

Prevalence of Plaque Induced Gingivitis Among Dental Students in College of Dentistry, Hawler Medical University.

Zainab Salim Mahmood⁽¹⁾; Qehraman Ismayil Ahmed⁽²⁾; Ahmed Luqman Saifullah⁽²⁾

Background and objective: Gingival inflammation in response to bacterial plaque accumulation is considered the key risk factor for the onset of periodontitis. Dental students should present to patients as good role models in their oral health behavior. The study aimed to evaluate the prevalence of plaque induced gingivitis among dental students in Hawler Medical University college of dentistry.

Method: The study enrolled 120 (65 male, 55 female) dental students from different years of study including both clinical and preclinical years. Intra-oral clinical parameters including (plaque index, gingival index, bleeding on probing) were recorded to evaluate the students' periodontal health status.

Result: The participants showed that the majority of students had fair plaque scores, and significant differences in clinical periodontal parameters between different years of study ($P < 0.05$). Significant differences were found in regards to bleeding on probing between males and females. All cases of severe gingivitis recorded were males which counted 5.8%, of total cases.

Conclusion: Preclinical dental students exhibited a slightly higher (plaque index, gingival index, bleeding on probing) mean scores than clinical students, and more than half of the participants presented with gingivitis, regardless of its severity.

Key words: Plaque index, gingival index, bleeding on probing, oral health.

⁽¹⁾ Department of Periodontology, College of Dentistry, Hawler Medical University.

⁽²⁾ Undergraduate student at the College of Dentistry, Hawler Medical University.

Corresponding Name: Zainab Salim Mahmood Email: Zainabsalm87@gmail.com

INTRODUCTION

Gingivitis is a reversible type of periodontal disease in which inflammation is limited to the gingiva without further destruction of the tooth supporting components, it is considered to be the second most common and widespread oral disease after dental caries, affecting more than 75% of the world's population.¹ Clinically, in regards to the gingival index (GI) of loe and sillness,² gingival inflammation can be categorized as mild, moderate, or severe. The occurrence of these signs of inflammation is regarded as the early phase of the more severe and irreparable form of periodontal destruction as in periodontitis cases.³ A subject's susceptibility to extend gingival disease to periodontitis is incompatible

and depends on the host response towards peri pathogens.^{4,5} Bleeding on probing (BOP) represents a clinical sign often exhibited by the patient, whereas low level of BOP is consistent with self-reported perception of healthy gingival conditions. Bleeding score can be effectively used to inform and motivate the patient, in addition to monitor the efficacy of preventive and treatment strategies aimed to control periodontal diseases.⁶ Dental students' oral health knowledge, attitude, and practice are important because it affects their capacity to translate information to their patients.⁷

Several studies have evaluated the oral health practices among dental students,^{8,9,10} however, most of these studies concentrated on oral health attitudes and practice, and it was noted that the mean scores increased significantly as the dental students progressed in their educational program. Although most of these are questionnaire based studies, in this study the oral health status and the gingival condition of the dental students were examined.

This study aimed to evaluate the prevalence and assess the severity of plaque induced gingival inflammation among dental students at The college of dentistry /Hawler Medical University in Erbil city.

SUBJECTS AND METHODS

Setting and time of study. The present study was carried out in periodontics department, College of Dentistry/Hawler Medical University in Erbil city. The study was carried out from October 2022 to February 2023.

Subjects. This cross-sectional study was implemented on one hundred-twenty preclinical and clinical undergraduate dental students including dental students of second, third and fourth year of study, with ages between 19 to 22 years of both sexes. Periodontal health was defined as the complete absence of gingivitis at any site, and gingivitis was defined as inflammation of the gingiva in at least one site with an absence of clinical attachment loss.¹¹ Subjects with any systemic condition or on drugs that are known to predispose to or exaggerate gingival inflammation, students who were wearing fixed or removable prosthesis, or with orthodontic appliances, tobacco smokers, female subjects who were pregnant, students who underwent periodontal treatment in the last 3 months were not included in this study.

