

Evaluation Of Chronic And Aggressive Periodontitis Among Patients - A Comparative Epidemiological Study

Research Article

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Abstract

Periodontitis is an inflammatory disease of supporting tissue of the teeth caused by specific microorganisms resulting in progressive destruction of periodontal ligament and alveolar bone with the formation of periodontal pocket and loss of attachment. Two main distinct presentations of periodontitis are chronic and aggressive periodontitis. The main aim of this study is to identify and compare oral hygiene status, probing depth, attachment loss, bone loss pattern and the difference in prevalence of disease in different age groups and gender, between chronic and aggressive periodontitis. A total of one hundred and thirty five patient's case records were retrieved and analysed from dental archives of Saveetha Dental College. Data retrieved was cross-verified by 2 reviewers. Data analysis was done by SPSS (version 26.0). As compared to aggressive periodontitis, chronic periodontitis patients had poor oral hygiene status and higher range of probing depth (> 4 mm). Chronic periodontitis was more common (74.7%) than aggressive periodontitis (25.9%) among the selected population. While comparing various parameters such as mean probing depth, mean oral hygiene status, mean attachment loss and bone loss patterns statistical difference was found ($P < 0.05$). Prevalence of periodontitis while comparing age distribution among patients with chronic and aggressive periodontitis was statistically significant ($P < 0.05$). Whereas, statistical significance was not found ($P > 0.05$) while comparing gender distribution with the disease diagnosed (chronic and aggressive periodontitis). Prevalence of chronic periodontitis is more common than the aggressive periodontitis.

Keywords: Aggressive Periodontitis; Bone Loss Pattern; Chronic Periodontitis; Oral Hygiene Status; Probing Depth.

Introduction

Periodontitis is defined as an inflammatory disease of supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone. Two major distinct presentations of periodontitis include chronic and aggressive periodontitis [1].

Cytokines play an important role in the pathogenesis and progression of periodontitis and the levels of TNF alpha and endothelins IL-21 and vary in chronic and aggressive periodontitis

[2-5]. Chronic periodontitis has been defined by the American Academy of periodontology (AAP) as "an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment loss and bone loss. It has a specific group of microorganisms such as *P. gingivalis*, *Tannerella forsythia* and *Treponema denticola* otherwise known as red complex microorganisms.

Periodontal disease can be a risk factor for cardiac disease and chronic obstructive pulmonary disease [6]. It becomes imperative to manage periodontal disease effectively, to achieve optimal periodontal health and regenerate lost tissue. Platelet rich fibrin and

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growth factors offer advantage over other forms of treatment in achieving these objectives [7, 8].

Classification of chronic periodontitis based on extent is localised chronic periodontitis which has a clear pattern in < 30% of teeth and generalised chronic periodontitis which occurs without a clear pattern and > 30% of teeth are affected. Whereas, based on severity it has been classified into mild, moderate and severe [9]. Fuzziness and discontinuity in lamina dura with wedge-shaped radiolucent area, reduced height of interdental septum and horizontal bone loss are commonly seen in chronic periodontitis [10]. Disease progression is measured by the continuous model, the random or episodic burst model, the asynchronous and multiple burst model of disease progression is seen in chronic periodontitis.

Aggressive periodontitis comprises a group of severe, rapidly progressive forms of periodontitis often characterised by an early age of clinical manifestation and a distinctive tendency for cases to aggregate in families [11]. It is a genetically complex disease, *Aggregatibacter actinomycetemcomitans* is considered as the primary pathogen for aggressive periodontitis [12].

Primary features of this disease include non-contributory medical history, rapid attachment loss and arc shaped bone loss. It is also classified based on extent as localised and generalised aggressive periodontitis. Disease progression is measured by burst hypothesis which includes alternate stages of quiescence and destruction [13, 14].

Although similar in many aspects, chronic and aggressive forms of periodontitis have a number of significant clinical differences which includes age of onset, rate of progression, patterns of destruction, probing depth, oral hygiene status.

Therefore the main objectives of the study includes;

- To study the prevalence rate of chronic and aggressive periodontitis
- To compare the oral hygiene status both of chronic and aggressive periodontitis
- To assess and compare mean probing depth of chronic and aggressive periodontitis
- To assess and compare mean attachment loss of chronic and aggressive periodontitis
- To compare the bone loss patterns of chronic and aggressive periodontitis
- To compare the age and gender distribution of both the diseases.

