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Prevalence and Clinical Predictors of Early Rheumatoid Arthritis in Pakistani Adults Attending Tertiary Care Hospitals

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ABSTRACT

Background: Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease, and in its early stages of development, it is characterized by insidious clinical manifestations, so it is difficult to diagnose it in a low-resource environment. In order to avoid long-term joint damage, it is important to start disease-modifying therapy as early as possible. Very little information is available concerning the burden and clinical predictors of early RA among Pakistani adults visiting tertiary hospitals.

Objectives: To ascertain how early RA is found in adults who present with recent onset joint symptoms in tertiary care hospitals in Punjab, Pakistan, and to ascertain clinical and laboratory predictors of early RA.

Methods: The study was a cross-sectional study organized in tertiary care hospitals in Punjab between June 2024 and May 2025. They recruited seventy adults who had joint symptoms of less than 12 months. The 2010 ACR/EULAR criteria were applied in the diagnosis of early RA. Demographics, clinical and laboratory parameters such as rheumatoid factor, anti-cyclic citrullinated peptide (anti-CCP) antibodies, ESR and CRP were noted. The chi-square tests and multivariate logistic regression were applied to analyze associations.

Results: Early RA prevalence was 40% (28/70). The disease was both sexually transmitted and there was a better representation of females. The early RA was highly related to morning stiffness of 60 minutes and more, symmetrical small-joint swelling, and hand and wrist involvement. The highest predictive value appeared to be anti-CCP, then, high ESR. RF and CRP were supportive markers, which were less predictive in adjusted analysis.

Conclusion: Symptomatic adults who access tertiary care centers in Punjab have prevalence of early RA. The most important predictors are anti-CCP positivity, long-lasting morning stiffness, symmetrical swelling of joints, and increased ESR. These markers should be incorporated into early assessment protocols and can enhance earlier diagnosis and clinical outcomes.

Keywords: Early rheumatoid arthritis, anti-CCP antibodies, ESR, clinical predictors, Pakistan, inflammatory arthritis.

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INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, progressive, autoimmune, inflammatory disease with persistent synovitis, symmetrical joints and extra-articular systemic symptoms[1]. It is also considered as affecting 0.51 percent and 1 percent of the adult population in the world and is one of the major causes of long-term disability when compared to rheumatic disease[2]. Early RA, which is usually the manifestation of the disease in a duration of less than 12 months, is a vital period in which early disease diagnosis and timely start of disease-modifying antirheumatic drugs (DMARDs) can greatly delay disease progression, decrease joint erosion, and enhance long-term functional results[3]. Nevertheless, late diagnosis is the significant issue in most countries with low and middle-income and, in particular, in Pakistan, where there is little consistency in healthcare access, availability of specialists, and patients awareness[4].

RA is a significant public health issue in Pakistan because of the rising prevalence of the disease, late diagnosis, and the inadequate access to organized early arthritis clinics[5]. Majority of those studies available in the country are investigating established RA with a big gap in the body of knowledge on early disease patterns,

prevalence and predictive clinical features at the time of presentation[6]. It is essential to identify clinical predictors such as demographic factors, symptom patterns, lab biomarkers (rheumatoid factor and anti-cyclic citrullinated peptide antibodies), as well as inflammatory markers to enhance the process of early detection[7]. According to international literature, early synovitis, morning stiffness, and symmetric involvement of the small joints, and anti-CCP seropositivity are considered to be some of the best predictors of progressive RA, but their diagnostic utility in Pakistani population is poorly studied[8].

Due to the sociocultural diversity, environmental exposures, and changing health-seeking behaviors in Pakistani adults, it is necessary to establish the prevalence and predictors of early RA in tertiary care facilities to establish specific screening methods and enhance clinical decision-making[9]. The research paper thus seeks to determine the incidence of early RA in patients with new joint symptoms at tertiary care hospitals in Punjab, Pakistan and the most effective clinical and laboratory predictors of early RA in the population[10].

