

Fatigue and Self-management among Multiple Sclerosis Patients

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Abstract Fatigue is considered as the most revealed symptoms in multiple sclerosis patients, reported by 88% of patients and has significant impact on all stages of life such as altering in daily living activity or psychosocial/mental functions. The pathogenesis of fatigue remain poorly understood and how its impact on self-management. The aim of study was to assess fatigue and self management among multiple sclerosis patients. A quantitative descriptive correlational design was used in this study. The study was conducted at both King Abdulaziz University Hospital and King Fahad Armed Forces Hospitals in Jeddah City from January till March 2018, data collected from outpatients' clinic and inpatients' medical-wards. A convenience sample of 50 Multiple Sclerosis patients. Data was collected through the main one tool, it consists of three parts; Part I, Socio-demographic and clinical data constructed by the researchers. Part II, Modified Fatigue Impact scale; to assess the Impact of fatigue on physical, cognitive, and psychosocial functioning in patient with Multiple Sclerosis.. Part III, Multiple Sclerosis Self Management Scale Revised; to provide a multidimensional and psychometrically assessment of self-management knowledge and behavior among Multiple Sclerosis patients. The study results showed there was a statistically significant negative correlations between fatigue subscales and overall self-management among Multiple Sclerosis patients with p-value (.019). Also, there was a statistically significant negative correlations between self-management factor scales and overall fatigue among Multiple Sclerosis patients with p-value (.019). It was concluded that there was a negative correlations between overall fatigue and overall self-management among Multiple Sclerosis patients, whenever fatigue severity increases, self-management decreases. It was a recommendation to encourage governmental policy and other decision makers in the Saudi community to develop periodically structure health education training program regarding self-management in MS and provide appropriate environments or facilities to conduct such programs, where nurses play a key role through health education and cooperate with other health care system.

Keywords: *fatigue, multiple sclerosis, self-management*

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1. Introduction

The progressive nature of Multiple Sclerosis (MS), variability of its symptoms lead to emotional or social changes and create a complex combination in which challenge healthcare professionals [1].

The direct medical costs of MS in the United State are estimated of 10\$ billion per year, and the indirect costs remains higher costs through reduced employment or unemployment, need for assistive equipment, paid personal care and productivity loss on later MS progression [2]. According to [3] who reported that in Saud Arabia, each neurology clinic visit for each MS patients coast around 820 Saudi Riyal from the stage of diagnosis to stage of receive require care in the last six

years at King Faisal Specialist Hospital & Research Center.

Multiple Sclerosis chronic nature and its long term complications, emerge need of multidisciplinary services. In which nurses have the key role in interacting with patients and their families throughout empower patients in selecting appropriate healthy behaviors management [4].

Multiple Sclerosis is a progressive, inflammatory, neurode-generative demyelinating disease of the central nervous system (CNS) characterized by chronic inflammation, demyelination, and scarring (plaques) of the nerve fibers in central nervous system mainly affecting white matter with the incidence rate in women is twice than of men [5].

The main cause of MS clinical symptoms are these plaques which deter transmission of regular electrical impulses, lead to one or more of the following symptoms;

blurred vision, blindness, loss of balance, poor coordination, slurred speech, tremors, numbness, extreme fatigue, problems with memory or concentration, paralysis, loss of cognitive functioning, and psychological disturbances most often characterized by depression lead to temporally or terminal problems as a result they faces a lot of struggle to live healthy and productively life because of increasing personal and social limitations [2].

According to [6] who stated that about 80% of MS patients reported fatigue and up to 65-70 % of them had severe level. Fatigue in MS patients has a great impact on all stages of life, their social relationships and early job retirement [7]. Furthermore, [8] confirmed that fatigue interferes with sustained usual function, cause a significant loss of employment, disability in unimpaired persons with MS and can contribute with other symptoms to cause co-morbidities.

A Self-management is a key strategy for improving the physical, psychological health and quality of life in patients with chronic conditions through positive health and rehabilitation outcomes [9]. Moreover [10] added that effective self management maximizing clinical outcomes and minimizing health care costs and utilization.

1.1. Significant of the Study

According to WHO in Multiple Sclerosis Atlas (2013) reported that an estimated 2,500,000 people worldwide have MS and the MS prevalence is at least from 2 to 3 times affects women rather than men, (ratio 1:2) [11].

MS in Arabian Gulf Countries shows rising in recent prevalence. Although Multiple Sclerosis International Federation and World Health Organization stated that the classification in low risk zone [12].

