1874-9445/23

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RESEARCH ARTICLE

Assessment of Impact of Spasticity on Activities of Daily Living in Multiple Sclerosis Patients from Saudi Arabia: A Cross-sectional Study

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Abstract:

Introduction:

Multiple sclerosis (MS) is a chronic progressive autoimmune disease with several symptoms, including spasticity. This study aimed to illustrate the impact of spasticity on the daily activities of MS patients.

Subjects and Methods:

A cross-sectional study was conducted using a self-administered questionnaire consisting of demographic, clinical characteristics, and MS spasticity scale. A total of 286 patients from Saudi Arabia participated in this study.

Results:

Muscle stiffness occurring due to spasticity in most cases does not bother the patient, except for muscle tightness (32.9%) and stiffness when staying in the same position for a long time (36.7%), which cause extreme discomfort to the patients. Five items of pain and discomfort have been reported to extremely bother the patients (28.0-33.6%). The highest percentage of patients claimed not to be affected by muscle spasm items (29.4%-66.1%), including activities of dressing and sleeping (36.7%-57.7%). More than 30% of the patients found spasticity to affect their walking speed and going up/downstairs. About 36% to 49% did not experience any difficulties with their body movements. The patients also did not exhibit any feelings of discomfort, except for irritation (30.4%) and nervousness (29.4%).

Conclusion:

MS patients are significantly affected by spasticity, and a considerable percentage of these patients experience problems with their movements and activities.

Keywords: Activities of daily living, Health care surveys, Multiple sclerosis, Muscle spasticity, Symptoms, CNS.

Article History	Received: July 7, 2022	Revised: December 6, 2022	Accepted: December 23, 2022

1. INTRODUCTION

Multiple sclerosis (MS) is a chronic progressive autoimmune disease of the central nervous system (CNS), in which the myelin sheath surrounding the neuron is destroyed by T and B lymphocytes, leading to inflammation and axonal damage [1 - 5]. MS is characterized by highly variable clinical, depressive, cognitive, and physical symptoms, including loss of sensory and motor functions that cause non-traumatic, permanent disability in young adults [2, 4, 6 - 8]. The disease is

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DOI: 10.2174/18749445-v16-e230111-2022-98, 2023, *16*, e187494452301092

classified into clinically isolated syndrome (CIS), relapsing-remitting MS (RRMS), primary progressive MS (PPMS), and secondary progressive MS (SPMS) [8, 9]. Approximately 80% of patients with RRMS experience gradual and progressive deterioration of neurological function that eventually leads to the SPMS type [9]. MS is a widespread condition that affects approximately 2.5 million people worldwide, with prevalence ranging from 15/100,000 to 250/100,000 [1, 9 - 11]. Its symptoms include leg paresis, ataxia, optic neuritis, speech disorders, and muscle spasticity and spasms, which affect the patients' quality of life [2, 6, 12 - 14].

Spasticity in MS is common and affects approximately 34% of patients [15 - 17]. Spasticity is caused by increased muscle tone accompanied by hyperexcitability of the stretch reflex [17 - 19]. The most common symptoms of MS spasticity are muscle spasms, stiffness, and mobility restrictions [6, 12, 15, 18]. Spasticity could be mild, causing the muscles and joints to tighten, or may be severe, producing painful, uncontrollable spasms of extremities [6]. Although spasticity can occur in the lower back and any limb, it is more common in the legs [6, 20]. Spasticity is indeed associated with several complications, such as pain, sleep disorders, bladder dysfunction, and depression, and also disrupts the daily activities of those affected [2, 12, 14, 20, 21]. Recently recommended treatments for mild to moderate spasticity include baclofen, benzodiazepine, gabapentin, diazepam, clonazepam, and pregabalin [2, 13, 22]. However, prolonged use of these drugs is associated with various adverse reactions, while these medications are not fully effective at combating such clinical manifestations [2, 23]. Spasticity and associated symptoms have a profound negative impact on the well-being of patients [16, 24].