Clinical periodontal examination. All participants underwent a full mouth periodontal examination by clinicians using clinical periodontal parameters of chronic gingivitis, measurement of the thickness of plaque according to PI.¹² The plaque index was measured by using a straight sharp explorer for four surfaces of all the examined teeth and given a score from 0-3, the subjects plaque status was assigned as follows: good (0.1-1); fair (1.1-2); poor (2.1

-3).¹²

Measuring the extent and severity of gingival inflammation according to GI.² Inspection by naked eyes and by gentle probing through using periodontal probe for four gingival surfaces of all examined teeth and given a score from 0-3, the subjects' gingival severity was assigned as follows: no inflammation (<0.1); mild inflammation (0.1-1); moderate inflammation (1.1-2); severe inflammation (2.1-3).²

Bleeding on probing was performed by running a periodontal probe gently along soft tissue wall of the gingival crevice or pocket wall. The bleeding was noted after 30 seconds and scored as (0) if absent or (1) for the presence of bleeding. The bleeding was expressed in percent (sites positive for bleeding multiplied by 100 divided by the number of measured sites).¹³

Statistical analysis. All analyses were performed by SPSS software package (version 22; SPSS Inc., Chicago, IL, USA). Results were considered significant, if P value < 0.05, comparison between variables was obtained by Fisher exact test.

Table 1: Distribution of sample.

Year	Male	Female	Total
	No. (%)	No. (%)	No. (%)
Second	20 (31.3)	15 (27.3)	35 (29.4)
Third	20 (31.3)	21 (38.2)	41 (34.5)
Fourth	25 (37.4)	19 (34.5)	43 (36.1)
Total	65 (100)	55 (100)	120 (100)

RESULTS

A total of 120 dental students (65 males and 55 females) were enrolled in the study, where dental students of fourth year represented 36.1% of total students, as shown in (Table.1).

The majority (68.3%) of dental students had fair plaque index. A significant association was detected between plaque index and both gender and the years of study (P<0.05). As

shown in (Figure 1 and 2).

The gingival index status was mild in 67.5%, moderate in 26.7%, and severe in

5.8% of dental students. Significant association was detected between gingival index and years of the study ($P < 0.05$),

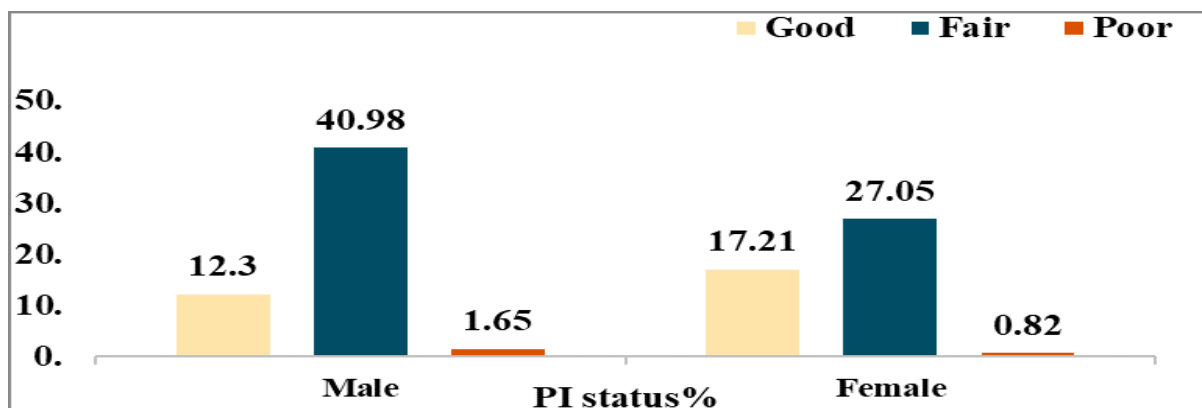


Figure 1: The association between gender and PI.

