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Self-efficacy in Patients with Multiple Sclerosis: A Model Test Study

Niloofar Hejazizadeh[1], Marzieh Pazokian[2*], Malihe Nasiri[3]

Abstract

Background: Multiple Sclerosis (MS) is a common disease among youngsters and self-efficacy is a crucial factor in these patients. Various variables, including demographic characteristics and disease symptoms, affect self-efficacy. Therefore, it is necessary to assess the relationship between these factors using a clear and comprehensive model.

Aim: this study aimed to investigate the self-efficacy model for MS patients.

Method: This descriptive-correlational study was performed on 203 patients referring to the Iran MS Society. Data collection tools entailed Rigby Multiple Sclerosis Self-efficacy Scale, Krupp Fatigue Severity Scale, and Rosenberg Self-Esteem Scale. Data were analyzed by the SPSS 24 and LISREL 8.8.

Results: The mean scores of self-efficacy, fatigue, and self-esteem were found as 39.6±9.1, 38.1±14.4, and 19±7.6, respectively. The model fit indices, including the goodness of fit index, comparative fit index, root mean square error of approximation, normalized fitness index, non-normalized fitness index, and the degree of freedom for the Chi-square were obtained as 0.9, 1, 0.002, 0.9, 0.9, and 1.03, respectively. Results indicated an appropriate prediction for the paths considered to determine the relationship between variables. Our findings demonstrated a significant correlation between self-efficacy and self-esteem (r=0.2), fatigue and self-esteem (r=-0.1) (P<0.001), as well as family support and self-esteem. Moreover, fatigue was observed to have a significant relationship with marital status, hospitalization, and exercise. However, no significant relationship was observed between fatigue and self-efficacy (r=0.02) (P>0.05).

Implications for Practice: The results showed that the Bandura model of self-efficacy can be used for the demographic and clinical variables of MS patients. Findings of this study can be helpful in developing and implementing instructional plan to improve self-efficacy in these patients.

Keywords: Fatigue, Multiple sclerosis, Self-efficacy, Self-esteem

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Introduction
Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system (1) and the major cause of disability in young adults (2) considered as century disease (3). According to the reports, approximately 15-30 individuals out of every 100,000 people in Iran are affected by this disease (4). Patients are faced with reduced social and personal function, as well as emotional and psychological problems due to the occurrence at a young age (5).

Regarding the nature of the disease, compatibility and self-efficacy are the factors that influence the ability to manage the condition (6). The concept of self-efficacy was proposed by Bandura for the first time (7). The self-efficacy theory of Bandura (1997) focuses on individual beliefs that affect self-management ability for the symptoms caused by disease. As a result, the factors with impacts on symptoms are necessary to be identified. Individual and disease-related characteristics, in addition to the relationship between them, might affect the beliefs of patients to perceived self-efficacy (PSE). This theory states that PSE is a mediator between disease symptoms and physical-functional situation. They used Hoffman theory (2009) of perceived self-efficacy and fatigue related to cancer. Hoffman et al. believed that cancer and treatment outcomes could impose adverse effects on the life of a person. Fatigue due to cancer was reported as one of the adverse outcomes in this study that can lead to more severe symptoms. These sequels can be managed with PSE as a key factor. To manage fatigue, it is essential for the patient to perceive whether he has the ability to manage these symptoms.

Hoffman et al. in Michigan performed a study to test the hypothesis that physical-functional situation is related with patient characteristics, cancer-related fatigue, other symptoms, and PSE for fatigue management in cancer patients (8). Similar to cancer patients, fatigue is one of the most debilitating symptoms experienced by MS patients (9-11). On the other hand, cancer patients similar to patients with MS have difficulty adapting to the new situation due to disease conditions and enduring some degrees of physical and psychological stresses (9).

Clinical conditions and demographic characteristics play an important role in the self-efficacy of chronic patients. Consequently, these patients seek information related to self-care and disease to achieve compatibility with the condition, improve their control over the situation, and have a high self-efficacy (12). Among the symptoms, fatigue is experienced by 50-80% of the patients (13) and about 28.9% of patients report this complication during the first three years of diagnosis (14). Wilski et al. (2016) claim that factors, such as fatigue may contribute to the reduction of the self-esteem of patients with MS (15).

