

## **Evaluation and Correlation between Rheumatoid Arthritis and Periodontitis - A Clinical and Epidemiological Study**

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**Citation of this Article:** Dr. Mahavish Zahed Khan, Dr. Sikander Pathan, Salman Noormohomed Sayyed, Dr. Sangeeta Muglikar, Dr. Satyajit Salve, “Evaluation and Correlation between Rheumatoid Arthritis and Periodontitis - A Clinical and Epidemiological Study”, IJDSIR- March - 2022, Vol. – 5, Issue - 2, P. No. 326 – 331.

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**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

### **Abstract**

**Introduction:** It is well recognized that striking pathogenic similarities exist between periodontitis and Rheumatoid Arthritis. Although they are different from one another in etiology, the pathogenic mechanisms of the two diseases are similar, and result in dysfunction due to inflammatory regulatory disorders and loss due to connective tissue destruction. Moreover, the two conditions share common genetic and environmental epidemiologic risk factors.

**Aim and objective:** The purpose of the present study is to investigate the rheumatoid arthritis patient’s knowledge, awareness and attitude towards chronic periodontitis using questionnaire-based data and clinical correlation between rheumatoid arthritis and

periodontitis from the patients reporting to rheumatology hospitals and institutes in western Maharashtra.

**Materials and method:** cross sectional questionnaire-based study. Information was gathered to assess the Knowledge, Awareness and Attitude towards periodontitis of 175 longstanding patients of arthritis. Assessment of Plaque Index, Gingival Index and Community Periodontal Index were performed to correlate the clinical findings.

**Results:** Under the limitations of this study, patient’s knowledge awareness and attitude of patients suffering from Rheumatoid Arthritis is insufficient. Also, no clear correlation between Rheumatoid Arthritis and Chronic Periodontitis could be established.

**Keywords:** Plaque Index, Gingival Index, Etiology

### **Introduction**

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease primarily of the joints that, if left untreated, results in functional disability concordant with radiographic progression. Rheumatoid arthritis has been reported to affect approximately 0.5 to 1.0% of the world's population. Although rheumatoid arthritis is a chronic inflammatory disease, no definite cause is known; however, social and population factors, health/lifestyle, genetic susceptibility, and environmental factors have been identified.<sup>1</sup>

It is well recognized that striking pathogenic similarities exist between periodontitis and RA.

Although Rheumatoid arthritis and periodontal disease are different from one another in a etiology, the pathogenic mechanisms of the two diseases are similar, and result in dysfunction due to inflammatory regulatory disorders and loss due to connective tissue destruction. Moreover, the two conditions share common genetic and environmental epidemiologic risk factors.<sup>2</sup>

Also, the presence of periodontitis in subjects with RA was associated with more active disease manifested by higher acute-phase responses and a higher number of tender and/or swollen joints.<sup>3</sup>

Although previous studies indicated no potential association between RA and periodontitis, recent systematic reviews have shown association which is still unclear due to the lack of unbiased well-defined population based epidemiological studies in western Maharashtra. Thus, further research is warranted to clarify their relationship between RA and periodontitis.

### **Aim and Objectives**

The purpose of this study is to evaluate patient's knowledge, awareness and attitude and to correlate the relationship between Chronic Periodontitis and

Rheumatoid Arthritis using questionnaire-based data from the patients reporting to hospitals and institutes in western Maharashtra.

### **Methodology**

The study was conducted abiding by Declaration of Helsinki revised year 2000 and the Guideline of Good Clinical Practice laid down by Indian Council of Medical Research. This Questionnaire based study was carried out at Rheumatology clinics in the city of Western Maharashtra. In this cross-sectional questionnaire-based survey total of 175 subjects above 20 years of age suffering from long standing Rheumatoid Arthritis were included.

To be identified as suffering from rheumatoid arthritis, the patients must not only have self-reported the presence of such a condition but also have had the prescription of a medication consistent with such a condition documented.

The patient dental records were obtained and the latest medical-dental questionnaires were evaluated. A self-structured questionnaire consisting total of 21 questions related to Rheumatoid Arthritis and Periodontitis were structured for the study. It was divided into three sections namely knowledge, attitude, and awareness about the periodontal diseases. All the questions were close-ended. The data obtained through the questionnaire was analysed, and the results were computed.

