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Prevalence of Periodontitis among Rheumatoid Arthritis Patients Attending Tertiary Hospital in Nepal

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ABSTRACT

Background: Rheumatoid arthritis and Periodontitis both are chronic destructive inflammatory disorders characterized by dysregulation of the host inflammatory response and increase in localized and systemically circulating pro-inflammatory cytokines. The objective of this study was to determine prevalence of periodontitis among Rheumatoid Arthritis patients in our setup.

Methods: A cross-sectional study was done in 43 cases of diagnosed Rheumatoid Arthritis patients visiting to department of Orthopedics of Bir Hospital during the period of July 2016 to January 2017 were examined for presence of periodontitis and its severity. A descriptive questionnaire was also prepared concerning age, sex, personal history. Parameters to be measured were Plaque Index, Gingival Index, Pocket Depth and Clinical Attachment Level.

Results: Prevalence of periodontitis among Rheumatoid Arthritis patients was found to be 86.04% (37) with Mild periodontitis in 9%(4), Moderate periodontitis 56% (24)and severe periodontitis in 21% (9). The commonest age group was 50.41±9. with male to female ratio of 1:3

Conclusions: Periodontitis was common in Rheumatoid Arthritis in our set up. Moderate periodontitis was more frequent. Periodic oral examination of patients with Rheumatoid Arthritis is required to improve periodontal health.

Keywords: Host response; inflammation; periodontal pocket depth; periodontitis; pgingivalis rheumatoid arthritis.

INTRODUCTION

Chronic periodontitis is an infectious inflammatory disease caused by bacteria of dental plaque, resulting in progressive destruction of structures supporting teeth.¹ Rheumatoid arthritis (RA) is also a chronic destructive inflammatory disease which is characterized by the accumulation and persistence of an inflammatory infiltrate in synovial membrane that leads to synovitis and destruction of joint architectures.²

In both diseases there is an imbalance between pro-inflammatory and anti-inflammatory cytokines which may lead to destruction of connective tissue.² Among RA patients restricted hand performance limits toothbrushing activity which may be the cause of periodontitis.³ There is subsequent recruitment of lymphocytes, immune mediate protection, together with degradation of the tissues, the release of more

cytokines (TNF- α , IL-1) all reflects a common underlying regulatory mechanisms between RA and periodontitis.⁴

Studies had showed that control of periodontal infection and gingival inflammation in patients with periodontal disease could reduce the severity or activity of RA by lowering inflammatory products and markers or reduce exposure of the joints structures to bacteria and their toxins.^{5,6}

As there is paucity of data in Nepal, this study can be useful for adding information regarding oral hygiene in rheumatoid arthritis patients.

The objective of our study was to find out prevalence of periodontitis among RA patients in our setup.

METHODS

A hospital based cross-sectional clinical study

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was conducted in department of Orthopedic and Periodontology and Oral Implantology unit of National Academy of Medical Sciences (NAMS), Bir Hospital. Patients visiting to dental OPD from July 2016 to January 2017 were included in the study.

Before starting study, an ethical approval was obtained from Institutional Review Board, Ethical Committee of NAMS, Bir hospital, Kathmandu, Nepal. Informed consent was obtained from patients and their participation in study was voluntary. The demographic and clinical data were recorded in detailed Performa.

Total 43 cases of diagnosed RA patients visiting to department of Orthopedics of Bir Hospital were examined for presence of periodontitis. The sample was taken on convenient basis. No randomization was done. The clinical examination was performed by a single examiner. All participants had completed a validated general health assessment questionnaire assessing information about age, sex, education level. Plaque Index, Gingival Index, Pocket Depth and Clinical Attachment Level were measured.

Inclusion criteria for RA patients were 1) Patients fulfilling 2010 American College of Rheumatology/European League Against Rheumatism (EULAR) classification criteria for RA.⁷ 2) Age group 35-54 years. 3) Patients with at least 16 teeth 4) No history of treatment for periodontal disease for previous 6 months.

Exclusion criteria included 1) Patients with systemic conditions that would modify periodontal disease manifestations (Type I & II Diabetes Mellitus, Osteoporosis, Disorders of cellular immunity, Sjogren's disease, Infective Endocarditis). 2) Pregnant and lactating women 3) Not willing to participate in the study or are not able to tolerate any of study procedures. 4) History of antibiotics taken in previous 3 months.

