QUALITY OF LIFE VALIDITATION IN PATIENTS WITH MULTIPLE SCLEROSIS BEFORE AND AFTER THERAPEUTIC PHYSICAL TREATMENT

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Abstract- INTRODUCTION: Multiple sclerosis (MS) is a chronic inflammatory, non-communicable, progressive multifocal demyelinating autoimmune disease of central nervous system (CMS) which can be noticed by various neurological symptoms. The objective of our study is to find out the influence of physical therapy in patients with multiple sclerosis and importance of physical therapy for quality of life in the persons with multiple sclerosis. **METHODS:** In the research were included 60 data subjects who satisfied the criteria for inclusion in the research. The subjects were divided in two almost equal groups (n=30). In the group I are the subjects who had not any physical treatment in the prior year while in the group II are the subjects who had undergone therapeutic physical therapy. The quality of life of the patients with multiple sclerosis in both examined groups, was evaluated by MSQUL-54 questionnaire, which is a multidimensional measure of quality of life related to health which connects generic and MS-specific items in one instrument. **RESULTS:** Concerning the gender, in both groups were predominant female subjects i.e. 63,3% in the group I and 70% in the group II. The physical therapy had no influence on the limitations of their daily routine and it was not found any statistically important difference between the group I and the group II. However, the physical therapy showed a positive effect in the group II at performance of daily routine, connected to failing health, related to the quantity of time during their work p=0.019, while the subjects of the group I, according to this statistics, achieve significantly less than they would like p=0.038. **CONCLUSIONS:** In most segments of the quality of life, better results were showed in subjects who had undergone physical therapy.

Index Terms— Multiple Sclerosis, Physical Therapy, Quality of Life, MSQOL-54

1 INTRODUCTION

Multiple sclerosis (MS) is neurodegenerative demyelinising disease of central nervous system (CNS) with clinical and radiological heterogenicity for which a pathognomic biomarker yet has not been found. Therefore, the atypical appearances of MS may present a diagnostic challenge, especially with the patients who in the beginning of the disease do not correspond to the classic pattern of a clinically isolated syndrome (CIS) and/or those who do not satisfy McDonalds criteria for 2010 (1). MS is among the most common, most difficult and most important neurological diseases. This is due to its frequency, chronicity and the tendency to attack younger adults (mostly between 20 and 40 years of age) (2). The symptoms mostly (85 - 90%) occur in attacks (exacerbations or relapse) or slowly progressive over time (3). Exacerbation are clinical reflection of an inflammatory action in CNS, taking place in an unexpected way, interceded by immune mechanism (4). The incidence of the disease is about 7 cases per 100,000 population every year, and the prevalence in European countries ranges between 80 and 120 per 100,000 population (5).

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Autoimmune reaction with formation of antibodies to myelin is also possible cause of multiple sclerosis as thereby also had been confirmed presence of activated T lymphocytes reactive to myelin basic protein in blood, cerebrospinal fluid and in MS lesions, as well as clonal multiplied B lymphocytes and high levels of locally synthesized immunoglobulins and oligoclonal antibodies in the cerebrospinal fluid (6). Genetic predisposition, environment, exposure to agents, vascular abnormalities, metabolic disorders, congenital and psychological disorders, and tumors are also considered to be grounds of the disease. (7). Geographic frequency of multiple sclerosis increases from ecuador to moderate climatic zones in the north. It occurs more often in men than in women. It usually occurs at the age of about 30 years. The disease is less common in other races than in white race (8).The symptoms of MS, such as weakness and loss of sensitivity, that are directly related to demyelinising and nerves loss, along with other symptoms such as depression or asociality, can lead to inactivity and deactivating, which significantly affects the quality of life of a person with MS (9). An incorrect diagnosis may also have negative clinical and financial impacts on such patients and

