CODEN: WJAPAC Impact Factor: 3.87 ISSN: 3049-3013

World Journal of Advance Pharmaceutical Sciences

Volume 3, Issue 1, Page: 78-84 Research Article www.wjaps.com

EVALUATION OF PERIODONTAL INDICES AMONG FOURTH- AND FIFTH-STAGE DENTAL STUDENTS AT AL-KAFEEL UNIVERSITY, A CROSS-SECTIONAL COMPARATIVE STUDY

Maher B. Mohammed[1], Karrar N. Shareef[2], Ghassan N. Talib[3], Abdulsahib S. Jubran*[4]

[1,2,3]Alkafeel University College of Dentistry.

How to cite this Article Maher B. Mohammed[1], Karrar N. Shareef[2], Ghassan N. Talib[3], Abdulsahib S. Jubran*[4] (2026). EVALUATION OF PERIODONTAL INDICES AMONG FOURTH- AND FIFTH-STAGE DENTAL STUDENTS AT AL-KAFEEL UNIVERSITY, A CROSS-SECTIONAL COMPARATIVE STUDY. World Journal of Advance Pharmaceutical Sciences, 3(1), 78-84.

Article Info

Article Received: 02 December 2025,

Article Revised: 23 December 2025,

Article Accepted: 13 January 2026.

DOI: https://doi.org/10.5281/zenodo.18270785

***Corresponding author:**

Dr. Abdulsahib S. Jubran

Alkafeel University College of Dentistry.

ABSTRACT

Background: Debris inflammation of the mouth is known as gingivitis around the teeth that doesn't lead to bone or clinical attachment loss. The type of gingivitis caused by dental biofilm is the most frequently diagnosed periodontal disease. Periodontitis involves periodontal inflammation and apical migration of the junctional epithelium, which destroys connective tissue connection and alveolar bone. Biofilm of bacteria forms on mouth surfaces as dental plaque. Calculus, a hard deposit generated by mineralization of dental plaque on natural teeth and dental prosthesis, is usually supra or subgingival. Periodontal disorders are among the most frequent oral illnesses. This study aimed to Evaluation of periodontal indices among dental student due to their easy accessibility, their similarity in age, and because they are more aware of oral care factors through their studies. The study also aims to provide a useful practical application for students in measuring indicators of gum disease, the students of dental college Alkafeel University as a sample. **Material and Methods:** This cross-sectional research was undertaken at Alkafeel University in Najaf, Iraq, in 2022–2023. This research involved 100 (50 male/50 female) fourth stage and 100 (50 male/50 female) final-year faculty students Using a systematic interview questionnaire, clinical exams, a flat mouth mirror, and a University of Michigan 'O' probe (Williams marks). The examiner measured plaque index (PI), gingival index (GI), and Simplified Calculus Index(CI). **Results:** The fourth stage (mean ±SD) of PI = (0.4498+0.3378), GI= (1.6006 ± 1.922), CI= (0.3140 ± 0.2668) were found to be high compared with The fifth stage(mean ±SD) of plaque (0.2980+0.2127), gingival (0.7260 ± 0.6004) and calculus (0.2980 ± 0.2127) indices, with significant difference in gingival index only $p<0.05$.

KEYWORDS: Debris, Inflammation, Periodontal Indices, Dental Students, Comparative Study.

INTRODUCTION

The periodontium encompasses tissues that form the tooth's protective casing and framework. It includes the gingiva, periodontal ligament, root cementum, and alveolar bone proper.[1] Periodontal components, including gingival tissues, have unique characteristics such as spatial location, tissue structure, biochemical composition, and chemical makeup. However, they work together harmoniously as a cohesive entity. Clinically healthy gingival tissues have pink color, sharp edges, and do not bleed when probed. a small crevice or gap, is formed by the tooth's surface and the epithelium lining

