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ASSESSMENT OF ORAL HYGIENE KNOWLEDGE AND PRACTICES AMONG FIRST-YEAR BACHELOR OF DENTAL SURGERY STUDENTS: ACROSS-SECTIONAL STUDY

(*Original Research*)

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Abstract

Background: Oral hygiene is fundamental to preventing dental caries, periodontal disease, and other oral conditions, yet personal practices among dental students—the future oral health educators—may not fully reflect their theoretical knowledge. Evaluating baseline understanding and daily behaviors in early training provides critical insights for curriculum development.

Objective: To assess baseline oral hygiene knowledge and daily practices among first-year Bachelor of Dental Surgery (BDS) students.

Methods: A four-month cross-sectional study was conducted among 120 first-year BDS students in Lahore, Pakistan. A validated, self-administered questionnaire assessed demographics, oral hygiene knowledge (maximum score 15), and daily practices (maximum score 10). Descriptive statistics summarized the data, and independent t-tests, one-way ANOVA, and Pearson correlation were applied using SPSS version 26. Ethical approval (IRB/2025/09-LHR) and informed consent were obtained.

Results: The mean age of participants was 19.2 ± 0.8 years, with 55% females and 70.8% urban residents. The mean knowledge score was 10.9 ± 2.0, and the mean practice score was 7.0 ± 1.8. Ninety-two percent correctly identified brushing twice daily as recommended, while only 54% reported regular flossing. Urban students demonstrated slightly higher practice scores (7.3 ± 1.7) than rural peers (6.7 ± 1.8). No significant correlation was observed between knowledge and practice scores ($r = –0.05$, $p>0.05$).

Conclusion: First-year dental students exhibited satisfactory oral hygiene knowledge but inconsistent application in daily self-care. Early, behavior-focused interventions in dental curricula are essential to strengthen the translation of knowledge into lifelong practices.

Keywords: Cross-Sectional Studies, Dental Students, Oral Health, Oral Hygiene, Preventive Dentistry, Surveys and Questionnaires, Toothbrushing.

Introduction

Oral health is an integral component of general health and well-being, yet it remains one of the most neglected areas of personal care across many populations (1). Dental diseases such as caries, gingivitis, and periodontitis are largely preventable through proper oral hygiene practices, but they continue to present significant public health challenges worldwide (2). The World Health Organization estimates that nearly 3.5 billion people are affected by oral diseases, with dental caries alone affecting more than half of the global population (3). Regular toothbrushing, appropriate use of fluoride, dietary modifications, and routine dental check-ups are well-established preventive measures, but adherence to these practices varies considerably depending on age, education, socioeconomic status, and cultural background (4). Among health professionals, and particularly dental students, the expectation is that knowledge and attitudes toward oral hygiene should be superior to those of the general population, as these individuals will ultimately serve as future educators and role models for their patients and communities (5).

The first year of dental school represents a critical period in shaping professional attitudes and personal habits (6). Students at this stage begin formal training in the biological sciences and basic clinical concepts, but their own oral hygiene behaviors are often still influenced by pre-university routines (7). Several studies have shown that even dental students may exhibit gaps in knowledge or inconsistencies in daily practices, despite their anticipated role as advocates for preventive care (8). Research conducted in different countries has revealed variations in brushing frequency, use of interdental aids, and understanding of fluoride benefits among first-year dental cohorts. These findings suggest that entry-level dental education may not immediately translate into optimal self-care behaviors, highlighting a need for early interventions to reinforce proper practices (9). Understanding the baseline knowledge and habits of first-year dental students is essential for developing targeted educational programs within dental curricula. By identifying deficiencies at the outset of training, educators can implement tailored strategies to strengthen both theoretical understanding and practical skills related to oral hygiene (10). Moreover, students who internalize good personal practices are more likely to counsel patients effectively and promote community awareness later in their professional careers. This dual impact underscores the importance of assessing not only what students know but also how consistently they apply this knowledge in their daily lives.

Despite the acknowledged importance of preventive dentistry, there is a paucity of region-specific data on the oral hygiene awareness and behaviors of first-year Bachelor of Dental Surgery (BDS) students (11). Most available studies focus on senior students or practicing dentists, leaving a gap in understanding the starting point of professional formation. Establishing this baseline is particularly relevant in contexts where cultural practices, dietary habits, and access to dental care may differ from global norms. Without such information, curriculum planners and public health advocates may miss opportunities to strengthen foundational education and promote long-term behavioral change. In light of these considerations, the present study seeks to assess the oral hygiene knowledge and daily practices of first-year BDS students through a cross-sectional survey. By evaluating their current understanding and self-care routines, the research aims to identify key areas requiring educational reinforcement at the earliest stage of dental training. The objective of this investigation is to provide evidence that supports curriculum development and fosters a culture of personal and professional responsibility for oral health among future dental practitioners.

