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## Screening For Acute Phase Reactant CRP And Rheumatoid Factor RF In Patients Attending Tertiary Dental Care Hospital.

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### ABSTRACT

There are many markers in our body, acting as indicators thereby enabling the early detection of any diseases that occur. These markers include acute phase reactants, hormone levels, antibody titre etc. This study involves the screening for the acute phase reactant CRP and rheumatoid factor RF in patients attending a tertiary dental care hospital, with symptoms of joint pain and inflammation. CRP is a biomarker which is used as a diagnostic and monitoring tool for patients with various systemic events and RF is used for detection of rheumatoid arthritis, a systemic autoimmune disease. Since this disease causes irreversible and irreparable damage which brings pain in the joints, thereby affecting the day to day activity of patients, it is essential to identify the condition at an early stage to render better treatment. There are various literature studies which proves a connection between oral health and systemic infections. Hence the purpose of this study is to screen for the presence of acute phase reactant CRP and rheumatoid factor RF in patients with complaints of joint pain and inflammation.

**Keywords:** acute phase reactant, rheumatoid factor, joint pain, inflammation

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## INTRODUCTION

C-reactive protein (CRP) are acute phase inflammatory proteins which belong to pentraxin family. They are usually seen to exist in two conformations as native pentameric CRP (pCRP) which has pro-inflammatory as well as anti-inflammatory properties and monomeric CRP (mCRP) with the capacity to amplify inflammatory response. These proteins are said to raise up to  $10^3$  fold during any inflammatory reactions [1]. CRP shows elevation in conditions like rheumatoid arthritis, any underlying infection and other cardiovascular diseases [2], where a deviation of at least 25% is often noted [3].

CRP is usually synthesized in the liver cells (hepatocytes) but they can also be synthesized in the macrophages, lymphocytes, smooth muscle cells and adipocytes [2]. There are literature studies which show their association with short term or acute inflammatory reaction but cannot differentiate from other overlying inflammatory conditions [4-6]. Studies in other aspects also say that a rise in the level of CRP was useful to estimate chronic inflammation and underlying tissue damage as a result of excess inflammation or the setback of the primary inflammatory process [7]. Regardless of these issues, CRP is conventionally used as a marker for cardiovascular events and infection. Recently, there are studies to prove the significant role of CRP in inflammatory processes and response of the host to infection including apoptosis, complement pathway, tumor necrosis factor- $\alpha$ , nitric oxide (NO) release, production of cytokines and phagocytosis [8, 9].

Rheumatoid factors (RFs) are a category of immunoglobulins which were discovered about 70 years ago and are known to possess various affinities and isotypes. Yet there are much more to investigate about their mechanism of production, pathological effects and physiological role [10]. Waaler described these antibodies during an agglutination reaction with sheep RBCs and rabbit antibodies [11]. Kurt Meyer was the first person to observe them in the serum of patients with chronic bronchitis and liver cirrhosis. These antibodies were found in patients suffering from rheumatoid arthritis (RA) during 1948 by Rose [12] and were given the name Rheumatoid factor (RF) in the year 1952 for their association with the autoimmune disease rheumatoid arthritis (RA) [13].

RFs are also found in patients with conditions other than rheumatoid arthritis like chronic diseases and infections but these RF antibodies are usually different from the RFs found in the arthritis patients as they are non-detrimental and transient. These RF antibodies act as good APCs (antigen presenting cells) and render their help in the clearance of the immune complexes during the time of infection. Thus the RF production at the time of infection is generally considered as protective towards the host against the infection [14, 15]. The presence of these antibodies are often reported in healthy population [17-19] but high titres of RF antibodies in healthy individuals may predict the onset or development of RA [20].

RFs are often detected in population with other autoimmune diseases (systemic) like mixed connective tissue disease, dermatomyositis, systemic lupus erythematosus and polymyositis [14, 16]. The sensitivity of RF testing in RA patients is about 60%-90% and the specificity is 85% approximately [21, 22]. There are many literature studies indicating the association of RFs in differential diagnosis of disease like polyarthritis as it makes the identification of RA possible [23]. Hence for the same reason, the testing for RF is a benchmark in the criteria for classification of RA from 1987 and their significance has been confirmed and updated in the preceding criteria till date [24, 25].

The present study, deals with the screening of acute phase reactant CRP and the immunoglobulin RF among the patients with the symptoms of joint pain and inflammation systemically.

## MATERIALS AND METHODS

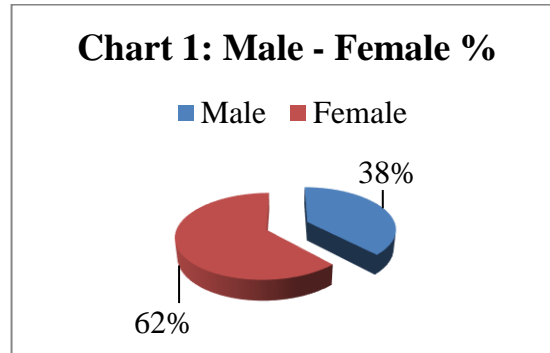
The study was conducted in a tertiary dental care hospital and the period of study was about 6 months from August 2021 to January 2022. The patients with joint pain and inflammation attending the dental care hospital were included and paediatric patients, patients above 60 years of age were excluded in the study. With the consent of the patient the blood samples of about 2ml were collected in red capped blood collection tubes.

