

Factors of depression among patients with rheumatoid arthritis

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Abstract

Objectives: The aim of this study was to assess the correlation between symptoms of depression and the course and clinical picture of rheumatoid arthritis (RA).

Material and methods: 120 patients with RA were included in the study: 104 (87%) female patients and 16 (13%) male patients. All studied patients completed the following questionnaires: Beck Depression Inventory (BDI), Ford Insomnia Response to Stress Test (FIRST), Athens Insomnia Scale (AIS) and Health Assessment Questionnaire (HAQ). The serum levels of IL-1 β , TNF- α , and IL-6 were measured using standard ELISA assays at the time of the first questionnaire assessment.

Results: Symptoms of depression were found in 91 patients (76%), including 79 (87%) women and 12 (13%) men. There were no significant differences between the prevalence of depression in women and men ($p = 0.93$). Symptoms of depression occurred more often in patients who were professionally inactive, compared with the professionally active patients ($p = 0.04$). Significant correlations were demonstrated between the value of BDI and the patient's pain assessed by the visual analogue scale (VAS) value ($r = 0.36$), the disease activity assessed by the patient and the physician evaluated in millimetres on the VAS scale ($r = 0.38$ and $r = 0.30$, respectively), the number of painful and swollen joints ($r = 0.22$ and $r = 0.26$, respectively), DAS28 ($r = 0.31$) as well as the Health Assessment Questionnaire (HAQ) value ($r = 0.46$). Longer duration of the disease was observed in patients with symptoms of depression ($p = 0.02$). Also a significant difference in the assessment of BDI between patients treated with biological drugs and those receiving no such treatment was observed ($p = 0.042$).

Conclusions: Professional inactivity and longer disease duration are important factors influencing symptoms of depression in patients with RA. Higher values of HAQ increase the probability of the occurrence of depression symptoms. The use of biological drugs that reduce the level of proinflammatory cytokines may have a positive effect on reducing the severity of depressive symptoms.

Key words: depression, rheumatoid arthritis, Beck Depression Inventory, Ford Insomnia Response to Stress Test, Athens Insomnia Scale.

Introduction

The relation between depression and its somatic symptoms as well as between chronic somatic disease and depression has been known for a long time. However, in recent years neuroimmunological studies have made it possible to reveal the pathomechanism of depression at a cellular level as well as to confirm and explain the above-mentioned relations. Proinflammatory

cytokines, such as TNF- α , IL-1, IL-2 and IL-6 as well as dysregulation of the limbic-hypothalamic-pituitary-adrenal (LHPA) axis play a key role in this pathomechanism [1, 2]. Psychological factors, individual response to stress, behavioural disorder and patient's personality are factors that influence the development of depression in patients with rheumatoid arthritis (RA) as well as in other groups of patients suffering from chronic autoimmune

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diseases [3]. It has been proven that elevated levels of C-reactive protein (CRP) as a marker of inflammation is associated with an increased risk of psychological distress and depression, which confirmed the study by Wiium-Andersen et al. on 73,131 individuals [4]. Nowadays, much attention is attached to the role of interleukin 17 in the pathogenesis of inflammation as well as the development of anxiety and depression [5]. There are ongoing studies on the association of inflammation and depression, and some researchers are taking rheumatoid arthritis as a model of the disease to study these connections [6].

International diagnostic criteria for depression that are currently in force specify that 2 out of 10 symptoms lasting at least 2 weeks need to be determined for diagnosis. The symptoms are as follows: low mood, loss of interests and pleasures, low energy, fatigue, apathy, pessimism towards the future, disturbed sleep, poor appetite, poor concentration, low self-esteem, guilt or self-blame, suicidal thoughts [7].

