ORIGINAL ARTICLE

Evaluation of Demographic, Clinical and Beyond Clinical Characteristics in Patients with Multiple Sclerosis in Rafsanjan City, Iran

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ABSTRACT

Background: Multiple sclerosis (MS) is a chronic and progressive autoimmune disease of the central nervous system that causes motor and sensory impairment and physical disability in patients. This study was conducted to determine the demographic, clinical, and beyond clinical characteristics in patients with MS to identify common disabilities and better understand the specific needs of these. **Methods:** This descriptive cross-sectional study was carried out on 50 MS patients in Rafsanjan, Iran. A definitive diagnosis has been done according to neurologist and McDonald criteria. The neurologist conducted examinations, and demographic data were recorded using questionnaire. Magnetic resonance imaging (MRI) findings were analyzed by a radiologist, and all data were analyzed using SPSS software. **Results:** The mean age was 33.81±8.38 years, and male/female ratio was 7/42. Also, 66.7% of the patients were suffering from relapsing-remitting (RR) type disease, and most lesions on MRI in these patients were observed in pyramidal and juxtacortical areas. The mean Expanded Disability Status Scale scores of patients were 1.46. The duration of disease and the number of attacks had a significant correlation with educational level (P<0.05); age was significantly associated with pyramidal, mental and sphincter symptoms (P<0.05). **Conclusion:** These results suggest that the prevalence of MS in women was higher than in men, especially among housekeeper women. The RR type was the higher frequency type.

INTRODUCTION

Multiple Sclerosis (MS) is an autoimmune system disease that affects the central nervous system. MS is characterized by three features, including inflammation, demyelination, and scar (1). The cause is unknown, but it appears that activation of immune mechanisms against the antigen of nerves' axon coating myelin is involved in causing the disease (2). The first manifestations of the disease usually occur between the ages of 20 and 40 years with symptoms such as anxiety, weakness, impaired balance and visual disturbances as well as psychological changes like depression, frustration and decreased ability to solve problems (3). The MS patients threaten the independence and the ability of individuals to participate effectively in the family and social activities as well as leads patients to the lack of a sense of competence and self-confidence. The disease occurs most often in the years that people expect health; with the onset of the dis-ease, a person loses body and health confidence. Due to the unpredictable nature of MS disease, some people may feel that they are unable to plan for the future (4). Behavioral transformations and patterns of modern life predispose individuals to chronic disease and cause reduced life expectancy, disability, family difficulties and increased healthcare costs; therefore, more attention is needed to the lifestyle of people in the community to prevent and control such diseases (5).

In Iran, the prevalence of the MS has been reported 15-30 per 100 thousand people (6). The MS occurs due to genetic and environmental factors (7). Inheritance, environmental factors, geographic region, sex, age, smoking, lack of sunlight (vitamins D deficiency), nutritional factors, physical injury, and pregnancy are known risk factors for the MS, but most of them still have not been established (8). In this regard, the cause of this disease is triggered by an autoimmune process in susceptible individuals with exposure to one or

more of the environmental factors (7). Evidence suggests that environmental factors have an important role in the development of MS. Smoking is one of the factors so that the incidence of this disease in smokers is 40 to 80 percent more than in non-smokers (9).

Preliminary investigations indicate that we are facing with approximately 50,000 MS patients in the country. Iran is among the first 10 countries in the world in terms of developing MS. The level of damages caused by the disease depends on background and causes so that a person may be incapacitated within three months and someone else maybe getting involved with this disease for 10 to 20 years without any problems with movement, speech, and seizures. Studies conducted on MS patients show that about 60% of them are women in which 78% of them are married, and 81.5% of this group are severely disabled. The prevalence and incidence rate of this disease in women is 3.5 times more than in men. As mentioned, the age of MS prevalence is 18 to 30 years, but it is likely that the neurological symptoms manifest in childhood or adolescence due to changes in the immune system after several years with the reactivation of the immune system (10).

The MS includes four main types of relapsing-remitting MS (RRMS), primary-progressive MS (PPMS), secondary-progressive MS (SPMS) and progressive-relapsing MS (PRMS). The most common disease-modifying drugs for the treatment of MS are interferon beta (Anovex, Betaferon, and Rebif), Glatiramer acetate and Natalizumab. Beta Interferon and Glatiramer acetate do not have benefits for everyone, but these drugs on average reduce the frequency of attacks as much as 30 percent in RRMS (11).

