



Health Related Quality of Life Among Patients With Multiple Sclerosis: The Role of Psychosocial Adjustment to Illness

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ARTICLE INFO

Keywords:

Multiple sclerosis
Quality of life
Psychosocial adjustment
Nurses

ABSTRACT

Background: Multiple Sclerosis (MS) is associated with poor quality of life (QOL). Individuals suffering from MS must make multiple adjustments as their condition changes. To date, little is known about the role of psychosocial adjustment in improving QOL of patients with MS.

Purpose: The purpose of this study is to identify the relationship between psychosocial adjustment and HRQOL controlling for demographic variables among patients with MS.

Methods: This study used a descriptive-correlational design. A sample of 160 patients from two hospitals participated in the study. Self-reported data were collected using the demographic survey, Multiple Sclerosis Quality of Life (MSQoL-54) tool and Psychosocial Adjustment to Illness Scale–Self Report (PAIS-SR).

Results: Participants reported poor QOL and difficulty with psychosocial adjustment. The QOL and psychosocial adjustment were correlated with various demographic variables. After controlling for demographic variables, psychosocial adjustment explained a large variance in the mental health composite of QOL (r square change = 44%) and the physical health composite of QOL (r square change = 38%).

Conclusion: Psychosocial care could play a vital role in improving quality of life among MS patients.

Introduction

Multiple sclerosis (MS) is a chronic progressive neurological disease associated with various physical and psychosocial impairments (Lee, Pieczynski, DeDios-Stern, Simonetti, & Lee, 2015). This incurable and disabling disease is more common among females and it is generally diagnosed among young adults (Akkus, 2011; Heydarpour, Khoshkish, Abtahi, Moradi-Lakeh, & Sahraian, 2015). Worldwide, the estimated number of patients diagnosed with MS in 2013 was 2.3 million (MSIF, 2013). In the Middle East region and particularly in Jordan, there has been little interest in conducting research studies targeting people with MS (Al-Sharman et al., 2018). The latest epidemiological study conducted in Jordan on MS reported a prevalence rate of 39 per 100,000, indicating that Jordan has one of the highest MS prevalence rates in the region (El-Salem et al., 2006). A meta-analysis conducted in the Middle East region indicated that the clinical pattern of MS in the Middle East region is generally similar to the disease pattern in the western countries (Benamer, Ahmed, Al-Din, & Grosset, 2009). Most of the patients

diagnosed with MS experience a relapsing-remitting form (Dutta & Trapp, 2014). During the MS relapse, the patient experiences an episode of new or worsening signs or symptoms of a demyelinating event for at least 24 h, in the absence of infection or fever (Polman et al., 2011).

The MS exposes patients to a variety of symptoms including muscle weakness in the extremities, vertigo, ataxia, spasticity, and visual impairment (Browne et al., 2014). In addition to the significant physical symptoms, patients may also experience disturbances in their cognitive functions (Braley, Kratz, Kaplish, & Chervin, 2016). They may also experience psychological effects such as malaise, fatigue, anxiety, depression, low self-confidence, and difficulties in sleeping and concentration (Marrie et al., 2015). All of these symptoms affect a person's ability to function normally, leading to a subsequent disruption in their education, family life, employment opportunities and activities of daily living. Hence, a reduction of quality of life may occur (Benito-León, Manuel Morales, Rivera-Navarro, & Mitchell, 2003; Berrigan et al., 2016; Tepavcevic et al., 2014).

To cope with MS, individuals are required to find ways to modify

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<https://doi.org/10.1016/j.apnu.2018.08.006>

Received 23 March 2018; Received in revised form 21 July 2018; Accepted 4 August 2018

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their lives to a wide range of disabilities. MS creates new demands and challenges; people with MS experience unwanted loss of roles, relationship changes, and possible financial difficulties (Guerra, 2013). These facets of the disease have a direct influence on psychosocial life, leading to a reduction of the quality of life and difficulties in coping with the condition. The supporting interventions to improve quality of life among patients diagnosed with MS should be multidimensional and utilize physical, psychosocial, and emotional aspects. However, the role of psychosocial care as a supportive intervention for patients diagnosed with MS has been neglected, and the unique beneficial impacts of psychosocial care on quality of life among patients diagnosed with MS are not fully elucidated. Psychosocial adjustment to MS might be helpful to cope with this chronic disease, which allows the patient to integrate the recent difficult experiences related to individual's goals, values, and beliefs with the existing personal experiences and cognitive processes (Grech et al., 2017). In practice, the psychosocial care is considered an essential psychiatric nursing practice that must be interdisciplinary and competent (Brandão, Nascimento, Brêda, Albuquerque, & Albuquerque, 2016).