The MS prevalence in Saudi Arabia shows that there is increasing in MS rate from 8 to 40 cases per 100.000 of population, this increases may related to well diagnosis and improvement of treatment facilities [13,14]. Furthermore, [3] confirmed that the total number of cases in Saudi Arabia now will be 12,863 per 32 million individuals with mean age of 25 years old which reported by the United

Nations, which proves that Saudi Arabia now in the moderate to high risk zone.

1.2. Study Aim

The present study aims to assess fatigue and self-management among Multiple Sclerosis patients.

1.3. Objectives of the Study

1. Assess fatigue among multiple sclerosis patients related to; cognitive, physical and psychosocial.
2. Assess self-management among multiple sclerosis patients.

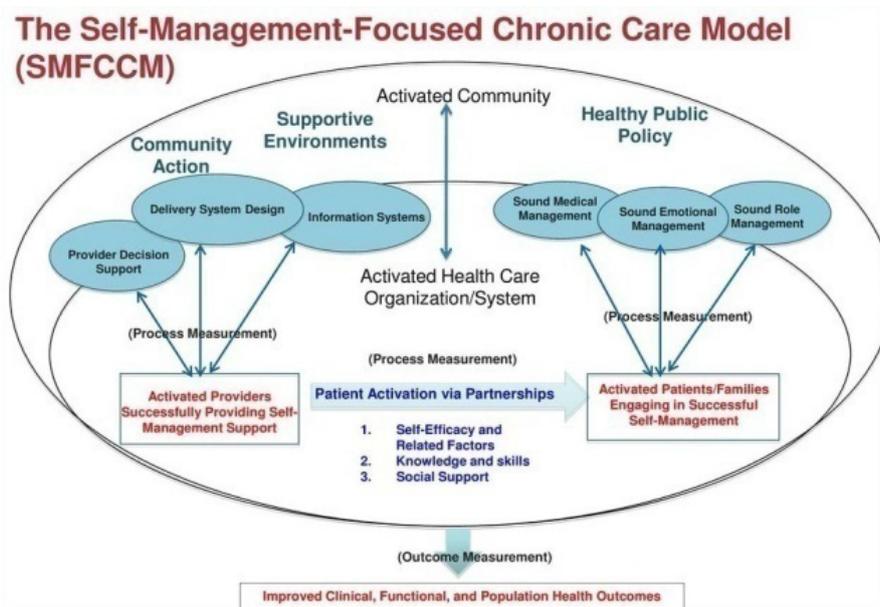
1.4. Theoretical Frame Work

1.4.1. Self-Management-Focused Chronic Care Model (SMFCCM)

The researcher select the given model to guide the research and bring out potentiality of applying the Self-Management-Focused Chronic Care Model to understand fatigue and self-management among MS patient.

(SMFCCM) developed by Suman Budhwani (2013) [15], derived from [16] Chronic Disease Prevention and Management Frame work, [17]Wagner's Chronic Care Model and [18] Greenhalgh's Model. It defines, gives a comprehensive view of successful self-management through describes the relationship among self-management, adherence, and outcomes at both the patient and system. It works as a guidance in assessing performance or successful self-management outcomes [15].

SMFCCM) emphasizes that the patient himself consider as the main agent and player in taking responsibility for self-care; in case of his inability to do so, the care provider must work on fostering awareness of the self-care needs and empowering MS patients, SMFCCM model could be significantly effective in reducing fatigue output in MS patients [15].



2. Subjects and Method

2.1. Research Design

A quantitative descriptive correlational design was used to achieve the aim of the study.

2.2. Setting and Subjects

The study was conducted in the outpatient clinics and inpatient medical wards at both King Abdulaziz University Hospital (KAUH) and King Fahad Armed Forces Hospitals (KFAFH) in Jeddah City, Saudi Arabia. A convenience sample included 50 patients (15 patients from KAUH and 35 from KFAFH) diagnosed with Multiple Sclerosis. They were recruited according to the inclusion criteria of being adult patients > 18 years old either female or male. Those who agreed to participate voluntarily. During the period of three month (January to March, 2018).

2.3. Tool of the Study

The researchers have used one tool for data collection. It consists of three parts;

Part I. Socio-demographic and Clinical Data: It was constructed by the researchers, it includes; age, gender, marital status, level of education, working status, living situation, diagnosed years with MS, admission frequency to hospital per year related to MS disease and other associated chronic disease.

