Research Article

Correlation between Expanded Disability Status Scale, Depression, Quality of Life and Age in Patients with Multiple Sclerosis

*Nexhat Shatri, Nazim Dakaj, Afrim Blyta, Kamber Zeqiraj and Enver Isaku

University Clinical Center of Kosova Prishtina

*Corresponding Author E-Mail: drshatri@gmail.com

Abstract

Introduction: The purpose of the study is to investigate correlation between the expanded disability status scale, depression, quality of life (QoL) and age as well as to investigate the impact of the interferon beta-1b in the QoL of MS patients and its possible depressogenic effect. Material and methods: This prospective study included 70 randomly selected patients with MS treated in the clinic of Neurology at University Clinical Center of Kosova in Prishtina, from January 2011 - December 2013. All patients fulfilled the MS McDonald criteria (2010). The diagnosis of depression is made based on the criteria of DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) and depression rate is measured by the Beck Depression Inventory (BDI). The degree of disability is determined by the EDSS (Expanded Disability Status Scale) and QoL is assessed using specific questionnaire SF-36 (Medical Outcomes Study Short Form 36-item Questionnaire). Results: The statistically positive correlation is found between EDSS and depression and EDSS and age. The significant negative correlation is found between EDSS and QoL as well as between depression and QoL. No impact of interferon beta-1b on QoL is found. The depressogenic effect of interferon beta-1b is not clear. Conclusion: The level of disability and the level of depression have an impact on the QoL in MS patients. EDSS is positively correlated with depression and age and negatively correlated with QoL. Depression is also negatively correlated with QoL.

INTRODUCTION

Neuropsychiatric disorders in general and particularly depression are encountered for the main causes of disability worldwide (World Health Report, 2001). The presence of psychiatric symptoms in patients with multiple sclerosis has been known since the nineteenth century, when Charcot, in his lectures in Salpeˆtrie`re hospital introduced for the first time the clinical - pathological description for "disseminated sclerosis" (Charcot, 1879).

Depression is a symptom that is very often seen to be present in multiple sclerosis patients. Most comparative studies have reported higher rates of depression among groups of patients with MS compared with groups of patients with other chronic diseases, including other neurological diseases (Minden et al., 1987; Schiffer and Babigian, 1984). During the life span of patients with MS, the risk of manifesting depressive spectrum disorders is very high (Minden and Schiffer, 1990). Many studies have shown that the frequency of appearance of depression in patients with multiple sclerosis ranges from 40-60 % (Bakshi et al. 2000; Minden et al. 1990). The point prevalence of major depressive syndrome in people with MS is around 14 % but can be even higher (Chwastiak et al., 2002).

According to some studies, the causes responsible for the changes in the mood of patients with multiple sclerosis should be seen in the process of their adaptation to this chronic illness.

In terms of early detection as well as the successful treatment of it, depression is a big challenge (Schiffer et al., 2003). Management of depression in a disorder like MS is very important. Except that depression is very common

clinical manifestation in patients with MS, it is also one of the main determinants of the quality of life of these patients (D'Alisa et al., 2006). Depression can further compromise cognitive functions in patients with MS and may lead to suicidal attempt (Arnett et al., 1999; Feinstein, 2002). If not treated, the social relationship between patients with MS and their environment can be disturbing (Maybury and Brewin, 1984). In another hand, treating depression improves adherence to therapy with interferon beta- 1b for the treatment of MS (Mohr et al., 1997). Numerous studies show that depression is often overlooked and, even if detected, is not adequately treated (Mohr et al., 2006). Contradictory data are reported regarding the impact of IFN-β therapy in QoL of MS patients. Some studies have found beneficial influence of IFN-β therapy on QoL (Rice et al., 1999, Arnoulds et al., 2000) while other study showed that treatment with IFNB did not significantly improve QoL (Schwartz et al., 1997).

