This paper has been published under Creative Common Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially.

ORIGINAL ARTICLE

doi: http://doi.org/10.31577/ansr.2026.68.2.3

Prevalence of depression, anxiety, and self-esteem and their influence on physical and mental health in multiple sclerosis patients

Iliass El Harchaoui [1], Taher Moussa Ahmadou [1], Ahmed Omar Touhami Ahami [1]

[1] Biology and Health Laboratory, Department of Biology, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

Correspondence to: Iliass EL Harchaoui, Biology and Health Laboratory, Cognitive-Behavioural Neuroscience and Nutritional Health Unit, Faculty of Science, Ibn Tofail University, Kenitra, Morocco.
e-mail: ilyass_harchaoui@hotmail.com

Submitted: 2026-08-12 Accepted: 2026-10-12 Published online: 2026-11-11

Key words: **Multiple sclerosis; Anxiety; Neuropsychology; Quality of Life; Depression**

Act Nerv Super Rediviva 2026; **68**(2): 67–74 **PII:** 68022603 © 2026 Act Nerv Super Rediviva

Abstract

OBJECTIVE: Mood disorders, such as depression and anxiety, are common in people with multiple sclerosis (MS), a neurodegenerative disease of the central nervous system, due to its physical and neuropsychological effects. These disorders can affect patients' quality of life (QoL). To examine aspects of QoL and mood disorders in patients with MS, simultaneously assessing the impact of these disorders on QoL.
METHODS: We conducted a cross-sectional study of 90 patients with MS. Data were collected using a sociodemographic and clinical questionnaire. QoL was assessed using Multiple Sclerosis Quality of Life 54 (MSQoL-54), Rosenberg Self-Esteem Scale (RSE) and Hospital Anxiety and Depression scale (HADs) questionnaires.
RESULTS: Approximately 47.8% reported experiencing depression, while 52.2% exhibited symptoms of anxiety. Furthermore, a significantly negative correlation was found between high levels of depression and anxiety presence, and a deterioration in QoL, both in terms of mental health with depression and anxiety ($p < 0.000$), as well as physical health, with depression ($p < 0.038$), and anxiety ($p < 0.005$). Additionally, a highly significant difference of mean scores was observed for the QoL composite based on levels of anxiety, depression, and self-esteem ($p < 0.000$) among the participants in our study.
CONCLUSION: This study shows the association between MS diagnosis, prevalence of depression and anxiety, and their impact on patients' QoL. The results underline the importance of taking these factors into account in the overall management of persons with MS, in order to improve their psychological and physical well-being.

Introduction

Multiple sclerosis (MS), characterized by its chronic impact on the central nervous system, presents significant physical and mental challenges, significantly impairing the quality of life (QoL) for those affected. This neurodegenerative disorder is predominant in women aged 20 to 40 (Hanna & Strober 2020), manifesting symptoms like coordination impairments, sensory disruptions, and pain, MS significantly diminishes both physical and mental aspects of QoL (Tan *et al.* 2010). MS ranks as the second most incapacitating chronic ailment of the brain and the spinal cord, resulting in repercussions akin to those of stroke and Parkinson's disease (Kargarfard *et al.* 2012; Opara *et al.* 2012).

Central to this issue lies the concept of QoL, a multidimensional notion often overlooked by medical standards. Due to its personal and diverse nature, QoL provides a holistic perspective enabling the evaluation of various aspects within a given situation (Ruet *et al.* 2013). The complexity of MS necessitates evaluation tools to address both impaired physical capabilities and subjective health aspects like cognition, emphasizing the difficulty of completely understanding the impact of the disease (Bass *et al.* 2020). The common measurement of QoL in patients with MS relies on disease-specific questionnaires, regarded as the most frequently utilized standardized tool (Bandari *et al.* 2010; Isaksson 2005; Opara *et al.* 2010).

However, beyond physical limitations, MS also leads to psychological manifestations such as anxiety and depression (Hanna & Strober 2020). These emotional disturbances, exacerbated by the unpredictable and progressive nature of the disease, contribute to a significant deterioration in patients' self-esteem (Beiske *et al.* 2008). Concurrently, the physical deterioration associated with MS has been identified as a trigger for depression, exacerbating fatigue, concentration issues, and memory problems (Chwastiak *et al.* 2002a; Figved *et al.* 2005; Patten *et al.* 2003).

This medical and psychological complexity has raised socio-medical concerns, particularly among persons in the middle-aged productive. Employment difficulties, loss of self-confidence, and social difficulties are major confrontation faced by patients with MS and may lead to hospitalization and a significant deterioration in QoL (Rezapour *et al.* 2017; Tan *et al.* 2010). In this context, this study seeks to assess how neuropsychological disorders such as anxiety, depression, and self-esteem affect health-related quality of life (HR-QoL) in populations with MS, with the ultimate goal of improving disease care.