Periodontal status was assessed using the Plaque Index, Gingival Index and Community Periodontal Index (CPI). The index teeth in each of the six sextants were examined: posterior right maxilla, anterior maxilla, posterior left maxilla, posterior right mandible, anterior mandible, and posterior left mandible.

### **Results**

Subjects completed the questionnaire and undergone intraoral examination. In this present study 175 subjects

with mean age 47.47 including 77 males with mean age 46.42 and 98 females with mean age 48.31.

Table 1: Responses to Knowledge based questions (Q1-Q7)

| Sn. | Questions  | No          | Maybe      | Yes        |
|-----|--|-------------|------------|------------|
| 1   | Q1: Does your dentist know you have arthritis?   | 76 (43.4%)  | 20 (11.4%) | 79 (45.1%) |
| 2   | Q2: Have you ever told by your dentist that you have gum problem/disease?  | 90 (51.4%)  | 0 (0.00%)  | 85 (48.6%) |
| 3   | Q3: Have you been ever informed that you have to be more careful and visit your dentist often because you have rheumatoid arthritis? | 114 (65.1%) | 09 (5.1%)  | 52 (29.7%) |
| 4   | Q4: Have you ever been told that rheumatoid arthritis affects periodontitis?   | 97 (55.4%)  | 2 (1.1%)   | 76(43.4%)  |
| 5   | Q5: Do you feel relief from jaw pain when you are under treatment for arthritis?   | 62 (35.4%)  | 77 (44.0%) | 36 (20.6%) |
| 6   | Q6: Do you think arthritis and oral health are interlinked?  | 64 (36.6%)  | 81 (46.3%) | 30 (17.1%) |
| 7   | Q7: Have you ever attended any oral health care awareness programs?  | 126(72.0%)  | 0(0.0%)    | 49(28.0%)  |

Table 2: Responses to Awareness based questions (Q1-Q7)

| Sn. | Questions (Awareness Based)   | Disagree    | Agree       |
|-----|---|-------------|-------------|
| 1   | Q1: Oral health is an integral part of general health?  | 69(39.4%)   | 106 (60.6%) |
| 2   | Q2: Are you aware that patients suffering from rheumatoid arthritis are more prone to gum disease then heathy person? | 133 (76.0%) | 42 (24.0%)  |
| 3   | Q3: Bleeding gum is an indicator of gums problem/disease?   | 142 (81.1%) | 33 (18.9%)  |
| 4   | Q4: Are you aware that arthritis leads to gum problem/disease?  | 124 (70.9%) | 51 (29.1%)  |
| 5   | Q5: Routine dental check-up is must if you are suffering from systemic illness?                                       | 128 (73.1%) | 47 (26.9%)  |
| 6   | Q6: Are you aware that taking proper medication of arthritis reduce your gum problems/disease?                        | 150 (85.7%) | 25 (14.3%)  |
| 7   | Q7: Do you think periodontal diseases are preventable?  | 133(76.0%)  | 42(24.0%)   |

Table 3: Responses to Attitude based questions (Q1-Q7)

| Sn. | Questions (Attitude based)   | A                           | B                            | C                             |
|-----|--|-----------------------------|------------------------------|-------------------------------|
| 1   | Q1: How often you visit your rheumatologist?                                     | Every 6 months 75 (42.9%)   | Every 3 months 78 (44.6%)    | Every 1 months 22 (12.6%)     |
| 2   | Q2: How often you visit a dentist?   | Occasionally/ Nil 06 (3.4%) | Every 3 months 56 (32.0%)    | Every 6 months 113 (64.6%)    |
| 3   | Q3: If you notice swelling gum, what will you do?                                | Ignore it 26 (14.9%)        | Consult physician 98 (56.0%) | Consult Dentist 51 (29.1%)    |
| 4   | Q4: When was the last time you visited gum specialist for cleaning or treatment? | Never 7 (4.00%)             | before 3-6 months 68 (38.9%) | before 1-3 months 100 (57.1%) |

|   |   |                                      |  |  |
|---|---|--------------------------------------|--|--|
| 5 | Q5: Have you ever consumed medications to treat inflammation of jaw bone?             | Rarely 115(65.7%)                    | Once/Twice 30(17.1%)                         | often 30 (17.1%)                         |
| 6 | Q6: Your approach when you encounter loosening of teeth by themselves without injury? | Use of home remedies 125 (71.4%)     | Wait for it to fall out by itself 45 (25.7%) | Visit a dentist for extraction 05 (2.9%) |
| 7 | Q7: Your opinion on surgical treatment for gum disease?                               | Is harmful for the patient 52(29.7%) | Should not be done 104(59.4%)                | Should be done if necessary 19(10.9%)    |