the gingiva, its called The gingival sulcus, The depth of a healthy gingival sulcus typically ranges from 1 to 3 mm.[2] Periodontal diseases (PDs), including gingivitis and periodontitis, are prevalent and significant dental conditions affecting populations globally. These disorders, particularly in adults, are responsible for tooth loss, as identified by Coventry et al. (2006).[3-5] Gingivitis is an inflammatory disease that only affects the soft tissue around the teeth, without any accompanying loss of bone or clinical attachment. Dental plaque is a common cause of this condition, which may develop on both stable and un attached periodontium. It may induce symptoms such as redness, changes in shape, tendency to be compressed and bleeding. Oral health maintenance necessitates the implementation of appropriate oral hygiene habits, such as using a toothbrush and engaging in interdental mechanical cleaning and efficiently controls plaque by a combination of mechanical and chemical methods. Studies indicate that the use of toothbrushes enhances the condition of the gums.[6-9] Professionals' assistance is necessary to supplement self-performed oral hygiene practices when variables that promote the retention of plaque, such as dental calculus, faulty dental restorations, or anatomical factors, hinder the effective removal of dental plaque by an individual.[10]

Periodontitis is an inflammatory condition that leads to tooth supporting parts destruction as a result of infectious agents. Periodontal pockets develop as a result of this characterized by an increasing probing pocket depth and the regression of the gingiva. The treatment entails a thorough periodontal therapy, which includes continuous plaque management, removal of both soft and hard deposits, and either resective or regenerative surgery. Every patient should have a comprehensive periodontal therapy regimen, which includes remote encouragement, reeducation, and further treatment if necessary.[11,12]

The periodontal diseases (PDs) are distinguished by changes in the color, as well as an increased predisposition for bleeding on probing (BOP). The BOP manifests prior to the onset of visible indications of inflammation, such as a change in color or other visual indicators. Utilizing bleeding indications instead of color changes for early detection of gingival inflammation offers advantages, as bleeding is a more objective indicator that necessitates less subjective assessment by the examiner.[13]

Furthermore, the periodontal tissue may display a diminished resistance to probing, which is viewed as an increase in pocket probing depth (PPD) and/or gingival recession.[14]

Russell's definition of the periodontal index is a numerical value that represents the scale's top and lower limits that show how bad or good a group is doing. This description makes it easy to compare to other groups that are categorised using the same standards and method (Russell, 1956).[15]

Optimal oral hygiene is crucial for overall well-being and a high standard of living. The World Health Organization (2012) defines oral health as the absence of mouth and facial pain, oral infections, sores, and diseases that impair an individual's ability to bite, chew, smile, talk, and maintain psychosocial well-being. Humanity continues to be afflicted by oral disorders such as dental caries and periodontal disease.

Oral health education is crucial for inspiring individuals, including the general people in the public, patients, healthcare workers, teachers, and policymakers, and others, to engage in proactive measures. Oral illnesses have numerous risk factors in common with other significant diseases.[16] Nevertheless, numerous research[16,17] have shown a clear correlation between the amount of education and periodontal health.

University students provide a significant demographic that can be readily utilized to evaluate the oral health condition, awareness, and behaviors within the young adult and educated cohorts. Dental students[18,19] are considered the most crucial category of university students who are expected to possess impeccable oral health status and oral health habits. The aim of this study was to evaluate the periodontal indices among dentistry college students at Alkafeel University in order to estimate their oral health condition.

MATERIALS AND METHOD

During the school year 2023–2024, this cross-sectional study was done at Al-Kafeel University in Najaf, Iraq. The Research and Ethics Committee of the Faculty of Dentistry at Al-Kafeel University looked over the study procedure and gave its approval. Before they were enrolled, all subjects gave their written consent after being fully told. The target population comprised students from the fourth and final academic years in the Faculty of Dentistry. A total of 200 students participated in the study, with an equal distribution of males and females (50 males and 50 females) from each academic level. Clinical examinations were carried out in the Department of Oral Medicine and Periodontology, Faculty of Dentistry, Al-Kafeel University. A flat mouth mirror and a university of Michigan 'O' probe (Williams's markings). The examiner determined the clinical parameters including; plaque index (PI) Described by (Sinless and Loe 1964), Simplified Calculus Index Described by (John C Greene and Jack R Vermillion in I960) and gingival index described by Loe and Sinless (1967).