Unfortunately, the consequences of this disease are very diverse and broad-spectrum in each case, and this makes difficult to handle and provide facilities for the convenience of the patients. The most common problems and disabilities need to be specified for each community and be evaluated for their frequency to do the most help to the loved ones in improving the quality of life based on correct information as much as possible. The present study was conducted for this purpose and accordingly examined the prevalence of common disability in patients with MS in the community under the guise of specific diseases department in Ali-Ibn Abi Talib Hospital in Rafsanjan city in order to collect relevant information for taking small steps to meet the needs and improve the quality of life among these people who have been affected by the disease due to painful disabilities.

METHODS

This descriptive cross-sectional study was carried out in Rafsanjan city in Kerman province, Iran. According to the 2006 census, Rafsanjan has a population of 266 thousand people (12). The study population included 50 patients with MS who admitted to Ali-Ebn Abi Talib Hospital in Rafsanjan during the period from early January 2014 to late December 2014. The diagnosis was made based on the McDonald criteria. Written informed consent was obtained from all patients prior to enrollment in the study. Data collection tool included a three-part checklist.

The first part was related to general demographic questions such as age, occupation (self-employed, employee, housekeeper and students or unemployed), income (less than five hundred thousand toman per month, over five hundred and one thousand toman up to one million toman per month and over one million and one thousand toman per month), residence (rural and urban areas in Rafsanjan based on geographic location via the map).

The second part consisted of general information, such as duration of disease, used medications, disease type and frequency of MS attacks per year. Data were collected and noted through medical records, and if necessary, with the help of questions in person with patient satisfaction.

The third part of the questionnaire included clinical information obtained from physical examinations, upon which Expanded Disability Status Scale (EDSS) was measured by the criteria defined and graded from 0 to 10, which was calculated by the examinations of a neurologist. The number of cervical and brain plaques was extracted from magnetic resonance imaging (MRI) stereotypes available in records and consultation with the radiologist.

Statistical Analysis

Data were analyzed using SPSS version 20 and P=0.05 was considered as significant level.

RESULTS

After reviewing the data, the results were grouped into separate tables. The demographic information and disease duration in all patients participated in the study have been listed. The mean age was 33.81±8.38 years, male/female ratio was 7/42 and the mean disease duration in was 63.07±50.19 month. Distribution of other demographic information in patients is presented in Table 1.

Distribution of beyond clinical characteristics of patients participating in the study in terms of one of the four classified types of MS showed that 66.7% of the patients are suffering from RR type. The most lesions on MRI in these patients were observed in pyramidal and juxtacortical areas. The average number of attacks in participants from diagnosis and treatment documented was 3 times in the range of 1 to 6 times in the period. The mean EDSS scores of patients were 1.46 in the range between 0 and 4 (Table 2).

The relationship between the two aspects of the MS disease including the duration of disease and the number of attacks based on demographic information using the Pearson correlation coefficient test has been shown in Table 3. It was found that the duration of the disease and demographic data had no significant relationship with the studied factors, except for education (P=0.034). It was also found that the number of attacks was significantly associated with the educational level (P=0.027). There was no significant relationship between the number of attacks and other demographic factors.

Table 4 shows the common symptoms and EDSS and also its relationship with demographic information (Pearson correlation coefficient). Concerning the type of dominant

Table 1. Distribution of clinical and demographic characteristics in patients with MS patients

Variables	Qualitative number (%)	Quantitative mean±SD (variation range)
Sex		-
Female	52 (88.1)	
Male	7 (11.9)	
Occupation		-
Housekeeper	46 (80.7)	
Self-employed	4 (7)	
Employee	3 (5.3)	
Students (unemployed)	4 (7)	
Residence		-
Urban	36 (61)	
Rural	23 (39)	
Education		-
Illiterate	1 (1.7)	
Elementary school	6 (10.2)	
Secondary school	16 (27.1)	
High school	27 (45.8)	
University	9 (15.3)	
Marital status		-
Single	8 (13.6)	
Married	50 (84.7)	
Divorced	1 (1.7)	
Income (toman)		-
<500 thousand	4 (7.0)	
> 500 thousand	29 (50.9)	
> One million	24 (42.1)	
Age (year)	-	33.81±8.83 (18-49)
Disease duration (month)	-	63.07±50.19 (2-180)

Table 2. Beyond clinical characteristics of participants for clinical, beyond clinical and demographic characteristics in patients with MS