The MS Spasticity Scale (MSSS- 88) has been proposed to assess the impact of spasticity on the patient and determine how it disturbs people with MS [12, 17, 25]. It helps to monitor the clinical status of patients and measure the efficacy of treatment [26]. This cross-sectional study on MS aimed to use a survey-based analysis to uncover the relationship between spasticity and movements of body impairment and other routine activities in addition to other emotional, health, and social complaints.

2. SUBJECTS AND METHODS

2.1. Study Population and Ethics Statement

The cross-sectional study was conducted using a validated self-administered questionnaire consisting of demographic, clinical characteristics, and the MSSS scale (MSSS-88) [27]. A total of 286 patients with clinically diagnosed MS of both sexes from several hospitals allocated in different regions (Aseer region, Eastern region, Jeddah city, Makkah city, Northern region, Riyadh city) of the Kingdom of Saudi Arabia (KSA) were enrolled in the study. The sample size was calculated using G * power software (Heinrich-Heine-Universität, Düsseldorf, Germany) with an effect size of 0.40, 95% confidence level, and 5% margin of error. Data were collected using a self-administered questionnaire that was distributed on social media in collaboration with MS societies (*e.g.*, ARFA, AAZM and SAED MS Societies). Data were collected by interviewing the target population over a six-month period (March-August 2021).

Ethical approval from the IRB committee was sought before data collection. The purpose and methodology of the study were clearly explained to the participants before their enrollment, and informed consent was obtained from them. Provisions for protecting privacy were made relevant to all stages of research, including subject identification, recruitment, participation, and analysis.

Sampling and less-than-truthful responses can be potential sources of bias. To reduce sampling bias, the questionnaire was distributed through various MS social media accounts and MS societies to improve its visibility among respondents. To address response biases, we employed a self-administered anonymous questionnaire in order to avoid leading questions and answers.

2.2. Measurement Scale

The MSSS-88 scale is designed to measure and quantify the impact of spasticity on MS patients. It consists of 88 items subdivided into eight subscales: three of which relate to spasticity-specific symptoms, the other three relate to physical functioning, and the last two subscales concern the psychosocial impact. The latter scales have 13 items for emotional health and 8 for social functioning. The spasticity-specific symptoms scales have 12 items for muscle stiffness, 9 for pain and discomfort, and 14 for muscle spasms. Regarding the physical functioning scales, they have 11 items for activities of daily living, 10 for walking, and 11 for body movement. Each subscale contains items rated on a 4-level Likert scale, ranging from 1 (not at all bothered) to 4 (extremely bothered) [27].

To maintain the effectiveness and efficiency of the questionnaire and verify that it is psychometrically valid, the questionnaire items were translated into the Arabic language by a certified independent translation office that performed a forward and backward translation. Furthermore, the validity and reliability of the translated questionnaire were tested using face validity and reviewed by a professor of medical sociology. In addition, a pilot test was also conducted before the distribution of the questionnaire to assess its reliability and validity.

2.3. Statistical Analysis

The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) software (version 26, IBM Inc., Chicago, IL, USA). The data analyzed have been presented as frequencies and percentages.

3. RESULTS

In this report, all 286 cases were Saudi MS patients from different regions of the Kingdom of Saudi Arabia, including Riyadh (34%), Aseer (10%), Eastern region (23%), Jeddah (9%), Makkah (4.1%), Northern region (3.1%), and others (16%). As shown in Table **1**, female patients in this study were approximately twice as males (64.3% *vs*. 35.7%). Based on age, the patients were divided into five age groups;

approximately half of them (46,9%) were between 31 and 40 years old, followed by 20-30 years (35%). More than one-third of the patients (36.7%) were diagnosed in their childhood before the age of five years, and to a lesser extent, only 5% were diagnosed at the young age of 20 years and older. A family history of MS disease was rare among the patients (85%). Approximately two-thirds of the patients (59%) were of unknown MS subtype, while a fifth (21.3%) had PRMS and SPMS to the least extent (4.5%). Most patients (56.7%) claimed to have two medications to treat MS, while 66.4% reported an enhancement in their health status after using the treatment. Additionally, approximately 32% were taking other medications to treat associated spasticity. Marital status, occupations, and other details are shown in Table **1**.