the health system (10.) Quality of life comprises a very wide spectrum of areas, including individual and psychological health and functioning, psycho-social well-being, psychological features, the role of psychological and social functioning, social support and resources, independence, autonomy and inspection over life, material and financial status, social capital of a community and the external environment and including the political structure of life (11).The loss of the ability to move does not only have a physical effect on the patient, but also psychological effect, which can cause a distortion of self-image: transforming a young healthy person to a sick disabled person in need of physical therapy (12). Multiple sclerosis is a disease where there is no restoration of health, but with proper therapy can be diminished symptoms and improve quality of life of a patient (13). Rehabilitation is defined by the World Health Organization as "a set of measures that help individuals with disabilities or those in whom it will likely arise, to achieve and maintain optimum functioning in interaction with their surroundings" (14). Rehabilitation is an important service aimed, at working with patients, to identify their needs, providing support and assistance to such patients to restore the necessary health and independence for maintaining of a good quality of life (15). An important role in preserving such patients' abilities are also different rehabilitation procedures. A working group, consisting of a doctor, a physiotherapist, an occupational therapist, a speech therapist, a psychologist, a social worker and a nurse, plans and performs complete rehabilitation (16). Having in mind that MS is a chronic disease a treatment plan should be flexible and anticipate the needs of the patient which can occur only in the future. The physical therapist should take into account not only the changes that will occur due to the progression of the disease, but also life changes such as a possible employment, pregnancy and childbirth, parenting and aging. The physiotherapy principles in multiple sclerosis are described by Ashburn and DeSouza (1988). Mostly used physical procedures are kineziotherapy (alloted active exercises and stretching), electrotherapy (electro-stimulation) and hydrotherapy.

The aim of the study is to determine the age and gender structure, the ability to perform daily professional tasks, the influence of physical therapy and to examine quality of life of patients with multiple sclerosis in those who had physical treatment compared to those who had not. Comparison of their magnetic resonance findings was made for all study subjects before and after the treatment conducting.

2 METHODS

The research is prospective. The data required for research, general patient information and the completed MSQOL-54 questionnaire were obtained by direct patient communication and personal questionnaire filling in. The study was conducted in Association of Patients with Multiple Sclerosis in Sarajevo Canton and Health Spa Aquaterm Olovo and was carried on from 05.03.2017 to 01.08.2017. The research was conducted in the Association of Patients with Multiple Sclerosis in Sarajevo Canton and Health Spa Aquaterm in Olovo and was conducted from 05. March 2017 to 08. January 2017. In the research took part 60 subjects who are members of the Association of Patients with Multiple Sclerosis:

- Study Group (Group I): 30 subjects who did not undergo physical therapy in the last year;
- Control Group (Group II): 30 subjects who had physical therapy in the last year in the Health Spa Aquaterm Olovo.

In addition to the general data, in the study was used the standardized questionnaire MSQOL-54.

MSQOL-54 is a multidimensional health-related quality of life measurement that combines both generic and MS-specific items in one instrument. This 54-items Instrument generates 12 subclasses with two summaries and two additional measures of one element. Subclasses are: physical function, physical role limitations, emotional role limitations, pain, emotional well-being, energy, perception of health, social function, cognitive function, health anxiety, overall quality of life and sexual function (17). We made overview of the magnetic resonance imaging made for all patients, before and after the end of the physical therapy according to the standard protocols for multiple sclerosis.

3 RESULTS

By research results analysis was not documented any statistically significant difference in gender structure of data subjects, $\chi 2 = 0.300$; $p = 0.785$. In both groups predominant are female subjects, i.e. 63.3% in Group I and 70% in Group II.

Table 1. Gender structure of data subjects

			GROUP		TOTAL
			Group I	Group II	
Gender	Male	Number	11	9	20
		%	36.7%	30.0%	33.3%
	Female	Number	19	21	40
		%	63.3%	70.0%	66.7%
TOTAL		Number	30	30	60
		%	100%	100%	100%

Also, there was not documented a statistically significant difference in the number of subjects in the examined groups concerning the age, $\chi 2 = 2{,}541$; $p = 0.111$. In the age group of 18-30 years, there were three subjects in each of the both examineted groups. In the age group of 31-40 years there were 8 subjects in the Group I and 4 in the Group II. In the Group I there were 13 subjects of aged 41-50 and in the Group II the number was 9. In the oldest age group of 51 years and above it, there were 6 subjects in the Group I and 14 subjects in the Group II. Out of the total number of subjects of both groups,

the waking aids used 20 subjects in the Group I and 21 subjects in the Group II ($\chi 2 = 0.076$; $p = 0.500$). Visual problems had, statistically of significance, more the subjects in the Group II (n = 24) than in the Group I (n = 16), $\chi 2 = 4{,}720$; $p = 0.027$. Also, the subjects in the Group II had more frequent coordination problems (n = 27) compared to the subjects in the Group I (n = 21), $\chi 2 = 3{,}688$; $p = 0.048$. The subjects in the Group I had a statistically significant decrease in the amount of time that they can spend in their work compared to subjects of the Group II ($p = 0.019$). Also subjects in the Group I achieved, statistically of significance, less than they would like with respect to subjects in the Group II ($p = 0.038$). Problems in performing other daily activities did not differ between the two groups due to failing physical health.The data analysis showed a statistically significant difference in the frequency of problems in performing daily activities due to a failing emotional state ($p < 0.05$), and the subjects in the Group I had the problems more frequently. (table 2.)

