

The Effect Of Gingivitis In Elderly Patients Compared With Young Patients And Impact Of Factors In Different Age Groups

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ABSTRACT

Background: Gingivitis/periodontitis is one of the widespread chronic diseases affecting the supporting structures of teeth, specifically the part of the gum that surrounds the base of the teeth. **Method:** The present study was involved 294 patients who were coming to Specialized Dental Center, (206) (68.8%) patients were coming for extraction of teeth while (94) (31.4%) were approached for filling teeth in specialist dentist. The data of the current research was collected from the patients who visited the Specialized Dental Center in the city of Al-Diwaniyah during the period from 1st Sept. to 31th Oct.-2021. **Results:** The results of current investigation were included 294 patients, 206 (68.6%) patients were visited dental clinic for teeth extraction whereas, only 94 (31.4%) coming for filling teeth. As well as the percentage of gingivitis in dental patients which involved (106) (51%) suffering from high level in gingivitis while (100) (48%) patients do not suffer from gum inflammation. Or over, there are multiple factors responsible for gingivitis such as smoking that was regarded as high rate about (41%) while only (24%) have a chronic disease and finally about (35%) patients have gingivitis because avoided brush teeth that mean bad oral hygiene, the male group reported (71) (67%) patients which significantly more than female group that reported lower percentage about (35) (33%) patient suffering from gingivitis. Finally, one of the most important results were Age groups of gingivitis patients were illustrated that the first age group (11-25 years) showed 16%, and the second age group (21-30) represented high percent about 51% which considered of the most important results which unexpected, and the third group (31-40) presents 26%. in contrast to above this fourth group provides low level only 7%, this results one of the different results in multi-label previous researches. **Conclusion:** The results of this investigation show that the most interesting finding was concluded that the young patients the most infected with gingivitis compared with elderly patients, this is an important issue for future research. These results were important to understanding what's the immunological different in young compared with aged group that lead increase level of infection by gingivitis. **Key words:** Gingivitis, Periodontitis, Smoking Patients, Microorganism.

Article Information

Received: January 09, 2024; Revised: February 28, 2024; Online: March, 2024

INTRODUCTION

Gingivitis is a common type of gum disease (periodontal disease) that can cause swelling (inflammation), irritation, and redness of the gingiva, which surrounds the base of the teeth. Gingivitis is one of them. So, gingivitis/periodontitis are one of the widespread chronic diseases affecting the supporting structures of teeth. Smoking is a significant risk factor for periodontitis and may affect the vasculature, the humeral immune system and the inflammatory system the periodontal disease is a group of chronic inflammatory disorders that are associated with damage of the periodontal attachment apparatus (cementum, collagen fibrils and a layer of calcified inter fibrillar matrix on the root surface of the tooth). In normal circumstances, the balance between host response and microbial virulence factors was present, when periodontitis occurs, this balance will be impaired. Smoking was considered one of the environmental factors that has been proposed to interact with host cells and influence on the inflammatory processes ¹.

As well, the smoke of cigarettes contains a complex mixture of more than 7000 chemical compounds in its second phase, which is tar and gas². Tobacco smoke has a lot of Cadmium, reaching (1-3µg per cigarette). Smoking is bad for the health because it weakens the body's ability to fight off infections and because the chemicals in cigarettes directly affect the gums and teeth^{3,4}.

More than 600 species-level taxa have been identified in the oral microbiome, which is a significant number of different species⁵. It has been extensively studied in recent years, using a variety of cultivation and microscopic methods, to better understand the oral microbiome. However, it has been hypothesized that a significant portion of the microbiome is made up of microorganisms that cannot be grown in a laboratory setting. Using Molecular biological methods made it clear that the oral microbiome was underestimated⁶. The development of next-generation sequencing methods, for example, has allowed scientists to gain a better understanding of the microbiome's complexity.

As an outcome, our understanding of periodontitis' pathogenesis continued to evolve. Recent paradigm shifts emphasise the interaction between complex microbiome changes and innate and adaptive immune responses⁷. The chief aim of current stud was

invested the effect of smoking on dysbiosis and caused periodontitis in different age groups.

