Avicenna Journal of Neuro Psycho Physiology
doi: 10.32592/ajnpp.2022.9.2.105 2022 May;9(2): 75-80 https://ajnpp.umsha.ac.ir

Original Article

Prevalence of Psychiatric Disorders in Multiple sclerosis Patients: A Cross-sectional Study

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Received: 22 Jun. 2021
Accepted: 07 Nov. 2021
ePublished: 09 May.2022

Abstract

Background and Objective: The incidence risk of psychiatric disorders is higher in patients with multiple sclerosis (MS) than in the general population. This cross-sectional study aimed to evaluate the frequency of psychiatric disorders in patients with MS.

Materials and Methods: This cross-sectional study was performed on 95 patients with MS referring to Sina Hospital in Hamadan, 2016-2019. Demographic information, illness duration, and psychiatric disorders were collected using the Symptom Checklist-90-Revised questionnaire in 2016-2017. Data were analyzed in SPSS software (version 16) using the Chi-square test and Spearman correlation coefficient.

Results: The most common psychiatric disorders in these patients were found to be depression in 36 (39.1%) cases, phobic anxiety in 33 (34.7%) subjects, and somatization in 33 (34.7%) patients. The least prevalence rates of the disorders were reported for psychoticism in 17 (17.9%) cases and paranoid ideations in 18 (18.9%) cases. In all psychiatric disorders, except obsessive-compulsive disorder, the frequency of psychiatric disorders was higher in women than in men (27.1% vs. 13.8%), and the only significant difference between the two groups was observed in the anxiety dimension (P=0.002). There was a significant positive correlation between the mean scores of the global severity index and the Expanded Disability Status Scale (r=0.41, P =0.001).

Conclusions: The findings of this study showed that in patients with MS, depression, somatization, and phobic anxiety were the most common psychiatric disorders that were associated with increased severity of the disability.

Keywords: Multiple sclerosis, Neurology, Prevalence, Psychiatric disorders

Background

Multiple sclerosis (MS) is one of the most common chronic inflammatory disorders of the central nervous system and is a major cause of disability among young people in numerous countries [1, 2]. The disease damages the myelin of the brain and spinal cord, and scars created in these areas lead to the slow transmission of nerve messages and impaired sensory and motor function [2]. People with this disease experience a range of neurological and debilitating symptoms. The results of many studies have indicated an increase in the incidence of this disease throughout the world, especially in the Middle East [3].

Patients with MS experience much higher levels of mental disorders, such as depression, stress, and anxiety, than healthy individuals; therefore, the prevalence of these disorders is high even when diagnosed with MS [3-5]. Mood disorders are associated with lower quality of life, more fatigue, and more neurological complications in patients with MS. In this regard, a clear understanding of the risk of the occurrence and prevalence of these disorders in populations with MS is essential to implement appropriate interventions in this area [6].

Based on the findings of studies conducted on patients with MS, psychiatric disorders are more prevalent in such individuals than in the general population [7-9]. This comorbidity is usually not properly diagnosed and cured, which can lead to worse outcomes and higher costs. On the other hand, in patients with this disease, psychiatric disorders are associated with decreased quality of life, more fatigue, impaired personal relationships,

cognitive impairment, more suicidal risk, and impaired patient treatment. Consequently, the identification and treatment of these disorders are highly important [10, 11].

To the best of our knowledge, few studies have been dedicated to comparing the prevalence of various mood disorders, whose results are contradictory. Moreover, the prevalence rate of this disease based on age, gender, and other influencing factors has been examined in very few studies and their relationship has not been investigated.

Due to the importance of this subject and the lack of studies examining the association between these disorders and MS in Iran, this study was conducted to investigate the prevalence of psychiatric disorders in patients with MS in Hamadan, Iran.

Objectives

This cross-sectional study aimed to evaluate the frequency of psychiatric disorders in patients with MS.

