The occurrence of depressive symptoms in rheumatoid arthritis: a cross-sectional study

Pojava simptoma depresivnosti kod bolesnika sa reumatoidnim artritisom: studija preseka

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Abstract

Background/Aim. Depression, as a common comorbidity in patients with rheumatoid arthritis (RA), has been found to affect the disease diagnosis and treatment response. Accordingly, the aim of the study was to investigate the occurrence of depressive symptoms among patients with RA and the association between RA and depression. **Methods.** The cross-sectional study included 69 patients with RA. The depressive symptoms in patients with RA were assessed using the Beck Depression Inventory (BDI), and RA activity was measured by Disease Activity Score-28 for RA with erythrocyte sedimentation rate (DAS28-ESR) and Clinical Disease Activity Index (CDAI). **Results.** It was found that 42% of respondents reported having depressive symptoms of different severity, among which the majority (23.2%) presented with mild symptoms. A mild positive correlation was found between the BDI and the DAS28-ESR (r = 0.39 p = 0.001), as well as between the BDI and the CDAI (r = 0.40 p = 0.001). Place of residence (t = -2.14 p = 0.03) and employment status (t = -2.81 p = 0.00) associated with depressive symptoms were also found to have statistically significant differences within the group of respondents. In addition, age had a positive correlation with the disease activity, as well as the place of residence and employment status. **Conclusion.** It has been observed that depressive symptoms in patients with RA were associated with disease activity, employment status, and place of residence. Therefore, there is an important need for integrating rheumatologic and mental health services for future research toward a better understanding of both depression and RA.

Key words:
age factors; arthritis, rheumatoid; depression; residence characteristics; severity of illness index; work.

Apstrakt

Uvod/Cilj. Depresija, kao čest komorbiditet kod bolesnika sa reumatoidnim artritisom (RA), može uticati na dijagnozu bolesti i odgovor na primenjeno lečenje. Zbog toga je cilj rada bio da se ispita učestalost simptoma depresivnosti kod bolesnika sa RA i međusobna povezanost između RA i depresije. **Metode.** Studija preseka obuhvatila je 69 bolesnika sa RA. Simptomi depresivnosti kod bolesnika sa RA procenjivani su korišćenjem Beck-ove skale za depresiju (*Beck Depression Inventory* –BDI), a aktivnost RA procenjivana je Indeksom aktivnosti bolesti (*Disease Activity Score-28 for RA with erythrocyte sedimentation rate* - DAS28-ESR) i Kliničkim indeksom aktivnosti bolesti (*Clinical Disease Activity Index* – CDAI). **Rezultati.** Simptomi depresivnosti različitog intenziteta zapaženi su kod 42% bolesnika, od kojih je najveći broj (23,2%) imao blage simptome depresivnosti. Utvrđena je pozitivna korelacija niskog stepena između BDI i DAS28-ESR (r = 0,39 p = 0,001), kao i između BDI i CDAI (r = 0,40 p = 0,001). Takođe, pokazano je da su mesto stanovanja (t = -2,14 p = 0,03) i status zaposlenja (t = -2,81 p = 0,00), koji su povezani sa simptomima depresivnosti, bili statistički značajno različiti unutar grupa ispitanika. Osim toga, životno doba bolesnika, mesto stanovanja i status zaposlenja su bili u pozitivnoj korelaciji sa stepenom aktivnosti bolesti. **Zaključak.** Simptomi depresivnosti kod bolesnika sa RA bili su povezani sa aktivnošću osnovne bolesti, statusom zaposlenja i mestom stanovanja. U cilju boljeg razumevanja depresije i RA, u budućim istraživanjima, neophodna je integracija reumatoloških službi i službi za mentalno zdravlje.

Ključne reči:
životno doba, faktor; artritis, reumatoidni; depresija; stanovanje; bolest, indeks, težine; rad.

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Introduction

Rheumatoid arthritis (RA) is a chronic systemic auto-immune disease primarily characterized by persistent synovitis symmetrically affecting peripheral joints [1]. It has been estimated that 1% of the world's population suffers from this disease [2, 3]. The majority of patients with RA exhibit a chronic fluctuating course of disease that, if left untreated, results in progressive joint damage, reduced functional ability, and disability.