The important point is that diminished self-esteem can affect the compatibility and ability of a person to overcome the disease (16). On the other hand, altered self-esteem of the patients with MS can influence their self-efficacy (17). Disability in people with MS can impose a negative impact on their independence leading to weaker self-efficacy (18). Self-efficacy is the confidence that a person has in performing certain behaviors and making some changes to determine whether he/she can perform a particular behavior or make a change (19). Enhanced self-efficacy results in boosted self-esteem, motivation to achieve goals, and resistance against difficulties (19).

Self-efficacy in MS patients is considered as a specific determinant of physical activities, work efficiency, adherence to therapy, fatigue, depression, and anxiety (20). Therefore, PSE can help nurses in developing care plans for patients with MS (21). In addition, self-efficacy can be related to self-assessment structures, such as self-esteem, personal control, and compatibility with disease symptoms (22).

Although fatigue, self-esteem, and self-efficacy have been investigated in patients with MS (11, 20, 23), studies on the relationship between self-management, self-esteem, and self-efficacy in MS patients are limited. To our knowledge, no study has evaluated the relationship between fatigue, self-esteem, and self-efficacy in MS patients based on a model.

With this background in mind, the purpose of this study was to test a model assuming that self-efficacy in MS patients may be related to fatigue and self-esteem. Physiological factors, namely age, gender, and medical information, in addition to contextual factors, such as marital status, education, income, employment, and insurance can affect fatigue, self-esteem, and self-efficacy. Regarding that cancer and MS are both chronic diseases and cause disabling symptoms, this model was used for patients with MS.

Physiological and contextual factors related to fatigue, self-esteem, and self-efficacy in MS patients were designed and tested using the model that Hoffman et al. (2009) applied in patients with cancer.
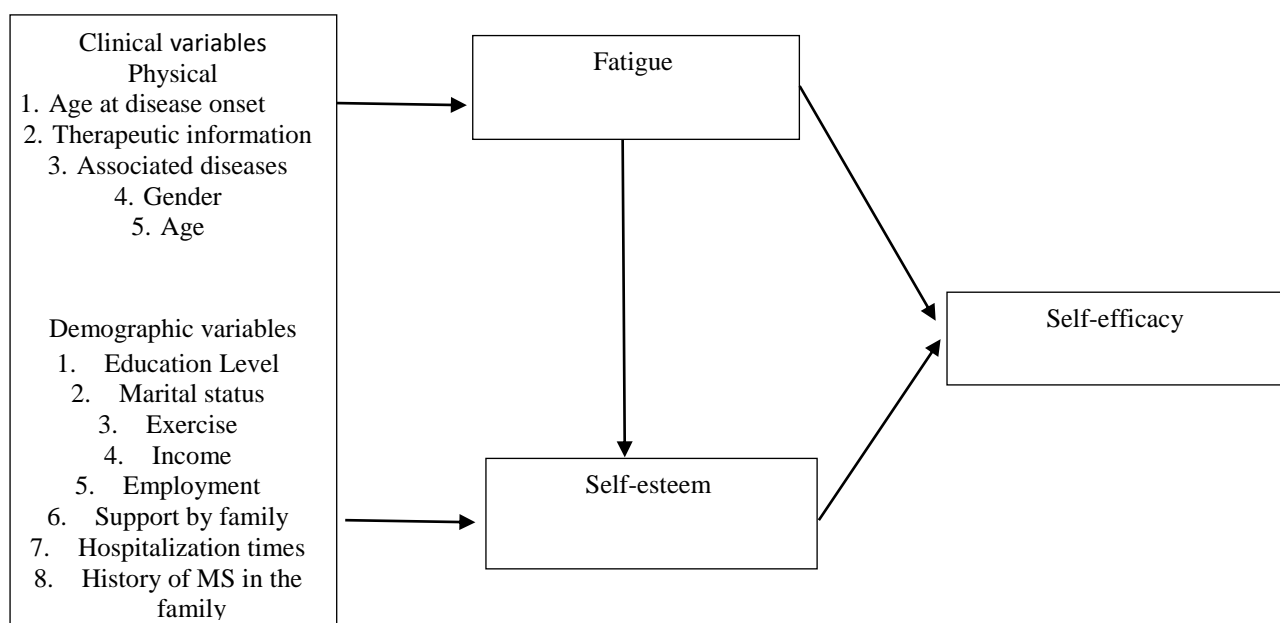
Figure 1. Hypothetical model in MS patients derived from the model of Hoffman et al. (2009) in patients with cancer