In this study, we evaluated the impact of spasticity on MS patients through the MSSS-88 subscales questionnaire, where all points were subscales (muscle stiffness, pain and discomfort, activities of daily living, muscle spasms, walking, body movements, emotional health, and social functioning). As shown in Table **2A**, most patients did not report being bothered by muscle stiffness due to spasticity (items 2, 4-7, and 9-12), except for muscle tightness and stiffness when staying in the same position for a long time, which was reported as extremely bothering (items 3 and 8). Among the nine items related to pain and discomfort (Table **2B**), five items (14-16, 18, and 19) were reported by the majority of patients as extremely bothering as a result of spasticity. However, the highest percentage of patients claimed not to be affected at all by muscle spasm items (Table **2C**), which included daily-life activities, such as dressing, cooking, and sleeping (Table **2D**). More than 30% of the patients reported spasticity affecting their walking speed, the effort needed to walk, and going up/downstairs (items 48, 50, and 51, Table **3A**). About 36% to 49% of patients did not experience any difficulties with their body movements (Table **3B**). The participants did not state any feelings of discomfort to be aroused by spasticity, except for irritation and nervousness (Items 72 and 80) and slight anger (Item 73, Table **3C**). In addition, socialization and interaction with other people were not found to be affected due to spasticity in the patients (Table **3D**).

Table 1. Sociodemographic characteristics of MS patients who responded to the MSSS-88 questionnaire.

Characteristic		**n, %**
Age	19	4, 1.4
	20-30	100, 35
	31-40	134, 46.9
	41-50	41, 14.3
	>50	7, 2.4
Marital status	Divorced	23, 8.0
	Married	151, 52.8
	Single	110, 38.5
	Widow	2, 0.7
Gender	Female	184, 64.3
	Male	102, 35.7
Family history	No	243, 85
	Yes	43, 15
Type of MS	Primary progressive (PPMS)	22, 7.7
	Progressive relapsing (PRMS)	61, 21.3
	Relapsing-remitting (RRMS)	21, 7.3
	Secondary progressive (SPMS)	13, 4.5
	Unknown	169, 59.1
Occupation	Homemaker	76, 26.6
	Retired	29, 10.1
	Student	28, 9.8
	Teacher	27, 9.4
	Other	126, 44.1
Educational level	High school	67, 23.4
	Primary school	1, 0.3
	Secondary school	8, 2.8
	University	210, 73.4
Diagnosis TIME	< 5	105, 36.7
	5 to 9	76, 26.6
	10 to 14	69, 24.1
	15 to 19	22, 7.7
	> = 20	14, 4.9

(Table 1) contd.....

Feeling better after taking MS medications	No	96, 33.6
	Yes	190, 66.4
No. of MS medications used	One	16, 5.6
	Two	188, 56.7
	More than two	37, 12.9
Medications used to reduce spasticity	No	196, 68.5
	Yes	90, 31.5
Data are shown as number, frequency (n, %)		

Table 2. The degree of trouble due to spasticity concerning muscle stiffness (section A), pain and discomfort (section B), muscle spasms (section C), and daily activities (section D) as reported by participants.