The data was processed and analysed using SPSS, version 26, which is a statistical package for the social sciences. Standard deviations and means and medians were among the statistical metrics computed using the program. We used independent-sample t-tests and

regarded a value of P < 0.05 to be statistically significant.

THE RESULT

The total number of study participant was 200 (male 100 and female 100). All of them were evaluated to record the clinical parameter (CI, GI&PLI) to compare between fifth and fourth stage of dental student of al kafeel University.

Evaluation of periodontal parameters indicated higher mean scores for plaque, gingival, and calculus indices among fourth-year students relative to fifth-year students. The variations in CI and PLI were statistically non-significant ($P > 0.05$), while the gingival index demonstrated a significant difference ($P < 0.05$). (table 3-1).

Table (3-1): mean values and standard deviations of PLI, GI, and CI for fifth and fourth stage.

index	Stage		Statistic	
	5th Mean ±sd	4th Mean ±sd	T test	P value
CI	0.1276 ± 0.1614	0.3140 ± 1.2668	1.032	0.3
GI	0.7260 ± 0.6004	1.6006 ± 1.922	3.071	0.03
PLI	0.2980 ± 0.2127	0.4498 ± 0.3378	-2.689	0.08

With respect to gender differences, male students in both the fourth and fifth academic stages exhibited higher mean values of plaque, gingival, and calculus indices compared with their female counterparts. The differences in the Plaque Index (PLI) and Gingival Index (GI) were statistically highly significant. (Table 3-2).

Table (3- 2): mean values and standard deviations of PLI, GI, and CI for males and females for each group.

Index	Gender		Statistic	
	Male Mean ±sd	Female Mean ±sd	T test	P value
CI	0.326 ± 1.2666	0.286 ± 0.682	1.658	0.1
GI	1.0630 ± 0.1372	0.4190 ± 0.4943	4.180	0.001
PLI	0.3254 ± 0.2556	0.1092 ± 0.1596	5.072	0.002

Males had higher mean values of plaque and gingival index with highly significant difference than females.