Screening measures used to assess the risk of depression and its intensity are based on questionnaires which are usually completed by the patient. The most frequently used questionnaires are as follows: Beck Depression Inventory – version I and II, Hamilton Rating Scale for Depression, Jung Self-Test Depression Scale, Montgomery-Åsberg Depression Rating Scale, Geriatric Depression Scale, Centre for Epidemiological Studies-Depression scale (CES-D) and Hospital Anxiety and Depression Scale (HADS-D). In the Polish population the prevalence of depression among adults is estimated to be 12% and this number increases to 15% among elderly people [8]. Depression is also diagnosed in 12.5% of patients who are under the care of a primary care physician; however, antidepressants are prescribed to only 20% of patients. But only every eighth of those treated with antidepressants are referred to a psychiatrist [8]. Masked depression (characterized by the diversity of clinical symptoms, creating difficulties in correct diagnosis) is diagnosed in 10% of patients under the care of primary care physicians [9]. Depression occurs more often in rheumatic diseases due to chronic stress caused by the disease and chronic inflammation. Regardless of the aetiopathogenesis of the inflammatory rheumatic disease the prevalence of depression is similar and ranges from 40 to 80%. In comparison with the general population depression is also diagnosed more often in non-inflammatory joint diseases such as osteoarthritis (OA) (40%) [10–14]. Patients with RA may develop different types of depression which overlap, from endogenous depression and reactive depression (caused by the “losses” that the patient experiences from the onset of the disease and during its course) to drug-induced depression (e.g. due

to large doses of glucocorticosteroids). What is especially important, sleep disturbances are often the first sign of depression in chronic somatic disorders [15, 16].

The objective of the present study was to assess the correlations between the symptoms of depression and the RA clinical activity as well as serum proinflammatory cytokine levels.

Material and methods

The study was carried out at the Clinic and Polyclinic of Rheumatology of the National Institute of Geriatrics, Rheumatology and Rehabilitation in Warsaw. 120 patients with an RA diagnosis, 104 (87%) females and (13%) males, participated in this study. The mean age of the participants was 59 (min. = 19, max. = 85). Characteristics of the study group are presented in Table I.

The study was approved by the Bioethics Committee of the National Institute of Geriatrics, Rheumatology and Rehabilitation.

The mean duration of the disease among participants was 11.2 years (min. = 0.5, max. = 40). The study group included 11% of patients with radiological changes qualified as stage I of disease radiological period according to Steinbrocker radiographic grading, 38% as stage II, 28% as stage III and 23% as stage IV, the highest on this scale. The following disease-modifying drugs (DMARDs) were used in RA patients' treatment (current therapy): sulfasalazine (25.8%), methotrexate (69.2%), azathioprine (3.3%), leflunomide (0.9%), and cyclophosphamide (0.8%). From all studied patients, 16.7% ($n = 20$) were additionally treated with biological drugs (rituximab, etanercept, infliximab and abatacept). Due to the small size of the group for analysis the patients were not divided into subgroups depending on the biological treatment they received. Additionally, 85 patients (70.8%) were treated with diclofenac and 27 patients (25.5%) with ketoprofen. 101 patients (84.2%) in the observed group were also treated with glucocorticosteroids (GCs). The average dose of GCs was 9.06 mg (calculated based on the prednisone dose).

Questionnaire tools

The questionnaire was completed twice at intervals of 3 months minimum and 5 months maximum. The questionnaire consisted of demographic and socio-economic data (residence, living conditions, education, professional activity, economic conditions) as well as clinical data of the disease such as medical history, treatment used so far and at present as well as co-existing diseases. Additionally the patients completed the following standardized questionnaires:

Beck Depression Inventory – version I (BDI I), which measures presence and degree of depression and consists of 21 items (questions) presented in multiple-choice format. BDI evaluates symptoms of depression, fifteen of which express emotions, four cover behavioural changes, and six concerns somatic symptoms. Specifically, such elements are taken into account as sadness, pessimism, suicidal thoughts/wishes, crying, agitation, loss of interest, indecisiveness, past failure, self-dislike, self-criticism, worthlessness, loss of energy, sleeping disturbances, irritability, changes in appetite, difficulties in attention, tiredness or chronic fatigue, and loss of interest in sex. Each answer is scored on a scale from 0 to 3. A result of 0–9 indicates mild-moderate depression, 19–29 indicates moderate-severe depression and 30–63 indicates severe depression.

Polish adaptation of Ford Insomnia Response to Stress Test (FIRST) – a nine-item self-report tool that measures sleep reactivity. This test assesses an individual's likelihood of experiencing sleep difficulties in response to stressful situations. Each item is assessed on a four-point Likert scale and summed; range of scores: 9–36; higher scores indicate higher levels of sleep reactivity.