Recently, there has been substantial interest in improving quality of life among people with MS (Levy, Geiss, & David, 2015). Given the chronic nature of MS, psychiatric nurses and other healthcare professionals who wish to implement supportive interventions for patients diagnosed with MS may want to identify potential correlates of health related quality of life (HRQOL) among these patients. Psychosocial Adjustment to Illness was found to be positively correlated with quality of life in various population (Kolokotroni, Anagnostopoulos, & Missitzis, 2017). However, the association of psychosocial adjustment with HRQOL in Arab patients with MS has yet to be established. Establishing the relationship of psychosocial adjustment with quality of life in Arab patients with MS may inform the development of future intervention, which may improve the HRQOL among this population in particular. Therefore, the purpose of this study was to identify the relationship between psychosocial adjustment and HRQOL controlling for demographic variables among patients with MS.

Methodology

Design

This study used a cross-sectional, descriptive-correlational design, and self-reported survey data.

Sample & setting

A power analysis using G power 3.0.10 was conducted to estimate the required sample size. The sample size required was 159 ($\alpha = 0.05$, medium effect size = 0.3, and power 0.80; these criteria were used to identify the minimum required sample size). This number was increased to 190 taking into consideration the anticipated missing data and attrition rate. The sample was recruited from two governmental hospital clinics in Jordan. Inclusion criteria were: a confirmed diagnosis of MS since > 6 months prior to the start of the study; an age of 18 years or older, and voluntary agreement to participate.

Instruments

Data were collected using a demographic survey, the Multiple Sclerosis Quality of Life (MSQoL)-54, and the Psychosocial Adjustment to Illness Scale–Self-Report (PAIS-SR). The demographic variables included age, gender, marital status, health insurance, occupation, educational level, diagnosis period, medical treatment, type of treatment, number of relapses during the last year, hospitalizations during the last year, and other co-morbidities.

The MSQoL-54 is a multidimensional health-related quality of life measure (Vickrey, Hays, Harooni, Myers, & Ellison, 1995). This 54-item

instrument generates 12 subscales, two composite scores, and two additional single-item measures. The physical health composite includes physical function (10 items), sexual function (four items), social function (three items), pain (three items), health distress (four items), health perceptions (five items), role limitations due to physical problems (four items), and energy/fatigue (five items). The mental health composite includes emotional well-being (five items), role limitations due to emotional problems (three items), cognitive function (four items), health distress, and overall quality of life (two items). The subscale scores are calculated by dividing the raw total score by number of items in the subscale. The MSQoL-54 physical and mental health composite scores are calculated by weighting subscale scores at a rate of their contribution to the total score. The scale is scored from 0 to 100, with a higher score indicates a greater health-related quality of life. This instrument shows good internal consistency, with published Cronbach's alphas 0.75 to 0.96 and test-retest reliability with intra-class correlation coefficients 0.66 to 0.96 (Vickrey et al., 1995).

The Psychological adjustment was measured using the 46-item PAIS-SR (Derogatis, 1986). Each item is comprised of four statements scored on a 4-point Likert scale (0 – no problem, to 3 – many difficulties). The scale measures seven primary domains of psychosocial adjustment to illness: health care orientation, vocational rehabilitation, domestic environment, sexual relationships, extended family relationships, social environment, and psychological distress. The seven raw domain total scores can be converted to standardized T-scores were provided by Derogatis and Derogatis (1990). The possible range for each domain T-score is 0–100. Higher scores indicate more difficulties experienced. A PAIS-SR total score equivalent to or greater than a T-score of 62 is positive for clinical levels of maladjustment (Derogatis & Derogatis, 1990). The internal consistency reliability coefficients estimates for the domain scores of the PAIS-SR in three studies were 0.63–0.80; 0.68–0.93; and 0.47–0.85. Inter-rater reliability coefficients for the PAIS-SR interview ranged from 0.74–0.86 and 0.33–0.82 in two published studies (Derogatis & Derogatis, 1990; Derogatis & Fleming, 1996) with coefficients for the PAIS-SR Total Adjustment Score being 0.86 and 0.83 respectively. Validation of the PAIS-SR has been extensive, with studies of convergent, predictive, and constructs validity, as well as confirmation of dimensional structure (Derogatis & Derogatis, 1990; Derogatis & Fleming, 1996).

