Research Letter

Prevalence of Stress at Home and Its Significant Associations Among Patients With Rheumatoid Arthritis

To the Editor:

Patients with rheumatoid arthritis (RA) are more prone to have anxiety, depression, and cognitive impairment compared to the general population.[1] Psychological stress is also widely recognized as an important risk factor in the disease course. We aimed to study the prevalence of mental and/or emotional stress at home and its associations among patients with RA. We addressed this question using real-world data from the Pakistan Registry of Rheumatic Diseases (PRIME), which is a large, independent, prospective, observational cohort initiated in October 2019.

This was a cross-sectional study conducted using data collected at the time of patient enrollment in the PRIME registry. Institutional review board approval was received from the FMH College of Medicine and Dentistry, Lahore, and informed consent was obtained.

We assessed the data for patients with RA fulfilling 2010 American College of Rheumatology/European Alliance of Associations for Rheumatology (ACR/EULAR) criteria.[2] Clinical variables studied were gender, age, smoking habits, education status, marital status, disease duration, rural/urban residence, level of physical disability (using the Health Assessment Questionnaire–Disability Index [HAQ-DI], comorbidities (using the Charlson Comorbidity Index [CCI]), and quality of life (QOL; using the 12-item Short Form Health Survey [SF-12] physical component score [PCS] and mental component score [MCS], along with disease activity indexes). At the time of patient enrollment, all participants were asked about the presence or absence of mental and/or emotional stress at home, and to rate it from 0 to 3 (no stress, mild, moderate, severe). For better understanding and ease of statistical analysis, we used a dichotomous variable by categorizing patients with moderate-to-severe stress and those with none-to-mild stress. The association of clinical variables with the severity of stress was determined using univariate and multivariate logistic regression.

The data from 1016 consecutive patients with RA was reviewed. Table 1 describes the demographics and clinical characteristics of the cohort. Forty-nine percent (n = 494) of patients reported having moderate-to-severe stress at home. Table 2 describes the univariate analysis results, and those with significance at the 0.25 level were entered into the multivariable model. In the multiple logistic regression analysis, a significant association of moderate-to-severe stress at home was observed with being married (odds ratio [OR] 0.57, 95% CI 0.38-0.87, $P = 0.009$), living in a rural residence (OR 0.64, 95% CI 0.42-0.99, $P = 0.045$), higher disease activity (Disease Activity Score in 28 joints; OR 2.36, 95% CI 1.99-2.80, $P < 0.001$), worse mental component of QOL (OR 0.65, 95% CI 0.61-0.68,

Table 1. Demographics and disease-related characteristics of the patients with RA (N = 1016).

	Values
Age, yrs, mean (SD)	40.8 (13.0)
Gender, female, n (%)	799 (78.6)
Disease duration, mos, mean (SD)	64 (66)
Not married, n (%)	385 (37.9)
Rural residence, n (%)	324 (31.9)
Smoking (active), n (%)	59 (5.8)
Low education status, ≤ primary school, n (%)	327 (32.2)
DAS28, mean (SD)	4.18 (1.42)
Moderate-to-severe stress, n (%)	494 (48.6)
SF-12 MCS, mean (SD)	41.5 (1.56)
SF-12 PCS, mean (SD)	42.8 (16.0)
CCI, mean (SD)	1.64 (1.02)
HAQ-DI, mean (SD)	0.66 (0.58)

CCI: Charlson Comorbidity Index; DAS28: Disease Activity Score in 28 joints; HAQ-DI: Health Assessment Questionnaire–Disability Index; MCS: mental component summary; PCS: physical component summary; RA: rheumatoid arthritis; SF-12: 12-item Short Form Health Survey.

$P < 0.001$), and more comorbidities (OR 1.43, 95% CI 1.16-1.76, $P = 0.001$). The final regression model resulted in a statistically significantly improved association and prediction of worse moderate-to-severe stress at home ($R^2 = 71.6\%$).