Methods

This cross-sectional study was conducted over a period of four months at a recognized dental teaching institution in Lahore, Pakistan, with the primary objective of assessing baseline oral hygiene knowledge and daily practices among first-year Bachelor of Dental Surgery (BDS) students. The study population comprised all first-year dental students enrolled during the academic session of 2025. A calculated sample size of 120 participants was determined using an anticipated prevalence of adequate oral hygiene knowledge of 50%, a 95% confidence level, and a 5% margin of error, allowing for maximum variability and ensuring sufficient statistical power. Students were recruited through non-probability consecutive sampling until the required sample size was achieved. Eligibility criteria were clearly defined to ensure a homogeneous cohort and minimize potential confounding. Inclusion criteria consisted of first-year BDS students of either gender, aged 18 years or older, who were enrolled as full-time students and willing to provide informed consent. Students with prior professional dental qualifications, those who had received formal dental hygiene training before admission, or those unwilling to

participate were excluded. This approach ensured that the participants represented a true baseline population in terms of oral hygiene knowledge and practices at the commencement of professional dental education.

Data were collected using a structured, self-administered questionnaire developed after an extensive review of relevant literature and validated by a panel of dental public health experts for content accuracy and clarity. The questionnaire was pilot-tested on a small group of second-year students, who were not part of the final sample, to ensure comprehensibility and reliability. Minor linguistic adjustments were made based on feedback from the pilot phase to enhance clarity and ease of understanding. The final instrument comprised three main sections: demographic information (age, gender, and residence), assessment of oral hygiene knowledge (including questions on recommended brushing frequency, fluoride use, interdental cleaning, and professional check-up intervals), and evaluation of daily oral hygiene practices (such as brushing duration, technique, frequency, type of toothbrush and toothpaste used, flossing habits, and mouthwash use). Knowledge scores were calculated by assigning one point for each correct answer, with a maximum possible score of 15, while practice scores were based on adherence to recommended oral hygiene behaviors, with a maximum possible score of 10. Higher scores indicated better knowledge or more optimal practices. The outcome measures included mean knowledge and practice scores as primary indicators. Secondary outcomes involved the identification of specific knowledge gaps and the prevalence of suboptimal oral hygiene behaviors within the cohort. Data collection was conducted in a classroom setting during scheduled academic hours to facilitate maximum participation and minimize disruption. All participants completed the questionnaire independently under the supervision of the research team to reduce the possibility of peer influence and ensure the integrity of responses. Anonymity was strictly maintained by using unique identification codes rather than names, and all collected data were stored securely with restricted access. Before participation, each student received a detailed explanation of the study objectives, procedures, and potential risks or benefits, both verbally and through an information sheet. Written informed consent was obtained from all participants, and they were informed of their right to withdraw from the study at any point without any academic or personal repercussions.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize demographic characteristics, knowledge scores, and practice scores. The normality of the data was assessed using the Shapiro–Wilk test, which confirmed a normal distribution of knowledge and practice scores. Independent sample t-tests were applied to compare mean scores between gender groups, while one-way analysis of variance (ANOVA) was used to evaluate differences across age categories where applicable. Pearson's correlation coefficient was employed to explore the relationship between knowledge and practice scores. A p-value of less than 0.05 was considered statistically significant for all analyses. Through this rigorous methodology, the study ensured the generation of valid, reliable, and reproducible findings that accurately reflect the baseline oral hygiene knowledge and practices of first-year dental students. The detailed design, standardized data collection tools, and robust statistical analysis provide a strong foundation for identifying areas in which educational interventions can be directed to strengthen preventive dental education at an early stage of professional training.

Results

The study included 120 first-year BDS students with a mean age of 19.2 ± 0.8 years. Females constituted 55.0% of the participants, while males accounted for 45.0%. Most students (70.8%) reported an urban residence, whereas 29.2% were from rural areas (Table 1).

The mean overall oral hygiene knowledge score was 10.9 ± 2.0 (out of 15), with scores ranging from 5 to 15. The mean practice score was 7.0 ± 1.8 (out of 10), ranging between 3 and 10 (Table 2). When stratified by gender, male students demonstrated a slightly higher mean knowledge score (11.1 ± 2.0) compared to females (10.8 ± 2.1), while practice scores were also marginally higher among males (7.0 ± 1.9) than females (6.8 ± 1.7), though these differences were not statistically significant (Table 3). Students from urban areas had a mean knowledge score of 11.0 ± 2.1 and a mean practice score of 7.3 ± 1.7, whereas rural students showed slightly lower mean scores of 10.6 ± 1.9 and 6.7 ± 1.8, respectively (Table 4). Analysis of individual questionnaire items revealed that 92.5% of students correctly identified brushing twice daily as the recommended frequency, while only 54.1% reported using dental floss on a regular basis. Fluoride toothpaste usage was reported by 78.3% of respondents, and 61.7% attended routine dental check-ups at least once a year. Daily mouthwash use was reported by 48.3% of participants, while 35.8% admitted to brushing for less than the recommended two minutes per session.