Section	**As a result of spasticity, how much in the past two weeks have you been bothered by:**	**Not at all (1)**	**Slightly (2)**	**Moderately (3)**	**Extremely (4)**
A	01. Stiffness when walking?	78, 27.3	92, 32.2	51, 17.8	65, 22.7
	02. Stiffness anywhere in your lower limbs?	81, 28.3	77, 26.9	57, 19.9	71, 24.8
	03. Stiffness when you are in the same position for a long time?	69, 24.1	65, 22.7	47, 16.4	105, 36.7
	04. Stiffness first thing in the morning?	109, 38.1	70, 24.5	49, 17.1	58, 20.3
	05. Tightness anywhere in your lower limbs?	105, 36.7	67, 23.4	51, 17.8	63, 22.0
	06. Your lower limbs feeling rigid?	90, 31.5	74, 25.9	49, 17.1	73, 25.5
	07. Stiffness when standing up?	99, 34.6	69, 24.1	51, 17.8	67, 23.4
	08. Tightness in your muscles?	53, 18.5	76, 26.6	63, 22.0	94, 32.9
	09. Stiffness that is unpredictable?	107, 37.4	61, 21.3	53, 18.5	65, 22.7
	10. Feeling that your muscles are pulling?	93, 32.5	59, 20.6	59, 20.6	75, 26.2
	11. Stiffness in your whole body?	141, 49.3	59, 20.6	37, 12.9	47, 17.1
	12. Your whole body feeling rigid?	135, 47.2	71, 24.8	30, 10.5	50, 17.5
B	13. Feeling restricted and uncomfortable?	52, 18.2	94, 32.9	69, 24.1	71, 24.8
	14. Feeling uncomfortable sitting for a long time?	55, 19.2	74, 25.9	63, 22.0	94, 32.9
	15. Painful or uncomfortable spasms?	76, 26.6	74, 25.9	56, 19.6	80, 28.0
	16. Pain when in the same position for too long?	49, 17.1	75, 26.2	66, 23.1	96, 33.6
	17. Feeling uncomfortable lying down for a long time?	84, 29.4	64, 22.4	62, 21.7	76, 26.6
	18. Difficulties finding a comfortable position to sleep in bed?	83, 29.0	59, 20.6	54, 18.9	90, 31.5
	19. Pain in the muscles on getting out of bed in the morning?	85, 29.7	64, 22.4	47, 16.4	90, 31.5
	20. Pain in the muscles provoked by movement?	76, 26.6	78, 27.3	61, 21.3	71, 24.8
	21. Constant pain in the muscles?	100, 35	62, 21.7	50, 17.5	74, 25.9
C	22. Spasms that come unpredictably?	89, 31.1	81, 28.3	61, 21.3	55, 19.2
	23. Powerful or strong spasms?	124, 43.4	53, 18.5	40, 14.0	69, 24.1
	24. Spasms when first getting out of bed in the morning?	101, 35.3	73, 25.5	45, 15.7	67, 23.4
	25. Spasms provoked by changing positions?	109, 38.1	77, 26.9	49, 17.1	51, 17.8
	26. Spasms provoked by movement?	102, 35.7	70, 24.5	55, 19.2	59, 20.6
	27. Spasms where your leg kicks out in front of you?	119, 41.6	55, 19.2	51, 17.8	61, 21.3
	28. Spasms provoked by certain positions?	103, 36.0	78, 27.3	47, 16.4	58, 20.3
	29. Spasms disturbing sleep?	121, 42.3	47, 16.4	37, 12.9	81, 28.3
	30. Spasms when doing certain tasks?	84, 29.4	68, 23.8	64, 22.4	70, 24.5
	31. Spasms when travelling over bumps or cobbles?	104, 36.4	52, 18.2	55, 19.2	75, 26.2
	32. Spasms where your knees pull up?	144, 50.3	55, 19.2	35, 12.2	52, 18.2
	33. Spasms causing legs to hit things?	134, 46.9	50, 17.5	44, 15.4	57, 20.3
	34. Spasms provoked by touch?	161, 56.3	40, 14.0	42, 14.7	43, 15.0
	35. Spasms pushing you out of a chair or wheelchair?	189, 66.1	33, 11.5	25, 8.7	39, 13.6

(Table 2) contd.....

D	**As a result of spasticity, how much have you been limited in your ability over the past two weeks to carry out the following daily activities?**	**Not at all (1)**	**Slightly (2)**	**Moderately (3)**	**Extremely (4)**
	36. Putting on your socks or shoes?	145, 50.7	75, 26.2	26, 9.1	40, 14.0
	37. Doing housework such as cooking or cleaning?	105, 36.7	77, 26.9	33, 11.5	71, 24.8
	38. Getting in and out of a car?	138, 48.3	79, 27.6	26, 9.1	43, 15.0
	39. Getting in and out of the shower and/or bath?	132, 46.2	79, 27.6	28, 9.8	47, 16.4
	40. Sitting up in bed?	150, 52.4	75, 26.2	32, 11.2	29, 10.1
	41. Getting into or out of bed?	156, 54.5	71, 24.8	26, 9.1	33, 11.5
	42. Turning over in bed?	133, 46.5	87, 30.4	28, 9.8	38, 13.3
	43. Getting into or out of a chair?	152, 53.1	78, 27.3	23, 8.0	33, 11.5
	44. Getting dressed or undressed?	152, 53.1	63, 22.0	33, 11.5	38, 13.3
	45. Getting on or off the toilet seat?	154, 53.8	72, 25.2	27, 9.4	33, 11.5
	46. Drying yourself with a towel?	165, 57.7	64, 22.4	25, 8.7	32, 11.2
Data are shown as number and frequency (n, %).					

