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The Influence of Pain, Weakness and Rheumatoid Factor Status on Depression Incidence Among Iranian Patients With Rheumatoid Arthritis

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Abstract

Background: Increased prevalence of depression among patients with Rheumatoid arthritis (RA) has been described previously. However, the impact of depression among Iranian patients has not yet been investigated.
Objectives: Here, the prevalence of depression was assessed and the effect of disease-related characteristics including pain, weakness and rheumatoid factor (RF) status on incidence of depression was evaluated.
Materials and Methods: Patients with RA, who were referred to rheumatology clinics of Kermanshah University of Medical Sciences and healthy subjects from the general population of Kermanshah participated in this investigation. Depression was assessed using Beck's depression inventory II (BDI II). Pain and weakness were assessed subjectively by patients' self-report. Data was collected during a year between 2012 and 2013. Chi-square test and independent t-test were used.
Results: One hundred and seventy-one patients with RA and 198 healthy individuals participated in this investigation. In the RA group, depressive mood was detected in 45.7% of patients, which was significantly higher than healthy subjects (P = 0.008). Depression was more common in elderly patients (> 50 years old) in comparison with healthy subjects at a similar age (P = 0.03). Pain and weakness had no influence on depression incidence (P = 0.14 and 0.19, respectively) whereas patients with negative RF status were significantly more susceptible to severe depression (P: 0.001).
Conclusions: Depression is more common among Iranian patients with RA (45%) than healthy subjects regardless of gender. Depression has a significant association with older age. Negative RF status may predict future risk of depression.

Keywords: Depression, Pain, Prevalence, Rheumatoid Arthritis, Weakness

1. Background

Increased rate of depression among individuals with Rheumatoid Arthritis (RA) in comparison with the general population has been described previously (1, 2). It has also been shown that depression can be associated with reduced health-related quality of life (3) and weakness (4) in patients with RA, which leads to poorer long-term outcomes (5). It is essential to target and treat depression since increased mortality rate has been reported in depressed subjects with RA (6). Although the association between depression and RA has been demonstrated in previous studies, there are conflicting results in the prevalence of depression in RA. Since there are various factors that affect incidence of depression, including socioeconomics condition and familial support, observing different prevalence rates among different nations can be expected. Until now, no investigation has been performed to estimate the prevalence of depression among Iranian patients with RA.

Before implementation of any kind of intervention to target depression, it is essential to know the background condition and prevalence of depression in a specific population. The reported estimation of depression prevalence in RA has a wide range from 9.5% [6] to 41.5% (7). Therefore, it is necessary to estimate the prevalence of depression in each population separately. to understand the impact of depression on RA.

Rheumatoid arthritis is a chronic multifactorial inflammatory disease, which primarily affects joints (8) and is associated with pain and weakness. It is characterized by joint swelling, morning stiffness and disability (9). Since RA is a chronic condition, it should be taken into consideration that cumulative risk of depression and also intermittent recurrences can occur (10, 11). Another reason for existence of conflicting reports in prevalence of depression in

RA is the usage of different assessment tools (1). Prevalence of depression has been reported much higher in studies using self-report measures (12). However, a higher rate of depression among patients with RA has been often observed in comparison with the general population (13).

2. Objectives

The aim of this study was to evaluate the prevalence of depression among Iranian patients with RA using Beck's depression inventory II (BDI II), and to compare it with healthy subjects. The effect of pain, weakness and Rheumatoid factor (RF) status on depression was also assessed.

3. Materials and Methods

3.1. Study Design

We investigated patients with RA, who were referred to rheumatology clinics of Kermanshah University of Medical Sciences in a descriptive cross-sectional study. The diagnosis of RA was confirmed by an expert rheumatologist. Written consent was obtained from each participant after explaining adequate information about the study. Data was collected during one year between 2012 and 2013. The study was approved by the research ethics committee of Kermanshah University of Medical Sciences.