All participants were examined on six sites per tooth assessing periodontal pocket depth (PPD), and clinical attachment loss (CAL) and four sites per tooth assessing "Plaque" Score and Gingival Index. Each tooth present was examined for PPD and CAL, in millimeters, using a mouth mirror with manual periodontal probe (UNC 15) and the readings was recorded to the nearest 1 mm. and applying a gentle probing force (20 g) or lower.

Bleeding on Probing (BOP) in Gingival index was recorded as either present or absent within 30 seconds of probing. For Plaque index four areas of tooth i.e, distofacial, facial, mesiofacial and lingual surfaces were examined

of entire dentition using mouth mirror, an explorer. Scoring was done according to Silness and Loe plaque index.⁸

Periodontitis was defined as the site-specific thresholds for increased probing depth that have ranged from 3mm to ≥ 6 mm, and those for clinical attachment loss have ranged from 2 mm to ≥ 6 mm.⁹

Periodontal disease was classified as mild, moderate and severe based on the 1999 International Workshop for a Classification of Periodontal Diseases and Conditions criteria¹⁰ as: Slight = 1 -2 mm CAL, Moderate = 3- 4 mm CAL, Severe ≥ 5 mm CAL.

The data were entered in Statistical package for social science (SPSS) programme version 21.0 and analyzed using statistical descriptive indices of central tendency (means).

The various periodontal parameters i.e. plaque and gingival indices scores, pocket depth and CAL scores were summarized with the help of mean and standard deviation calculated and displayed with bar diagrams, pie chart and tables.

RESULTS

Table 1. Demographic variables

Variables	Number and percentage
	n= 43
Female	32(74.41%)
Male	11(25.58%)
Age (years)	50.41 \pm 9.48

Table 2. Periodontal Parameters

	Mean \pm SD
Plaque index	1.5 \pm 0.347
Gingival index	1.45 \pm 0.351
PPD(mm)	2.34 \pm 0.433
CAL(mm)	1.8 \pm 0.985

Male to female ratio was 1:3 with mean age group 51 years.

Prevalence of periodontitis among RA patients was 86.04% (Figure 1). Out of 43 RA patients 6 had no periodontitis, 4 had mild periodontitis, 24 had moderate periodontitis and 9 had severe periodontitis. (Figure 2).

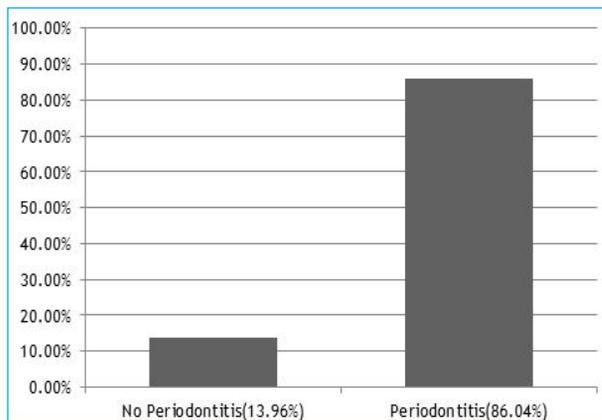


Figure 1. Prevalence of periodontitis.

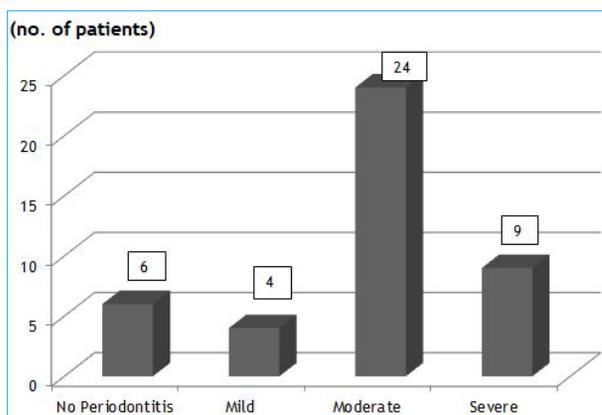


Figure 2. Severity of Periodontitis in numbers.

DISCUSSION

The current epidemiological study was done in hospital population in Nepal to evaluate the prevalence and severity of periodontitis among RA patients as there is paucity of data on the same.

It was found that prevalence and severity of periodontitis were increased in RA patients. Inflammatory response may be common to both diseases and this association can be correlated that RA is a causal factor in the pathogenesis of periodontitis.

