Original article

Impact of Oral Health Knowledge and Attitude on Gingival Health Status

Nadia Rahouma* [iD]**, Raja Barioun**

Department of Periodontology, Faculty of Dentistry, University of Tripoli, Tripoli, Libya

ARTICLE INFO

ABSTRACT

*Aims. The aim of the present study is to assess the impact of oral health knowledge and attitude on gingival health status among dental students at the University of Tripoli, Libya. **Methods**. This cross-sectional study was conducted on 160 dental students, all of whom were healthy and of comparable ages. The clinical examination includes the Silness & Loe Plaque Index, 1964 for oral hygiene evaluation and the Loe & Silness Gingival Index (GI), 1967 for the severity of gingival inflammation. **Results**. The average Plaque index (PI) for the entire students was 0.86 ± 0.42, which reflects the good oral hygiene of students. The mean GI score for participants was 1.01 ± 0.50, which shows moderate gingivitis. **Conclusion**. This study emphasized the need to enhance dentistry students' oral health knowledge, attitude, and practice. Inflammation of the gingiva was quite common among dental students.*

INTRODUCTION

Health education is an aspect of health promotion and one of its roles is to provide people with information, skills, and experiences through which they can exercise a great degree of control over their own health [1]. Acquiring knowledge and attitudes of oral health and oral hygiene practices is very important during dentists' training period. One of the main objectives of dental education is to train students who can motivate patients to adopt good oral hygiene. The students would be able to do this if they themselves were motivated [2,3]. Overall, it has been demonstrated that dental students exhibit positive behavior and attitudes toward oral health [4]. There are disagreements among researchers reporting on how education affects dental students' attitudes, behaviors, and oral hygiene [2]. However, dental students often have more positive attitudes and understanding of oral health than other university students, such as those studying medicine, pharmacy, and nursing [5].

Periodontal health, as defined by the new classification, is the absence of clinically evident inflammation. Clinical healthy gingiva can be found in an intact periodontium (there is no clinical attachment loss or bone loss), as well as in a reduced periodontium in either a non-periodontitis patient (such as a patient with gingival recession) or in a periodontitis patient who is now periodontally stable [6,7]. The absence of bleeding on probing, erythema, and edema, as well as patient complaints, characterizes clinically healthy gingiva.

Clinical healthy gingiva is defined as bleeding sites of 10% with probing depths ≤ 3 mm for an intact periodontium, a reduced and stable periodontium [7]. Plaque-induced gingivitis, a nonspecific inflammatory reaction to dental plaque biofilm. While the disease is reversible in nature, it can progress in susceptible hosts into periodontitis, which is characterized by irreversible loss of periodontal attachment. Therefore, early intervention to improve oral hygiene and reduce gingivitis is an important approach to prevent periodontitis [8].

Dental plaque is an initiator factor of periodontal diseases. An uncontrolled accumulation of dental plaque on the gingival third of the teeth induces an inflammatory response that is associated with gingivitis and periodontitis [9]. The

oral hygiene practice can be described as any effort that has been performed by the individual in order to remove the supragingival plaque [10].

Several studies have shown that poor oral hygiene leads to gingival inflammation and hence establish a linear relationship between plaque development and the presence of gingivitis, which further had been linked to the development of periodontitis [11]. Hence, the primary aim of this study was to relate oral health knowledge with oral hygiene practice and the gingival health status among undergraduate dental students.

METHODS

Study Design and Data Collection

This cross-sectional study was conducted among the final-year dental students who were enrolled at the University of Tripoli during the academic year 2021/2022. The Ethical clearance for the study was obtained from the Faculty of Dentistry, Tripoli University dated 24/10/2022 before commencing the study.

The participant students were explained about the objectives of the study and informed consent was obtained from each participant. The study was conducted during the period from October 2022 to February 2023. The sample consisted of 160 dental students, all of comparable ages and good health. Subject name, gender, and age were recorded on the consent form, which was signed by the student.

The clinical examination was performed by two dental surgeons including the Silness & Loe Plaque Index, 1964 for oral hygiene evaluation and the Loe & Silness Gingival Index (GI), 1967 for the severity of gingival inflammation. The PLI and GI were calculated based on the Ramfjord teeth index (teeth number: 16, 21, 24, 36, 41, 44). The four surfaces examined for each tooth, i.e., the distal-facial, facial, mesial - facial and lingual surfaces. Unlike the buccal (facial) surface, the lingual surface was considered as 1 unit.