Depressive symptoms are common in patients with RA. More recent studies on RA patients with depression reported that the occurrence varies between 13% and 42% due to differences in methods of identification, assessment scales used, and heterogeneity of disease presentation [4–6]. In addition, such substantial differences in the occurrence may result from the overlap between somatic depressive and RA symptoms, as well as the significant impact of perceived social support on depression [7]. Rheumatologists have estimated the occurrence of depression in 10.5% of patients with RA, while the occurrence of self-reported depressive symptoms is almost twice as common, i.e., 22% [8].

Studies have shown that depression is two times more common in RA patients than in the general population, whereby women are more susceptible to depression [9, 10]. The association between depression and RA may be attributed to many factors. In some cases, low socioeconomic status, gender, and age have been linked to the development of depression in RA patients. According to one of the studies, which takes into account the multidimensionality of socioeconomic factors, lower education and income level have been shown to be independently associated with mental health and arthritis [11]. Additionally, studies have shown that the occurrence of RA and depression is higher in women, while there is an assumption that aging increases the risk of depression. However, empirical studies investigating the relationship between aging and depression have not shown the consistency of these research findings [12]. In other cases, the occurrence of depressive symptoms is associated with the consequences of RA-related disease and disability. Loss of functional abilities is directly related to decreased activity in daily life and the presentation of depressive symptoms [13]. Consequently, depression is related to chronic pain intensity and poor clinical status, functional limitations, and disability [5, 14].

Furthermore, the psychological impact of chronic inflammatory disease on mental well-being is related to disease activity levels, as well as disease duration [15, 16]. Chronic pain, fatigue, difficulty in performing daily life activities, and psychological stress also contribute to disease activity and the manifestation of depression.

The presence of depression affects both the patient's quality of life and the disease course, increasing the need for medical care and treatment and contributing to the increase in unemployment and reduced work efficiency.

The importance of identifying depression and depressive symptoms in patients with RA has not only been associated with the treatment of comorbid depression but also with the prevention or elimination of the negative impact of de-pression on treatment response in patients with RA. Given the consequences of the presence of depressive symptoms associated with the course of the disease and treatment outcomes in patients with RA, we were interested in the levels of severity of depressive symptoms among patients included in this study. Specifically, the aim of the study was to determine the occurrence of depressive symptoms and the relationship between RA and comorbid depression.

Methods

The sample included 69 patients hospitalized or monitored on an outpatient basis at the Clinic for Nephrology and Clinical Immunology, University Clinical Center of Vojvodina, Serbia. All patients have been diagnosed earlier with RA by a rheumatologist.

A cross-sectional study was designed. It included patients older than 18 years of age treated with conventional synthetic disease-modifying drugs, followed by adding biological disease-modifying drugs, IL-6 receptor antagonists, or TNF-α inhibitors. Exclusion criteria were a diagnosis of depression and/or dementia before inclusion in the study, intellectual disability, patients with evidence of other systemic diseases (overlapping syndrome), and patients with a history of alcoholism or psychoactive substance abuse.

Prior to performing the planned research, each respondent was provided with both verbal and written explanations of how the research would be carried out, how the plan of research worked, and how these research findings would be implemented in practice. Afterward, they gave informed consent to participate in the study. The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the Faculty of Medicine University of Novi Sad (protocol code 01-39/212/1, date of approval July 16, 2020).

The general questionnaire was used to collect data on respondents' gender, age, occupation, marital status, and place of residence.

The level of disease activity was calculated using the Disease Activity Score-28 for RA with erythrocyte sedimentation sate (DAS28-ESR) [17]. DAS28-ESR is a combined index that measures disease activity in patients with RA based on 28 painful and swollen joint counts. Longitudinal studies have shown that the effect of disease activity and joint destruction on functional capacity changes throughout the disease. In early RA, functional capacity is mostly associated with disease activity, and in late disease, with joint damage [18]. The final score criteria classified individual patients as being in remission using DAS28-ESR ≤ 2.6, between 2.6 and 3.2 as low disease activity, between 3.2 and 5.1 as moderate activity, and > 5.1 as high activity [19].

The Clinical Disease Activity Index (CDAI) was used to determine the level of underlying disease activity [20]. It is a composite index for assessing RA disease activity based on the simple sum of the number of painful joints (28 joints) and the number of swollen joints (28 joints) and patients' and physicians' global assessment of the disease activity. The global assessment of the disease activity from both the pa-

tient and the physician was measured on a visual analog scale (VAS), a measurement instrument used commonly to asses a parameter that ranges across a continuum of values, such as pain. It ranges from 0 to 100 mm, where the lowest score indicates the absence of the examined value and is calculated by the measured distance in mm of the vertically drawn line on the scale (as a marker of intensity) from the left edge of the scale.

