

Demographic and Clinical Characteristics of Patients with Rheumatoid Arthritis

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Abstract:

Background and Objective: Rheumatoid arthritis is the most common chronic systemic autoimmune inflammatory polyarthritis that usually affects smaller joints as well as the larger joints which leads to initiate the cartilage damage, bone erosions, joint destruction, deformity and disability in course of time. The study was carried out with the objective to correlate the demographic and clinical characteristics of RA subjects. **Materials and Methods:** A total of 210 RA patients (165 females and 45 males), aged ≥ 20 years, were included in the study from Malda Medical College & Hospital, Malda, West Bengal. RA was diagnosed according to the ACR-EULAR/2010 criteria. The demographic and clinical characteristic of RA patients were collected using structured questionnaire. The qualitative determination of rheumatoid factor (RF) in sera of RA patients was done using latex agglutination method (Angstrom Biotech Pvt. Ltd., Vadodara, India) and erythrocyte sedimentation rate (ESR) was measured using Westergren method. **Results:** No significant association was found between RF seropositivity and socio-demographic and/or clinical characteristics including gender, age groups, morning stiffness and joint swelling. However, an association between RF seropositivity and ESR in female patients aged ≥ 20 was found to be significant ($p= 0.035^*$). **Conclusion:** The finding of the study indicates that there is a gender bias with respect to the correlation between rheumatoid factor (RF) and erythrocyte sedimentation rate (ESR) in RA patients. Female RA patients with RF seropositivity tend to have elevated level of ESR, an acute phase reactant.

Keywords

Rheumatoid arthritis, rheumatoid factor, erythrocyte sedimentation rate, morning stiffness.

1. Introduction

Rheumatoid arthritis (RA) is a systemic autoimmune disease that is characterized by persistent synovial inflammation of peripheral joints. The disease is 2-3 times more common in females than in males and affects approximately 0.5–1% of the general human population worldwide [i,ii]. However, the prevalence of RA is reported to be high in the Pima Indians and the Chippewa Indians while low in the populations of China and Japan [i,iii,iv]

The complex interaction between the host genetic factors and the environmental factors and/or the microbial infection determines the development of RA. The genetic factors are assumed to contribute to about 60% of risk in many populations across the world [v]. The main genetic susceptibility risk factor of RA is the human leukocyte antigen (HLA) system, especially HLA-DRB1 alleles with increased frequency in affected individuals [vi].

RA is clinically characterized by the symmetrical polyarthritis of the small and large joints, multiple joint pain, morning stiffness and appearance of synovitis (synovial tissue swelling) due to synovial inflammation and effusion [vii]. RA manifestations involve mainly the small joints including proximal interphalangeal (PIP) joints, the metacarpophalangeal (MCP) joints, metatarsophalangeal (MTP) joints, thumb inter-phalangeal joints and the wrist joint but also involve the large joints such as shoulders, elbows, hips, knees and ankles [viii, ix]. Patients (30-40%) may develop a number of extra-articular manifestations and comorbidities including mild fever, fatigue, anaemia, interstitial lung disease, vasculitis, pericarditis, pulmonary fibrosis, peripheral neuropathy, amyloidosis, osteoporosis and rheumatoid nodules [x]. Rheumatoid factor (human anti-IgM or IgG antibody) and anti-cyclic citrullinated protein antibodies (ACPA) are the distinct auto-antibodies present in the sera of RA patients [xi, xii]. Also, there is an elevation of acute phase reactants such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) in RA patients [x]. Generally, these biomarkers are considered for the diagnosis of RA. However, RF can be detected in healthy individuals several years prior to the onset of clinical RA [xiii, xiv]. The disease development and progression and its effect on health quality of life in different age groups have motivated to conduct the present study. The study was carried out among RA patients of Malda district, West Bengal, India, to find out the correlation between demographic and clinical characteristics.

2. MATERIALS AND METHODS

1.1. Subjects

A total of 210 RA patients aged >20 years were included in the present study from the outdoor unit of

Malda Medical College & Hospital, Malda, West Bengal, between June 2017 and November 2018. RA was diagnosed according to the criteria defined by the 2010 American College of Rheumatology (ACR) and European League Against Rheumatism (EULAR) for the disease identification [ix,xv]. The criteria comprising of 4 domains including the types of joints involvement, presence of the auto-antibodies (RF and/or ACPA) in the sera, laboratory markers of inflammation (ESR/CRP) and the duration of symptoms were evaluated. Patients were considered to have definite RA if the score was at least 6 out of 10. The study was approved by the Institutional Ethics Committee, University of Gour Banga (Approval No. UGB/IEC (Human)/001-17, Dated: 13.02.2017) and the informed consent was obtained from all the participants.