Finally, the aim of the study is to explore and understand the complex links between mood disorders and QoL in patients with MS. Through a thorough analysis of the impacts of depression, anxiety, alterations in social life, and decreased self-esteem, this study aims to provide insights to develop integrated management approaches. The ultimate goal is to investigate the neurocognitive concept and mood disorders in patients with MS; and simultaneously assess the impact of these disorders on QoL.

Methods

Research design and setting: We performed a descriptive, cross-sectional study on MS patients. Primary data were collected on 55 cases at the Department of Neurology, Ibn Sina Hospital, Rabat, from January 2019 for one years. The second phase included 35 patients from the Neurology Department, Ibn Rochd Hospital, Casablanca, from July 2022 for six months.
Study population: The study involved 90 cases of MS. The collection of data was carried out by consultation, using a questionnaire on sociodemographic and clinical characteristics.
Inclusion and Exclusion criteria: Cases diagnosed with MS who attended the department during the study period were included in the study, whereas those with unconfirmed MS or who did not consent to participate were excluded.

Variable
Data collection was through self-questionnaires administered to each patient The questionnaire comprises sociodemographic and clinical variables and includes a set of scales: the Patient Determined Disease Steps (PDDS), Multiple Sclerosis Quality of Life 54 (MSQoL-54), Rosenberg Self-Esteem Scale, and the Hospital Anxiety and Depression Scale (HADS).

Measuring instruments
Socio-Demographics data: The data collection method employed in the study was through the use of self-administered questionnaires; information was obtained on socio-demographics, including the current age, age at diagnosis, gender, marital status and, information on health insurance status and clinical features including MS phenotype.
Hospital Anxiety and Depression Scale (HADS) consists of 14 items assessing both anxiety (7 items subscale) and depression (7 items subscale). Each item is rated on a 4-level scale ranging from 0 to 3, yielding maximum scores of 21 for both anxiety and depression. A score of 0 to 7 is considered normal, a score of 8 to 10 is interpreted as a borderline case, and a score of 11 to 21 is interpreted as a case (of either anxiety or depression) (Zigmond & Snaith 1983).
Rosenberg Self-Esteem Scale (RSEs) developed by Dr. Rosenberg in 1965 and used in this study because of its link with mood disorders, the CSR consists of 10 items rated on a 4-point scale (1 = strongly disagree, 4 = strongly agree). The total score ranges from 10 to 40. For items 1-2-4-6 and 7, scores are taken as they are, while for items 3-5-8-9 and 10, scoring is

Copyright © 2026 Activitas Nervosa Superior Rediviva ISSN 1337-933X

Tab. 1. Prevalence of depression, anxiety and self-esteem by sociodemographic characteristics

Disorder		Depression; n (%)			Anxiety; n (%)			Self-Esteem; n (%)		
Characteristics		**Low**	**Moderate**	**Sever**	**Low**	**Moderate**	**Sever**	**Low**	**Moderate**	**High**
Gender	Women	15 (22.1)	16 (23.5)	37 (54.4)	17 (25)	13 (19.1)	38 (55.9)	44 (65)	4 (6)	20 (29)
	Men	8 (36.4)	8 (36.4)	6 (27.3)	7 (31.8)	6 (27.3)	9 (40.9)	15 (68)	6 (27)	1 (5)
Marital status	Single	10 (20.4)	18 (36.7)	21 (42.9)	9 (18.4)	14 (28.6)	26 (53.1)	33 (67)	4 (8)	12 (24)
	Married	13 (31.7)	6 (14.6)	22 (53.7)	15 (36.6)	5 (12.2)	21 (51.2)	16 (52)	6 (19)	9 (29)
Health Insurance	Yes	23 (29.1)	22 (27.8)	34 (43)	24 (30.4)	18 (22.8)	37 (46.8)	50 (63)	9 (11)	20 (25)
	None	0 (0)	2 (18.2)	9 (81.8)	0 (0)	1 (9)	10 (91)	9 (82)	1 (9)	1 (9)
Age (years)	mean	33.3±8.95	33.8±11.1	37±10.2	33.1±8.18	34.6±12.7	36.5±10.0	36.8±11.1	32.1±5.51	31.9±8.30
	<25	5 (31.3)	5 (31.3)	6 (37.5)	4 (25)	5 (31.3)	7 (43.8)	9 (56)	0 (0)	7 (44)
	25-35	9 (25)	12 (33.3)	15 (41.7)	10 (27.8)	9 (25)	17 (47.2)	22 (61)	8 (22)	6 (17)
	35-45	7 (25)	5 (17.9)	16 (57.1)	9 (32.1)	2 (7.1)	17 (60.7)	19 (68)	2 (7)	7 (25)
	>45	2 (20)	2 (20)	6 (60)	1 (10)	3 (30)	6 (60)	9 (90)	0 (0)	1 (10)
Clinical Form	RR	15 (25)	15 (25)	30 (50)	16 (27)	12 (20)	32 (53)	42 (70)	5 (8)	13 (22)
	SP	4 (17)	7 (30)	12 (52)	5 (22)	5 (22)	13 (56)	14 (61)	5 (22)	4 (17)
	PP	4 (57)	2 (29)	1 (14)	3 (43)	2 (29)	2 (29)	3 (43)	0 (0)	4 (57)

n; number, %; percentage, RR, Relapsing-remitting; SP, Secondary Progressive; PP, Primary Progressive

reversed. After adding up the scores for all the items, the final score indicates the level of self-esteem (Rosenberg 1965).