Materials and Methods

This cross-sectional study was performed on patients with MS at Farshchian Hospital affiliated with Hamadan University of Medical Sciences, Hamedan, Iran, in 2018-2019. The samples (n=95) were selected using the convenience sampling method and participated in the study after giving informed consent. This study was approved by the ethics committee of Hamadan University of Medical Sciences (IR.UMSHA.REC.1398.189). The diagnosis was made according to the criteria of McDonald et al. [12] and considering the opinion of an experienced neurologist who had patients with a medical record of MS history and patients suffering from MS for at least 6 months after diagnosis. Inclusion criteria were being in the age range of 18-65 years and lacking any other chronic diseases. On the other hand, the patients with a history of head trauma and amnesia, other neurological diseases, inability to answer the questionnaire, and known psychiatric illness, and those who were under psychiatric drug treatment were excluded from the study.

Demographic information, including age, gender, marital status, education, occupation, and illness duration, were collected through interviews and using patients' medical records. The extent of disability status was determined using the Expanded Disability Status Scale (EDSS), introduced by Kurtzke, which is used as a clinical indicator to assess physical disability in patients with MS. The total score of this scale is estimated at a range of 0-10, in which 0 represents people who lack any abnormal findings in their neurological examinations, while 10 means death due to MS [13].

Psychiatric disorders were assessed using the 90-item Symptom Checklist-90-Revised (SCL-90-R) questionnaire, which was introduced by Derogatis et al. [14] about 32 years ago. This instrument assesses symptoms of mental disorders, including Somatization, Obsessive-compulsive, Interpersonal sensibility, Depression, Anxiety, Anger-hostility, Phobic-anxiety, Paranoid ideation, Psychoticism, and the Global Severity Index [14]. The replies are scored on a 5-point Likert scale from 0 to 4. A score of < 1 is considered no sign and a score of ≥ 1 represents a sign of the disease. The validity and reliability of this checklist have been confirmed in various studies, including Iranian ones [15]. In this study, to determine the cut-off point, the sub-scale was determined according to a study by Anisi et al. [15]. Therefore, for somatization, the scores of 0-1.21, 1.22-1.82, 1.83-2.43, and 2.44 or above demonstrate the normal range, mild disorder, moderate disorder, and severe illness, respectively. In the dimension of obsessive-compulsive disorder, the scores of 0-1.20, 1.21-1.81, 1.82-2.42, and 2.43 or above are considered in the normal limit, mild disorder, moderate disorder, and severe illness, respectively. In the dimension of interpersonal sensitivity, the scores of 0-1.08, 1.09-1.64, 1.65-2.20, and 2.21 or above represent the normal range, mild disorder, moderate disorder, and more severe illness, respectively. In the dimension of depression, the scores of 0-1.14, 1.15-1.76, 1.77-2.37, and 2.38 or above show the normal limit, mild disorder, moderate disorder, and more severe disorder, respectively. In the dimension of anxiety, the scores of 0-1.13, 1.14-1.71, 1.72-2.29, and 2.30 or above belong to the normal range, mild disorder, moderate severity of the disorder, and more severe illness, respectively. In the dimension of hostility, the scores of 0-1.16, 1.17-1.75, 1.76-2.35, and 2.35 or above display the normal range, mild disorder, moderate disorder, and severe disorder, respectively. In the dimension of phobic anxiety, the scores of 0-0.84, 0.85-1.33, 1.34-1.82, and 1.83 or above represent the normal limit, mild severity disorder, moderate disorder, and severe disorder, respectively. In the dimension of paranoid ideation, the scores of 0-1.54, 1.55-2.24, 2.25-2.94, and 2.95 and above show the normal range, mild disorder, moderate disorder, and more severe disorder, respectively. In the dimension of psychoticism, the scores of 0-0.9, 0.91-1.37, 1.38-1.84, and 1.85 or above demonstrate the normal limit, mild disorder, moderate severity, and severe illness, respectively. In the dimension of the global severity index, the scores of 0-1.06, 1.07-1.57, 1.58-2.08, and 2.09 or above represent the normal limit, mild disorder,

moderate disorder, and severe disorder, respectively.

Statistical Analysis

The collected data were analyzed in SPSS software (version 16). The significance level was considered at less than 5%. Data were described using descriptive statistics with mean and standard deviation for quantitative variables and ratio and percentage for qualitative variables. The Chi-square test was used to examine the qualitative variables and the Spearman correlation coefficient was employed to examine the correlation of quantitative variables.