Part II. Modified Fatigue Impact scale (MFIS): Modified Fatigue Impact scale (MFIS) adopted from [19,20]. Aimed to evaluating the impact of fatigue on physical, cognitive, and psychosocial function in MS patients. It is a likert scale including 21 items. It is ranked from Never to Almost always. These grades were respectively assigned values (Never) was given 0, (Rarely) was given 1, (Sometimes) was given 2, (Often) was given 3, (Almost always) was given 4. It included three subscales; (I) physical (9 items), (II) cognitive (10 items), (III) psychosocial (2 items). The total score for the MFIS is the sum of 21 items and range from 0 to 84. The total mean score of fatigue level are divided according to fatigue severity into 3 categories (from 2.80 to 4.0 consider as high level, from 2.20 up to 2.80 consider as medium level, from 1.6 up to 2.20 consider as mild level). A Higher scores indicate a greater impact of fatigue on a patient's daily life.

Part III. Multiple Sclerosis Self Management Scale Revised (MSSM-R):

Adopted from [9]. Aimed to provide a multidimensional and psychometrically assessment of self-management knowledge and behavior among Multiple Sclerosis patients. The scale has 24 items. It includes five ranked ranging from Disagree to Agree Completely. These grades were respectively assigned values of (Disagree Completely) was given 1, (Disagree Somewhat) was given 2, (Neither Agree nor Disagree) was given 3, (Agree Somewhat) was given 4, (I Agree Completely) was given 5. It included five factor scales; (I) treatment adherence and barriers (7 items), (II) understanding and actively learning about MS (4 items), (III) managing one's health on day to day

basis (4 items), (IV) being an active participant in decision making with health professionals (6 items), (V) managing the impact of MS on one's physical, emotional and social life (3 items). The total range of score (0-100 point). The total mean score of self management level are divided according into 3 categories (from 3.40 to 5.0 consider as high level, from 2.60 up to 3.40 consider as medium level, from 1.0 up to 2.60 consider as mild level). A Higher scores indicate a high self-management level. A higher score indicates a higher degree of self management.

2.4. Ethical Consideration

An official written permission was obtained from Committee of Nursing College and Scientific Council. Additional approval from Ethical Committee of King Abdulaziz University and King Fahad Armed Forces Hospital to conduct the study. In addition, the researchers acquired approval from the studied sample that participate in the study. Full information was provided to the studied sample with preserved their right to withdraw from participation at any time. Ensure that the patient's anonymity and information confidentiality is protected for all participants.

2.5. Validity and Reliability

The data collection tool reviewed by five expert of Medical Surgical Nursing academic staff, Faculty of Nursing, King Abdulaziz University, to judge the appropriateness, accuracy, and representation of the tool and the recommended changes have been made accordingly. The reliability of Modified Fatigue Impact and Multiple Sclerosis Self Management Revised Scale were obtained from the tool designers as well as other used investigation studies. The alpha reliability of the scale was reported as, 0.73 and 0.78 respectively, that indicating very high internal consistency.

The present study, Cronbach's alpha coefficient, was 0.62 which is consider valid and reliable.

2.6. Pilot Study

The pilot study were conducted on 10 % of the participants (5 patients) from the sample size participating in the research to test the feasibility, clarity and simplicity of the questionnaire. After statistical analysis of the pilot study. No changes have been made on the data collection tool.

2.7. Procedure for Data Collection

1. The researchers interviewed each patient, explained the aim of the study to the studied sample and volunteer willing to participate. Confidentiality, privacy also has been ensured and no known risk for participants. The sample collected days at King Fahad Armed Forces Hospital were on Mondays and Tuesdays, While in King Abdulaziz University Hospital were on Sundays and Thursdays from morning shift; 9 a.m. to 1 p.m. and night shift; 5 p.m. to 10 p.m.
2. The researchers distributed the questionnaire for each patient after explained the meaning of each

question and answer any query if present (the total time spent with each patient ranged from 15 up to 30 minutes).

- The data collected duration were 3 month period (from January till March, 2018).

2.8. Statistical Analysis

Data were collected, and analyzed using SPSS (Statistical Package for the Social Sciences program) version 22. Descriptive and inferential statistical data are conducted with tests such as frequency, percentage, mean, standard deviation and Cronbach Alpha Coefficient to describe demographic data of participants, to measure fatigue and self-management level among multiple sclerosis patients, correlations analysis to test the relationship between fatigue and self-management among multiple sclerosis patients. Other inferential statistic using data from sample to measure the correlation between variables used test called Pearson coefficient. The researchers conducted a T- independent samples test with; Gender, and Living Situation and the one way a nova test with the; age, marital status, level of education and diagnosed years with MS.