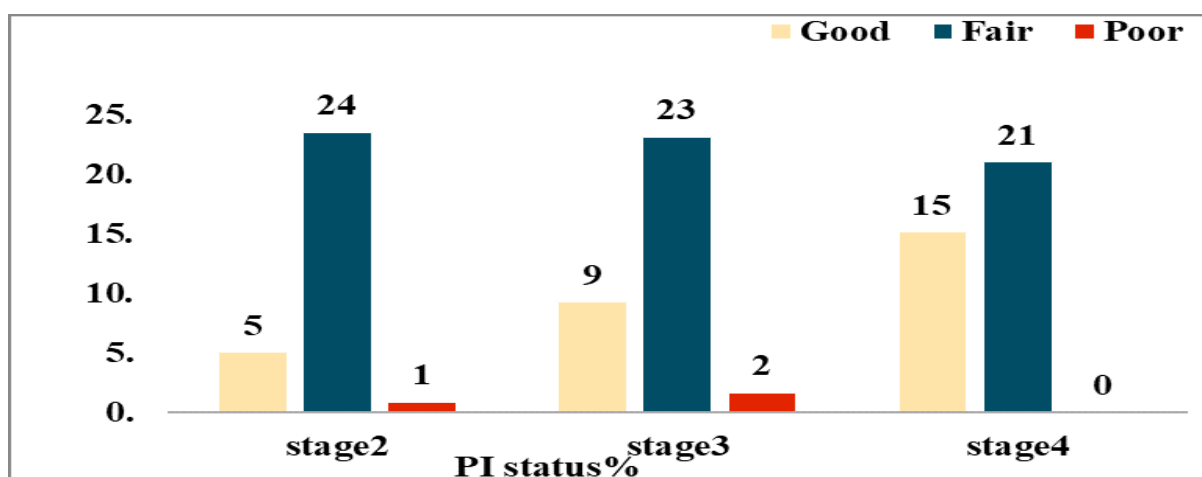


Figure 2: The association between year of study and PI.

Table 2: Association between year of the study and gender with gingival index.

	Mild	Moderate	Severe	Total	P.value
	No. (%)	No. (%)	No. (%)	No. (%)	
Year					
Second	11 (31.4%)	18 (51.4%)	6 (17.1%)	35 (100%)	
Third	31 (75.6%)	9 (22%)	1 (2.4%)	41 (100%)	0.04
Fourth	39 (90.7%)	4 (9.3%)	0 (0.0%)	43 (100%)	
Gender					
Male	39 (60.0%)	19 (29.2%)	7 (10.8%)	65 (100%)	
Female	42 (76.4%)	13 (23.6%)	0 (0.0%)	55 (100%)	0.87
Total	81 (67.5%)	32 (26.7%)	7 (5.8%)	120 (100%)	

*By Fisher's exact test.

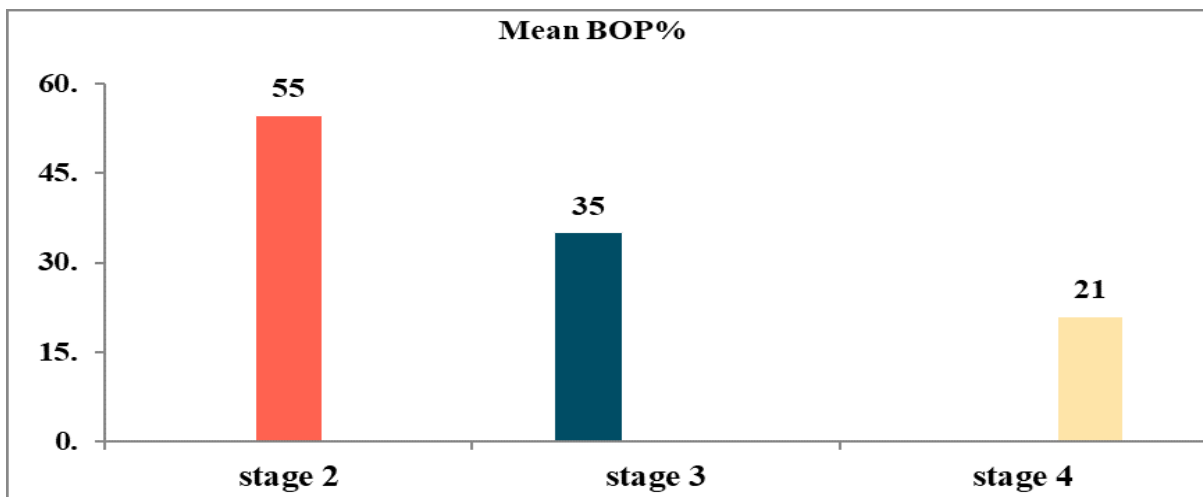


Figure 3: Year of study and BOP.

