Clin Schizophr Relat Psychoses
Volume 16:S3, 2022
Doi:10.3371/CSRP.IDAH.032822

Clinical Schizophrenia & Related Psychoses

Research Article

Hybrid Open Access

The Effectiveness of Jacobson's Progressive Muscle Relaxation Technique on Fatigue among Jordanian Patients with Multiple Sclerosis during Corona Epidemic

Dima Ibrahim Abu Maloh[1*], Hazem AlNahar[1], Walead AlRahahleh[1], Hasan Jamal AlOran[1] and Haya Ibrahim Ali Abu Maloh[2]

[1]Department of Health and Recreation, School of Sport Science, The University of Jordan, Amman, Jordan.

[2]Department of Nursing and Rehabilitation, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

Abstract

This study aimed to evaluate the effectiveness of Jacobson's Progressive Muscle Relaxation Technique on fatigue among Jordanian patients with multiple sclerosis during Corona epidemic. A pre-post quasi-experimental design was conducted. A total of 120 participants were divided in to two groups; 60 participants in the intervention group and 60 participants in the control group. The intervention group received the Jacobson's Progressive Muscle Relaxation Technique and was instructed to perform it two specific times a day for 10 minutes each time for 8 weeks. While the control group was subject to routine medication. Data were collected from July 2021 up to November 2021 using the Arabic version of the Modified Fatigue Impact Scale. STROBE guidelines were followed in reporting the review. The pre-intervention and post-intervention levels of the physical, cognitive, psychosocial subscales and the total score of the Modified Fatigue Impact Scale for the intervention group and the control group were compared. Results revealed that there was a statistically significant reduction in the physical, cognitive, psychosocial subscales and the total score of the Modified Fatigue Impact Scale for the intervention group ($P<0.05$) and there was a non-statistically significant reductions for the control group ($P=>0.05$). Adding the Jacobson's Progressive Muscle Relaxation Technique to therapeutic routine treatments as it is a cost-effective and useful complementary therapy to reduce fatigue level among patients with multiple sclerosis. This study provides a baseline of data that could facilitate further investigations in the future to improve the quality of services delivered to patients with multiple sclerosis, their quality of life, and satisfaction and reduce their fatigue level.

Keywords: Jacobson's relaxation technique • Fatigue • Multiple sclerosis • Corona-virus

Introduction

There is an undeniable fact that the Corona epidemic has caused many ambiguities, especially in the psychological, social, and healthcare fields [1]. This virus will continue to change the world. The consequences are highly unpredictable, but there is no doubt that it will have an impact on all areas of life [2]. The pandemic has so far resulted in thousands of deaths and psychosocial stress among the population as well as economic losses. Several studies have recommended that it is necessary to recognize the impact of this pandemic on the health aspects of individuals [3-6].

The lack of specific treatment interventions for this virus, coinciding with its rapid transmission rate led to recommend the avoidance of exposure to the virus, including patients with Multiple Sclerosis (MS) [7]. Patients with MS have also reported that one of their biggest concerns during the pandemic is infection with the Coronavirus [8]. MS is no more serious than the risk of infection with the Coronavirus [9]. A study reported that 70% of patients with MS have Coronavirus and are more dangerous than the average population because of their disease and the nature of their medication [10]. Around, 6.3% of patients with MS have COVID-19, 2.2% of the patients died due to COVID-19 and 20.3% of the patients were admitted to the hospital [11].

Although it is estimated that around 2.5 million people worldwide are living with MS, it is a chronic disease of the central nervous system, removing the melanin layer [12]. In addition, patients with MS suffer from many psychological and physical disorders as a result of the nature of the disease; fatigue, convulsions, muscle weakness, sensory imbalance, and imbalance [13]. However, two studies have shown that the coronavirus pandemic also has a negative impact on several aspects of the psychology of patients with MS, including Fatigue (F) [14,15]. F is one of the most disturbing symptoms among patients with MS and more than 90% of them suffer from F [16]. It is defined as a heightened sense of mental and physical stress that affects adversely the ability of patients to cope with other symptoms of the disease and their daily practice [16]. A study showed that F associated with MS is the main reason that prevents patients from participating in various activities [17]. Furthermore, 80% of patients with MS reported that they lost their jobs due to F, as it reduces their ability to perform their individual and social tasks and maintain a normal life [18]. A study in Jordan also reported that the reason for the low quality of life among patients with MS is their exposure to F [19]. The COVID-19 pandemic has also negatively affected the physical activity of patients with MS, which in turn leads to increased F [20,21].

Furthermore, during this pandemic, the most observed symptoms of COVID-19 were psychological, neurological, and clinical symptoms, including increased F, fear, stress, and low quality of life [22,23]. Some of the symptoms of coronavirus are similar to those of MS [24]. Therefore, the assessment of the psychological and neurological indicators of patients with MS is the most important in such traumatic periods [25]. Especially since some symptoms of MS, if left untreated may exacerbate other symptoms [26] As a result, Jacobson's Progressive Muscle Relaxation Technique (JPMRT) has recently become an integral part of chronic disease care because of its positive effect in reducing disease symptoms for example, it reduces F, reduces contractions, and stresses muscles [27,28]. It is a form of exercise that involves the voluntary relaxation of a group of muscles (each muscle separately) from hand to foot [28]. JPMRT is one of the most commonly used techniques in which patients achieve complete relaxation by contracting a special muscle group and gradually releasing it down to self-repair. It is recommended to practice this technique two or three times a day [29]. Psychologically, JPMRT reduces F, stress, depression, and

***Corresponding Author:** Dr. Dima Ibrahim Abu Maloh, Department of Health and Recreation, School of Sport Science, The University of Jordan, Amman, Jordan; E-mail: demamaloh@gmail.com; Tel: (+962)799641044*

Received: 03-Mar-2022, Manuscript No. CSRP-22-58633; Editor assigned: 07-Mar-2022, PreQC No. CSRP-22-58633 (PQ); Reviewed: 21-Mar-2022, QC No. CSRP-22-58633; Revised: 24-Mar-2022, Manuscript No. CSRP-22-58633 (R); Published: 31-Mar-2022, DOI:10.3371/CSRP.IDAH.032822.

