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Social support as a moderator of functional disability's effect on depressive feelings in early rheumatoid arthritis: a four-year prospective study

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Abstract

Objective. To examine associations of depressive feelings with disease related variables and explore the moderating effect of social support on depressive feelings in individuals with early rheumatoid arthritis (RA) prospectively over four years.

Research Method. Data were collected annually over a four-year period. The sample consisted of 124 individuals with diagnosed RA (85.5% women; mean age 48.1 years; mean disease duration 21.9 months). The strength of cross sectional and prospective associations of sociodemographic, disease related variables and the direct and moderating effects of social support on depression were tested using correlations, multilevel models and hierarchical linear regressions.

Results. The study showed that emotional support moderated the influence of functional disability on depressive feelings in individuals with RA. This was not detected for instrumental support. Further prospective associations between functional status, marital status and depressive feelings were also found. Overall the strongest association was found between initial depressive feelings and depressive feelings four years later.

Conclusions. Initial depression seems to be a risk factor in explaining later depressive feelings but emotional support might be prospectively beneficial especially for individuals with higher levels of disability. Early detection of individuals at risk for depression and providing interventions aimed at the specific functions of social support might help to decrease mental health problems.

Introduction

A number of studies have reported increased levels of depressive feelings in individuals with rheumatoid arthritis [1-5]. Studies focusing on the prevalence of depression vary about the exact estimate depending on the method and socio-demographic characteristics used, but a review of the literature suggests that individuals with RA are about twice as likely to suffer from depression in comparison to the normal population [6-8].

Evidence exists that depression in individuals with RA is related to physical disability, pain, fatigue caused the disease [9, 10] but these disease-related variables alone are insufficient to fully explain the negative feelings [2, 11]. Physical disability is undoubtedly an important indicator of restriction in daily functioning but it often only crudely reflects the individual's actual functioning in his/her social environment [12-14]. Associations between disease-related variables and depression have been analysed further by a number of authors [9-10, 15]. Katz has suggested a close connection between depressive feelings and the ability to perform valued activities. He claims that it is not essentially the physical disability itself but rather very specific limitations imposed by it that may lead to depression [15].

The positive effects of social support on health have been shown in many studies [16-18]. Regarding RA, elements of the social environment, such as social stresses and a lack of social support, may contribute considerably to an increase in depressive feelings [19]. Thus depressive feelings that RA individuals experience may not only reflect the activity and disabling effect of arthritis, but also the social environment of the individual.

Functional disability imposes limitations, which are likely to be appraised as exceeding an individual's resources and thus cause considerable stress to the individuals with RA [20]. As a consequence, social resources may become crucial for successful adaptation. According to the classical theory of stress and coping, functional disability may be thought of as a taxing situation that initiates the coping process and successful activation of social support becomes crucial [21, 22].

This study specifically addresses two types of social support. These are emotional sustenance and practical aid, which refer to two specific functions emotional support and instrumental support. It has been hypothesized that both of these specific functions are activated and highly relevant, serving as moderators against the burden created by functional disability in RA.

Findings concerning these specific functions of social support in RA individuals have been found to be rather inconsistent in the current literature. A direct effect of social support has been demonstrated in the context of RA [14, 23, 24] but findings about its moderating effect seem to be less clear [20, 25].

The aim of the present study is twofold. Firstly, it is to explore the associations of depressive feelings with disease related variables over time. Secondly, the aim is to address the moderating role of emotional support and instrumental support in of how it can prevent RA individuals from experiencing depressive feelings when facing functional disability as a result

of RA. Specifically, the study employs the assumption that functional disability is a global indicator of burden caused by RA. The goal is to examine whether, emotional support and instrumental support can ameliorate the negative impact of RA via a moderating effect.

Methods

Sample and procedure

This study is the Slovak part of the EURIDISS (European Research on Incapacitating Diseases and Social Support) project. Four waves of data collection were carried out during the years 1994-1998. Inclusion criteria for participating in the study were: age from 20 to 70 years at the beginning of the study, RA diagnosed no more than four years prior to the beginning of the study, fulfilment of at least 4 criteria of the American College of Rheumatology (ACR) and signing the informed consent form.