Materials and Methods

Study Design

A Comparative epidemiological study to evaluate chronic and aggressive periodontitis among the patients aged from 18 to 80 years was conducted in Saveetha Dental College, Chennai. Inclusion criteria involved both male and female patients with chronic and aggressive periodontitis among the patients aged from 18 to 80 years. Whereas exclusion criteria includes patients who had previously undergone periodontal treatment, pregnancy, presence of

systemic diseases such as epileptic patients, cardiovascular problems and patients with hematological disorders.

Ethicals

Before scheduling of the retrospective study, the official permission was obtained from the Institutional ethical committee (ethical approval number- SDC/ SIHEC/ 2020/ DIASDATA/ 0619-0320).

Data Collection

A total of one hundred and thirty five patients having chronic (100 patients) and aggressive (35 patients) periodontitis were taken into the study. The data was collected from the case records of each patient, and were verified from the dental records of Saveetha dental college. Data collection included various parameters such as age, gender (male or female), mean oral hygiene status (good, fair or poor). Mean probing depth and attachment loss in which all the six sides of the teeth were assessed using Williams probe. Bone loss patterns (vertical or horizontal) were evaluated. All the parameters among the selected population was assessed by reviewing the periodontal diagnosis chart of each patient.

Data Analysis

Data collected were tabulated in excel sheets and imported into SPSS (version 26.0) in which independent variables include age, gender, oral hygiene status, probing depth, bone loss patterns and loss of attachment. Whereas, dependent variables are the prevalence rate and frequency of occurrence of aggressive and chronic periodontitis. Incomplete data were excluded from the study. Data analysis was done by chi-square test, using which comparative analysis between chronic and aggressive periodontitis patients were done.

Results And Discussion

Prevalence of chronic periodontitis (74.7%) is higher than aggressive periodontitis (25.9%) among the selected population (Graph-1). Comparison of chronic and aggressive periodontitis was done among different age groups. In which among the age group of 18 to 30 years, the prevalence of chronic periodontitis was about 10.37% and aggressive periodontitis was 15.56%. Among 31 to 50 years of age group, the prevalence of chronic periodontitis was 28.15% and aggressive periodontitis were about 10.37%. Whereas, among the age group between 51 to 80 years, the prevalence of chronic periodontitis is 35.56% and there were no prevalence of aggressive periodontitis at this age group (Graph-2).

The Prevalence of chronic and aggressive periodontitis is compared by gender distribution. Among males, prevalence of chronic periodontitis was about 41.48% whereas in aggressive periodontitis it was about 14.81%. Among females, prevalence of chronic periodontitis was about 32.59% whereas aggressive periodontitis was 11.11%. Therefore, in both the cases, prevalence of the disease among males was higher than females (Graph-3).

Comparison of chronic and aggressive periodontitis was done with their mean oral hygiene status. In which among chronic peri-

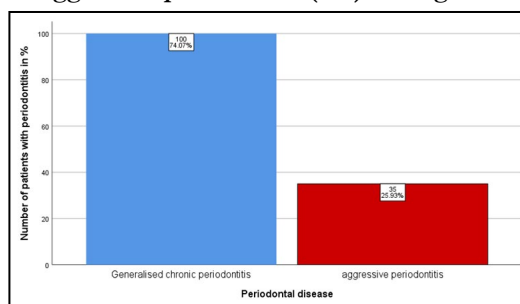
odontitis patients, 0.74% of them had good oral hygiene status, 22.96% of them had fair oral hygiene status and 50.37% of them had poor oral hygiene status. Among aggressive periodontitis patients, 2.96% of them had good oral hygiene status, 6.67% of them had fair oral hygiene status and 16.30% of the patients had poor oral hygiene status (Graph-4).

Comparison of chronic and aggressive periodontitis was done with their mean probing depth (Table-1). Among chronic periodontitis, 74.07% of the patients had probing depth in the range of > 4mm, none of them had probing depth in between the range of 1 to 3 mm .Whereas, among aggressive periodontitis, 10.37% of them had normal probing depth (range of 1 to 3mm) and 15.56% of them had probing depth in between the range of >4 mm (Graph-5).