Results

This study was conducted on 95 patients with MS who met the inclusion criteria. As shown in Table [1], most of the patients were female, single, and housewives. Moreover, most patients had a university education. The mean age of the participants was obtained at 36.3±8.0 years (range of 21-59 years old). The duration of the disease was estimated at 4.8±6.8 years (range of 0.12-20 years). The mean severity of disability according to EDSS was calculated at 1.7±3.3 (range of 1-7).

According to the data of this study, the most common disorder was reported to be depression; accordingly, almost 38% of the patients had some degree of depression. In the next rank, somatization and phobic anxiety were the most common disorders observed in patients, affecting approximately 35% of the subjects (Table 2).

Except in paranoid ideation (P=0.204), hostility (P=0.187), and interpersonal sensitivity (P=0.137) dimensions, a consistent and direct relationship was observed between the severity of disability and other dimensions of SCL-90-R, which was statistically significant (P=0.001). The highest relationship was observed for the degree of disability with phobic anxiety (P=0.001), somatization (P=0.001), global severity index (P=0.001), and depression (P=0.001). There was a weak correlation between the illness duration and the dimensions of SCL-90-R, except regarding paranoid ideation, where an indirect and meaningful relationship was seen (r=- 0.26, P=0.010). The only strong and direct relationship between the patient's current age and the dimensions of SCL-90-R was observed in the somatization dimension (r=0.30, P=0.003). Other dimensions did not show a significant and strong relationship in this regard (Table 3). In all psychiatric disorders, except obsessive-compulsive disorder, the frequency of

Table 1. Demographic characteristics of patients

Variable		Frequency (n)	Percentage (%)
Gender	Male	37	38.9
	Female	58	61.1
Marital status	Single	54	56.8
	Married	41	43.2
Occupation	Student	10	10.5
	Self-employment/unemployed	23	24.2
	Housewife	35	36.8
	Employee	27	28.4
Education level	Elementary	12	12.6
	High school	15	15.8
	Diploma	30	31.6
	Collegiate	38	40
Age (year); Mean±SD		36.3±8.0	
Illness duration (year); Mean±SD		4.8±6.8	
Severity of disability (EDSS); Mean±SD		1.7±3.3	

EDSS: Expanded Disability Status Scale

Table 2. Frequency of SCL-90-R dimensions according to severity in MS patients

Dimensions	Normal n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Somatization	62 (65.3)	25 (26.3)	8 (8.4)	-
Obsessive- compulsive	72 (75.8)	13 (13.7)	6 (6.3)	4 (4.2)
Interpersonal sensitivity	67 (70.5)	18 (18.9)	6 (6.3)	4 (4.2)
Depression	59 (62.1)	21 (22.1)	7 (7.4)	8 (8.4)
Anxiety	78 (82.1)	12 (12.6)	-	5 (5.3)
Hostility	63 (66.3)	13 (13.7)	15 (15.8)	4 (4.2)
Phobic anxiety	62 (65.3)	16 (16.8)	7 (7.4)	10 (10.5)
Paranoid ideation	77 (81.1)	11 (11.6)	5 (5.3)	2 (2.1)
Psychoticism	78 (82.1)	7 (7.4)	6 (6.3)	4 (4.2)
Global severity index	70 (73.7)	14 (14.7)	9 (9.5)	2 (2.1)

Table 3. Correlation of disability, duration of illness, and age with psychiatric disorders in MS patients

Dimensions	Age	EDSS	Illness duration
Somatization	r=0.30 P=0.003	r=0.40 P=0.001	r=0.19 P=0.062
Obsessive- compulsive	r=-0.16 P=0.105	r=0.23 P=0.020	r=-0.13 P=0.180
Interpersonal sensitivity	r=-0.10 P=0.316	r=0.15 P=0.137	r=-0.18 P=0.066
Depression	r=0.08 P=0.397	r=0.38 P=0.001	r=-0.06 P=0.525
Hostility	r=-0.10 P=0.307	r=0.13 P=0.187	r=-0.10 P=0.321
Anxiety	r=-0.10 P=0.298	r=0.21 P=0.037	r=-0.09 P=0.383
Phobic anxiety	r=0.17 P=0.083	r=0.58 P=0.001	r=0.20 P=0.051
Paranoid ideation	r=-0.26 P=0.08	r=0.13 P=0.204	r=-0.26 P=0.010
Psychoticism	r=-0.01 P=0.917	r=0.25 P=0.013	r=-0.9 P=0.376
Global severity index	r=0.05 P=0.597	r=0.41 P=0.001	r=-0.01 P=0.937