According to the above mentioned criteria 176 individuals from eastern Slovakia were found to be eligible of which 16 individuals refused to participate. Thus the first wave (T1) consisted of 160 individuals. In the second wave (T2) 9 individuals were lost and in the third wave (T3) an additional 18 individuals ceased participation. An additional 9 individuals were lost in the fourth wave (T4). The overall response rate of the study was thus 77.5% with 124 individuals participating in the fourth wave. The dropouts from the study and the individuals participating in the fourth wave were compared in order to ascertain whether they differed in characteristics obtained at the beginning of the study. Sex, age, disease duration in months, depressive feelings and functional disability were compared and no significant differences were found.

The data were collected in annual intervals via administration of the same set of questionnaires during a semi-structured interview conducted by a trained interviewer and lasting about ninety minutes. The medical information of the individuals was retrieved from their medical files.

Measures

Socio-demographic variables were collected via a separate questionnaire, which provided basic information about the age, sex, marital status, residence and overall living conditions of the individuals. Further detailed information about the disease was retrieved from individual medical files.

Depressive feelings were measured using the General Health Questionnaire (GHQ-28) [26]. In this instrument the individual is asked about his recent health status and answers each question on a four-point Likert scale. Items have four possible response categories: “not at all”; “no more than usual”; “rather more than usual”; “much more than usual”. The depression subscale consists of 7 items, and its total score ranges from 7 to 28. This instrument has been frequently used to evaluate psychological

functioning in RA individuals [14, 20], with a higher score indicating stronger depressive feelings [26]. Cronbach's alpha of the scale assessed at the baseline was 0.83.

Disease activity was assessed via the Erythrocyte Sedimentation Rate (ESR) during the first hour and joint tenderness was assessed using the Ritchie Articular Index (RAI). This examination was performed by a rheumatologist. Firm pressure to each joint is applied and the individual's reaction was recorded on a four-point scale ranging from "no pain", "pain complaint", "complaint and wince", and "withdrawal".

Functional disability was measured using the Groningen Activity Restriction Scale (GARS) [27]. This scale consists of 18 items divided into two subscales. The first subscale represents Activities of Daily Living and the second subscale represents Instrumental Activities of Daily Living. Individuals were asked to answer each question on a four-point Likert scale indicating how difficult the activity was for them to perform. Scores range from 18-72 with higher scores indicating higher levels of functional disability. This instrument has been frequently used to measure functional disability among RA individuals due to its excellent psychometric characteristics with a high sensitivity [28, 27]. Cronbach's alpha at the baseline was 0.95 for this scale.

Social support was measured using the Satisfaction with Social Support Questionnaire (SSQS) [12]. In our study two subscales from this measure were applied to assess emotional support satisfaction (ESS) and instrumental support satisfaction (INS). The discrepancy between the received and the desired amount of social support was considered to be the indicator of satisfaction with the social support. Individuals answered each question on a three-point Likert scale. Scores for ESS range from 11 to 33 and for INS from 7 to 21 with a higher score indicating more satisfaction with the supportive transactions [29]. Cronbach's alpha at the baseline of this study was 0.86 for ESS, and 0.76 for INS.

Statistical methods

The prospective data set was firstly analyzed using descriptive statistics. Then cross-sectional correlation coefficients were computed to explore associations at each wave (T1 – first wave, T2 – second wave, T3 – third wave, T4 - fourth wave). In the next step, multilevel analysis was performed. This addressed the level of variance within persons and time in order to explore the associations of the studied variables with levels of depression over time. In addition the interaction of social support and functional status on depressive feelings was tested in order to explore the possible moderating effect. The present model controlled for socio-demographic and disease-related variables as well as the initial level of depression. This analysis was further followed by individual hierarchical linear regression analyses conducted separately for every point of measurement to explore the moderation effect of social support. A significant effect of the interaction between social support and the functional disability after controlling for the direct effect of both of these variables on depressive feelings was considered

as a proof of the moderating assumption which was followed by testing the significance of simple slopes [30, 31]. Data were centred to avoid the effects of co-linearity prior to exploring the interaction variables. All data were analysed using SPSS, version 15.

Results

Descriptive statistics

The sample was predominantly female (85.5%) and married (77.4%) with a mean age of 47.9 (SD=12.53) and mean disease duration of 22.2 (SD=16.03) months. The means and standard deviations of depressive feelings, functional status, disease activity, emotional support and instrumental support are displayed in Table 4.1.