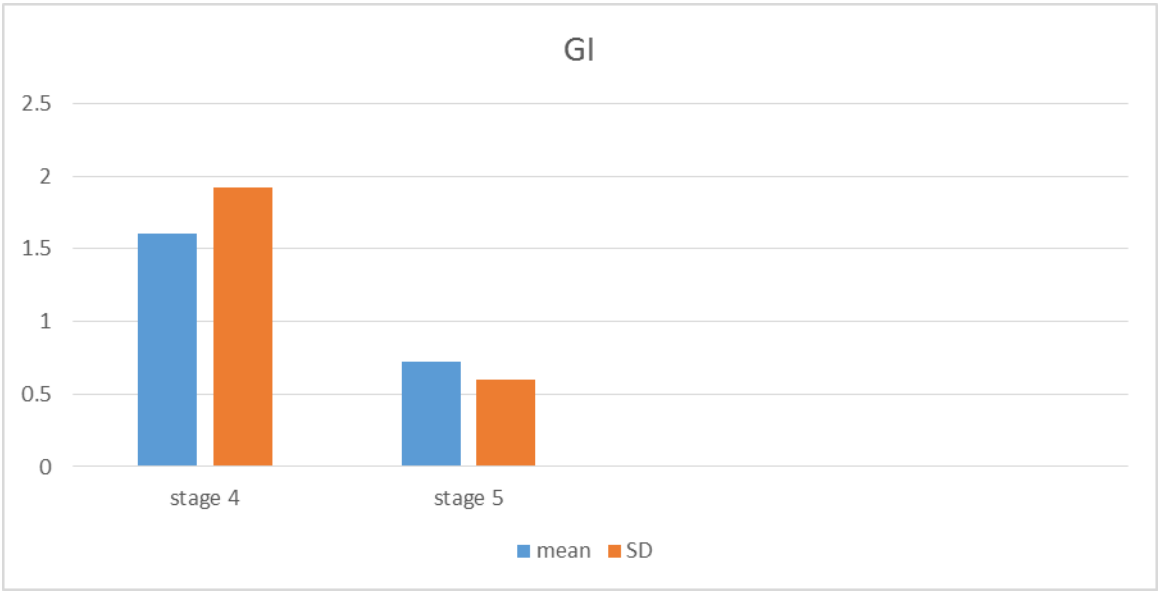

Fig (3-1) averages, dispersion, and variability of gingival index of study groups (fifth & 4th)

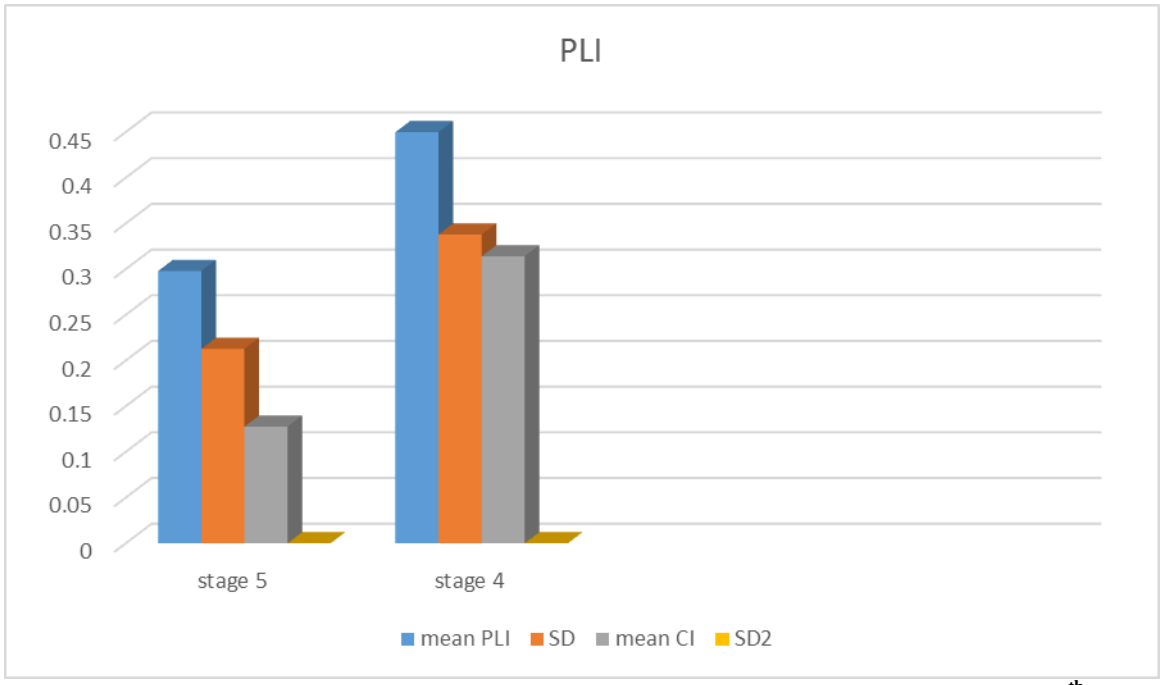

Fig (3-2) mean values and standard deviations of plaque and calculus index of (fifth & 4th)