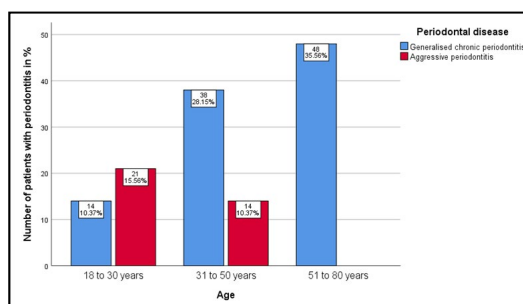
Comparison of chronic and aggressive periodontitis was done with their mean loss of attachment (Table-2). Among chronic periodontitis, 62.96% of the patients had attachment loss greater than 6 mm, 11.11% of them had attachment loss in between the

range of 1 to 6 mm. Whereas, among aggressive periodontitis, 20% of them had attachment loss in the range of 1 to 6 mm and 5.9% of them had attachment loss greater than 6 mm (Graph-6). Comparison of chronic and aggressive periodontitis patients was done with their bone loss patterns among chronic periodontitis patients , 53.3% of the patients had horizontal bone loss pattern than vertical which was about 20.7%. Whereas, among patients with aggressive periodontitis, 4.4% of them had horizontal bone loss and 21.4% of them had vertical bone loss pattern (Graph-7) Statistically significant association ($p < 0.05$) while comparing various parameters such as mean probing depth, mean oral hygiene status, bone loss patterns and mean loss of attachment among the patients with chronic and aggressive periodontitis. Prevalence of periodontitis while comparing age distribution with the disease diagnosed (chronic and aggressive periodontitis) was found to be statistically significant ($P > 0.05$). Whereas, statistical significance was not found ($P > 0.05$) while comparing gender distribution and the disease diagnosed (chronic and aggressive periodontitis) among the selected population.

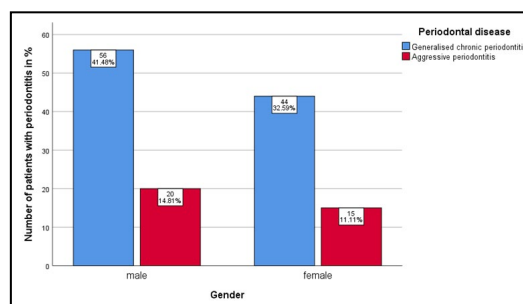
Graph 1. Bar graph represents the frequency distribution of patients with chronic and aggressive periodontitis. X axis represents chronic and aggressive periodontitis. Y axis represents the number of periodontitis. Chronic periodontitis(blue) was more prevalent than aggressive periodontitis(red) among the selected participants



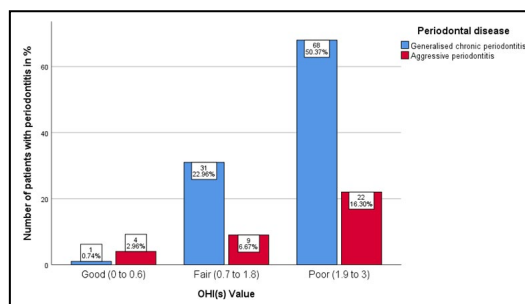
Graph 2. Bar graph represents association between chronic and aggressive periodontitis patients with different age groups. X axis represents age. Y axis represents the number of patients with periodontitis. Chronic periodontitis (blue) is more prevalent among older adults, whereas aggressive periodontitis (red) was common among younger adults. Therefore , this difference was statistically significant when assessed using chi square test. Chi square value - 37.9; $P = 0.0001$ ($p < 0.05$).



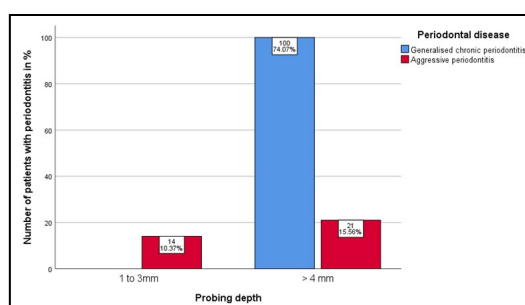
Graph 3. Bar graph showing the association between patients with chronic and aggressive periodontitis with gender. X axis denotes gender. Y axis denotes the number of patients with periodontitis. From the graph, we can infer that both chronic (blue) and aggressive periodontitis (red) was more prevalent among males than females. However, this difference was not statistically significant when assessed using chi square test Chi square value - 0.14; $P = 0.907$ ($p > 0.05$).