METHODS

The present study was involved 294 patients who were coming to Specialized Dental Center, (206) (68.8%) patients were coming for extraction of teeth while (94) (31.4%) were approached for filling teeth in specialist dentist. The data of the current research was collected from the patients who visited the Specialized Dental Center in the city of Al-Diwaniyah during the period from from 1st Sept. to 31th Oct. -2021, these data involved the gender and age of the patients, the presence of bacterial diseases, chronic diseases, brushing the teeth, and whether the patient is a smoker or not were taken all these information were collected depend on confirmed diagnosis by a specialist dentist.

After collecting the data, they were classified in the form of statistical tables, in which the percentage was used. As well as periodontitis can progress, leading ultimately to tooth loss. Fundamentally, tooth loss is considered as a lifetime cumulative indicator of poor oral health ⁸.

RESULTS

The results of current investigation were included 294 patients, 206 (68.6%) patients were visited dental clinic for teeth extraction whereas, only 94(31.4%) coming for filling teeth as we can see in Figure (1).

As we can see in figure (2) was illustrated the percentage of gingivitis in dental patients which involved (106) (51%) suffering g from high level in gingivitis while (100) (48%) patients do not suffer from gum inflammation.

The results, as shown in figure (3), indicate that there are multiple factors responsible for gingivitis such as smoking that was regarded as high rate about (41%) while only (24%) have a chronic disease and finally about (35%) patients have gingivitis because avoided brush teeth that mean bad oral hygiene.

As can be seen from the figure (4), the male group reported (71) (67%) patients which significantly more than female group that reported lower percentage about (35) (33%) patient suffering from gingivitis.

The results obtained from the preliminary analysis of Age groups of gingivitis patients are presented in figure (5) illustrated that the first age group (11- 25) showed 16%, and the second age group (21-30) represented high percent about 51% which considered of the most important results which unexpected, and the third group (31- 40)presents 26%.in contrast to above this fourth group provides low level only 7%, this results one of the different results in multi-label pervious researches.

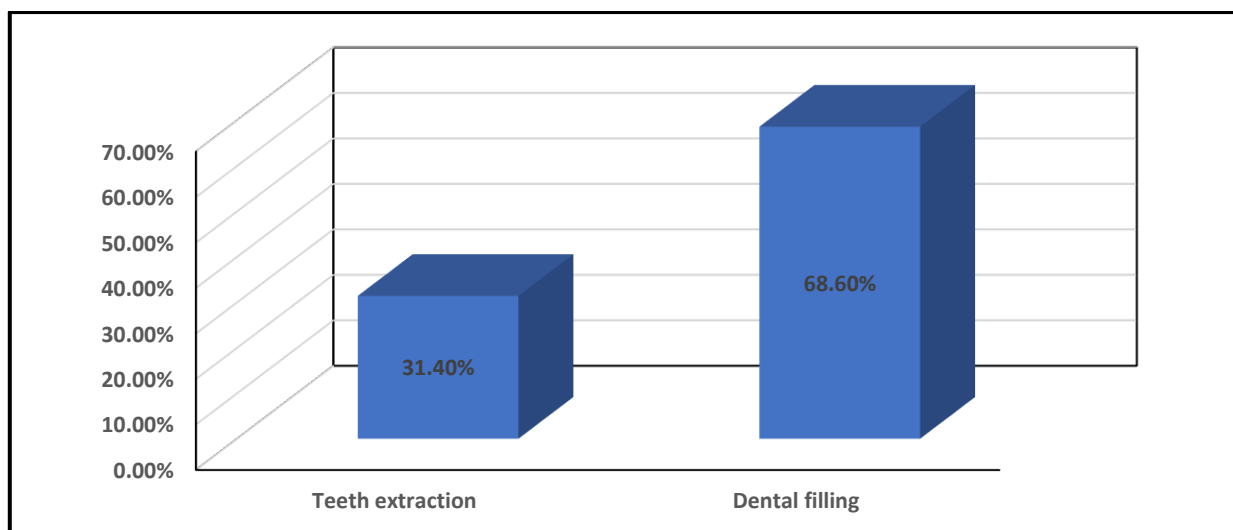


Fig. 1: The percentage of inflammation of gingiva in dental patients.