Some studies suggest that interferon medications may be related to increased risk for depression among patients with MS (Neilley et al., 1996; Goeb et al., 2006), while other studies have not found a relationship between interferon treatment and depression in MS (Kim et al., 2012; Mohr et al., 1999).

MATERIAL AND METHODS

During the period January 2011 - December 2013 we evaluated 70 randomly selected patients with multiple sclerosis. Of these 70 patients, 42 patients were under the treatment with immunomodulatory therapy (interferon beta-1b) and they were coming every month in the Clinic of Neurology in Clinical University Center of Kosova in Prishtina to get supplied with monthly quantity of the therapy. The other 28 patients were from a waiting list (for interferon beta-1b). So, these 28 patients were not under the treatment with interferon beta-1b at the time of the study. None of the patients, from both groups, included in the study was receiving any anti-depressive therapy.

All patients included in the study met the McDonald et al. (2010) criteria for multiple sclerosis. The diagnosis of depression is made based on the criteria of DSM - IV (Diagnostic and Statistical Manual of Mental Disorders) and depression rate is determined based on the Back Depression Inventory - BDI. This questionnaire contains 21 groups of statements that describe the way the patients have been feeling during the past two weeks, including the examining day as well. All patients underwent complete clinical neurological examination and the level of disability was evaluated using the Expanded Disability Status Scale - Kurtzke et al., 1983 - EDSS). Patients' quality of life (QOL) is evaluated using special questionnaire SF - 36 (Medical Outcomes Study Short Form 36 item Questionnaire). Through this questionnaire there were assessed 8 domains of life: physical functioning; role limitations due to physical health; role limitations due to emotional problems; energy/fatigue; emotional well-being; social functioning; pain; and general health. The results of the study are analyzed using the SPSS program, version 16.

Correlation between EDSS and depression (BDI), EDSS and quality of life (QOL), EDSS and age as well as correlation between depression (BDI) and quality of life (QOL) for all 70 patients was evaluated using Spearman's rank correlation test. Statistical significance is calculated by the Student test, while p -values < 0.05 are considered statistically significant.

RESULTS

The study included 70 patients diagnosed with clinically definite multiple sclerosis from whom 45 (64 %) were female and 25 (36 %) were male (Figure 1).

Figure 1. Distribution of Patients with MS according to Gender
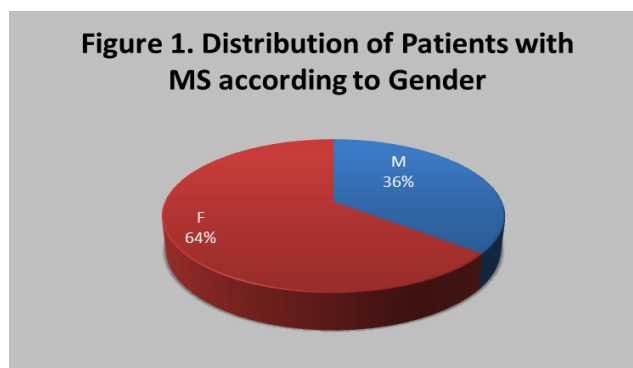
The average age of patients at the time of study was 37.04 years (SD ±9.01). The average age of male patients was 36.9 years (SD±7.59), whereas for women it was 37.1 years (SD±9.79).

When analyzing the course of the disease, 87% of patients were with relapsing – remitting and 13% with secondary progressive form of multiple sclerosis. None of the patients were with the primary progressive form of the disease.
The average value of the EDSS score was 3.2 (min 1 and max 8; SD±1.88). In male patients the average value of EDSS score was slightly lower than in females (3.2 to 3.3 respectively), but there was no statistically significant difference of EDSS between the gender (t =-0.288; p = 0.775, at p < 0.05). The average score of BDI was 15.3 (min 0, max 45 points; SD±7.72). The average BDI score for male patients was slightly higher (15.4) compared to females (15.2) (Figure 2).