Multiple sclerosis Quality of Life (MSQoL-54): This questionnaire includes the SF-36 (Short form-36 items) as a general QoL assessment instrument (Stuifbergen *et al.* 2000), plus 18 additional questions specific to MS patients. The examination result contains two composite score domains, reflecting physical health (PH) and mental health (MH), independent of each other. A separation of domains and components has been adapted from the original version of the MSQoL-54 proposed by Vickrey *et al.* in 1995 (Vickrey *et al.* 1995). In our study, we used the French-Canadian version (Acquardo *et al.* 2003).

Statistical analysis

The data were entered into Excel, and after filtering and coding were re-entered into SPSS version 25 software for statistical analysis. Descriptive analyses were performed (mean and standard deviation for quantitative variables and percentages for qualitative variables). It employed z-score, applied chi-square to compare categorical variables, and used the ANOVA test to compare continuous variables. Spearman's rank correlation analysis was conducted to analyze correlation among variables. tests were considered statistically significant at $p < 0.05$.

Results

A total of 90 patients, of whom 76% were women and 24% were men, resulting in a sex ratio of 3.09 in favor of women. We also noted that 54% (n = 49) were single and 46% (n = 41) married. The same sample showed that 87.8% had social security cover. The mean of current age of our population is 35.2±10.19 years. The average age at diagnosis was 28±7.87 years.

The analysis reveals crucial aspects regarding depression, anxiety, and self-esteem among patients with MS. Women are found to have higher rates of depression (54.4%) and anxiety (55.9%), respectively. Regarding marital status, married patients are more

Tab. 2. Description of clinical characteristics

Variables	Median	Mean	Std. Error of mean
PHC	46.3	49	1.49
MHC	43.6	43	1.64
Depression	10.00	11.3	0.49
Anxiety	11.00	11.1	0.48
Self-esteem	25	25.9	0.95

PHC, Physical Health Composite; MHC, Mental Health Composite

Tab. 3. Mean of depression, anxiety, and self-esteem by sociodemographic and clinical characteristics

Variable		Depression		Anxiety		Self-esteem	
		mean ±sd	*p*-value	mean ±sd	*p*-value	mean ±sd	*p*-value
Gender	Women	11.7±0.593	0.153	11.5±0.567	0.207	26.1±1.212	0.860
	Men	10.1±0.808		10±0.906		25.7±1.431	
Marital status	Single	11.2±0.607	0.742	11.3±0.604	0.680	25.6±1.247	0.656
	Married	11.5±0.811		10.9±0.786		26.5±1.557	
Health insurance	Yes	10.8±0.512	**0.002****	10.7±0.516	**0.021****	27 ±1.008	0.10
	No	15.3±1.121		14.1±1.066		19.4±2.744	
Age (years)	<25	10.7±1.16	0.469	10.7±1.12	0.698	27.9±2.298	0.354
	25-35	10.7±0.62		10.7±0.72		26.7±1.324	
	35-45	12.4±1.08		11.5±0.998		25.7±2.078	
	>45	11.8±0.49		12.4±1.28		21.5±2.634	
Clinical form	RR	11.4±0.634	0.173	11.2±0.608	0.313	25.7±1.199	0.250
	SP	12±0.874		11.7±0.905		25.1±2.002	
	PP	8.3±1.209		8.71±1.57		31.6±2.635	

Abbreviation: RR, Relapsing-remitting; SP, Secondary Progressive; PP, Primary Progressive;

Tab. 4. Cross-tabulation between anxiety and depression

Characteristics		Anxiety n,%			Total; n (%)	Khi2 (*p* value)
		Normal	Moderate	Severe		
Depression	Normal	20 (22)	7 (8)	4 (4)	31 (34)	49,11*** ($p < 0.000$)
	Moderate	5 (6)	6 (7)	5 (6)	16 (18)	
	Severe	4 (4)	1 (1)	38 (42)	43 (48)	
Total ; n (%)		29 (32)	14 (16)	47 (52)	90 (100)	

prone to severe levels of depression (53.7%), while the percentage of anxiety is more than half and is shared equally between the two categories. The uninsured are more susceptible to suffering from depression (81.8%) and anxiety (91%) than those with health insurance. Cases aged between 35-45 and above 45 years having a high rate of severe depression and anxiety. When it comes to the self-esteem is low in 68% of men, 67% of single patients, and 82% of those without health insurance. Additionally, 90% of persons over the age of 45 have low self-esteem.