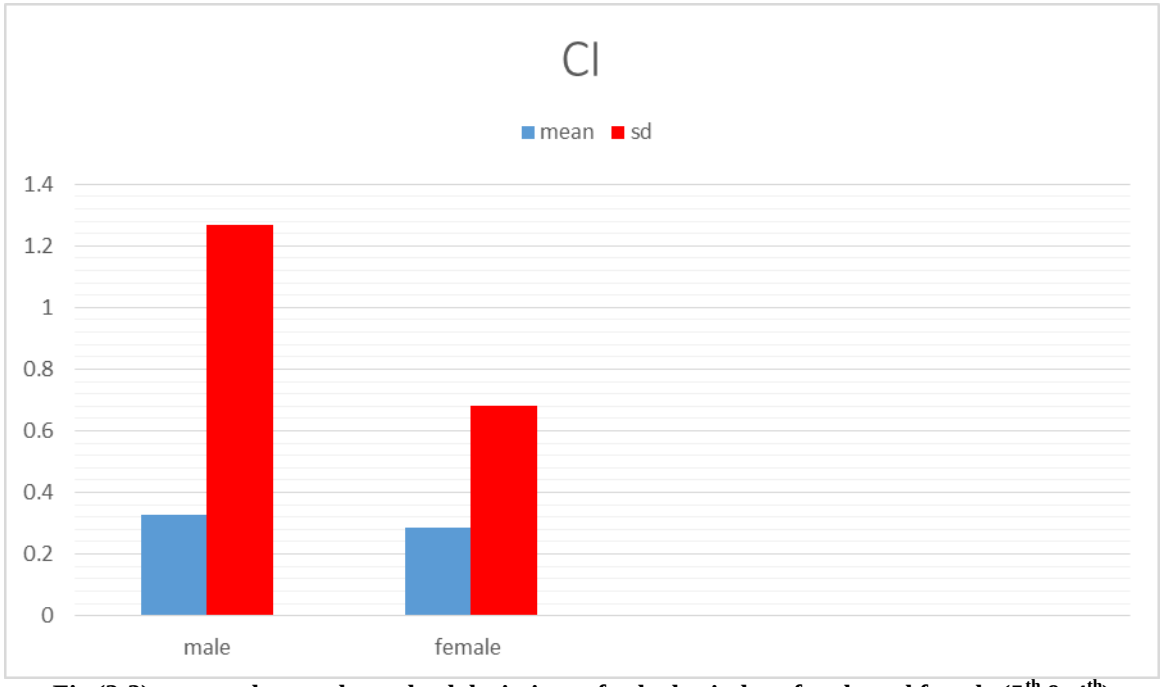

Fig (3-3) mean values and standard deviations of calculus index of male and female (5th & 4th)

