



## The influence of personality traits and coping strategies on the quality of life of patients with relapsing-remitting type of multiple sclerosis

Uticaj osobina ličnosti i strategija suočavanja sa stresom na kvalitet života obolelih od multiple skleroze relapsno remitentnog toka

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### Abstract

**Background/Aim.** Multiple sclerosis (MS) is a chronic, progressive autoimmune disease of the central nervous system, that can reduce quality of life. Personality traits and coping strategies are significant factors in interpersonal variance regarding quality of life. The aim of this study was to examine relations between personality traits and coping strategies in patients with relapsing-remitting (RR) type of MS, and to examine relations of personality traits, coping strategies, and quality of life in patients with RR type of MS. **Methods.** This observational cross-sectional study included 66 patients (34 female, 32 male) with clinically definitive MS, based on the McDonald criteria. The following clinical scales were used to examine personality traits, coping strategies, and quality of life: Revised NEO Personality Inventory (NEO-PI-R), Coping Strategies Inventory (CSI), and Multiple Sclerosis Quality of Life (MSQoL-54). **Results.** The average age of the patients

was  $41.6 \pm 7.1$  years. The Pearson's correlation coefficient showed that with regards to coping strategies, the only positive correlation existed with neuroticism ( $r = 0.502$ ). The correlation was negative between neuroticism and physical ( $r = -0.284, p < 0.05$ ) and mental health ( $r = -0.289, p < 0.05$ ), as well as between passive coping strategies and mental health ( $r = -0.358, p < 0.05$ ), meaning that the patients with a higher level of neuroticism, and who relied on passive coping strategies, had a lower quality of life. **Conclusion:** This research showed the importance of personality traits and coping strategy assessment in patients with RR-type MS. Participation in cognitive-behavioral therapy, with emphasis on active coping strategies, can improve the quality of life in patients with MS.

### Key words:

adaptation, physiological; multiple sclerosis; personality; recurrence; quality of life; serbia; stress, psychological; surveys and questionnaires.

### Apstrakt

**Uvod/Cilj.** Multipla skleroza (MS) je hronična, progresivna autoimunska bolest centralnog nervnog sistema, koja može narušiti kvalitet života. Osobine ličnosti i strategije suočavanja sa stresom su bitan faktor za promenljivost između osoba u odnosu na kvalitet života. Cilj istraživanja je bio ispitivanje povezanosti osobina ličnosti i strategija suočavanja kod obolelih od MS relapsno remitentnog (RR) toka, kao i ispitivanje povezanosti osobina ličnosti i strategija suočavanja sa kvalitetom života kod obolelih od MS RR toka. **Metode.** Opservacionom studijom preseka obuhvaćeno je 66 bolesnika (34 osobe ženskog i 32 osobe muškog pola) sa dijagnozom klinički definitivne MS RR toka, postavljene na osnovu Mek Donaldovih kriterijuma. Za procenu

osobina ličnosti, strategija suočavanja i kvaliteta života, korišćene su sledeće kliničke skale: Revidirani NEO-Inventar ličnosti (NEO-PI-R), Inventar strategija suočavanja (*Coping Strategies Inventory*) i Kvalitet života MS (*Multiple Sclerosis Quality of Life-54*). **Rezultati.** Prosečna starost ispitanika je bila  $41,6 \pm 7,1$  godina. Pirsonov koeficijent korelacije pokazao je da je sa korišćenjem pasivnih strategija suočavanja pozitivno povezan jedino neuroticizam ( $r = 0,502$ ). Korelacija je bila negativnog smera između neuroticizma i fizičkog ( $r = -0,284, p < 0,05$ ) i mentalnog zdravlja ( $r = -0,289, p < 0,05$ ), kao i između pasivnih strategija suočavanja i mentalnog zdravlja ( $r = -0,358, p < 0,05$ ), što znači da su bolesnici kod kojih je neuroticizam bio više izražen, i koji su koristili pasivne strategije, imali lošiji kvalitet života. **Zaključak.** Rezultati ovog istraživanja ukazuju na značaj

procene ličnosti i strategija suočavanja kod obolelih od MS. Uključivanje u kognitivno-bihevioralnu terapiju i favorizovanje aktivnih strategija suočavanja može poboljšati kvalitet života obolelih od MS.