From a clinical standpoint, the results of this study are important in a number of ways. First, our study showed a higher level of moderate-to-severe stress among patients with RA compared to the general population (49% vs 24%).[3] Second, unmarried patients with RA reported a higher level of stress at home; this possibly reflects the lack of social support at home. Third, our study has shown that patients with RA residing in rural areas are significantly less stressed compared to those residing in urban areas. City life is traditionally considered stressful, and a 2011 study published in *Nature* showed that people who lived in cities had an increase of 21% in mood disorders and an increase of 39% in anxiety disorders compared to those living in rural areas.[4] Fourth, our results concur with previous studies that stress correlates with increased RA disease activity and flare.[5] It is likely that there is a bidirectional relationship between psychological factors and RA disease activity, and previous research has indeed suggested that psychosocial well-being is independently related to disease activity in RA.[6] Fifth, our study shows a highly significant mutual relationship between stress and QOL, highlighting the need to adopt a multipronged approach in managing these patients. Previous studies have shown that patients with RA have poor QOL.[7] Finally, higher stress levels and a greater number of comorbidities were noted in our study. Resolving the interplay between RA, stress, and comorbidities is challenging. However, it is plausible that stressed patients with RA have poor lifestyles, poor compliance, and more severe disease activity, leading to the development of comorbidities.

Table 2. Univariate and multivariate associations of different clinical variables with moderate-to-severe stress.

	Univariate Model			Multivariate Model		
	OR	95% CI	*P*	OR	95% CI	*P*
Age	1.00	0.99-1.01	0.29			
Gender, female	1.34	0.99-1.81	0.06			
Disease duration	1.00	1.001-1.003	0.12			
Low education status	0.83	0.64-1.07	0.16			
Rural residence	0.76	0.59-1.00	0.05	0.64	0.42-0.99	0.045
Unemployed	1.16	0.89-1.52	0.25			
Married	0.54	0.42-0.70	< 0.001	0.57	0.38-0.87	0.009
DAS-28	2.44	2.15-2.77	< 0.001	2.36	1.99-2.80	< 0.001
SF-12 PCS	0.84	0.82-0.87	< 0.001			
SF-12 MCS	0.64	0.61-0.67	< 0.001	0.65	0.61-0.68	< 0.001
CCI	1.40	1.22-1.59	< 0.001	1.43	1.16-1.76	0.001
HAQ-DI	1.07	0.87-1.32	0.50			

Variables entered in the final regression analysis were age, disease duration, gender; education status, marital status, rural residence, CCI, DAS28, HAQ-DI, and MCS and PCS scores. CCI: Charlson Comorbidity Index; DAS28: Disease Activity Score in 28 joints; HAQ-DI: Health Assessment Questionnaire–Disability Index; MCS: mental component summary; PCS: physical component summary; SF-12: 12-item Short Form Health Survey.

The strengths of our study are as follows: (1) we included a wide range of potentially important demographics and clinical variables; (2) since ethnic variation in arthritis-related stress susceptibility has been described,[8] we performed our study in a relatively homogeneous Pakistani population; (3) to our knowledge, this study is the largest to date from Asia that has attempted to identify in great detail the clinical associations of stress among patients with RA; (4) a significant majority ($R^2 = 71.6\%$) of the variation of a dependent variable (stress at home) was explained by the independent variables used in our regression model. We acknowledge that the prevalence of stress was examined in one cross-sectional assessment, which is not the ideal study design to investigate the associations of stress at home. Additionally, the specific ethnocultural background and relatively low average age in our cohort potentially make the results less generalizable.

Our study highlights the high prevalence of stress at home in patients with RA and provides detailed evidence that stress at home is independently associated with being single, urban residence, higher disease activity, comorbidities, and worse QOL. A better understanding of the relationship between RA and stress could provide more insight into possible psychosocial interventions that could improve the management of RA.

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