay attention to how patients diagnosed with multiple sclerosis adapt to life outside the hospital, how they move, how they engage in daily activities like housework, shopping, etc. Patients with multiple sclerosis may require the involvement of other specialists such as psychiatrist, physical medicine and rehabilitation specialists given the wide range of symptoms and signs they may experience. Involving the social worker may help to clarify certain aspects of employment, social, and disability benefits; some patients may need occupational or physical therapists as part of the multidisciplinary team approach to assist with their ongoing disabilities (15).

The study has limitations as it was conducted only in one unit, and the sample size was collected only in a few months. However, we found out with a small group of the respondents that locomotion and activities of daily living problems were progressing with the duration of illness.

Conclusions

Patients with multiple sclerosis have movement problems and limited independency in activity of daily living. The restrictions in movement and independent active living reveal when the illness duration increases up to 7 years and more. The nurses' role would be to help patients to adapt to

and cope with the life changes because of disease and physical dependencies in collaboration with the multidisciplinary team members.

Statement of Conflict of Interest

The authors state no conflict of interest.

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