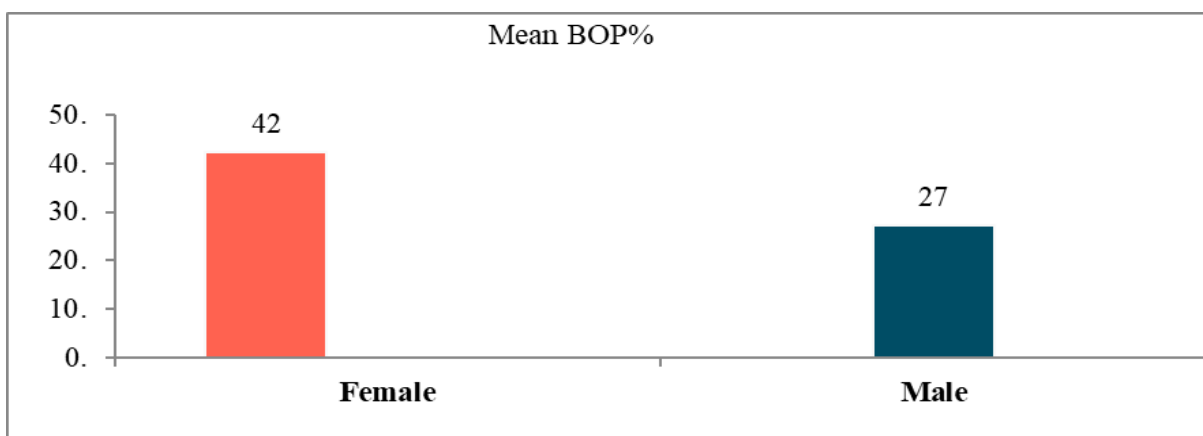


Figure 4: Gender and BOP.

DISCUSSION

Plaque induced gingivitis is an inflammation induced by the bacteria located on the gingival margin, premature alteration of the gingival health status in plaque induced gingivitis is not clinically evaluable, however, with the progression of the gingivitis clinical signs and symptoms become more evident.¹

Dental students should be sufficiently self-motivated to encourage their patients to practice good dental hygiene. In Hawler Medical University/ college of dentistry, students of fourth and fifth years come in contact with patients. This study included second, third- and fourth-year dental students among preclinical, and clinical-year undergraduate students.

This study aimed to evaluate the prevalence and severity of plaque induced gingivitis among dental students. The

results showed that more than half of the students had fair plaque score, suggesting a fair oral health status among them. There was a significant association between plaque index and both gender and years of study, females and fourth year student showed less poor plaque scores than male and preclinical students. These findings are similar to the results obtained by a study conducted on preclinical and clinical dental students and found a significant improvement in oral health.¹⁴ Although another study conducted on senior dental students showed that there was no improvement in oral hygiene and gingival health in those students.¹⁵

In regard to gingival index this study presented that the majority of students had mild gingival index, and a significant association was detected between years of study, this difference may be attributed to the personal attitude of dental students

toward their oral hygiene, enhanced by regular patient contact.

These results are in the same line with other studies.^{16,17,18} A study reported advancement in dental students' oral health awareness and attitudes among clinical year students.¹⁶ Another study also reported that dental education had a significant positive impact on the oral health and behavior improvement.¹⁷

For bleeding on probing index, the study showed that most of subjects had different percentages of BOP with the highest value found in second year students that reached 55%. These results are similar to the results of a study conducted on dental students by comparing their clinical gingival bleeding scores and self-reports and concluded that BOP was widely encountered and indicated gingival inflammation.¹⁹

Another study conducted on Iraqi dental students showed that Around 38.9% of the students revealed bleeding gingiva after brushing.²⁰

Significant difference was found between male and female according to BOP, the causes of these gender variations may be due to the fact that women before menstruation and during ovulation will have a rise in progesterone level, which in turn, prevents the reconditioning of collagen fibers leading to blood vessels widening.²¹

CONCLUSION

Dental students in Hawler Medical University had higher prevalence of gingivitis in the early stages of their dental education, although a significant improvement was detected in oral health and oral hygiene practice as the dental students progressed from preclinical years to clinical years, the scores were considerably higher than what was expected. In addition, more than half of the participants presented with gingivitis, regardless of severity. More studies with large samples size will be required to assess the prevalence of gingivitis in dental students.