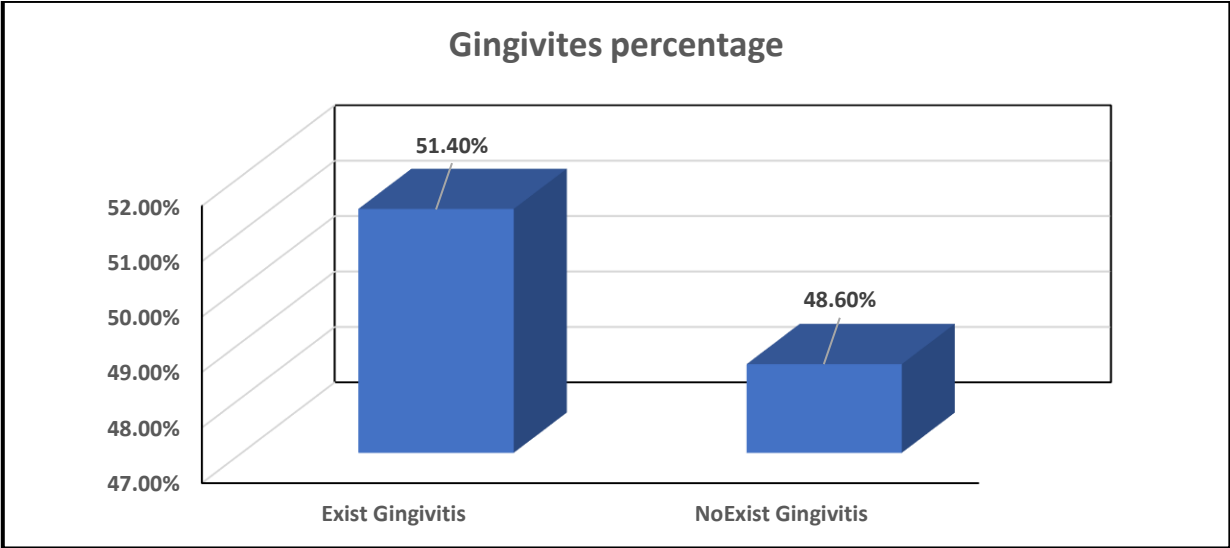


Fig. 2: The percentage of inflammation of gingiva in dental patients.

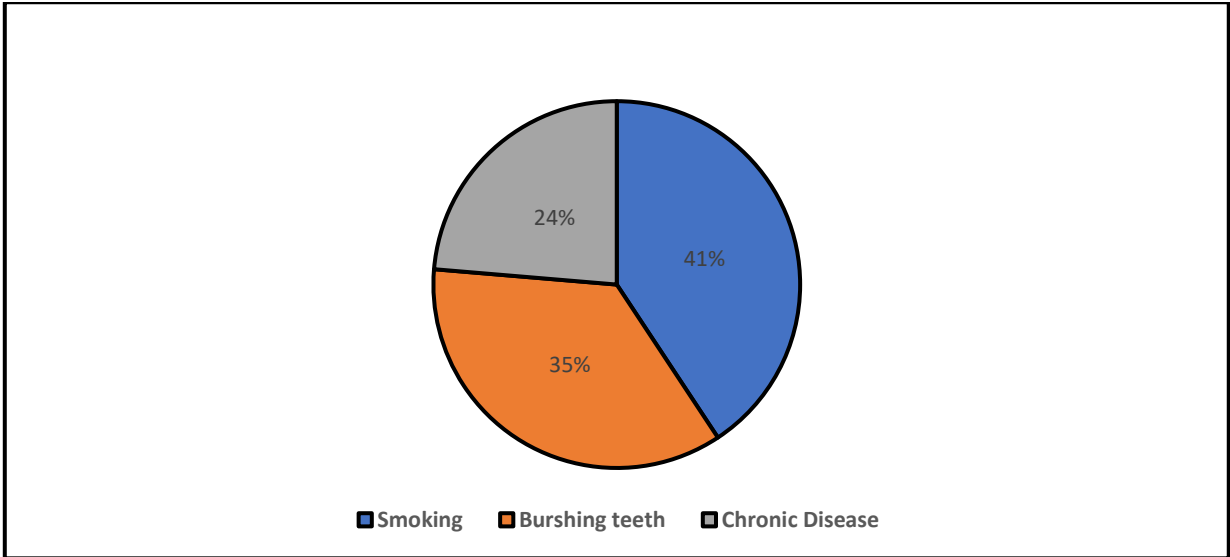


Fig. 3: The main factors of gingivitis on dental health care patients.

