

Evaluation Of Oral Hygiene Practices And Effect Of Educational Intervention On Undergraduate Dental Students - A Quasi Experimental Study

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Abstract:

Background: Oral hygiene is central to oral health, it controls dental plaque, the primary etiological factor for most oral diseases. Effective oral hygiene prevents disease, maintains healthy oral tissues, ensures success of dental treatments, and contributes to overall well-being

Materials and Methods: This experimental study was conducted on 60 1st year BDS students to evaluate the effect of educational intervention using Pre and Post questionnaire and clinical examination over a period of 3 months

Results: This study shows that the educational intervention, the decayed (D) score slightly decreased, the missing (M) component remained unchanged, and the filled (F) component increased significantly ($p = 0.033$). The overall DMFT score showed a minimal, non-significant reduction ($p = 0.568$). However, oral hygiene improved significantly.

Conclusion: The study findings indicate that oral health education significantly improved oral hygiene practices and gingival health among undergraduate dental students.

Key Word: health education, intervention program, oral health, oral hygiene

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I. Introduction

Oral health is regarded as a component of general health and the quality of life is influenced by it.¹ Dental students must maintain excellent oral hygiene as they serve as role models for their patients and the community. Good personal oral health enhances professional credibility and reinforces patient trust and compliance. Their habits directly influence how effectively they can promote and practice preventive dentistry.¹ A primary goal of health education is the training of dental students to motivate patients towards good oral hygiene, which is more likely when the students themselves are motivated and practice proper oral care.¹ An important role in oral health education at the individual and community levels can be played by dental health professionals; however, before such a role is undertaken, the level of their own knowledge, attitude, and behavior toward oral health must be assessed.² This study was conducted to evaluate the improvement of oral hygiene of first year dental students during their academic training.³ Considerable differences in dental health attitudes and behaviors were observed among students.⁴ Oral health does not receive the level of attention it deserves, and this lack of emphasis increases the risk of developing oral diseases.⁵ Awareness and understanding of oral health serve as essential foundations for cultivating positive health behaviors.⁵ Preventive strategies are broadly accepted as the most reliable and cost-effective approach to maintaining optimal oral health.⁵ In recent years, oral health has gained recognition as an integral component of overall systemic health. Effective oral health instructions help reduce the emergence of risk factors by promoting proper hygiene practices, healthier dietary habits, and regular dental visits, while also enabling early identification and interception of high-risk behaviors such as smoking, tobacco use, and alcohol consumption, thereby preventing the onset and progression of oral diseases and long-term conditions such as oral cancer. Although studies indicate that knowledge by itself may not necessarily lead to behavioral modification, which plays a crucial role in influencing attitudes and supporting better oral health outcomes.⁵ The findings of this study emphasize the necessity of enhancing dental students' knowledge, attitudes, and practices related to oral health.⁶ The primary causes of dental caries include inadequate oral hygiene practices, frequent consumption of

carbohydrate-rich and highly processed foods, and the failure to seek regular preventive care and routine dental check-ups.⁷ This study aims to evaluate the oral health knowledge, attitudes, and behaviors of undergraduate dental students and the improvement of oral hygiene after comprehensive instruction on oral health and hygiene.⁸ Their attitudes demonstrate their awareness of the significance of disease prevention and their commitment to enhancing their patients' oral health.⁹ Their personal oral health behaviors can act as influential role models for their patients, families, and peers.⁹

II. Material And Methods

Study Design: This quasi - experimental study was conducted on 60 first-year dental students in the age group of 17–25 years. Out of 100, 40 students were excluded if they had history of allergies or hypersensitivity, had any systemic illness, were taking any medication, were undergoing orthodontic treatment or were unwilling to participate in this study. Written informed consent was obtained from all participants before their inclusion in the study.

Sample size calculation: The sample size for the present study was calculated based on the primary outcome variable (oral hygiene indices) using data from previously published literature. Assuming a confidence level of 95% and a statistical power of 80%, the minimum required sample size was determined to detect a clinically significant difference in mean scores before and after the intervention. The effect size was estimated from earlier studies with similar methodology. The calculation was performed using standard sample size formulae for comparison of means:

$$n = \frac{2\sigma^2(Z_{\alpha/2} + Z_{\beta})^2}{d^2}$$

The initial estimated sample size was approximately 44 participants. To account for potential attrition and incomplete data, an additional 20% was included. Thus, the final sample size was rounded to 60 participants.

