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Social Participation of Rheumatoid Arthritis Patients: Does Illness Perception Play a Role?

Alexandra Husivargova^{1, 2}, Vladimira Timkova¹, Zelmira Macejova^{3, 4}, Zuzana Kotradyova^{3, 4},
Mundher Abdulkareem Salmon Aljubouri^{3, 4}, Dagmar Breznoscakova¹, Robbert Sanderman^{2, 5}, and Iveta Nagyova¹

¹ Department of Social and Behavioural Medicine, Faculty of Medicine, Pavol Jozef Safarik University

² Department of Health Psychology, University Medical Center Groningen, University of Groningen

³ 1st Department of Internal Medicine, Faculty of Medicine, Pavol Jozef Safarik University

⁴ 1st Department of Internal Medicine, Louis Pasteur University Hospital, Kosice, Slovakia

⁵ Department of Psychology Health and Technology, University of Twente

Objective: Social participation is an important aspect associated with health-related outcomes in chronic diseases. However, little is known about the factors that may affect participation in patients with rheumatoid arthritis (RA). We aimed to examine whether pain, fatigue, anxiety, depression, and illness perception are associated with social participation in patients with RA when controlled for clinical and sociodemographic variables. We also analysed the mediating role of illness perception in the association between physical and psychological variables on social participation. **Method:** We included 157 RA patients (84.7% females; mean age 56.4 ± 13.9 years) who completed the Participation Scale, Brief Illness Perception Questionnaire, Generalized Anxiety Disorder Scale, Patient Health Questionnaire, 36-item Short Form Health Survey, and the Visual Analogue Scale. Multiple linear regressions and mediation analyses were used to analyze the data. **Results:** In the final regression models, illness perception ($\beta = .42; p \leq .001$) and functional disability ($\beta = .21; p \leq .05$) were associated with social participation. Income ($\beta = -.18; p \leq .05$) lost its significance when physical variables were added to the model, and pain ($\beta = .24; p \leq .05$) and fatigue ($\beta = -.24; p \leq .05$) when psychological distress was added. No significant role of anxiety, depression, disease activity, or age was identified using regression analyses. Illness perception mediated the association of pain, fatigue, anxiety, and depression with social participation, and the indirect effect varied from 65% to 98%. **Conclusions:** Illness perceptions may significantly diminish the impacts of pain, fatigue, anxiety, and depression on social participation in individual RA patients. Therefore, RA patients could benefit from psychological interventions aimed at tackling negative illness perceptions.

Public Significance Statement

Social participation is an important aspect associated with health-related outcomes in chronic diseases. Our study found that how patients perceive their illness may significantly diminish the impacts of pain, fatigue, anxiety, and depression on social participation in rheumatoid arthritis (RA). Nonpharmacological interventions may consider illness perception as one of the key factors for enhancing social participation, as well as overall well-being and quality of life in RA patients.

Keywords: rheumatoid arthritis, social participation, psychological distress, fatigue, pain

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Alexandra Husivargova  <https://orcid.org/0000-0002-4639-4354>

Iveta Nagyova  <https://orcid.org/0000-0002-9528-5234>

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Alexandra Husivargova served as lead for writing—original draft, contributed equally to data curation, and served in a supporting role for conceptualization. Vladimira Timkova served in a supporting role for conceptualization, formal analysis, methodology, and resources. Zelmira Macejova served in a supporting role for conceptualization, supervision, and writing—review and editing. Zuzana Kotradyova served in a supporting role for data curation, investigation, and writing—review and editing. Mundher Abdulkareem Salmon

Aljubouri served in a supporting role for data curation, investigation, and writing—review and editing. Dagmar Breznoscakova served in a supporting role for conceptualization, investigation, and writing—review and editing. Robbert Sanderman served in a supporting role for project administration and writing—review and editing. Iveta Nagyova served as lead for funding acquisition and project administration and served in a supporting role for resources and writing—review and editing. Alexandra Husivargova and Iveta Nagyova contributed equally to formal analysis and methodology. Alexandra Husivargova and Vladimira Timkova contributed equally to writing—review and editing. Vladimira Timkova, Robbert Sanderman, and Iveta Nagyova contributed equally to supervision. Alexandra Husivargova and Zelmira Macejova contributed equally to investigation. Robbert Sanderman and Iveta Nagyova contributed equally to conceptualization. All of the authors contributed to the study's structure and data analysis or interpretation. Similarly, all of the authors assisted with the preparation of the article and approved the final version.

Correspondence concerning this article should be addressed to Iveta Nagyova, Department of Social and Behavioural Medicine, Faculty of Medicine, Pavol Jozef Safarik University, Trieda SNP 1, 040 11 Kosice, Slovak Republic. Email: iveta.nagyova@upjs.sk

Rheumatoid arthritis (RA) is an autoimmune inflammatory systemic disease of unknown aetiology that predominantly affects small and large joints with a deteriorating prognosis (Espinoza et al., 2021; Katchamart et al., 2020). With a global prevalence of 0.4%–1.3%, RA primarily affects female patients with a 3:1 ratio (Espinoza et al., 2021; Szady et al., 2017). RA is acknowledged as one of the 50 most widespread diseases globally, contributing to disease burden and one of the leading causes of disability in Europe (Espinoza et al., 2021; Szady et al., 2017). RA can lead to serious socioeconomic consequences and can cause a decrease in life expectancy; thus, targeted diagnosis and lifetime management are needed (Beşirli et al., 2020; Boonen & Severens, 2011; Espinoza et al., 2021; Suh et al., 2018). RA also often leads to restrictions in social participation, i.e. difficulties that individuals may experience on a daily basis in different domains and roles, such as economic, social, interpersonal, or household (Benka et al., 2016a; Berner et al., 2018; Boonen & Severens, 2011).