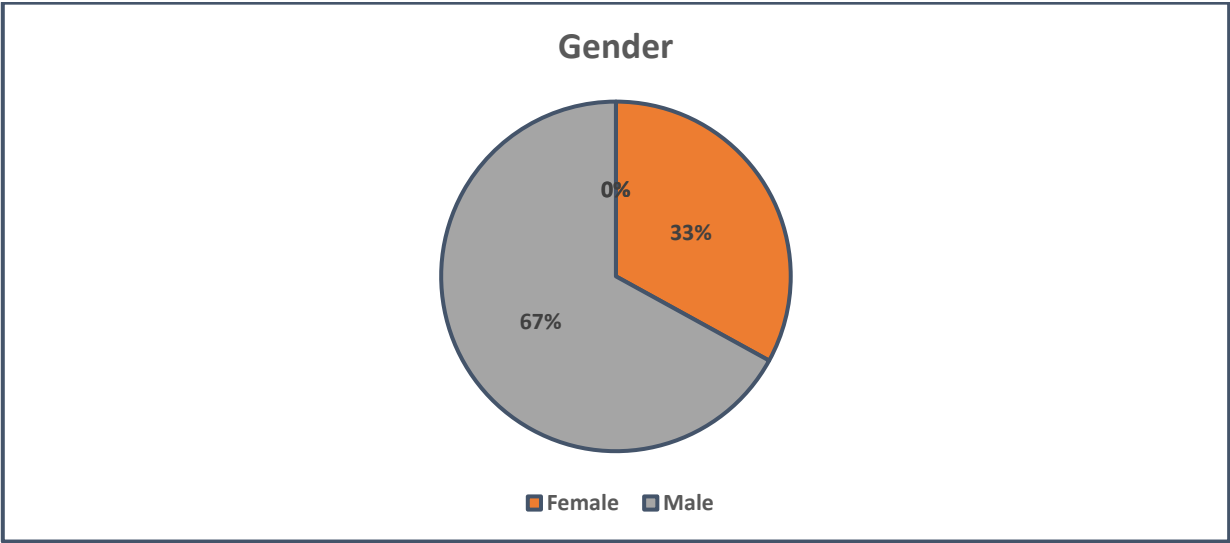


Fig. 4: The percentages of males and females in gingivitis patients.

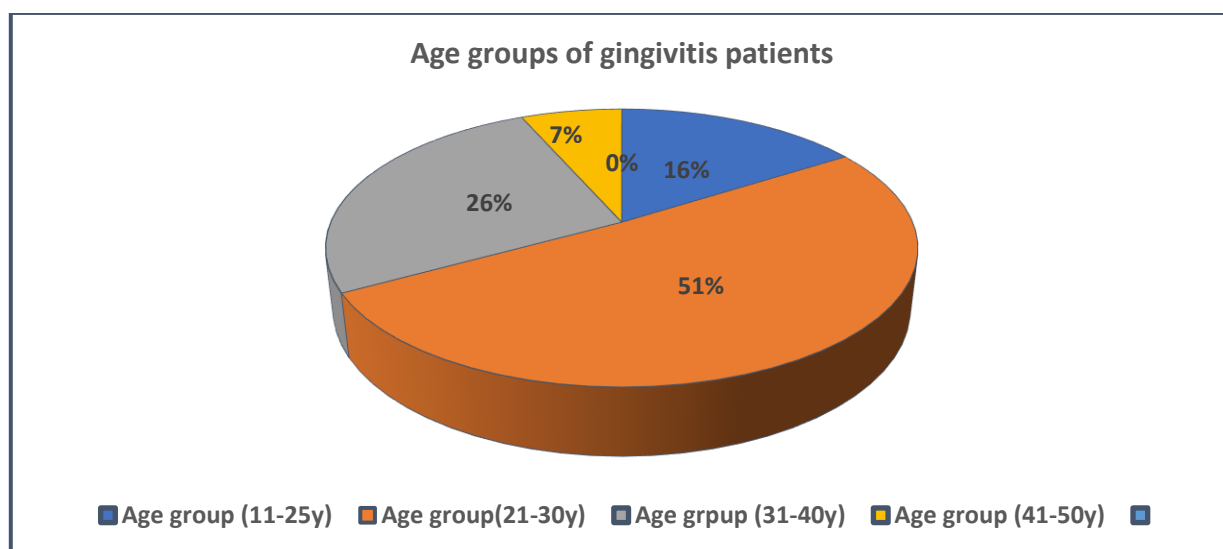


Fig. 5: The percentages of ages groups among gingivitis patients.