Figure2. Mean BDI scores of the patients according to the gender
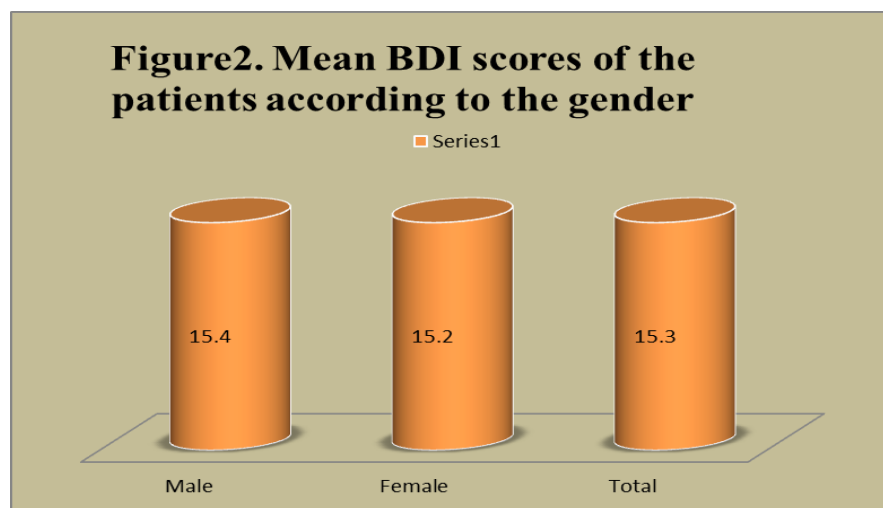
However there was no statistically significant difference of BDI score between gender (t=-0.404; p=0.689, at p<0.05 level). Out of the 70 patients included in the study, 51 (73%) manifested symptoms of depression of varying levels. Thus, 21 (30%) had mild mood disturbance (BDI score 11-16), 30 (43%) have demonstrated clinical depression (BDI score ≥17), and other 19 (27%) patients have manifested ups and downs within normal range (BDI score 1-10) (Table 1).

Table 1. The level of depression in MS patients distributed according to the gender

| Level of depression | Gender | | | | | |
| | Male | | Female | | Total | |
	N	%	N	%	N	%
Ups and downs within normal range (1-10 score)	5	26	14	74	19	27
Mild mood disturbance (11-16 score)	7	33	14	67	21	30
Borderline clinical depression (17-20 score)	10	50	10	50	20	29
Moderate depression (21-30 score)	2	29	5	71	7	10
Severe depression (31-40 score)	0	0	1	100	1	1
Extreme depression (>40 score)	0	0	2	100	2	3
Total	24	34	46	66	70	100

The results of our study show that the rate of depression, evaluated with Beck Depression Inventory is positively correlated with the level of disability (EDSS) (rho =0.740; p =0.000) and negatively correlated with quality of life (QOL) (rho=-0.691; p=0.000) (Table 2 and 3). Patients with higher rates of depression (BDI score ≥ 17) had a significantly lower percentage of quality of life 51.3%, compared with those with lower rates of depression (BDI score 11-16) 67.5%, and those without signs of depression 77.9% (BDI score 1-10).

Table 2. Correlation between Expanded Disability Status Scale (EDSS) and Depression (BDI)

Correlations			EDSS	BDI
Spearman's rho	EDSS	Correlation Coefficient	1.000	.740[**]
		Sig. (2-tailed)	.	.000
		N	70	70
	BDI	Correlation Coefficient	.740[**]	1.000
		Sig. (2-tailed)	.000	.
		N	70	70
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 3. Correlation between depression (BDI) and quality of life (QOL)

Correlations			BDI	QoL
Spearman's rho	BDI	Correlation Coefficient	1.000	-.691[**]
		Sig. (2-tailed)	.	.000
		N	70	70
	QoL	Correlation Coefficient	-.691[**]	1.000
		Sig. (2-tailed)	.000	.
		N	70	70

**. Correlation is significant at the 0.01 level (2-tailed).

A significant negative correlation is found between EDSS and quality of life, showing that higher levels of EDSS score are associated with significant reduction in the percentage of the total quality of life (rho=-0.718; p = 0.000) (Table 4).