3.2. Participants

Patients with RA, who were referred to rheumatology clinics, were entered in this study. Exclusion criteria were: previous history of other chronic diseases (such as diabetes, hypertension, collagen vascular disorders, hypo-or hyperthyroidism, metabolic disorders, and etc.), addiction to illegal drugs, and smoking and alcohol consumption. Participants of control group were selected from the general population of Kermanshah. Similar exclusion criteria were considered when selecting participants in the control group. The sampling method was based on selection of participants according to the inclusion and exclusion criteria.

Age, marital status, educational level and occupation were asked directly from the participants and were indexed in pre-prepared forms. Existence of pain and weakness was assessed subjectively by patients' self-report to yes/no questions. Pain of the affected joints was taken into consideration when assessing pain.

3.3. Beck's Depression Inventory II (BDI II)

Beck's depression inventory II is a self-report measurement for depression, which consists of 21 items in two subscales (14). Affective subscale contains eight items and the somatic subscale includes 13 items. Each of the 21 items corresponds to a symptom of depression and is summed to give a single score for BDI II. There is a four-point scale for each item ranging from 0 to 3. On two items (16 and 18) there are seven options to indicate either an increase or decrease of appetite and sleep. Total score of 0 - 13 is considered in the minimal range, 14 - 19 indicates mild depression, 20 - 28 shows moderate, and 29 - 63 illustrates severe depression. Beck's Depression Inventory II is a screening tool for severe depression. The Persian version of this questionnaire has been validated and its high internal consistency (Cronbach's alpha = 0.87) and validity (r = 0.74) have been demonstrated (15).

3.4. Statistical Analysis

All statistical analysis was performed using SPSS software version 18 (SPSS, Inc., Chicago, IL, USA). Categorical variables were expressed with frequency, and continuous variables were described with mean$\pm$ standard deviation. Chi-square test was used to compare prevalence of depression between the two groups. Comparison of means was performed using independent t-test and One-way Analysis of Variances (ANOVA). P-values of < 0.05 were considered significant.

4. Results

A total of 171 patients in the RA group and 198 subjects in the control group participated in this investigation. Mean age in RA and control group was 42.05 $\pm$ 11.22 and 41.36 $\pm$ 10.77 years old. The majority of participants in both groups were female (123 (62.1%) in the RA group and 108 (63.2%) in the control group). Most subjects in both groups were also married (71.2% and 77.2% in the RA and control groups, respectively). Only 17.7% of patients in the RA group (n: 35) and 19.9% of participants in the control group (n: 34) were living in villages. There were no significant differences in the demographic features between the two groups (Table 1). Healthy subjects had significantly higher BDI II scores. One hundred and three participants (52%) in the control group and 30 patients (29.2%) in the RA group had minimal range of BDI II score whereas 29 patients in the RA group (17%) and 20 healthy subjects (10.1%) revealed severe depression (Table 1). In the RA group, 45.7% of patients revealed some extent of depressive mood whereas this estimation was 32.8% in the control group (P = 0.008).

Table 1. Baseline Characteristics of Patients With Rheumatoid Arthritis (Ra) and Healthy Subjects[a,b]

Characteristics	RA Group	Control Group	P-Value**
Gender			NS
Male	63 (36.8)	75 (37.9)	
Female	108 (63.2)	123 (62.1)	
Marital Status			NS
Married	132 (77.2)	141 (71.2)	
Single/divorced/widow/widower	39 (22.8)	57 (28.8)	
Age Group, y			NS
< 35	65 (38)	79 (39.9)	
35 - 50	62 (36.3)	67 (33.8)	
> 50	44 (25.7)	51 (26.3)	
Living location			NS
City	137 (80.1)	163 (82.3)	
Village	34 (19.9)	35 (17.7)	
Depression severity			0.008*
Minimal	30 (29.2)	103 (52)	
Mild	43 (25.1)	30 (15.2)	
Moderate	49 (28.7)	45 (22.7)	
Severe	29 (17)	20 (10.1)	

Abbreviation: NS, Not Significant

[a] * Significance at the level of P < 0.01; ** Chi-square test was used to compare the prevalence of each category between groups.

[b] Values are expressed as No. (%).