DISCUSSION

The results of this study show 206(68.6%) patients have visited the dental clinic for teeth extraction whereas, only 94 (31.4%) came for filling teeth indicate that a high percentage of patients suffering from gingivitis was considered as the main reason for tooth loose. Gingivitis is an inflammatory condition of the gingiva caused by the accumulation of dental plaque. It can develop in a matter of days. If untreated, periodontitis can lead to tooth loss due to the irreversible destruction of tissues that support teeth caused by a combination of chronic bacterial infection and the host's inflammatory response⁹. According to Janakiram (2020) findings, periodontal diseases include both reversible and irreversible changes in the soft tissues surrounding and supporting the tooth. On the other hand, the percentage (106) (51%) of dental patients who had gingivitis, compared to (100) (48%) of dental patients who did not, is in agreement with Janakiram's findings. These diseases are considered to be a major public health issue because they are endemic. Our population's oral disease burden cannot be accurately assessed due to lack of continuous monitoring, so data from various prevalence studies is the only option.

Periodontal disease is a major problem for adults, according to a recent analysis of prevalence studies¹⁰.

Moreover, the current study found that there are multiple factors responsible for gingivitis such as smoking that was regarded as a high rate of about (41%) while only (24%) have a chronic disease, and finally about (35%) of patients have gingivitis because of no cleaning teeth that mean bad oral hygiene. Since smoking is the leading preventable cause of death in the world and periodontal disease the leading cause of tooth loss in adults, it may be possible to explain this correlation between gingivitis and smoking¹¹. Additionally, these findings corroborate a previous study that demonstrated that cigarette smoke extract significantly increases the production of interleukin (IL) -8 by human epithelial cells in smokers' gingival tissues compared to non-smokers.^{12, 13}

Previous studies have shown that gingival tissues from patients with periodontitis express high levels of IL-6, IL-8, and TNF-¹⁴. Inflammatory cytokines promote osteoclastogenesis, which can exacerbate periodontal inflammation and MBL if left uncontrolled¹⁵. While, On the question of the

correlation between gingivitis and chronic disease, this study found that (24%) of those suffering from gingivitis have a chronic disease, this results in agreement with various reaches found that few diseases like cancer, diabetes, and human immunodeficiency virus are associated with an increased risk of gingivitis¹⁶ Patients with periodontal disease may experience bacteremia after dental examinations or treatments, as well as after routine oral hygiene practices such as brushing, flossing, and chewing.¹⁷ As with other chronic infections or inflammatory processes, the host's response to bacteremia and systemic spread of pro-inflammatory cytokines from periodontal pockets is similar. There are several ways in which CRP and other acute-phase proteins are produced, one of which is the production of interleukin-6 (IL-6)^{18,19}.

Periodontitis patients are more likely to have bacteremia after periodontal probing than gingivitis patients²⁰. According to the Centers for Disease Control and Prevention, researchers have discovered potential links between gum disease and other serious health conditions. In people with healthy immune systems, the bacteria in the mouth that makes its way into the bloodstream is usually harmless. But under certain circumstances, these microorganisms are associated with health problems such as stroke and heart disease. Diabetes isn't only a risk factor for gum disease, but gum disease may make diabetes worse²¹. Finally, according to the current study, gingivitis is more common in women than men. These gender differences may partly be explained by the increasing evidence of gingivitis' close association with the phenomenon of gender-based heterogeneity in periodontal disease. There are distinct gender differences in the prevalence and severity of chronic periodontitis, which may be explained by a combination of genetic structures based on

sex and sex steroid hormones. Because estrogens, which are the main sex hormones in women, have immune-protective and anti-inflammatory effects in hormonally active premenopausal women, they have better periodontal status than men of the same age. In contrast, After menopause, when oestrogen levels drop, women may have the same or worse periodontal health than men. It is possible that menopausal hormone therapy will improve the periodontal health of postmenopausal women. It is relatively simple to detect alveolar bone loss on radiographs, which is an irreversible sign of previous periodontal disease activity in an objective manner. Orthopantomography is a relatively accurate method of determining the health of alveolar bone throughout the entire mouth. It was decided to conduct a cross-sectional retrospective panoramic radiographic analysis in a north Indian dental institute in order to determine the gender-based distribution of periodontal bone loss. Updates on gender-based differences in oral health, underlying mechanisms, differences in patterns, distribution of alveolar bone loss, and potential gender-specific disease protection and management strategies will be provided in the current chapter.²².