The hypothetical model of this theory in patients with MS is presented in Figure 2.

Two hypotheses were proposed in the present study: 1) self-efficacy in patients with MS can be related to fatigue and self-esteem and 2) demographic and clinical variables can affect fatigue, self-esteem, and subsequently self-efficacy. The results of this investigation can be a guide for interventional studies in the field of fatigue management and self-efficacy enhancement in patients with MS.

Methods

This descriptive-correlational study was conducted on the study population consisting of people with MS who referred to Iran MS Society in Tehran and participated in this study voluntarily. The sample size for this study was calculated as 184 patients using the formula of sample size for correlation studies and considering the type 1 correlation error, type 2 test error, test power, and correlation coefficient of 5% (α=0.05), 10%, 90%, and 0.2, respectively (24). Afterwards, the sample size was estimated as 203 considering the probability of a 10% drop out.

The inclusion criteria encompassed being over 20 years old, being able to communicate, having the literacy of reading and writing, being affected with disease for at least one year, having a clinically stable status (no chronic, acute, or malignant disease), not having any record of depression and anxiety, and gaining a score of 3.5 or less in the Expanded Disability Status Scale (EDSS).

Fatigue severity correlates with the progress of the chronic disease, motor symptoms, and a score of higher than 3.5 in the EDSS (14). Therefore, patients with a score of lower than 3.5 in the EDSS participated in the current study. It should be noted that the EDSS score was measured by one of the researchers with the help of a physician before entering the study.