Table 4.1 Displayed values as means and standard deviations of depression, disease activity, functional disability and social support over four years in individuals with RA

	Score range	T1	T2	T3*	T4
		Mean (SD) baseline	Mean (SD) 12 months	Mean (SD) 24 months	Mean (SD) 36 months
DEPRESSION	7-28	9.8(3.3)	9.1(3.2)	9.4(3.3)	9.6(3.9)
ESR	1-150	26.4(18.4)	23.0(17.5)	23.1(17.7)	25.9(18.2)
RAI	0-72	13.5(7.3)	12.8(9.1)	12.4(9.4)	11.5(8.9)
GARS	18-72	32.4(11.1)	32.1(10.6)	34.6(11.4)	35.8(12.7)
ESS	11-33	29.4(4.0)	29.9(4.0)	30.7(3.5)	30.7(3.8)
INS	7-21	19.3(2.5)	19.7(2.4)	19.6(2.6)	19.7(2.6)

Note 1 Abbreviations mean: GARS = Groningen Activity Restriction Scale, RAI = Ritchie Articular Index, ESR = Erythrocyte Sedimentation Rate, ESS = Emotional Support Satisfaction Scale, INS = Instrumental Support Satisfaction Scale

*Note 2 *8 individuals failed to participate at T3 so means and SD were calculated only from 116 respondents*

Cross-sectional analysis.

Cross-sectional relationships between functional disability, social support scales and depressive feelings were investigated by the means of correlation coefficients over the four-year period. Statistically significant associations (not displayed in the table) between functional disability and depressive feelings were found in every wave $r=0.27$ at T1, $r=0.46$ at T2, $r=0.48$ at T3, $r=0.44$ at T4, all statistically significant ($p<0.001$).

The association between emotional support and depressive feelings was not significant in the first two waves but became significant in the following years with levels of correlation at $r= -0.31$ at T3 and $r= -0.40$ at T4, both significant ($p<0.001$). The direction of the associations shows that more satisfaction with emotional support is connected with experiencing fewer depressive feelings during the progression of the disease. Instrumental support presented a different pattern of correlations, however, showing

a significant association in the first wave at $r = -0.23$ ($p < 0.05$) at T1, failing to be significant in the second wave and being significant for the last two waves at $r = -0.17$ ($p < 0.05$) and $r = -0.34$ ($p < 0.001$). These associations are also negative, which means that less satisfaction with instrumental support is connected with more depressive feelings.

Multilevel analysis

Multilevel models were built to address the between person and within person variance in depressive feelings over time and their association with baseline levels of disease related variables and social support. A baseline model was followed by six additional models which successively included the sociodemographic variables initial levels of depression, disease activity (erythrocyte sedimentation rate and sensitive joints) functional disability and social support (instrumental and emotional) as well as the interaction effects on depressive feelings measured over the period of four years are presented in Table 4.2. The final model of the analysis showed that depressive feelings were associated with marital status $F(1, 105.797.529) = 6.478$ $p \leq 0.05$, initial depressive feelings $F(1, 104.965) = 161.739$ $p \leq 0.001$ and functional status $F(1, 105.848) = 12.490$ $p \leq 0.001$. Further emotional support reached significance $F(1, 104.935) = 4.601$ $p \leq 0.05$ but instrumental support was not found to be significantly related to depressive feelings. The last variable entering the model were interaction terms consisting of emotional support and functional disability as well as instrumental support and functional disability. The emotional support interaction was found to be significant $F(1, 105.108) = 7.809$ $p \leq 0.01$ whereas instrumental support interaction did not yield significance.

Moderation analysis

In the next step the interaction term of emotional support and functional disability was further tested individually as a predictor of depressive feelings at three following waves T2 T3 and T4 controlling for the main effect of functional disability and emotional support. As shown in Table 4.3 all interactions were found to be statistically significant. The analysis showed the same pattern over time, however, both main effects and interaction were found to be significant only in predicting depressive feelings at the fourth wave ($p \leq 0.001$). Interactions were subsequently tested for significance of simple slopes [30]. Low emotional support slopes were shown to be significant ($p < 0.001$) suggesting that the patients with low ESS and high functional disability experienced more depressive feelings prospectively. The interaction predicting depressive feelings at T4 is shown in 4.1.