Variables	Qualitative number (%)	Quantitative mean±SD (variation range)
Type of MS		-
RR	38 (66.7)	
RP	1 (1.8)	
SP	14 (24.6)	
PP	4 (7.0)	
Region involvement in MRI		-
Pyramidal	52 (88.1)	
Juxtacortical	56 (94.9)	
Infratentorial	36 (61.0)	
Enhancing	26 (44.1)	
Cervical	50 (87.7)	
Corpus calosum	83 (89.8)	
Number of attacks	-	3.00±1.23 (1-6)
EDSS	-	1.46±1.29 (0-4.0)
Motion	-	0.63±0.95 (0-3)
Cerebellar	-	0.44±0.84 (0-3)
Olfactory	-	0.24±0.57 (0-2)
Sensory	-	0.68±0.94 (0-3)
Sphincteric	-	0.58±0.81 (0-3)
Visual	-	0.24±0.73 (0-4)
Mental	-	0.71±0.81 (0-3)

manifestations of disease and age, penetration rate and interaction of examined factors were shown with r with regard to the quantitative nature of the data; statistics closer to 1 indicates a stronger relationship. The difference was significant about the correlation among pyramidal, mental and sphincter symptoms and disability with age ($p>0.05$). It was found that the demographic factors had no significant relationship with dominant manifestations of MS but the relationship between income and sex was significant in the type of sphincter ($p>0.05$).

DISCUSSION

This descriptive cross-sectional study was carried out to evaluate the findings related to the disability and demographic information associated with the MS in patients with MS referring to MS Clinic of Ali-Ibn Abi Talib hospital in Rafsanjan from early January 2014 to late December 2014.

The mean age of the patients was 33.81 ± 8.38 years, which was consistent with the studies conducted by Nabavi et al. (13) and Dehghan et al. (14). Evaluation of occupational distribution among patients showed that 80% of participants were housekeeper (for female participants) and unemployment (for male participants), similar to the study of Nabavi et al. (13). In their study, 60% of participants were reported unemployed, housekeeper and disabled. In the present study, 61% of participants are living in the city, 61.1% of the participants were high school and university graduates, and 84% of them were married as well as only 7% had income less than 500 thousand toman per month. In the study of Nabavi et al., marital status was reported 69.5% in studied patients; high levels of marital status among patients reported could be due to the age of onset of disease symptoms and involvement of the patient in the aftermath of making family and sometimes having children. Given the average age of the patients (over 30 years), the age at marriage (26 years for men and 23 years for women) in Iran (13), it can be predicted that the diagnosis of the disease takes place after marriage.

The study findings showed that the mean duration of disease was 63 months in the participants (about 5 years), similar to the study of Sahebalzamani et al. (15). Increasing duration of chronic diseases, especially MS, could be a result

Table 3. Frequency distribution of the number of attacks and duration of disease based on demographic information using the Pearson correlation coefficient test in patients with MS

Variables	Age	Sex	Occupation	Residence	Income level	Education	Marital status
Duration of disease	r:0.616 p:0.000	0.616	0.383	0.850	0.231	0.034	0.538
Number of attacks	r:0.665 p:0.000	0.515	0.241	0.828	0.368	0.027	0.139

Table 4. Frequency distribution of relationship between dominant manifestations of disease and demographic information (Pearson correlation coefficient) in patients with MS

Variables	Sex	Age	Occupation	Residence	Income level	Education	Marital status
Pyramidal	0.870	r:0.274 p:0.039	0.824	0.214	0.278	0.915	0.893
Cerebellum	0.361	r:0.239 p:0.074	0.396	0.556	0.110	0.116	0.383
Brain	0.643	r:0.076 p:0.573	0.906	0.532	0.339	0.749	0.932
Sensory	0.458	r:0.207 p:0.123	0.937	0.654	0.769	0.148	0.421
Bowel	0.017	r:0.355 p:0.007	0.539	0.464	0.032	0.528	0.602
Visual	0.718	r:0.225 p:0.092	0.871	0.058	0.129	0.515	0.576
Mental	0.618	r:0.279 p:0.035	0.853	0.838	0.679	0.528	0.534
EDSS	0.580	r:0.355 p:0.007	0.299	0.679	0.329	0.669	0.864

of greater awareness of the disease, better healthcare, having more amenities in educated families, enlist the support of subsidiary treatments and the high overall quality of life. More and better comply with instructions and advice provided by the physician according to higher education of patients could be another reason for increasing survival rate in this population, which in turn increases the duration of disease.

