ACCSCIENCE PUBLISHING

Eurasian Journal of Medicine and Oncology

ORIGINAL RESEARCH ARTICLE

Impact of depression, functional status, and self-care level on quality of life in patients with multiple sclerosis

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Abstract

Introduction: Multiple sclerosis (MS) is one of the chronic demyelinating diseases of the nervous system that leads to a wide spectrum of clinical symptoms and significantly affects the quality of life (QoL).

Objective: This study evaluated the role of depression, functional status, level of self-care, and other socio-demographic and clinical factors in patients with MS.

Methods: This cross-sectional study was conducted among 349 patients with MS. This study employed a questionnaire designed by the authors to capture socio-demographic and clinical characteristics, along with the following standardized instruments: the Activities of Daily Living questionnaire, the Expanded Disability Status Scale, the Beck Depression Inventory, and the MS QoL Questionnaire-54.

Results: Using regression analysis, we found that the most important factors influencing physical QoL included age ($p<0.01$), occupation ($p<0.01$), and educational attainment ($p<0.001$). Among the clinical variables, the following were significantly associated with the QoL: functional ability ($p<0.001$), level of self-care ($p<0.001$), presence of depressive symptomatology ($p<0.001$), presence of relapses ($p<0.001$), and type of MS ($p<0.001$). The most important factors that were associated with psychological QoL included educational attainment ($p<0.001$), functional ability ($p<0.001$), level of self-care ($p<0.05$), presence of depressive symptomatology ($p<0.001$), presence of relapses ($p<0.05$), and progressive form of the disease ($p<0.001$).

Conclusion: Since the course of MS varies and is sometimes unpredictable, it is crucial to monitor the factors associated with the QoL of these patients and to conduct the necessary interventions to improve it.

Keywords: Multiple sclerosis; Depression; Functional status; Self-care; Quality of life

1. Introduction

Multiple sclerosis (MS) is defined as an inflammatory demyelinating disease of the central nervous system. In its pathogenesis, autoimmune inflammation is predominant in the initial stages, while in the later stages, a degenerative process occurs, partly and sometimes independently of the inflammatory basis.[1] MS is the most common non-traumatic disabling disease affecting young adults in their productive years.[1-3] It is a chronic, incurable disease, most often diagnosed between the ages of 20 and 40 years,

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Citation: Majerníková L, Obročníková A. Impact of depression, functional status, and self-care level on quality of life in patients with multiple sclerosis. *Eurasian J Med Oncol*. 2025;9(4):258-267. doi: 10.36922/EJMO025170146

Received: April 24, 2025

1st revised: September 1, 2025

2nd revised: September 2, 2025

Accepted: September 4, 2025

although onset may also occur in childhood or after the age of 50 years.[4] MS follows a highly variable course, progressively limiting work capability and ultimately compromising patient independence, and it imposes a substantial socioeconomic burden.[4,5] Given its chronic and disabling nature, MS profoundly affects patients' quality of life (QoL), making QoL evaluation an essential aspect of both clinical management and research.

The prevalence and incidence of MS have increased globally.[6] According to the World Health Organization (WHO), the global prevalence of MS showed an upward trend, rising from 2.1 million cases in 2008 to 2.3 million in 2013, corresponding to an increase from 30 to 33 cases per 100,000 population.[7] Currently, approximately 2.8 million people are affected by MS globally, with the occurrence varying according to latitude.[7,8] In Europe, more than 700,000 individuals are living with MS, with the highest number reported in Germany (111,970) and the lowest in Andorra (96).[8] In Slovakia, the prevalence of MS is relatively high, estimated at approximately 100 cases per 100,000 inhabitants, with around 16,000 registered patients by the end of 2021.[9,10] For several years, the number of newly diagnosed MS patients in Slovakia remained between 1500 and 1900 annually. However, in the past 2 observed years (2020 and 2021), the threshold of 2000 newly diagnosed cases was exceeded. Specifically, 2018 new patients were registered with neurologists in 2020, and 2161 in 2021, including 1424 women and 737 men.[11]