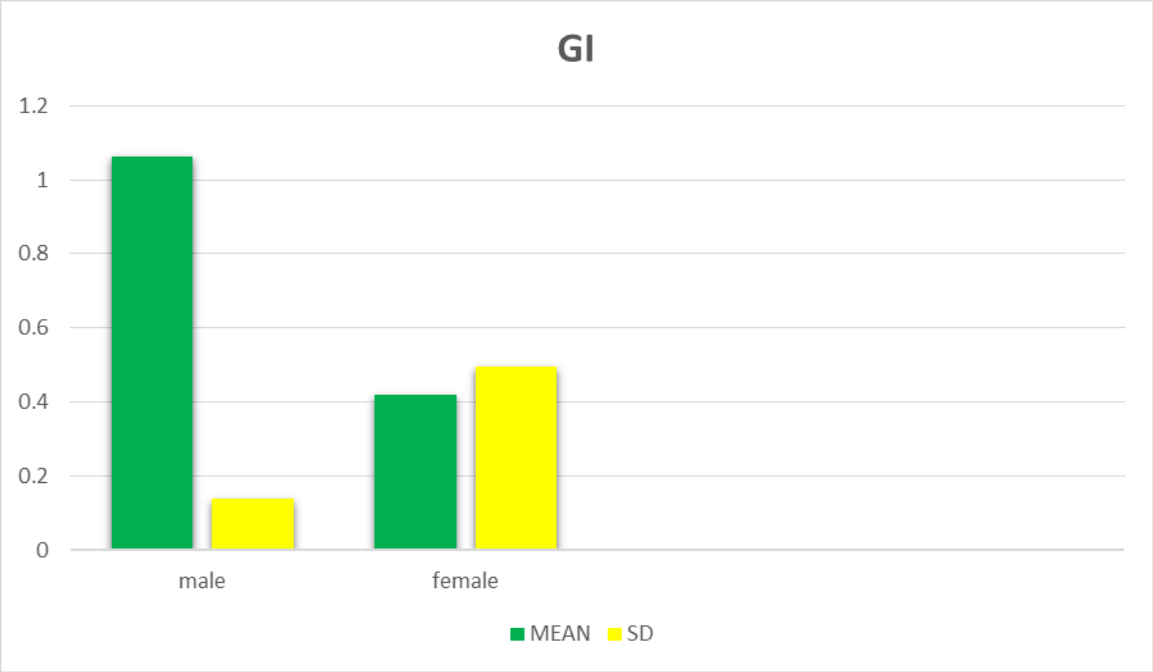

Fig (3-4) means values and standard deviations of gingival index of male and female for (fifth & 4th)

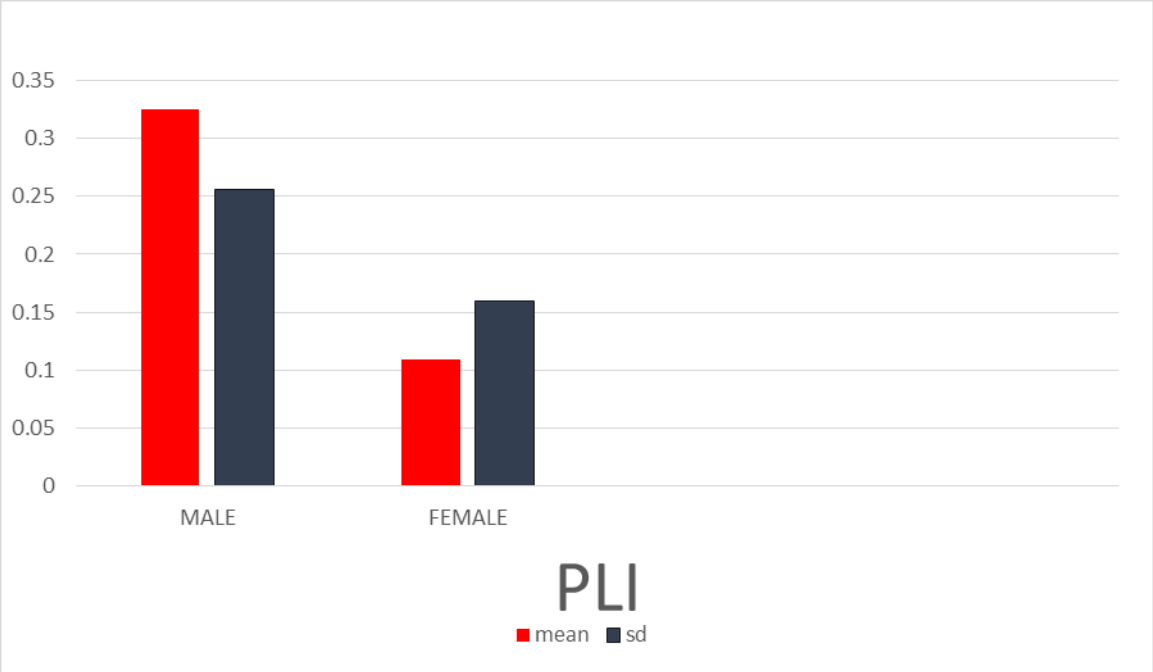

Fig (3-5) mean values and standard deviations of plaque index of male and female for (fifth & 4th)

DISCUSSION

Dental students were included in this study, and it can be claimed that the sample is accurate representation of this group, even if taking part was entirely optional. In addition, the inclusion of the Faculty of Dentistry aims to reflect the state of periodontal health through educational fields, thus evaluating the impact of university education on the periodontal health of an important section of society (university students as whole and dental students in particular).