Table 4.2 Parameter estimates (coefficients and standard errors) of sociodemographic variables, disease related variables and social support in the persons with RA on depressive feelings

Predictors	Model 0		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.
Mean T1	9.782	(0.305)	9.850	(1.004)	1.567	(0.844)	1.170	(0.942)	1.056	(0.913)	2.868	(1.807)	-8.115	(4.096)
T1-T2	-0.707*	(0.276)	-0.707*	(0.276)	-0.707*	(0.276)	-0.681*	(0.284)	-0.681*	(0.284)	-0.681*	(0.284)	-0.681*	(0.284)
T1-T3	-0.442	(0.282)	-0.440	(0.282)	-0.458	(0.282)	-0.448	(0.290)	-0.452	(0.290)	-0.448	(0.290)	-0.450	(0.290)
T1-T4	-0.202	(0.276)	-0.202	(0.276)	-0.202	(0.276)	-0.150	(0.284)	-0.150	(0.284)	-0.150	(0.284)	-0.150	(0.284)
Sex			-0.630	(0.744)	-0.735	(0.448)	-0.675	(0.463)	-0.557	(0.449)	-0.502	(0.452)	-0.510	(0.430)
Age			0.000	(0.022)	0.022	(0.013)	0.022	(0.014)	0.013	(0.014)	0.015	(0.014)	0.017	(0.013)
Marital status			-0.247	(0.653)	0.846*	(0.401)	0.925*	(0.407)	0.813*	(0.395)	0.761*	(0.398)	0.972*	(0.382)
Disease duration			0.009	(0.016)	0.012	(0.010)	0.014	(0.010)	0.008	(0.010)	0.009	(0.010)	0.008	(0.010)
Depression T1					0.698***	(0.048)	0.696***	(0.050)	0.640***	(0.052)	0.632***	(0.053)	0.635***	(0.050)
ESR T1							-0.003	(0.009)	-0.006	(0.009)	-0.005	(0.009)	-0.002	(0.009)
RAI T1							0.029	(0.024)	-0.013	(0.027)	-0.010	(0.027)	-0.005	(0.026)
GARS T1									0.054**	(0.018)	0.052*	(0.019)	0.367*	(0.104)
ESS T1											-0.070	(0.045)	0.301*	(0.141)
INS T1											0.015	(0.076)	0.002	(0.264)
ESS T1 x GARS T1													-0.012*	(0.004)
INS T1 x GARS T1													0.002	(0.007)
Variance Components														
Level-1: within-person	4.723		4.723		4.725		4.828		4.829		4.829		4.833	
Level-2: Between-persons	6.849		7.021		1.790		1.818		1.621		1.599		1.312	
Goodness-of-fit														
Deviance	2377.997		2386.754		2269.899		2216.535		2214.248		2219.353		2223.794	
BIC	2390.361		2399.101		2282.242		2228.802		2226.510		2231.607		2236.039	

Note 1: abbreviations mean: ESR = Erythrocyte Sedimentation Rate Health Questionnaire, RAI = Ritchie Articular Index, GARS = Groningen Activity Restriction Scale, ESS = Emotional Support Satisfaction Scale, INS = Instrumental Support Satisfaction Scale
 Note 2: *means $p \leq 0.05$; **means $p \leq 0.01$; ***means $p \leq 0.001$

Figure 4.1 Interaction of baseline emotional support and functional disability on depressive feelings at T4

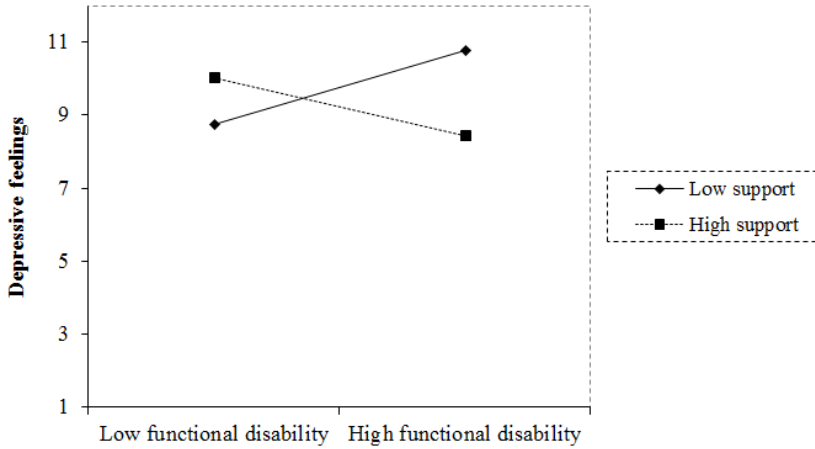


Table 4.3 Hierarchical regression analysis of baseline functional disability, emotional support and their interaction effect on depressive feelings measured in annual intervals