MS is a chronic neurodegenerative disease characterized by a wide range of symptoms and a high degree of unpredictable prognosis, which can seriously affect the patient's QoL.[12] The QoL in MS patients can be assessed from various perspectives, considering the diversity of determinants that contribute to the multidimensionality of this concept. Depression in MS patients, with a prevalence of 40–60%, occurs three to five times more frequently than in the general population. This prevalence is also significantly higher than in patients with other chronic illnesses. However, it is often underdiagnosed, partly due to its overlap with sleep disturbances, fatigue, and neurovegetative symptoms,[13] even though its core features include a sad mood, loss of joy, and diminished interest in everyday activities. Depression also indirectly affects cognitive functions, such as information processing speed and working memory. Therefore, depression serves as one of the key determinants influencing the QoL in MS patients.

The etiology of depression in MS patients is linked to pathophysiological changes in the brain as well as coexisting psychosocial variables.[14] Reliable diagnosis of depression in MS patients can be challenging, as MS itself may also cause some symptoms that form the basis of depression diagnosis. The development of depression in MS patients is sometimes a subjective reaction to the onset and progression of the disease. It may arise as a direct consequence of the pathological process, as a side effect of pharmacotherapy, or as a separate co-occurring condition. In many cases, its occurrence is multifactorial.[13,14] This psychological issue can significantly affect not only the mental but also the physical and social dimensions of QoL.

2. Materials and methods

2.1. Patient recruitment

This study aims to evaluate the association between the selected sociodemographic and clinical indicators and QoL in patients. In Slovakia, this study represents the first study for MS patients, as no similar research has been conducted in this region using a specific instrument for MS patients. The results enable comparison with findings from other studies. We employed a descriptive cross-sectional study design with purposive sampling of respondents. This study recruited 349 MS patients receiving outpatient care at the J.A. Reiman University Hospital with Polyclinic in Prešov and the Hospital with Policlinic in Bardejov from January 2022 to December 2022. Participation was voluntary, and all patients provided informed consent after being informed of the study's objectives.

The inclusion criteria for the study sample were as follows:

(i) Age 18 years or older
(ii) Diagnosed with MS according to the McDonald criteria[15]
(iii) Disease duration of at least 1 year
(iv) Provided written informed consent.

The exclusion criteria were as follows:

(i) Exacerbation of MS in the last month before the survey was conducted
(ii) The presence of another chronic disease and/or a psychiatric disorder.

2.2. Data collection method

Data were collected using a set of questionnaires. The following instruments were employed to capture various aspects of patients' health status and daily functioning:

(i) To assess the level of QoL in patients with MS, a disease-specific measurement tool—the MS QoL Questionnaire-54 (MSQOL-54)[16,17] was used, Added
(ii) The patient's disability was evaluated by a neurologist using the Expanded Disability Status Scale (EDSS)[18,19]
(iii) The presence of depression and depressive symptoms was assessed using the Beck Depression Inventory (BDI-II)[20,21]

(iv) To evaluate the capability of self-care, the Barthel Index for Activities of Daily Living (ADL)[22,23] was used.

Validated Slovak versions of all questionnaires were used. Their psychometric properties have been confirmed in previous studies.

2.3. Statistical analysis

For the analysis of sociodemographic indicators and other characteristics of the study sample, descriptive statistics were employed (absolute frequencies, percentage distributions, mean, standard deviation, median, mode, minimum, and maximum values). Pearson's correlation coefficient (r) was used to assess the relationship between variables. Finally, multiple regression analysis was applied to evaluate the composite scores of physical and mental health related to the independent variables. The statistical significance threshold of $p<0.05$ was applied to all statistical analyses. For statistical analysis, the Excel program (Microsoft Corporation, United States of America) was used along with the statistical software STATISTICA (Version 14.0.1, TIBCO Software Inc., United States of America).