Mean BDI II score was significantly higher in the RA group in comparison with the control group (15.53 ± 11.04 and 19.26 ± 10.06 in the control and RA groups, respectively; P = 0.001). Similar results were obtained when we compared the mean scores of BDI II between each gender separately (Table 2). Mean BDI II score was 18.49± 8.56 and 14.66 ± 10.97 among males in RA and control group, respectively (P = 0.026). Similarly female participants in the RA group obtained higher scores than healthy subjects (19.71 ± 10.85 and 16.05 ± 11.09 in the RA and control groups, respectively; P = 0.012). Although there was a significant difference in BDI II scores between these two groups among participants younger than 50 years old, patients with RA, who were older than 50 years showed significantly higher BDI II scores in comparison with healthy subjects (21.11 ± 9.36 and 16.48 ± 11.6 in RA and control groups, respectively; P = 0.036) (Table 2).

Severity of depression detected by BDI II was significantly higher among males and females with RA. Minimal range of BDI II score was detected in 34 females with RA (31.5%) and 62 healthy females (50.4%), whereas 21 females with RA showed severe depression (19.43%) while the prevalence of severe depression among healthy females was only 12 (9.75%) (P = 0.016). Similar results could be detected amongst males (Table 3).

In the RA group, 154 (90.1%) mentioned that they were feelings of pain and only 17 patients (9.9%) expressed having no pain. Similarly, 149 (87.2%) felt weakness and 22 (12.8%) did not complain from weakness. No significant association was found between existence of pain and weakness and score of BDI II (P = 0.14 and 0.19, respectively). Rheumatoid factor (RF) was positive in the majority of patients (87.7%). Positive RF status was associated with lower scores of BDI II whereas patients with negative RF status were significantly more susceptible to severe depression (P = 0.001). Among patients that had positive RF status, 33% had minimal, 25% had mild, 28% had moderate and only 12.8% had severe depressive mood. Among patients with negative RF status, 43% had severe depression and no case of minimal range of BDI II score could be found. These re-

Table 2. Mean Score of Beck Depression Inventory II (BDI II) in Patients With Rheumatoid Arthritis (RA) and Healthy Subjects[a,b]

Characteristics	RA Group	Control Group	P-Value**
Gender			
Male	18.49 (8.56)	14.66 (10.97)	0.012*
Female	19.71 (10.85)	16.05 (11.09)	0.026*
Age Group, y			
< 35	19.96 (9.56)	16.56 (10.92)	0.052
35 - 50	17.20 (10.81)	13.59 (19.62)	0.058
> 50	21.11 (9.36)	16.48 (11.6)	0.036*

Abbreviation: SD, Standard deviation.

[a] *Significance at the level of P < 0.05; **Independent t-test was used to compare means between groups.

[b] Values are expressed as mean (SD).

Table 3. Severity of Depression Detected by Beck Depression Inventory II (BDI) Among Males and Females in Rheumatoid Arthritis and Control Groups[a,b]

Depression	Male		Female	
Severity	RA Group	Control Group	RA Group	Control Group
Minimal	16 (25.4)	41 (54.66)	34 (31.5)	62 (50.4)
Mild	21 (33.33)	13 (17.33)	22 (20.37)	17 (13.85)
Moderate	18 (28.6)	13 (17.33)	31 (28.7)	32 (26)
Severe	8 (12.67)	8 (10.68)	21 (19.43)	12 (9.75)
P-Value	0.005**		0.016*	

[a] *Significance at the level of $P < 0.05$; **Significance at the level of $P < 0.01$.
[b] P-value stands for Chi-square test to evaluate prevalence between categorical groups.

sults show that positive RF can be a preventive factor for depression among patients with RA.

5. Discussion

In the present study, the prevalence of depression was assessed in patients with RA and was compared with a group of healthy subjects. Depression was assessed using the BDI II measurement tool. Here, we reported that 17% of Iranian patients with RA had severe depression, which is significantly higher than healthy individuals. Higher level of mood deterioration in patients with RA in comparison with the general population has been reported, previously (1, 2). The role of social support (16) and socioeconomic status (17) has been described by Zyrianova et al. (16) and Margaretten et al. (17), studies of whom demonstrated that higher rate of depression in RA is associated with lower socioeconomic status and social support, which insists on the fact that the prevalence of depression may vary in different countries in which patients receive different levels of social support. To the best of our knowledge, this is the first investigation assessing the prevalence and impact of depression among Iranian patients with RA.