The samples were then centrifuged for serum separation and stored in small vials under refrigeration temperature. Serological test was performed by using the rapid latex agglutination test for

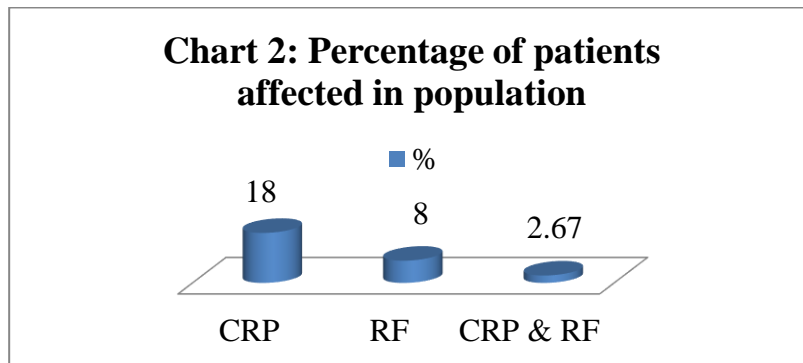
both CRP and RF. On performing the test, the samples were thawed and procedure was followed as per the instruction from the serological test kits and the results of were noted based on agglutination.

**RESULTS**

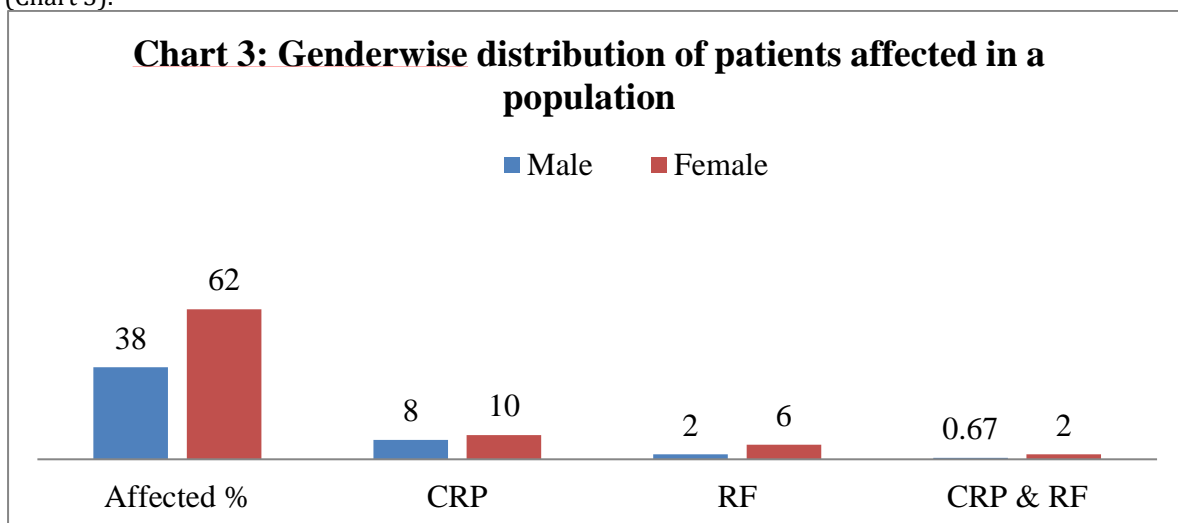
The total of 150 patients constituting 62% female and 38% male with symptoms of inflammation and joint pain were involved in this study (Chart 1). The patients were predominantly from Periodontics and also from Conservative Endodontics, Oral Surgery departments.



The serological screening revealed 27(18%) of positivity for CRP, 12 (8%) were positive for the rheumatoid factor (RF) and both CRP and RF were positive in 2.67% out of 150 patients (Chart 2).



In gender wise distribution, 8% of the male were with elevated CRP, 2% with abnormal rheumatoid factor and 0.67% showed both CRP & RF level abnormality among the total of 38% of the male population. The female population which constituted about 62%, 10% had elevated CRP levels, 6% with elevated rheumatoid factor and abnormality in both proteins were seen in 2% of the population (Chart 3).



## DISCUSSION

The purpose of this study was to screen for the markers of acute phase reactants CRP and rheumatoid factor (RF) in symptomatic patients. From historic days, there has always been a connection between our oral hygiene, oral status and the systemic infections that we acquire. There are many literatures to support the association mainly between rheumatoid arthritis (RA) and oral infections especially periodontal diseases [26-28]. There are many similar pathobiologic processes like bone destruction associated with osteoclasts, serum and microenvironmental cytokines, matrix metalloproteinases etc., [29].

CRP is a more specific and accurate marker for assessing any acute phase reaction in the patient's condition in response to a stimuli. It is not only a screening test, as more often these tests were used for diagnosis and monitoring of the patients inflammatory condition.

Rheumatoid arthritis is a systemic autoimmune disease which could greatly affect the patients livelihood. It is not only a health issue, but it also affects a patients socioeconomic status which eventually lead to extreme pain, stiffness in joints that greatly affect the patients day to day activities and it brings permanent deformities, if left untreated. It is better to screen for the Rheumatoid Factor in patients with joint pain and inflammatory conditions as early detection of this condition could be managed easily.

This study was focused in detection of these markers among patients with symptoms of inflammation and joint pain with some limitations as only few parameters were observed in a small population.

## CONCLUSION

This study has taken only a few parameters and in order to diagnose the rheumatic status of the patient various other criteria has to be assessed in the patient as per the guideline of ACR/EULAR revised criteria. So, further parameters should also be considered in account to evaluate the disease activity score (DAS) of the patient.

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