Athens Insomnia Scale (AIS) – a short self-report tool with eight-items that allows quantitative measurement of insomnia symptoms based on ICD-10 criteria. The total score on the scale is between 0 and 24 points. A score of 6 points or more was considered to be a value allowing for a high probability to conclude about the occurrence of insomnia.

The disease activity was assessed based on the values of the **Visual Analogue Scale (VAS)** (pain and disease activity as assessed by the patient), the duration of morning stiffness, disease activity as assessed by the physician (measured with the VAS), number of painful and swollen joints (in the assessment of 28 joints), and Disease Activity Score 28 (DAS28). All patients also completed the **Health Assessment Questionnaire (HAQ)**. This questionnaire has eight main categories including 20 activities of daily living with four response categories [without any difficulty (score 0), with some difficulty (score 1), with much difficulty (score 2), not being able to do it (score 3)].

Laboratory tests

Additionally, among the standard laboratory tests erythrocyte sedimentation rate (ESR) and concentration of C-reactive protein (CRP) were determined and the serum levels of proinflammatory cytokines IL-1 β , TNF- α , IL-6 were measured using standard ELISA assays at the time of the first questionnaire assessment.

Table I. Characteristics of study group ($N = 120$)

Study group	n (%)
Gender	
Female	104 (87)
Male	16 (13)
Residence	
Town	95 (79)
Countryside	25 (21)
Marital status	
Single (never married)	15 (12.5)
Widow/widower	24 (20)
Married	81 (67.5)
Education	
Primary	9 (7.5)
Basic vocational	24 (20)
Secondary	65 (54)
Tertiary	21 (17.5)
Other	1 (0.8)
Professional activity	
Employed	22 (18)
Unemployed	98 (82)
Disability pension yes	55 (46)
Disability pension no	65 (54)
Pension yes	41 (34)
Pension no	76 (63)
No answer	3 (2.5)
Children	
Yes	102 (85)
No	18 (15)
Living conditions	
Alone	22 (18)
With a spouse	52 (43)
With children	14 (12)
With parents/family	1 (0.8)
Other	31 (26)
Coexisting diseases	
Coexisting diseases in total	62 (52)
Hypothyroidism	18 (15)
Diabetes	13 (11)
Ischaemic heart disease	20 (17)
Epilepsy or other mental illness before RA onset	10 (8)
Positive family history for mental illnesses	6 (5)

Table II. Occurrence of depression symptoms (BDI \geq 10) in reference to the characteristics of the study group (N = 120)

Parameters	No depression symptoms (BDI < 10)	Depression symptoms (BDI \geq 10)	p-values
Gender			0.93
Female	25	79	
Male	4	12	
Total	29	91	
Marital status			0.13
Single (never married)	4	11	
Widow/widower	2	22	
Married	23	58	
Total	29	91	
Residence			0.61
Town	22	73	
Countryside	7	18	
Total	29	91	
Education			0.40
Primary	2	7	
Basic vocational	6	18	
Secondary	13	53	
Tertiary	8	13	
Total	29	91	
Professional activity			0.04
Work yes	9	13	
Work no	20	78	
Total	29	91	
Disability pension			0.33
Having disability pension	11	44	
No disability pension	18	47	
Total	29	91	
Professional activity			0.41
Retired yes	8	33	
Retired no	20	56	
Total	28	89	

Statistical analysis

The level of statistical significance for all the tests carried out within the study was defined as $p < 0.05$. Within descriptive statistics continuous variables were characterized using classic (mean, the standard deviation) as well as positional measures (minimum, maximum, median and quartiles). In the case of ordinal variables of a small number of categories and nominal variables the structure of particular answers was calculated. Hypotheses about the relations between nominal variables were tested using the chi-squared test. The differences between the values of continuous variables in two groups were examined using Student's t-test. In the case of comparison of more than two groups variance analysis was used and additional post-hoc tests were performed with the least significant difference (LSD) test. If the size of the group was too small, the results were additionally verified using the nonparametric Mann-Whitney U test. The relation between continuous variables was measured with the Pearson product-moment correlation coefficient and nonparametric Spearman's rank correlation coefficient. Two-way analysis of variance describing the modelling of binary variables was carried out using a logistic regression model. Calculations were carried out using Statistica and GRETL software.