Study procedure: The research preparations and the study were carried out in two stages

Stage 1

The first stage was conducted before the health education intervention, on 15th - 20th January 2026, during which a dental examination was carried out and the level of oral hygiene was assessed. A research record of the oral health (oral hygiene) condition of the respondents was prepared in accordance with the parameters recommended by the World Health Organization. For the evaluation of selected oral health parameters, the DMF index was used to determine the total number of decayed, missing, and filled teeth. The condition of oral hygiene was assessed using the Silness–Løe plaque index. Additionally, the condition of the gingiva was evaluated using the Silness–Løe gingival index. Oral hygiene was assessed using basic dental instruments, including dental probe, mouth mirror, periodontal probe under artificial light in a clinical setting of the Department of Public Health Dentistry.

A pre validated questionnaire² was used for the evaluation of the oral health knowledge, attitudes, and behaviors of the students. Behavior or practices of the students towards oral health maintenance: This section includes questions related to the behaviors and practices adopted by the students for maintaining oral health. It contains multiple- choice as well as yes/no type questions. For scoring purposes, each correct response was assigned a score of one. In the case of yes/no questions, a score of one was given for “yes” responses, while for the questions marked as (N), a score of one was assigned to the response “no.”

The educational program designed for this study focused on key areas including the significance of oral health, proper oral hygiene practices, and the development of healthy habits the intervention was delivered through group-based educational session, which included a lecture, demonstrations, and interactive activities to enhance understanding and participation. Educational aids such as: visual materials, audio-visual presentations and dental demonstration models were utilized during the sessions. The topics addressed in the program included the importance of maintaining good oral health, the relationship between oral and general health, prevention of oral diseases, and the need for regular dental visits. Key concepts such as dental plaque, dental caries, gingivitis, calculus, periodontal diseases, oral hygiene practices, and oral hygiene aids were also explained. In addition, participants were instructed on the proper use of oral hygiene aids, including dental floss, floss holders, interdental brushes, and mouth rinses.

Stage 2: The post instruction examination was conducted after a gap of two months between the initial assessment and the final assessment on the 16th- 20th March 2026. The same validated questionnaire² was re-administered post intervention to evaluate the improvement in oral health knowledge, attitudes, and hygiene practices among the participants. This served as a tool to assess the effectiveness of the intervention in enhancing awareness and

promoting positive behavioral changes. The responses obtained provided valuable insights into the extent of knowledge gained and the adoption of improved oral hygiene practices.

Statistical analysis: Statistical analysis was done with Statistical Package for Social Sciences (IBM SPSS Statistic for window, version 26.0. Armonk, NY: IBM Corp.) at 95% CI and 80% power to the study. Kolmogorov-Smirnov and Shapiro Wilk test was done to check for normal distribution of the data. Descriptive statistics was performed in terms of Mean, Std Deviation, Frequency and percentage. Paired t test was applied to compare DMFT, PI and GI scores between Pre and Post instructions Chi Square / Fisher’s exact test was applied to compare the qualitative data. Statistical significance was calculated at $p < 0.05$ and $p < 0.001$ was considered statistically highly significant.

III. Result

The present study included 60 undergraduate dental students with a mean age of 19.50 ± 1.26 years, of which the majority were females (81.7%). The baseline findings indicated suboptimal oral hygiene practices among participants. Following the educational intervention, there was a slight reduction in the mean decayed (D) score and no change in the missing (M) component, while the filled (F) component showed a statistically significant increase ($p = 0.033$). However, the overall DMFT score demonstrated only a minimal, non-significant reduction ($p = 0.568$) (Table 1). In contrast, a marked and statistically highly significant improvement was observed in oral hygiene status, with the Plaque Index (PI) decreasing from 1.57 ± 0.77 to 0.85 ± 0.48 and the Gingival Index (GI) reducing from 1.71 ± 0.82 to 0.86 ± 0.50 ($p < 0.001$) (Table 2), indicating a substantial improvement in plaque control and gingival health following the intervention. The mean Plaque Index (PI) score significantly reduced from 1.57 ± 0.77 (pre-instructions) to 0.85 ± 0.48 (post-instructions), with the difference being highly statistically significant ($p < 0.001$). (Fig 1) Similarly, the mean Gingival Index (GI) score decreased significantly from 1.71 ± 0.82 (pre-instructions) to 0.86 ± 0.50 (post-instructions), which was also highly statistically significant ($p < 0.001$). (Fig2)