A recent scoping review operationalizes social participation as “a person’s involvement in activities providing interactions with others in community life and important shared spaces, evolving according to available time and resources, and based on the societal context and what individuals want and is meaningful to them” (Levasseur et al., 2022). Currently, social participation represents a well-established proxy of disease impacts and treatment outcomes (Piskur et al., 2014) in various chronic diseases, including RA (Bay et al., 2020). A recent meta-analysis to determine the extent to which social relationships influence risk for mortality found a 50% increased likelihood of survival for participants with stronger social relationships. Lack of social connections and restrictions in social participation were found to have an effect on health outcomes comparable to “lifestyle” risk factors, such as obesity or tobacco use (Holmes & Joseph, 2011; Holt-Lunstad & Smith, 2012). Decreased social participation is usually associated with loneliness (Bay et al., 2020; Vingeliene et al., 2019), which has a negative effect on health-related outcomes (Ang, 2019a; Berner et al., 2018) and inflammation biomarkers (Vingeliene et al., 2019). Furthermore, as the COVID-19 pandemic demonstrated, restrictions in social participation and absence of social interactions are critical to an individual’s health and well-being (Levasseur et al., 2022).

It is important that clinicians pay attention to psychological, social, behavioral, contextual, and biological aspects of RA, as these are inextricably linked and affect the perception of and response to illness processes and related disability (Turk & Thiene, 2018). A conceptual model of biopsychosocial interactive processes involved in health and illness (Gatchel, 2004) aptly delineates the complex interplay between these factors in RA. Disease processes have psychological and social consequences, and conversely, these consequences can impact the progression of the disease. Recent studies have shown that restrictions in social participation are linked to disability levels (Barnabe et al., 2018; Benka et al., 2016a), disease activity (Benka et al., 2016a), pain (Ahlstrand et al., 2012; Bay et al., 2020; Benka et al., 2016a), fatigue (Ahlstrand et al., 2012; Bay et al., 2020), anxiety (Benka et al., 2016a), and depression (Benka et al., 2016a, 2016b). In the study by Bay et al. (2020), RA patients described feelings of fear and loss related to their chronic illness, as well as physical limitations and a lack of mental energy, which prevent them from engaging in social activities. These participation restrictions were associated with a sense of exclusion from societies or social life, as well as

the fear of losing employment, important life roles, loneliness, and the need to develop a new, renegotiated identity (Bay et al., 2020). Pain, fatigue, depression, and anxiety are commonly recognized as four major concomitants of RA (Turk & Thiene, 2018). Pain with a prevalence of up to 90% is a primary reason for seeking medical care, and up to 70% of patients ranked pain relief as their number one priority in RA management (Bas et al., 2016; Cho et al., 2013). Fatigue is another dominant RA symptom that is difficult to manage, with up to 80% prevalence (Choy, 2019; Primdahl et al., 2019; Szady et al., 2017). The prevalence of mental health problems in RA varies between 66% and 84% in RA, and anxiety or depression may significantly contribute to negative health outcomes, as well as social restrictions, and worsen disease prognosis (Beşirli et al., 2020; Fiest et al., 2017; Katchamart et al., 2020; Marrie et al., 2018; Rezaei et al., 2014; Santos et al., 2019). A recent study in RA patients revealed that pain, fatigue, disability, and mental distress persist despite biological treatment (Husivargova et al., 2022). In addition, some studies emphasized the role of confounding sociodemographic factors, such as age (Benka et al., 2016b), sex (Ang, 2019b; Geuskens et al., 2007), cohabitation with a partner (Feng et al., 2020), or income (Barnabe et al., 2018; Rezaei et al., 2014) in the association with social participation.

In the past decades, great attention has been given to illness perception, defined as patients’ emotional and cognitive representations of an illness and its association with self-reported health outcomes (Berner et al., 2018; Rezaei et al., 2014; Timkova et al., 2021), along with work and social restrictions in somatic diseases (Fanakidou et al., 2018; Hoving et al., 2010). Illness perception affects a patient’s responses to the difficulties caused by the disease, as well as their psychological adjustment to the disease, mental health, perceptions of symptom severity, and everyday life (Timkova et al., 2021). Psychosocial models including illness perception might explain individual differences in daily functioning and quality of life in patients with chronic conditions, including RA (Berner et al., 2018). The concept of illness perception is derived from the Common-Sense Model of Self-Regulation, which offers a basis for investigating the perceptual, behavioral, and cognitive processes involved in people’s self-management of current and future health threats (Leventhal et al., 2016). The impact of chronic illness is generally influenced by the patient’s perception of the disease, represented by cognitive and emotional interpretation, which culminates in the development and formulation of coping strategies (Aloush et al., 2021; Rezaei et al., 2014; Zyrianova et al., 2011). Previous studies have shown a mediating effect of illness perception on the association between physical disability, pain, and various psychological and physical symptoms in RA patients (Rezaei et al., 2014; Zyrianova et al., 2011). As RA symptoms persist even despite pharmacological treatment, an effort has to be made to identify factors that are manageable via nonpharmacological interventions (Berner et al., 2018; Husivargova et al., 2022).