The plaque index measures the plaque thickness on the four surfaces of the tooth (distal, facial or buccal, mesial, and lingual). Every tooth was examined using a mirror, and proper lighting, and an explorer passed over the gingival third to test for the presence of plaque.

Plaque Index (PI) [12]:

0: No plaque; 1: Thin layer of plaque at the gingival margin, only detected on the tip of the probe when scraping the gingival third of the tooth; 2: Moderate amount of plaque at the margin of gingiva; interdental space free, but the deposit is visible to the unaided eye; 3: Heavy plaque along the margin of the gingiva, the interdental area is stuffed with plaque. The patients were classified as having excellent oral hygiene if PLI = 0. Good oral hygiene if PLI = 0.1-0.9. Fair oral hygiene if PLI = 1.0-1.9. Poor oral hygiene if PLI =2.0-3.0.

Gingival index (GI) [13]:

0 = no sign of inflammation; 1 = inflammation slight (slight change in color, slight edema); 2 = moderate inflammation (redness, edema, hyperplasia, and bleeding on probing); 3 = severe inflammation (redness, swelling, ulceration, and spontaneous bleeding tendency). The patients were classified as having healthy gingiva if their GI score was <0.1. Mild gingivitis was diagnosed if GI = 0.1—1, whereas moderate gingivitis was identified with GI = 1.1—2. Individuals with GI = 2.1—3 was categorized as subjects with severe gingivitis.

Data management and statistical analysis

Developed data entry format then computerized analysis was performed by statistical package for social science (SPSS) software version. Simple descriptive statistics were used (mean ± standard deviation for quantitative variables, and frequency with percentage for categorized variables.

RESULTS

Demographic characteristics of studied group

Gender

At the end of the survey, a total of 160 medical students had taken part in this study. Of the 160 students, most were female (115, 71.9%), and forty-five (11.2%) were male.

Table 1. Distribution of students according to gender

Variable	Frequency	Percentage
Male	45	28.1%
Female	115	71.9%
Total	98	100%

Clinical measurements (periodontal parameters)
Plaque index (PI)

The results, as shown in Table 2, indicate that the average Plaque index (PI) for the entire students was 0.86 ± 0.42, which reflects the good oral hygiene of students. Ninety-two students (57.5%) had a PI score equivalent to less than 1, which replicates good oral hygiene of students, whereas, 68(42.5%) had a PI score equivalent to fair oral hygiene of students.
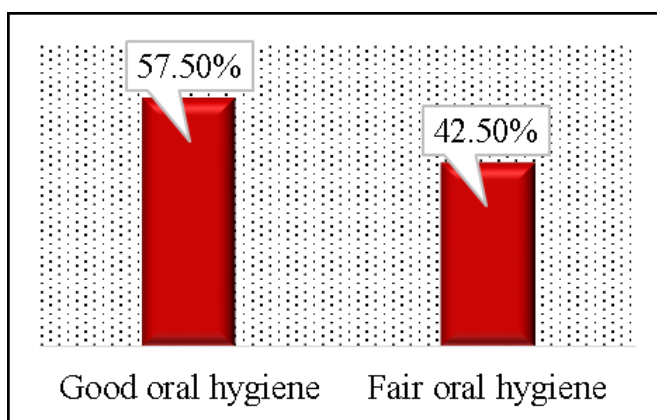

Figure 1. Plaque index (PI) of students

Gingival index (GI)

The consequence of this study revealed that 97.8% of all students presented with a variety of inflammation signs. The mean GI score for participants was 1.01 ± 0.50, which shows moderate gingivitis. 81 of the students (50.6%) had moderate gingivitis, 74 students (46.3%) had a mild degree of gingivitis, and only five students (3.1%) had healthy gingivitis.
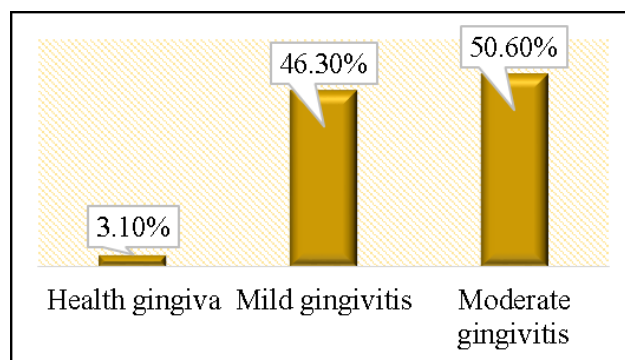

Figure 2. Gingival index

DISCUSSION

Gingivitis is a reversible gingival disease and can be resolved by removing the dental plaque biofilm every day. It is necessary to prevent and treat gingival inflammation, through maintaining good oral hygiene. Several studies have reported a close relationship between the incidence of gingivitis and poor oral hygiene [14].