3. Results

A total of 349 patients participated in our study. In terms of demographic data, women (64%) predominated in the research sample compared to men (36%). The most represented age category was 30–39 years (27%), followed by the 18–29 years of age group (22%). The average age of the MS patients in our cohort was 43.2 ± 9.7 years, with the youngest respondent being 18 years old and the oldest 66 years old. Regarding education, the majority were patients who had completed high school with a matriculation exam (67%), followed by those with a university education (25%), and those who had completed high school education without a matriculation exam (8%). Socio-demographic indicators show an overall employment rate of 64% (with 36% employed full-time, 14% part-time, and 14% students). For the 36% unemployed respondents, 15% were students. Most of the respondents lived with a partner (60%), and 54% of participants resided in a city. In terms of social support through a self-help group, 20% of respondents reported using this option (Table 1).

Table 1. Socio-demographic characteristics of respondents

Demographic data	*n* (%)	Min-max
Gender		-
Male	125 (36)	
Female	224 (64)	
Education		-
Basic	0 (0)	
Secondary education without matriculation	30 (8)	
Secondary education with matriculation	234 (67)	
University education	85 (25)	
Age (M±SD)	43.2±9.7 years	18–66 years
18–29 years	75 (22)	
30–39 years	96 (27)	
40–49 years	74 (21)	
50–59 years	59 (17)	
60–66 years	45 (13)	
Employment		-
Employed full-time	125 (36)	
Employed part-time	49 (14)	
Not working	124 (36)	
Studying	51 (15)	
Social support		-
With a partner	208 (60)	
Without partner	141 (40)	
Residence		-
City	189 (54)	
Village	160 (46)	
Membership of a self-help group		-
Yes	69 (20)	
No	280 (80)	
Duration of the disease (M±SD)	9.4±8.7 years	1–32 years
1–4 years	165 (47)	
5–9 years	89 (26)	
10–14 years	49 (14)	
15–20 years	42 (12)	
21–32 years	5 (1)	
Type MS		
Relapsing remitting MS	263 (75)	
Secondary progressive MS	49 (14)	
Primary progressive MS	22 (6)	
Undetermined type of MS	15 (4)	
Taking immunomodulatory therapy		-
Immunomodulatory therapy	293 (84)	

(Cont'd...)

The average duration of MS among our participants was 9.4 ± 8.7 years, with the largest group being respondents with a disease duration of up to 4 years (47%), followed by those with 5–9 years (26%), 10–14 years (14%), 15–20 years (12%), and 21–32 years (1%). Most of our respondents (84%) were receiving immunomodulatory treatment. In the analysis of the EDSS scores, the study population showed a value of 3.0 (with a standard deviation of 4.7). According to the ADL test, 58% of respondents were classified as

Table 1. ***(Continued)***

Demographic data	*n* (%)	Min-max
Without immunomodulatory therapy	56 (16)	
EDSS (M±SD)	3.0±4.7	0.0–8.0
Presence of relapse within the last year		
Yes	195 (66)	
No	154 (44)	
Level of self-care		-
Independent	204 (58)	
Partially independent	105 (30)	
Dependent	40 (12)	
BDI		
0–11	275 (79)	
12–26	53 (15)	
27–49	17 (5)	
50–56	4 (1)	

Abbreviations: BDI: Beck Depression Inventory; EDSS: Expanded Disability Status Scale; M: Mean; Max: Maximum value; Min: Minimum value; MS: Multiple sclerosis; SD: Standard deviation.

independent, 30% as partially independent, and 12% as dependent. Most of the participants suffered from relapsing-remitting MS (75%) and secondary progressive MS (14%). In 4% of respondents, the form of MS was not definitively determined. In the previous year (2021), 66% of respondents experienced an MS relapse (Table 1).

Regarding clinical indicators, the following data were collected from the respondents using the questionnaire: disease duration, level of functional status based on the EDSS assessment, level of self-care based on the ADL score achieved, type of MS, presence of relapses, and the method of MS treatment.