improves wellness and quality of life [30,31]. On the functional side, JPMRT reduces symptoms of anxiety such as reducing respiratory rate, heart rate, shortness of breath, and reduce diastolic blood pressure [32-34]. In addition, JPMRT is easy to learn by practicing and repeating it 3 to 4 times, even in public places. It is a technique practiced by conscious patients, unlike other methods that can be difficult to learn and cause drowsiness [35]. Due to the lack of specific treatment strategies for COVID-19, in addition, many aspects of the virus are still unknown [36]. Furthermore, due to the increase in the number of people affected by MS and the negative effects of increased F on their lives [14,37]. Many of the literature have applied various methods aimed to reduce the negative emotional impact of patients with MS for example, relaxation and stress management techniques have had a positive impact on depression, anxiety, stress, and the quality of life of patients with MS [38-41]. Due to the paucity of studies in Jordan of applying the JPMRT on F among patients with MS, the current study aimed to evaluate the effectiveness of JPMRT on F among Jordanian patients with MS during Corona Epidemic. The study should answer the following questions:

1. Are there statistically significant differences in F among patients with MS according to the variable gender, physical activity, social status, age in years, and duration of disease?

2. Are there statistically significant differences in F among Jordanian patients with MS before and after applying the intervention of JPMRT?

Materials and Methods

Design

This study used a pre-post quasi-experimental design which included two groups of Jordanian MS patients the control group and the intervention group. With regards the control group was subjected to routine medication. While to the intervention group, we have applied JPMRT. The intervention group was instructed to perform the JPMRT two specific times a day for 10 minutes each time for 8 weeks. This study is reported according to the Strengthening the Reporting of Observational studies in Epidemiology (STROBE).

Setting

This study was conducted at Health Insurance Agency (HIA) in Amman-Jordan. In this center normally specialized neurological doctors specify patients with MS by giving them prescriptions.

Population and sampling

All the participants who were diagnosed with MS in Jordan have been included in the study population. Sampling technique was based on a non-random process; there was an option in the information sheet and the consent form to determine the patient's willingness to attend the intervention. Those who were willing to attend the program became the intervention group, and those who were unwilling to attend the program became the control group.

Inclusion and exclusion criteria

The inclusion criteria were: (a) having a registration file of the patients within HIA in Amman to confirm that he/she is among patients with MS by a neurologist. (b) Should be able to read, write and understand Arabic language.

Exclusion criteria were: (a) attending any intervention psychological/mental health during the last 6 months. (b) Having a received psychotherapy during the last six months. (c) Having a psychotic disorder specified in this medical file. (d) Absence from more than two of the JPMRT intervention sessions. (e) Received a sort of a shock in the past month such as divorce, death of any of the parents or close relative.

Sample size

We have calculated the sample size using G power software (23). Statistical tests were used in the study (independent t-test and paired t-test), assuming a power of 80% and a level of 0.05 and medium effect size. A total of 102 patients were considered sufficient to find any statistically significant difference between the two groups with regards to their demographics and was enough to detect the effect of JPMRT on MFIS of MS patients. Out of 148 MS patients approached and invited to participate voluntarily to the study, 134 consented representing 91%. Of those who consented, 120 completed and returned the questionnaire, representing a final response rate of 90%. They were divided in to two groups; 60 participants received the intervention (intervention group) and 60 participants had routine treatment (control group).

Instruments

Socio-demographic characteristics: The socio-demographic form included: gender, physical activity, marital status, age in years, and disease duration.

Arabic version of the Modified Fatigue Impact Scale (MFIS)

MFIS consist of several items reported by the patient himself during the past month. The Arabic version of MFIS has been derived from [42]. MFIS consist of 21 items distributed among three categories: Cognitive subscale: consists of 10 items the range of the scale is between 0-40. Physical subscale consists of 9 items the range of the scale is between 0-36. Psychosocial subscale: consists of 2 items the range of the scale is between 0-8. The range of the scale for the total MFIS score is between 0-84. The response scales consist of 5 responses (Never=0, rarely=1, sometimes=2, often=3, almost always=4). The reliability of MFIS was measured using Cronbach Alpha and was reported to be very good (a=0.98) [42]. A permission to use the questionnaire was obtained from the author. In this study the MFIS showed high internal consistency (a=0.93).

Jacobson's Progressive Muscle Relaxation Technique (JPMRT) Intervention

JPMRT has been developed by DR. Jacobson. JPMRT can be achieved by tensing the muscles for a few seconds then release. Patients are requested to tense each muscle for 5 to 7 seconds then release from 20-30 seconds for each time [43,44]. This technique is based on tense and release of each muscle separately (forehead, jaw and neck, right arm, left arm, back and shoulders, stomach, thighs, right calf, left calf, right foot, and left foot) with deep breath [30]. JPMRT was applied on the intervention group by a qualified interventionist in relaxation techniques. Participants in the intervention group were divided in two groups; each group received one training session; each session for one hour. This session was conducted in a warm quite room with efficient light, temperature and ventilation. Participants had to perform the technique by themselves after the interventionists made sure that participants can do the technique by them. Participants were asked to perform the technique twice daily for 10 minutes each time for 8 weeks. We displayed a video clip on JPMRT to participants during the session. We advised the participants to perform the JPMRT step by step.

Participant's compliance with JPMRT intervention

A CD of JPMRT with hard copies of JPMRT performance handed over to participants so as they can go back to them when needed. Participants were instructed to perform the JPMRT in two specific times a day for 10 minutes each time for 8 weeks. Participants filled in a daily record form to ensure their compliance with JPMRT. Once a week, we met the participants as encouragement process and have a performance record form. Furthermore, we made a group on what's up so as to remind the participants to perform the JPMRT by sending them video clip on JPMRT twice a day, participants used to send the sign (like) as they finished the technique. In case of any questions from the participants it was answered to all the members of the group so as all participants get benefit of the answer.

Data collection process

The data was collected from July 2021 up to November 2021. The patients were met and asked if they were willing to participate voluntarily in the study. Information sheet and invitation letter were distributed to

the participants. The researchers' contact details were written on the information sheet to the participants' if they have any questions about the study. An informed consent form was signed by all participants' who agreed to participant in the study. A section on the information sheet and consent form to determine the participants willingness to attend to the intervention. Those who filled this section were willing to attend the intervention and became the intervention group and those who were unwilling to attend the intervention group became the control group. The socio-demographic form and MFIS were distributed among the patients who agreed to participated in this study before applying JPMRT and made sure to state their telephone numbers. We have communicated with the intervention group to apply JPMRT. The study was conducted for a period of 8 weeks. After that, all participants were invited to refill MFIS again.