Table 2. Limitations in daily activities due to health conditions

		N	X	SD	SEM	Min	Max
Vigorous activities	Group I	30	1.33	.54	.09	1	3
	Group II	30	1.20	.48	.08	1	3
Moderate activities, (pushing a vacuum cleaner, bowling)	Group I	30	1.56	.72	.13	1	3
	Group II	30	1.36	.66	.12	1	3
Lifting or carrying groceries from shop	Group I	30	1.53	.73	.13	1	3
	Group II	30	1.50	.73	.13	1	3
Climbing several flights of stairs	Group I	30	1.53	.62	.11	1	3
	Group II	30	1.26	.58	.10	1	3
Climbing one flight of stairs	Group I	30	1.80	.76	.13	1	3
	Group II	30	1.70	.70	.12	1	3
Kneeling, bending, stooping	Group I	30	1.60	.72	.13	1	3
	Group II	30	1.60	.67	.12	1	3
Walking more than 1,5 km	Group I	30	1.43	.56	.10	1	3
	Group II	30	1.30	.65	.11	1	3
Walking several hundred of meters	Group I	30	1.70	.87	.16	1	3
	Group II	30	1.40	.72	.13	1	3
Walking 100 meters	Group I	29	1.89	.90	.16	1	3
	Group II	30	1.70	.74	.13	1	3
Bathing yourself	Group I	30	2.03	.88	.16	1	3
	Group II	30	1.80	.76	.13	1	3

The Group I subjects had a statistically significant limitation in the amount of time they can perform their work compared to Group II ($p = 0.028$) due to failing emotional state. Also, subjects of the Group I achieved statistically significantly less than they would like compared to the Group II ($p = 0.038$) due to the failing emotional state. The Group I subjects were statistically significantly less careful than usual performing their work compared to the subjects of the Group II with failing emotional health ($p=0.009$). Average validation of the physical health of the subjects in the Group I was 0.28 and of the subjects in the Group II 0.25 ($p=0.357$). The validation of the health perception of the subjects of the Group I was 0.55 and of the subjects in the Group II was 0.54 ($p=505$). Validation of energy and strength of the subjects in the Group I was 0.45 and of the subjects in the Group II was 0.46 ($p=0.275$). Average validation of physical problems of the subjects in the Group I was 0.13 and of the subjects in the Group II was 0.15 ($p=0.080$). The validation of pain of the subjects in the Group I was 0.31 and of the subjects in the Group II was 0.35 ($p=0.374$). Sexual function differed, statistically significantly, in comparison of the investigated groups and the average validation was 0.21 in Group I and in Group II was 0.26 ($p = 0.011$). Socialization also differed, statistically significantly, and the subjects in group I it was 0.33, and of the subjects in the Group II was 0.37 ($p = 0.037$). The change in health was not statistically significant and validation in the Group I was 0.03 and the same validation was in the Group II ($p = 0.795$). Changes in health of subjects in the Group I were validated at 0.47 and of the subjects in the group II were 0.48 so was not found a statistically significant difference ($p = 0.795$). The quality of life was also statistically not significantly different between the investigated groups, and in the Group I it was 5.19, and in the Group II was 4.50 ($p = 0.221$). The average validation of emotional status did not differ between the examined groups ($p = 0.605$) and of the subjects in Group I it was 1.13 and of the subjects in the Group II was 1.11. By using ANOVA test was found a statistically significant difference in the average validation of emotional disability ($p=0.011$ and the average validation of cognitive functions was ($p=0.010$). (tables 3 and 4)

Table 3. Problems in carrying out daily activities due to failing physical health