The role of social participation in RA has received more attention in the past decade, and several studies have been conducted lately on the role of physical and psychological factors that may affect social participation in RA patients (Barnabe et al., 2018; Benka et al., 2016b). To the best of our knowledge, no previous study has assessed the mediating role of illness perception in the associations between major consequences of RA (pain, fatigue, anxiety, depression) and social participation. In previous research, illness perception was studied in RA with different factors, such as adherence,

psychological distress, quality of life, coping, pain, or disability, rather than in association with social participation (Berner et al., 2018; Katchamart et al., 2020; Rezaei et al., 2014; Suh et al., 2018; Zyrianova et al., 2011). Therefore, this study aimed to examine the association of pain, fatigue, anxiety, depression, and illness perception with social participation in RA patients, while controlling for relevant clinical and sociodemographic variables. We also aimed to assess the mediating role of illness perception on the associations between physical and psychological variables on social participation. In daily clinical practice, the patient should be encouraged to participate in social activities, which have been proven to have beneficial effects on patients' health and well-being. Illness perceptions are potentially modifiable factors that may be useful to address in the self-management or cognitive behavioral interventions to diminish the negative effect of RA-related symptoms and improve social participation in RA patients.

Method

Sample and Procedure

Participants were recruited at the Rheumatology Outpatient Clinic of the Louis Pasteur University Hospital in Kosice, Slovakia, which specializes in biological treatment. The following criteria had to be met in order to participate in the study: RA diagnosed according to the American College of Rheumatology criteria (Arnett et al., 1988) and treatment with biologic disease-modifying antirheumatic drugs (bDMARDs). Exclusion criteria were being under the age of 18 and the inability to speak Slovak. Patients with RA who had comorbidities were not excluded from participating in the study.

Patients were recruited between April 2019 and February 2020 and were routinely examined by a rheumatologist. The data collection proceeded with the postal delivery of self-report questionnaires, an invitation letter, and a written informed consent form to the participants' homes. Out of the 206 invited patients from the whole database of RA patients from our clinic (all white and Slovaks), 157 agreed to participate and 49 refused (response rate of 76.2%). There were no statistically significant differences between respondents and nonrespondents in terms of age, sex, or disease duration.

The Ethics Committee of the Faculty of Medicine at PJ Safarik University in Kosice approved the study (approval No. 115/2011, 2021/EK/01001). All patients signed an informed consent form before participating in the study. Participation in the study was entirely voluntary, with no incentives offered for participation. The study followed Good Clinical Practice standards and the Declaration of Helsinki.

Measures

Social Participation

Social participation was measured with an 18-item Participation Scale (P-scale). The scale assesses participation restrictions in patients with chronic conditions and evaluates social stigma by responding to questions about inclusion/exclusion from various social activities. Total scores range from 0 to 90, with higher scores indicating higher restrictions in social participation. The cutoff scores for mild, moderate, severe, and extreme restrictions are 13, 23, 33, and 53, respectively (van Brakel et al., 2006). Cronbach's α for P-scale in our sample yielded .91.

Illness Perception

Illness perception was measured using the Brief Illness Perception Questionnaire (B-IPQ) consisting of eight items and the last open-ended item (cause), which was not included in our analyses. The scale assesses patients' cognitive and emotional representations of their illness. Cognitive representations include (a) perceived consequences (impacts of the illness on physical, psychological, and social functioning), (b) timeline (duration or course of the disease), (c) personal control (how much control one has over the disease), (d) treatment control (the extent of believes that the disease is amenable to cure/control), (e) identity (ideas about the nature of the disease and its label), and (f) understanding (comprehension about illness). Emotional illness representations include (g) concern (worries about the disease) and (h) emotional response (perceived impact of the illness on the emotions). The overall range of questionnaire scores is 0–80, with higher scores reflecting a more threatening view of the illness (Broadbent et al., 2006; Timkova et al., 2021). Cronbach's α in our sample was .70.

Anxiety

Anxiety was assessed using the General Anxiety Disorder Scale (GAD-7). The GAD-7 is a self-report scale with seven items assessed on a 4-point Likert scale. The range of the total scale score is from 0 to 21, with higher scores indicating greater anxiety levels. The cutoff scores for mild, moderate, and severe anxiety symptoms were 5, 10, and 15, respectively (Spitzer et al., 2006). Cronbach's α in our sample was .89.

Depression

Depression was measured with the self-report Patient Health Questionnaire (PHQ-9). It is a nine-item questionnaire developed to assess the presence of depressive symptoms based on the *Diagnostic and Statistical Manual of Mental Disorders-Fourth edition* criteria for major depressive disorder. Each item is scored on a 4-point Likert scale, with the total score ranging from 0 to 27, with higher scores indicating more depression. With cutoff scores of 5, 10, 15, and 20 correspondingly, distinct degrees of depression can be determined for mild, moderate, moderately severe, and severe depressive symptoms (Kroenke et al., 2001). Cronbach's α in our sample yielded .83.

Fatigue

The level of fatigue was assessed using the vitality subscale of the 36-item Short Form Health Survey (SF-36). The questionnaire measures perceived health and especially the health-related quality of life in a variety of populations, including RA. The vitality subscale consists of four items, with a total range from 0 to 100, with higher scores indicating lower fatigue (Choy, 2019; Ware & Sherbourne, 1992). Cronbach's α for the vitality subscale in our sample was .87.

Pain

The severity of pain was assessed using a 100 mm Visual Analogue Scale (VAS), with scores ranging from 0 to 100, with a higher score representing greater pain (Huskisson, 1974).

Clinical and Sociodemographic Variables

Clinical variables, such as disease duration, disease activity, and functional disability, were assessed during a medical examination by a rheumatologist, and additional information was retrieved from patients' medical records.

The Disease Activity Score contains a 28-tender and swollen joint count, the Erythrocyte Sedimentation Rate, and a VAS for general health assessment. RA disease activity levels can be categorized as remission (<2.6), low disease activity ($2.6\text{--}3.2$), moderate ($3.3\text{--}5.1$), or high activity (>5.1) (Van der Heijde et al., 1992).