Data analysis

The data were analyzed using the SPSS statistical software (Version 22). Descriptive statistics (frequency, percentage, mean and standard deviation) were used to summarize all variables. Chi-square test was used to assess the differences between the study groups regarding the social demographic characteristics and to compare the two groups at baseline. Independent t-test was used to compare MFIS scores between the two groups at baseline. Independent t test and one way-ANOVA were conducted to assess the association of social demographic variables with study variables during the pre-intervention phase. Paired t-test was conducted to check any differences in MFIS scores before and after implementing the Jacobson's Progressive Muscle Relaxation Technique (JPMRT).

Ethical consideration

The patients have been informed of their willingness to participate voluntarily in the study, as they agreed to participate. Ethical approvals were gained from the Institutional Review Board of the University of Jordan and from the HIA in Amman to perform the study at their premises. We assured the patients with the confidentially of their personal information and informed them that they can withdraw from the study any time they desire.

Results

Study sample consisted of 120 patients with MS. A total of 60 patients with MS were assigned to the intervention group and 60 patients with MS were assigned to the control group. The majority of the sample were females (N=79; 65.8%), with a mean age ranged from 30 years to less than 40 years old (N=61; 50.8%), married (N=68; 56.7%), with disease duration ranged from 5 years to less than 10 years (N=66; 55%), and were non-participant in physical activity (N=73; 60.8%).

Chi-Square (X2) test was used for comparison between the intervention and the control groups in terms of socio-demographic characteristics (gender, marital status, education level). Results revealed that the two groups (intervention and control group) are similar to each other's in terms of socio-demographic characteristics. (No statistics difference; P=>0.05) (Table 1). Regarding MFIS, findings revealed that the mean score of the total MFIS among patients with MS was (67.25 ± 8.042). Moreover, the mean score of the physical, cognitive and psychosocial subscales were (29.43 ± 3.446, 31.18 ± 3.771, 6.63 ± 1.195), respectively (Table 2). Item "I have needed to rest more often or for longer periods" was the highest mean score reported among patients with MS (3.59 ± 0.601). On the other hand, the item "I have been less alert" was the lowest mean score reported among patients with MS (2.38 ± 0.791). An independent t-test was conducted to compare the physical, cognitive, psychosocial subscales and the total score of the MFIS for the intervention and the control groups during the pre-intervention period. Findings revealed that there were a non-statistically significant difference of the physical, cognitive, psychosocial subscales and the total score of the MFIS between the intervention group and control group (P>0.05) (Table 3). An independent-t test was conducted to compare the physical, cognitive, psychosocial subscales and the total MFIS score for gender and physical activity among patients with MS. Regarding gender, results revealed a statistically significant difference in scores for males and females in terms of the physical, cognitive, psychosocial subscales and the total MFIS score at pre-intervention (P<0.05). Concerning physical activity, results revealed a non-significant difference in scores for participant in physical activity and non-participant in physical activity in terms of the physical, cognitive, psychosocial subscales and the total MFIS score at pre-intervention (P=>0.05) (Table 4). One way-ANOVA was used to assess the association of age, marital status and disease duration with the physical, cognitive, psychosocial subscales and the total score of the MFIS among patients with MS. Results revealed a non-statistically significant differences between age, marital status and disease duration with the physical, cognitive, psychosocial subscales and the total score of the MFIS among patients with MS. (P=>0.05).

A Paired t-test was conducted to compare the pre-intervention and post-intervention levels of the physical, cognitive, psychosocial subscales and the total score of the MFIS for the intervention group and the control group. Results revealed that there was a statistically significant reduction in the physical, cognitive, psychosocial subscales and the total score of the MFIS for the intervention group (P<0.05) and there was a non-statistically significant reductions for the control group (P=>0.05) (Table 5).

Table 1. Comparison of the Socio-demographic characteristics in the intervention and control groups among patients with MS (N=120).

Variables	Intervention Group Frequency (%)	Control Group Frequency (%)	P
Gender			
Male	22 (36.7)	19 (31.7)	X2=0.333, df=1
Female	38 (63.3)	41 (68.3)	P=0.564
Age			
20 to <30	25 (41.7)	24 (40.0)	X2=0.037
30 to <40	30 (50.0)	31 (51.7)	df=2
40 to <50	5 (8.3)	5 (8.3)	P=0.982
Marital Status			
Single	19 (31.7)	16 (26.7)	X2=0.375
Married	33 (55.0)	35 (58.3)	df=2
Others (Divorced and Widower)	8 (13.3)	9 (15.0)	P=0.829
Disease duration			
<5 years	21 (35.0)	23 (38.3)	X2=0.152
5 to <10 years	34 (56.7)	32 (53.3)	df=2
10 to <15 years	5 (8.3)	5 (8.3)	P=0.927
Physical activity			
Participant in physical activity	23 (38.3)	24 (40.0)	X2=0.035,df=1
Non-participant in physical activity	37 (61.7)	36 (60.0)	P=0.852

Note: SD=Standard deviation, N=Number of participants, X 2=Chi-Square, df=degree of freedom, significance=(P ≤ .05).

Table 2. Means and standard deviations of the physical, cognitive, psychosocial subscales and total score of the MFIS among patients with MS (N=120).

MFIS Subscales/Scale	Mean ± SD	Minimum	Maximum
Physical	29.43 ± 3.446	22	36
Cognitive	31.18 ± 3.771	23	39
Psychosocial	6.63 ± 1.195	3	8
Total MFIS	67.25 ± 8.042	51	82

Note: SD=Standard deviation, N=Number of participants.

Table 3. Independent samples t-tests for comparison of physical, cognitive, psychosocial subscales and total score of the MFIS between intervention group and control group at pre-intervention (N=120).

MFIS Subscales/ Scale	Intervention group Mean ± SD	Control group Mean ± SD	t	P
Physical	29.35 ± 3.458	29.52 ± 3.462	-0.264	0.792
Cognitive	31.22 ± 3.928	31.15 ± 3.640	0.096	0.923
Psychosocial	6.62 ± 1.209	6.65 ± 1.191	-0.152	0.879
Total MFIS	67.18 ± 8.231	67.32 ± 7.918	-0.09	0.928

Note: N=Number of participants, SD=Standard Deviation, t=t value independent t-test significant at α =0.05 (2-tailed).

