

# Seroprevalence of Rheumatoid Factor in Tertiary Care Hospital

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## ABSTRACT

Rheumatoid arthritis (RA) is a chronic inflammatory disorder that affects many tissues and organs but mainly affects the joints, producing a proliferative and inflammatory disease that progresses to damage the joint cartilage and ankylosis of the joints. About 1% of the world's population are affected by RA, women three to five times more often than men it was more common in the age group of 40 to 70 years of age. The useful serological markers for RA are Rheumatoid factor (RF) and antibodies to citrullinated peptides. This present study was done to find out the prevalence of serological markers in suspected arthritis cases in tertiary care hospitals. This prospective study was carried out in the serology section in the central pathology lab in Government Medical College, Banda from April 2015 to August 2018. A total of 776 blood samples were received for RA factor analysis. Out of 776 samples, 111 samples were positive for RA factor of 14.3% prevalence. A total of 88 cases were females and 23 were males. The most common age group involved was 21–60 years in females and 40–70 years in males. For the evaluation of patients with suspected RA, it is recommended to perform anti-cyclic citrullinated peptide antibody and RF analysis to increase the specificity of the results.

**Key-words:** Anti-CCP, Citrullinated, RA Factor, Rheumatoid Arthritis, Serological marker

## INTRODUCTION

Rheumatoid Arthritis is a chronic s inflammatory disorder that may affect many tissues and organs but mainly attacks the joints, producing a proliferative and inflammatory synovitis that often progresses to involve the articular cartilage and ankylosis of the joints.

About 1% of the world's population is affected by RA <sup>[1,2]</sup> women three to five times more common than men. It is most common in those 40 to 70 years of age. The clinical course is not consistent. The disease begins slowly in more than half of the affected individuals. Initially there is weakness, fatigue and generalized musculoskeletal pain and after many weeks to months joints become involved. Symmetrically small joints are involved before the larger joints. Symptoms usually develop in wrist and feet with ankles, elbows and knees. RA is diagnosed according to clinical findings and serological testing.

The main serological markers are RA factor and Anti-CCP. Rheumatoid factor is mainly IgM antibody, but it can also be IgA, IgG or IgE isotype directed against Fc portion of IgG of human or animal. It is found in 60% to 90% of rheumatoid arthritis patients <sup>[3,4]</sup>. Three RF isotypes (IgM, IgA, and IgG) are detected in upto 52% of RA patients but in fewer than 5% of patients with other connective tissue diseases. Increase in Both IgM and IgA RF factor was almost exclusively seen in RA patients <sup>[5,6]</sup>. The present study was proceed to know that the sero-prevalence of serological marker in clinically suspected arthritis case in tertiary care hospital.

## MATERIALS AND METHODS

This original preliminary prevalence study was carried out in serology section in Central pathology lab in Government Medical College, Banda from April, 2015 to August, 2018. Total 776 blood samples were received for RA factor Analysis. Blood samples were centrifuged in 3000 rpm and Sera Separated.

RA factor was determined quantitatively by Immunoturbidimetric analysis, using turbilatex RF (Accurex Biomedical Kit). RF kit contained latex particles coated with human gamma globulin which reacted with

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RF in the sample resulting in the Agglutination. This agglutination caused change in absorbance, which was measured at 650 nm and it was proportional to the concentration of RF. RF factor is measured by the fully automated spectrophotometric analyzer. RF factor value above 20 IU/L was considered significant.

## RESULTS

Out of the 776 samples, 111 samples were positive for RA Factor 14.3% prevalence (Table 1). This study was done in Cameroon and showed the prevalence of 5.4% [7], whereas a similar study in Cote d Ivoire showed the prevalence of 7% among people aged between 3–70 years [8]. The study done by Chandrashekhar *et al.* [9] showed a prevalence of 7% in the age group of 21–60 years whereas study was done by Sucilathangam *et al.* [10] reported a 10.6% prevalence of RA factor. Study by Alghuweri *et al.* [11] had high prevalence of Rheumatoid factor, which was 81.7% in their study. Out of 111 samples, which were positive for RA factor, 88 were females (79.28%) and 23 were males (20.72%). Most positive cases in females were in the age group of 21–60 years, and in males in the age group of 40–70 years (Table 2). Female to male ratio of positivity was of around 4:1. The youngest female patient was 16 yrs of age and youngest male was 18 years of age. Out of total of 776 samples, 512 samples were of females and 264 samples were of males. Total 17.1% positivity prevalence was seen female patient age group. Total 88 cases were positive out of 512, where as in males it was around 8.7%, 23 cases positive out of 264 samples tested (Table 3). All positive samples showed results above 20 IU/L (Highest being of value >900 IU/L of 38 year old female patient), which considered significant in RF analysis by immunoturbidimetric method.