Our study showed higher prevalence of depression and higher rate of severe depression among patients with RA regardless of gender. However, older patients (older than 50 years old) showed more depressive signs than healthy subjects at a similar age, which is in line with the report of Matcham et al. (1). However, Matcham also explained that this higher rate of depression in elderly might exist regardless of presence of RA, since increased risk of depression in the elderly has been described previously (18). In this regard, our study showed that elderly patients with RA are more depressed than healthy subjects at a similar age. In fact, old age, which is an independent determinant of depression, affects patients with RA more considerably than the normal population.

In line with our results, Dickens et al. (19) reported that depression is more common in patients with RA than in healthy individuals. However, Dickens proposed that this difference is not due to socio-demographic differences between groups. Moreover in their meta-analysis the role of various methods of assessing depression in differences among studies, examining the levels of depression in patients with RA, was described. Similarly, Matcham et al. (1) showed that depressive symptoms were present in 38.8% of subjects using the patient health questionnaire PHQ-9, and in 14.8% to 48% of subjects using the hospital anxiety and depression scale (HADS). Here we used the beck depression inventory II to determine depression among patients with RA. According to our results, 45% of patients with RA showed some extent of depressive mood (28% moderate and 17% severe depression). The relative difference between our report and previous literature can be due to variations in the measurement tools.

Our investigation revealed no relationship between pain and depression in patients with RA. Similar to our outcomes, Scheidt et al. (20) reported no effect of pain intensity on depression in RA. Pinto-Gouveia et al. (21) demonstrated the role of disease acceptance in the association between pain and depression in RA. Their study illustrated that patients with higher acceptance had slower growth rates of depression across time, even when pain increased. This finding showed that acceptance is a confounder in the correlation between pain and depression. Here, we found no association between pain and BDI II score, which may be due to the existence of such confounders.

Previously, Wolfe and Michaud showed that weakness is a dominant predictor of self-reported depression in RA (10). Similar results have been demonstrated by Fifield (22). In our study no association between weakness and depression could be detected. One reason for these conflicting results can be differences in weakness of the measurement tool. Although all these investigations have assessed weakness through patients' subjective self-report, variation in assessment tools can cause such conflicts in the outcomes. Age, duration of RA and existence of other comorbid conditions are probable confounders that may affect the lin-

ear relationship between weakness and depression in RA. Further studies should be performed to clarify these correlations with adjustment for confounders.

Previously, Tillmann et al. reported that the RF-subtype is associated with higher incidence of depression (23), which is in line with our results. Previous literature has linked RF negative status to the covariates of depression, such as psychiatric disorders anxiety and neuroticism (24-26). Furthermore, RF negative status has been associated with lower self-acceptance, somatization complaints and obsessive-compulsiveness (27, 28). All these studies, including our investigation, have proposed RF negative status as an available biomarker, which may be clinically linked to higher psychopathy.

5.1. Conclusion

Here, we found that depression is more common among Iranian patients with RA than healthy subjects and is estimated to be 45% (P = 0.008). The higher rate of depression exists among patients with RA regardless of gender but it has a significant association with older age (P = 0.03). Our results also demonstrated that negative RF status may predict future risk of depression.

Footnotes

Authors' Contribution: Jalal Shakeri designed the study and approved the final revised manuscript; Hania Shakeri drafted the manuscript and contributed to writing and editing the paper; Ehteram Ebrahimi contributed to data collection and interview with the study subjects; Fatemeh Jalilian contributed to data collection, interviewing with the study subjects, interpretation of outcomes, reviewing the related literatures and data analysis; Farid Arman contributed to data analysis; Vahid Farnia contributed to intellectual editing of the content of the manuscript and approved the final manuscript. All authors read and approved the final manuscript.

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