		N	X	SD	SEM	Min.	Max.
Cut down on the amount of time you could spend on work	I	30	1.40	.49	.09	1	2
	II	30	1.13	.34	.06	1	2
Accomplished less than you would like	I	30	1.26	.44	.08	1	2
	II	30	1.06	.25	.04	1	2
Were limited in the kind of work or other activities	I	30	1.23	.43	.07	1	2
	II	30	1.10	.30	.05	1	2

Had difficulty performing the work or other activities	I	30	1.13	.34	.06	1	2
	II	30	1.13	.34	.06	1	2

Table 4. Average rate of physical health compared to present symptoms of multiple sclerosis

Group		N	X	SD	SEM	95% CI Lower	95% CI Upper	Min	Max
Group I Application of walking aids	No	10	2.13	.26	.08	1.94	2.32	1.70	2.74
	Yes	20	2.37	.164	.03	2.29	2.45	2.12	2.73
	F=9.775; p=0.004								
Group II Application of walking aids	No	9	2.28	.15	.05	2.16	2.40	2.06	2.53
	Yes	21	2.45	.23	.05	2.34	2.56	2.08	2.85
	F=3.800; p=0.041								
Group I Vision problems	No	14	2.15	.20	.05	2.04	2.27	1.70	2.60
	Yes	16	2.41	.18	.04	2.31	2.51	2.07	2.74
	F=13.010; p=0.001								
Group II Vision problems	No	6	2.27	.14	.05	2.12	2.42	2.06	2.39
	Yes	24	2.43	.23	.04	2.33	2.53	2.08	2.85
	F=2.481; p=0.126								
Group I Coordination problems	No	9	2.12	.24	.08	1.93	2.30	1.70	2.60
	Yes	21	2.36	.18	.04	2.28	2.45	2.07	2.74
	F=9.136; p=0.005								
Group II Coordination problems	No	3	2.27	.18	.10	1.81	2.74	2.06	2.39
	Yes	27	2.41	.22	.04	2.32	2.50	2.08	2.85
	F=1.080; p=0.308								

The average mental health validation of male subjects in the Group I was 7.81 ± 2.73, and of female subjects was 7.62 ± 2.50, and by application of ANOVA test was not found a statistically significant difference, F = 0.040; p = 0.842. No statistically significant difference was found in group II in the average mental health validation compared to the gender differences, F = 0.006; p = 0.939. The average mental health validation of the male gender in the Group II was 6.82 ± 2.10, and in female subjects was 6.8 ± 2.09. (tables 5 and 6)

Table 5. Problems in carrying out daily activities due to failing emotional health

	Group	N	X	SD	SEM	Min	Max
Did you feel full of pep?	I	30	3.53	1.50	0.27	1	6
	II	30	4.13	1.27	0.23	1	6
Have you been a very nervous person?	I	30	3.96	1.32	0.24	1	6
	II	30	3.40	1.13	0.20	1	6
Have you felt so down in the dumps that nothing could cheer you up?	I	30	4.33	1.42	0.25	1	6
	II	30	4.00	1.14	0.20	1	6
Have you felt calm and peaceful?	I	30	3.50	1.35	0.24	1	6
	II	30	4.26	1.01	0.18	2	6
Did you have a lot of energy?	I	30	4.13	1.47	0.27	1	6
	II	30	4.76	1.00	0.18	2	6
Have you felt downhearted and blue?	I	30	4.33	1.12	0.20	2	6
	II	30	3.63	1.21	0.22	1	5
Did you feel worn out?	I	30	3.66	1.39	0.25	1	6
	II	30	3.36	1.18	0.21	1	6
Have you been a happy person?	I	30	3.43	1.13	0.20	1	5
	II	30	3.96	1.24	0.22	1	6
Did you feel tired?	I	30	3.46	1.40	0.25	1	6
	II	30	2.63	1.15	0.21	1	5
Did you feel rested on waking in the morning?	I	30	3.76	1.25	0.22	1	6
	II	30	4.40	1.10	0.20	2	6