The questionnaire for demographic characteristics included age, gender, the age of disease onset, marital status, education level, employment status, monthly income, exercise, support by family (with whom you live), the record of hospitalization and disease in the family. In addition, the 9-item Fatigue Severity Scale (FSS) by Krupp et al. (1989) was applied to evaluate fatigue among individuals. This
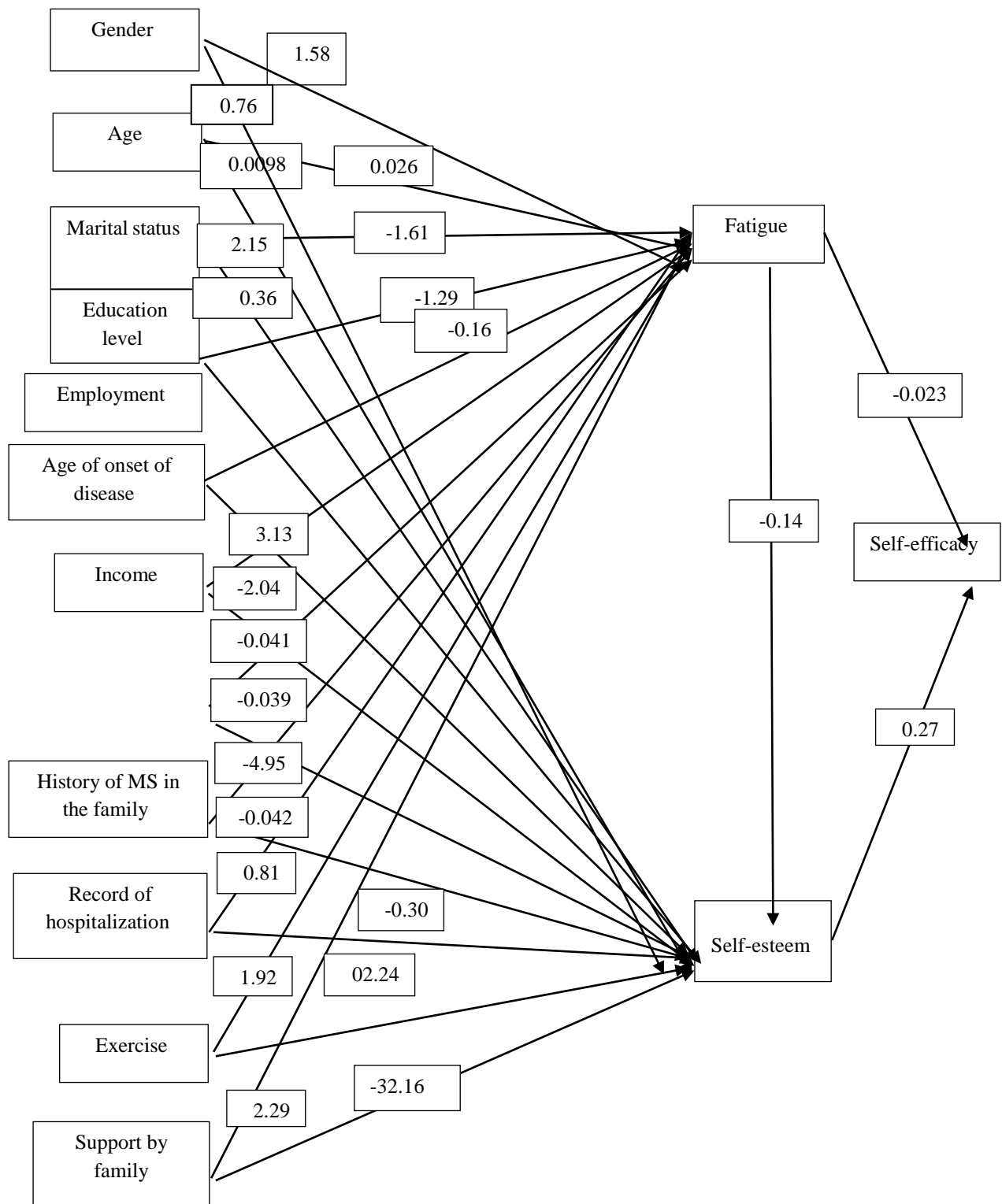
Figure 2. Extracted model with a non-standardized coefficient (raw coefficients)

tool is scored based on a seven-point Likert scale with the final score ranging from nine to 63. Scores below 18 and above 45 indicate low and severe fatigue, respectively.

Rosenberg Self-Esteem Scale (RSES) (1965) was used to assess the self-esteem of participants. The 10-item RSES with five positive items (1-5) and five negative items (6-10) is a valid questionnaire for measuring the self-esteem of patients. This scale is scored by a four-point Likert scale with the final scores being in the range of 0-30. Scores below 15 showed low self-esteem and scores above 25 indicated high self-esteem.

Furthermore, we examined self-efficacy by the 11-item Multiple Sclerosis Self-Efficacy (MSSE)

questionnaire designed by Rigby et al. (2003), which was scored as a five-point Likert scale. This tool consisted of three dimensions, namely independence and activity (four items), concerns and interests (four items), and personal control (three items). The scores of this questionnaire were in the range of 11-55 and higher scores indicated higher self-efficacy.

The validity of the questionnaire for demographic and clinical information was confirmed by a group of ten faculty members of the Nursing and Midwifery Faculty using content validity qualitatively and formally. In Iran, Shahvarughi Farahani et al. (2008) evaluated the internal consistency of the FSS obtaining a Cronbach's alpha of 0.96 and an intraclass correlation coefficient of 0.93 (25).

Rajabi and Bohlol (2006) showed through factor analysis that RSES had a high construct validity with the Cronbach's alpha of 0.93 for the whole questionnaire (26). In the study by Reshvanlo and Soleimanian (2012), the validity of the MSSE survey was reported to be desirable using construct validity and Cronbach's alpha of the whole questionnaire obtained as 0.9 (27). The reliability coefficients of FSS, RSES, and MSSE surveys were found as 0.92, 0.92, and 0.85, respectively.