3.1. Use of immunomodulatory treatment

Most of the respondents in this study were undergoing immunomodulatory treatment. The comparative results indicate that patients receiving this type of treatment reported better ratings on the dimensions of the MSQOL-54 compared to respondents who did not receive such treatment. Significance was demonstrated in the areas of physical health, role limitations due to physical problems, social functioning, changes in health status, and sexual satisfaction. Statistically significant differences were also observed in both the physical composite score (FCS: $p<0.05$) and psychological composite scores (PCS: $p<0.05$).

3.2. Level of self-care

Self-care was assessed using the Barthel Index, categorizing the respondents as independent, partially independent, or dependent. Statistical comparisons revealed significant differences in perceived QoL across all measured dimensions of the MSQOL-54, except for the dimensions of emotional support and cognitive functioning. In our sample, the level of QoL decreased as the level of independence worsened. Statistically significant differences were also found in both the FCS ($p<0.001$) and PCS ($p<0.001$).

3.3. Depression

Analysis of the BDI data showed that 21% of respondents suffered from depression of varying severity (15% of respondents exhibited symptoms of mild depression, while 6% showed symptoms of moderate to severe depression). Using the BDI questionnaire, we examined the effect of the presence or absence of depressive symptoms on the QoL. Statistically significant inverse correlations were found between the BDI score and all dimensions of the MSQOL-54. It was also found that the severity of depressive symptoms correlated with negative ratings in all subscales of the measurement tool, reaching statistical significance of $p<0.001$.

3.4. Associations of QoL

Spearman correlations and multiple regression analysis were used to assess the impact of demographic and clinical characteristics on the FCS and PCS. Regression models were constructed using a stepwise entry method, with a significance threshold of $p<0.05$ for variable inclusion. Multicollinearity was assessed using the variance inflation factor, with all values below 2. Assumptions of normality and homoscedasticity for continuous outcomes were tested using the Shapiro-Wilk test and visual inspection of residual plots.

Table 2 presents the relationships between individual variables and the FCS. FCS showed a strong positive correlation with the PCS ($r = 0.85$, $p<0.001$) and was negatively correlated with depression severity (BDI: $r = -0.533$, $p<0.001$) and disability level (EDSS: $r = -0.54$, $p<0.001$). A strong positive correlation was observed between FCS and daily functioning (ADL: $r = 0.778$, $p<0.001$). Furthermore, higher physical health was associated with younger age ($r = -0.36$, $p<0.01$), higher education level ($r = 0.278$, $p<0.001$), and shorter disease duration ($r = 0.122$, $p<0.05$).

A better PCS was reported in patients without depressive symptomatology ($r = -0.655$, $p<0.001$). PCS also negatively correlated with EDSS score ($r = -0.688$, $p<0.001$) and level of self-care ($r = 0.123$, $p<0.01$). No correlations were found between mental health and age or disease duration. Depressive symptoms measured using the BDI were related to increasing age ($r = -0.236$, $p<0.001$). Moreover, patients

Table 2. Correlations between determinants of quality of life

Parameters	1	2	3	4	5	6	7
1. FCS	-						
2. PCS	0.850***	-					
3. BDI	−0.533***	−0.650***	-				
4. EDSS	−0.540***	−0.688***	−0.344**	-			
5. ADL	0.778***	0.123**	−0.220***	0.496***	-		
6. Age	−0.360**	−0.125	−0.233***	0.456***	0.486***	-	
7. Level of education	0.278***	0.149*	0.023*	0.033*	−0.206**	−0.157***	-
8. Duration of illness	0.122*	0.104	0.159*	0.486***	0.566***	0.455**	0.096

Notes: Results processed by Spearman correlations, *$p<0.05$; **$p<0.01$, ***$p<0.001$.
Abbreviations: ADL: Activity Daily Living; BDI: Beck Depression Inventory; EDSS: Expanded Disability Status Scale; FCS: Physical composite score; PCS: Psychological composite score.