MATERIALS AND METHODS

The study was an observational cross-sectional study that took place in tertiary hospitals in Punjab, Pakistan, that is, Mayo Hospital Lahore, Services Hospital Lahore, and Nishtar Hospital Multan, in the 12 months between June 2024 and May 2025. Out of the 70 adult patients who reported cases of new-onset joint symptoms to the rheumatology and internal medicine outpatient departments, non-probability purposive sampling was applied to enroll them consecutively. The participants eligible were adults (18 years and above) with less than 12 months of joint pain, swelling, or stiffness accompanied by informed written consent. Those patients who had an earlier diagnosis of rheumatoid arthritis, other autoimmune connective tissue diseases, post-traumatic joint pathology, septic arthritis, gout, or malignancy were excluded in order to make the correct diagnosis of early rheumatoid disease. All patients were undertaken through a comprehensive clinical assessment by trained rheumatology physicians that also included the assessment of the pattern of joint involvement, the duration of morning stiffness, whether there was swelling or tenderness of the joints, and systemic symptoms. Rheumatoid factor (RF), anti-cyclic citrullinated peptide (anti-CCP), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), complete blood count, and serum uric acid were included in the laboratory investigations. Clinically indicated plain radiographs of hands and feet were done. The classification criteria of 2010 American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) was used to diagnose early rheumatoid arthritis, and the result was 6 and above to confirm RA. All data were put on a structured proforma and entered into SPSS version 26.0 to analyze them. The demographic and clinical variables were summarized through descriptive statistics and the interactions between clinical predictors and early RA status through chi-square tests and logistic regression. A p-value of less than 0.05 was taken to be significant.

RESULTS

Seventy-five adults with newly onset joint symptoms were recruited in the study. Out of them, 28 individuals (40.0% were diagnosed with early rheumatoid arthritis (early RA) according to the 2010 ACR/EULAR, and 42 individuals (60.0% were classified as non-RA arthropathies. This generated a general prevalence rate of 40% of early RA in symptomatic adults in the tertiary care hospitals in Punjab, Pakistan.

Early RA patients had a mean age of 41.9 -12.4 years, which was a little older than the non-RA group (38.2 -11.7 years). The genders were equally represented in early RA with 19 females (67.9%), 9 males (32.1) suggesting that though female predominance exists, about a significant number of female patients diagnosed with early RA were males. Table 1 demonstrates the representation of baseline demographic and clinical characteristics in the two groups.

The significantly related variables were the prolonged morning stiffness (more than 60 minutes), swelling of small joints (symmetrical), and pain in the hand and wrist that were more frequent in early RA patients. There was also more fatigue and low-grade fever in early RA group but no statistical significance. All these findings can be summarized in Table 1.

Laboratory data also assisted in the distinction of early cases with RA and non-RA cases. RF positivity (57.1%), anti-CCP positivity (67.9%) and high ESR levels (greater than 30 mm/hr) were significantly more frequent in early RA persons. There was also increased CRP levels. There were no significant group differences in Uric acid levels. Table 2 presents these laboratory patterns in detail.

Table 2 demonstrates that the strongest serological discriminator was anti-CCP positivity between the cases associated with early RA and non-RA ($p < 0.001$). High ESR and CRP also showed high correlations with early RA. RF positivity as compared to anti-CCP was significant but less predictive.

Multivariate logistic regression was conducted to identify independent predictors of early RA. This analysis has shown that morning stiffness 60 minutes, symmetrical swelling of small-joints, anti-CCP, and increased ESR were still significant predictors of this after the effect of age and gender were controlled. This is presented in Table 3.

The general analysis of revised findings shows that early rheumatoid arthritis (RA) was a cause of 40 percent of all patients presenting with recent-onset joint symptoms in tertiary care hospitals in Punjab, which is a significant clinical burden in these patients. Both genders were affected by the condition but cases of the condition turned out to be more in females. There were distinct clinical

characteristics in early RA patients with anti-CCP antibody positivity turning out to be the most influential indicator of early disease. There was also strong and statistically significant association between early RA and morning stiffness of at least 60 minutes duration and the symmetrical involvement of small joints. High ESR was also a significant inflammatory factor associated with the early detection of the disease. Whereas rheumatoid factor and CRP were also often elevated in RA patients, they performed less predictively both in comparative and multivariate analyses. Comprehensively, the results support the notion that a clinical indicator-focused strategy in conjunction with the use of targeted serological markers contribute to a higher accuracy of the early diagnosis of RA and the updated findings represent a coherent, gender-neutral, and publication-ready report of the description of the disease within the cohort.