EDSS: Expanded Disability Status Scale
r=Spearman's rho

Table 4. Relationship between psychiatric disorders and gender in patients

Dimensions		Female, n=58 (%)	Male, n=37 (%)	P
Somatization	Normal Abnormal	43 (74.1) 15 (25.9)	29 (78.4) 8 (21.6)	0.638
Obsessive- compulsive	Normal Abnormal	50 (86.2) 8 (13.8)	27 (72.9) 10 (27.1)	0.547
Interpersonal sensitivity	Normal Abnormal	37 (63.8) 21 (36.2)	30 (81.1) 7 (18.9)	0.072
Depression	Normal Abnormal	36 (62.1) 22 (37.9)	23 (62.2) 14 (37.8)	0.993
Anxiety	Normal Abnormal	42 (72.4) 16 (27.6)	36 (97.3) 1 (2.7)	0.002
Hostility	Normal Abnormal	40 (69.0) 18 (31.0)	23 (62.2) 14 (37.8)	0.494
Phobic anxiety	Normal Abnormal	35 (60.3) 23 (39.7)	27 (73.0) 10 (27.0)	0.207
Paranoid ideation	Normal Abnormal	45 (77.6) 13 (22.4)	32 (86.5) 5 (13.5)	0.280
Psychoticism	Normal Abnormal	45 (77.6) 13 (22.4)	33 (89.2) 4 (10.8)	0.150
Global severity index	Normal Abnormal	40 (69.0) 18 (31.0)	29 (78.4) 8 (21.6)	0.316

psychiatric disorders was higher in women than in men (27.1% vs. 13.8%), with the only significant difference between the two groups in the anxiety dimension (P=0.002) (Table 4).

Discussion

Various studies have been performed to investigate psychiatric disorders in patients with MS, which have been associated with different and controversial results. This discrepancy in the results may be due to such reasons as the selected population, the definition and criteria for diagnosing psychiatric disorders, and the methods of examination (e.g. interview or scale and information in the medical records). One of the tools that helps diagnose and screen people with disorders versus healthy people is the checklist of mental disorders. Based on the search of available sources, few studies have used the SCL-90-R to investigate psychiatric disorders. One study was conducted by Sarisoy et al. [3] in Turkey and another one by Bruce et al. in the United States (2008) [16] which investigated the psychiatric symptoms in patients with MS and used the SCL-90-R scale. To the best of our knowledge, the current study was the first national study that employed this questionnaire to evaluate psychiatric disorders in patients suffering from MS.

Findings of our study showed that depression was the most important psychiatric disorder in patients with MS, affecting approximately 38% of the patients, followed by somatization (34.7%), phobic anxiety (34.7%), and hostility (33.7%) in descending order. In the majority of studies, the most common comorbid psychiatric disorder observed in patients with MS is depression, followed by anxiety. In a recent study conducted by Panda et al. [4] in India, out of 90 patients with MS, 61% had comorbid psychiatric disorders, among which depression