Table 1: Mean D, M, F Score Pre and Post intervention among study population

		Mean	N	Std. Deviation	P value
D	Pre Intervention	2.23	60	2.29	0.21
	Post Intervention	2.16	60	2.31	
M	Pre Intervention	0.03 ^a	60	0.18	-
	Post Intervention	0.03 ^a	60	0.18	
F	Pre Intervention	0.41	60	1.64	0.03
	Post Intervention	0.51	60	1.68	
DMFT	Pre Intervention	2.68	60	2.65	0.56
	Post Intervention	2.66	60	2.69	

Table 2: Mean PI and GI Score Pre and Post Instructions among study population

		Mean	N	Std. Deviation	Std. Error Mean
PI	Pre Intervention	1.56	60	0.76	<0.001
	Post Intervention	0.84	60	0.47	
GI	Pre Intervention	1.70	60	0.82	<0.001
	Post Intervention	0.86	60	0.49	

Figure 1: Pre and post intervention Plaque index scores of study population

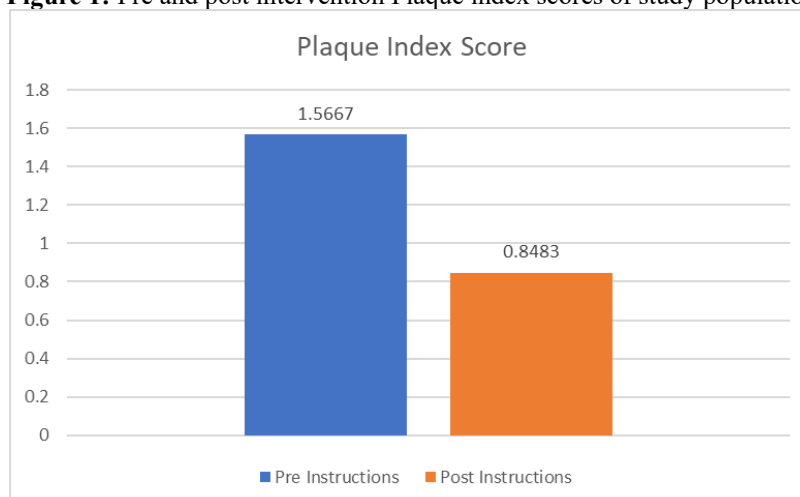
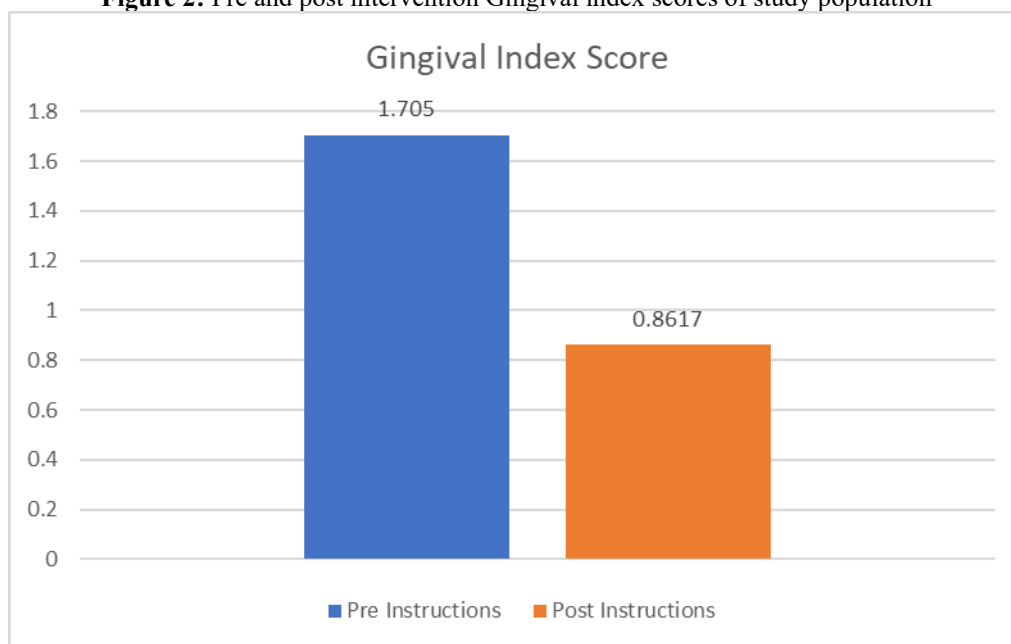