Following obtaining the required licenses from the Student Research Committee and describing the purpose of the study for the officials of Iran MS Society in Tehran, sampling was started. One of the researchers provided questionnaires to the patients attending the MS Society and explained the study objectives to the participants and informed written consents were taken regarding the ethical considerations. Patients had 30 min for completing the questionnaires.

Sampling was performed during May-July 2018 and the researcher was present at the MS Society during activity hours (i.e., 8 am-3 pm). The subjects were randomly selected through the convenience sampling out of people who referred to the MS Society to complete administrative affairs, refer to the physiotherapy center, participate in sport classes, and register in the Society. During this period, 296 questionnaires were collected and 93 individuals were excluded from the study due to depression and anxiety disorders or refusing to complete the questionnaire.

The plan of this study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences in 2018. Participants completed the questionnaires voluntarily after signing written consent forms. The patients were assured regarding the confidentiality of information and codes were used instead of the names of patients.

All the data were analyzed by descriptive analysis, including frequency, percentage, Pearson correlation, Spearman correlation, regression, and the Chi-square test using the SPSS software version 24 (IBM, Chicago, USA). Pearson and Spearman correlation coefficients were used to assess the correlation between fatigue, self-esteem, and self-efficacy. The regression model was utilized to evaluate the contextual and clinical variables.

Moreover, the LISREL software version 8.8 was applied to investigate the relationship and dependency between variables through the path analysis method. In this method, multiple regression techniques, factor analysis, multivariate correlation, and the analysis of variance and covariance were used to test the hypothetical model. Selected indices for determining the compatibility of models included the degree of freedom for the Chi-square ($\chi2/df$), goodness of fit index (GFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA), normalized fitness index (NFI), and non-normalized fitness index (NNFI). The RMSEA values lower than 0.05 with the confidence interval of 90% and GFI, CFI, NFI, and NNFI values higher than 0.9 were considered acceptable for the compatibility of models.

Results

A total of 203 patients with MS participated in this study with the mean age of 36.7±9 years. Our findings showed that the mean age of subjects at disease onset was 28.7±8.2 years. Moreover, the mean of hospitalization times was reported as 2.9±4.1 times. According to our results, 46.8% of the participants were exercising for 1-5 h per week. The mean scores of self-efficacy, fatigue, and self-esteem were obtained as 39.6±9.1, 38.1±14.4, and 19±7.6, respectively. The remaining descriptive data are presented in Table 1.

The results of this study showed direct significant relationships between fatigue and self-esteem (r=-0.1, P<0.001), as well as self-efficacy and self-esteem (r=0.2, P<0.001). On the other hand, no statistically significant relationship was observed between fatigue and self-efficacy (P>0.05).

Table 1. Demographic information of patients with MS (n=203)

Demographic variable	Group	Frequency (%)	Demographic variable	Group	Frequency (%)
Gender	Female	140 (69)	Monthly income	Enough	73 (36.5)
	Male	63 (31)		Not enough	129 (63.5)
Education level	Under diploma	25 (12.3)	Employment	Student	10 (5)
	Diploma	81 (39.9)		Housewife	80 (39.4)
	Associate degree	20 (9.9)		Employee	24 (11.8)
	BA	55 (27.1)		Retired	12 (5.9)
	MA	21 (10.3)		Unemployed	37 (18.2)
	Ph.D.	1 (0.5)		Freelancer	40 (19.7)
Exercise	Yes	135 (66.5)	Support by family	Yes	166 (81.8)
	No	68 (33.5)		No	37 (18.2)
Marital status	Single	74 (36.4)	Record of hospitalization	Yes	167 (82.3)
	Married	108 (53.2)		No	36 (17.7)
	Divorced	17 (8.4)	History of disease in the family	Yes	28 (13.8)
	Widow	4 (2)		No	175 (86.2)

Table 2. Direct and indirect effects of total fatigue, self-esteem, and other demographic variables on self-efficacy in the path analysis model