**Table 1:** Total number of positive cases with percentage prevalence

Total	Number
Total positive cases	111
Total sample tested	776
Percentage prevalence	14.3%

**Table 2:** Age and sex wise distribution of positive cases

Age group	Number of Females	Number of Males
10–20	3	2
21–30	24	–
31–40	19	3
41–50	20	8
51–60	17	–
61–70	5	8
>70	–	2
Total	88	23

**Table 3:** Sex wise distribution of positive cases

Sex	Total sample tested	Total positive cases
Males	264	23
Females	512	88
Total	776	111

## DISCUSSION

Our study has shown more females produced RA factor than males. This can be explained by the involvement and influence of female sex hormones on autoimmunity. Female hormones play a role in the initiation and/or worsening of the disease as seen by the risk induced by estrogen-progestin pills, pregnancy, and the postpartum period [12]. Rheumatoid factor was present in people aged 16–70 years and absent beyond 70 years. Some studies have shown that several autoimmune diseases, including RA can occur at any age but mostly between 30 and 60 years. Beyond this age, the rate decreases gradually [13]. The aging is also accompanied by decreased immunity, alteration of T lymphocyte cooperation with B Lymphocytes, decreased B cell survival and dysfunction of co-stimulatory pathways [24].

In Finland, the prevalence of RF positive RA adults was reported to be 0.7%. The annual adults were reported to be 0.7%. The annual incidence had varied from 32 to 42 per 100000 in different studies during the past two decades<sup>[14]</sup>. In England the Prevalence of a false positive RF reaction was seen much higher in polluted areas than in less polluted areas<sup>[15]</sup>. The prevalence of RA is 0.5–1% among adults in Europe but it seems to be much lower in some Asian and African Populations<sup>[16]</sup>.

RF positive patients with R.A. may experience more serious and erosive joint disease and extra articular manifestations than those who were R.F. negative. Rheumatoid factor was also found in many other diseases including other connective tissue disease like Sjogren syndrome, systemic lupus erythematosus, mixed connective tissue diseases, chronic infection and in healthy elderly population. Patients with Sjogrens syndrome and Type II and Type III mixed cryoglobulinemia have the maximum titre<sup>[17,18]</sup>.

Presently, the main clinically useful markers in patients with RA are Rheumatoid factors and antibodies to citrullinated peptides for both diagnosis and radiological changes. R.F. Testing in RA patients had a sensitivity of 60% to 90% and a specificity of 85%<sup>[3,4]</sup>. ESR and CRP used for aiding in the assessment of disease activity, predicting functional and radiographic outcomes.

It had been recognized that RFs have an important role in the differential diagnosis of Multi-arthritis because they make it possible to identify RA patients<sup>[19]</sup>. RF testing had been one of the classification criteria for RA since 1987 and their role in classification of RA had been confirmed by the updated criteria<sup>[20,21]</sup>. To assess the patients with suspected RA, It is recommended to perform anti-cyclic citrullinated peptide antibody and IgM RF to increase the specificity of the results.

A metanalysis has shown that the pooled sensitivities of ACPA and RF are similar but ACPA positivity was more specific for RA than IgM RF and more specific for early RA<sup>[22,23]</sup>.

## CONCLUSIONS

Prevalence of RA factor was 14.3%, females almost 4 times more positive than males. Positivity of RA factor was not seen above 70 years of age which may be due to decreased immunity and decreased alteration of co-stimulatory pathways. RA factor alone is less specific as a marker for diagnosis of RA; hence Anti-CCP needs to

be added in testing in order to increase the specificity of the test, especially for early suspected RA patients. This preliminary study provided insight of prevalence of RA factor in rural population of Banda district in Uttar Pradesh, in reference to their Age and Sex. Detailed study is required to correlate the prevalence of RA factor with other non-rheumatic diseases. Further study is required to determine the impact of geographic, epidemiologic pattern and to draw conclusions specifically treatment patterns for RA.

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## CONTRIBUTION OF AUTHORS

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