	Depression T2 12 months	Depression T3 24 months	Depression T4 36 months
1. GARS T1	0.336***	0.395***	0.319***
2. ESS T1	- 0.119	-0.133	-0.274***
3. ESS T1 x GARS T1	-0.162*	-0.261**	-0.271***

Note 1: abbreviations mean: GARS = Groningen Activity Restriction Scale, ESS = Emotional Support Satisfaction Scale

Note 2: *means $p \leq 0.05$; **means $p \leq 0.01$; ***means $p \leq 0.001$

Note 3: displayed values are standardized β coefficients

Discussion and Conclusion

Discussion

The aim of the present study was to explore the associations of disease related variables with depressive feeling over time. Furthermore, the aim focused on the moderating role of emotional support and instrumental support on depressive feelings when facing functional disability as a result of RA.

Emotional support was found to be moderately related to depressive feelings over time. This association remained significant after four years, even after the relevant variables and levels of initial depressive feelings were controlled for. This finding is in line with other studies which also found

a close association between emotional support and depressive feelings cross-sectionally [2, 32] and longitudinally [14, 33]. The results also suggest that emotional support may have a moderating effect on depressive feelings prospectively when individuals with low levels of emotional support were found to be experiencing more depressive feelings when facing higher functional disability. Studies investigating moderation effect of social support in the population of chronically ill have demonstrated similar results [34, 35], although studies in an RA context have failed to provide clear evidence [20, 25].

The association between instrumental support and depressive feelings was found to be much weaker, and no direct or moderating effect could be detected. Studies investigating the role of instrumental support in RA individuals have found stronger associations with functional disability within a specific area [15, 36]. This may be due to the fact that instrumental support is less directly related to depressive feelings, and, as Neugebauer et al. [25] suggest, it is rather more closely related to valued activities and may thus affect psychological functioning. The present analysis focused on the impact of general functional disability rather than on limitations in specific activities. Instrumental support as a practical aid or assistance is undoubtedly important, if not essential, for some individuals but it seems that individuals from our sample adapted to physical limitations well in regard to depression and their psychological functioning was more determined by their social environment.

Functional disability significantly predicted depressive feelings and explained a considerable amount of variance. This result is in line with other studies showing this association [37]. The course of depressive feelings in the population under study was observed to be relatively stable, and no substantial differences were found in the level of depression between consecutive measurements. The analysis showed that depressive feelings experienced during the previous years were a very important variable in predicting depression four years later. Similar results were found in the study conducted by Strating et al. [14]. This means that individuals who have elevated levels of depressive feelings at the onset of RA, or even before, are naturally at a greater risk of elevated levels of depression as the disease progresses [20, 14].

However, there are limitations to this study as well. The level of depressive feelings among individuals in the sample was relatively low but comparable with similar studies employing GHQ-28 [20]. Similarly, the level of functional disability as measured by GARS can be related to findings in other studies [14, 32]. At the time these data were collected the individuals could not benefit from the application of biological agents as the main treatment, which has become an important means of decreasing the impact of RA. Furthermore, functional disability was chosen as the stressor similarly as in the study conducted by Doeglas et al. [20] because it summarizes the impact of many symptoms caused by RA, such as pain, destruction of the joints and overall disability. However, this does not in itself necessarily reflect all of the stress imposed on individuals by RA. Other or additional variables exploring the moderating effect of social support could enhance the understanding of its function and especially controlling for personality

variables [38]. Social support was assessed only by self-report measures. It may be very useful for future research to acquire information from relatives or caregivers, especially partners of the individuals mapping their social environment more efficiently and providing extra information beyond the self-report measures [39].

Conclusion

This study was based on longitudinal data, which allowed building a relatively strong predictive model. The chosen multilevel model was able to control for relevant socio-demographic variables and for the initial level of depression. The findings of this study suggest that emotional support moderates the burden of functional disability imposed by symptoms of RA. It can thus serve in early RA as an indicator of individual's vulnerability to depression, which can be useful for devising intervention programs aimed specifically on this subtype of social support. To conclude it should be stressed that checking for depression and its treatment in RA patients at or early after diagnosis may favourably influence the overall quality of life in this patient group.