For the purpose of this study, official permissions were obtained from the copyright holders of both the MSQOL-54 and the PAIS-SR to translate them into Arabic, perform a cross-cultural adaptation, and validation of the Arabic translated versions. Both measures were translated from English into Arabic and back-translated from Arabic into English. Then, the back-translated versions of these measures were compared with the original measures to assure the validity of the translation versions. The content validity was assured by a committee of experts who evaluated each item in term of clarity and relevance. The content validity index was 87% for MSQOL-54 and 89% for PAIS-SR. A pilot testing of the measures was conducted with a sample 35 Jordanian patients diagnosed with MS. The pilot testing indicating satisfactory acceptability of the measures with an estimated time of 14 min to complete the MSQOL-54 and 11 min to complete the PAIS-SR. In the current study, the reliability of both instruments was measured using internal consistency reliability. Reliability was found to be good for both the MSQOL-54 (Cronbach's Alpha = 0.74) and the PAIS-SR (Cronbach's Alpha = 0.89).

Procedure

After obtaining the ethical approval from the targeted hospitals, a package of study materials and the three self-report questionnaires were distributed to the MS patients in the chosen clinics. All patients included in the study were diagnosed with MS based on the revised McDonald's criteria (Polman et al., 2005). The physicians helped as liaisons to facilitate access to patients. Patients with MS who stated

interest in participation were given a package with a cover letter that included data about the study, its purpose, what would be expected from them as participants, and where to return the packages, as well as contact information for the primary investigator. Participation was voluntary and the anonymity of participants was ensured by assigning each participant a digital code. Out of the 190 surveys distributed, 160 completed questionnaires were returned (representing a response rate of 84%). Data collection occurred between March 2015 and July 2015.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of Nursing Faculty at The University of Jordan; approval was also obtained from selected hospital clinics. Permission for using the two instruments was obtained prior to data collection.

Data analysis

Data were analyzed using SPSS version 21.0. Descriptive statistics were used to present sample characteristics. Independent *t*-test and ANOVA were used to examine differences in the study variables based on participant characteristics. Relationships were analyzed using Pearson Product-Moment coefficients. Hierarchical multiple regressions were used to identify the correlation between psychosocial adjustment and HRQOL controlling for demographic variables. Findings were considered statistically significant at $P = .05$. These statistical tests were used after assuring that the psychosocial adjustment and HRQOL scores were approximately normally distributed as indicated by skewness and kurtosis values and the visual inspection of the histograms. Homogeneity of variance assumption was examined using the Levene's test. Additionally, the multicollinearity was examined before conducting the regression analysis. The intercorrelations between the predictor variables were small to medium, and no problem was found in multicollinearity, as all tolerance statistics were > 0.2 , and the values of variance inflation factors were < 10 for all tested variables.

Results

Sample characteristics

Table 1 presents the sample characteristics. Respondents' average age was 31.2 ($SD = 5$), ranging from 19 to 45 years. The sample was mostly female ($n = 126, 78.8\%$), and about half of the sample ($n = 78, 48.8\%$) were married and living with their spouse. Almost half of the respondents had a graduate level of education ($n = 130, 92.5\%$), and most of them (72.5%) were employed. Almost two-thirds of respondents (58.1%) considered their incomes average, the remaining percentage considered themselves to be poor. All respondents had insurance, either governmental or private. About three-fourths of the sample reported two or more relapses this year (2016), with a maximum of five relapses reported. More than three-fourths of participants (77.6%) reported entering the hospital in the last 4 months. Most respondents had been diagnosed for 6–7 years. Interferon was the most common treatment used (91%), while around 4% used cortisone.