3. Results

Table 1 show the Socio-demographic and clinical data of the Multiple Sclerosis patients, 70.0% of patients were from King Fahad Armed Forces Hospital and only 30.0% from king Abdulaziz University hospital. The age percent of the studied sample were 46.0% from 18 -24 year, 40.0% from 25-34 years and 14.0% from 35-54 years respectively, with Mean±SD of age (30.24 ± 12.8). The majority of the studied sample were 70.0% female and 30.0% of male. More than half 60.0% were single, 34.0% were married, and only 6.0% were divorced. As related to level of education 52.0% with Secondary degree, 46.0% with bachelor degree and only 2.0% with primary degree. In relation to working status more than 38.0% not working, 36.0% working as full time, 10.0% working as part time, and only 8% not working (disable) or receive assistance. The living situation of 94.0% of patients live with family and only 6.0% live alone. About patients years diagnosed with MS 66.0% diagnosed from; 1 to 5 year, 20.0% from; 5 to 10 year, and 10.0% from; 11 to 15 year. Regarding to the number of hospital admission per year related to (MS) disease, the majority of patients 84.0% reported that hospitalized from; 1-3 time per year and only 16.0% hospitalized from; 4-6 time per year. According to chronic disease associated with MS, it was found that 24.0% had chronic disease (DM & Hypertension, 66.7% & 33.3% respectively), while 76% had no chronic disease.

Table 2 clarified mean score of overall fatigue subscales among Multiple Sclerosis patients. It is shown that; 26% of the Multiple Sclerosis patients are suffering severe cognitive fatigue, 40% of the Multiple sclerosis patients with a medium cognitive fatigue and 34% with a mild cognitive fatigue. While 70% of the Multiple Sclerosis patients are suffering severe physical fatigue, 10% with a medium physical fatigue and 20% with a mild physical fatigue. Moreover that 34% of the Multiple

Sclerosis patients are suffering severe psychosocial fatigue, 46% with a medium psychosocial fatigue and 10% of the Multiple sclerosis patients with a mild psychosocial fatigue. Moreover, 48% of overall fatigue subscales of Multiple Sclerosis patients had sever fatigue level, 44% of Multiple Sclerosis patients had medium fatigue level and 8% of Multiple Sclerosis patients had mild fatigue level with overall Mean±SD (2.41±0.81), which means that the majority of them suffering from medium fatigue level.

Table 3 explained mean score of overall Self-management Factor Scales among Multiple Sclerosis patients. It shown that; According to MS knowledge and information; 80%, 14% and 6% among Multiple Sclerosis patients had; high, medium and low self-management respectively. Regarding treatment adherence/barriers; 68% and 32% among Multiple Sclerosis patients had; high, medium self- management level respectively. Related to health maintenance behavior level; 16%, 80% and 4% among Multiple Sclerosis patients had; high, medium, and low self-management respectively. Pertaining to Healthcare Provider Relationship and Communication; 52%, and 48% among Multiple Sclerosis patients had; high and medium self-management level respectively. And based on Social/Family Support; 70%, 22% and 4% among Multiple Sclerosis had; high, medium and low self-management respectively. It was observed from overall self-management factor scales that; 58%, 42% and 21% of the Multiple Sclerosis patients with; high, medium and low overall level of Self-management respectively with Mean±SD (3.27±0.796), which mean that the majority of multiple Sclerosis patient have medium self-management level.

Table 4 described the relationship between socio-demographic/clinical data to overall mean score of fatigue and self-management of Multiple sclerosis patients. It show that; There were statistically significant difference between overall fatigue and socio-demographic data related to; age, level of education, years of MS and chronic disease with p-value; .006, .014, .018 and 0.001 respectively. While there were no statistically significant difference between overall fatigue and socio-demographic data related to; gender, marital status, working status and living situation with p-value; .705, .228, 0.064 and .927 respectively. There was a significant statistically difference between overall self-management and socio-demographic data related to age with p-value (.010). There were no statistically significant difference between overall self-management and socio-demographic data related to; marital status, years of MS, level of education, gender, working status chronic disease and living situation with p-value; .147, .258, .308, .394, 0.550, .961 and .980 respectively.