Table 3. Multivariate regression analysis of quality of life predictors

Dependent variable	Predictor	β coefficient	95% CI	p-value
FCS	BDI	−0.420	−0.490, −0.350	<0.001
FCS	EDSS	−0.310	−0.380, −0.240	<0.001
FCS	ADL	0.610	0.540, 0.680	<0.001
FCS	Age	−0.180	−0.250, −0.110	0.004
FCS	Education	0.120	0.050, 0.190	0.021
FCS	Duration	−0.070	−0.140, 0.000	0.051
PCS	BDI	−0.580	−0.650, −0.510	<0.001
PCS	EDSS	−0.390	−0.460, −0.320	<0.001
PCS	ADL	0.490	0.420, 0.560	<0.001
PCS	Age	−0.150	−0.220, −0.080	0.007
PCS	Education	0.100	0.030, 0.170	0.034
PCS	Duration	−0.060	−0.130, 0.010	0.062

Notes: Results processed by regression analysis, *$p<0.05$; **$p<0.01$, ***$p<0.001$.
Abbreviations: ADL: Activity Daily Living; BDI: Beck Depression Inventory; EDSS: Expanded Disability Status Scale; FCS: Physical composite score; PCS: Psychological composite score.

with a secondary school education were characterized by a higher severity of depressive symptoms than patients with a university education ($p=0.023$, $p<0.05$). The relationship between depressive symptomatology and both increasing age and longer disease duration was also confirmed. A significant correlation was also confirmed for BDI versus EDSS ($r = -0.344$, $p<0.01$) and ADL ($r = -0.220$, $p<0.001$). EDSS and ADL significantly correlated with all variables, indicating that patients with older age and longer disease duration were associated with a lower level of functionality and self-care ($r = 0.496$, $p<0.001$). Similar relationships were found in the areas of mental (EDSS: $r = -0.688$, $p<0.001$; ADL: $r = 0.123$, $p<0.01$) and physical health (EDSS: $r = -0.54$, $p<0.001$; ADL: $r = 0.778$, $p<0.001$).

As presented in Table S1 for the FCS and PCS, we conducted multiple regression analyses among the selected QoL indicators. Both composite scores were analyzed based on three models that incorporated sociodemographic and clinical determinants of QoL, including gender, age, cohabitation with a partner, social support from a self-help group, education, employment, disease duration, disease course, presence of relapses in the last year, EDSS score, BDI, and ADL. The multivariate linear regression identified several significant predictors of both the physical (FCS) and psychological (PCS) components of QoL in patients with MS.

3.5. Physical component of QoL

Significant negative predictors included depressive symptoms (BDI: $\beta = -0.420$, 95% confidence interval [CI]: −0.490–−0.350, $p<0.001$), degree of disability (EDSS: $\beta = -0.310$, 95% CI: −0.380–−0.240, $p<0.001$), and age ($\beta = -0.180$, 95% CI: −0.250–−0.110, $p=0.004$). The strongest positive predictor was functional independence in ADL ($\beta = 0.610$, 95% CI: 0.540–0.680, $p<0.001$). Higher education was also associated with slightly better FCS ($\beta = 0.120$, 95% CI: 0.050–0.190, $p=0.021$). Disease duration showed only a borderline significant negative effect ($\beta = -0.070$, 95% CI: −0.140–0.000, $p=0.051$) (Table 3).

3.6. Psychological component of QoL

The strongest negative predictor of PCS was depressive symptoms (BDI: $\beta = -0.580$, 95% CI: −0.650–−0.510, $p<0.001$). Higher disability level also played a significant role (EDSS: $\beta = -0.390$, 95% CI: −0.460–−0.320, $p<0.001$), as did older age ($\beta = -0.150$, 95% CI: −0.220–−0.080, $p=0.007$). Conversely, greater functional independence in ADL was a strong positive predictor of PCS ($\beta = 0.490$, 95% CI: 0.420–0.560, $p<0.001$). Higher education showed a weaker but statistically significant positive effect ($\beta = 0.100$, 95% CI: 0.030–0.170, $p=0.034$). Disease duration was not a significant predictor of PCS ($\beta = -0.060$, 95% CI: −0.130–0.010, $p=0.062$) (Table 3).

The findings indicate that depressive symptoms and neurological disability are the most important negative factors affecting both components of QoL. Functional independence (ADL test value) emerged as the strongest protective factor. Demographic variables, such as age and education, had weaker but significant effects, while disease duration proved to be a relatively weak and non-significant predictor. Detailed results are presented in Table S2.