Variables	Direct effect	Indirect effect	Total effect	T-value
Fatigue	-0.02	-0.05*	-0.07	1.98*
Self-esteem	0.27	-	0.27	3.94*
Gender	-	0.24	0.24	0.6
Age	-	-0.01	-0.01	-0.33
Marital status	-	-0.18	-0.18	-0.75
Education level	-	0.01	0.01	0.75
Employment status	-	-0.03	-0.03	-0.28
Monthly income	-	-0.93	-0.93	2.33*
Age at disease onset	-	0.02	0.02	0.81
History of disease in family	-	0.41	0.41	0.84
Record of hospitalization	-	0.22	0.22	0.53
Exercise	-	-0.68	-0.68	-2.1*
Support by family	-	-0.7	-.07	2.1*

* Variable effect is significant

Table 3. Fit indices in the self-efficacy path analysis model

Indices	Value	Acceptable
$\chi 2/df$	1.03	<3
RMSEA	(0.001-0.046)0.0021	<0.05
CFI	0.97	>0.9
GFI	0.97	>0.9
NFI	0.98	>0.9
NNFI	0.99	>0.9

According to Table 2, the fatigue variable affects the self-efficacy variable indirectly through self-esteem (T-value=1.98, total β=0.07). Furthermore, self-esteem imposes a direct impact on self-efficacy (T-value=3.04, total β=0.27). Income variable influences self-efficacy indirectly and the mean self-efficacy score in subjects with insufficient income was lower than 0.93.

The two variables of exercise and being supported by family imposed an indirect effect on self-efficacy. The findings demonstrated that the mean self-efficacy score in patients who did not exercise and had no support was 0.68 and 0.7, respectively. As summarized in Table 3, the fit indices revealed that the self-efficacy path analysis model had a good fit and the paths in the model were correctly determined.

Discussion

This study was conducted to test the model of self-efficacy in patients with MS. The variables in the extracted model were obtained to indicate the factors related to self-efficacy. However, this mode cannot be claimed to have an absolute comprehensiveness and is not necessarily the most complete model for showing relationships between the variables. Results of the current investigation support the self-efficacy theory of Bandura by identifying the relationship between fatigue and self-esteem, as well as self-esteem and self-efficacy.

The most important finding of this study was the significant relationships between fatigue and self-esteem. Fragoso et al. (2009) and Ifantopoulou et al. (2015) pointed out that the higher the fatigue score, the lower the self-esteem (11, 16). In fact, the present study showed that fatigue can affect self-esteem as a psychological category in patients with MS.

It is important for nurses to take into consideration psychological problems, such as self-esteem that can affect the physical symptoms. In addition, the nurses try to improve physical status with the psychological status of patients. It has been specified in other chronic diseases, such as cancer that individuals with lower fatigue scores have better physical performance and a higher quality of life with improved self-esteem. In other words, above all, physical ability and function affect the self-esteem of individuals (28).

Another important finding of the extracted model is the correlation between self-esteem and self-efficacy in patients with MS. The present study and the research by Mikula et al. (2018) showed that self-efficacy has a relationship with self-esteem in chronic diseases, including MS. In fact, in case a person suffers from a chronic disease, they deserve attention and care.

The relationship between self-esteem and self-efficacy enables an individual to use different strategies of compatibility in different challenging situations. The individual seeks to achieve compatibility, stop stressful thoughts, achieve emotional support, and pull out their mind from the disease. Protective processes, including compatibility and the quality of life of patients, progress following the promotion of the self-esteem of patients (29). Therefore, it can be concluded that self-esteem can act as the mediator between fatigue and self-efficacy.

Our results did not reveal a significant relationship between fatigue and self-efficacy. Contrary to the present study, Jongen et al. (2014) conducted an investigation concerning the two groups of patients with clinically isolated syndrome and MS. The latter authors showed that people who reduced their working hours during the year following diagnosis had more fatigue and less self-efficacy (30).

Asea et al. (2017) stated in another study that people with higher self-efficacy, had lower rates of depression, anxiety, and fatigue leading to enhanced self-management (23). Amtmann et al. (2012) carried out a study on fatigue and self-efficacy in MS patients and patients with vertebral lesions. They reported that high self-efficacy scores had a significant relationship with better physical and mental health. Moreover, increased self-efficacy scores have a relationship with diminished fatigue, stress, sleep disturbance, pain, and symptoms of depression (31).

