IMPACT OF SOCIO-DEMOGRAPHIC AND CLINICAL CHARACTERISTICS ON FUNCTIONAL STATUS AND HEALTH OF PATIENTS WITH RHEUMATOLOGICAL AND AUTOIMMUNE DISEASES; PRESENTING IN RHEUMATOLOGY OPD OF A TERTIARY CARE HOSPITAL

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ABSTRACT
Background: Rheumatological and autoimmune diseases affect a substantial portion of world's population and had substantial impact on functional status and health-related outcome of affected individuals.
Objectives: We investigated the influence of socio-demographic and clinical factors on the functional status and health of patients with rheumatological and autoimmune diseases.
Methods: We conducted a cross-sectional survey of 384 patients with rheumatological and autoimmune diseases to examine relationships between socio-demographic and clinical variables, functional status, and patients' health. We collected data on structured questionnaire pertaining to socio-demographics of patients and assessment of functional health status of patients was done using DAS-28 and MHAQ scoring charts.
Results: Majority of patients (73.69%) were females ($p<0.05$). Age range of patients was 18-68 years with mean 58.32 ± 9.18 years. 52 patients (13.54%) had a DAS-28 score between 2.6 and 3.2, 218 patients (56.77%) had a DAS-28 score between 3.2 and 5.1, and 98 patients (25.52%) had a DAS-28 score higher than 5.1. Between 0 and 8 MHAQ scores, there were 89 (23.17%) patients, between 9 and 16 patients had 163 (42.44%), between 17 and 24 patients had 109 (28.38%), and between 25 and 32 patients had 23 (5.98%).
Conclusion: Socio-demographic and clinical factors played significant role in determining the functional status and overall health of patients with rheumatological and autoimmune diseases. Older age, a lower literacy level, prolonged disease and occurrence of multiple clinical characteristics were associated with a abridged functional and health-status of patients' life.

KEYWORDS: Arthritis; Biologic therapy; Health outcomes; Patients awareness; Rheumatological disorders.

INTRODUCTION

Rheumatological and autoimmune diseases are a group of chronic inflammatory disorders affecting millions of people around the globe [1]. These conditions had substantial influence on functional status and health-related value of life of patients, resulting in physical disability, psychological distress, and decreased comfort [2]. Despite the development of novel treatments and advancements in our understanding of the underlying pathophysiology of these diseases, a significant number of patients experienced functional impairment and diminished life quality due to it [3].

In recent years, numerous researchers examined influence of socio-demographic and clinical characteristics on functional status and health outcomes of patients with rheumatological and autoimmune diseases [4]. According to studies, elements like age, literacy, gender, disease activity, and duration can influence functional status and health-outcome of patients. However, relationship between these variables and health outcomes is not completely understood and is complex [5].

Disease activity has been shown to significantly affect the functional status and patients' health outcomes with these conditions [6]. Disease activity refers to the degree of inflammation and tissue injury in affected organs or tissues and is frequently used to quantify the severity of a disease. Compared to patients with low disease activity with high, were more likely to experience functional impairment [7].

Socio-demographic characteristics may also influence the functional status and patients' health outcomes with rheumatological and autoimmune diseases. According to studies, older age, a lesser level of education, and occurrence of comorbidities are associated with a poorer functional status and abridged health-outcome in patients with these conditions. Nevertheless, the relationship between these factors and health outcomes is complex and may depend on the characteristics of the individual patient [4, 8].

Additionally, sociodemographic characteristics, the use of biologic therapy has emerged as an important predictor of functional status of patients. Biologic therapy refers to drugs that target specific molecules or cells implicated in the pathogenesis of these conditions, resulting in enhanced disease control and functional outcomes [9-11].

Majority of existing literature has concentrated on specific diseases within the rheumatological and autoimmune spectrum, including erythematosus, systemic lupus, rheumatoid and psoriatic arthritis. While these studies have provided valuable insights into effect of such diseases on patients' functional status, less is known about how sociodemographic and clinical characteristics may influence these outcomes across the spectrum of rheumatological and autoimmune diseases [12].