Functional disability was measured using the Health Assessment Questionnaire–Disability Index (HAQ-DI). HAQ-DI is a self-reported questionnaire with 20 items that assesses fine movements of the upper extremities, locomotor activities of the lower extremities, and activities that involve both the upper and lower extremities in eight categories. A total score ranging from 0 to 1 represents “mild to moderate difficulty”; a score of 1 to 2 indicates “moderate to severe disability”; and 2 to 3 represents “severe to very severe disability” (Bruce & Fries, 2005; Szilasiova et al., 2002). Cronbach's α in our sample yielded .85.

Sociodemographic variables, such as age, sex, cohabitation with a partner, and household income, were obtained from self-report questionnaires. Income was classified per person based on the criteria stated by the Ministry of Labour, Social Affairs and Family of the Slovak Republic (MLSAaF SR) as less or equal to the subsistence minimum, higher than the subsistence minimum, and at least double the subsistence minimum (MLSAaF SR, 2017).

Statistical Analyses

The data in this study were analyzed using several statistical methods. The basic characteristics of the participants were examined using descriptive statistics (frequencies, percentages, and mean values with standard deviations). Correlational analyses were used to assess the associations of social participation (P-scale) with pain (VAS), fatigue (SF-36), anxiety (GAD-7), depression (PHQ-9), illness perception (B-IPQ), and control variables (disease activity, functional disability, disease duration, age, sex, cohabitation with partner, and household income). Next, multiple linear regression analyses were employed to investigate the associations between variables under study and social participation as a dependent variable while controlling for age, income, disease activity, and functional disability. Only variables that were found to be significantly associated with social participation in correlational analyses were included in the regression models. The variance inflation factor was ≤ 2.5 and showed no significant multicollinearity (Senaviratna & Cooray, 2019). The variables in the first model included sociodemographic data (age and income). The clinical variables (disease activity and functional disability) were added to the second model. The third model included pain, and the fourth model implemented fatigue. Anxiety and depression were incorporated into the fifth model, and illness perception was added to the sixth model to examine the increase in the total explained variance of social participation. Additionally, the Sobel test was performed to assess the mediation effect of illness perception on the associations between pain, fatigue, anxiety, depression, and social participation. A p value of .05 was considered statistically significant. According to power analysis, the statistical power for multivariate analysis

exceeded 0.95%, with a medium effect size of $\alpha = .05$ (Faul et al., 2009). The analyses were performed using the Statistical Package for the Social Sciences (SPSS 25; IBM).

Results

Sample Characteristics

The study sample consisted of 157 RA patients (84.7% female; mean age 56.4 ± 13.9 years; mean disease duration 19.5 ± 9.5 years). The majority of patients (67.5%) were in remission. Half of the RA patients (50.3%) experienced moderate to severe functional disability. About half of the patients had no significant social participation restrictions (51.6%), followed by mild (19.1%), moderate (13.4%), severe (10.8%), and extreme (5.1%) restrictions (Table 1).

Correlations of Pain, Fatigue, Anxiety, Depression, Illness Perception, and Social Participation

Restrictions in social participation were significantly correlated with higher age, lower income, higher disease activity, worse functional disability, greater pain and fatigue, higher levels of anxiety and depression, and negative illness perception. Social participation was not associated with patients' sex, cohabitation status, or disease duration (Table 2).

Associations of Pain, Fatigue, Anxiety, Depression, Illness Perception, and Social Participation, When Controlling for Sociodemographic and Clinical Variables

Multiple regression analyses showed that in Model 1, incorporating sociodemographic variables, reduced social participation was significantly associated with low income ($\beta = -.18$; $p \leq .05$); however, this association was no longer significant when the pain was added to the regression model. Functional disability ($\beta = .21$; $p \leq .05$) was significantly associated with reduced social participation in all subsequent regression models (Models 2–6). Higher levels of pain were associated with higher social restrictions ($\beta = .24$; $p \leq .05$), but these associations were no longer significant when fatigue was added to the model (Model 4). Reduced social participation was significantly associated with higher levels of fatigue ($\beta = -.24$; $p \leq .05$) until psychological distress was added to the next model (Model 5). Positive illness perception was strongly associated ($\beta = .42$; $p \leq .001$) with social participation. Anxiety, depression, disease activity, and age were not significantly associated with social participation in any of the regression models. The proposed final model explained 39% of the total variance of social participation (Table 3).

The Mediating Effect of Illness Perception on the Association Between Pain, Fatigue, Anxiety, Depression, and Social Participation

Figure 1 displays the mediation model. The conditions to establish mediation were met. Pain, fatigue, anxiety, and depression were all significantly associated with social participation, and secondly, pain, fatigue, anxiety, and depression were related to illness perception (Table 4). The Sobel test confirmed a statistically significant indirect effect of illness perception on social participation via pain (Sobel z value = 5.85; $p \leq .001$), fatigue (Sobel z value = -6.02 ;