Quality of life among MS patients

The mean scores of the MSQoL-54 are presented in Table 2. The physical health composite mean score was 33.9 ($SD = 17.9$) with subscales mean scores ranging from high for physical function ($M = 43.8, SD = 30.9$) to low for sexual function ($M = 11.7, SD = 18.2$). The mean mental health composite score was 22.3 ($SD = 20.4$). For the mental health composite, the overall quality of life subscale had the highest mean score ($M = 35.9, SD = 14.7$) and health distress had the lowest mean scores ($M = 16.8, SD = 16.7$). All subscales indicate poor health-related quality of life. The physical health composite score was higher

Table 1
Sample characteristics.

Variable	N (%)	Mean (SD)
Age		31.2 (5)-range 19–45
Gender	Female 126 (78.8%) Male 34 (21.3%)	
Marital status	Single 79 (49.4) Married 78 (48.8%) Divorced 3 (1.9%)	
Educational level	High school or less 12 (7.5%) Graduate level 130 (92.5%)	
Job	Governmental 72 (45%) Private 16 (10%) Free business 28 (17.5%) Unemployed 44 (27.5%)	
Insurance type	Governmental 154 (96.3%) Private 6 (3.7%)	
No of years since diagnosis		6.7 (3.1)-range 1–16 years
Type of treatment	Cortisone 6 (3.8%) Interferon 146 (91.3) Non 8 (5%)	
Did you enter hospital last 4 month	No 36 (22.5%) Yes 124 (77.5%)	
How many times relapsed during last year	Zero 15 (9.4%) One 24 (15%) Two 56 (35%) Three 45 (28.1%) Four 13 (8.1%) Five 7 (4.4%)	2.2 (1.2)-range 0–5 times

Table 2
MSQOL-54 physical and mental health domains.

MSQOL-54 domains	Mean (SD)	Range
Physical health composite	33.87 (17.9)	9.6–75.1
Physical function	43.78 (30.96)	0–100
Social function	38.68 (15.5)	8–83
Health perception	26.03 (22.9)	0–80
Pain	22.8 (20.3)	0–100
Energy	18.6 (17.2)	0–68
Health distress	16.75 (16.7)	0–60
Role limitation due to physical problems	16.6 (36.1)	0–100
Sexual function	11.7 (18.2)	0–75
Mental health composite	22.3 (20.4)	1–79
Over all QOL	35.9 (14.7)	5–65
Emotional wellbeing	24.1 (24.3)	0–92
Cognitive function	23.6 (22.7)	0–90
Role limitation due to emotional problems	21.9 (40.8)	0–100
Health distress	16.8 (16.7)	0–60

than the mental health composite, indicating that mental health problems contributed more significantly to impairment of overall quality of life in the sample.

Psychosocial adjustment to multiple sclerosis

The average psychosocial adjustment score among MS patients on the PAIS-SR was 65.1, $SD = 10.2$, range 30–81, indicating difficulty in adjustment to MS among the study participants. The participants reported the most difficulty in the extended family relationship domain, with an average score of 73.3 ($SD = 8.7$), while the lowest was in the sexual relationships domain, with an average score of 47.2 ($SD = 10.1$) (Table 3). As the cut-off point for positive clinical levels of maladjustment is 62 or greater, we found that 65.6% of the participants ($n = 105$) scored positive for clinical levels of psychosocial maladjustment.

Table 3
Mean scores, standard deviations, and range for the seven domains of PAIS-SR.

PAIS-SR domains	Mean	SD	Range
Health care orientation	55.9	12.4	26–81
Vocational environment	56.6	10.4	33–81
Domestic environment	51.7	10.5	27–78
Sexual relationships	47.2	10.1	39–81
Extended family relationships	73.3	8.7	40–81
Social environment	70.7	9.9	33–77
Psychological distress	71.3	7.2	44–78
Total PAIS-SR	65.1	10.2	30–81