This study aimed to examine the influence of socio-demographic and clinical factors on the functional status and health-outcome of patients with rheumatological and autoimmune diseases. By identifying the factors that influence these outcomes, healthcare providers can tailor interventions to meet the unique requirements of patients and enhance their life quality. Prior research has examined impact of disease activity, its duration, and comorbidities on functional status for such disorders. However, the role of socio-demographic factors such as age, gender, and educational level in these outcomes has received less attention. This study seeks to fill this gap in literature by examining links between socio-demographic and clinical characteristics, functional status, and health-related quality of life in patients with these conditions. The findings will produce significant implications for management of these conditions and develop patient-centered interventions for enhancing patients' health outcomes.

MATERIAL AND METHODS

We conducted a cross-sectional survey of 384 patients with rheumatological and autoimmune diseases to examine the relationships between socio-demographic and clinical variables, functional status, and health-outcome. In this cross-sectional study, patients who attended rheumatology clinics at Mayo Hospital, Lahore, Pakistan, in 2021-23 participated, under the protocol of convenient sampling. Data

was collected on structured questionnaire pertaining to socio-demographics of patients with rheumatological and autoimmune diseases and clinical characteristics were analyzed with their functional and health status.

Age, disease duration, follow-up intervals, educational level and employment status were provided by the patients. Co-morbidities and clinical disease characteristics were also recorded. Disease activity score (DAS-28) and modified health assessment questionnaire (MHAQ) were used to evaluate the functional status.

Inclusion criteria for study comprised patients having confirmatory diagnosis for rheumatoid ailments, who visited rheumatology clinics at our institute for at least six months; patients more than 18 years old and concurred to participate. Excluded were patients with necrotic vascular disease, disabled or not receiving treatment [4].

The DAS-28 is a composite measure used to assess disease activity of rheumatoid disorders. It considered number of tender and inflamed joints, patient's global assessment of disease and a laboratory measure of inflammation (C-reactive protein or ESR) (Table 1). Higher DAS-28 scores indicated more active disease. Patients with rheumatoid arthritis commonly use DAS-28 in clinical trials and routine clinical practice to monitor disease activity and treatment response [13-14].

The MHAQ also assess functional status of rheumatic diseases. The questionnaire evaluated patient's capacity to achieve 08 daily activities, including dressing, grooming, dining, walking, and other physical tasks. Each activity was rated on a four-point scale ranging from 0 (no difficulty) to 3 (unable to perform). Sum of scores for each category yielded total score between 0 and 24, with higher scores indicating greater disability (Table 2). MHAQ is a reliable and valid instrument that is extensively utilized in clinical practice and research to evaluate functional status and disability with rheumatic diseases [15].

The Institutional Review Board approved study protocol on. Before enrollment, written informed consent was received from participants.

For quantitative variables, the descriptive data were presented using mean and SD, while for qualitative variables, frequency and percentage. For qualitative variables, whereas for quantitative variables, one-way ANOVA and post hoc Tukey tests were employed. P-values less than or equivalent to 0.05 were deemed statistically significant. Data was processed using version 24.0 of SPSS statistical software.

Table 1: Evaluation and scoring of patients for rheumatoid disorders on DAS-28 chart

S. No	DAS-28 score	Disease activity level	Functional status
1	0-2.6	Remission	Normal
2	2.6-3.2	Low	Slightly impaired
3	3.2-5.1	Moderate	Moderate impairment
4	>5.1	High	Severe impairment

Table 2: Evaluation and scoring of patients for rheumatoid disorders on MHAQ chart

S. No	Category	Scores
1	Dressing and hygiene	
2	Getting from bed	
3	Feeding	0- No difficulty
4	Walking	1- Slight problem
5	Cleanliness	2- Much difficult to perform
6	Reach	3- Failed to perform
7	Grab	
8	Actions	