Table 4. Independent samples t-tests between socio-demographic data and physical, cognitive, psychosocial subscales and total score of the MFIS among patients with MS at pre- intervention (N=120).

MFIS Subscales/ Scale	Variable	N	Mean ± SD	t	df	P*
Physical	Gender	-0.09	-0.09	-0.09	-0.09	-0.09
	Male	41	30.51 ± 3.091	2.526	118	0.013*
	Female	79	28.87 ± 3.506	-	-	-
	Physical activity	-0.09	-0.09	-0.09	-0.09	-0.09
	Participant in physical activity	47	29.32 ± 3.465	-0.29	118	0.772
	Non-participant in physical activity	73	29.51 ± 3.457	-	-	-
Cognitive	Gender	-0.09	-0.09	-0.09	-0.09	-0.09
	Male	41	32.27 ± 3.082	2.312	118	0.023*
	Female	79	30.62 ± 3.985	-	-	-
	Physical activity	-0.09	-0.09	-0.09	-0.09	-0.09
	Participant in physical activity	47	30.74 ± 3.937	-1.023	118	0.309
	Non-participant in physical activity	73	31.47 ± 3.659	-	-	-
Psychosocial	Gender	-0.09	-0.09	-0.09	-0.09	-0.09
	Male	41	7.02 ± 1.037	2.647	118	0.009*
	Female	79	6.43 ± 1.227	-	-	
	Physical activity	-0.09	-0.09	-0.09	-0.09	-0.09
	Participant in physical activity	47	6.60 ± 1.296	-0.275	118	0.783
	Non-participant in physical activity	73	6.66 ± 1.133	-	-	-
Total MFIS	Gender	-0.09	-0.09	-0.09	-0.09	-0.09
	Male	41	69.80 ± 6.838	2.565	118	0.012*
	Female	79	65.92 ± 8.336	-	-	-
	Physical activity	-0.09	-0.09	-0.09	-0.09	-0.09
	Participant in physical activity	47	66.66 ± 8.302	-0.644	118	0.521
	Non-participant in physical activity	73	67.63 ± 7.905	-	-	-

Note: N=Number of participants, SD=Standard Deviation, df=degree of freedom, t=t value independent t-test, P=Significant at α=0.05* (2-tailed).

Table 5. Paired samples t-tests of the physical, cognitive, psychosocial subscales and the total score of the MFIS between the intervention group and control group for pre-intervention and post-intervention (N=120).

MFIS Subscale/ scale	N	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	t	df	P*
Intervention group						
Physical	60	29.35 ± 3.458	27.68 ± 3.577	19.702	59	<0.001*
Cognitive	60	31.22 ± 3.928	29.67 ± 3.990	11.822	59	<0.001*
Psychosocial	60	6.62 ± 1.209	6.03 ± 1.275	5.448	59	<0.001*
Total MFIS	60	67.18 ± 8.231	63.38 ± 8.330	43.036	59	<0.001*
Control group						
Physical	60	29.52± 3.462	29.55± 3.451	-1.426	59	0.159
Cognitive	60	31.15± 3.640	31.18± 3.648	-0.814	59	0.419
Psychosocial	60	6.65± 1.191	6.67± 1.188	-1	59	0.321
Total MFIS	60	67.32± 7.918	67.40± 7.879	-1.692	59	0.096

Note: N=Number of participants, SD=Standard Deviation, df=degree of freedom, t=t value paired t-test, P=significant at α=0.05 (2-tailed)*.

Discussion

This study aimed to evaluate the effectiveness of JPMRT on F among patients with MS in Jordan. Results revealed a statistically significant reduction in the physical, cognitive, psychosocial subscales and the total score of the MFIS for the intervention group and there was a non-statistically significant reduction for the control group.

Regarding gender, this study revealed a statistically significant difference in scores between males and females in terms of the physical, cognitive, psychosocial subscales and the total MFIS scores at pre-intervention. The research has failed to show any correlation between F related to MS and gender [45]. Although the cause of F has not been accurately detected among patients with MS, the nature of biological differences between the genders makes females more susceptible to F [46]. However, the nature of biological differences between the genders such as reproductive function has a role in increasing F, with increased symptoms during childbirth, menstruation, and improved during pregnancy. In addition, genetic and hormonal factors can make females more affected by F [47,48]. The result was agreed with a study that showed statistically significant differences in F among patients with MS between the genders [49], while the results of a study showed that there were no statistically significant differences in F among patients with MS according to the gender variable [50]. However, the researchers attribute the result of the study to the possibility of early diagnosis among the majority of the study sample with MS, which results in increased F among them. In addition, the nature and diversity of hard job between the genders has a role in increasing F. A study showed that the clinical pattern of men with chronic F syndrome was younger than females, skilled workers, and singles [48]. Furthermore, the COVID-19 pandemic has also been shown to play a major role in increasing F among the majority of patients with MS [14]. Despite the importance of physical activity on F among patients with MS [20,49-51] . However, there were no statistically significant differences in F between participant and non-participant in physical activity among patients with MS. This contradicted the result of the study of [52,53]. It was agreed with a study that showed non-statistically significant differences in physical activity and F among patients with MS and showed a decline in the practice of sports activities among patients with MS during the coronavirus period [54]. The researchers attributed this to several reasons, including the nature of MS-related F, which negatively affects the daily activities of patients, thus reducing their physical activity. A study showed that 69.4% of patients with MS suffering from F reduced their exercise of daily activities [55].

During this pandemic, they were also found not to participate in therapeutic decisions and to abide by treatment protocols and health instructions due to their lack of energy [56]. One of the treatment options promoted during the planning for treating F among patients with MS is physical activity [57]. Low physical activity leads to increase F [37]. In addition, the COVID-19 pandemic has also affected the physical activity of patients with MS for fear of infection of the coronavirus. One study reported that 33.3% of MS patients reduced physical activity during the Coronavirus pandemic [58]. Besides that, the lack of exercise has been linked to F caused by the Coronavirus, which negatively affected the fear criteria associated with the Coronavirus and the practicing of physical activity among patients with MS as it was recommended to identify the reason for this impact in detail [21].