**Ključne reči:**  
adaptacija, fiziološka; multipla skleroza; ličnost; recidiv; kvalitet života; srbija; stres, psihički; ankete i upitnici.

## Introduction

Multiple sclerosis (MS) can decrease quality of life (QOL) by affecting the patient's ability to work or perform regular functions in everyday life. Patients with MS often experience symptoms involving discomfort and pain. They feel frustrated and isolated, which significantly lowers their QOL<sup>1</sup>. Personality traits and coping strategies are recognized as a notable factor in interpersonal variances regarding QOL<sup>2,3</sup>.

High neuroticism indicates that the individual will experience negative emotions and frustration dealing with everyday stress of living with a chronic neurological disease such as MS. High neuroticism leads to increased pain, somatization, and can be the cause of early death<sup>4</sup>. Individuals with high neuroticism are vulnerable to feelings of helplessness and irrational thoughts, which makes them less capable of impulse control<sup>5</sup>.

Adaptive personality traits (extroversion and conscientiousness) are less affected by stress. That means that the patients manage their illness more efficiently, which is important for their psychological well-being and quality of life<sup>6</sup>.

Personality traits can predict coping strategies<sup>7</sup>. Relations between personality traits and coping strategies have been the subject of many studies. The results of these studies imply that neuroticism correlates positively with passive coping strategies<sup>8</sup>.

Adaptive personality traits correlate positively with active coping strategies (solving problems, seeking support from others, etc). However, some researchers have nevertheless failed to find a significant connection between adaptive personality traits and active coping strategies<sup>8</sup>.

For patients with MS, coping strategies play a major role in adapting to psycho-social problems and quality of life. Passive strategies involve withdrawal, avoidance, lower quality of life, and increase the risk of psychological issues such as depression and anxiety<sup>9</sup>.

In his study, Strober<sup>2</sup> found that the "D personality" type (a combination of a higher neuroticism and a lower extroversion) uses maladaptive coping strategies, and that this personality type is related to lower QOL in patients with MS.

The aim of this study was to examine relations between personality traits and coping strategies in patients with RR-type MS, and to examine relations between personality traits and coping strategies with the QOL in patients with RR-type MS. These relations have been scrutinized in developed countries. So far, no such studies concerning the MS-affected population have been conducted in Serbia.

## Methods

### *Study design, time, and place*

The study was designed as an observational cross-sectional study, and it was carried out at the Clinic of Neurology and the Clinic of Psychiatry at the Military Medical Academy (MMA) in Belgrade. The study included patients with RR-type MS treated at the Clinic of Neurology, MMA from March 2014 until March 2015. In accordance with the regulations of Good Clinical Practice (GCP), and with prior approval by the Ethics Committee of the Military Medical Academy Committee (decision issued on December 6, 2013, approval number: 0901-2-50/15) the patients had signed a form declaring consent to participate in the study, having been provided with all necessary information and explanations, including their opportunity to ask relevant questions.

### *Participants*

The study included 66 patients (32 male, 34 female), aged 18–55, diagnosed with clinically definitive MS based on McDonald criteria<sup>10</sup>. The diagnoses were made by a neurologist, who also provided the patients' scores on the Expanded Disability Status Scale (EDSS). Inclusion criteria were: either gender, age 18–55, consent form signed, definitive clinical diagnosis of RR-type MS established according to the revised 2010 McDonald criteria and EDSS score  $\leq 6.0$ .

Exclusion criteria were: central nervous system (CNS) diseases other than MS, major head injury, clinically definitive relapse of the basic illness in the past 3 months, corticosteroid therapy in the past 3 months, history of hepatic/renal insufficiency, diabetes mellitus, arterial hypertension, use of alcohol or psychoactive substances, malignant conditions, impaired hearing, binocular visual acuity  $\leq 75\%$ , and pregnancy<sup>2</sup>.

### *Instruments*

Three clinical scales were used in this study.

Revised NEO Personality Inventory (NEO-PI-R), containing 240 items, measures five major personality traits (neuroticism, extroversion, openness, agreeableness, and conscientiousness). It offers an all-encompassing, detailed assessment of personality of the respondents<sup>11–13</sup>. NEO-PI-R assessment was performed by a clinical psychologist.