Table 1
Baseline Characteristics of the Study Population

Variables	N (%) / mean \pm SD	Theoretical range	Study range	N
Sociodemographic variables				
Age	56.4 \pm 13.9		23–78	157
Sex				157
Female	133 (84.7%)			
Male	24 (15.3%)			
Cohabitation status				146
With partner	105 (71.9%)			
Alone	41 (28.1%)			
Household income				144
Less or equal to the subsistence minimum ^a	16 (11.1%)			
Higher than the subsistence minimum ^b	57 (39.6%)			
At least double the subsistence minimum ^c	71 (49.3%)			
Clinical variables				
Disease duration	19.5 \pm 9.5		4–57	148
Disease activity (DAS-28)	2.4 \pm 1.1	0–10	0.5–6.6	151
Remission	102 (67.5%)	0–2.5	0.5–2.5	
Low	22 (14.6%)	2.6–3.2	2.6–3.2	
Moderate	22 (14.6%)	3.3–5.1	3.3–5.1	
High	5 (3.3%)	5.1–10	5.1–6.6	
Functional disability (HAQ-DI)	1.4 \pm 0.7	0–3	0–3	149
Mild to moderate	37 (24.8%)	0–0.9	0–0.9	
Moderate to severe	75 (50.3%)	1–1.9	1–1.9	
Severe to very severe	37 (24.8%)	2–3	2–3	
Social participation (P-Scale)	16.6 \pm 16.3	0–90	0–65	157
No significant restriction	81 (51.6%)	0–12	0–12	
Mild restriction	30 (19.1%)	13–22	13–22	
Moderate restriction	21 (13.4%)	23–32	24–32	
Severe restriction	17 (10.8%)	33–52	33–46	
Extreme restriction	8 (5.1%)	53–90	56–65	
Pain (VAS)	48.4 \pm 23.9	0–100	0–100	157
Fatigue (SF-36 vitality)	43.7 \pm 18.8	0–100	0–90	157
Anxiety (GAD-7)	4.2 \pm 3.9	0–21	0–17	131
None to minimal	84 (64.1%)	0–4	0–4	
Mild	34 (26%)	5–9	5–9	
Moderate	8 (6.1%)	10–14	10–12	
Severe	5 (3.8%)	15–20	15–17	
Depression (PHQ-9)	5.4 \pm 4.6	0–27	0–26	131
None to minimal	69 (52.7%)	0–4	0–4	
Mild	46 (35.1%)	5–9	5–9	
Moderate	8 (6.1%)	10–14	10–13	
Moderately severe	5 (3.8%)	15–19	15–18	
Severe	3 (2.3%)	20–27	20–26	
Illness perception (B-IPQ)	43 \pm 10.1	0–80	9–67	156

Note. DAS 28 = Disease Activity Score; HAQ-DI = Health Assessment Questionnaire–Disability Index; P-Scale = Participation Scale; VAS = Visual Analogue Scale; SF-36 = 36-item Short Form Health Survey; GAD-7 = Generalized Anxiety Disorder Scale; PHQ-9 = Patient Health Questionnaire; B-IPQ = Brief Illness Perception Questionnaire.

^aLess than €199 per person/per month. ^b€199–399 per person/per month. ^cMore than €399 per person/per month.

$p \leq .001$), anxiety (Sobel z value = 4.32; $p \leq .001$), and depression (Sobel z value = 4.56; $p \leq .001$). The type of mediation effect identified in our study was full mediation. The proportion of the indirect mediating effect of illness perception on the associations between the variables under study and social participation was the highest in fatigue (97.6%), followed by pain (88.3%), depression (75%), and anxiety (65%) (Table 5).

Discussion

This study aimed to examine factors associated with social participation in RA patients. In particular, the association between pain, fatigue, anxiety, depression, illness perception, and social participation

was examined, controlling for clinical and sociodemographic variables. The findings suggest that the key factors associated with social participation are not the patients' anxiety, depression, disease activity, or age, but rather illness perception and functional disability, which played a significant role in the experienced level of social restrictions in RA. Fatigue and pain were also found to be associated with social restrictions, but when psychological distress (anxiety and depression) was included in the regressions, they lost their significance. Furthermore, we found that illness perception acts as a full mediator in the associations between pain, fatigue, anxiety, depression, and social participation.

Illness perception was found to be strongly associated with social participation. The regression model with illness perception explained

Table 2
Correlations of Pain, Fatigue, Anxiety, Depression, Illness Perception, and Restrictions in Social Participation

Variables	Restrictions in social participation	Age	Gender	Cohabitation	Income	Disease duration	Disease activity	Functional disability	Pain	Fatigue	Anxiety	Depression
Age	.21**	—										
Gender	.04	.01	—									
Cohabitation	.16	.03	.14	—								
Income	-.29***	-.11	.10	.05	—							
Disease duration	.15	.24**	-.02	-.07	-.03	—						
Disease activity	.19*	.08	-.01	.07	-.04	.21*	—					
Functional disability	.47***	.35***	-.03	.07	-.25**	.30***	.31***	—				
Pain	.40***	.22**	-.05	.11	-.39***	.03	.20*	.58***	—			
Fatigue	-.43***	-.20*	-.04	-.07	.22**	-.07	-.24**	-.50***	-.55***	—		
Anxiety	.37***	.12	-.10	.12	-.07	.07	.21*	.13	.25**	-.40***	—	
Depression	.35***	.07	.06	.16	-.11	-.05	.19*	.15	.32***	-.41***	.64***	—
Illness perception	.62***	.25**	.05	.04	-.24**	.13	.17*	.51***	.62***	-.69***	.43***	.46***

Note. Bold was used to highlight the statistically significant results.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

an additional 6% of the total variance in social participation after all sociodemographic, clinical, physical, and psychological variables were entered into the model. Our results also showed that illness perception mediated the association between pain, fatigue, anxiety, depression, and social participation. These findings are in line with a recent study in multiple sclerosis patients that showed an association between illness perception and psychological well-being (Timkova et al., 2021). Thus, we may assume that in chronic conditions with a lack of controllability, such as RA and multiple sclerosis, illness perception may mitigate the negative impact of the disease on patients' daily functioning (Timkova et al., 2021). Patients with chronic conditions may benefit from nonpharmacological interventions aimed at diminishing negative illness perceptions. Furthermore, an earlier study by Rezaei et al. (2014) emphasized the importance of patients' perceptions and emotional responses to symptoms and disease as key factors influencing consultation satisfaction and future use of health-care services.