Table 4. Correlation between Expanded Disability Status Scale and quality of life (QOL)

Correlations			EDSS	QoL
Spearman's rho	EDSS	Correlation Coefficient	1.000	-.718[**]
		Sig. (2-tailed)	.	.000
		N	70	70
	QoL	Correlation Coefficient	-.718[**]	1.000
		Sig. (2-tailed)	.000	.
		N	70	70

**. Correlation is significant at the 0.01 level (2-tailed).

Results of the study showed that there is positive correlation between the level of disability (EDSS) and age, indicating that older patients with multiple sclerosis have higher values of EDSS (greater disability) (rho=0.757; p=0.000).
Out of the 70 patients included in the study 42 (60%) patients were being treated with interferon beta-1b and 28 (40%) other patients at the time of the study were not on interferon beta-1b therapy. The average age of patients treated with interferon beta-1b was 37.25 years (SD ± 9.03), the mean disease duration was 9.89 years (SD ± 4.96), mean EDSS 3.23 (SD ± 1.92) and the mean QoL 63.6% (SD ± 20.13). In patients not treated with interferon beta-1b the mean age was 35.8 years (SD ± 9.28), the mean disease duration 7.9 years (SD ± 6.94), the mean EDSS 3.05 (SD ± 1.77) and the mean of QoL was 54.6 % (SD ± 17.94) (Table 5). Although the mean percentage of QoL in patients treated with interferon beta-1b was higher compared to the mean percentage of QoL in patients not treated with interferon beta-1b, Student test did not show any statistically significant difference in the QoL between patients treated with interferon beta-1b and those untreated (t = -0.783; p = 0.454, at p < 0.05).

Table 5. Clinical and demographic characteristics of patients treated and those untreated with interferon beta-1b

Classification of patients	No (%)	Gender		Mean age (SD)	The mean disease duration (SD)	Mean EDSS (SD)	Mean QoL	Mean BDI (SD)
		M (%)	F(%)					
Patients treated with interferon beta-1b	42 (60)	16 (38)	26 (62)	37.25 (± 9.03)	9.89 (± 4.96)	3.23 (± 1.92)	63.6% (± 20.13)	14.7 (±7.44)
Patients not treated with interferon beta-1b	28 (40)	6 (20)	22 (80)	35.8 (±9.28)	7.9 (± 6.94)	3.05 (± 1.77)	54.6 (± 17.94)	13.1 (±5.74)
Total	70	22	48					

No – Number
M – Male
F – Female
SD – Standard Deviation
EDSS – Expanded Disability Status Scale
QoL – Quality of Life
BDI – Back Depression Inventory

The mean scores on the BDI in patients with MS treated with interferon beta-1b has been somewhat higher (14.7; SD±7.44) compared with the mean scores of patients who were not treated with interferon beta-1b (13.1; SD±5.74) (Table 5). However, the Student test did not show any statistically significant difference in the level of depression between the patients treated and those not treated with interferon beta-1b (t = -0.573, p = 0.581, at p < 0.05).

DISCUSSION

Numerous studies have shown that depression is a very common disorder that is encountered in patients with multiple sclerosis. For the diagnosis of depression among five symptoms must be included: sadness, depressed mood, and loss

of interest and pleasure in usual activities of life (American Psychiatric Association, 2000). Review of affective disorders in patients with multiple sclerosis, in 1990, has revealed that the majority of studies have reported that depressive symptoms have higher incidence and prevalence in patients with multiple sclerosis compared with patients with other neurological diseases (Schiffer, 1990). Studies have also shown that the prevalence of depression in multiple sclerosis is higher compared with groups of patients with other chronic diseases (Siegert et al., 2005).