4. Discussion

MS is one of the most exhausting diseases in young adulthood, impacting the QoL in patients. This low QoL can lead to ineffective coping and adaptation mechanisms, thereby increasing stress and exacerbating disease symptoms.[24,25]

In general, several factors can significantly deteriorate or enhance the QoL in patients with MS. Studies indicate that QoL in people with MS is largely determined by physical factors, including the severity and duration of the disease, overall weakness, disability, adaptation, and walking impairments.[26] Other findings show that mood disorders, poor QoL, perceived fatigue,[27] depression, anxiety, sleep problems, pain, and sexual dysfunction[28,29] are among the common psychological issues in patients with MS. These issues subsequently affect the overall treatment process and reduce patients' active participation in their treatment.[30,31]

The subjective feedback provided by the patient enables healthcare personnel to improve cooperation with the patient and thus increase their adherence to treatment by adapting to the patients' legitimate needs. An alternative perspective on the disease course and the patients' QoL is the evaluation provided by family members and caregivers of affected individuals. These evaluations are very often different from the patients' own assessments, and it is known that caregivers usually rate QoL more pessimistically—and ultimately worse—than the patients themselves.[32,33]

This study aims to determine, within the Slovak population of MS patients, the level of QoL using a disease-specific instrument for this type of chronic disease (MSQOL-54), and to compare the obtained results with those of similar studies. In this study, we found statistically significant associations between the MSQOL-54 subscales, the FCS and PCS, and other clinical and demographic factors, including age, gender, disease duration, level of self-care, education, and the presence of relapses over the previous year (2021).

Assessing QoL and the consequences of functional and mental states is equally important for healthcare professionals as well as the patients themselves. Such evaluation helps in taking measures to improve and stabilize patients' physical and mental conditions, thereby enhancing patients' perspectives of their lives.[34] However, assessing and analyzing QoL in patients with MS is a challenging task because it is a complex and inherently subjective concept.[35] Over the years, several studies have identified various factors that negatively affect health-related QoL in these patients.

Gil-González *et al.*[12] conducted a systematic review of 106 studies on predictors of QoL in individuals with MS, identifying both protective and risk factors. The EDSS score was one of the primary factors that deteriorated QoL. Disease duration, a progressive disease phenotype, a progressive onset of MS, and the presence of relapses in the last 3 months were other relevant factors that negatively affected QoL. Several studies found a significant relationship between the severity and number of symptoms and a decline in QoL in MS. Fatigue was identified as the primary risk factor. Numerous studies reported the importance of sensory and motor dysfunctions on QoL, including paralysis, difficulties with walking, balance problems, stiffness, and cramps as motor issues. Pain, spasticity, and reduced sensory sensitivity in patients were emphasized. A negative impact on QoL was also found with various cognitive disorders, such as cognitive fatigue, memory loss, and planning/organizational dysfunction. These symptoms were classified as significant risk factors in several studies.[36-43]

One of the objectives of our study is to assess the impact of disease characteristics, such as the type of MS, disease duration, disease course, the occurrence of relapses, EDSS, and ADL, on the physical and mental dimensions of QoL in MS patients. Our findings, based on regression analysis, indicate that disease characteristics are important factors related to both physical and mental health components. According to our results, there is a significant relationship between demographic factors and QoL in patients with MS. In our study, we found significant relationships between physical health level and age, cohabitation with a partner, education, and employment (models 1 and 2). Demographic indicators, such as gender and social support from a self-help group, were not associated with the FCS. Model 3, in which we included all measured demographic and clinical indicators, achieved the greatest variance and demonstrated a statistically significant relationship with higher education, employment, lower EDSS and BDI scores, and higher ADL ratings as predictive factors influencing the FCS (Figure S1).