Coping Strategies Inventory (CSI) is a self-report scale containing 72 items. It is applied to assess cognitive ability

and behavior relating to specific stressors. Respondents are required to mark the extent to which each coping strategy has been used to cope with the selected stressor. Answers are marked on the five-item Likert scale, with eight primary subscales: problem solving, cognitive restructuring, social support, expression of emotions, problem avoidance, wishful thinking, social withdrawal, and self-criticism. Problem solving, cognitive restructuring, avoidance, and wishful thinking are problem-focused coping strategies, where the first two are active and the other two passive. Social support, expression of emotions, self-criticism, and withdrawal are emotion-focused coping strategies, where the first two are active and the other two passive<sup>14</sup>.

Multiple Sclerosis Quality of Life (MSQOL-54) is a self-report scale that measures quality of life. This instrument contains 54 items with 12 subscales. The subscales are: physical functionality, role limitations – physical, role limitations – emotional, pain, emotional well-being, energy, health perception, social function, cognitive function, health distress, overall quality of life, and sexual function<sup>15, 16</sup>.

#### Statistical analysis

The data were analyzed using the SPSS v. 23.0 statistical software (IBM Corp., USA). Sociodemographic clinical data are presented through descriptive statistical

methods: absolute and relative numbers, arithmetic mean, standard deviation (SD).

The Pearson's correlation coefficient was used in determining the correlation between personality traits and coping strategies, as well as between coping strategies, personality traits, and quality of life. All *p*-values less than 0.05 were considered significant.

The correlation between personality traits and gender, duration of illness, and the EDSS score was analyzed using MANOVA (multivariate variance analysis). All *p*-values less than 0.05 were considered significant.

#### Results

The average age of the patients was  $41.6 \pm 7.1$  years. Sociodemographic and clinical characteristics of the patients are presented in Table 1.

Within our patients' groups, there was a statistically significant difference between men and women regarding certain personality traits (MANOVA – Wilks  $\lambda = 0.718$ ,  $F = 4.326$ ,  $p = 0.002$ ). The personality trait contributing to this difference was neuroticism, which was statistically significantly more present in women than in men ( $F = 4.015$ ,  $p = 0.05$ ) (Table 2).

The Pearson's coefficient showed that the patients with RR-type MS with a high conscientiousness score had lower score on the EDSS. The correlation was negative and weak,

**Table 1**

#### **Sociodemographic and clinical characteristics of patients with multiple sclerosis**

Variable	Values
Gender, n (%)	
male/female	32 (48.5) / 34 (51.5)
Age (years), mean $\pm$ SD	41.6 $\pm$ 7.1
Education (years), n (%)	
8–12	4 (6.0)
12–16	46 (70.1)
> 16	16 (23.9)
Marital status, n (%)	
unmarried	7 (10.6)
married	55 (83.3)
divorced / widowed	4 (6.1)
Invalidity, n (%)	
none/yes	34 (51.5) / 32 (48.5)
Psychiatric assistance, n (%)	
yes / no	11 (16.7) / 55 (83.3)
Duration of illness (years), mean $\pm$ SD	8.1 $\pm$ 5.1
Time since first symptoms (in years), mean $\pm$ SD	10.1 $\pm$ 4.9
EDSS score, mean $\pm$ SD (min–max)	2.4 $\pm$ 1.1 (1.0–4.5)

**SD – standard deviation; min-max – minimum–maximum;**

**EDSS – Expanded Disability Status Scale.**

**Table 2**

#### **Personality traits in patients with multiple sclerosis according to gender**

Variable	Male	Female	F	<i>p</i>
Neuroticism	141.10	147.68	4.015	<b>0.050</b>
Extroversion	151.50	154.84	0.864	0.356
Openness	158.23	165.84	3.755	0.057
Agreeableness	158.00	161.65	1.360	0.248
Conscientiousness	164.27	162.16	0.484	0.489

**Results are given as arithmetic mean.**

but significant ( $r = -0.285$ ,  $p < 0.05$ ) (Table 3).