In addition, all patients were examined for the presence and severity of a broad range of depressive symptoms using the standardized Beck Depression Inventory (BDI). It is one of the most widely used instruments to assess depression. Since it was originally developed in English in 1961, the BDI has been translated into many languages [21]. The standardization of the Beck scale into the Serbian language was performed in 2011, and it has been shown that the results clearly indicate the fact that this scale is one of the golden standards for depression measurement and can be considered a valid instrument for depression evaluation in our surroundings [22]. BDI was designed to be used specifically as a screening tool for measuring depression symptoms and the degree of depression severity [23]. This self-report rating inventory comprises 21 items. Each item is evaluated on a severity scale ranging from 0–3 (0 = least, 3 = most), with a total score ranging from 0–63. Higher scores indicate greater depression severity. BDI cut-off scores are used to measure the severity of depression in the following way: scores from 0 to 9 indicate no depression; from 10 to 15, mild depression; from 16 to 19, mild to moderate depression; from 20 to 29, moderate to severe depression; from 30 to 63, severe depression. The BDI takes approximately ten min to complete.

As such, the BDI is considered one of the most relevant tools in assessing depression, showing high reliability and validity. Psychometric properties of the BDI with psychiatric and nonpsychiatric samples were reviewed from 1961 until June 1986. The BDI demonstrates high internal consistency, with alpha coefficients of 0.86 and 0.81 for psychiatric and nonpsychiatric populations, respectively, and the internal consistency of the scale ranged between 0.73 and 0.92 with a mean of 0.86 [24].

Statistical analysis

The research has been done in the form of an observational cross-sectional study. The SPSS 24.0 software package was used for data processing. The Kolmogorov-Smirnov test results showed harmonic data distributions of all variables compared to the nonharmonic distribution of disease activity by CDAI, which was assessed using nonparametric statistics. Descriptive statistics methods were used to measure central tendency (an arithmetic mean) and measures of variability [the standard deviation (SD)] in order to summarize the major numerical characteristics of observations. Additionally, the *t*-test was used to compare the test statistic. Mann-Whitney test was used in order to determine differences between two independent variables. Evaluation of statistically significant differences between frequency distributions among groups was verified by the Chi-squared (χ^2) test. In the tests used, statistically significant differences were observed outside the 95% confidence interval ($p < 0.05$). To measure reliability as a whole, Cronbach's alpha coefficient was used as a measure of internal consistency. The coefficients of at least 0.80 were considered acceptable.

Results

Out of the total number of respondents, 65 (94.2%) were females, and 4 (5.8%) were males. The median age of respondents was 52.2 years (SD = 13.3; min = 19, max = 75). Of the respondents, 43 (62.3%) lived in the urban area, and 26 (37.7%) lived in the rural area. According to the distribution of patients by marital status, the majority, 47 (68.1%) were married, and 22 (31.9%) were single. The distribution of respondents by status in employment was similar, where 38 (55.1%) were employed and 31 (44.9%) were unemployed. The average disease duration was 13.7 years (SD = 7.0; min = 1, max = 40).

The present study showed that the internal consistency estimate for the BDI was high, with Cronbach's alpha coefficients of 0.88. Table 1 shows average values and characteristics of parameter distribution, which were associated with the level of disease activity, functional status, and pa-

Table 1

Descriptive statistics of the data about depressive symptoms in patients with rheumatoid arthritis (n = 69) collected using research instruments

Parameter	Min	Max	Mean	SD	*Sk*	*Ku*
BDI	0.00	30.00	9.52	7.19	0.88	0.20
CDAI	0.00	57.50	11.29	9.57	2.05	7.34
DAS28-ESR	1.11	7.06	2.89	1.21	0.70	1.30
VASi	0.0	75.0	30.52	19.37	0.40	-0.65
VASb	0.0	83.0	36.33	21.23	0.36	0.70

BDI – Beck Depression Inventory; CDAI – Clinical Disease Activity Index; DAS28-ESR – Disease Activity Score-28 erythrocyte sedimentation rate; VASi – patient global health assessment measured on a visual analog scale by the physician; VASb – patient global health assessment measured on a visual analog scale by the patient; Min – minimum; Max – maximum; SD – standard deviation; *Sk* – Skewniss measurement of curvation; *Ku* – (Kurtosis) measurement of flatness.