Gil-González *et al.*[12] reports the favorable influence and harmful impact of emotional stability on QoL. The most studied emotional symptom in the literature was depression, followed by anxiety. Both symptoms were confirmed as risk factors for QoL in MS. In addition to the clinical health status, the QoL in patients is affected by a multitude of complex social, psychological, and contextual factors. Identification of these factors is an important goal to improve the QoL in MS patients.[25] Studies show that MS patients experience a reduction in QoL due to psychosocial problems, such as sexual dysfunction, bowel problems, feelings of impotence and shame, and social stigma.[31]

Our study explored the determinants of QoL in patients with MS, examining both FCS and PCS. Multiple regression analyses revealed that clinical factors, particularly EDSS, ADL, BDI, presence of relapse, and progressive disease course, were consistently significant predictors of QoL. These findings indicate that the degree of disability, functional limitations, and depressive symptoms are central to patients' physical and psychological well-being. Education emerged as a robust predictor across all models, suggesting that higher educational attainment may buffer against the negative impact of disease on QoL, possibly through better disease understanding, access to resources, and coping strategies.

Sociodemographic variables, such as gender, age, and cohabitation status, showed weaker or inconsistent effects. This observation likely reflects the fact that clinical severity and education level overshadow the influence of these sociodemographic factors. Social support appeared to have a modest impact on psychological QoL in some models, although this effect was not consistent, highlighting the need for more detailed assessment of psychosocial resources.

Notably, the explained variance was moderate for physical QoL but lower for psychological QoL, suggesting that additional unmeasured factors—such as fatigue, coping strategies, environmental stressors, and social determinants—contribute to psychological well-being. The relatively low predictive power of PCS underscores the complexity of psychological outcomes in MS and the importance of comprehensive assessments beyond standard clinical measures.

Gil-González *et al.*[12] listed among the positive predictors from sociodemographic indicators, employment, job satisfaction, and the adaptation of work conditions to the disease, all of which positively correlate with QoL. Conversely, unemployment, low socioeconomic status, and financial difficulties were identified as risk factors for a lower level of QoL. Other socio-demographic variables associated with poorer QoL in MS include male gender, older age, being single or living with other significant persons, with higher education serving as a protective factor.[44,45]

The above findings from our study, as well as those from the previous studies, underline the importance of clinical, psychological, and demographic variables as risk and protective factors for QoL. Among the recommended interventions arising from our results is the need to assess QoL in MS patients using appropriate instruments. Effective QoL evaluation requires careful consideration in choosing assessment tools and how they are used in both research and clinical practice. It is therefore necessary to continue validating instruments for our population of MS patients, and further improvement of the existing instruments is needed.

This study has several limitations: the cross-sectional design prevents causal inferences, the participants from outpatient clinics in a specific region of Slovakia may introduce selection bias, and reliance on self-report questionnaires carries the risk of reporting bias.

5. Conclusion

The findings indicate that the QoL in MS patients is lower than in the healthy population. It is therefore important to recognize that the disease can affect multiple areas of life and, in its progressive form, significantly impact the physical, psychosocial, and spiritual dimensions—ultimately affecting the overall perceived QoL. Like other chronic diseases, MS affects not only the patient but also their social environment. Therefore, healthcare should be provided with an individualized and holistic approach.

Acknowledgments

None.

Funding

This study was conducted within the project KEGA-015PU-4/2024 titled "Application of New Methods in Teaching of Future Health Professionals for Improving Self-management of Patients Towards Their Health."

Conflict of interest

The authors declare they have no competing interests.

Author contributions

Conceptualization: Ludmila Majerníková
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Ethics approval and consent to participate

This work was approved by the Ethics Committee of the J.A. Reiman University Hospital with Polyclinic and the Ethics Committee of the Hospital with Polyclinic in Bardejov, Slovakia (Approval ID: NO: 521/2021/OZ-024). All the work related to this cross-section study was by the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent for publication

All participants provided informed consent for the publication of the findings derived from this study. Where applicable, participants gave explicit permission for the publication of any data, images, or information that could potentially reveal their identity. The authors affirm that all relevant consent forms have been obtained and are available upon request.

Availability of data

Data are available upon request from corresponding author.

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