Prevalence of depressive disorders ranges 27 % -75 %, while in MS patients it is between 47% and 54 % (Fisher et al., 1994; Arnett et al., 2006). The presence of depression among our MS patients was 43%, which is lower than that reported in the studies cited above. According to the results of our study out of 30 (43%) patients with multiple sclerosis who manifested symptoms of clinical depression, 3 (10%) have manifested severe and extreme depression. The average value of BDI scores of patients in our study was 15.3, which is within the current gold standards for the diagnosis of depressive disorders in people with multiple sclerosis according to the Goldman consensus group (cut - off score 13 in Beck inventory). In our study a positive correlation resulted between EDSS and depression (rho=0.740, p=0.000). A positive correlation between depression and EDSS is also found in a study in Serbia (Miletic et al., 2010), while in another study conducted in Bosnia and Herzegovina there was no correlation obtained between EDSS and depression (Alajbegovic et al., 2009). The results of our study show that people with higher values of depression (BDI score ≥ 17) have significantly lower average of quality of life (51.3%) compared with those with lower values of depression (67.5%) and those without symptoms for depression (77.9%).

Many studies have explored the relationship between EDSS and QoL in MS patients. Results from several studies indicate a strong correlation between disability and QoL (30,31). The results of our study have shown that the overall QoL was significantly lower in patients with high EDSS score. The Spearman's rank correlation test in our patients showed that EDSS is in a significant negative correlation with QoL (rho=-0.718; p=0.000). Approximately, same results, regarding correlation of EDSS and QoL were obtained in a study conducted in Serbia (Feinstein et al., 2002). Our study revealed a negative correlation between BDI and QOL as well (rho=-0.691; p=0.000). Positive correlation was found between EDSS and age (rho=0.757; p=0.000) and that correlation is evident in many other studies in the world and the region.

Some authors reported a beneficial influence of IFN-β therapy on QoL (Rice et al., 1999; Arnoulds et al., 2010). Nevertheless, other study showed that treatment with IFNB did not significantly improve QoL (Schwartz et al., 1997). There are some other studies that report even that treatment with IFNB had a negative impact on QoL over the time in MS patients because of adverse effects related to treatment (Arnoulds et al., 2000; Nortvedt et al., 1999) and short-term treatment did not affect the QoL (Simone et al., 2006). Even if, in our study the mean of the QoL in patients treated with interferon beta-1b was higher compared to the mean of the QoL in patients not treated with interferon beta-1b, Student test did not show any statistically significant difference in the QoL between patients treated with interferon beta-1b and those untreated (t = -0.783; p = 0.454, at p<0.05).

The relationship between immunomodulatory drugs and depression is still under debate with some studies suggesting that interferon medications may be related to increased risk for depression among patients with MS (Neilley et al., 1996; Goeb et al., 2006). Several other studies have not found a relationship between interferon treatment and depression in MS (Kim et al., 2012; Feinstein et al., 2002; Mohr et al., 1999).

In our study the mean scores on the BDI in MS patients treated with interferon beta-1b has been somewhat higher (14.7; SD±7.44) compared with the mean scores of patients who were not treated with interferon beta-1b (13.1; SD±5.74). However, no evidence of increased depressive symptomatology was observed in association with interferon beta-1b with Student test (t=-0.573, p=0.581, at p < 0.05).

CONCLUSION

The results of our study indicate that older patients with multiple sclerosis have higher rates of EDSS. Depression is correlated with EDSS and QoL. Depression reduces the QoL of MS patients. Therefore, early detection and adequate treatment can improve the QoL of patients with MS. Results from our study support the hypothesis that immunomodulatory therapy, in our case interferon beta-1b, does not improve the quality of life in patients with SM. The particular concern regarding depressogenic effect of IFNβ-1b is not established Clinicians who deal with the treatment of patients with MS should estimate that they will be often faced with affective depressive disorders in patients with multiple sclerosis and that these disorders do not go away spontaneously therefore should be treated appropriately.

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