Results

Beck Depression Inventory scores above or equal to 10 points were found in 91 patients, including 79 (87%) women and 12 (13 %) men. There was no significant difference in the prevalence of depression between men and women. Also no significant differences in the prevalence of depression symptoms in groups with various marital status, place of residence, or educational level were found (Table II).

Our results did not confirm an association between the prevalence of depression symptoms and having a disability pension. However, a significant difference ($p = 0.04$) was observed between professionally inactive and active patients (Table II). Higher prevalence of depression symptoms was found in the group of patients with a worse financial situation ($p = 0.006$). While analysing the prevalence of depression symptoms in reference to the age of the patient, it was found that depression symptoms occur more often in older patients, but the difference was not significant ($p = 0.10$). Also, longer duration of the disease was observed in patients manifesting symptoms of depression ($p = 0.03$). There were no significant differences in the prevalence of depression symptoms between groups of patients with various coexisting chronic diseases such as hypertension, hypothyroidism, hyperthyroidism, diabetes, ischaemic heart

disease, episode of epilepsy or mental illness. Also there was no significant difference in the prevalence of depression symptoms ($BDI \geq 10$) between patients with positive and negative family history of mental illnesses (Table III).

Analysis of the impact of treatment on the occurrence of depression symptoms

No statistically significant difference in the prevalence of depression symptoms was found between the patients treated and not treated with glucocorticosteroids. Also no significant correlations between the prevalence of depression symptoms and the GCs dose ($p = 0.73$) and the duration of GCs therapy ($p = 0.81$) were observed.

The analysis of the impact of biological treatment in patients with RA on the BDI, FIRST and AIS values was carried out in the questionnaires that were completed twice. A statistically significant difference in BDI values was found in the second questionnaire between the patients treated with biological drugs and the patients not receiving this type of therapy ($p = 0.006$). In the FIRST scale values no significant differences were found in the analysed group between patients treated and not treated with biologics. However, significant differences were demonstrated in the total AIS values between patients treated and not treated with biological drugs in the first questionnaire ($p = 0.02$). These data are presented in Table IV.

Table III. Occurrence of depression symptoms ($BDI \geq 10$) in reference to coexisting diseases ($N = 120$)

Parameters	No depression symptoms ($BDI < 10$)	Depression symptoms ($BDI \geq 10$)	<i>p</i> -values
Hypertension			0.20
Yes	12	50	
No	17	41	
Hypothyroidism			0.89
Yes	4	14	
No	24	77	
Hyperthyroidism			0.25
Yes	0	4	
No	29	87	
Diabetes			0.43
Yes	2	11	
No	27	80	
Ischaemic heart disease			0.92
Yes	5	15	
No	24	76	
Episode of epilepsy or mental illness before diagnosis of RA			0.06
Yes	0	10	
No	29	81	
Positive family history for mental illnesses			0.59
Yes	2	4	
No	27	87	

Table IV. Treatment with biologics and the occurrence of depression symptoms in the study group

Questionnaires	Non biologics group mean (SD)	Biologics group mean (SD)	<i>p</i> -level
Questionnaire 1 BDI value	16.22 (8.03)	14.95 (9.39)	0.58
Questionnaire 2 BDI value	17.12 (9.17)	11.90 (6.50)	0.006
Questionnaire 1 FIRST value	24.09 (5.73)	21.88 (5.39)	0.17
Questionnaire 2 FIRST value	24.19 (6.20)	21.96 (5.85)	0.15
Questionnaire 1 total AIS	9.54 (4.07)	6.44 (4.66)	0.024
Questionnaire 2 total AIS	9.69 (4.41)	8.20 (4.50)	0.198

Two-way analysis of variance of the impact of BDI, FIRST and AIS values on the disease activity

Two-way analysis of variance showed that the increase in BDI value by one unit causes, in the same, unchanged conditions (*ceteris paribus*) an increase in VAS value by 0.84 on average, whereas an increase in FIRST value by one unit causes a decrease in VAS value by 0.93 on average. The increase in AIS value by one unit is followed by the increase in VAS value by 1.53 on average. The relations between the values of BDI, FIRST and AIS scales and the value of pain perceived by the patient and measured on the VAS scale were on the verge of statistical significance for BDI and AIS ($p = 0.06$) and they were not statistically significant for the FIRST scale.