References

- [1] Chaney JM, Mullins LL, Wagner JL, Hommel KA, Page MC, Doppler MJ. A longitudinal examination of causal attributions and depression symptomatology in rheumatoid arthritis. *Rehab Psych* 2004; 49, 126-133.
- [2] Covic T, Tyson G, Spencer D, Howe G. Depression in rheumatoid arthritis patients: Demographic, clinical, and psychological predictors. *J Psychosom Res*, 2006; 60(5), 469-476.
- [3] Creed F. Psychological disorders in rheumatoid arthritis: A growing consensus? *Ann Rheum Diseases*, 1990; 49, 808-812
- [4] Dickens C. Depression in rheumatoid arthritis: A systematic review of the literature with meta-analysis. *Psychosom Med*, 2002; 64(1), 52-60.
- [5] Lok EYC, Mok CC, Cheng CW, Cheung EFC. Prevalence and determinants of psychiatric disorders in patients with rheumatoid arthritis. *Psychosom*, 2010; 51(4), 338.
- [6] Dickens C. The burden of depression in patients with rheumatoid arthritis. *Rheumatol*, 2001; 40, 1327-1330.
- [7] Martens MP, Parker JC, Smarr KL, Hewett JE, Ge B, Slaughter JR, Walker, SE. Development of a shortened center for epidemiological studies depression scale for assessment of depression in rheumatoid arthritis. *Rehab psychol*, 2006; 51, 135-139.
- [8] Sheehy C, Murphy E, Barry M. Depression in rheumatoid arthritis - underscoring the problem. *Rheumatol*, 2006; 45(11), 1325-1327.

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- [9] Bazzichi L, Maser J, Piccinni A, Rucci P, Del DA, Vivarelli L, Catena M, Bouanani S, Merlini G, Bombardieri S, Dell'Osso L. Quality of life in rheumatoid arthritis: Impact of disability and lifetime depressive spectrum symptomatology. *Clin Experim Rheumatol*, 2005; 23, 783-788.
- [10] Smedstad LM, Moum T, Vaglum P, Kvien TK. The impact of early rheumatoid arthritis on psychological distress. A comparison between 238 patients with RA and 116 matched controls. *Scand J Rheumatol*, 1996; 25, 377-382.
- [11] Evers AW, Kraaimaat FW, Geenen R, Bijlsma JW. Psychosocial predictors of functional change in recently diagnosed rheumatoid arthritis patients. *Behav Res Therapy*, 1998; 36, 179-193.
- [12] Doeglas D, Suurmeijer TP, Krol B, Sanderman R, Van Rijswijk M, Van Leeuwen M. Social support, social disability, and psychological well-being in rheumatoid arthritis. *Arthritis Care Res* 1994; 7, 10-15.
- [13] Hewlett S, Smith AP, Kirwan JR. Measuring the meaning of disability in rheumatoid arthritis: The personal impact health assessment questionnaire (PI HAQ). *Ann Rheum Diseases*, 2002; 61, 986-993.
- [14] Strating MM, Suurmeijer TP, Van Schuur WH. Disability, social support, and distress in rheumatoid arthritis: Results from a thirteen-year prospective study. *Arthritis Rheum*, 2006; 55, 736-744.
- [15] Katz PP, Morris A, Yelin EH. Prevalence and predictors of disability in valued life activities among individuals with rheumatoid arthritis. *Ann Rheum Diseases*, 2006; 65, 763-769.
- [16] Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychol Bull*, 1985; 98, 10-357.
- [17] Stanton AL, Revenson TA, Tennen H. Health psychology: Psychological adjustment to chronic disease. *Ann Rev Psychol*, 2007; 58, 565-592.
- [18] Treharne GJ, Kitas GD, Lyons AC, Booth DA. Well-being in rheumatoid arthritis: The effects of disease duration and psychosocial factors. *J Health Psychol*, 2005; 10(3), 457-474.
- [19] Dickens C. Association of depression and rheumatoid arthritis. *Psychosom*, 2003; 44(3), 209-215.
- [20] Doeglas DM, Suurmeijer TP, Van den Heuvel WJ, Krol B, Van Rijswijk MH, Van Leeuwen MA, Sanderman R, Functional ability, social support, and depression in rheumatoid arthritis. *Qua Life Res*, 2004; 13, 1053-1065.
- [21] Folkman S, Moskowitz JT. Coping: Pitfalls and promise. *Ann Rev Psychol*, 2004; 55, 745-774.
- [22] Lazarus RS, Folkman S. *Stress, appraisal, and coping*, 1984; New York: Springer: Publishing Company Inc
- [23] Fyrand L, Moum T, Finset A, Glenn A. The impact of disability and disease duration on social support of women with rheumatoid arthritis. *J Behav Med*, 2002; 25(3), 251-268.