In this study that conducted among dental students (the fourth and the fifth stage), and according to the results, it was found that the fifth stage better than oral hygiene than fourth stage and agree with previse studies.[20,21,22] In a follow-up study conducted among dental students, periodontal indices were reported to improve progressively as students advanced through their educational programs.[20] Furthermore, both oral health awareness and oral hygiene practices showed enhancement with higher academic levels.[21] Comparable findings were observed among French dental students after participation in a periodontal

course.[22] It should be noted, however, that the current study employed a cross-sectional design rather than a cohort approach, yet the conclusions drawn remain consistent and scientifically sound in this context.

Female students demonstrated noticeably superior periodontal health as contrasted with men, across all academic disciplines. Similar findings have been reported in a previous Iraqi study[23] as well as among Polish dental and medical students.[24] A possible explanation for these findings is that females tend to place greater emphasis on aesthetics and are more likely to utilize available preventive dental measures than males.[25,28] This difference may also be attributed to females' higher awareness and concern regarding oral health and appearance. The significantly higher mean plaque index observed among males could be due to their comparatively poorer oral hygiene practices, as females are generally more consistent with toothbrushing and flossing routines.[26–29] This observation might further reflect underlying sociocultural and lifestyle differences between genders. Males have been reported to exhibit a higher prevalence of periodontal disease across various races, age groups, and geographic regions. The elevated mean plaque index values among male participants in the present study are consistent with these previously reported trends. The results also showed among the fourth and fifth stages, whether males or females, as the survey result showed that, the fifth stage students in general are better than the fourth stage students.

CONCLUSIONS

The findings of this study revealed that fifth-stage dental students at Al-Kafeel University demonstrated better oral health compared to students in earlier stages. In addition, female students showed improved oral health outcomes compared to their male counterparts. These results emphasize the influence of both educational level and gender on oral health, and highlight the importance of promoting awareness and preventive practices across all groups within the academic community and beyond.

REFERENCES

1. Mahajani, M. J., Acharya, V. D., Samson, E., Chavan, A. P., Sewane, S. V., & Balagangadhartilak, P. (2016). Assessment of periodontal health status and treatment needs in rural population of the central Maharashtra: A cross sectional study. Journal of International Oral Health, 8(7): 772.
2. Fiorellini, J. P., Luan, K. W., Chang, Y. C., Kim, D. M., & Sarmiento, H. L. (2019). Peri-implant Mucosal Tissues and Inflammation: Clinical Implications. International Journal of Oral & Maxillofacial Implants, 34.
3. Mehta, P., & Lim, L. P. (2010). The width of the attached gingiva—Much ado about nothing?. Journal of dentistry, 38(7): 517-525.
4. 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.
5. Coventry, J., Griffiths, G., Scully, C. and Tonetti, M. (2000). ABC of oral health: Periodontal disease. BMJ, 321(7252): 36–39.
6. Akaji, E. A., Folaranmi, N., & Ashiwaju, O. (2014). Halitosis: a review of the literature on its prevalence, impact and control. Oral Health Prev Dent, 12(4): 297-304.
7. Batra, M., Tangade, P., & Gupta, D. (2014). Assessment of periodontal health among the rural population of Moradabad, India. Journal of Indian Association of Public Health Dentistry, 12(1): 28.
8. Sekhon, T. S., Grewal, S., & Gambhir, R. S. (2015). Periodontal health status and treatment needs of the rural population of India: A cross-sectional study. Journal of natural science, biology, and medicine, 6(1): 111.
9. Jebur, H. J. (2020). Periodontal health status and treatment needs among college students in Al Basrah governorate, Iraq: cross-sectional study (Doctoral dissertation, University of Baghdad).
10. Mariotti, A., & Hefti, A. F. (2015). Defining periodontal health. BMC Oral Health, 15(1): 1-18.
11. Saini, R., Saini, S., & Saini, S. R. (2011). Periodontitis: A risk for delivery of premature labor and low birth weight infants. Journal of natural science, biology, and medicine, 2(1): 50.
12. Sanz, M., Kornman, K., & Working Group 3 of the Joint EFP/AAP Workshop. (2013). Periodontitis and adverse pregnancy outcomes: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. Journal of periodontology, 84: S164-S169.
13. Fiorellini, J. P., Luan, K. W., Chang, Y. C., Kim, D. M., & Sarmiento, H. L. (2019). Peri-implant Mucosal Tissues and Inflammation: Clinical Implications. International Journal of Oral & Maxillofacial Implants, 34.
14. Salvi, G. E., Matarasso, M., Iorio-Siciliano, V., Blasi, A., Ramaglia, L., & Sculean, A. (2015). Enamel matrix derivative and bone grafts for periodontal regeneration of intrabony defects. A systematic review and meta-analysis. Clinical oral investigations, 19(7): 1581-1593.
15. Russell, A. L. 1956. A system of classification and scoring for prevalence surveys of PD. J Dent Res, 35(3): 350-9.
16. FDI World Dental Federation. Oral health worldwide. Geneve, Switerzland: FDI World Dental Federation, 2014.
17. Sanders AE, Slade GD, Turrell G, John Spencer A, Marcenes W. The shape of the socioeconomic-oral health gradient: implications for theoretical explanations. Community Dent Oral Epidemiol, 2006; 34: 310-19.
18. Dye BA, Selwitz RH. The relationship between selected measures of periodontal status and