RESULTS

The study was conducted in Mayo Hospital, Lahore, comprising 384 patients presented at rheumatology department during 2021-23. Socio--demographic data of patients with rheumatological and autoimmune diseases was analyzed for 384 patients enrolled in this study. Majority of the patients (73.69%) were females, and p-value showed a significant difference in the distribution of the sexes (p<0.05), while males were only 26.30%. Age range of patients was 18-68 years with an average of 58.32±9.18 years. Majority of the patients (53.90%) had completed their intermediate education (p<0.05), and the F-value and p-value indicated that there was a substantial difference in their reading level. The bulk of patients (51.56%) lacked jobs, and professions of these patients differ significantly (p<0.05) from one another. The F-value and p-value showed that there was significant difference in the activity level among patients (p<0.05), with majority having a low activity level (62.50%), 8.85% of patients bear a genetic predisposition to rheumatological and autoimmune disorders having significant difference in the genetic propensity (p<0.05). The majority of patients (72.39%) were married (p<0.05), followed by unmarried (19.27%), others (5.46%) and divorced (2.86%). The majority of patients (48.95%) had normal BMIs (p<0.05), followed by overweight (39.06%) and underweight (11.97%). Overall, this table offered crucial socio-demographic details about the study's patient population that may be used by researchers and clinicians to better understand the group's characteristics and adjust treatment and management plans accordingly. According to p-value, there were substantial differences in demographic variables, which had impact on the onset and course of autoimmune and rheumatological disorders (Table 3).

Incidence of rheumatic and autoimmune disorders in participating patients was evaluated and it was found that most of the population (p<0.05) was suffering from osteoarthritis (55%), followed by ankylosing spondylitis (11%), rheumatoid arthritis (7%), psoriatic arthritis (7%) and Juvenile osteoarthritis (1%) (Figure 1). Assessment of clinical characteristics of the patients were also keenly seen and we found that significant proportion of the patients exhibited inflammation (77%), fatigue (67%), joint pain and stiffness (45%), malaise (43%), loss of joint function (33%), numbness (28%), tingling (24%), morning stiffness (23%), fever (16%), limited mobility (15%), autoantibodies (13%) *etc* (Figure 2).

Functional and health status of the patients was assessed using DAS-28 score chart, as mentioned in the Table 1. DAS-28 score chart is composite measure incorporating the clinical and laboratory measurements to assess disease activity in rheumatoid disorders of patients. DAS-28 score range, patient count, frequency (%), and p-value are all columns in the table. Higher DAS-28 scores indicate more disease activity; the scale runs from 0 to >5.1. As seen in the table 52 patients (13.54%) had a DAS-28 score between 2.6 and 3.2, 218 patients (56.77%) had a DAS-28 score between 3.2 and 5.1, and 98 patients (25.52%) had a DAS-28 score higher than 5.1. The distribution of DAS-28 scores was statistically significant (p<0.05). This implied that DAS-28 score was an effective method for evaluating functional status in rheumatoid disorders patients and that it can be used to classify patients according to the severity of their condition (Table 4). Patients' functional status was also evaluated using MHAQ score chart. MHAQ score was a self-administered questionnaire that assessed how difficult it was for patient to carry out daily tasks because of their illness. Higher scores on MHAQ scale, which spu from 0 to 32, indicated greater disability. Our findings suggested that between 0 and 8 patients had an MHAQ score of 89 (23.17%), between 9 and 16 patients had 163 (42.44%), between 17 and 24 patients had 109 (28.38%), and between 25 and 32 patients had 23 (5.98%). The statistical significance of distribution of MHAQ scores was shown (p<0.05). Clinicians could monitor changes in patient's functional status over time, assess the efficacy of treatments, and make defensible decisions about how to manage the patient's condition by using a table like this. The MHAQ score can also be used to group patients into several functional groups, which can help inform therapy choices and forecast the course of a disease (Table 5).