A most interesting finding was that the first group involved young patients extend from (11-25) years the most infected with gingivitis compared with other groups. The most probable explanation for this results in the factors including lifestyle-related factors (e.g., local diets in North Africa or the Mediterranean diet) and hormone imbalances during adolescence (e.g., sex hormones such as androgens and estrogens) may modify the onset and progression of this disease²³. These findings corroborate the conclusion of (Seong, 2018) that the recession rates in young adults' gingivitis observed in this study were high, but consistent with other recent

studies highlighting the extent of this problem²⁴.

The current result contradicts According to data from the 2009–2012 National Health and Nutrition Examination Survey (NHANES) cycles, over 46% of the adult population in the United States has periodontitis, implying that periodontitis is widespread among the elderly²⁵. However, the current study's findings contradict previous research indicating that the total incidence of periodontitis is lesser in a younger generation. In 2005, the World Health Organization collected cohort data from the United Kingdom and discovered that 97 percent of 15–19-year-olds lacked evidence of periodontal disease. This figure decreased to 25 percent among those aged (35–44)²⁶.

In contrast to previous findings, the current study found that gingivitis occurred at a low prevalence of approximately 7% in the elderly (41-50 years) group when compared to other groups. This finding was consistent with the fact that the total incidence of periodontitis was highest in older adults. As India's population ages, the prevalence of periodontitis is expected to rise as a result of increased tooth retention and a possible lack of emphasis on geriatric dental care; this is a common phenomenon worldwide^{27, 28}. This is an important issue for future research, these results were important to understanding what's the immunological different in young compared with the aged group that lead increase level of infection by gingivitis.

CONCLUSION

The results of this investigation show that the most interesting finding was concluded that the young patients the most infected with gingivitis compared with elderly patients, this is an important issue for future research, these results were important to understand what's the immunological different in young compared with aged group that lead increase level of infection by gingivitis.

ACKNOWLEDGMENT

The author would like to thank the staff of Al Diwanayah Specialized Center.

REFERENCES

1. Palmer, R. M., Wilson, R. F., Hasan, A. S., & Scott, D. A. (2005). Mechanisms of action of environmental factors—tobacco smoking. *Journal of clinical periodontology*, 32, 180-195.
2. Rodgman, A., & Perfetti, T. A. (2008). *The chemical components of tobacco and tobacco smoke*. CRC press.
3. Gamal, A. Y., & Bayomy, M. M. (2002). Effect of cigarette smoking on human PDL fibroblasts attachment to periodontally involved root surfaces in vitro. *Journal of clinical periodontology*, 29(8), 763-770.
4. Al-Ghamdi, H. S., & Anil, S. (2007). Serum antibody levels in smoker and non-smoker Saudi subjects with chronic periodontitis. *Journal of periodontology*, 78(6), 1043-1050.
5. Griffen, A. L., Beall, C. J., Campbell, J. H., Firestone, N. D., Kumar, P. S., Yang, Z. K., ... & Leys, E. J. (2012). Distinct and complex bacterial profiles in human periodontitis and health revealed by 16S pyrosequencing. *The ISME journal*, 6(6), 1176-1185.
6. Hajishengallis, G. (2014). Immunomicrobial pathogenesis of periodontitis: keystones, pathobionts, and host response. *Trends in immunology*, 35(1), 3-11.
7. Hajishengallis, G. (2014). Immunomicrobial pathogenesis of periodontitis: keystones, pathobionts, and host response. *Trends in immunology*, 35(1), 3-11.