demographic and behavioural risk factors. J Clin Periodontol, 2005; 32: 798-808.
19. Kumar S, Motwani K, Dak N, Balasubramanyam G, Duraiswamy P, Kulkarni S. Dental health behaviour in relation to caries status among medical and dental undergraduate students of Udaipur district, India. Int J Dent Hyg., 2010; 8: 86-94.
20. Hasan, A., & Palmer, R. M. (2014). A clinical guide to periodontology: Pathology of periodontal disease. British dental journal, 216(8): 457-461.
21. Preshaw, P. M. Jaedicke, K. M., Bissett, S. M., Finch, T., Thornton, J. (2019). Exploring changes in oral hygiene behaviour in patients with diabetes and periodontal disease: A feasibility study. International journal of dental hygiene, 17(1): 55-63.
22. Cekici, A., Kantarci, A., Hasturk, H., & Van Dyke, T. E. (2014). Inflammatory and immune pathways in the pathogenesis of periodontal disease. Periodontology, 2000; 64(1): 57-80.
23. Mohammed, Maher B., and Maha Sh Mahmood. "Assessment of dental calculus, plaque and gingivalinflammation in patients with urinary stone." *Journal of baghdad college of dentistry*, 2019; 31.1: 14-18.
24. Witthoft, M. 2013. Etiology/Pathogenesis. In: Gellman, M. D. and Turner, J. R. (eds.) Encyclopedia of Behavioral Medicine. New York, NY: Springer New York.
25. Cortellini, S., Favril, C., De Nutte, M., Teughels, W., & Quirynen, M. (2019). Patient compliance as a risk factor for the outcome of implant treatment. Periodontology, 2000; 81(1): 209-225.
26. Zini, A., Sgan-Cohen, H. D., & Marcenes, W. (2011). Socio-economic position, smoking, and plaque: a pathway to severe chronic periodontitis. Journal of clinical periodontology, 38(3): 229-235.
27. Biswas, S., Das, H., Das, U., Sengupta, A., Dey Sharma, R., Biswas, S. C., & Dey, S. (2020). Smokeless tobacco induces toxicity and apoptosis in neuronal cells: a mechanistic evaluation. Free Radical Research, 54(7): 477-496.
28. Penmetsa, G. S., & Seethalakshmi, P. (2019). Effect of stress, depression, and anxiety over periodontal health indicators among health professional students. Journal of Indian Association of Public Health Dentistry, 17(1): 36.
29. Goyal, N., Rishi, P., & Shukla, G. (2013). Lactobacillus rhamnosus GG antagonizes Giardia intestinalis induced oxidative stress and intestinal disaccharidases: an experimental study. World Journal of Microbiology and Biotechnology, 29(6): 1049-1057.