Table 5 revealed the correlation between fatigue subscales and overall self-management among Multiple Sclerosis patients; It was observed that there were a statistically significant differences between physical and psychosocial fatigue related to overall self-management, while there was no significant difference between cognitive fatigue and overall self-management as shown; The correlation coefficient between Physical fatigue and overall self-management among Multiple Sclerosis patients is statistically significant with p-value (0.013) $r = -.348$, which indicate there is a negative correlation

between physical fatigue and overall self-management among Multiple Sclerosis patients. The correlation coefficient between Psychosocial fatigue and overall self-management among Multiple Sclerosis patients is statistically significant with p-value (0.007) $r = -0.374$, which indicate that there is a negative correlation between psychosocial fatigue and overall self-management among Multiple Sclerosis patients. The correlation coefficient between cognitive fatigue and overall self-management among Multiple Sclerosis patients is statistically non-significant with p-value (0.176) $r = -0.194$, which indicates that there is no negative correlation between cognitive fatigue and overall self-management among Multiple Sclerosis patients. There is a statistically significant negative correlation between overall fatigue subscales and overall self-management among Multiple Sclerosis patients with p-value (0.019) $r = -0.332$.

Table 6 illustrate the correlation between Self-management factor scales and overall fatigue among Multiple Sclerosis patients: It was observed that there were significant differences between health maintenance behavior and health care provide relationship/communication related to overall fatigue, While there were no statistically significant differences between treatment adherence /barriers, MS knowledge and information and social/family support overall fatigue as shown; The correlation coefficient between health maintenance behavior and overall fatigue among Multiple Sclerosis patients is statistically significant with p-value (0.007) $r = -0.375$, which indicate that there is a negative correlation between

health maintenance behavior and overall fatigue among Multiple Sclerosis patients. The correlation coefficient between healthcare provider relationship/communication and overall fatigue among Multiple Sclerosis patients is a statistically significant with p-value (0.013) $r = -0.349$, which indicate that there is a negative correlation between healthcare Provider Relationship/Communication and overall fatigue among Multiple Sclerosis patients. The correlation coefficient between treatment adherence/barriers and overall fatigue among Multiple Sclerosis patients is a statistically non-significant with p-value (0.340) $r = -0.138$, which indicates that there is no negative correlation between treatment Adherence/Barriers and overall fatigue among Multiple Sclerosis patients. The correlation coefficient between MS knowledge and information and overall fatigue among Multiple Sclerosis patients is a statistically non-significant with p-value (0.118) $r = 0.224$, which indicate that there is no negative correlation between MS Knowledge and Information and overall fatigue among Multiple Sclerosis patients.

The correlation coefficient between social/family support and overall fatigue among Multiple Sclerosis patients is a statistically non-significant with p-value (0.110) $r = -0.211$, which indicate that there is no negative correlation between social/family support and overall fatigue among Multiple Sclerosis patients There is a statistically significant negative correlation between overall self-management factor scales and overall fatigue among Multiple Sclerosis patients with p-value (0.019) $r = -0.322$.

Table 1. Frequency/Distribution of socio-demographic and clinical data of Multiple Sclerosis patients (n=50)

Socio-demographic data	No	%	Socio-demographic data	No	%
Hospital			Working Status		
King Fahad Armed Forces Hospital	35	70.0	Not Working	19	38.0
			Full Time	18	36.0
king Abdulaziz University hospital	15	30.0	Part Time	5	10.0
			Not working(disable)	4	8.0%
			Receive Assistance	4	8.0%
Age			Living Situation		
18 -24year	23	46.0	Live with family	47	94.0
25-34 years	20	40.0			
35-54 years	7	14.0	Live Alone	3	6.0
Total Mean ± SD		30.24 ± 12.8			
Gender			How Many Years diagnosed with MS		
Female	35	70.0	1 -5 year	33	66.0
			6 – 10 year	10	20.0
Male	15	30.0	11 – 15 year	5	10.0
			16 – 20 year	2	4.0
			Total Mean ±SD		7.6 ± 4.15
Marital Status			How Many Time Admitting to hospital per year related to (MS) disease		
Single	30	60.0	1 - 3	42	84.0
Married	17	34.0	4 - 6	8	16.0
Divorced	3	6.0			
Level of education			Have any other chronic disease		
Secondary	26	52.0	No	38	76.0
Bachelor	23	46.0	Yes	12	24.0
			If yes; DM	8	66.7
Primary	1	2.0	Hypertension	4	33.3

Table 5. Correlations between fatigue subscales and overall self-management among Multiple Sclerosis patients

Fatigue categories	Total Mean \pm SD	Correlation Coefficient (Overall Self-Management)	p-value
Cognitive Fatigue	1.97 \pm 0.856	-.194	.176
Physical Fatigue	3.14 \pm 0.7123	-.348(*)	.013*
Psychosocial Fatigue	2.11 \pm 0.8595	-.374(**)	.007*
Overall Fatigue	2.41 \pm 0.81	-.332(*)	.019*

* $p < (0.05)$, ** $p < (0.01)$.