Table 3: Socio-demographic data of patients with rheumatological and autoimmune diseases

S. No	Socio-demographic data	Frequency	F-value	p-value
1	Sample size (n)	384	--	--
2	Age (Mean$\pm$SD) years	58.32$\pm$9.18	--	--
3	Sex n(%) Male Female	 101 (26.30) 283 (73.69)	288.75	0.00001*
4	Literacy level n(%) Uneducated Intermediate Graduate Postgraduate	 91 (23.69) 207 (53.90) 78 (20.31) 08 (2.08)	193.72	0.00001*
5	Profession n(%) Unemployed White collar worker Blue collar worker	 198 (51.56) 37 (9.63) 152 (39.58)	1719.25	0.00001*
6	Activity level n(%) Low Medium High	 240 (62.50) 98 (25.52) 46 (11.97)	6050.4	0.00001*
7	Genetic predisposition n(%) No Yes	 350 (91.14) 34 (8.85)	99856	0.00001*
8	Marital status n(%) Unmarried Married Divorced Others	 74 (19.27) 278 (72.39) 11 (2.86) 21 (5.46)	924.53	0.00001*
9	BMI n(%) Underweight Normal Overweight	 46 (11.97) 188 (48.95) 150 (39.06)	1621.2	0.00001*

* indicated that the value is significant at $p < 0.05$

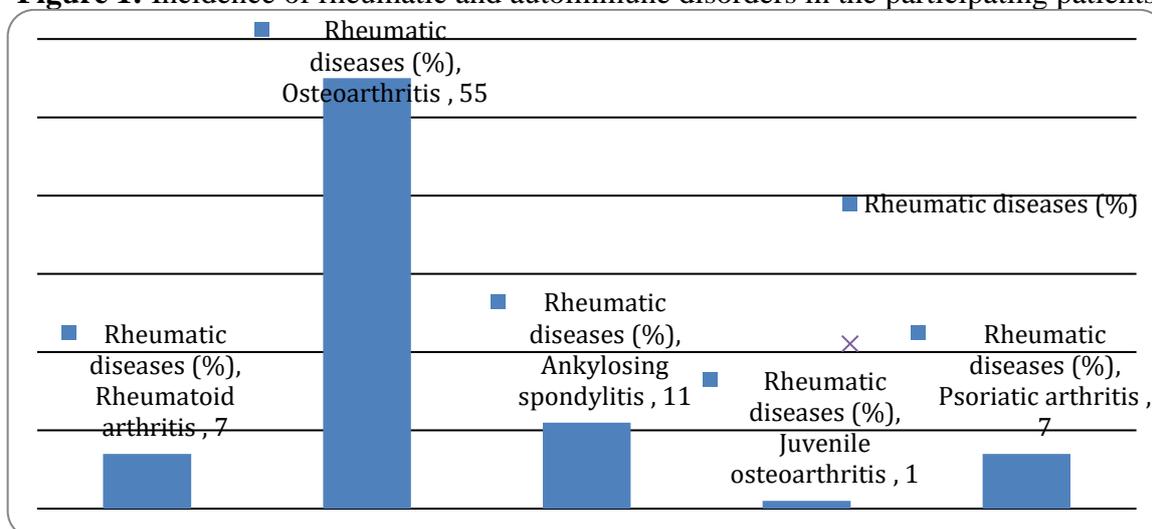**Figure 1:** Incidence of rheumatic and autoimmune disorders in the participating patients