This finding is similar to two studies showing no differences in F among patients with MS according to marital status [59,60]. Another study reported that F among patients with MS was more common among married couples, divorced women, and widows [61]. Around, 64.1% of patients with MS reported that F has a negative impact on working and family life, around 60.3%, considered F one of the most disturbing symptoms of the MS disease [62]. The researchers attribute this finding to the fact that work is considered an important tool for many patients regardless of their marital status, as it enables them to provide and satisfy their needs. Patients with MS in this study had f; this led to the possibility of negatively affecting their work life. Because of F, 71% of MS patients reported having many sick leaves and many patients were forced to resign and change jobs. Also, 80% reported losing their jobs [18,63]. Furthermore, in the context of the Coronavirus pandemic, patients with MS suffered many personal losses and financial difficulties due to the economic crisis, which led to sad reactions [1,64]

Regarding the age and disease duration, the results of the study were similar to several studies [60,65,66]. The researchers attribute the results of the study to the limitations of this study. Patients with MS in the study sample have the first stage of MS (Relapsing-remitting MS), and the average age of the patients in the study is from 30 to less than 40, which makes the impact of F on them to some extent convergent. This stage of the disease is characterized by the unexpected onset of various neurological symptoms and the average age of the diagnostic person is 31 years [67,68]. The studies involving advanced stages of the disease have shown that the duration of the disease plays a role in increased F [59,64,69]. It was also found that the longer the duration of MS disease, the higher the level of disability for patients [62,70]. The result of the study showed that there was a statistically significant decrease in F for the intervention group, unlike the control group, where there was no change in it [30,40,56,71]. Because MS-related F is more profound than other patients [46,72]. There are also two types of MS-related f, the first is caused by the weakness of neurons and the removal of myelin. The second is caused by factors and symptoms associated with the disease, such as mood disorders, lack of sleep, and medication [72]. Furthermore, F is considered difficult to assess as it is a personal symptom [73]. Moreover, F negatively affects the daily activities of patients with MS, the quality of their lives, their early retirement, and unemployment [72-75]. It was found that the level of unemployment among patients with MS is 80% adversely affects their social and economic lives [72,74,76].

Consequently, non-pharmacological interventions were considered a first-class treatment for F associated with MS, and a first-line treatment for the management of F among patients with MS [72,77]. Also, in the context of the COVID-19 pandemic, a study has shown that online psychological interventions with the support of a psychiatrist via e-mail have a role in reducing the level of F. It is considered an effective and cost-acceptable approach of treating F among patients with MS [78] Psychotherapeutic interventions include several types, including JPMRT [79]. Accordingly, the researchers attribute the result of the study to the positive effects of JPMRT on F among patients with MS. Initially, JPMRT was considered a complementary treatment among patients with MS. In addition, this technique has a role in reducing depression, anxiety, and stress among patients with MS [40]. A study also provided scientific evidence that JPMRT improved the quality of life among 1,340 patients with MS [80] Moreover, JPMRT had a positive effect on F among patients with MS, as it was found that through this technique, F can be predicted and controlled [71]. JPMRT is one of the simplest relaxation techniques and can be easily learned. It is also an active, dynamic, and participatory method that promotes patient autonomy and allows the patient to learn to assess the tension of a specific muscle group for relaxation.

Conclusion

Patients with MS suffer from F. Moreover, there was a positive effect of JPMRT on F among patients with MS. The researchers recommend patients with MS to keep practicing the JPMRT and make it a part of their daily practice. The effect of JPMRT on F has never been studied among patients with MS in Jordan. This study highlights the importance of adding the JPMRT to therapeutic routine treatments among patients with MS. JPMRT is a cost-effective and useful complementary therapy to reduce F level among patients with MS. This study provides a baseline of data that could facilitate further investigations in the future to improve the quality of services delivered to patients with MS, their quality of life, satisfaction and reduce their F level. Improving the levels of F is extremely important for the treatment of patients with MS, as these conditions often present with various other comorbidities that can affect patients' quality of life.

Limitations

The major limitation of this study was that all patients have the first stage of MS disease (Relapsing-remitting MS). It would have been more representative to include participants from other stages of the disease. In addition to that, the relatively small sample size used in the current study as a result of convenience sampling. While adequate for the purposes of this research, the inclusion of more participants would have strengthened the conclusions drawn from the results. This study implements a quasi-experimental design; a randomized control trial may add more and can better predict the effect of the intervention.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data Availability

All collected data were securely stored (i.e., password-protected computers and in locked filing cabinets), accessible only to the research team.

Conflicts of Interest

The researchers declare that there is no conflict of interest.

Supplementary Materials

STROBE Statement: checklist of items that should be included in reports of cross-sectional studies.