Relation between serum levels of proinflammatory cytokines (IL-6, TNF- α , IL-1 β) and values of BDI, FIRST and AIS scales

Based on the two-way analysis of variance in three linear models no statistically significant differences were found between the values of BDI, FIRST and AIS scale and the levels of IL-6 ($p = 0.24$), TNF- α ($p = 0.27$) and IL-1 β ($p = 0.41$).

Relation between value of pain measured with VAS CRP, DAS28, ESR, the number of painful and swollen joints, HAQ as exogenous variable and BDI, FIRST and AIS as endogenous variable

Statistically significant correlations were demonstrated between the value of BDI and the patient's pain assessment (VAS mm) and BDI with the disease activity assessed by the patient and the physician, the number of painful and swollen joints, DAS28 as well as HAQ value. No statistically significant relation was observed between the FIRST value and the assessed parameters. A statistically significant relation was identified in the correlation analysis of total AIS value between the total

AIS and the patient's pain VAS, the disease activity VAS assessed by the patient and the physician and HAQ values (Table V).

Analysis of disease impact on the risk of depression symptoms occurrence

A statistically significant impact of the rheumatoid arthritis on the occurrence of depression symptoms was demonstrated in multivariate logistic regression model. RA increases the risk of depression symptoms (BDI ≥ 10) – the odds ratio (OR) is 8.67 ($p < 0.01$) (95% CI).

Discussion

In the course of RA chronic pain dominates and may determine the occurrence of depression symptoms. Pain also accompanied by chronic inflammation may cause general symptoms similar to the symptoms of depression (depression-like disease) but also predisposing the patient to this disease. At the present time, depression is seen as a complex disease involving many factors associated with the nervous, neuroendocrine and immune systems. The inflammatory theories of depression are confirmed by the increase in pro-inflammatory cytokines IL-6, IL-1, TNF- α or IL-17 in patients with depression [5, 15–18]. Increasing these cytokines may result in antidepressant treatment resistance [19]. Results of the present study did not show a significant dependence of depression symptoms on sex, but it is known that in the general population women suffer from depression definitely more often than men [20, 21]. It should be underlined that in our study group there were 104 female patients but only 16 males; therefore the male group was too small to make certain conclusions.

In the present study patient's age, marital status, having children, living environment, education, financial situation and disease duration did not have an impact on the occurrence of depression symptoms in the studied group. However, it should be emphasized that professional ac-

Table V. Analysis of correlation coefficients between parameters characterising depression symptoms (BDI, FIRST and AIS) and the measures of aggravation of disease symptoms (ESR, CRS, number of painful and swollen joints, DAS28, disease activity VAS assessed by the physician, disease activity VAS assessed by the patient and the patient's pain VAS, HAQ) in patients with RA ($N = 120$)

	Patient's pain VAS (mm)	Disease activity VAS patient's assessment (mm)	Disease activity VAS physician's assessment (mm)	No. of painful joints	No. of swollen joints	ESR (mm/h)	CRP (mg/l)	DAS28	HAQ
BDI	0.36 $p = 0$	0.38 $p = 0$	0.30 $p = 0.001$	0.22 $p = 0.01$	0.26 $p = 0.004$	0.09 $p = 0.33$	0.09 $p = 0.35$	0.31 $p = 0.001$	0.46 $p = 0$
FIRST	-0.03 $p = 0.81$	-0.07 $p = 0.61$	-0.08 $p = 0.50$	-0.14 $p = 0.22$	0.02 $p = 0.88$	-0.16 $p = 0.18$	-0.22 $p = 0.08$	-0.12 $p = 0.30$	0.04 $p = 0.71$
Total AIS	0.25 $p = 0.03$	0.25 $p = 0.03$	0.17 $p = 0.15$	0.19 $p = 0.10$	0.11 $p = 0.34$	0.02 $p = 0.83$	-0.01 $p = 0.96$	0.21 $p = 0.054$	0.42 $p = 0$

tivity is a beneficial factor causing fewer symptoms of depression. By reversing the situation, professionally inactive patients have significantly more depressive symptoms than those who are professionally active (78 vs. 13). It underlines how important it is for patients with RA to keep working, as professional activity is a factor that decreases the risk of depression, which is confirmed in the literature [22, 23]. The obtained results correspond with the relation between depression symptoms and financial situation of the patients – depression symptoms occurred statistically significantly more often in patients who reported having a worse financial status. The occurrence of depression symptoms increases with age, but this difference in our study did not attain statistical significance.