The patients with RA are more likely to have moderate to severe forms of periodontitis than non RA group.¹¹ But Sjostrom et al in 1989 found better periodontal conditions among RA-patients, severe periodontal breakdown occurring less frequently among RA-patients (12%) than among the controls (16%).¹² These differences could be explained by selection of older patients, longer duration of RA, more RA activity, and methods of dental examination with examiner variations in studies.

In our study the gender distribution showed that females were affected more than males. Similar reported in studies showing that females are three times more likely to develop RA than males.^{13,14} Rheumatoid arthritis (RA) is 2-4 times more in women than men despite of fact that excess estrogen and progesterone in women are joint protective.¹⁵

Mean age group in our study 51 years which shows that thorough maintenance of oral hygiene is quite difficult. Bokhari et al. (2015) also reported that subjects aged 40 years and above were four times more likely to have periodontitis using Community Periodontal Index (CPI) methods.¹⁶ Study confirms a high prevalence of periodontitis in US adults aged ≥ 30 years, with almost 50% were affected.¹⁷

In our study bleeding on probing was less in participants and similar result was presented by other investigator.^{12,18,19} Antirheumatic medication including corticosteroid and nonsteroidal anti-inflammatory drugs which suppresses inflammation may be the reason for increased periodontal inflammation without an associated increase in bleeding on probing.²⁰

In our study, the mean plaque index was found to be higher however the severity of periodontal destruction is inconsistent with supragingival plaque present at an individual site.²¹ Study conducted by Torkezaban et al in 2012 reported no significant differences in the PI means between RA and non-RA subjects.²³ Thus, the common perception that limited dexterity leads to more plaque accumulation in RA patients²⁴ was not validated. So it can be noted that with similar plaque and bleeding scores the amount of destruction seen in the RA group may be due to other mechanisms.

Our study resulted in significant PD and CAL among volunteers. Similar results were observed in study where the attachment loss and an increase in tooth loss are more pronounced in patients with RA than in non RA.^{25,26} In contrast to our study Sjostrom et al in 1989 found better periodontal conditions among RA-patients, severe periodontal breakdown occurring less frequently among RA-patients (12%) than among the controls (16%).¹²

In our study though participants had fair oral hygiene score and mild gingivitis, they had more PPD and CAL. The deeper periodontal pockets may be due to more severe periodontal destruction in subjects. Similar results have been reported in other studies as well.^{19,25}

The common underlying dysregulation of inflammatory mechanism is reason for increased occurrence and

severity of periodontitis in RA subjects.²⁷ In RA subjects there is more production of Prostaglandin E₂ (PGE₂) in response to bacterial lipopolysaccharides (LPS) due to monocytic hypersecretory trait resulting in severe periodontal destruction.²⁸

Studies showed that relationship exist between RA and Periodontitis as there is high levels of proinflammatory cytokines, including IL-1 β , IL-6 and TNF- α and low levels of anti-inflammatory cytokines such as IL-10 and transforming growth factor-b (TGF- β) in both RA and Periodontitis subjects.^{19, 29} The tissue destruction in both the diseases might be due to similar cytokines with high levels of PGE₂ and MMPs and low levels of TIMPs.^{28, 30}

PAD (Peptidyl arginine deaminase) enzyme produced by *P. gingivalis* plays an important role in the development of periodontal disease which act as systemic immunogens that produces rheumatoid factor and local inflammation of both gingiva and synovium so it is hypothesized that *P. gingivalis* provides a causal link among periodontal disease, citrullination, and RA.³¹⁻³³

In our study, we found increased prevalence of periodontitis in RA patients which is consistent with study performed by de Pablo et al where it was reported that RA group had about two-fold increases in edentulism and periodontitis compared to NRA.³⁴

The limitations of present study included small sample size, environmental and risk factors influencing periodontitis were not examined, lab parameters for RA were not presented.

CONCLUSIONS

The present study showed that there is high prevalence of periodontitis among rheumatoid arthritis patients. Moderate periodontitis is the commonest presentation. Therefore close collaboration between Rheumatologist and Dental clinical team is necessary for the joint management of people suffering from rheumatoid arthritis. Up to our knowledge, this is the first study about periodontitis and RA in Nepal. Further studies and clinical evaluations with large sample size are needed on relationship between rheumatoid arthritis and periodontitis.

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