The type of MS significantly influences the intensity of symptoms, particularly for those with the relapsing-remitting (RR) and secondary progressive (SP) forms, who often report higher rates of depression and anxiety disorders. Additionally, about 70% of patients with the relapsing form experience low self-esteem.

Finally, patients with severe depression had an average age (37 years) greater than those with low depression (33.3 years), the cases with severe anxiety (36.5 years) are older than those with low symptoms (33.1 years). In terms of self-esteem, those with poor self-esteem (36.8 years) are older than those with strong self-esteem (31.9 years), This indicates that severe depressive and anxiety disorders, as well as low self-esteem, appear at an older age [Table 1].

Descriptive analysis of depression and anxiety disorder in MS patients provides important information on psychological health problems affecting these subjects. Accordingly, the mean scores for depression and anxiety were 11.3 ± 0.49 and 11.1 ± 0.48, respectively, showing a moderate degree of psychological distress. Finally, quality of life composites indicates that PHC enjoys an average score of 49 ± 1.49, which could be considered as a moderated impairment in physical health status compared to the more impaired health MHC with an average of 43 ± 1.64. Finally, self-esteem assessment has a median of 25, suggesting that the large proportion of participants have self-esteem scores below this value [Table 2].

The mean scores for depression, anxiety and self-esteem were higher for female patients (11.7, 11.5 and 26.1 respectively) than for male patients (10.1, 10 and 25.7 respectively). There was no significant difference in scores between married and single patients in any of the three dimensions. In contrast, patients with health insurance exhibited significantly lower scores in depression (10.8 vs. 15.3, $p < 0.002$) and anxiety

Copyright © 2026 Activitas Nervosa Superior Rediviva ISSN 1337-933X

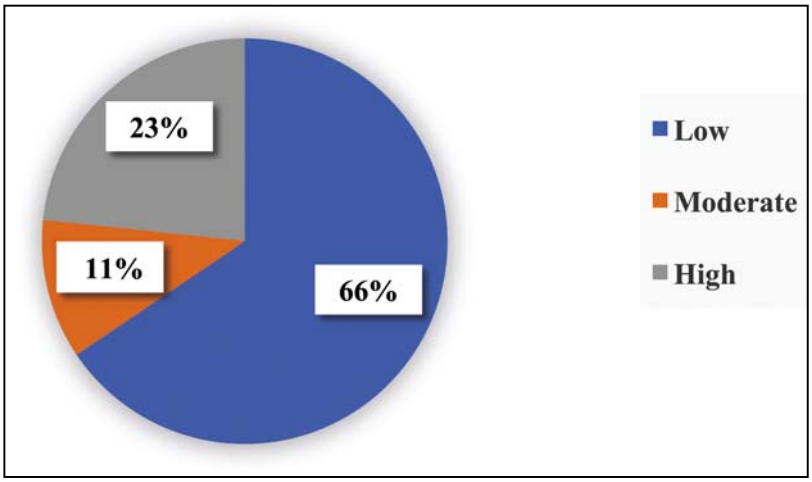


Fig. 1. Distribution of patients by self-esteem level

Tab. 5. Mean physical and mental health composite scores by depression and anxiety disorder

Characteristic		Mean±SD PHC	F; *p*-value	Mean±SD MHC	F; *p*-value
Depression	Score<8	60.2±2.601	F = 23.797 $p < 0.000^{**}$	54.7±2.945	F = 18.232 $p < 0.000^{**}$
	Between 8 et 10	44.1±2.089		39.5±2.345	
	Score>10	42.2±1.507		36.3±1.794	
Anxiety	Score<8	55.3±2.730	F = 19.741 $p < 0.000^{**}$	51±3.004	F = 18.820 $p < 0.000^{**}$
	Between 8 et 10	59.8±3.279		54.1±3.168	
	Score>10	41.4±1.387		35.1±1.652	

SD: Standard deviations; PHC: Physical Health Composite; MHC: Mental Health Composite
Note: *Significance level <0.05; **Significance level < 0.01 level.

(10.7 vs. 14.1, $p < 0.021$), and higher scores in self-esteem (27 vs. 19.4, $p < 0.10$). These findings suggest that health insurance has a positive impact on these psychological aspects.

Furthermore, the analysis of current age and age at diagnosis revealed that as the age of patients increased, there was an increase in depression and anxiety disorders. Patients over 45 years of age had a mean depression score of 11.8 ± 0.49, while patients under 25 years of age, with a mean depression score of 10.7 ± 1.16. Finally, cases with clinical form SP had depression and anxiety (12 ± 0.874; 11.7 ± 0.905), followed by RR form (11.4 ± 0.634; 11.2 ± 0.608) [Table 3].