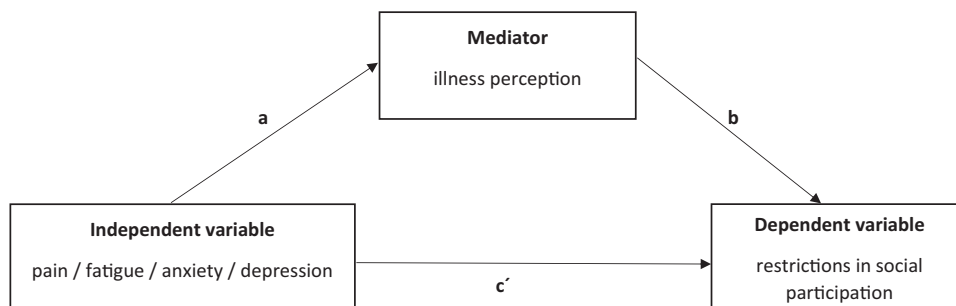
Using correlation analyses, we found significant associations between anxiety, depression, and social participation, which is in line with previous studies (Benka et al., 2016a; Beşirli et al., 2020). However, this association was not significant in multiple linear regressions when controlled for the effect of sociodemographic and clinical variables. Illness perception acted as a full mediator of the associations between anxiety, depression, and social participation with an indirect effect of 65% and 75%, respectively. According to a previous study (Zyrianova et al., 2011), restrictions in social functioning and valued activities, such as visiting relatives or going on vacation, were associated with an increase in depression the following year. Our findings of a lack of a significant association between psychological distress and social participation may be explained by the high prevalence of none-to-minimal depression (52.7%) and none-to-minimal anxiety (64.1%) reported in our sample. The lack of an association between depression and social restrictions may also be explained by the use of bDMARDs to treat RA in

Table 3
Restrictions in Social Participation Regressed on Pain, Fatigue, Anxiety, Depression, Illness Perception, Controlling for Sociodemographic and Clinical Variables

Variables	Crude	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	.21**	.18	.04	.02	.00	.01	-.04
Income	-.29***	-.25**	-.18*	-.12	-.12	-.11	-.14
Disease activity	.19*		.10	.11	.07	.05	.09
Functional disability	.47***		.39***	.27**	.25*	.29**	.21*
Pain	.40***			.24*	.14	.11	.00
Fatigue	-.43***				-.24*	-.17	.00
Anxiety	.37***					.14	.08
Depression	.35***					.11	.05
Illness perception	.62***						.42***
F change		6.76**	11.13***	5.6*	6.1*	3.21*	12.53***
R ² change		.11	.15	.04	.04	.04	.07
Adjusted R ²		.09	.23	.27	.30	.33	.39

Note. Bold was used to highlight the statistically significant results. Crude: effect of each variable separately on restrictions in social participation; Model 1: age and income on restrictions in social participation; Model 2: age, income, disease activity, and functional disability on restrictions in social participation; Model 3: age, income, disease activity, functional disability, and pain on restrictions in social participation; Model 4: age, income, disease activity, functional disability, pain, and fatigue on restrictions in social participation; Model 5: age, income, disease activity, functional disability, pain, fatigue, and anxiety with depression on restrictions in social participation; Model 6: age, income, disease activity, functional disability, pain, fatigue, anxiety with depression, and illness perception on restrictions in social participation; F change—the significance of prediction improvement in a model fit; Adjusted R²—explained variance adjusted for the number of predictors in the particular model.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Figure 1
The Mediating Role of Illness Perception on the Association Between Pain/Fatigue/Anxiety/Depression and Restrictions in Social Participation



our sample. Current studies indicate that treatment with bDMARDs may improve depressive symptomatology in RA more significantly compared to DMARDs (Choy, 2019). In line with the above findings, a lower prevalence of depression was identified in established RA patients (Santos et al., 2019) who represent our entire study sample. This may possibly be caused by less active disease in established RA patients when compared to early RA patients (Katchamart et al., 2020). Also, the majority of our patients had longer disease duration and were predominantly in remission; thus, they might have developed more successful coping mechanisms for dealing with physical as well as psychological problems when compared to newly diagnosed patients (Katchamart et al., 2020). In addition, younger age was identified as a possible risk factor for depression in RA patients (Berner et al., 2018; Marrie et al., 2018; Santos et al., 2019), while the average age in our study was 56.4 years. Our findings could also be explained by a reluctance to report mental health problems influenced by cultural differences related to the stigmatization of mental illness, which may still be very common in Slovakia and may represent a barrier to seeking mental health care or discussing psychological problems with a physician (Beldie et al., 2017).

Fatigue strongly correlated with social participation and was significant in multiple linear regression analyses, explaining an additional 3% of the total variance of social participation, beyond sociodemographic and clinical variables and pain. Illness perception acted as a full mediator in the association between fatigue and social participation, with an indirect effect of 97.6%. Our findings did not fully support those of a strong association between fatigue and social restrictions, which is surprising, as the previous research (Feldthusen et al., 2013;

Primdahl et al., 2019) emphasized the social impact of fatigue and defined fatigue as a cause of the inability to satisfy common social roles within the family, social interactions, work, and leisure activities, resulting in strained social relations. This result could be explained by the unpredictable nature of fatigue in RA patients (Primdahl et al., 2019) and differences in reported fatigue levels during the daytime, which vary in magnitude and significance throughout the day (Bouchaala et al., 2021).