Studying distribution of disease stages in MS patients showed that the majority of patients (66.7%) are suffering from RR phase that is characterized by the appearance of signs and symptoms of the disease, and the individual can remain in this phase for many years. With the worsening of the disease and inadequate or no treatment, the patient may switch to more advanced stages of the disease (SP and RP). The number of patients was calculated 8.1% in RP phase and 6.24% in SP phase. According to the mean duration of disease in participants (approximately 5 years) and duration of RR that can last for years, this conclusion seems logical that living of more patients in the early stages of the disease is not farfetched regarding patients' awareness of therapeutic requirements, high level of education, residence of most people in urban areas and access to the health facilities.

Frequency distribution of relationship among demographic information with duration of disease and the number of attacks had a significant correlation with the level of education (P<0.05) and the P value was more than 0.05 in other cases. The relationship among education with a du-

ration of disease (P=0.034) and the number of attacks per year were statistically significant (P0.027). Due to the high level of education for the disease that is because of a higher frequency of individuals with high education level, the statistically significant relationship seems to be logical. The high educational levels in patients with MS have also been reported in the study by Dehghan et al. that indicated the level of literacy under high school diploma was only 16% (14). A high level of education in our country is greatly in direct association with higher social status, occupational condition and income. People who have studied at the university have a greater understanding of the world around and think about the quality of their work and life and family more than in people at the same age, but low literacy. Expecting a decent life and providing welfare for own self and the family are some of the reasons to study at the university (14). Hence, higher frequency of attacks in these patients could be linked to misery business and preoccupation that incidentally became more in person with the disease. Educated person trying to have a higher social level and comfort for own self and the family always remains at a level of stress. People with low literacy are less exposed to these stresses. The educated people have higher expectations, and are familiar with different levels of quality of life due to the presence of the various strata at the universities and hence will have a sense of satisfaction from their achievements later (14). All of these issues alongside chronic MS can be the reasons for the higher number of attacks in this group of patients.

Distribution of lesions in some regions of the brain and spinal cord tissues, which were diagnosed by a radiologist, showed that enhancing lesion accounted for the lowest levels of plaques found in the brain despite the 26 lesions from 57 samples studied. No significant correlation was found between the site of plaques in the brain with a disability caused by the disease as well as the number of attacks. Rezai et al. by doing a study in this regard reported that the symptoms could not be predicted based on the presence of plaques, and it is necessary to examine the course of the disease and other symptoms (16).

The demographic data and dominant manifestations of disease showed statistically significant association only among sex, income level and age with symptoms in the digestive system and sphincter in the participants and without a significant relationship in other cases. Significant association was obtained among bowel problems with sex (P=0.017), income level (P=0.032) and age (P=0.007). Gastrointestinal tract and sphincter problems caused by MS in educated people can be due to nutritional behavior and higher levels of stress and anxiety in this category. A few studies have been done so far about the relationship between sex and how to increase or decrease the symptoms of MS (15). However, hormonal differences between males and females can be effective on differences in symptoms between male and female patients. On the other hand, because most people with the disease are women (15), perhaps multiple and natural deliveries that are consistent with the participants in this study economically and socially may be underlying causes or helps to create a significant relationship between sex and sphincter disorders. The relationship between age and digestive problems that were statistically significant with positive impact has not been investigated in other studies. However, this association may be due to the decreased ability of the digestive system as a result of aging, the effect of drugs, unhealthy lifestyle and wrong nutritional behavior, which have a longer history in older people than in younger people.

Sahebalzamani et al. reported a significant association between the consumption of meat and dairy with the MS disease (15). Regarding the higher quality of life in educated families, higher income and wrong nutritional habits in a country in which protein foods are mistakenly thought to be special meals and helpful, thus there will be more meat and dairy foods in this class. It is one of the differences in lifestyle with the higher social level in our country, which was explained as an example.

CONCLUSION

These results suggest that the prevalence of MS in women was higher than in men, especially among housekeeper women. The RR type was the higher frequency type. Many cases have not been investigated so far, and right or wrong are lifestyle differences in the various income deciles and can play a role in the increased prevalence of gastrointestinal and sphincter symptoms and even developing MS disease. Hence, there is a need to examine their role in the MS disease.

AUTHORS CONTRIBUTION

All authors contribute equally in this study.

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