References

1. Demir, Caner Feyzi, Furkan Bilek, and Ferhat Balgetir. "Neuropsychiatric Changes during the COVID-19 Pandemic in Multiple Sclerosis Patients." *Arq Neuro-Psiquiatr* 78(2020):570-575.
2. Armitage, Richard, and Laura B. Nellums. "COVID-19 and the Consequences of Isolating the Elderly." *Lancet Public Health* 5(2020): e256.
3. Al Shehri, Ali M. "A Lesson Learned from Middle East Respiratory Syndrome (MERS) in Saudi Arabia." *Med Teach* 37(2015): S88-S93.
4. Al-Rabiaah, Abdulkarim, Mohamad-Hani Temsah, Ayman A Al-Eyadhy and Gamal M. Hasan,et al. "Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) Associated Stress Among Medical Students at a University Teaching Hospital in Saudi Arabia." *J Infect Public Health* 13(2020):687-691.
5. Torales, Julio, Marcelo O'Higgins, João Mauricio Castaldelli-Maia, and Antonio Ventriglio. "The Outbreak of COVID-19 CoronaVirus and its Impact on Global Mental Health." *Int J Soc Psychiatry* 66(2020):317-320.
6. Davico, Chiara, Ada Ghiggia, Daniele Marcotulli and Federica Ricci, et al. "Psychological Impact of the COVID-19 Pandemic on Adults and their Children in Italy." *Front Psychiatry* 12 (2021): 239.
7. Brownlee, Wallace, Dennis Bourdette, Simon Broadley and Joep Killestein, et al."Treating Multiple Sclerosis and Neuromyelitis Optica Spectrum Disorder during the COVID-19 Pandemic." *Neurology* 94 (2020) 949–952.
8. Moss, Brandon P, Kedar R Mahajan, Robert A Bermel and Kelsey Hellisz,et al. "Multiple Sclerosis Management during the COVID-19 Pandemic." *Mult Scler J* 26(2020): 1163-1171.
9. Willis, M D, and N P Robertson. "Multiple Sclerosis and the Risk of Infection: Considerations in the Threat of the Novel Coronavirus, COVID-19/SARS-CoV-2." *J neurol* 267(2020):1567-1569.
10. Costabile, Teresa, Antonio Carotenuto, Luigi Lavorgna and Giovanna Borriello,et al. "COVID-19 Pandemic and Mental Distress in Multiple Sclerosis: Implications For Clinical Management." *Eur J neurol* 28(2021): 3375-3383.
11. Zabalza, Ana, Simón Cárdenas-Robledo, Paula Tagliani and Georgina Arrambide, et al. "COVID-19 in Multiple Sclerosis Patients: Susceptibility, Severity Risk Factors and Serological Response." *Eur J neurol* 28(2021): 3384-3395.
12. Motl, Robert W, and Brian M Sandroff. "Benefits of Exercise Training in Multiple Sclerosis." *Curr Neurol Neurosci Rep* 15(2015): 1-9.
13. Motolese, Francesco, Mariagrazia Rossi, Giuliano Albergo and Domenica Stelitano,et al. "The Psychological Impact of COVID-19 Pandemic on People with Multiple Sclerosis." *Front Neurol* (2020): 1255.
14. Chiaravalloti, Nancy D, Maria Pia Amato, Giampaolo Brichetto and Jeremy Chataway, et al. "The Emotional Impact of the COVID-19 Pandemic on Individuals with Progressive Multiple Sclerosis." *J Neurol* 268(2021): 1598-1607.
15. Lauren, B., and M. D. Krupp. "MS Society of Canada educational Series." *Living well with MS: managing fatigue, Canada* (2010).
16. Nery, Mara B. "Multiple Sclerosis and Wellness: How Self-Compassion Influences Physical Activity and Health-Related Quality of Life." *USA* (2016).
17. Pappalardo, A, F Patti, D Restivo, and A Reggio. "Aspetti sintomatici della sclerosi multipla." *Clin Ter* 15(2004):505-528.
18. Abu Maloh, Dima Ibrahim, Hazem Nouri AlNahar, and Haya Ibrahim Abu Maloh. "Quality of Life among Multiple Sclerosis Patients in Terms of Mental Health." *Asian Soc Sci* 17(2021): 1-62.
19. Halabchi, Farzin, Zahra Alizadeh, Mohammad Ali Sahraian, and Maryam Abolhasani. "Exercise Prescription For Patients With Multiple Sclerosis; Potential Benefits And Practical Recommendations." *BMC neurol* 17 (2017): 1-11.
20. Özkeskin, Mehmet, Fatih Özden, Bedriye Karaman, Özgül Ekmekçi, and Nur Yüceyar. "The Comparison Of Fatigue, Sleep Quality, Physical Activity, Quality Of Life, And Psychological Status In Multiple Sclerosis Patients With Or Without Covid-19." *Mult Scler Relat Disord* 55 (2021): 103180. [Crossref] [Googlescholar]
21. Vanichkachorn, Greg, Richard Newcomb, Clayton T Cowl and M Hassan Murad, et al. "Post–COVID-19 Syndrome (Long Haul Syndrome): Description of a Multidisciplinary Clinic at Mayo Clinic and Characteristics of the Initial Patient Cohort." *Mayo Clinic Proc* 96(2021):1782-1791.
22. Amdal, Cecilie Delphin, Madeline Pe, Ragnhild Sørum Falk and Claire Piccinin , et al. "health-Related Quality Of Life Issues, Including Symptoms, In Patients With Active Covid-19 Or Post Covid-19; A Systematic Literature Review." *Qual Life Res* 30(2021): 3367-3381.
23. Mazza, Mario Gennaro, Rebecca De Lorenzo, Caterina Conte and Sara Poletti, et al. "Anxiety and depression in COVID-19 survivors: Role of inflammatory and clinical predictors." *Brain Behav Immun* 89 (2020): 594-600.
24. Benedict, Ralph HB, and Robert Zivadinov. "Reliability and validity of neuropsychological screening and assessment strategies in MS." *J Neurol* 254 (2007): II22-II25.
25. Crayton, Heidi, Rock A. Heyman, and Howard S. Rossman. "A multimodal approach to managing the symptoms of multiple sclerosis." *Neurology* 63(2004): S12-S18.
26. Ertu¨rk IO. Fatigue and multiple sclerosis. Yasxamsal (2004) ;1:11–12
27. Baltasx A, and Baltasx Z. Stress and Coping. Remzi Publishing, Istanbul (2000).
28. Bastable, Susan Bacorn. "Nurse as educator: Principles of teaching and learning for nursing practice." *Jones and Bartlett Learning*, 2003.
29. Dayapoğlu, Nuray, and Mehtap Tan. "Evaluation of the effect of progressive relaxation exercises on fatigue and sleep quality in patients with multiple sclerosis." *J Altern Complement Med* 18(2012):983-987.
30. Merakou, Kyriakoula, Konstantinos Tsoukas, Georgios Stavrinos and Eirini Amanaki,et al. "The Effect Of Progressive Muscle Relaxation On Emotional Competence: Depression-Anxiety-Stress, Sense Of Coherence, Health-Related Quality Of Life, And Well-Being Of Unemployed People In Greece: An Intervention Study." *Explore* 15(2019): 38-46.
31. Lerman, Caryn, Barbara Rimer, Barbara Blumberg and Suzanne Cristinzio, et al. "Effects of Coping Style and Relaxation on Cancer Chemotherapy Side Effects and Emotional Responses." *Cancer Nurs* 13(1990): 308-315.
32. Palles, C, J D Orem, and F Travis. "The Effect of Transcendental Meditation Technique and Progressive Muscle Relaxation on Stress Reactivity Psychological Parameters and Mental Health in Adults People." *Int Neuro Sci* 25 (2002): 46-59.