Decreased activity due to fatigue, in addition to a reduction in self-esteem and the level of social activity of a patient, creates a major challenge for nurses. As a result, nurses require to prevent such occurrences at first and think about strategies for patients and their families (28).

Marital status was one of the variables correlated with self-esteem among the study variables. Sharifi Neyestanak et al. (2012) contrary to Masoodi et al. (2009) reported a significant relationship between marital status and self-esteem (24, 32). Sharifi Neyestanak et al. (2011) stated that a higher level of self-esteem is observed in single people, which is not consistent with the results of the present study. An intimate relationship with a spouse along with emotional support can provide suitable self-esteem and security for patients (24).

According to the extracted model in Figure 2, the records of hospitalization had a significant relationship with fatigue and self-esteem. Contrary to the study by Afrasiabifar et al. (2016) in MS patients, Ghanbari et al. (2015) in subjects with chronic obstructive pulmonary disease revealed that fatigue augments by the elevated number of hospitalizations (33, 34). In fact, it can be concluded that higher hospitalization times affect the physical performance of the patient and regarding the limitations, the individual experiences more fatigue. On the other hand, according to the study performed by Zendehtalab and Nowrouzi (2012), MS as a chronic disabling disease associated with recurrence and increased hospitalization times can have devastating effects on the different dimensions of the life of a patient (35).

It should be noted that a significant correlation was not observed between exercise and self-esteem. However, lower self-esteem scores were found in the subjects who did not exercise. As in the present study, Awick et al. (2017) showed that in women with breast cancer, physical activity is correlated with exercise self-efficacy, physical self-esteem, and general self-esteem.

Joseph et al. (2014) demonstrated that physical activity has a significant relationship with physical self-esteem and sport self-efficacy in BA students (36, 37). Evidence shows that self-esteem is a multidimensional concept playing an important role in the quality of life and health of an individual (36). Further studies are recommended to identify the relationship between physical activity, exercise, fatigue, self-esteem, and self-efficacy in patients with MS.

People without emotional support in the family were reported to have lower self-esteem. However, social support in these patients protects them from the psychological consequences of low self-esteem (16). Jelinek et al. (2016) completed a study on 2312 patients with MS from 54 countries. Most people were supported financially by two or more members of the family and were shown to have an increase of 6-7 scores in mental health domain in quality of life (38). In fact, the family, friends, and caregivers of patients with MS play an important role in the use of strategies by the patient for compatibility with the disease (29).

According to Bandura, human behavior is influenced by extrinsic and intrinsic factors that encompass individual characteristics. According to present study, some characteristics had an effect on increasing fatigue, decreasing self-esteem, and self-efficacy. However, other extrinsic and intrinsic factors may be influential, which need further evaluations.

The high number of questions in the questionnaires made the completion procedure time-consuming for the participants and due to the feeling of fatigue in most patients, it was tried to be controlled by giving enough time to the individuals. Moreover, considering the patients who referred to the MS Society as the study population leads to the low generalizability of results to the entire community of the patients with MS. The self-reported information form results in the possibility of not being honest in answering the questions.

Implications for Practice

Model fit indices showed that the self-efficacy model of Bandura can be used in patients with MS regarding the demographic and clinical variables. Findings of the present study can be helpful for the professional members of the health team and be useful in the development of nursing care. As a result, treatment staff and nurses, in particular, should take into consideration the psychological problems of patients, in addition to their physical problems. In future studies, it is suggested to examine the relationship between the physical symptoms of patients, such as fatigue and the psychological symptoms, including self-esteem and self-efficacy. Furthermore, we recommend conducting studies on MS patients in larger populations with diverse and more variables. It is recommended to use a larger sample size and a statistical population that is not limited to the people who refer to the MS Society in future studies.

Acknowledgments

Conflicts of Interest

The authors declare no conflict of interest for the present study.

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