Pain was found to have a strong correlation with social participation and was significant in regression until fatigue was added to the model. The lack of association between pain and social participation may be explained by the longer disease duration of our patients. In line with this assumption, a previous study by Benka et al. (2016a, 2016b) showed that the level of pain experienced by newly diagnosed RA patients was significantly higher when compared to the established group (Benka et al., 2016b). Illness perception acted as a full mediator of the association between pain and social participation, with an indirect effect of 88.3%. Based on these findings, it appears that interventions to enhance positive illness perception may be beneficial for RA patients who experience higher levels of pain. Previous research has shown that the crucial role of timely RA management is especially important in the early stages of the disease when patients are experiencing more pain and developing the formation of illness perception (Benka et al., 2016b; van der Elst et al., 2016).

Functional disability strongly correlated with social participation and was significant in all the regression models. In contrast, disease activity was not significant in any of the regression models. These

Table 4
The Mediating Paths of Illness Perception on the Association Between Pain/Fatigue/Anxiety/Depression and Restrictions in Social Participation

Independent variable	Independent variable to dependent variable (social participation) <i>c</i>	Independent variable to mediating variable (illness perception) <i>a</i>	From mediator (illness perception) to dependent variable (social participation) <i>b</i>	From independent variable to dependent (social participation) with a mediator (illness perception) <i>c'</i>
Pain	.40***	.62***	.62***	.04
Fatigue	-.43***	-.69***	.59***	-.01
Anxiety	.37***	.43***	.61***	.13
Depression	.35***	.46***	.55***	.09
			.56***	

*** $p \leq .001$.

Table 5
The Mediating Effect of Illness Perception on the Association Between Pain/Fatigue/Anxiety/Depression and Restrictions in Social Participation

Independent variable	Type of mediation	Sobel z value	Total in %	Stand. coefficient of variables on social participation			
				Direct	Direct in %	Indirect	Indirect in %
Pain	Full	5.85***	40.9	0.04	11.7	0.36	88.3
Fatigue	Full	-6.02***	-43.2	-0.01	2.4	-0.42	97.6
Anxiety	Full	4.32***	36.5	0.13	35.0	0.24	65.0
Depression	Full	4.56***	34.8	0.09	25.0	0.26	75.0

*** $p \leq .001$.

findings may be explained by higher functional disability (75.1%) compared to disease activity (32.5%) in our study sample. It seems that although RA bDMARDs may help patients stay in remission, most patients still experience functional disabilities. In line with our findings, previous studies showed that these RA disabilities are often the results of joint deformities (Espinoza et al., 2021; Rezaei et al., 2014) related to sick leave or nonemployment that cause patients to withdraw from social contact and can lead to disability pension, which causes problems in taking on social roles (Bay et al., 2020; Benka et al., 2016b).

With regard to sociodemographic variables, our study implies that low income may have been associated with a decrease in social participation; however, this association decreased and was no longer significant when the pain was added to the regression model. We also found that 11.1% of RA patients in our study had a lower or equal to subsistence minimum household income, while 39.6% of RA patients reported higher income than the subsistence minimum. Such data may cause concern, as reported income is not able to cover living expenses. Moreover, an individual's financial situation was identified as one of the key barriers to social participation (Boonen & Severens, 2011; Vlachantoni et al., 2020). The low household income of our patients can be explained by the severe functional disability experienced by the majority of patients (75.1%) and dependency on a disability pension. Functional disability limits the ability of people with RA to work or participate in leisure activities (Barnabe et al., 2018; Benka et al., 2016a; Beşirli et al., 2020; Katchamart et al., 2020) and causes restrictions in social participation. It was further found that it is common for RA patients to reduce working hours, quit their job, or switch careers 2 years after being diagnosed with RA (Beşirli et al., 2020; Geuskens et al., 2007; Rezaei et al., 2014). Sick leaves or loss of employment have an impact on a patient's identity, as well as social contacts, and patients often experience social exclusion and a lack of understanding from others (Bay et al., 2020). Thus, we may assume our patients do not have sufficient financial resources to participate in leisure activities.

Surprisingly, age seems to have a weak correlation with social participation and was not significant in regression models, which contradicts previous research (Griffith et al., 2017). This may be explained by the different age groups of patients included in our study, while earlier studies focused mostly on elderly patients (Feng et al., 2020; Griffith et al., 2017). Older RA patients with reduced social participation may be influenced by an increased risk of downsizing social networks due to the death of peers in later life (Feng et al., 2020). Interestingly, we found no association between sex, cohabitation with a partner, and social participation. Sex differences in social participation were reported in previous studies (Stamm et al., 2010), with

females being usually more socially active than males (Ang, 2019b). Physical limitations from RA symptoms were also found to be associated with changes in male identity formation, which may further lead to restricted social participation and the threat of social exclusion (Bay et al., 2020; Stamm et al., 2010). As RA primarily affects females (Espinoza et al., 2021), the lack of an association between sex and social restrictions may be explained by the higher number of female patients (84.7%) included in our study when compared to males. A previous study (Feng et al., 2020) showed that results on the associations between marital status and social participation were inconclusive. We may assume that people in a relationship may be more inclined to participate in social activities since doing so with their partner is more appealing than doing so on their own (Feng et al., 2020). However, we may also assume that this positive association between social participation and cohabitation with a partner in women may be mitigated by the fact that the majority of our study sample consisted of female patients, who still do a majority of house chores and take care of their partner (Feng et al., 2020; Stamm et al., 2010; Yuying & Jing, 2022).