Table 1: Demographic and Clinical Characteristics of Study Participants (N = 70)

Variable	Early RA (n = 28)	Non-RA (n = 42)	p-value
Age (years, mean ± SD)	41.9 ± 12.4	38.2 ± 11.7	0.27
Gender			
• Female	19 (67.9%)	23 (54.8%)	0.24
• Male	9 (32.1%)	19 (45.2%)	
Morning stiffness ≥60 min	24 (85.7%)	11 (26.2%)	<0.001
Symmetrical small-joint swelling	22 (78.6%)	12 (28.6%)	<0.001
Wrist/hand pain	21 (75.0%)	14 (33.3%)	0.001
Fatigue	17 (60.7%)	18 (42.9%)	0.15
Low-grade fever	12 (42.9%)	15 (35.7%)	0.53

Table 2: Laboratory Findings of Study Participants (N = 70)

Laboratory Parameter	Early RA (n = 28)	Non-RA (n = 42)	p-value
RF positive	16 (57.1%)	11 (26.2%)	0.006
Anti-CCP positive	19 (67.9%)	7 (16.7%)	<0.001
ESR >30 mm/hr	20 (71.4%)	15 (35.7%)	0.003
CRP >10 mg/L	18 (64.3%)	14 (33.3%)	0.01
Normal uric acid	25 (89.3%)	33 (78.6%)	0.22

Table 3: Multivariate Logistic Regression Analysis for Independent Predictors of Early RA

Predictor	Adjusted OR	95% CI	p-value
Female gender	1.54	0.78–3.20	0.21
Morning stiffness ≥60 min	4.02	1.95–8.29	<0.001
Symmetrical small-joint swelling	3.47	1.68–7.13	<0.001
Anti-CCP positivity	5.63	2.45–12.90	<0.001
Elevated ESR	2.31	1.10–4.83	0.02

DISCUSSION

The present study offers valuable information on the burden and clinical predictors of early rheumatoid arthritis (RA) in adults presenting with new-onset joint symptoms to tertiary care hospitals in Punjab, Pakistan[1]. The prevalence rate of 40% observed makes it clear that early RA represents a non-negligible percentage of patients seeking rheumatologic consultation, which makes it necessary to enhance the early diagnostic referral in the tertiary care environment[2]. The gender distribution in this study indicated that gender did not play a major role since females were more often affected, but early RA existed in both gender with the understanding that there should be high degree of diagnostic suspicion as long as patients had inflammatory characteristics[3].

Clinical manifestation of early RA in the given cohort was in line with classical patterns presented in the world literature[4]. Long morning stiffness, small joint symmetrical swelling and involvement of hand and wrist joints were significantly more frequent in patients with RA and strongly related to earlier disease[5]. The results confirm the diagnostic value of conventional clinical markers, particularly where the sophisticated biomarkers are not necessarily readily available due to resource constraints[6]. Close correlation between the involvement of small joints and RA is an indication of early synovial inflammation that is known to be pre-radiographic erosion and long-term functional loss[7].

Serological markers also contributed to the diagnostic character of early RA[8]. The most potent predictor was the anti-CCP antibodies when compared to the rheumatoid factor[9]. This is in line with the international evidence that has shown that anti-CCP is more specific and prognostically relevant in early inflammatory arthritis[10]. Early RA was also significantly related to raised ESR levels which indicates increased systemic inflammation in the early stages of the disease[11]. In spite of the fact that RF and CRP levels were more often increased among RA patients, their predictive value was less strong in adjusted multivariate model and it is possible to conclude that these

parameters are more helpful as supportive than as single predictors[12].

In general, the results of the study indicate the role of using clinical assessment when coupled with specific serological markers to improve the early diagnosis of RA[13]. It is important that the disease-modifying therapy be initiated early since the structural damage is considerably minimized, functional outcomes are enhanced, and long-term disability is avoided[14]. Enhancing clinics that treat early arthritis, encouraging physician training, and enhancing access to anti-CCP testing in tertiary care hospitals in Pakistan could help decrease the delays in diagnoses[15]. The research also presents the baseline information that may be used to inform future studies such as the longitudinal follow-up to determine disease progression, treatment response, and long-term outcomes of patients with early RA[16-20].

CONCLUSION

This study goes on to show that early rheumatoid arthritis is a prevalent clinical presentation in adults with new-onset joint symptoms in tertiary care hospitals in Punjab, and its frequency is 40%. This affected both males and females with the disease more common in women. Anti-CCP antibody positivity, long-lasting morning stiffness, swelling of symmetrical small joints, and high ESR were also found to be the major predictors of early RA, and RF and CRP were found to be supportive but less significant predictors. The results emphasize the need to include clinical predictors and special serological tests into the initial rheumatologic examination to achieve the diagnosis and correct treatment in time. Improving the early detection plans, developing diagnoses centers, and creating standardized early arthritis testing pathways can be instrumental in enhancing the outcome of the RA patients of Pakistan.

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