The Table 4 presents the results of the distribution of respondents according to depression and anxiety. It was observed that 32% (n = 29) of respondents show no signs of anxiety disorders and 34% (n = 31) show no signs of depressive disorders. However, as shown in the following table, 14 (16%) individuals and 16 (18%) patients respectively show a suspicion (moderate) of anxiety or depressive disorders. It is also worth noting that 52% of patients exhibit confirmed anxiety disorders, and 48% exhibit confirmed depressive disorders. The chi-square test of independence between the categories of anxiety and depression shows a highly significant association ($p < 0.000$). The prevalence of cases with confirmed anxiety and depression is 42%, compared to 22% who report no anxiety or depressive disorders.

The categories resulting from the distribution are of three types: the first concerns 66% (n = 59) of patients with low self-esteem; the second, which represents 11% (n = 10), relates to patients with moderate self-esteem; a significant number, namely 23% (n = 21) of these patients, have very high self-esteem [see Figure 1].

Comparison of mood disorder scores based on physical and mental health composite

The average scores of physical and mental health differ between patients with low and moderate levels of depression and anxiety. For the low level (Depression: 60.2 ± 2.601 ; 54.7 ± 2.945 / Anxiety : 55.3 ± 2.730 ; 51 ± 3.004) and the moderate level (Depression : 44.1 ± 2.089 ; 39.5 ± 2.345 / Anxiety : 59.8 ± 3.279 ; 54.1 ± 3,168), the scores are higher compared to those reached by patients suffering from severe depressive and anxiety disorders (42.2 ± 1.507 ; 36.3 ± 1.794 VS 41.4 ± 1.387 ; 35.1 ± 1.652) respectively for physical and mental health, with highly significant differences ($p < 0.000$) for both physical and mental health scores. In conclusion, this indicates that patients with lower levels of depression and anxiety experience less distress than those with moderate or advanced anxiety-depressive disorders [Table 5].

Tab. 6. Correlations between depression, anxiety, self-esteem and composite of quality of life

Variables	PHC		MHC	
	r	p-value	r	p-value
Depression	-0.219*	p<0.038	-0.398**	p<0.000**
Anxiety	-0.293**	p<0.005	-0.416**	p<0.000**
Self-esteem	0.302**	p<0.004	0.414**	p<0.000**

PHC: Physical Health Composite; MHC: Mental Health Composite
Note: *Significance level <0.05; **Significance level < 0.01 level.

Correlation between mood disorders and composite health-related quality of life

The correlation between the composite of physical health (PHC) and depression as well as anxiety is negatively significant ($p < 0.038$; $p < 0.005$), while the correlation between depression and anxiety and the composite of mental health (MHC) of QoL is also negatively significant ($p < 0.000$). Regarding self-esteem, the correlation is positively significant with the PHC and the MHC ($p < 0.004$; $p < 0.000$) respectively [Table 6].

Discussion

In this study, we present a detailed assessment of the influence of neuropsychological disorders, including depression, anxiety, and self-esteem, on quality of life related to the health in patients with MS. The findings reveal that depression and anxiety are more prevalent among women, and patients without health insurance face an elevated risk. Additionally, the severity of psychological disorders is influenced by advanced age and the type of MS.

Depressive disorder frequently emerges as the most common and challenging symptom to manage in the context of MS. A Canadian comparative study was conducted to assess the prevalence of depression in a large population of MS patients, comparing them to patients with other chronic illnesses and to a population with no other illnesses (Patten *et al.* 2003).

The results revealed that the prevalence of depression was significantly higher among persons with MS compared to the other groups. This observation has been confirmed by other studies, which have reported depression prevalence estimates reaching up to 89.9% (Alhussain *et al.* 2020), with an estimated prevalence of nearly 50% over the course of a lifetime (Wang *et al.* 2023). A study conducted in Saudi Arabia on 328 patients with MS identified respective rates of anxiety and depression of 42.9% and 58.8%, respectively (Alharbi *et al.* 2022).

Depression, in addition to being a debilitating symptom, is associated with a significant impact on QoL (Feinstein 2011), with 55% of patients with MS taking medication for depression (Beckner *et al.* 2010). Women appear to be more affected, with a study reporting a depression rate of 37.9% among women with MS (Jerković *et al.* 2021). The risk of suicide is also higher among patients with MS, estimated at 22% within the five years following diagnosis (Strupp *et al.* 2016). This effect is accentuated by the association of depression with social isolation and alcohol abuse, which contributes to suicidal thoughts. (Feinstein & Pavisian 2017).

In our study, the prevalence of depression, measured using the HADS scale, showed an average score of 11.3, indicating moderate to severe intensity, and 48% have a sever depression. Anxiety, like depression, is a persistent phenomenon from the onset of the disease, with an average score of moderate to severe anxiety of 11.1 in our study, affecting 52% of patients. The association between anxiety and depression is significant, with 42% of patients suffering both disorders. These symptoms have a negative impact on physical, psychological, social, and overall QoL (Gedik & Idiman 2020).

This increase in the prevalence of anxiety could be attributed to various factors, such as difference in health insurance, age, and income levels among patients with MS. According to a study by Karimi *et al.* demonstrated a difference between married and singles persons, with especially lower levels of anxiety, observed among patients with higher income and those who had a university education degree (Karimi *et al.* 2020). This finding highlights the role that socio-economic factors play in the mental health of MS patients.