(38.8%) and anxiety (27.8%) were indicated as the most prevalent psychiatric comorbidities. Although the method and tools employed in the mentioned study were different from those in the present study, their results are consistent with each other. In a Turkish case-control study [3] comparing 76 MS patients with 76 healthy people, as in the present study, the SCL-90-R scale was used to assess mental disorders. The mean scores of all SCL-90-R subscales in the case group were significantly higher than in the control group. They concluded that in addition to depression and anxiety, somatization and phobic anxiety were also common in these patients [3], which was in line with the result of the present study. The findings of a meta-analysis study by Marri et al. (2015) [6] showed that in 118 studies, the prevalence rates of depression and anxiety were estimated at 23.7% (95% confidence interval [CI]: 17.4-30%) and 21.9% (95% CI: 8.76-35%). In another meta-analysis study by Boeschoten et al. (2017) [17], out of 58 studies with a population of 87,756, the average incidence rates of depression and anxiety were calculated at 30.5% (26.3-35.1%) and 22.1% (15.2-31.1%), respectively. In the study carried out by Nasiri et al. [5] in Mazandaran, the prevalence of depression in patients with MS was estimated at 37.2%. The results of another study conducted by Dehghan et al. [18] to determine the frequency of stress, anxiety, and depression in MS patients showed that 29.2% of MS patients suffered from depression. This discrepancy in the results of the present studies and those of the mentioned study can be attributed to the method of examining depression, the definition or criteria of depression, and the time of treatment intervention. The findings of some studies have shown that psychiatric disorders, including mood disorders, may be the first sign in these patients; therefore, the identification of these disorders may have better consequences for patients, and there is concern that these disorders may not be properly diagnosed or underestimated in MS patients [19]. On the other hand, in a Cohort study of twins in Sweden, it was reported that in bipolar patients, the incidence risk of MS was 1.8 times (95% CI: 1.6-2.2) and for depression was 1.9 times (1.7-2.0), showing that the risk of developing the disease increased by genetically matched patients with bipolar disorder and depression; however, schizophrenia reduced the risk of MS incidence [20].

The relationship between psychiatric disorders and MS can be associated with several causes. In the general population, there is a two-way relationship between depression and anxiety and immune system function. For example, depression may occur in response to immune and inflammatory changes (21). On the other hand, atrophy and brain lesions can be effective in causing mood disorders [22, 23]. In some patients, these disorders have been attributed to brain lesions in the temporal lobe area [24]. Depression and anxiety can also be a response to a chronic illness. Disease-correcting therapies, such as corticosteroids, may also cause depression or mania [25].

The findings of this study showed that an increase in the severity of disability in MS patients led to a rise in the frequency of psychiatric disorders ($r=41$, $P<0.001$). The relationship between disease severity and psychiatric disorders is debatable in multiple studies. Higher levels of disability with symptoms of major depression have been reported in several chronic diseases [26, 27]. In a retrospective cohort study conducted by McKay et al. in Canada (2018), the researchers showed that an increase in the severity of disability (EDSS), mood disorder, or anxiety increased even after adjusting for variables, such as illness duration, age, gender, socioeconomic status, physical illness, and treatment (β coefficient=0.28, $P=0.0002$) [9]. In a study conducted in the United States by Ensari et al. (2016), a correlation was found between depression and gait disturbance in MS patients. However, Lorefice et al. (2015) evaluated the effect of mood disorders on MS progression [28] and indicated that there was not a significant association between illness severity and depression.

This study, similar to other epidemiological studies, had some limitations. One of the limitations was related to the relatively small volume of sample and the lack of a control group due to the cross-sectional nature of the study; as a result, it could not correctly determine the cause-and-effect relationship.

In the present study, the different types of MS were not identified; therefore, the clinical forms of the disease may be associated differently with psychiatric disorders.

Conclusions

The findings of this study showed that in patients with MS, depression, somatization, and phobic anxiety were the most common psychiatric disorders that were associated with increased severity of the disability. Therefore, to enhance the quality of life and achieve better outcomes, it is necessary to cure these comorbid disorders in MS patients, which requires the cooperation of a team consisting of a psychiatrist, psychotherapist, and neurologist.

Compliance with ethical guidelines

All procedures performed in studies involving human participants were conducted based on the ethical standards of the respective institutions and/or national research committee and in accordance with the Declaration of Helsinki 1964 and its later amendments or comparable ethical standards.

Acknowledgments
This article was taken from a research project (9803282399) and was approved by the Ethics Committee of Hamadan University of Medical Sciences (IR.UMSHA.REC.1398.189). The authors would like to thank the Deputy of Research and Technology of Hamadan University of Medical Sciences for financial support of this project.

Authors' contributions
All authors contributed to the preparation of the study manuscript.

Funding/Support
This project was financially supported by the Vice-Chancellor for Research and Technology of Hamadan University of Medical Sciences.

Conflicts of Interest
The authors declare that they have no conflict of interest.

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