The relation between the prevalence of depression symptoms and the disease duration was demonstrated and the differences were statistically significant. It may stem from the stress caused by the chronic disease and its consequences.

The increase in prevalence of depression symptoms in patients with RA was demonstrated for coexisting diseases such as hypertension, hypothyroidism, hyperthyroidism, diabetes and ischaemic heart disease, but the differences were not statistically significant (however, the limitation is that the group of patients with accompanying diseases is too small). It is known that depression occurs more frequently in patients suffering from hypertension, hypothyroidism, hyperthyroidism, diabetes or ischaemic heart disease than in the general population of healthy individuals and the combination of several somatic diseases increases the risk even more [24–27]. However, reverse relations, demonstrating that depression in patients with RA increases the risk of myocardial infarction and overall cardiovascular risk ratio, can also be found in the literature [27].

It was also demonstrated that symptoms of depression occur more often in patients who suffered from an episode of mental illness and/or epilepsy before RA diagnosis as well as in patients with positive family history for mental illness (although the differences were not statistically significant and the size of the study group was small).

It is confirmed in literature data, which show that in 50–85% of patients who suffered from one episode of depression, another episode is likely to occur [28].

Also, some studies have shown that mental illness can run in families [29] but what is interesting in the present study is that there were no connections between family history of mental illness and symptoms of depression in the studied group of patients. This can be explained by the fact that RA is an independent risk factor for the development of these symptoms, so the significance of family history is not demonstrated.

The impact of treatment with glucocorticosteroids and biological drugs on the occurrence of depression symptoms in patients with RA was also analysed. Glucocorticosteroids are not only drugs used in exacerbations of RA but are often used chronically in this group of patients. As many as 84.2% of patients in the study group were treated with GCs. It was demonstrated that the treatment with GCs as well as treatment duration and the dose of GCs did not impact the occurrence of depression symptoms. It should be noted that patients with BDI > 10 and < 10 treated with GCs had a similar mean dose of GCs (9.06; 8.15 mg respectively). It was significant that the mean dose of GCs used in the studied group was relatively low. According to the available literature studies, psychiatric disorders are related to high doses of GCs (> 40 mg/24 h) [30]. Therefore, even the chronic use of a small dose of GCs was not associated with increased depression symptoms in the study group.

As many as 20 patients were treated with biological drugs (rituximab, etanercept, infliximab, ataccept), which had an impact on statistically significantly lower BDI values – 11.90 in patients treated with biological drugs vs. 17.12 in patients not treated with biologics. There are some reports which confirm a positive impact of biological drugs on the decrease of depression symptoms in patients with RA [31]. No statistically significant differences were demonstrated between the values of FIRST and AIS scales in patients treated or not treated with biological drugs.

It was demonstrated that the changes in the values of BDI and AIS scales impact the symptoms and the course of RA. The pain assessed by the patient increases by 0.84 on average when the BDI value increased by 1 and by 1.53 when the AIS value increased by 1. No such correlation was found for the FIRST scale which indicates individual and permanent personal methods of coping with stress. What is interesting, there was a difference in assessment in the AIS scale between patients' and physicians' assessment.

An impact of the values of the FIRST and AIS scale on the number of painful joints was demonstrated, close to statistical significance, but without an impact on BDI values. None of the scales had an impact on the number of swollen joints.

Contrary to observations in the general population the inflammatory parameters ESR and CRP had no impact on symptoms of depression in the studied RA group, which may be due to the fact that these patients were taking anti-inflammatory drugs.