The Pearson's coefficient showed that there was no correlation between personality traits and duration of the illness (Table 3).

The evaluation of correlation between personality traits (NEO-PI-R) and coping strategies (CSI) in patients with RR-type MS is presented in Table 3.

The Pearson's coefficient showed that there was positive correlation only between passive coping strategies and neuroticism ( $r = 0.502$ ,  $p < 0.01$ ), which means that the patients with higher levels of neuroticism were more likely to use passive coping strategies. All other personality traits were moderately related to active coping strategies.

The assessment of correlation between NEO-PI-R and MSQOL-54 in patients with RR-type MS is presented in Table 3.

The Pearson's correlation coefficient showed that all personality traits, except conscientiousness, correlate positively (at low intensity) with QOL, contentment, mental and physical health. This means that the higher the expression of extroversion, openness and agreeableness, the better QOL. The correlations were significant ( $p < 0.05$ ).

The correlation between neuroticism and physical ( $r = -0.284$ ) and mental health ( $r = -0.289$ ) was negative, meaning that the patients with more pronounced neuroticism will report more negative assessment of their contentment, physical and mental health, or the overall QOL.

When it comes to CSI and MSQOL-54, the Pearson's coefficient showed a strong negative correlation between using passive coping strategies and perceived physical and mental well-being ( $r = -0.358$ ) (Table 4).

The patients who relied less on passive strategies reported a more positive estimation of their contentment and mental health. The correlation was significant ( $p < 0.01$ ).

## Discussion

Serbia is one of the countries with a relatively high prevalence of MS. According to the latest figures, there are more than 5,000 registered patients with MS in Serbia<sup>17</sup>. To the best of our knowledge, there was no research on the influence of personality traits and coping strategies on the QOL in patients with MS in Serbia.

The gender balance in our study was almost perfect (34 females and 32 males), even though research indicates that women are three times more likely to develop MS<sup>18</sup>. This can be explained by the fact that the military health care institution is focused on military insurance users and active military personnel, who are predominantly male. Previous research shows that women today make up from 8.7% to 19.3% of the entire military personnel in the Army of Serbia<sup>19</sup>.

Personality traits are one of the main factors affecting psychological functionality, as well as the exposure and the ability of individuals to deal with stressful situations in life. A study performed in 2018 on a sample of adult twins ( $n = 973$  pairs), showed the existence of gender differences, based on phenotype rather than genetics, in personality traits, but also that these differences are smaller than a previous study by South et al.<sup>20</sup> implied. Female twins had higher neuroticism compared to male twins<sup>20</sup>. The results of our research also confirmed that female patients with MS had more expressed neuroticism. It would be interesting to investigate whether personality traits at the onset of a chronic disease change over time, since beside physiological changes, such a disease also leads to lifestyle changes (mobility, ability to work, finances, relations with friends and family, life role...), all of which can lead to personality changes in patients<sup>21, 22</sup>. Nevertheless, current studies indicate that personality traits are resistant to effects of

**Table 3**

**Correlation between personality traits and Expanded Disability Status Scale (EDSS) score, illness duration, coping strategies and quality of life in multiple sclerosis patients**

Variable	Neuroticism	Extroversion	Openness	Agreeableness	Conscientiousness
EDSS score	0.169	-0.014	-0.107	-0.196	<b>-0.285*</b>
Illness duration	-0.044	-0.039	-0.001	-0.002	-0.033
Active strategies	0.234	<b>0.365*</b>	<b>0.268*</b>	<b>0.429**</b>	<b>0.282*</b>
Passive strategies	<b>0.502**</b>	0.240	0.186	0.236	0.196
Physical health	<b>-0.284*</b>	<b>0.254*</b>	<b>0.257*</b>	<b>0.261*</b>	0.229
Mental health	<b>-0.289*</b>	<b>0.251*</b>	<b>0.271*</b>	<b>0.294*</b>	0.193

$p < 0.05$ ;  $**p < 0.01$ .