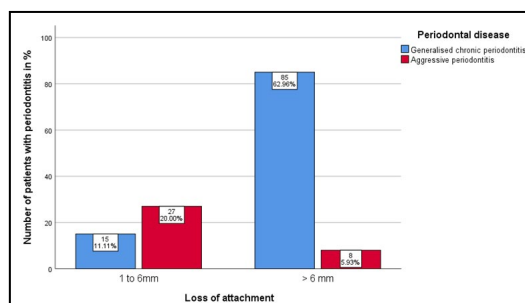
Graph 4. Bar graph showing the association between patients with chronic and aggressive periodontitis with their mean oral hygiene status . X axis represents OHI (s) value. Y axis represents the number of patients with periodontitis. Chronic periodontitis patients (blue) have poor oral hygiene status as compared to patients with aggressive periodontitis (red). Therefore, this difference was statistically significant when assessed using chi square test. Chi square value 7.9; P = 0.019.(p<0.05).



Graph 5. Bar graph represents association between chronic and aggressive periodontitis patients with their mean probing depth. X axis denotes probing depth. Y axis denotes the number of patients with periodontitis. Mean probing depth of chronic periodontitis(blue) patients was greater than patients with aggressive periodontitis(red). Therefore, this difference was statistically significant when assessed using chi square test. Chi square value = 44.62, P = 0.001.(p<0.05).



Graph 6. Bar graph represents association between patients with chronic and aggressive periodontitis with their mean attachment loss. X axis represents attachment loss. Y axis represents the number of patients with periodontitis. Mean attachment loss of chronic periodontitis patients(blue) was greater than patients with aggressive periodontitis(red). Therefore, this difference was statistically significant when assessed using chi square test. Chi square value - 46.7;P = 0.001(p<0.05).



Graph 7. Bar graph represents association between chronic and aggressive periodontitis patients with their bone loss patterns. X axis represents bone loss patterns. Y axis represents the number of patients with periodontitis. Vertical bone loss was commonly seen among patients with aggressive periodontitis (red), whereas in chronic periodontitis patients (blue) horizontal bone loss were seen. Therefore, this difference was statistically significant when assessed using chi square test. Chi square value - 33.2; P = 0.001(p<0.05).

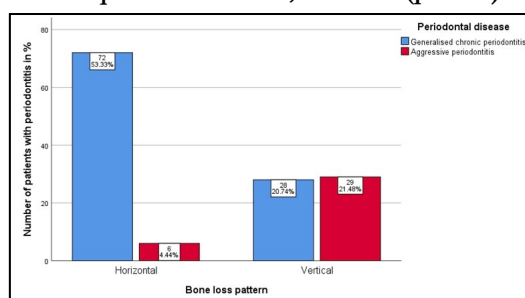


Table 1. Mean probing depth of Chronic and aggressive periodontitis. Table 1 shows that the Mean probing depth for chronic periodontitis is 6.75 mm and for aggressive periodontitis is 3.03 mm. Mean probing depth seen in chronic periodontitis is higher than aggressive periodontitis.

	N	Mean	Std. Deviation	Std. Error Mean
Mean probing depth of chronic periodontitis	100	6.75	1.266	0.127
Mean Probing depth of aggressive periodontitis	35	3.03	1.462	0.198

Table 2. Mean attachment loss of Chronic and aggressive periodontitis. Table 2 shows that the Mean attachment loss for chronic periodontitis is 7.19 mm and for aggressive periodontitis is 4.49 mm. Mean attachment loss seen in chronic periodontitis is higher than aggressive periodontitis.

	N	Mean	Std. Deviation	Std. Error Mean
Mean attachment loss of chronic periodontitis	100	7.19	1.662	0.166
Mean attachment loss of aggressive periodontitis	35	4.49	2.02	0.341

Difficulties in differential diagnosis between Chronic and Aggressive periodontitis are present since the introduction of classification by the American Academy of Periodontology in 1999. Differentiating cases of Chronic periodontitis from Aggressive periodontitis becomes more complex when family history is not very clear, and the patient is referred after initial periodontal therapy is already completed. One of the supporting features to diagnose aggressive periodontitis is the mismatch between the amount of local factors and the amount of periodontal destruction [15].

In cases, where initial therapy is already completed, this vital piece of information is missing for the assessment by the diagnosing clinicians. It would be possible that chances of incorrect diagnosis would be higher in such instances. Therefore, awareness of comparison between the features of chronic periodontitis and aggressive periodontitis is important.