Table 6. Correlation between Self-management Factor Scales and overall fatigue among Multiple Sclerosis patients

Self-Management Factor Scales	Total Mean \pm SD	Correlation Coefficient (Overall Fatigue)	p-value
MS Knowledge and Information	2.94 \pm 0.772	.224	.118
Treatment Adherence/Barriers	3.40 \pm 0.864	-.138	.340
Health Maintenance Behavior	2.8 \pm 0.761	-.375(**)	.007*
Healthcare Provider Relationship and Communication	3.49 \pm 0.754	-.349(*)	.013*
Social/Family Support	3.70 \pm 0.827	-.211	.110
Overall Self-management	3.27 \pm 0.796	-.332(*)	.019*

* $p < (0.05)$, ** $p < (0.01)$.

4. Discussion

The socio-demographic and clinical findings of the study revealed that the majority of MS patients were female versus male with Mean \pm SD (30.24 \pm 12.8), these findings are generally consistent with [21] who reported that 78% of MS patients were female and 22% were male at the peak age is between 20 and 30 years, as well as [22] who stated that MS usually affects women rather than men, between 20 and 40 years and in their most productive years of life. Moreover, [23] mentioned that MS is usually diagnosed in young adults and affects women two to three times as often as men.

As regard to marital status, around two third were single, this finding was in contrast with [24] who mentioned that more than half of respondents (55.4%) were married.

According to level of education, it shows that more than half of MS patients had a secondary level and less than half with bachelor level, this agreed with [25] who reported that 78% had diploma degree and below this level of literacy. In addition [26] reported that (41%) had high school level of education.

Patients working status in this study, more than one third were not working. This is consistent with [25] who stated that the majority of MS patients were unemployed, while other studies [27,28] revealed that (53-55%) of MS patients were unemployed.

For living situation in this study, the majority of MS patients lived with family. This finding is coherent with [26] who confirmed that 94 % of MS patients were living with family/spouse. While [25] mentioned that about half of the patients were living with families.

Regarding diagnosed years with MS, two third of MS patients had a diagnosed durations from one up to five years, this in line with [21] who emphasized that the mean time interval between the first symptoms and disease diagnosis was around two years. While, [24] reported that the mean duration of the disease was around five years.

As related to the hospital admission frequency per year, it was recorded that more than three quarters of MS patients hospitalized at least from one to three times per year. This supported by [29] who clarify that 80% of MS

patients usually experience hospitalization several times due to relapses phases of MS. [30] mentioned that around 25.8% of the MS population being hospitalized annually. Furthermore [31,32] informed that the median number of hospitalizations per year was at least from one to two times with a median hospital stay of four days.

Regarding other chronic disease, three quarter of MS patients stated that they don't have any chronic disease while one quarter of MS patients had chronic disease such as (hypertension or diabetes). In line with [33] who stated that most frequently reported co-morbidities in MS of (17.8%) is hypertension. Moreover [34] reported that eighteen percent of the MS patients had impaired fasting glucose.

According to overall fatigue subscales, around half of MS patients had sever fatigue level, less than half had medium fatigue level and the rest had mild fatigue level. The giving findings in consistent with [6,35] who emphasized that that fatigue may affect up to 80 % of MS patients, it can be severe in up to 60-70 % of them, and it tends to persist over time once it appears as it compared to those with chronic fatigue syndrome.. Moreover, [36] mentioned that 90% of fatigue could be a very debilitating and difficult to treat symptom.

As related to physical fatigue, near three quarter of Multiple Sclerosis patients had severe physical fatigue, this finding supported by [37] who stated that MS-related fatigue is associated with daily physical functioning and there was a significant negative association between the dimensions of physical fatigue and physical behavior (i.e. more fatigued persons have a less active life. [38] mentioned that physical and cognitive fatigue had great impact on person life more than psychosocial fatigue. Moreover [39] confirmed that MS patients had highest fatigue scores in physical subcategory.

As it comes to overall self management factor scales, more than half with high level of self management and less than half with medium level of self management. This findings in contrast with [40,41] who described that MS patients have increased susceptibility to poor self-management due to chronic nature of MS disease, therefore require more attention from all medical team, where nurses play important role through establish a

healthy partnership between the patient and care provider, enhance MS patient to participate in planning and decision making of the medical care or treatment. Moreover, [42] revealed that MS patients had moderate level of overall self management.

Regarding health maintenance behavior, the majority of MS patients had medium level of health maintenance behavior of self-management and a few of them had high level. This findings in line with [43] who reported that around one third of MS patient had health maintenance behavior. While [42] confirmed that (13.63%) of MS patient had health maintenance behavior.