8. Meyle, J., & Chapple, I. (2015). Molecular aspects of the pathogenesis of periodontitis. *Periodontology 2000*, 69(1), 7-17.
9. Meyle, J., & Chapple, I. (2015). Molecular aspects of the pathogenesis of periodontitis. *Periodontology 2000*, 69(1), 7-17.
10. Janakiram, C., Mehta, A., & Venkitachalam, R. (2020). Prevalence of periodontal disease among adults in India: A systematic review and meta-analysis. *Journal of Oral Biology and Craniofacial Research*, 10(4), 800-806.
11. Rivera C, Jones-Herrera C, Vargas P, Venegas B, Droguett D. Oral diseases: a 14-year experience of a Chilean institution with a systematic review from eight countries. *Med Oral Patol Oral Cir Bucal*. 2017 May 1;22(3):e297- e306. Pubmed PMID: 28390130.
12. Mahanonda, R., Sa-Ard-Iam, N., Eksomtramate, M., Rerkyen, P., Phairat, B., Schaecher, K. E., ... & Pichyangkul, S. (2009). Cigarette smoke extract modulates human β -defensin-2 and interleukin-8 expression in human gingival epithelial cells. *Journal of periodontal research*, 44(4), 557-564.
13. Wolgin, M., Liodakis, S., Ulrich, I., Zakrzewicz, A., Kielbassa, A. M., & Pries, A. R. (2012). Gene expression of human beta defensins-1 and-2 is significantly reduced in non-inflamed keratinized oral tissue of smokers. *Journal of dentistry*, 40(11), 949-954.
14. Noh, M. K., Jung, M., Kim, S. H., Lee, S. R., Park, K. H., Kim, D. H., & Park, Y. G. (2013). Assessment of IL-6, IL-8 and TNF- α levels in the gingival tissue of patients with periodontitis. *Experimental and therapeutic medicine*, 6(3), 847-851.+
15. Graves, D. T., Li, J., & Cochran, D. L. (2011). Inflammation and uncoupling as mechanisms of periodontal bone loss. *Journal of dental research*, 90(2), 143-153.
16. Wohlfeil, M., Wehner, J., Schacher, B., Oremek, G. M., Sauer-Eppel, H., & Eickholz, P. (2009). Degree of gingivitis correlates to systemic inflammation parameters. *Clinica Chimica Acta*, 401(1-2), 105-109.
17. Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation* 2007;116:1736–54.
18. Pepys, M. B., & Hirschfield, G. M. (2003). C-reactive protein: a critical update. *The Journal of clinical investigation*, 111(12), 1805-1812..
19. D'Aiuto, F., Parkar, M., Andreou, G., Suvan, J., Brett, P. M., Ready, D., & Tonetti, M. S. (2004). Periodontitis and systemic inflammation: control of the local infection is associated with a reduction in serum inflammatory markers. *Journal of dental research*, 83(2), 156-160.
20. Daly, C. G., Mitchell, D. H., Highfield, J. E., Grossberg, D. E., & Stewart, D. (2001). Bacteremia due to

- periodontal probing: a clinical and microbiological investigation. *Journal of periodontology*, 72(2), 210-214.
21. Germen, M., Baser, U., Lacin, C. C., Fıratlı, E., İşsever, H., & Yalcin, F. (2021). Periodontitis prevalence, severity and risk factors: A comparison of the AAP/CDC case definition and the EFP/AAP classification. *International Journal of Environmental Research and Public Health*, 18(7), 3459.
22. Jain, A., Bhavsar, N. V., Baweja, A., Bhagat, A., Ohri, A., & Grover, V. (2020). Gender-Associated Oral and Periodontal Health Based on Retrospective Panoramic Radiographic Analysis of Alveolar Bone Loss. In *Clinical Concepts and Practical Management Techniques in Dentistry*. IntechOpen.
23. Seong, J., Bartlett, D., Newcombe, R. G., Claydon, N. C. A., Hellin, N., & West, N. X. (2018). Prevalence of gingival recession and study of associated related factors in young UK adults. *Journal of dentistry*, 76, 58-67.
24. Haubek, D., Mulli, T., Kemoli, A., Lindholm, M., Gjørup, H., Nørregaard, M. L. M., & Johansson, A. (2021). Prevalence of JP2 and Non-JP2 Genotypes of *Aggregatibacter actinomycetemcomitans* and Oral Hygiene Practice of Kenyan Adolescents in Maasai Mara. *Pathogens*, 10(4), 488.
25. Elamin, A. M., Skaug, N., Ali, R. W., Bakken, V., & Albandar, J. M. (2010). Ethnic disparities in the prevalence of periodontitis among high school students in Sudan. *Journal of Periodontology*, 81(6), 891-896.
26. Petersen, P. E., & Ogawa, H. (2012). The global burden of periodontal disease: towards integration with chronic disease prevention and control. *Periodontology 2000*, 60(1), 15-39.
27. Tonetti, M. S., Jepsen, S., Jin, L., & Otomo-Corgel, J. (2017). Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: A call for global action. *Journal of clinical periodontology*, 44(5), 456-462.
28. Vos, T., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., Abd-Allah, F., ... & Criqui, M. H. (2017). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, 390(10100), 1211-1259.