In this study, one hundred and thirty five patients were included in total. Comparison of aggressive and chronic periodontitis was done among the selected population. Prevalence of chronic periodontitis (73.8%) more than aggressive periodontitis (26.1%). Similar studies Ricardo benza et al, stated that the prevalence of aggressive periodontitis is low (less than 1%) in caucasian subjects.

In this study, both chronic (blue) and aggressive periodontitis (red) was more prevalent among males than females. Whereas no related studies had compared gender distribution among both chronic and aggressive periodontitis.

Prevalence of chronic periodontitis in older adults is higher and aggressive periodontitis is more prevalent among younger adults. Therefore, statistically significant difference in prevalence of aggressive periodontitis was found between different age groups. Similar studies stated that aggressive periodontitis is more common in younger adults (< 25 years), but occurs in all age groups. Whereas chronic periodontitis occurs in all age groups but specifically has more prevalence towards older adults [16].

Another study demonstrated that aggressive periodontitis was highly prevalent among young individuals of an isolated and untreated brazilian population [17]. Several studies that correlated gender with aggressive periodontitis stated that, the prevalence of aggressive periodontitis is marginally higher in females, various pathogenetic mechanisms can be at play in the progression of aggressive periodontitis. The rate of bone destruction is faster in aggressive periodontitis, that males even the rehabilitation process like provision of implants difficult [18].

Oral hygiene status is assessed especially based on the accumulation of soft and hard deposits on the surfaces of teeth, which are the etiological factors of periodontitis. In this study, we had compared the oral hygiene status of aggressive and chronic periodontitis, as there are not many studies which have measured oral hygiene status. Among which, poor and fair oral hygiene status were more common among chronic periodontitis patients than in aggressive periodontitis which had good oral hygiene status. Similarly kharidhi et al revealed that patients with aggressive periodontitis had better oral hygiene habits with regards to type of toothbrush and frequency of brushing compared to patients with chronic periodontitis. The difference was statistically significant ($p < 0.05$) [19].

Probing depth between 1 to 3 mm was more common among aggressive periodontitis than chronic periodontitis had probing pocket depth (>4 mm) and did not have probing depth of 1 to 3 mm [20]. A study concluded that teeth with occlusal discrepancies were found to have deeper initial probing depths, significantly worse prognosis and oral hygiene status in chronic periodontitis than in aggressive periodontitis which was conducted in San antonio, USA. Similarly a study investigating Tehran patients stated that chronic periodontitis had increased in periodontal pocket depths than aggressive periodontitis [21, 22].

In this study, Chronic periodontitis patients had greater loss of attachment (62.9%) than aggressive periodontitis. Similar studies had compared clinical attachment loss with the gender distribution among both chronic and aggressive periodontitis. Our study states that, horizontal bone loss pattern (53.33%) is more preva-

lent among the patients with chronic periodontitis whereas, vertical bone loss pattern (21.48%) was more common among aggressive periodontitis patients. Similarly other studies had compared chronic and aggressive periodontitis based on their alveolar bone loss levels and they had not evaluated the patterns of bone loss.

The treatment modalities for chronic periodontitis and aggressive periodontitis, though basically remain the same. Antimicrobial therapy has provided added advantage in trending aggressive periodontitis cases. Herbs have been used as antimicrobial agents in treating periodontal disease. Effectiveness of various herbal mouthwashes have been tested in different periodontal disease [23].

Researchers have attempted various regenerative methods like PRF, growth factors and stem cells to salvage the destruction of periodontal tissues in chronic as well as aggressive forms of periodontitis [24]. As this is a retrospective study, further prospective study could be done, which may throw a light on variations and clinical differences which occur among the patients with chronic and aggressive periodontitis.

Conclusion

Comparative evaluation of chronic and aggressive periodontitis concluded that the prevalence of chronic periodontitis is higher than aggressive periodontitis. Chronic periodontitis is prevalent in older adults than aggressive periodontitis which is manifested in younger adults. Males are profoundly affected by both aggressive and chronic periodontitis than females. Aggressive periodontitis patients have better oral hygiene status than chronic periodontitis patients. Chronic periodontitis patients had deeper probing depth and also had greater attachment loss than aggressive periodontitis patients. Horizontal bone loss was more prevalent among the chronic periodontitis patients whereas, vertical bone loss was common among aggressive periodontitis patients.

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