tient disability index. As shown in Table 1, the characteristics of distribution for CDAI did not match a normal distribution, which is also identified through the values of skewness and kurtosis (values above 1.5). The remaining values from this group of parameters were presented with a normal distribution. Patients had lower mean values of BDI, CDAI, and DAS28-ESR scores. The patient-reported and physician-reported mean VAS measurement scores were approximately the same, with slightly higher scores obtained from patients. Using Intraclass Correlation (IC) for VAS ratings of the two subscales provided independently by the patient and the physician, it was obtained that there was a high degree of agreement between patients and physicians (IC = 0.94, p = 0.00).

The disease activity was assessed by DAS28-ESR and CDAI. The results indicated that the majority of respondents had a moderate level of disease activity. However, a larger number of patients who were in remission as measured by DAS28-ESR were more likely to have lower disease activity than those measured by CDAI (Table 2).

Regarding depressive symptoms measured using the BDI questionnaire, it was found that 40 (58%) respondents reported no symptoms, while 29 (42%) reported having symptoms. Among those who had symptoms of depression, mild symptoms were found in 16 (23.2%) respondents, mild to moderate in 5 (7.2%), moderate to pronounced symptoms in 7 (10.1%), and one (1.4%) had pronounced symptoms of depression. In the further analysis, the results were analyzed only according to the presence or absence of depressive symptomatology since in some subgroups, where the severity of depressive symptoms was assessed, there was a small number of self-reported depressive symptoms.

Pearson's Correlation showed a high-level statistical significance, but of a moderate range, between the BDI and the DAS28-ESR (r = 0.39 p = 0.001), as well as between the BDI and the CDAI (r = 0.40 p = 0.001). Nonparametric techniques of assessing differences between two groups, such as the Mann-Whitney U test and χ^2 test, were used in order to estimate whether there was a connection between certain groups of depression (those with and without depressive symptoms) and disease activity severity. These tests were also used to assess the presence of a statistically significant difference in average scores of disease activity measurements and frequency of depression symptoms. Table 3 shows the frequency values of Mann-Whitney tests, levels of statistical significance for each group, as well as the level of χ^2 test. It is indicated that the results of the Mann-Whitney U test exhibit differences in average ranges of patients in various depression categories (with and without depression), which are of a statistically significant difference in scores of the parameters shown. All of the obtained differences stand for the fact that persons with depressive symptoms had a higher disease activity index (DAS28-ESR; CDAI). Additionally, results obtained from the pain scales, measured by both the patient global health assessment measured on a VAS by the patient – VASb (U = 253.5 p = 0.000) and the patient global health assessment measured on a VAS by the physician VASi – (U = 260.0 p = 0.000), confirm that the presence of depression was associated with a higher level of pain.

In further analysis, Pearson's χ^2 test was used to determine whether there was a relationship between the levels of disease activity and depressive symptoms with some of the examined sociodemographic variables such as patient's age and disease duration. There was a relationship between depressive symptoms and respondents' status in employment, while the level of disease intensity was related to respondents' age as measured on both applied scales. The CDAI demonstrates the respondents' relationship with both places of residence and work activities (Table 4).

Table 2

Level of disease activity in patients with rheumatoid arthritis

Disease activity	DAS28-ESR n (%)	CDAI n (%)
Remission	26 (37.7)	13 (18.8)
Low	9 (13.0)	24 (34.8)
Moderate	32 (46.4)	27 (39.1)
High	2 (2.9)	5 (7.2)
Sum	69 (100.0)	69 (100.0)

DAS28-ESR – Disease Activity Score-28 erythrocyte sedimentation rate; CDAI – Clinical Disease Activity Index.

Table 3

Presence of depressive symptomatology in relation to the level of disease activity (DA)

The level of DA	Remission n (%)	Low DA n (%)	Moderate DA n (%)	High DA n (%)	U	p	χ^2	p
DAS28-ESR								
no depression	20 (50)	4 (10)	16 (40.0)	0 (0.0)	405.0	0.01	8.10	0.04
depression	6 (20.7)	5 (17.24)	16 (55.17)	2 (6.89)				
CDAI								
no depression	10 (25)	18 (45.0)	11 (27.5)	1 (2.5)	297.5	0.00	11.02	0.01
depression	3 (10.34)	6 (20.7)	16 (55.17)	4 (13.79)				

DAS28-ESR – Disease Activity Score-28 erythrocyte sedimentation rate; CDAI – Clinical Disease Activity Index.