Dental plaque control is considered a preventive approach to removing dental plaque biofilm and preventing it from accumulating to maintain good oral hygiene [15]. Dental plaque control is included in the curriculum of students in the 4th (final) year at the University of Tripoli. The oral hygiene index of 92% of the dental students in this study was good. This agrees with several studies performed in Arabic countries using the Hiroshima University Dental Behavioral Inventory (HU-DBI) where the clinical students (final year) had higher HU-DBI scores than the preclinical students [16]. Future providers of oral healthcare are dental students. They should be sufficiently self-motivated to encourage their patients to practice proper dental hygiene. When patients are inspired by students who cannot practice adequate personal oral hygiene, it is impossible to expect a change in their oral hygiene [17].

In the present study, the severity of gingival inflammation in the dental students was high, the mean GI score was 1.01,

and this result agrees with a study done in dental students of Riyadh Elm University where the mean GI was 1.16 [18]. Kalevski et al [19], and Tenenbaum et al [20], reported that the improvement of oral hygiene or gingival health was unsatisfactory after an educational program. Furthermore, deterioration in the gingival status and oral hygiene occurred in the senior 5th year in a study conducted by Lang et al [21]. The deterioration in the gingival health status of dental students may be due to the stress of the final graduation exams.

Stress has a negative impact on oral hygiene levels and the gingival health status of students and is a modifying factor for plaque-induced diseases. This is consistent with the findings of the Ravishankar et al study [22]. To the best of the authors' knowledge, this study is the first to provide evidence on the oral hygiene and gingival status of dental students (final year) at the University of Tripoli-Libya, through a clinical examination. The limitation of this study is the unbalanced distribution between females/males and there is no comparison preclinical group or students from other colleagues.

CONCLUSION

The oral hygiene index score of the dental students was good but an excellent oral hygiene index was not found. The status of the gingiva was not satisfactory. To enhance oral health knowledge and practice it is better to incorporate an oral health educational undergraduate training program for dental students.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

REFERENCES

1. Jawad K, Azeez R, Impact of dental study on oral health behavior, oral hygiene and gingival health status of Iraqi dental students. Mustansiria Dental Journal 2006;3(3):277-282.
2. Rahman B, Kawas SA. The relationship between dental health behavior, oral hygiene and gingival status of dental students in the United Arab Emirates. Eur J Dent. 2013 Jan; 7(1):22-7.
3. Lalani A, Dasar PL, Sandesh N, Mishra P, Kumar S, Balsaraf S. Assessment of the relationship between oral health behavior, oral hygiene and gingival status of dental students. Indian J Dent Res 2015; 26: 592-7.
4. Kalevski K, Vojinovic J, Gajic M, Aleksic E, Tambur Z, Milutinovic J, et al. The Outcomes of an Interventional Oral Health Program on Dental Students' Oral Hygiene. Int. J. Environ. Res. Public Health. 2021;18:132-142.
5. Riad A, Buchbender M, Howaldt H-P, Klugar M, Krsek M, Attia S. Oral Health Knowledge, Attitudes, and Behaviors (KAB) of German Dental Students: Descriptive Cross-Sectional Study. Front Med. 2022;9:852660.
6. Suvan JE, Sabali M, Araújo M, Ramseier C. Behavioral strategies for periodontal health. Periodontology 2000. 2022; 90: 247–261.
7. Chapple ILC, Mealey BL, Van Dyke TE, Bartold PM, Dommisch H, Eickholz P, et al. Periodontal health and gingival diseases and conditions on an intact and a reduced periodontium: Consensus report of workgroup 1 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. J Periodontol. 2018 Jun;89 Suppl 1:S74-S84.
8. Al-Haddad K, Ibrahim Y, Al-Haddad A, Al-Hebshi N. Assessment of Gingival Health Status among 5- and 12-Year-Old Children in Yemen: A Cross-Sectional Study. International Scholarly Research Notices. 2013:352621;1-7.
9. Sreenivasan P, Prasad K, Javali S. Oral health practices and prevalence of dental plaque and gingivitis among Indian adults. Clin Exp Dent Res. 2016 Jan 28; 2(1):6-17.
10. Beyene D, Shashamo B, Digesa L, Tariku E. Oral Hygiene Practices and Associated Factors among Patients Visiting Private Dental Clinics at Hawassa City, Southern Ethiopia, 2018. International Journal of Dentistry. 2021:8868308.
11. Panguluri T, Gadhvi A, Mannepula S, Patel C, Takkalapelly D, Ngjelo A. The Effect of Oral Health Knowledge, Attitude and Practice on Periodontal Status among Dental Students. Saudi J Med. March 2020; 5(3):159-162.
12. Löe H. The gingival index, the plaque index, and the retention index system. J Periodontal 1967; 38:610-616.
13. Kane AST, Niang A, Mariko D, Djire H, Diawara O, Ba B.et al., Prevalence of Gingivitis among Malian Children. Pesq Bras Odontoped Clin Integr 2018, 18(1):4129.
14. Newman M, Takei H, Klokkevold P, Carranza F. Newman, and Carranza's Clinical Periodontology. 13th ed. Elsevier Health Sciences. 2018.
15. Vyas T, Bhatt G, Gaur A, Sharma C, Sharma A, Nagi R. Chemical plaque control - A brief review. J Family Med Prim Care. 2021 Apr;10(4): 1562–1568.
16. Riad A, Al-Khanati N, Issa J, Zenati M, Abdesslem NB, Attia S, et al. Oral Health-Related Knowledge, Attitudes and Behaviours of Arab Dental Students: Multi-National Cross-Sectional Study and Literature Analysis 2000–2020. Int J Environ Res Public Health 2022, 19, 1658.
17. Ahmad F, Alotaibi M, Baseer M, Shafshak S. The Effect of Oral Health Knowledge, Attitude, and Practice on Periodontal Status among Dental Students. Eur J Dent 2019 Jul; 13(3):437-443