The positive correlation between anxiety and depression is supported by previous studies (Chwastiak *et al.* 2002b; Shawaryn *et al.* 2002), emphasizing the impact of disease severity on psychological distress. Cognitive deficits, especially in information processing speed, executive function, and working memory, are strongly associated with severe depression (Arnett *et al.* 2008, 2022; Arnett & Randolph 2006).

The association of depression with QoL is well established, with numerous studies demonstrating its negative impact on various dimensions of life (Berrigan *et al.* 2016; Janssens *et al.* 2003). Anxiety disorders, including panic disorder, obsessive-compulsive disorder, and generalized anxiety disorder, are also prevalent among patients with MS. These disorders are closely linked to depression and contribute to an increased risk of suicidal thoughts (Korostil & Feinstein 2007).

Copyright © 2026 Activitas Nervosa Superior Rediviva ISSN 1337-933X

Lobentanz *et al.* (2004), conducted a study to examine the impact of disability, depression, fatigue and sleep on QoL. Their findings indicated that depression emerged as the predominant predictor of all facets of QoL, thereby underscoring a substantial negative correlation between depression and QoL, irrespective of its etiology. A similar observation was made by Dayapoglu & Tan (2011), who also noted the negative effect of depression disorder on physical and mental health-related QoL.

Consideration of self-esteem constitutes a central element in many fields of psychology, including clinical psychology, development, personality, and the social domain (Rosenberg 1965). In our study, the average self-esteem score is 25.9, with a medium of 25. Notably, 66% of cases exhibit low self-esteem, while 23% display high self-esteem. This distribution differs from that observed in a study in Tunisia, where 57.1% of patients with a disability level measured by EDSS score of 2.8 showed low self-esteem (Halouani *et al.* 2019).

The prevaling idea is that self-esteem is generally lower in population with MS. The aim is to conduct a self-assessment to evaluate and to determine the QoL based on physical and psychological aspects. Previous study conducted by Dlugonski and Motl found a positive correlation between higher self-esteem and a more positive perception of health-related QoL, and vice versa (Dlugonski & Motl 2012), suggesting that boosting self-esteem could lead to improvements in overall QoL among MS patients.

It is evident that self-esteem maintains a negative relationship with depression, anxiety, and disability, as corroborated by previous research (Mikula *et al.* 2017, 2021). Reduced self-esteem and low self-efficacy are also strongly linked to an increased prevalence of depression (Mikula *et al.* 2021). This issue of self-esteem persists post-diagnosis (Berzins *et al.* 2017).

In a similar context, a Turkish study demonstrated a significant difference between MS patients suffering from depression and those without depression ($t = -5.86$; $p < 0.001$). Significant negative associations were established between self-esteem and depression, anxiety, and disability. Conversely, positive correlations were observed between self-esteem and physical, psychological, social, and overall QoL (Gedik & Idiman 2020). These results extend to mood disorders, such as anxiety and depression, which have a negative impact on self-esteem (McCabe 2005). Additionally, positive self-esteem is associated with better QoL, especially with social support to cope with the reality of MS (Gil-González *et al.* 2020; Wilski & Tasiemski 2016). Thus, there is a close link between self-esteem, disability, physical and psychological impact factors in the context of MS, and QoL (Wilski & Tasiemski 2016).

Conclusion

In conclusion, our comprehensive study on the assessment of mood disorders and quality of life in patients with multiple sclerosis revealed the degree of difficulties suffered by these patients. The effects of depression, anxiety and low self-esteem demonstrate the necessity of integrated approaches to care by simultaneously addressing the physical and mental aspects of multiple sclerosis.

Acknowledgments

We express our sincere gratitude to P Mohamed Yahyaoui and Pr. El Hachmia Ait Ben Haddou, research professor in neurology and neurogenetics department at the Faculty of Medicine and Pharmacy, Mohammed V University, for their support and collaboration throughout this study, as well as for their valuable contributions.