Bechman et al. [32] demonstrated that mental health and stage of disability may influence RA flare in patients who were tapering anti-TNF inhibitor. The authors suggested that the decision about anti-TNF tapering should

be considered not only based DAS28 and inflammatory markers such as ESR or CRP assessment but also mental health and dysfunction should be considered.

What is important, a positive correlation was demonstrated between the values of FIRST and AIS scales and the value of DAS28. In the assessment of the impact of BDI, AIS and FIRST values on HAQ value statistically significant correlations were indicated between BDI and AIS values and HAQ value. These data show that the symptoms of depression, sleep disorders and predisposition to sleep disorders due to stress have an impact on clinical activity of RA.

Further analyses were used to assess the influence of clinical and laboratory disease activity on the occurrence of depression symptoms and sleep disorders, including as a response to stress (in BDI, AIS and FIRST scale). The treatment used (biological treatment in particular) could have influenced the differences in results. Many studies underline that higher CRP values occur in individuals with depression both in the general population and in the group of patients than in patients who do not suffer from depression [4].

There was a significant correlation between assessment of disease impact (pain assessed by VAS, number of painful and swollen joints, ESR, CRP, DAS28, HAQ) on depression symptoms (BDI values), FIRST value and insomnia symptoms – AIS value between HAQ value and BDI and AIS values as well as between the number of swollen joints and FIRST value. It indicates a strong correlation between the patient's disability assessment and symptoms of depression and insomnia. The assessment of the impact of depression symptoms (BDI value), and the values of FIRST and AIS scales on the activity of rheumatoid arthritis showed that BDI value has a statistically significant impact on the patient's VAS pain, disease activity assessed by the patient and the physician (measured in VAS), number of painful and swollen joints, DAS28 value and HAQ value, whereas the AIS value has a statistically significant impact on the patient's VAS pain and disease activity as well as the HAQ value. It is partially confirmed in a publication presenting a decrease in pain experienced by patients with RA treated with dothiepin due to coexisting depression [33].

A significant impact of general fitness assessed by the patient in the HAQ survey on the occurrence of depression symptoms (BDI \geq 10) should be particularly underlined. Similarly a strong correlation was proved between the pain experienced by the patient (measured on the VAS) and the occurrence of depression symptoms (BDI \geq 10). It was demonstrated that the increase of HAQ value by 0.1 is followed by an increase of 3 times in the odds ratio of depression symptoms development.

The fact that the study was carried out using a questionnaire constitutes a limitation. The obtained data are based on the declarations of respondents and not on observations of their behaviour. In the case of BDI, FIRST and AIS scales, which are related to some controversy (in terms of depression symptoms), it can be expected that the declarations differ from actual behaviours. In the case of questions relating to HAQ, VAS and DAS28 there is only a slight risk that the respondents provided false information. It can be therefore assumed that the data obtained in the study are not fundamentally affected. The small number of participants in the study groups constitutes another limitation. It did not allow for more detailed statistical analysis. However, the large number of questionnaires validated for Polish conditions that were used in the study constitutes its strength.

The obtained results confirm the need for screening for occurrence of depression symptoms in RA patients, which may lead to early diagnosis and treatment not only of RA and joint inflammation but also direct actions on the depression symptoms. This prevents the development of a full-blown disease like depression. Rheumatoid arthritis and depression may influence each other, which cause worsening of their course. On the other hand there was evidence which was presented by Song et al. [34] that exposure to a stress-related disorder and depression was associated with increased risk of autoimmune diseases including RA. The authors compared these results with unexposed individuals and with full siblings. Both the severity of RA and the occurrence of depressive symptoms require a comprehensive treatment approach. The omission of assessment for symptoms of depression in RA patients may result in a worse course of disease and it may be a reason for resistance to treatment of depression.

Conclusions

In patients with RA, the occurrence of depressive symptoms is more frequently observed than in the general population and correlates with duration of chronic disease.

Symptoms of depression in RA patients are more frequent in the group of professionally non-active patients.

Higher values of HAQ increase the probability of the occurrence of depression symptoms.

Treatment of RA patients with biological drugs, which very effectively suppresses proinflammatory cytokines, may reduce aggravation and prevalence of depression symptoms in this group of patients.

The authors declare no conflict of interest.

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