1.2. Collection of demographic & clinical characteristics

The questionnaire was designed in simple language and then translated to the people into their native language for the collection of information on clinico-demographic characteristics. The characteristics viz. age, age at onset, gender, family history, clinical symptoms including morning stiffness, joint swelling, duration of symptoms and the pattern of joints affected by RA were collected from the patients using questionnaire.

1.3. Determination of RF and ESR

The qualitative level of RF in sera of patients was determined using latex agglutination method (Angstrom Biotech Pvt. Ltd., Vadodara, India). The assay procedure was followed as per the manufacturer's instruction. Briefly, one drop of test serum was placed on a glass slide and one drop of latex reagent was added to it and mixed well with disposable applicator stick. The slide was rocked gently for two minutes and observed for agglutination reaction. The test sample showing visible agglutination was considered to be seropositive for RF with the concentration ≥ 8 IU/ml while sample showing no agglutination was considered to be seronegative. The ESR of all RA patients was measured using Westergren method. The elevated level of ESR was defined as ≥ 15 mm/hr and ≥ 20 mm/hr in male and female patients, respectively.

1.4. Statistical analysis

Data were statistically analyzed using statistical package (IBM SPSS 25). Mean and SD were calculated for continuous variables while percentages were calculated for discrete variables. χ^2 test was employed for comparison of RF seropositivity with the clinico-demographic characteristics of RA patients. A p-value < 0.05 was considered to be statistically significant.

3. RESULTS

3.1. Demographic characteristics

The mean ages of male, female and total patients are depicted in Figure 1 and other demographic characteristics of RA patients are presented in Table 1. Out of 210 subjects, 165 were females and 45 were males, with a ratio of 3.67:1. The majority of the patients, 183 (87.14%) were married, 163 (77.62%) were the inhabitants of rural areas, 154 (73.33%) were house wives, 113 (53.81%) were the Hindu by faith.

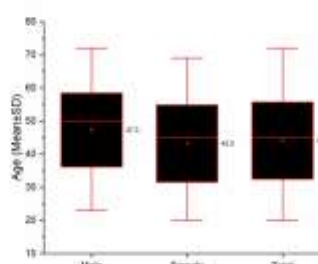


Figure 1. Mean age of male, female and total RA patients.

Table 1. Demographic characteristics of RA patients

Characteristics	Number of patients	Percentage
Gender:		
Male	45	21.43%
Female	165	78.57%
Marital status:		
Single	15	7.14%
Married	183	87.14%
Widowed	09	4.29%
Divorced	03	1.43%
Residence:		
Rural	163	77.62%
Urban	47	22.38%
Occupation:		
Student	05	2.38%
Employed	14	6.67%
House wife	154	73.33%
Farmer	08	3.81%
Laborer	29	13.81%
Religion:		
Islam	85	40.48%
Hindu	113	53.81%
Others	12	5.71%

3.2. Distribution of RA patients into different age groups

Table 2 shows the distribution of RA patients into the different age groups based on the gender. The majority of male RA patients (35.56%) were found to be in the age group of 50 – 59 years while the majority of female patients (28.48%) were in the age group of 40 – 49 years. However, the majority of total RA patients (27.62%) were found to be in the age group of 40 – 49 years.

Table 2. Distribution of RA patients into different age groups based on gender

Age group (years)	No. of patients		
	Male No. (%)	Female No. (%)	Total No. (%)
20 – 29	4 (8.89%)	21 (12.73%)	25 (11.90%)
30 – 39	9 (20%)	41 (24.85%)	50 (23.81%)
40 – 49	11 (24.44%)	47 (28.48%)	58 (27.62%)
50 – 59	16 (35.56%)	37 (22.42%)	53 (25.24%)
≥ 60	5 (11.11%)	19 (11.52%)	24 (11.43%)
Total	45 (21.43%)	165 (78.57%)	210 (100%)

3.3. Association of RF seropositivity with demographic and clinical characteristics

Table 3 shows the association of RF seropositivity with the demographic and clinical characteristics of RA patients. The result showed no significant association between RF seropositivity and other demographic and clinical characteristic such as gender, age, morning stiffness and joint swelling in the RA patients. However, significant association between RF seropositivity and the elevated level of ESR in female patients was observed ($\chi^2= 4.430$, p value = 0.035*). The association between RF seropositivity and elevated level of ESR could not be found in male RA patients.