REFERENCES

1 Acquardo C, Lafortune L, Mear I (2003). Quality of life in multiple sclerosis : Translation in French Canadian of the MSQoL-54. *Health Qual Life Outcomes.* **1**: 1–12.
2 Alharbi NA, Alawi SH, Alharbi YM, Alharbi MY, Alsamarh TN, Aldubaiyan AA, et al. (2022). Prevalence of depression and anxiety among adult patients with multiple sclerosis at Riyadh City, Saudi Arabia. *Neurosciences.* **27**(2): 71–78.
3 Alhussain H, Aldayel AA, Alenazi A, Alowain F (2020). Multiple Sclerosis Patients in Saudi Arabia: Prevalence of Depression and its Extent of Severity. *Cureus.* **12**(2): e7005.
4 Arnett PA, Barwick FH, Beeney JE (2008). Depression in multiple sclerosis : Review and theoretical proposal. *J Int Neuropsychol Soc.* **14**(5): 691–724.
5 Arnett PA, Cadden M, Roman CAF, Guty E, Riegler K, Thomas G (2022). Sensory-Motor and Affective-Fatigue Factors are Associated with Symbol Digit Performance in Multiple Sclerosis. *J Int Neuropsychol Soc.* **28**(4): 362–370.
6 Arnett PA & Randolph J (2006). Longitudinal course of depression symptoms in multiple sclerosis. *J Neurol Neurosurg Psychiatry.* **77**(5): 606–610.
7 Bandari DS, Vollmer TL, Khatri BO, Tyry T (2010). Assessing Quality of Life in Patients with Multiple Sclerosis. *Int J MS Care.* **12**(1): 34–41.
8 Bass AD, Van Wijmeersch B, Mayer L, Mäurer M, Boster A, Mandel M, et al. (2020). Effect of Multiple Sclerosis on Daily Activities, Emotional Well-being, and Relationships. *Int J MS Care.* **22**(4): 158–164.
9 Beckner V, Howard I, Vella L, Mohr DC (2010). Telephone-administered psychotherapy for depression in MS patients : Moderating role of social support. *J Behav Med.* **33**(1): 47–59.
10 Beiske AG, Svensson E, Sandanger I, Czujko B, Pedersen ED, Aarseth JH, et al. (2008). Depression and anxiety amongst multiple sclerosis patients. *Eur J Neurol.* **15**(3): 239–245.
11 Berrigan LI, Fisk JD, Patten SB, Tremlett H, Wolfson C, Warren S, Fiest KM, McKay KA, Marrie RA; CIHR Team in the Epidemiology and Impact of Comorbidity on Multiple Sclerosis (ECoMS) (2016). Health-related quality of life in multiple sclerosis : Direct and indirect effects of comorbidity. *Neurology.* **86**(15): 1417–1424.
12 Berzins SA, Bulloch AG, Burton JM, Dobson KS, Fick GH, Patten SB (2017). Determinants and incidence of depression in multiple sclerosis : A prospective cohort study. *J Psychosom Res.* **99**: 169–176.
13 Chwastiak L, Ehde DM, Gibbons LE, Sullivan M, Bowen JD, Kraft GH (2002a). Depressive Symptoms and Severity of Illness in Multiple Sclerosis : Epidemiologic Study of a Large Community Sample. *Am J Psychiatry.* **159**(11): 1862–1868.

14 Chwastiak L, Ehde DM, Gibbons LE, Sullivan M, Bowen JD, Kraft GH (2002b). Depressive symptoms and severity of illness in multiple sclerosis : Epidemiologic study of a large community sample. *Am J Psychiatry.* **159**(11): 1862–1868.

15 Dayapoglu N & Tan M (2011). Quality of life in relapsing-remitting multiple sclerosis. *Pak J Med Sci.* **27**(1): 133–137.

16 Dlugonski D & Motl RW (2012). Possible antecedents and consequences of self-esteem in persons with multiple sclerosis : Preliminary evidence from a cross-sectional analysis. *Rehabil Psychol.* **57**(1): 35–42.

17 Feinstein A (2011). Multiple sclerosis and depression. *Mult Scler J.* **17**(11): 1276–1281.

18 Feinstein A & Pavisian B (2017). Multiple sclerosis and suicide. *Mult Scler J.* **23**(7): 923–927.

19 Figved N, Klevan G, Myhr KM, Glad S, Nyland H, Larsen JP, et al. (2005). Neuropsychiatric symptoms in patients with multiple sclerosis. *Acta Psychiatr Scand.* **112**(6): 463–468.

20 Gedik Z & Idiman E (2020). Health-related quality of life in multiple sclerosis : Links to mental health, self-esteem, and selfcompassion. *Dusunen Adam - J Psychiatry Neurol Sci.* **33**(1): 59–70.

21 Gil-González I, Martín-Rodríguez A, Conrad R, Pérez-San-Gregorio MÁ (2020). Quality of life in adults with multiple sclerosis : A systematic review. *BMJ Open.* **10**(11): e041249.

22 Halouani N, Smaoui N, Ellouze S, Dammak M, Daoud S, Aloulou J, et al. (2019). Sexual dysfunctions and self-esteem in multiple sclerosis : A Tunisian study. *Inf Psychiatr.* **95**(5): 331–338.

23 Hanna M & Strober LB (2020). Anxiety and depression in Multiple Sclerosis (MS) : Antecedents, consequences, and differential impact on well-being and quality of life. *Mult Scler Relat Disord.* **44**: 102261.

24 Isaksson A-K (2005). Quality of life and impairment in patients with multiple sclerosis. *J Neurol Neurosurg Psychiatry.* **76**(1): 64–69.

25 Janssens AC, Van Doorn PA, De Boer JB, Kalkers NF, Van Der Meché FG, Passchier J, et al. (2003). Anxiety and depression influence the relation between disability status and quality of life in multiple sclerosis. *Mult Scler J.* **9**(4): 397–403.