As related to health care provider relationship and communication, more than half of MS patient had high level of healthcare provider relationship and communication of self-management and less than half with medium level. This findings in contrast with [43] who mentioned that less than one quarter of MS patient had lower self management related to healthcare provider relationship. In addition [42] reported that around one quarter of MS patient had high healthcare provider relationship and communication level.

As regards the relationship between age related to overall fatigue and self-management of MS patients, there was statistically significant difference with p-value (.006 and .010, respectively). The researchers believes that fatigue in MS increase and worsens with the age as result of its progressive disease course and early self-management strategies on early MS stage in young adult can helps in maintaining good Quality of life and prevent later complications or disability in MS patients. The study result in consistent with [44,45] who explained that age was a significant factor influencing fatigue and strongest predictor of self-management behavior of people with MS. [6,22] added that the majority of MS patients who suffering from fatigue are young adult on their most productive years of life, it can be severe, tends to persist over time and it can lead to MS complications or disability after long period of time. Furthermore [46,47] explained that living with a chronic disease like MS needs to control the disease and limit its progression on early stage , in which young MS individuals play an important role in self-management of the daily effects of the disease on their lives through early control strategy such as self management and changing lifestyle to adjust it.

For the relationship between level of education related to overall fatigue and self-management of MS patients, there was a statistically significant difference with p-value (.014) related overall fatigue, while there was statistically non -significant difference with p-value (.308) related to self-management. The researchers suggests that MS patients with lower levels of education affects negatively on disease progression through unhealthy lifestyle practice compared with high level of education. This finding agreeable with [48,45] who described that level of education, knowledge and beliefs, are the most strongest predictor in self-management behavior in predicting quality of life for MS patients. [49] clarify that low education levels, might indirect contribute to unhealthy patterns such as; physical inactivity, obesity, smoking, poor treatment adherence and other associated co-morbid diseases. [50,51] confirmed that patient information and knowledge about MS is essential part of informed

decision making in treatment and patients with lower education level consistently showed more impaired quality of Life domains.

Regarding the relationship between current number of years diagnosed with MS related to overall fatigue and self-management of MS patients, there was a statistically significant difference with p-value (.018), while there was statistically non -significant difference with p-value (.258) related to self-management. The researchers believes that fatigue severity in MS was increases in those who were older and had a longer time, since symptom onset occur and could be effect on; cognitive, motor functioning, social activity or relationships, therefore early symptoms management in MS is a key strategy to effective self management. This finding in line with [6,35] who noted that fatigue in MS after (15-20) years of symptom onset, can lead to progressive course or clinical deterioration of MS. [52] added that fatigue in MS patients is associated with reduced employment and lower quality of life over time. In addition [6] explained that early management of fatigue in MS can help in starting a suitable treatment and prevent complication. [53] added that fatigue in MS affecting personal, family, and community participation, in which early management of fatigue get through; behavior change, develop and integrate self-management skills into their day to day activities and understanding of the positive effect of early self-management on their quality of life.

According to the relationship between other associated chronic disease related to overall fatigue and self-management of MS patients, there was a statistically significant difference with p-value (.001) related to overall fatigue, while there was statistically non -significant difference with p-value (.961) related to self-management. Other common co-morbidities associated with MS like hypertension and diabetes could be related unhealthy lifestyle. This finding supported by [54,55] who reported that hypertension is one co-morbid condition that affects 10% to 30 % of MS patients and increases with age. While [56] mentioned that some autoimmune diseases like MS, associated with certain genotypes that increased risk of damage of islet beta cells and may lead to occurrence of diabetes. Moreover [57] stated that diabetes in multiple sclerosis contribute to the progression of MS and disability. [58,59] added that as MS progresses, patients encounter limitations; in their daily activities or working abilities. It can cause; extensive physical disabilities, delay MS diagnosis, increase hospitalization, increase the chance of death or lack of effective treatment and negative impact quality of life. [54] confirmed that hypertension is consider as one of the main top five leading causes of disability among MS patients as a result of sedentary life behavior. While [60] reported that co-morbid medical conditions such as diabetes can substantially affect neurologic disease such as MS outcomes, higher blood glucose concentration is associated with poorer self management outcomes and this due to reduced mobility and sedentary lifestyle.

As it comes to the correlation between overall fatigue subscales and overall self-management among Multiple Sclerosis patients, there was a statistically significant negative correlation with p-value (.019). this agreed with [61] who stated that effective self-management is consider

as a potential approach that may mitigate the symptoms associated with MS. Moreover [62] mentioned that fatigue is the most common and bothersome symptoms in MS patients and is reported in 50% to 92% of the MS population. Pharmacological treatments are often unsatisfactory whereas rehabilitation and self-management strategies seem to have better effects.