Group		N	X	SD	SEM	95% CI		Min	Max
						Lower	Upper		
Group I *Application of walking aids*	No	10	9.90	1.54	.48	8.80	11.00	7.14	12.28
	Yes	20	6.58	2.21	.49	5.54	7.62	2.05	9.88
	F=17.933; p=0.001								
Group II *Application of walking aids*	No	9	8.22	1.91	.63	6.75	9.69	6.02	11.46
	Yes	21	6.16	1.83	.40	5.32	7.00	3.04	10.08
	F=7.761; p=0.009								
Group I *Vision problems*	No	14	9.11	1.97	.52	7.96	10.25	5.61	12.28
	Yes	16	6.45	2.37	.59	5.17	7.71	2.05	9.56
	F=10.914; p=0.003								
Group II *Vision problems*	No	6	7.84	1.92	.78	5.81	9.86	6.17	11.46
	Yes	24	6.51	2.04	.41	5.65	7.38	3.04	10.36
	F=2.038; p=0.164								
Group I *Coordination problems*	No	9	9.99	1.56	.52	8.79	11.20	7.39	12.28
	Yes	21	6.70	2.23	.48	5.68	7.72	2.05	9.88
	F=16.001; p=0.001								
Group II *Coordination problems*	No	3	8.89	2.24	1.29	3.31	14.47	7.28	11.46
	Yes	27	6.54	1.94	.37	5.77	7.31	3.04	10.36
	F=3.828; p=0.060								

Table 6. Average rate of mental health compared to present symptoms of multiple sclerosis

Table 7. Correlative Relations of Mental and Physical Health

Group			MSQOL Mental Health	MSQOL Physical Health
I	MSQOL Mental Health	Pearson Correlation	1	-.758**
		Sig. (2-tailed)		.000
		N	30	30
	MSQOL Physical Health	Pearson Correlation	-.758**	1
		Sig. (2-tailed)	.000	
		N	30	30
II	MSQOL Mental Health	Pearson Correlation	1	-.565**
		Sig. (2-tailed)		.001
		N	30	30
	MSQOL Physical Health	Pearson Correlation	-.565**	1
		Sig. (2-tailed)	.001	
		N	30	30

Comparison of the MR findings of both groups before and after carrying out the treatment did not show statistically significant differences.

4 Discussion

The analysis of the subjects' age did not establish statistically significant differences in the age of the subjects, p = 0,111. In the Group I the largest number of subjects belonged to the age group 41-50 years, 13 subjects, while in the Group II 14 subjects belonged to the age group 51 and older. The research conducted by Una Nedeljković indicated in her doctoral study that the average age of her subjects was 40 years, which is partly correlated with our investigations (18). The Group I subjects performed their work, statistically significantly, less carefully than usually, compared to the Group II subjects with failing emotional status (p = 0.009). Phillips et al., in their research, stated that people with multiple sclerosis exhibit greater emotional problems due to the difficulty of accepting the disease, which causes depression which, in turn, worsens the daily activities and the psychological and social quality of life of MS patients (19). By usage of correlation in relations between the duration of disease and the physical health in the MSQoL-45 questionnaire, a statistically significant positive correlation and the duration of the disease and mental health in the MSQoL-54 questionnaires, were established for subjects of the Group I and the Group II a statistically significant negative correlation, which is partially correlated with Idiman's research, where the correlation relations between the duration of the disease and physical health, as well as the duration of the disease and mental health of the patient are in a statistically significant positive correlation (20). The average duration of the disease in our research in the Group I was 10.68 ± 6.55 and in the Group II was 14.50 ± 9.15, which is not correlated with the research of Bojana and al., where on a total of 156 subjects the duration of the disease was 8.5 ± 5.1 (21). Statistical analysis of physical health in our study yielded results for Group I, which was 0.28 and for the Group II was 0.25, which is not correlated with Ćatić's research where the grade of physical health was 0.96. In the analysis of the disability in our research, the results for the Group I was 0.15 and for the Group II was 0.13, which also did not correspond to Ćatić's research where the score for the disability was 0.95. In analysis of socialization, our research showed results for the Group I the score 0.33 and for the group II 0.37, which was correlating with Ćatić's research, where the rating for socialization in his research was 0.74. By analysing the quality of life in our research, the results for group I were 5.19 and the Group II were 4.5, which does not match with Čatić's research that showed results for quality of life of 0.78. The results for the emotional status of respondents for the Group I were 1.13 and for the Group II were 1.11 which is not correlated with Čatić's research for emotional status of subjects of 0.96. In our, as well as in Čatić's research was used MSQoL-54 questionnaire and was applied to total 60 data subject. By statistical analysis of the written radiological findings of the both groups of patients were not found statistically significant differences, which is in correlation with results of Stivenson and al. (23).

5 Conclusion

In most segments of the quality of life, the better the results showed subjects who had undergone physical therapy

6 References

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