- [24] Keefe FJ, Smith SJ, Buffington ALH, Gibson J, Studts JL, Caldwell DS. Recent advances and future directions in the biopsychosocial assessment and treatment of arthritis. *J Consul Clin Psychol*, 2002; 70(3), 640-655.
- [25] Neugebauer A, Katz PP. Impact of social support on valued activity disability and depressive symptoms in patients with rheumatoid arthritis, *Arthritis Rheum*, 2004; 51(4), 586-592
- [26] Goldberg DP, Hillier VF. A scaled version of the general health questionnaire. *Psychol Med*, 1979; 9, 139-145
- [27] Suurmeijer TP, Doeglas DM, Moum T, Briancon S, Krol B, Sanderman R, Guillemin F, Bjelle A, Van den Heuvel WJ. The Groningen activity restriction scale for measuring disability: Its utility in international comparisons. *Am J Pub Health*, 1994;84, 1270-1273.
- [28] Szilasiova A, Macejova Z, Kovarova M, Nagyova I, Trejbal D, Pramuk I, Beresova A. [The groningen activity restriction scale (GARS) in the evaluation of severity of rheumatoid arthritis]. *Vnitr Lek*, 1998; 44, 195-200.
- [29] Doeglas D, Suurmeijer TP, Briancon S, Moum T, Krol B, Bjelle A, Sanderman R, Van den Heuvel WJ. An international study on measuring social support: Interactions and satisfaction. *Soc Sci Med*, 1996; 43, 1389-1397.
- [30] Aiken LS, West SG. *Multiple Regression: Testing and Interpreting interactions*, 1991; London: SAGE
- [31] Holmbeck GN. Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *J Ped Psychol*; 2002, 27, 87-96.
- [32] Demange V, Guillemin F, Baumann M, Suurmeijer TP, Moum T, Doeglas D, Briancon S, Van den Heuvel, W. J. Are there more than cross-sectional relationships of social support and support networks with functional limitations and psychological distress in early rheumatoid arthritis? the european research on incapacitating diseases and social support longitudinal study, *Arthritis Rheum*, 2004; 51, 782-791.
- [33] Evers AW, Kraaimaat FW, Geenen R, Jacobs JW, Bijlsma JW. Longterm predictors of anxiety and depressed mood in early rheumatoid arthritis: A 3 and 5 year follow-up. *J Rheumatol*, 2002; 29, 2327-2336.
- [34] Jump RL, Robinson ME, Armstrong AE, Barnes EV, Kilbourn KM, Richards HB. Fatigue in systemic lupus erythematosus: Contributions of disease activity, pain, depression, and perceived social support. *J Rheumatol*, 2005; 32(9), 1699-1705
- [35] Olstad R, Sexton H, Sogaard AJ. The finnmark study. A prospective population study of the social support buffer hypothesis, specific stressors and mental distress, *Soc Psychiatry Psychiatr Epidemiol*, 2001; 36(12), 582-589.
- [36] Neugebauer A, Katz PP, Pasch LA. Effect of valued activity disability, social comparisons, and satisfaction with ability on depressive symptoms in rheumatoid arthritis. *Health Psychol*, 2003; 22(3), 253-262.

[37] Evers AW, Kraaimaat FW, Geenen R, Bijlsma JW. Determinants of psychological distress and its course in the first year after diagnosis in rheumatoid arthritis patients. *J Behav Med*, 1997; 20, 489-504

[38] Suurmeijer TPBM, Van Sonderen FLP, Krol B, Doeglas DM, Van den Heuvel WJA, Sanderman R. The relationship between personality, supportive transactions and support satisfaction, and mental health of individuals with early rheumatoid arthritis. results from the dutch part of the euridiss study. *Soc In Res*, 2005; 73(2), 179-197.

[39] Strating MM, Van Schuur WH, Suurmeijer TPBM. Contribution of partner support in self-management of rheumatoid arthritis individuals. an application of the theory of planned behavior. *J Behav Med*, 2006; 29, 51-60.