Table 3. The degree of trouble due to spasticity concerning the ability to walk (section A), body movement (section B), feeling discomfort (section C), and social functioning (section D), as reported by the participants.

Section	**As a result of spasticity, how much in the past two weeks have you been bothered by:**	**Not at all (1)**	**Slightly (2)**	**Moderately (3)**	**Extremely (4)**
A	47. Difficulties walking smoothly?	87, 30.4	76, 26.6	50, 17.5	73, 25.5
	48. Being slow when walking?	80, 28.0	71, 24.8	42, 14.7	93, 32.5
	49. Having to concentrate on your walking?	89, 31.1	67, 23.4	46, 16.1	84, 29.4
	50. Having to increase the effort needed for you to walk?	85, 29.7	63, 22.0	50, 17.0	88, 30.9
	51. Being slow when going up or down stairs?	85, 29.7	54, 18.9	51, 17.8	96, 33.6
	52. Being clumsy when walking?	126, 44.1	44, 15.4	40, 14.0	76, 26.6
	53. Tripping over or stumbling when walking?	121, 42.3	47, 16.4	39, 13.6	79, 27.6
	54. Feeling like you are walking through treacle?	127, 44.4	43, 15.0	44, 15.4	72, 25.2
	55. Losing your confidence to walk?	137, 47.9	35, 12.2	37, 12.9	77, 26.9
	56. Feeling embarrassed to walk?	146, 51.0	33, 11.5	32, 11.2	75, 26.2
B	57. Difficulties moving freely?	113, 39.5	64, 22.4	43, 15.0	66, 23.1
	58. Difficulties moving smoothly?	104, 36.4	65, 22.7	47, 16.4	70, 24.5
	59. Limited range of movement?	116, 40.6	60, 21.0	51, 17.8	59, 20.6
	60. Difficulties moving parts of your body?	124, 43.4	59, 20.6	51, 17.8	52, 18.2
	61. Difficulties bending your limbs?	125, 43.7	66, 23.1	52, 18.2	43, 15.0
	62. Is your body resistant to movement?	133, 46.5	59, 20.6	42, 14.7	52, 18.2
	63. Do your body or limbs feel locked?	119, 41.6	59, 20.6	38, 13.3	70, 24.5
	64. Awkward or jerky movement?	138, 48.3	50, 17.5	41, 14.3	57, 14.3
	65. Difficulties in straightening your limbs?	135, 47.2	53, 18.5	43, 15.0	55, 19.2
	66. Difficulties relaxing parts of your body?	123, 43.0	61, 21.3	45, 15.7	57, 19.9
	67. No control over your body?	138, 48.3	58, 20.3	38, 13.3	52, 18.2
C	68. Feeling frustrated?	90, 31.5	82, 28.7	43, 15.0	71, 24.8
	69. Feeling less confident in yourself?	110, 38.5	72, 25.2	34, 11.9	70, 24.5
	70. Feeling inadequate?	114, 39.9	69, 24.1	38, 13.3	65, 22.7
	71. Feeling low?	85, 29.7	71, 24.8	51, 17.8	79, 27.6
	72. Feeling irritated?	66, 23.1	83, 29.0	50, 17.5	87, 30.4
	73. Feeling angry?	81, 28.3	83, 29.0	45, 15.7	77, 26.9
	74. Feeling depressed?	88, 30.8	66, 23.1	39, 13.6	93, 32.5
	75. Loss of self-worth?	133, 46.5	54, 18.9	33, 11.5	66, 23.1
	76. Feeling like a failure?	145, 50.7	44, 15.4	36, 12.6	61, 21.3
	77. Feeling scared?	114, 39.9	57, 19.9	29, 10.1	86, 30.1
	78. Crying (tearful)?	121, 42.3	51, 17.8	44, 15.4	70, 24.5
	79. Feeling panicky?	140, 49.0	47, 16.4	33, 11.5	66, 23.1
	80. Feeling nervous?	77, 26.9	79, 27.6	46, 16.1	84, 29.4

(Table 3) contd.....