33. Conversano, Ciro, Graziella Orrù, Andrea Pozza and Mario Miccoli, et al. "Is Mindfulness-Based Stress Reduction Effective for People with Hypertension? A Systematic Review and Meta-Analysis of 30 Years of Evidence." *IntJ EnvRes Public Healt* 18(2021): 2882.
34. Hamidizadeh, Saeid, Fazlollah Ahmadi, and Mohammad Asghari. "Study Effect of Relaxation Technique on Anxiety and Stress in Elders with Hypertension." *J Shahrekord uni Med Sci* 8 (2006).
35. Ahadi, Maral Seyed, Mohammad Ali Sahraian, Nasim Rezaeimanesh, and A. Naser Moghadasi. "Psychiatric Advice during COVID-19 Pandemic for Patients with Multiple Sclerosis." *Iran J Psychiatry Behav Sci* 14 (2020): e1032432.
36. Aghaei, Naiereh, Soheila Karbandi, Mohammad Ali Heidari Gorji and Maryam Bidgoli Golkhatmi, et al. "Social Support in Relation to Fatigue Symptoms among Patients with Multiple Sclerosis." *Ind J Pall Care* 22(2016):16.
37. Taylor, Paul, Diana S Dorstyn, and Elise Prior. "Stress Management Interventions for Multiple Sclerosis: A Meta-Analysis of Randomized Controlled Trials." *J Healt Psycho* 25(2020):266-279.
38. Turner, AP and Knowles LM. Behavioral Interventions in Multiple Sclerosis. Federal practitioner: for the health care professionals of the VA, DoD, and PHS. (2020).
39. Akbari, Ali, Forouzan Ahmadi, Ebrahim Jalili, and Salman Khazaei. "The Effect of Relaxation Technique (Jacobsen and Benson) on Depression, Anxiety, and Stress in Patients with Multiple Sclerosis." *Curr Psych Res* 16 (2020): 213-219.
40. Agland, Susan, Amanda Lydon, Sally Shaw and Rodney Lea, et al. "Can a Stress Management Programme Reduce Stress And Improve Quality Of Life In People Diagnosed With Multiple Sclerosis?" *Mul Scler J Exp Tran and Clini* 4 (2018): 2055217318813179.
41. Abu Maloh,D, AlNahar H, and Abu Maloh H. (2021). "The relationship of social support and the role of physical activity in reducing fatigue among patients with multiple sclerosis. Turkish Journal of Physiotherapy and Rehabilitation." 32(3):19302-19309.
42. Jacobson, E. "Progressive relaxation Univ." Chicago Press, Chicago (1938).
43. Cooke, Helen, and CAM-Cancer Consortium. "Progressive Muscle Relaxation." *CAM-Cancer Cons* (2015): 1-6.
44. Anens, Elisabeth, Margareta Emtner, Lena Zetterberg, and Karin Hellström. "Physical Activity in Subjects with Multiple Sclerosis with Focus on Gender Differences: A Survey." *BMC neurol* 14 (2014): 1-10.
45. Krupp, Lauren B, Luis A Alvarez, Nicholas G LaRocca, and Labe C Scheinberg. "Fatigue in multiple sclerosis." *Arch neurol* 45(1988):435-437.
46. Bassi, Nicola, Daniela Amital, Howard Amital, and Andrea Doria, et al. "Chronic Fatigue Syndrome: Characteristics and Possible Causes For Its Pathogenesis." *Isr Med Asso J* 10(2008): 79.
47. Faro, Mònica, Naia Sàez-Francás, Jesús Castro-Marrero and Luisa Aliste, et al. "Gender Differences in Chronic Fatigue Syndrome." *Reumatología clínica* 12(2016): 72-77.
48. Ghajarzadeh, Mahsa, Rozita Jalilian, Ghazaleh Eskandari and Mohammad Ali Sahraian, et al . "Fatigue in Multiple Sclerosis: Relationship with Disease Duration, Physical Disability, Disease Pattern, Age and Sex." *Acta Neurol Belgi* 113 (2013): 411-414.
49. Alshamrani, Foziah J, Mohammed F Almuaigel, Fahd A Alkhamis and Abdullah A Alsulaiman. "Impact of Depression and Fatigue on Relapsing Remitting Multiple Sclerosis in Kingdom of Saudi Arabia." *Saudi Med J* 41(2020): 290.
50. Stroud, Nicole M, and Clare L Minahan. "The Impact of Regular Physical Activity on Fatigue, Depression and Quality of Life in Persons with Multiple Sclerosis." *Health qual life out* 7(2009): 1-10.
51. Redlicka, Justyna, Ewa Zielińska-Nowak, Anna Lipert, and Elżbieta Miller. "Impact of Moderate Individually Tailored Physical Activity in Multiple Sclerosis Patients with Fatigue on Functional, Cognitive, Emotional State, and Postural Stability." *Brain Sci* 11(2021): 1214.
52. Rzepka, Michalina, Mateusz Toś, Michał Boroń and Katarzyna Giba, et al."Relationship between Fatigue and Physical Activity in a Polish Cohort of Multiple Sclerosis Patients." *Med* 56 (2020):726.
53. Woods, Jeffrey A, Noah T Hutchinson, Scott K Powers and William O Roberts, et al. "The COVID-19 pandemic and physical activity." *Sports Med and Healt Sci* 2(2020):55-64.
54. Ghafari, Somayeh, Fazlolah Ahmadi, Seyyed Masoud and Nabavi, Robabeh Memarian,. "Effect of Applying Progressive Muscle Relaxation on Activities of Daily Living in Multiple Sclerosis Patients."*Sci Inf* (2007):73-80.
55. Javdan, Tayebeh, Elham Imani, Ahmad Agha Negahi, And Saeed Hosseini Teshnizi. "Evaluation the Effect of Progressive Muscle Relaxation Technique on Fatigue and Daily Living Activities in Patients with Multiple Sclerosis." *PJMHS* 15(6):1773-1777.
56. Motl, Robert W. "Benefits, Safety, and Prescription of Exercise in Persons with Multiple Sclerosis." *Exp rev neurotherap* 14(2014): 1429-1436.
57. Kalron, Alon, Mark Dolev, Michal Greenberg-Abrahami and Shay Menascu, et al. "Physical Activity Behavior in People with Multiple Sclerosis during the Covid-19 Pandemic in Israel: Results of an Online Survey." *Mult Scler Rel Disord* 47 (2021): 102603.
58. Razazian, Nazanin, Mohsen Kazeminia, Hossein Moayedi and Alireza Daneshkhah, et al. "The Impact Of Physical Exercise On The Fatigue Symptoms In Patients With Multiple Sclerosis: A Systematic Review and Meta-Analysis." *BMC neurol* 20 (2020): 1-11.
59. Razazian, Nazanin, Nastaran Shokrian, Arash Bostani and Nasrin Moradian, et al. "Study of Fatigue Frequency and Its Association with Sociodemographic and Clinical Variables in Patients with Multiple Sclerosis." *Neurosci J* 19(2014): 38-42.
60. Hejazizadeh, Niloofar, Marzieh Pazokian, and Mojtaba Abdi. "Fatigue in Patients with Multiple Sclerosis in Tehran in 1398." *Iran J Nur* 33(2020):1-15.
61. Lobentanz, I S, S Asenbaum, K Vass andC Sauter, et al. "Factors Influencing Quality of Life in Multiple Sclerosis Patients: Disability, Depressive Mood, Fatigue and Sleep Quality." *Acta Neurol Scandinavica* 110 (2004):6-13.
62. Zifko, Udo A. "Management of Fatigue in Patients with Multiple Sclerosis." *Drugs* 64(2004):1295-1304.
63. Kang, Chuanyuan, Shuran Yang, Jing Yuan and Li Xu, et al. "Patients with Chronic Illness Urgently Need Integrated Physical and Psychological Care during the Covid-19 Outbreak." *Asian J Psych* 51(2020):102081.
64. Mills, Roger J, and Carolyn AYoung. "The Relationship between Fatigue and other Clinical Features of Multiple Sclerosis." *Mult Scler J* 17(2011): 604-612.
65. Johansson, Sverker, Anders G Skjerbæk, Michael Nørgaard and Finn Boesen. "Associations Between Fatigue Impact And Lifestyle Factors In People With Multiple Sclerosis-The Danish Ms Hospitals Rehabilitation Study." *Mult Scler Relat Disord* 50 (2021): 102799.
66. Confavreux, Christian, and Sandra Vukusic. "Natural History of Multiple Sclerosis: A Unifying Concept." *Brain* 129 (2006): 606-616.
67. Walton, Clare, Rachel King, Lindsay Rechtman and Wendy Kaye, et al. "Rising Prevalence of Multiple Sclerosis Worldwide: Insights from the Atlas of Ms." *Mult Scler J* 26 (2020): 1816-1821.
68. Nagaraj, Karthik, Arun B Taly, Anupam Gupta, Chandrajit Prasad, and Rita Christopher. "Prevalence of Fatigue in Patients with Multiple Sclerosis and its Effect on the Quality of Life." *J neurosci rural pract* 4 (2013): 278-282.
69. Moriya, Rika, and Nanae Ikeda. "A Pilot Study of the Effects of Progressive Muscle Relaxation on Fatigue Specific to Multiple Sclerosis." *Bri J Neurosci Nurs* 92013): 35-41.
70. Krupp, Lauren B. Fatigue in Multiple Sclerosis: A Guide to Diagnosis and Management. *Demos Medical Publishing, USA* (2004).
71. Chahin, Salim, Deborah Miller, Reiko E Sakai and James A Wilson, et al. "Relation of Quantitative Visual and Neurologic Outcomes to Fatigue in Multiple Sclerosis." *Mult Scler Relat Disord* 4 (2015): 304-310.
72. Smith, Megan M, and Peter A Arnett. "Factors Related to Employment Status Changes in Individuals with Multiple Sclerosis." *Mult Scler J* 15 (2005): 602-609.
73. Genevie, Louis, June E Kallos, and Elmer L Struening. "Job Retention among People with Multiple Sclerosis." J Neurol Rehab 1(1987): 131-135.
74. Scheinberg, L, N Holland, N Larocca and P Laitin, et al. "Multiple Sclerosis; Earning a Living." *J med* 80 (1980):1395-1400.
75. Phyo, Aung Zaw Zaw, Thibaut Demaneuf and Alysha M De Livera, et al. "The Efficacy of Psychological Interventions for Managing Fatigue in People with Multiple Sclerosis: A Systematic Review and Meta-Analysis." *Front neurol* 9 (2018): 149.