4. DISCUSSION

In this study, the demographic and clinical characteristics of 210 adult RA patients of Malda district of West Bengal, India, were analyzed. The mean age of the patients was 44.08 ± 11.64 years. The patients were predominantly females with female:male ratio of 3.67:1. The female preponderance may be related with the hormonal factor. This ratio of female:male RA patients is close to the ratio observed in various other studies [xvi-xviii]. The studies conducted in RA patients of Piauí, Brazil [xix] and in Indian adult population [xx], female:male ratio of RA patients was reported to be much higher than the ratio observed in our study.

Table 3. Association of RF seropositivity with demographic and clinical characteristics

Characteristics	Total no. of patients (N=210)	No. of seropositive patients (n= 163)	χ^2 value	P value
Gender:				
Male	45	35		
Female	165	128	0.0008	0.977
Age group:				
<50 years	31	106		
≥50 years	79	57	2.179	0.140
ESR (mm/hr), male				
<15	6	5		
≥15	39	30	0.124	0.725
ESR (mm/hr), female				
<20	37	24		
≥20	128	104	4.430	0.035*
Morning stiffness:				
Yes	182	139		
No	28	24	1.218	0.269
Joint swelling:				
Yes	153	121		
No	57	42	0.697	0.403

* p < 0.05

The findings revealed that the majority of RA patients were found to be married (87.14%), inhabitants of the rural area (77.62%), housewives (73.33%) and the Hindu by faith (53.81%). In consistent to this, the findings of a prospective study conducted in Kosovo revealed that the large proportions of RA patients were housewives & farmers and most of the patients were from the rural areas [xviii]. Similarly, in another study it was reported that the majority of the RA patients were housewives, had disease duration of more than 24 months and had hypertension as the most common comorbid condition. In the majority of the patients, CRP was reported to be positive and majority of the patients had received DMARDs [xvii].

The finding of a significant association between RF seropositivity and elevated ESR level in female RA patients is similar to the finding of the study conducted in Korean RA patients in which the RF seropositive patients were reported to have higher levels of inflammatory markers viz. ESR and CRP. Moreover, the study suggested that the disease activity was much more severe in seropositive patients and this group of patients needed rigorous treatment regime as compared to seronegative RA patients [xxi]. Another study conducted in Korea reported that the RF/ACCP seronegative RA patients had significantly higher baseline 28 tender/swollen joint count and DAS28 when compared to seropositive patients. The study suggested that seronegative patients manifested more active disease at baseline but responded better to treatment than

the seropositive patients [xxii]. Further, a study conducted in Malaysia found the significant association between RF seropositivity and patients aged ≥ 50 years [xxiii].

Numerous studies have been conducted in various populations to evaluate the demographic and clinical features of RA patients. The findings of a prospective study conducted in a Brazilian cohort revealed the predominance of women patients, Caucasian or Black, patients belonging to intermediate-low social strata and patients with 8.3 years of schooling. The majority of patients were reported to have acute symptoms, with poly-articular onset, persistent synovitis of the hands and prolonged morning stiffness (157 minutes on average) [xxiv]. A retrospective study conducted in PSG hospitals, Ciombatore, Tamil Nadu, India, showed that ESR, haemoglobin (Hb) and other haematological tests were the frequently used laboratory parameters and knee, wrist, ankle, shoulder and elbow joints were reported to exhibit the articular manifestations in RA patients. Hypertension and diabetes mellitus were shown to be the most common comorbidity and methotrexate was reported to be prescribed as the first line DMARD [xvi]. Another prospective study conducted in medicine OPD of SGRRIM and HS, Dehradun, India, reported that RF factor was positive in 70.67% of patients and anti-CCP level was elevated in 90.67% of patients. The RA patients were prescribed different drugs such as disease modifying anti-rheumatic drugs (DMARDs), vitamin-D3 and calcium supplements, analgesics, antacids, etc. [xxv].

5. CONCLUSION

The finding of the present study suggests that RF seropositive female RA patients tend to have elevated level of ESR, an acute phase reactant. It indicates that the disease activity in seropositive patients is accompanied with high level of systemic inflammation.

6. ACKNOWLEDGEMENTS

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7. CONFLICTS OF INTEREST

Authors declare no conflicts of interest.

8. AUTHORS' CONTRIBUTION

Rajat Sarkar, Project Fellow, collected data of RA patients from Malda Medical College & Hospital and wrote the first draft of manuscript. Dr. Bappaditya Ghosh, M.B.B.S., D (Kol.), MD (Ortho), diagnosed RA cases and

provided the clinical data. Dr. Manoj Lama, Principal Investigator, designed the study, analyzed data and contributed in writing the manuscript.

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