Table 4: CPI Scores Frequency among Study group.

| Code | CPI1 | CPI2 | CP13 | CPI4 | CPI5 | CPI6 |
|------|------|------|------|------|------|------|
| 0    | 111  | 115  | 113  | 129  | 99   | 111  |
| 1    | 64   | 60   | 61   | 46   | 76   | 57   |
| 2    | 0    | 0    | 1    | 0    | 0    | 1    |
| 3    | 0    | 0    | 0    | 0    | 0    | 0    |
| 4    | 0    | 0    | 0    | 0    | 0    | 0    |
| 9    | 0    | 0    | 0    | 0    | 0    | 0    |
| ×    | 0    | 0    | 0    | 0    | 0    | 0    |

**The response of study subjects based on knowledge towards periodontal diseases**

Majority of subjects (43.4%) have not informed by their dentist who were unaware about them suffering from arthritis, most of them (65.4%) have not been told about their gum disease or not aware about the findings and never been informed to visit dentist often for regular check-up. The subjects seeking treatment got relief from jaw pains while seeking treatment for arthritis was 44% and 46.3% of subjects agreed that may be arthritis and periodontitis are inter linked, without attending any health care program.

**The response of study subjects based on awareness towards periodontal diseases**

Of all the Participants surveyed, 60.6% of participating subjects unequivocally agreed that oral health is an integral part of general health, 76% of subjects disagreed when asked patient suffering from rheumatoid arthritis are more prone to gum disease than healthy person also 81.1% have disagreed that bleeding gums is an indicator

for gums disease and rheumatoid arthritis can lead to gum disease. 73.1% subjects were not in the favour of routine dental check-up is must for systemic health or illness, similarly 76% disagreed upon that periodontal disease is preventable and 85.7% of subjects were of opinion that one seeking treatment for arthritis reduces gums problem.

**The response of study subjects based on attitude towards periodontal diseases**

When surveying the participants 42.9% of subjects visit every 6 months for routine check-up whereas 44.6% visits every 3 months and 12.6% every 1 month. 29.1% of subjects have agreed to visit a dentist when one noticed a swelling in gums whereas 56% of subjects were in an opinion to visit consultant physician, around 14.9% believe in ignoring. 65.7% have rarely consumed medicines for inflammation in jaw bone rather 17.1% have either had it once/ twice or had it often. When asked for opinion regarding their approach if one encounter loosening of teeth, 71.4% subjects opted for

home remedies ,2.95 agreed to visit a dentist for extraction and 25.7% are in favour of leaving the tooth to fall out by itself. 29.7% of subjects believes that seeking surgical treatment for gums disease is harmful, 59.4% are not in favour of it whereas only 10.9% of participants were sensible about the necessity of the treatment.

### **Discussion**

Periodontal disease is characterized by the progression beyond an initial stage of gingivitis, to a chronic inflammatory process that begins to affect connective tissues surrounding the tooth leading to attachment loss. Periodontal disease has a considerable impact on oral healthrelated quality of life.<sup>4</sup> Increasing evidence supports associations between periodontal disease and various chronic conditions.

Possible explanations include chronic inflammatory processes, shared pathogens, and shared risk factors.

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease primarily of the joints that, if left untreated, results in functional disability concordant with radiographic progression.