76. Van Kessel, Kirsten, Trecia Wouldes, and Rona Moss-Morris. "A New Zealand Pilot Randomized Controlled Trial of A Web-Based Interactive Self-Management Programme (MSInvigor8) with and without Email Support for the Treatment of Multiple Sclerosis Fatigue." *Clini Rehabili* 30 (2016): 454-462.

77. Tur, Carmen. "Fatigue Management in Multiple Sclerosis." *Curr treatoptions in neurol* 18 (2016):1-12.

78. Ghafari, Somayeh, Fazlolah Ahmadi, Masoud Nabavi and Kazemnejad Anoshirvan, et al. "Effectiveness of Applying Progressive Muscle Relaxation Technique on Quality of Life of Patients with Multiple Sclerosis." *J clini nurs* 18 (2009): 2171-2179.

79. Nickel, Cerstin, Christian Kettler, Moritz Muehlbacher and Claas Lahmann,et al. "Effect of Progressive Muscle Relaxation In Adolescent Female Bronchial Asthma Patients: A Randomized, Double-Blind, Controlled Study." *J psychosoma res* 59 (2005): 393-398.

80. Brasio, Karina Magalhães, Diana Tosello Laloni, Queila Pierre Fernandes, and Thais de Lima Bezerra. "Comparação entre três técnicas de interveção psicológica para tratamento da fibromialgia: treino de controle de stress, relaxamento progressivo e reestruturação cognitiva." *Revista de Ciências Médicas* 12 (2003):14-19.

How to cite this article: Abu Maloh, Dima Ibrahim, AlNahar Hazem, AlRahahleh, Walead, AlOran, Hasan Jamal and Abu Maloh, Haya Ibrahim, et al. "The Effectiveness of Jacobson's Progressive Muscle Relaxation Technique on Fatigue among Jordanian Patients with Multiple Sclerosis during Corona Epidemic." *Clin Schizophr Relat Psychoses* 16S (2022). Doi:10.3371/CSRP.IDAH.032822