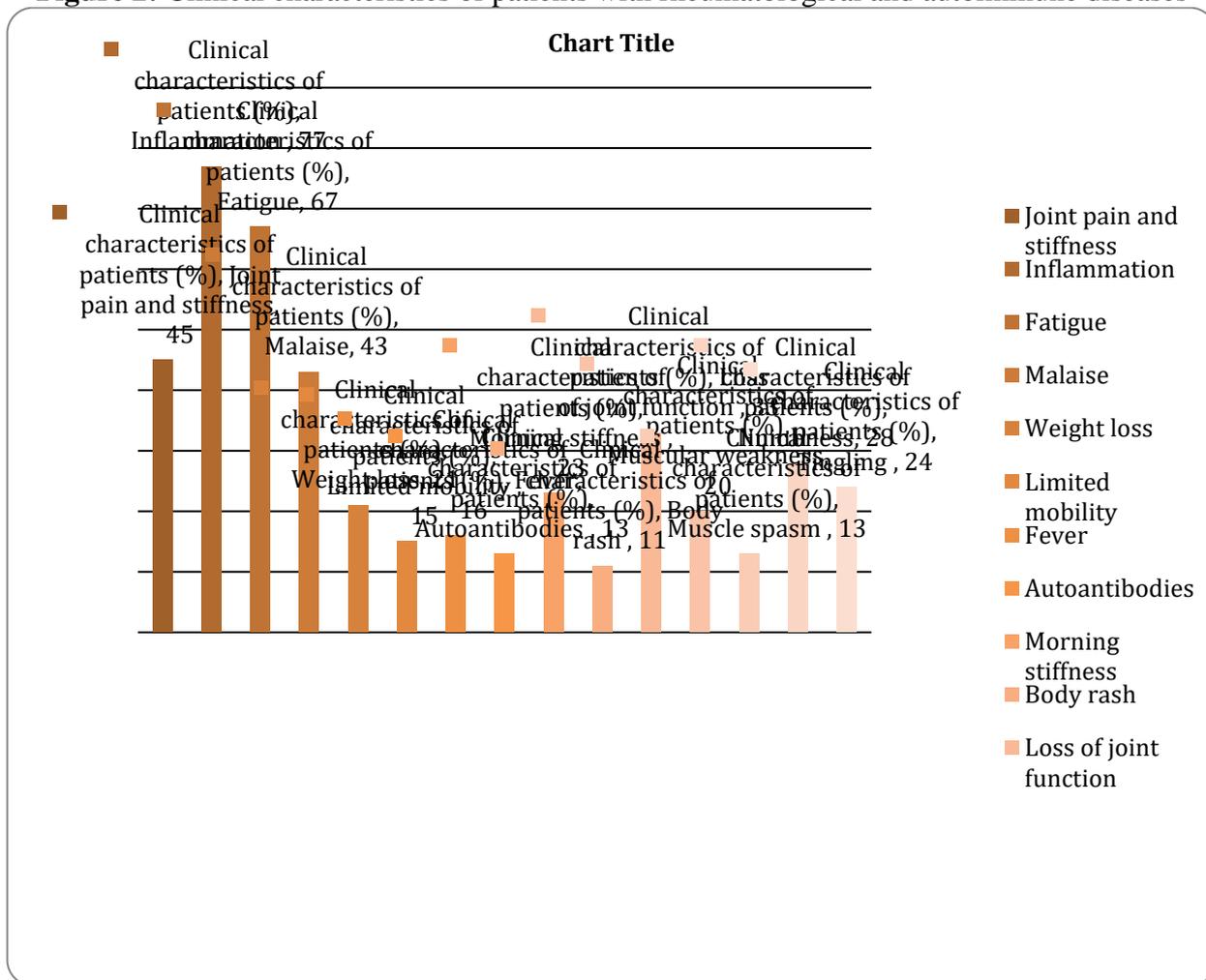**Figure 2:** Clinical characteristics of patients with rheumatological and autoimmune diseases

Table 4: Assessment of functional status of patients using DAS-28 score chart

S. No	DAS-28 score	Number of patients (n)	Frequency (%)	p-value
1	0-2.6	16	4.16	
2	2.6-3.2	52	13.54	0.00001*
3	3.2-5.1	218	56.77	(value is significant
4	>5.1	98	25.52	at p<0.05)

Table 5: Assessment of functional status of patients using MHAQ score chart

S. No	MHAQ score	Number of patients (n)	Frequency (%)	p-value
1	0-8	89	23.17	0.00001*
2	9-16	163	42.44	(value is significant
3	17-24	109	28.38	at p<0.05)
4	25-32	23	5.98	