26 Jerković A, Proroković A, Matijaca M, Vuko J, Poljičanin A, Mastelić A, et al. (2021). Psychometric Properties of the HADS Measure of Anxiety and Depression Among Multiple Sclerosis Patients in Croatia. *Front Psychol.* **12**: 1–10.

27 Kargarfard M, Eetemadifar M, Mehrabi M, Maghzi AH, Hayatbakhsh MR (2012). Fatigue, depression, and health-related quality of life in patients with multiple sclerosis in Isfahan, Iran. *Eur J Neurol.* **19**(3): 431–437.

28 Karimi S, Andayeshgar B, Khatony A (2020). Prevalence of anxiety, depression, and stress in patients with multiple sclerosis in Kermanshah-Iran : A cross-sectional study. *BMC Psychiatry.* **20**(1): 1–8.

29 Korostil M & Feinstein A (2007). Anxiety disorders and their clinical correlates in multiple sclerosis patients. *Mult Scler.* **13**(1): 67–72.

30 Lobentanz IS, Asenbaum S, Vass K, Sauter C, Klösch G, KolleggerH, et al. (2004). Factors influencing quality of life in multiple sclerosis patients : Disability, depressive mood, fatigue and sleep quality. *Acta Neurol Scand.* **110**(1): 6–13.

31 McCabe MP (2005). Mood and self-esteem of persons with multiple sclerosis following an exacerbation. *J Psychosom Res.* **59**(3): 161–166.

32 Mikula P, Nagyova I, Krokavcova M, Vitkova M, Rosenberger J, Szilasiova J, et al. (2017). Self-esteem, social participation, and quality of life in patients with multiple sclerosis. *J Health Psychol.* **22**(8): 984–992.

33 Mikula P, Timkova V, Fedicova M, Szilasiova J, Nagyova I (2021). Self-management, self-esteem and their associations with psychological well-being in people with multiple sclerosis. *Mult Scler Relat Disord.* **53**: 103069.

34 Opara JA, Jaracz K, Brola W (2010). Quality of life in multiple sclerosis. *J Med Life.* **3**(4): 352–358.

35 Opara J, Jaracz K, Brola W (2012). Burden and quality of life in caregivers of persons with multiple sclerosis. *Neurol Neurochir Pol.* **46**(5): 472–479.

36 Patten SB, Beck CA, Williams JVA, Barbui C, Metz LM (2003). Major depression in multiple sclerosis : A population-based perspective. *Neurology.* **61**(11): 1524–1527.

37 Rezapour A, Almasian Kia A, Goodarzi S, Hasoumi M, Nouraei Motlagh S, Vahedi S (2017). The impact of disease characteristics on multiple sclerosis patients' quality of life. *Epidemiol Health.* **39**: e2017008.

38 Rosenberg M (1965). Society and the Adolescent Self-Image. Princeton University Press, 338 p.

39 Ruet A, Deloire M, Hamel D, Ouallet J-C, Petry K, Brochet B (2013). Cognitive impairment, health-related quality of life and vocational status at early stages of multiple sclerosis : A 7-year longitudinal study. *J Neurol.* **260**(3): 776–784.

40 Shawaryn MA, Schiaffino KM, LaRocca NG, Johnston MV (2002). Determinants of health-related quality of life in multiple sderosis : The role of illness intrusiveness. *Mult Scler J.* **8**(4): 10–18.

41 Strupp J, Ehmann C, Galushko M, Bücken R, Perrar KM, Hamacher S, et al. (2016). Risk Factors for Suicidal Ideation in Patients Feeling Severely Affected by Multiple Sclerosis. *J Palliat Med.* **19**(5): 523–528.

42 Stuifbergen AK, Seraphine A, Roberts G (2000). An explanatory model of health promotion and quality of life in chronic disabling conditions. *Nurs Res.* **49**(3): 122–129.

43 Tan H, Yu J, Tabby D, Devries A, Singer J (2010). Clinical and economic impact of a specialty care management program among patients with multiple sclerosis : A cohort study. *Mult Scler J.* **16**(8): 956–963.

44 Vickrey BG, Hays RD, Harooni R, Myers LW, Ellison GW (1995). A health-related quality of life measure for multiple sclerosis. *Qual Life Res.* **4**(3): 187–206.

45 Wang C, Zhou Y, Feinstein A (2023). Neuro-immune crosstalk in depressive symptoms of multiple sclerosis. *Neurobiol Dis.* **177**: 106005.

46 Wilski M & Tasiemski T (2016). Health-related quality of life in multiple sclerosis : Role of cognitive appraisals of self, illness and treatment. *Qual Life Res.* **25**(7): 1761–1770.

47 Zigmond AS & Snaith RP (1983). The Hospital Anxiety And Depression Scale. *Acta Psychiatr Scand.* **67**(6): 361–370.

Copyright © 2026 Activitas Nervosa Superior Rediviva ISSN 1337-933X