Table 4

Relationship of some sociodemographic factors with disease levels and depressive symptoms in patients with rheumatoid arthritis

Parameter	DAS28-ESR	CDAI	BDI
Gender			
Pearson	0.86	4.02	1.01
Sig.	0.83	0.25	0.90
Place of residence			
Pearson	2.72	9.47	6.27
Sig.	0.43	0.02	0.17
Employment status			
Pearson	7.13	10.82	11.29
Sig.	0.06	0.01	0.02
Marital status			
Pearson	3.12	0.94	5.09
Sig.	0.37	0.81	0.27
Age			
Pearson	0.28	0.34	0.20
Sig.	0.01	0.00	0.09
Disease duration			
Pearson	-0.12	-0.13	0.19
Sig.	0.32	0.27	0.11

DAS28-ESR – Disease Activity Score-28 erythrocyte sedimentation rate; CDAI – Clinical Disease Activity Index; BDI – Beck Depression Inventory.

Table 5

Significance of differences between the examined variables

BDI	n	Mean	*t*-test	*p*	Cohen's *d*
Place of residence					
urban	43	8.12	-2.14	0.03	0.50
rural	26	11.85			
Employment status					
yes	38	7.42	-2.81	0.00	0.67
no	31	12.10			
Marital status					
married	47	9.04	-0.80	0.42	- 0.20
single	22	10.55			

BDI – Beck Depression Inventory.

The significance of differences examined by the *t*-test, as well as the size effect, is given in Table 5. Place of residence and working status associated with depressive symptoms also had statistically significant differences within the group of respondents. Thus, the mean value of the respondents residing in rural areas was higher, which indicated more depressive symptoms in relation to the respondents from urban areas. Effect size represents a medium. Respondents who were unemployed at the moment were more likely to have depressive symptoms, while the size effect was also moderate. In contrast to these variables, there is no statistically significant difference in the manifestation of depressive symptomatology between married and single subjects.

Discussion

According to the research conducted, the average age of respondents was 52.17 years, similar to the majority of studies in which respondents were 51–59 years old. As in other cohort studies, the majority of respondents were females, and the sample size of males in the present study was 5.8%. Previous research has shown that females reported more depressive symptoms and had poorer results obtained through different types of questionnaires measuring health-related quality of life in depression, etc. Nevertheless, there is no consensus on whether RA is worse in females or males, and that caution should be exercised when interpreting gender differences, especially related to low disease activity, which can be a consequence of measuring disease activity [25]. In further work, due to the unequal sample sizes, predominantly comprised of females, the obtained results were interpreted without taking into account gender differences.

In this study, slightly less than half (42%) of the patients had depressive symptoms exhibited in varying degrees, among which the majority of the patients had mild symptoms (23.2%). Prior studies have also reported such a high occurrence rate of depressive symptomatology depending on disease duration, the mean age, sleep disturbance, and fatigue [4, 9, 26, 27]. As can be seen from the obtained results, the reported BDI score positively correlated with the level of

disease activity measured by both DAS28-ESR and CDAI. The largest number of respondents with depressive symptoms had moderate disease activity, assessed by both DAS28-ESR and CDAI, thus suggesting that the level of disease activity influences the occurrence of depressive symptomatology in our sample.

In the high-disease-activity group, it is noticeable that, when assessed by CDAI, the number of respondents with depressive symptoms doubled compared to the same group assessed by DAS28-ESR. That could be a result of the incorporation of patient self-reported VAS in CDAI, as opposed to DAS28-ESR, and their perceived severity of the disease, which was reportedly on higher levels of disease activity. Although the level of agreement, as measured using the VAS, between respondents and observers is high, higher mean values are registered in the patient-based assessment of disease activity in terms of more pronounced problems and higher levels of disease activity. The results analyzed in this research show that when information regarding disease activity is obtained through objectively measured data, depression symptoms are registered up to a lower extent compared to the results that rely on a subjective assessment of disease activity by the patient. Considering that the assessment of mental disorders is not clearly defined in terms of a missing consensus on where the line between normal and pathological is drawn, subjective perception and interpretation of symptoms indicating depression in patients with RA must be considered. That is why in patients with RA, equal importance in functional assessment should be given to objective measurement techniques, as well as the subjective perception of patients' condition and everyday functioning.