DISCUSSION

We analyzed socio--demographic data of patients with rheumatological and autoimmune diseases was analyzed for 384 patients enrolled in this study. Socio--demographic characters proved to have significant impact on functional characteristics as well as health status of rheumatological and autoimmune disorder affected patients whereby older age, a lower literacy level, longer disease duration, and occurrence of multiple clinical characteristics were associated with a reduced functional and health-status of patients' life. Functional and health status of patients was assessed using DAS-

28 and MHAQ score charts which implied that these methods were effective for evaluating functional status in rheumatoid disorders patients and that it can be used to classify patients according to the severity of their condition.

Our findings were corroborated with the study conducted at two multicentric French cohorts. In both diseases' later phases, younger people, men, and Caucasians reported less discomfort. Participants with advanced degrees and Caucasians experienced little discomfort early on and no changes throughout the duration of the illness [16]. Similar conclusions were acquired from a research which identified a number of critical elements that must be taken into account when treating such patients. Accordingly, work, higher income, the absence of night pain, the absence of comorbid diseases, and treatment with a biological DMARD (Etanercept) were all significantly associated with better HRQoL in rheumatoid patients, who had median EQ-5D-5L index scores that were roughly half of the total score. The study also discovered that rheumatoid patients had high disability scores (HAQ-DI score), and that certain factors were significantly associated with higher HAQ-DI scores (more disability), including age, lack of employment, lower income, morning stiffness, night pain, comorbid diseases, and not receiving biological DMARD (Etanercept) treatment. Furthermore, it was discovered that patients with poor HRQoL were more disabled [4]. A number of variables, including age, gender, pain, income, education level, employment position, social status, and body mass index, might had an impact on a patient's quality of life if they have rheumatoid arthritis [17]. Additional factors, such as disease activity, depression, fatigue, anxiety, sleep duration, psychological counseling, and levels of C4 and IgA, also had an impact on quality of life of rheumatoid patients [18-19].

In a different study, 946 people with rheumatoid arthritis and systemic lupus erythematosus (SLE) (44.2% and 34.1%, respectively) were enrolled. Except for the environment dimension, 145 (52.5%) of the patients reported having a health-related disease or illness (HCI), and their dimension scores were considerably lower than those of the patients without an HCI. Baseline QoL dimension scores were correlated with psycho-emotional factors (like confusion, depression, and anxiety), sociodemographic factors (like age, COVID-19's negative economic impact, years of scholarship, HCI, and employment), and biomedical factors (like RAPID-3 score and corticosteroid use). As a result, majority patients' QoL dimensions were strongly impacted by HCI, and psycho-emotional, sociodemographic, and biological characteristics were consistently linked to the scores of these dimensions, which in turn predicted the QoL trajectory [20]. Another report was seen that university education was a strong predictor of low disease activity, and it appeared to be associated with a more favorable rheumatoid condition. It was highlighted that low education was not the only factor that contributed to poor health outcomes and was not the direct cause of higher morbidity and death in rheumatoid patients [21-22].

CONCLUSION

This study indicated that socio-demographic and clinical factors played significant role in determining the functional status and overall health of patients with rheumatological and autoimmune diseases. Older age, a lower literacy level, prolonged disease, and occurrence of multiple clinical characteristics were associated with a diminished functional and health-status of patients' life. When devising treatment plans and evaluating outcomes, it is crucial to consider patient-specific factors such as age, gender, education, income, disease severity, and comorbidities. Because patients with lower levels of education and income, and those with more severe disease and comorbidities were at increased risk for poor functional status and overall health outcomes. Consequently, interventions intended to improve life quality and overall health with rheumatological and autoimmune diseases should consider resolving these socio-demographic and clinical factors. In addition, the study highlighted need for continued research to investigate the impact of these factors on the health of patients with these conditions. This investigation provided precious insights into the intricate relationship between socio-demographic and clinical characteristics on functional status and health outcome in rheumatological and autoimmune diseases.

CONFLICT OF INTEREST
None.

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