Factors associated with HRQOL and psychosocial adjustment

Differences in HRQOL and psychosocial adjustment according to sample characteristics were examined using independent *t*-test and ANOVA (Table 4). Analysis of the data revealed that males had a significant greater health-related quality of life than females for both physical and mental health composites, with physical health composite scores of 60.1 vs. 29.7 ($P \leq .001$) and mental health composite scores of 33.02 vs. 19.7 ($P \leq .01$). Additionally, employed patients had a greater health-related quality of life than non-employed patients for the mental health composite, at 25.6 vs. 13.99 ($P \leq .001$), $t(116.8) = -3.84$, while it was not statistically significant for the physical health composite. Regarding income (two groups at the end, poor and average), the average income group had a statistically significant higher mean for MSQoL-54 for both physical and mental health composites, with a physical health composite of 36.5 vs. 22.8 ($P \leq .001$), $t(52.7) = -4.23$, and a mental health composite of 27.7 vs. 15.3 ($P \leq .001$), $t(147.5) = -4.04$. There was no significant difference in QOL according to the marital status. However, participants with higher educational level had higher scores on mental health composite of QOL than other participants ($P < .05$).

Psychosocial adjustment was significantly different between male and female participants ($t = -4.01$, $P = .001$). The mean for unemployed participants was higher than that of employed participants ($t = -3.26$, $P = .008$). Low-income participants had more difficulty in adjustment than participants who had medium income ($t = 3.85$, $P = .002$). However, participants with higher educational level had less difficulty in adjustment than other participants ($P < .05$).

In order to estimate relationships of HRQOL and psychosocial adjustment with the continuous sample characteristics, correlation coefficients were calculated (Table 5). A negative correlation was found

Table 4
Differences in psychosocial adjustment according to sociodemographic variables.

Variable	Psychosocial adjustment			Mental health composite of QOL			Physical health composite of QOL		
	Mean (SD)	<i>t</i> / <i>F</i>	<i>P</i> value	Mean (SD)	<i>t</i> / <i>F</i>	<i>P</i> value	Mean (SD)	<i>t</i> / <i>F</i>	<i>P</i> value
Gender									
Female	67.1 (8.5)	-4.01	.001	19.69 (17.9)	2.58	.01	60.13 (11.62)	5.49	< .01
Male	57.4 (12.5)			33.02 (26.3)			29.67 (14.95)		
Education									
High school or less	70.91 (3.8)	4.32	< .001	10.16 (6.9)	4.92	< .01	26.54 (4.2)	0.42	.68
Graduate level	64.60 (10.4)			23.32 (20.9)			33.32 (18.20)		
Employment									
Yes	63.9 (10.9)	-3.26	.008	25.60 (21.6)	3.85	< .01	30.8 (19.12)	0.32	.76
No	68.9 (6.2)			13.99 (14.19)			34.2 (17.9)		
Income									
Poor	68.8 (6.8)	3.85	.002	15.26 (16.1)	4.1	< .01	22.82 (5.6)	52.1	< .001
Medium	62.99 (11.2)			27.7 (21.8)			36.45 (18.8)		
Marital status									
Single	64.8 (19.6)	0.48	.62	21.3 (18.1)	1.7	.34	18.3 (20.1)	1.8	.30
Married	65.2 (22.4)			23.8 (22.2)			22.8 (23.4)		
Divorced	72 (25.3)			6.61 (3.2)			10.21 (4.3)		

Table 5
Correlation of psychosocial adjustment and HRQOL with Sociodemographic variables.

Variable	Psychosocial adjustment	HRQOL	
		Mental health composite	Physical health composite
Age	0.05	0.03	-0.16
Duration of illness	0.28**	-0.20*	-0.26*
How many times relapsed during this year	0.32**	0.44**	-0.51**

* $P < .05$

** $P < .01$

between the mental health composite of the MSQoL-54 and duration of illness and the number of times relapsed last year ($P < .05$). Conversely, the physical health composite score revealed a negative correlation with duration of illness and the number of times relapsed last year ($P < .05$). In addition, positive correlations were observed between the psychosocial adjustment and duration of illness and the number of times relapsed last year ($P < .05$).