D	81. Difficulties come out?	128, 44.8	58, 20.3	44, 15.4	56, 19.6
	82. Feeling isolated?	120, 42.0	53, 18.5	46, 16.1	67, 23.4
	83. Feeling vulnerable?	104, 36.4	62, 21.7	42, 14.7	78, 27.3
	84. Difficulties in finding energy for other people?	129, 45.1	52, 18.2	43, 15.0	62, 21.7
	85. Feeling reluctant to go out?	118, 41.3	52, 18.2	44, 15.4	72, 25.2
	86. Feeling less sociable?	134, 46.9	44, 15.4	41, 14.3	67, 23.4
	87. Difficulties with relationships with other family members?	135, 47.2	51, 17.8	41, 14.3	59, 20.6
	88. Difficulties interacting with people?	131, 45.8	59, 20.6	35, 12.12	61, 21.3

Data are shown as number and frequency (n, %).

4. DISCUSSION

Spasticity is pathophysiologically complex and is one of the most common physical deterioration symptoms experienced by people with MS [4, 28]. It affects up to 90% of MS patients, where the estimated prevalence of spasticity of the lower extremities in MS is 2–350/100,000 [29, 30]. MS patients with spasticity were found to experience more symptoms and higher disability rates compared to their counterparts without spasticity, thus requiring more healthcare resources [31]. Spasticity has also been found to interfere with basic and more complex activities, whereas it can considerably interfere with personal well-being and the quality of life, resulting in impaired walking, movement, and functional and participation activities [12, 15]. Spasticity interference usually appears in the lower extremities, while less severity is reported in activities of social functioning, such as difficulties in finding energy, making relationships, interacting with people, and feeling less sociable [22]. The strong association between walking impairment and spasticity severity is consistent with a previous study, which showed MS patients with spasticity to face difficulties in walking and performing daily activities [18]. In a cross-sectional survey of 701 MS patients in the UK population, 85.7% reported spasticity [32]. Higher levels of spasticity among that cohort were associated with depression, anxiety, fatigue, and general quality of life impairments [32]. These findings suggest a significant correlation between the increasing severity of spasticity and the deterioration of symptoms associated with MS disorder [31, 32].

A total of 4% of MS patients had diminished sacral feeling [33], and 30% of the patients lacked sacral reflexes. Anal sphincter resting tone was lowered in 12% of patients, while anal sphincter voluntary contraction was absent or reduced in 3% [33]. Urodynamic observations included detrusor overactivity and incontinence in 37.5%, incomplete voiding in 30%, aberrant sphincter activity in 16%, abnormal bladder feeling in 6%, and contractility of the detrusor in 8.3% [33]. Morphological abnormalities of the lower urinary tract were found in 41.6% of the Swiss population [33].

In a study on the Italian population, urinary symptoms were discovered to be related to illness duration rather than impairment status [34]. Urodynamic abnormalities were associated with illness duration (P=0.0001) and handicap status (P=0.0001) [34]. Only 3.3% of patients experienced upper urinary tract dilatation. With medicinal therapy, all patients' hydronephrosis resolved and did not reoccur [34]. Most patients were treated with a combination of oral pharmaceutical medications and clean intermittent catheterization [34].