18. Kalevski K, Vojinovic J, Gajic M, Aleksic E, Tambur Z, Milutinovic J. et al. The Outcomes of an Interventional Oral Health Program on Dental Students' Oral Hygiene. Int J Environ Res Public Health. 2021 Dec 15; 18(24):13242.
19. Tenenbaum H. Impact of a periodontal course on oral hygiene and gingival health among senior dental students. Community Dent Oral Epidemiol. 1980 Oct; 8 (7):335-8.
20. Lang NP, Cumming B R, Löe H A. Oral hygiene and gingival health in Danish dental students and faculty Community Dent Oral Epidemiol. 1977 Sep;5(5):237-42.
21. Tangade P, Mathur A, Gupta R, Chaudhary S. Assessment of stress level among dental school students: an Indian outlook. Dent Res J (Isfahan) 2011; 8(2):95–101.
22. Ravishankar TL, Ain TS, Gowhar O. Effect of academic stress on plaque and gingival health among dental students of Moradabad, India. J Int Acad Periodontol. 2014 Oct; 16(4):115-20.

تأثير المعرفة والمواقف المتعلقة بصحة الفم على الحالة الصحية للثة

نادية رحومة، رجاء باريون

قسم أمراض اللثة، كلية طب الأسنان، جامعة طرابلس، طرابلس، ليبيا

المستخلص

الأهداف. الهدف من هذه الدراسة هو تقييم تأثير المعرفة والاتجاهات المتعلقة بصحة الفم على الحالة الصحية للثة لدى طلاب طب الأسنان في جامعة طرابلس، ليبيا. **طُرق الدراسة**. أجريت هذه الدراسة المقطعية على 160 طالبًا في طب الأسنان، وكان جميعهم يتمتعون بصحة جيدة ومن نفس الأعمار. يتضمن الفحص السريري مؤشر Silness & Loe Plaque لعام 1964 لتقييم نظافة الفم ومؤشر Loe & Silness Gingival Index (GI) لعام 1967 لشدة التهاب اللثة. **النتائج**. كان متوسط مؤشر البلاك (PI) لجميع الطلاب 0.86 ± 0.42، وهو ما يعكس نظافة الفم الجيدة للطلاب. كان متوسط درجة مؤشر اللثة (GI) للمشاركين 1.01 ± 0.50، مما يدل على التهاب اللثة المعتدل. **الخاتمة**. أكدت هذه الدراسة على الحاجة إلى تعزيز المعرفة والمواقف والممارسة في مجال صحة الفم لدى طلاب طب الأسنان. كان التهاب اللثة شائعًا جدًا بين طلاب طب الأسنان.

الكلمات الدالة. المعرفة بصحة الفم، نظافة الفم، حالة اللثة، طلاب طب الأسنان.