REFERENCES

1. Murakami S, Mealey BL, Mariotti A, Chapple ILC. Dental plaque-induced gingival conditions. *J Periodontol* 2018; 1:17-27. DOI:10.1002/JPER.170095
2. Löe H, Silness J. Periodontal disease in pregnancy I. prevalence and severity. *Acta Odontol Scand* 1963; 21:533-51. DOI: 10.3109/00016356309011240.
3. Carvajal P, Gómez M, Gomes S, Costa R, Toledo A, Solanes F, et al. Prevalence, severity, and risk indicators of gingival inflammation in a multi-center study on South American adults: a cross sectional study. *J Appl Oral Sci*. 2016; 24 (5): 524-534. DOI:10.1590/1678-77572016178.
4. Broadbent JM, Thomson WM, Boyens JV, Poulton R. Dental plaque and oral health during the first 32 years of life. *J Am Dent Assoc*. 2011; 142(4):415-26. DOI: 10.14219/jada.archiv.2011.0197.
5. Pari A, Ilango P, Subbareddy V, Katamreddy V, Parthasarthy H. Gingival diseases in childhood—A review. *Journal of clinical and diagnostic research: JCDR*. 2014; 8(10):ZE01. DOI: 10.7860/JCDR/2014/9004.4957.
6. Trombelli L, Farina R, Silva CO, Tatakis DN. Plaque-induced gingivitis: Case definition and diagnostic considerations. *J Clin Periodontol* 2018; 45(20):44-67. DOI: 10.1111/jcpe.12939.
7. Kumar S, Motwani K, Dak N, Balasubramanyam G, Duraiswamy P, Kulkarni S. Dental health behavior in relation to caries status among medical and dental undergraduate students of Udaipur district, India. *Int J Dent Hyg*. 2010; 8(2):86-94. DOI: 10.1111/j.1601-5037.2008.00346.
8. Cortes FJ, Nevot C, Ramon JM, Cuenca E. The evolution of dental health in dental students at the University of Barcelona. *J Dent Educ*. 2002; 66(10):1203-8. DOI: 10.1002/j.0022-0337.2002.66.10.
9. Badovinac A, Božić D, Vučinac I, Vešligaj J, Vražić D, Plancak D. Oral health attitudes and behavior of dental students at the University of Zagreb, Croatia. *J Dent Educ*. 2013; 77(9):1171-8. DOI:10.1002/0022-0337.2013.77.9.
10. Hosing A, Hiremath A, Vadavadagi V, Bansal A, Kahar A. Oral Hygiene Practices in Dental Students. *J Oral Health Comm Dent* 2016; 10 (1): 30-34. DOI: 10.5005/johcd-10-1-30.
11. Wiebe CB, Putnins EE. The periodontal disease classification system of the American Academy of Periodontology—an update. *J Can Dent Assoc*. 2000; 66(11):594-9.
12. Silness J, Löe H. Periodontal disease in

- pregnancy II. Correlation between oral hygiene and periodontal condition. *Acta odontol scand.* 1964;22(1):121-35. DOI: 10.3109/00016356408993968.
13. Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. *Int Dent J.* 1975; 25(4):229-35.
 14. Lalani A, Dasar PL, Sandesh N, Mishra P, Kumar S, Balsaraf S. Assessment of relationship between oral health behavior, oral hygiene and gingival status of dental students. *Indian J Dent Res.* 2015; 26(6):592-7. DOI: 10.4103/0970-9290.176922.
 15. Tenenbaum H. Impact of a periodontal course on oral hygiene and gingival health among senior dental students. *Community Dent Oral Epidemiol.*1980;8(7):335-8. DOI: 10.1111/1600-0528.1980.
 16. Barrieshi-Nusair K, Alomari Q, Said K. Dental health attitudes and behavior among dental students in Jordan. *Community Dent Health.* 2006; 23(3):147-51.
 17. Al-Omiri MK, Barghout NH, Shaweesh AI, Malkawi Z. Level of education and gender-specific self-reported oral health behavior among dental students. *Oral Health Prev Dent.* 2012; 10(1):29-35. DOI: 10.3290/j.ohpd.a25695.
 18. Pacauskiene IM, Smailiene D, Siudikienė J, Savanevskyte J, Nedzelskiene I. Self-reported oral health behavior and attitudes of dental and technology students in Lithuania. *Stomatologija* 2014;16(2):65-71.
 19. Baser U, Germen M, Erdem Y, Issever H, Yalcin F. Evaluation of gingival bleeding awareness by comparison of self-reports and clinical measurements of freshman dental students. *Eur J Dent.* 2014; 8(3):360-365. DOI:10.4103/1305-7456.137649.
 20. Karem Hassan B, Jabbar Ali B, Mahmood Alwan A, Badeia RA. Self-reported oral health attitudes and behaviors, and gingival status of dental students. *Clin Cosmet Investig Dent.* 2020; 25:225-32. DOI: 10.2147/CCID.S249708.
 21. Al-Abdaly M, AlQahtani H, Al-Qahtani S. The Impact of Age and Gender on Severity and Types of Periodontal Diseases among Patients from Two Regions in Saudi Arabia. *Open j. stomatol.* 2019; 9:39-50. DOI: 10.4236/ojst.2019.93005.