In studies on the US population, more than 80% of the 10,353 respondents (66% response rate) experienced spasticity, and more than 35% were somewhat or considerably affected by stiffness, spasms, or pain, primarily in the lower extremities. Severe spasticity was associated with decreased disability, mobility, bladder function, and fatigue [13]. Spasticity was most commonly described as a barrier to stair climbing, walking, and sleeping [13]. Although most of the people reported having spasticity treatment (mainly oral medicines, stretching, exercise at home, and physical therapy), less than half were satisfied with their current treatment [13]. The mean time from the diagnosis of MS to the occurrence of spasticity was 7.8 years [13]. In a second study, compared to no minimal urinary symptoms, the urinary urgency (UU) and urinary urgency incontinence (UUI) subgroups both led to a decrease in the quality of life in MS patients [35].

In a study on the French population, bladder problems were found to greatly limit social activities with friends and family and also interfere with patient relationships [36]. We did not predict correlations because we believed that even relatively minor bladder problems would interfere with relationships to the same extent as more severe problems [36]. This appears to have been a misguided assessment of the impact of relatively minor bladder problems on relationships [36].

In this survey, MS participants experienced several symptoms related to spasticity, with around 66% being good responders to MS treatment and one-third using medications to reduce spasticity. Spasticity-specific symptoms scales showed most patients do not or be slightly bothered by muscle stiffness and muscle spasms, compared to a significant percentage of patients extremely distressed by pain and discomfort. The psychosocial impact of spasticity on the emotional health and social functioning of patients mainly concentrates on ‘not at all’ and ‘extremely bothered’ scales. According to the physical functioning scales, up to 50% of the participants have not been limited in their ability to perform daily activities, walk, and carry out body movements. Although more than half of the subjects (68.5%) did not use their spasticity treatment and experienced its severity, the majority were not distressed or upset by any of the items mentioned as a result of spasticity. This could be due to the dissatisfaction of MS patients with moderate to severe spasticity medications, as reported in 40% of respondents in an international survey of healthcare providers [24]. The limitations of this study with respect to this survey approach include self-report bias and participants' ability to accurately record their symptoms, medical state, and therapy. Another limitation is selection bias. This convenience sample of patients who self-selected to participate in this study had to have an internet connection and may have had features not shared by the general MS community. Patients in later stages of the disease, for example, may have been less interested in completing a questionnaire due to fatigue, mobility challenges, or the ability to focus on a computer screen for extended periods. Additionally, due to the lack of awareness of these specialized services, there is poor communication between healthcare providers and fewer referrals from MS patients to expert services.

CONCLUSION

In conclusion, Ms is a disease that can have a major impact on individual quality of life. Among the symptoms of MS, spasticity is very common and can affect the patient's activities of daily living. In this study, we highlight the effects of spasticity on activities of daily living in MS patients in order to increase awareness about the consequential impact of these factors on the psychosocial life of MS patients. In this study, spasticity has been observed to interfere with fundamental and more complicated tasks, as well as with personal well-being and quality of life, resulting in impairments in walking, mobility, function, and participation in activities. These findings emphasize the importance of assessing the level of activities of daily living in routine clinical visits and providing social counseling to help MS patients to overcome difficulties and challenges in order to increase their quality of life.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approval by the Institutional Review Board (or Ethics Committee) of King Khalid University (approval No. ECM#2021-5402 and date of approval: 02 May 2021).

HUMAN AND ANIMAL RIGHTS

No animals were used in the studies that are the basis of this research. All the humans were used in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013 (http://ethics.iit.edu/ecodes/node/3931).

CONSENT FOR PUBLICATION

Informed consent was obtained from all subjects involved in the study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available in the [Zenodo Repository] at [https://zenodo.org/deposit/7535450], reference number [DOI: 10.5282/zenodo.7535450].

FUNDING

This work was supported by the Deanship of Scientific Research at King Khalid University through the small group project (grant number: RGP. 1/66/43).

CONFLICT OF INTEREST

The authors declare no conflict of interest. The funders had no role in the design of the study, collection, analyses, or interpretation of data, writing of the manuscript, or decision to publish the results.

ACKNOWLEDGEMENTS

The authors would like to extend their appreciation to the Deanship of Scientific Research at King Khalid University for funding this work through the small group project (grant number: RGP. 1/66/43). The authors would also like to thank ARFA, AAZM and SAED MS societies for their cooperation in distributing the survey among their members.

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