The relationship between psychosocial adjustment and HRQOL controlling for demographic variables

Hierarchical multiple regressions were used to identify the correlation between psychosocial adjustment and HRQOL controlling for demographic variables. Variables that were not significantly correlated with HRQOL were excluded from the regression analysis. Table 6 presents the regression used to identify the correlation between psychosocial adjustment and the mental health composite of HRQOL controlling for demographic variables. The demographic variables were entered in the first model which was significant, $F(5, 126) = 6.04$, $P < .001$, R square = 0.19. However, in this model, only the gender of the participant was significantly associated with the mental health composite of HRQOL controlling for other demographic variables ($P = .001$), suggesting that males had a significant greater health-related quality of life than females for the mental health composites of HRQOL. The psychosocial adjustment was entered in the second model which also was significant, $F(2, 125) = 36.18$, $P < .001$, R square = 0.64. The psychosocial adjustment explained 44% additional variance above and beyond the 19% accounted for the demographic

Table 6
The relationship between psychosocial adjustment and mental health composite of HRQOL controlling for demographic variables.

	b	Std. error	Beta	t	P value
(Constant)	28.127	15.183		1.852	.066
Gender	-15.028-	4.387	-0.288-	-3.426-	.001
Education	6.200	6.235	0.084	0.994	.322
Employment	7.617	4.247	0.160	1.793	.075
Income	6.877	3.718	0.163	1.850	.067
Duration of illness	-0.737-	0.549	-0.112-	-1.343-	.182
(Constant)	176.212	15.827		11.133	.000
Gender	-3.882-	3.100	-0.074-	-1.252-	.213
Education	4.589	4.215	0.062	1.089	.278
Employment	2.819	2.896	0.059	0.973	.332
Income	0.859	2.560	0.020	0.336	.738
Duration of illness	0.138	0.378	0.021	0.366	.715
Psychosocial adjustment	-0.368-	0.030	-0.744-	-12.287-	.000

1st model $F(5, 126) = 6.04, P < .001, R \text{ square} = 0.19.$

2nd model $F(2, 125) = 36.18, P < .001, R \text{ square} = 0.64, r \text{ square change} = 0.44.$

variables. This outcome indicates that psychosocial maladjustment to illness is associated with low scores on the mental health composites of HRQOL, with a large effect size, $r \text{ square} = 0.44.$

Table 7 presents the regression used to identify the correlation between psychosocial adjustment and the physical health composite of HRQOL controlling for demographic variables. The demographic variables were entered in the first model which was significant, $F(3, 53) = 12.43, P < .001, R \text{ square} = 0.38.$ The gender of the participant was the only unique variable associated with the physical health composite of HRQOL ($P < .001$), indicating that the male participants had significantly higher scores on the physical health composites of HRQOL as well. The psychosocial adjustment was entered in the second model which also was significant, $F(4, 52) = 67.9, P < .001, R \text{ square} = 0.83.$ The psychosocial adjustment explained 43% additional variance above and beyond the 38% accounted for the demographic variables. This outcome indicates that psychosocial maladjustment to illness is associated with low scores on the physical health composites of HRQOL, with a large effect size, $r \text{ square} = 0.43.$

Discussion

The purpose of this study was to identify the relationship between psychosocial adjustment and HRQOL controlling for demographic variables among patients with MS. Overall, the participants reported poor QOL. Considering the MS disease profile, it is not surprising that, compared to the general population; individuals with MS had a lower quality of life scores (Berrigan et al., 2016; Heiskanen, Vickrey, & Pietila, 2011; Klevan et al., 2014). Patients with MS suffer from various symptoms that may disturb their daily lives, with decreasing physical

Table 7
The relationship between psychosocial adjustment and physical health composite of HRQOL controlling for demographic variables.

	b	Std. error	Beta	t	P value
(Constant)	69.731	14.826		4.703	.000
Gender	-25.906-	5.699	-0.506-	-4.545-	.000
Income	10.196	4.888	0.226	2.086	.042
Duration of illness	-0.883-	0.588	-0.164-	-1.501-	.139
(Constant)	160.185	10.982		14.586	.000
Gender	-9.930-	3.303	-0.194-	-3.006-	.004
Income	3.779	2.639	0.084	1.432	.158
Duration of illness	-0.133-	0.317	-0.025-	-0.418-	.677
Psychosocial adjustment	-0.273-	0.023	-0.774-	-11.748-	.000

1st model $F(3, 53) = 12.43, P < .001, R \text{ square} = 0.38.$

2nd model $F(4, 52) = 67.9, P < .001, R \text{ square} = 0.83, r \text{ square change} = 0.43.$

function. Impairment in mental health composite of QOL which was found in the current study was also supported by the previous research which found difficulties in preserving social relationships and creating new ones, sexual inability and frigidity, changes in family relations, working life, and leisure activities (Li et al., 2010).