Figure 2: Pre and post intervention Gingival index scores of study population



IV. Discussion

The present study evaluated the effect of an oral health education intervention among 60 undergraduate dental students and demonstrated significant improvement in oral hygiene status after the program. A marked reduction was observed in Plaque Index and Gingival Index scores, indicating better plaque control and gingival health following the intervention. These findings are in agreement with Kalevski et al.¹ who reported that interventional oral health programs positively influenced dental students' oral hygiene practices and clinical oral health outcomes. Similarly, their later study also emphasized that health education programs are effective in changing the attitudes and behaviors of dental students toward oral health maintenance.⁵ In the present study, the majority of participants were females (81.7%) with a mean age of 19.50 ± 1.26 years. Although demographic variables were not the primary focus, the improvements observed after the intervention were consistent across participants. Ahmed et al.² found that both preclinical and clinical dental students showed progressive improvement in oral health knowledge, attitude, and behavior with advancing academic years, suggesting that professional education itself contributes positively to oral health awareness. The significant reduction in plaque and gingival inflammation in the current study is also supported by Ahmad et al.⁶, who demonstrated that better oral health knowledge, attitude, and practice were strongly associated with improved periodontal status among dental students. This highlights the close relationship between oral health awareness and actual clinical oral hygiene outcomes.

However, despite the positive changes in oral hygiene indices, the present study showed only a minimal and statistically non-significant reduction in DMFT scores. This finding is expected, as DMFT reflects cumulative dental caries experience and is less likely to change over a short intervention period. Similar observations were reported by Cortes et al.³ and Dabrowska et al.⁷, who noted that caries experience among dental students reflects long-term oral health behavior rather than short-term educational improvements. The present findings also support studies comparing oral self-care behaviors among dental students from different populations. Polychronopoulou and Kawamura⁴ found that oral self-care practices varied among students depending on educational background and motivation, emphasizing the need for continuous reinforcement. Likewise, Kim et al.⁹ reported that oral health attitudes and gingival self-care behavior among dental students were associated with better gingival health outcomes. Although improvement was observed after the intervention, some students still did not achieve ideal oral hygiene levels. This suggests that a single short-term educational intervention may not be sufficient to establish permanent behavioral change. Continuous oral health education, reinforcement sessions, regular dental check-ups, and preventive motivation should therefore be integrated into the dental curriculum from the early academic years. As future oral health professionals, dental students are expected to act as role models for patients and the community.

The limitations of the present study include a relatively small sample size and short follow-up duration, which may limit the generalizability of findings and the ability to assess long-term effects. Future studies with larger samples, multicenter participation, and longer follow-up periods are recommended.

Overall, the present study confirms that structured oral health education interventions are effective in improving short-term oral hygiene behavior and gingival health among dental students, while long-term outcomes such as dental caries require sustained preventive efforts.

V. Conclusion

The findings of this study suggest that oral health education interventions have a significant positive impact on improving oral hygiene practices and gingival health among undergraduate dental students. While changes in DMFT scores were not statistically significant over the short duration, the significant reduction in plaque accumulation and gingival inflammation highlights the effectiveness of structured educational programs in promoting better oral hygiene behavior. Therefore, incorporating regular and comprehensive oral health education into the dental curriculum is essential for fostering long-term healthy habits and preparing students to serve as effective role models and oral health promoters in the community.

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