In regard to the correlation between health maintenance behavior and overall fatigue among MS patients, there was a statistically significant negative correlation with p-value (.007). This finding is consistent with [63] who revealed that MS causes multiple stressors for patients, in which all require different methods of coping, influenced by the level of impairment, and tackling more intensively with their disease, [64] added that adaptive coping strategies in MS is beneficial for psychosocial adjustment and management of disease progression. Furthermore [65] mentioned that demonstrating a desirable individual performance such as (modulation of activities, appropriate environments, having adequate knowledge about the disease, good , seeking for further information about MS) are all expressed that patients can successfully cope with disease through self-management behaviors.

Regarding the correlation between healthcare provider relationship/communication and overall fatigue among MS patients, there was a statistically significant negative correlation with p-value (.013). This finding is in line with [66] who mentioned that lack of understanding of MS disease, as well as the uncertainty of MS symptoms, all this challenges makes the MS patient difficult to response to treatments, in which an effective communication has a critical role in improving; acceptance of the disease, patients' compliance with chronic treatments and patients' quality of life. [67] added that the demanding need of care in MS patients demonstrates social, psychological, and physical impact not only patients but also their families or caregivers.

As it comes to the correlation between overall self-management factor scales and overall fatigue among MS patients, there was a statistically significant negative correlation with p-value (.019). This finding is in line with [68] who mentioned that fatigue in MS is treated with a several self management approaches such as; patients' behavior emotional and mental attitude, in which have a positive effect on reducing fatigue output. In addition [69] added that self-management is one of the most powerful methods that MS patients can use to cope with the signs and symptoms of disease such as fatigue through promoting patients' learning skills, increases their decision-making and performing abilities as well as their use of adaptability mechanisms.

5.1. Conclusion

The study concluded that;

- There were statistically significant negative correlations between overall self-management and fatigue subscales related to physical and psychosocial fatigue among MS patients. However, there was no statistically significant negative correlation between overall self-management and fatigue subscales related to cognitive fatigue among MS patients.

- There was a statistically significant negative correlation between fatigue subscales and overall self-management among MS patients.

- There were statistically significant negative correlations between self-management factor scales and overall fatigue related to; healthcare provider relationship/communication and health maintenance behavior among MS patients.

- However, there were no statistically significant negative correlation between self-management factor scales and overall fatigue related to; treatment adherence/barriers, MS knowledge/information and social/family support) among MS patients.

- There was a statistically significant negative correlation between self-management factor scales and overall fatigue among MS patients.

5.2. Recommendations

5.2.1. Implication for Future Research

- The current study recommended further research about how to conduct fatigue management program on MS patients focusing on nursing role who involves on treatment. of MS patients, such program could be applied on a large sample size using pre and post assessment intervention design to generalize the result.
- Further research about essential nursing skills and knowledge needed in conducting patient self-management program.

5.2.2. Implication for Nursing Practice

- Conducting a periodic patients self-management educational program regarding coping strategies to reduce fatigue and healthy lifestyle in MS patients. Includes perform comprehensive assessment for each patient; needs, preferences, learning style and family.
- Formulate a collaborative treatment plan taking into account; patient's symptom, level of disability, need for disease modifying treatment and need for sustained or prolonged care.
- Negotiating within the healthcare system ensuring that MS patients get the medications, equipment, resources they needed and promoting self-management.
- Nurse can act as advocate through helping patient to overcome; physical, cognitive and psychosocial obstacles to treatment. So, they become active members and participate on decision making and treatment options.

5.2.3. Nursing Administrations and Health Policies

- Encourage governmental policy and other decision makers in the Saudi community to support self-management educational programs and provide appropriate environments and facilities to conduct such programs.

5.2.4. Implication for Patient Education

- Multiple sclerosis patients should be educated about essential skills in effective coping strategy and

symptoms management of MS such as; disease modifying medications and teaching self-injection.

- A self-management program should be developed for people with chronic disease such as MS patients. Focusing on three primary tasks of self-management program include; First, medical management such as (taking medication, adhering to a special diet, using medical services, and changing the lifestyle (sleep, hygiene and exercise). Second, role management covers (maintaining changing and creating new meaningful behaviors in life roles) such as changing responsibilities within the family. Third, emotional management is related to how to deal with the feelings resulting from a chronic disease such as (anger, fear, disappointment, and depression) which are commonly experienced as a result of a chronic disease.

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