The clinical and sociodemographic variables associated with psychosocial adjustment and HRQOL among patients with MS should be of considerable interest to clinicians. Acknowledgment of these relationships may permit the identification of those aspects that are most closely linked with patient response to illness and thus inform targeted interventions.

The results of our study regarding the relationship of QOL with some demographic variables such as job and income were consistent with the previous studies. For example, HRQOL was lower in patients who were unemployed and those having a lower income, which is consistent with the study of Heiskanen et al. (2011). Additionally, Šabanagić-Hajrić and Alajbegović (2015) found that full employment status had a positive impact on physical health and mental health. The current study revealed that male participants had better HRQOL than female participants. The differences in HRQOL according to the gender of patient with MS were investigated in previous research. For example, Miller and Dishon (2005) found that female participants had concerns regarding the emotional or psychological dimensions. In contrast, male participants are more concerned with physical aspects (Northrup & Purkis, 2001).

Multiple Sclerosis as a lifelong disease leads to many physical and mental disabilities. These disabilities challenge the patient to adjust to a new life characterized by limited abilities and performance, which require varying patterns of psychosocial adjustment at the personal, family, and social levels (Wassem & Dudley, 2003). The findings of this study indicate that unemployment, poor education, low-income, female gender, duration of illness, and frequency of relapse were associated with maladjusted among MS patients. However, the ways of psychosocial adjustment to MS as measured by the seven domains of the PAIS-SR is not clear. As shown in Table 3, it seems that MS patients are well adjusted in the psychosocial domains including interaction between patients and significant others, sexual relationships, domestic environment, health care orientation, and vocational environment. In the current study, patients with MS were found to have the greatest ability to adapt to the sexual relationships domain. However, participants in the Arab culture feel shame to talk about this sensitive issue, which might not reflect their actual perception regarding their sexual relationships (Yasmine, Ghandour, & El Kak, 2016).

The current study provided baseline data that could be utilized to inform developing specific interventions by psychiatric nurses to help patients with MS and to reduce the devastating impact of the disease process on their HRQOL. Since there is no cure and no effective treatment for MS, nurses might want to identify factors that are uniquely associated with HRQOL for patients with MS. The present study found a significant relationship between psychosocial adjustment to the MS symptoms and HRQOL controlling for the sample characteristics, with higher levels of psychosocial adjustment to the MS symptoms associated with better HRQOL. One advantage of the current study was controlling the demographic variables, which was helpful to determine how much psychosocial adjustment has a unique contribution to HRQOL. Psychosocial adjustment to the disease symptoms was shown to be very important to improve quality of life in patients with MS. Subsequently, targeting factors that might improve psychosocial adjustment such as perceived uncertainty about the disease status, cognitive disability, and medications could play a vital role in improving QOL among these patients (Sullivan, Wilken, Rabin, Demorest, & Bever, 2004).

Historically, patients diagnosed with MS have received care by neurologists and nurses in special clinics affiliated to hospitals. However, these patients might need referrals to psychiatric nurses and other mental health care professionals within a multidisciplinary team

to help them in their psychosocial adjustment to their illness. These patients might benefit from various psychosocial interventions including cognitive-behavioral therapy, group psychotherapy, and stress management (Malcomson, Dunwoody, & Lowe-Strong, 2017). In addition, there is a need to move services provided to patients diagnosed with MS from secondary care to primary care, where psychiatric nurses can address their complex psychosocial needs within a multi-disciplinary team. Psychiatric nurses might have an additional important role related to providing emotional support for patients with MS and addressing some important issues such as low self-esteem and adaptation to the consequences of MS on patients' life.

An important strength point of this study was collecting the data from different institutions, which might increase the possibility of generalization of the findings. In contrast, investigating a sensitive social issue like sexual relationships could provide inaccurate data because this topic has a cultural concern in the Arab world. Willingness to honestly disclose perceptions related to sensitive social issues like sexual relationships in the Arabic culture might represent a threat to internal validity. Despite this limitation, the current study provided valuable data that could be utilized to improve quality of life among patients with MS in the future.

Conflict of interest

The authors declare no conflict of interest.

Grant and other acknowledgments

The research did not receive any fund.

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