The data obtained on the frequent presence of depressive symptoms, involving the self-evaluation of disease activity performed by the patients, only calls for the necessity of further implementation of mental health care protection. The complaints that foremost belong to the field of psychopathology are associated with everyday living and are a result of the disease symptoms but also of the lack of reaction and support of the society and surrounding they live in. Several studies report that there is a relationship between the levels of disease activity and depressive symptomatology when it comes to the likelihood of achieving remission. That depressive symptomatology is more common in the early stages of RA, but sociodemographic factors such as marital status, employment status, occupation, and patients' age also have a significant impact on their occurrence [28, 29]. That is why knowing certain risk factors and their contribution to the development of depressive symptoms in patients with RA is essential.

In our research, connections have not been found between the age of respondents and depressive symptomatology, nor with disease duration. In addition, the level of disease activity is correlated with the age of respondents, i.e., it increases with aging. Similar results are confirmed by other studies in which age was found to have a significant positive relationship with the DAS28-ESR [30, 31].

Place of residence was analyzed in relation to the respondents residing in rural areas compared to those residing in urban areas. The results obtained using the DAS28-ESR, but also BDI, have not shown any relationship with the place of residence. These findings are in line with those from the study by Movahedi et al. [32], in which no significant differences were observed demographically nor in the disease characteristics of patients living in rural and urban areas. The CDAI assessment has shown a statistically significant association with the place of residence. Since this instrument relies more on the subjective assessment of the respondents, this result may indicate that living in rural and urban areas can affect their attitudes, needs, and desires, as well as the greater availability of health services and counseling. The presence of depressive symptomatology in this study, measured by CDAI, is present more in respondents living in rural areas. Regardless of the level of disease activity, the rural environment is usually less favorable. Support services are less available, as well as the adaptation to the environment, which can affect the higher frequency of depressive symptoms occurrence. In contrast to these results, previous studies have found that rural patients are also more content with their fate [33].

However, even though RA is a chronic illness that has an impact on quality of life, functional abilities, work ability, and interpersonal relationships, no statistically significant correlations between disease activity levels and depression with marital status were registered in this study. Such findings are consistent with previous research suggesting that RA is unrelated to marital status [34].

The presence of symptoms of depression differs in relation to the respondents' employment status, i.e., depressive symptoms are related to a higher risk of unemployment status. Several studies have revealed that people with RA are more likely to be absent from work, need more time to complete work activities, have difficulty with physical tasks, and have fatigue development, often accompanied by a reduction in earnings and job losses. The loss of work productivity among RA patients is associated with the level of disease severity, as well as the presence of depressive symptomatology. Unemployed patients, bearing in mind that it is a chronic, progressive disease, gain an insight into their disease that will lead to the need for reduced working hours, lower productivity, and inability to engage in work-related tasks and personal activities, which affects the occurrence of depressive symptomatology.

The study did not include the assessment of the quality of life in people with RA or co-existent comorbidities, which could be considered a limitation of the study. These factors could also affect the occurrence of depressive symptomatology among these individuals to a certain degree and have mutual influence. The study sample was small and derived from a single center, which could also be considered a limitation. The impact of specific disease-modifying drugs used in RA treatment was not considered but should be considered for further research implementation. The abovementioned data would provide additional information on depressive symptoms in RA, thus providing the basis for further research.

Conclusion

Even though depressive symptoms have been identified in almost half of the patients, most patients have mild depressive symptoms. The presence of these symptoms is correlated positively with the level of disease activity, which speaks in favor of the fact that this symptomatology is an important factor that may influence further prognosis and treatment of these patients. A higher occurrence of depressive symptoms was identified in situations where patients self-evaluated their disease activity, which only shows the need to take greater care of their mental health. The analysis of certain risk factors and their influence on the appearance of depression indicated that work status and place of resi-

dence contribute to the appearance of depressive symptoms, especially when it comes to the subjective evaluation of the patients. That is exactly why adequate evaluation of risk factors and support systems is necessary for RA patients and should be based on patients' needs through coordinated services from different field experts. It is important to conduct further observational studies, which could give more information on mental health disorders associated with RA and thus help patients and physicians in decision-making and treatment.

Conflict of interest

The authors declare no conflict of interest.

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