**Table 4**

**Correlation between coping strategies and quality of life in multiple sclerosis patients**

Variable	Active strategies	Passive strategies
Physical health	0.107	0.241
Mental health	-0.002	<b>-0.358**</b>

$**p < 0.01$ .

chronic disease<sup>21, 22</sup>. The results of our study show that personality traits are not affected by the duration of the illness, which concurs with the findings of the previous studies mentioned above<sup>21, 22</sup>.

Individuals with high neuroticism experience daily frustrations as problematic and are more prone to mood disturbances, self-criticism, hypochondria, and stress vulnerability<sup>23</sup>. Our results indicate that higher neuroticism correlates with negative assessments and physical health (physical functionality, pain, energy, social and sexual function) as well as mental health (emotional problems, cognitive functions, emotional well-being). In other words, patients with RR-type MS with higher neuroticism have decreased quality of life, while RR-type MS patients with more expressed extroversion, openness, and agreeableness have higher quality of life and better physical and mental health. Recent studies in Austria and Italy also suggest that neuroticism correlates with lower QOL in MS<sup>24, 25</sup>.

To the best of our knowledge, there is only one study that while examining the association of personality traits and cognitive impairment in MS, also investigated relations between personality traits and EDSS score. Benedict et al.<sup>26</sup> found significant correlation between abnormal personality traits and heightened EDSS score, while the results of our study do not show that. A possible explanation could be lower average EDSS score in our study sample: 2.4 (range 1.0–4.5) compared to the sample used by Benedict et al.<sup>26</sup>, where the average EDSS score was 4.1 (range 1.0–8.5), with a significantly smaller sample size of 34 compared to 66 in our study.

Our results showed that RR-type MS patients with higher conscientiousness score had lower score on the EDSS ( $r = -0.285, p < 0.05$ ). It is consistent with the findings that higher conscientiousness implies better organisational skills, deliberation, and healthy behaviour, while lower conscientiousness correlates with impulsiveness and risky behaviour (smoking, alcohol etc.). This is important, considering the results of previous research that showed that smoking had been both a risk factor for developing MS and an accelerator of the illness progression<sup>27, 28</sup>.

Personality traits can predict coping strategies<sup>29</sup>. Coping strategies reflect repertoires of responses to stress, both cognitive and behavioural, that the individual will use to manage external and/or internal demands of a stressful event. Passive coping (wishful thinking, withdrawal, avoidance, self-criticism), focuses on ignoring the stressor and involves minimizing, denial, or avoidance in dealing with the stressful situation. Such coping is maladaptive and becomes a new

source of stress. Research so far shows that passive coping correlates with increased pain, invalidity, and depression<sup>30</sup>.

In our study, RR-type MS patients with higher neuroticism were shown to be significantly more likely to use passive strategies of coping with stress. Our results also show that other personality traits correlate, albeit weakly, with active strategies, while neuroticism does not correlate with active strategies at all. Research so far also shows that individuals with high neuroticism resort to passive strategies<sup>2, 7, 29, 31</sup>. As for adaptive personality traits, some studies suggest that individuals with high extroversion use active strategies, while other studies do not find any significant correlation between adaptive personality traits and active coping strategies<sup>8, 29</sup>. This discrepancy could be explained by the low intensity of the correlation that our study found.

Patients with RR-type MS who rely on passive strategies estimate their own mental health (psychological well-being) as lower. These results are in accordance with research conducted so far on coping strategies in MS patients. Studies performed on 26 individuals in Mexico<sup>9</sup> and 34 individuals in Lebanon<sup>32</sup>, respectively, showed that reliance on active coping strategies leads to more positive assessment of QOL.

#### *Limitations of the study*

Our study involved only the patients with RR-type MS; future research on these topics in Serbia should include other clinical types of MS as well. Another significant limitation was that the quality of life questionnaire is MS-specific, making it inapplicable on healthy sample groups.

#### **Conclusion**

Our study shows the importance of personality and coping strategy estimation in patients with MS, as they represent major factors affecting their quality of life. Our results show that higher neuroticism and passive coping strategies are connected to lower quality of life in patients with MS.

Therefore, treatment of MS should be multidisciplinary, and take into account individual characteristics in adapting to a chronic disease.

Since personality traits can change during one's life, especially after significant events, inclusion into cognitive-behavioural therapy and adopting active coping strategies can improve MS patients' quality of life.

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