It is well recognized that striking pathogenic similarities exist between periodontitis and RA. A number of large epidemiological studies and smaller case-control and cohort studies have been published showing associations between rheumatoid arthritis and periodontal disease, and have been extensively reviewed

Studies by JY Han (2012), JM Berthelot (2011), have suggested that nonsurgical periodontal therapy improves rheumatoid arthritis parameters, including a recent study showing reductions inflammatory cytokines level there by reducing inflammation.<sup>5,6</sup>

PG Rutger (2012) in their review have also shown that alveolar bone loss in rheumatoid arthritis patients with

periodontal disease counterparts rheumatoid arthritis erosions at other sites of body.<sup>7</sup>

To our knowledge, this study is the first to assess knowledge, awareness and attitude towards periodontitis in patients with rheumatoid arthritis and their correlation by performing intraoral examination.

As per the results mentioned in table 1, 2 and 3 obtained from self-reported questionnairebased study has shown the knowledge of the subjects suffering from rheumatoid arthritis is weak towards the periodontitis. Also, patients were unaware of ill effect of Rheumatoid Arthritis on periodontal health. This has undesirably affected the attitude towards seeking periodontal treatment.

This may be due to the lack of information of the existing oral and periodontal health or patient negligence towards same, hence the outcome from this study should utilize to bring change in lifestyle and to counsel the patients. We also believe that the inputs of the survey will benefit the dental care providers to organize Periodontal Health Awareness Programs for patients suffering from rheumatoid arthritis and structuring special clinics, and planning collaboration with rheumatologists

Since Rheumatoid Arthritis and Periodontitis shares same genetic and environmental factors this study clinically correlated the intra oral findings. The results of community periodontal index indicate mild to moderate gingivitis and has not progressed to periodontal breakdown in the rheumatoid arthritis patients.

The recent systematic review and meta-analysis has found significant association between RA and periodontitis which contradicts the results of the present study.<sup>8</sup> Lozano R.B (2019) important findings of their work was that they have shown there is an independent association between periodontitis and RA which are in accordance with the result of our study.<sup>9</sup>

## **Conclusion**

An increasing number of mechanistic studies are being reported that are likely to reveal additional interactions between these related diseases, and to provide insights for treatment and prevention. Under the limitations of this study, patient's knowledge awareness and attitude of patients suffering from RA is insufficient. Also, no clear correlation could be established. Hence further study with additional data of RA status and elaborate periodontal assessment are required.

## **References**

1. de Pablo P, Dietrich T, Mc Alindon TE. Association of periodontal disease and tooth loss with rheumatoid arthritis in the US population. *J Rheumatol* 2008; 35:70–76.
2. Marotte H, Farge P, Gaudin P, Alexandre C, Mouglin B, Miossec P. The association between periodontal disease and joint destruction in rheumatoid arthritis extends the link between the HLA-DR shared epitope and severity of bone destruction. *Ann Rheum Dis* 2006; 65:905- 909.
3. Pinho Mde N, Oliveira RD, Novaes AB Jr, Voltarelli JC (2009). Relationship between periodontitis and rheumatoid arthritis and the effect of non-surgical periodontal treatment. *Braz Dent J* 20: 355–364.
4. Hitchon CA, Chandad F, Ferucci ED, et al. Antibodies to porphyromonas gingivalis are associated with anticitrullinated protein antibodies in patients with rheumatoid arthritis and their relatives. *J Rheumatol* 2010; 37:1105–12.
5. Han JY, Reynolds MA. Effect of anti-rheumatic agents on periodontal parameters and biomarkers of inflammation: a systematic review and meta-analysis. *Journal of periodontal & implant science*. 2012 Feb 1;42(1):3-12.
6. Berthelot JM, Le Goff B. Rheumatoid arthritis and periodontal disease. *Joint Bone Spine*. 2010 Dec 1;77(6):537-41.
7. Persson GR. Rheumatoid arthritis and periodontitis— inflammatory and infectious connections. Review of the literature. *Journal of oral microbiology*. 2012 Jan 1;4(1):11829.
8. Feldman RS. Non-steroidal anti-inflammatory drugs in the reduction of human alveolar bone loss. *J Clin Periodontol* 1983; 10:131- 136.
9. Rodríguez-Lozano, B., González-Febles, J., Garnier-Rodríguez, J.L. et al. Association between severity of periodontitis and clinical activity in rheumatoid arthritis patients: a case–control study. *Arthritis Res Ther* 21, 27 (2019).