Strengths and Limitations

The strength of this study is the high response rate (76.2%), which provides a representative sample of RA patients undergoing biological treatment. Moreover, all of our participants were established RA patients, resulting in a homogeneous group. Furthermore, our study examined complex associations between illness perception, physical, and psychological variables and social participation, which may contribute to a better understanding of this understudied, yet important topic, and help to develop efficient nonpharmacological interventions for RA patients. Focusing on illness perception among patients early on gives a possibility to enhance the concordance between doctor and patient beliefs and may have significant beneficial effects on various kinds of patient-related outcomes such as anxiety, depression, or understanding of the information given (Broadbent et al., 2009). Based on results from previous studies, cognitive behavioral therapy could be used to help modify patients' perceptions of their conditions in various chronic illnesses and was found to have the potential to diminish the intensity or frequency of unwanted outcomes, such as psychological distress (Dalili & Bayazi, 2019; Lemos et al., 2020).

However, some limitations should be noted. To confirm the findings revealed in our study, a larger sample size with more male participants is required. Because Slovakia has a low number of minorities and people of different races, our study sample consists of only white and Slovaks who were in a database of RA patients on biological treatment at our rheumatology outpatient clinic.

Furthermore, due to the cross-sectional nature of our study, we are unable to establish a causal association between the variables under study and social participation. Moreover, a fluctuation of illness perception over time due to disease progression or subsequent life events should be considered. Our study sample, however, consisted of established patients, the majority of whom were in remission, and this may have affected illness perception, which could be more stable when compared to newly diagnosed patients. The next limitation is that all patients, despite representing the region of eastern Slovakia, were from a single outpatient clinic. Also, our patients were undergoing biological treatment, making it difficult to transfer our findings to patients receiving different RA treatments.

Implications for Practice and Future Research

Future research should use a larger sample size, and additional longitudinal studies are needed to confirm our findings. Uncovering how patients perceive themselves and their disease may also improve the ability to conceptualize self-regulation and self-management, as well as guide the development of nonpharmacological interventions. Previous research identified the possibility to manage illness perception by healthcare professionals during medical encounters (Arat et al., 2018). This may be beneficial when designing interventions, as our research indicates that illness perception does indeed have a strong indirect effect on social participation. Although current prospective studies with chronically ill populations are consistent with our assumption that illness perceptions influence adaptive outcomes (Sawyer et al., 2019), it is likely that multiple and reciprocal causality is involved, and as a result, more research is required to analyze changes in illness perceptions over time and in the longitudinal relationship between illness perceptions and pain, fatigue, anxiety, depression, and social participation in the context of RA. Future research on illness perception might also focus on the assessment of separate dimensions of illness perception in order to create a more comprehensive image of where interventions should be targeted. What's more, it could benefit from aiming at the illness perception of early RA patients, as this stage is the most threatening for patients due to a lack of disease-related experience, knowledge, and awareness. The early stage of the disease is critical in the formation of illness perception (van der Elst et al., 2016). It may be difficult for patients to discuss restricted social participation or loneliness with others; thus, healthcare practitioners should support patients to encourage a dialogue about their involvement in life situations (Bay et al., 2020).

Conclusion

Negative illness perception and functional disability were significantly associated with a decrease in social participation in RA patients. RA interventions may consider illness perception as one of the key factors for enhancing social participation. Our findings suggest that illness perception may outweigh the potential direct impacts of pain, fatigue, anxiety, and depression on social participation.

Resumen

Objetivo: La participación social es un aspecto importante asociado con los resultados relacionados con la salud en las enfermedades crónicas. Sin embargo, se sabe poco sobre los factores que pueden afectar la participación en pacientes con Artritis Reumatoide (RA,

por sus siglas en inglés). Nuestro objetivo fue examinar si el dolor, la fatiga, la ansiedad, la depresión y la percepción de la enfermedad están asociadas con la participación social en pacientes con RA cuando se controlan por variables clínicas y sociodemográficas. También analizamos el papel mediador de la percepción de enfermedad en la asociación entre variables físicas y psicológicas en la participación social. **Métodos:** Incluimos 157 pacientes con RA (84.7% mujeres; edad media 56.4 ± 13.9 años), que completaron la Escala de Participación, el Cuestionario Breve de Percepción de la Enfermedad, la Escala de Trastorno de Ansiedad Generalizada, el Cuestionario de Salud del Paciente, la Encuesta de Salud Breve de 36 ítems y el Escala Analógica Visual. Se utilizaron regresiones lineales múltiples y análisis de mediación para analizar los datos. **Resultados:** En los modelos de regresión finales la percepción de enfermedad ($\beta = .42$; $p \leq .001$) y la discapacidad funcional ($\beta = .21$; $p \leq .05$) se asociaron con la participación social. El ingreso ($\beta = -.18$; $p \leq .05$) perdió su significancia cuando se agregaron variables físicas al modelo, y el dolor ($\beta = .24$; $p \leq .05$) y la fatiga ($\beta = -.24$; $p \leq .05$) cuando se agregó angustia psicológica. Mediante análisis de regresión no se identificó ningún papel significativo de la ansiedad, la depresión, la actividad de la enfermedad o la edad. La percepción de enfermedad medió la asociación del dolor, la fatiga, la ansiedad y la depresión con la participación social y el efecto indirecto varió del 65% al 98%. **Conclusiones:** Las percepciones de enfermedad pueden disminuir significativamente los impactos del dolor, la fatiga, la ansiedad y la depresión en la participación social de los pacientes con RA. Por lo tanto, los pacientes con RA podrían beneficiarse de intervenciones psicológicas destinadas a abordar las percepciones negativas de la enfermedad.

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