The relationship between knowledge and practice scores was weak and negative, with a Pearson correlation coefficient of –0.05, indicating no significant association between higher knowledge and better daily oral hygiene behaviors. Figure 1 shows the distribution of knowledge scores, with the majority of students clustering around scores of 10 to 12. Figure 2 illustrates the mean practice scores by residence, highlighting slightly better self-care among urban students. These results provide a clear snapshot of the current oral hygiene knowledge and practices among first-year BDS students. While overall knowledge was moderate to high, daily practices showed variability, particularly in the use of interdental aids and adherence to optimal brushing duration, underscoring the need for early reinforcement of preventive dental care within the curriculum.

Table 1: Demographic Characteristics of Participants (N = 120)

Variable	n (%) or Mean ± SD
Age (years)	19.2 ± 0.8
Gender (Male/Female)	54 (45.0%) / 66 (55.0%)
Residence (Urban/Rural)	85 (70.8%) / 35 (29.2%)

Table 2: Overall, Knowledge and Practice Scores

Variable	Mean ± SD	Range
Knowledge Score (max 15)	10.9 ± 2.0	5–15
Practice Score (max 10)	7.0 ± 1.8	3–10

Table 3: Knowledge and Practice Scores by Gender

Gender	Knowledge Mean ± SD	Practice Mean ± SD
Male	11.1 ± 2.0	7.0 ± 1.9
Female	10.8 ± 2.1	6.8 ± 1.7

Table 4: Knowledge and Practice Scores by Residence

Residence	Knowledge Mean ± SD	Practice Mean ± SD
Urban	11.0 ± 2.1	7.3 ± 1.7
Rural	10.6 ± 1.9	6.7 ± 1.8

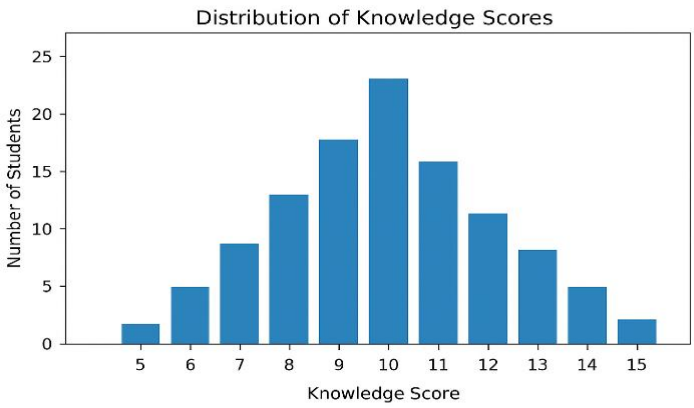

Figure 2 Distribution of Knowledge Scores

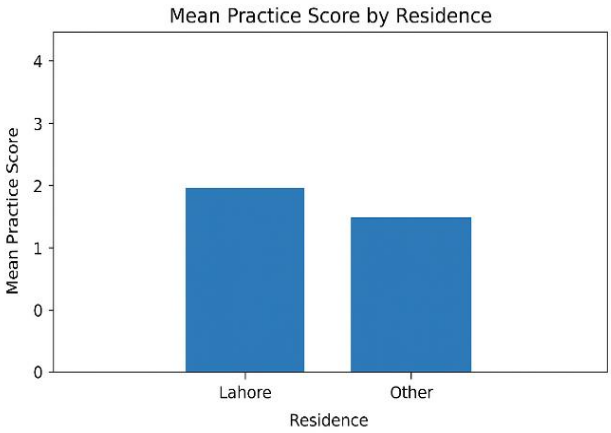

Figure 2 Mean Practice Scores by Residence

Discussion

The present study explored the baseline oral hygiene knowledge and practices of first-year Bachelor of Dental Surgery students, providing valuable insight into the starting point of professional dental education (12). The findings demonstrated moderate to high levels of knowledge but revealed variability in the translation of knowledge into daily self-care behaviors. Most students were well informed regarding the importance of twice-daily brushing and fluoride use, which aligns with similar studies conducted in Pakistan, India, and other Asian countries where dental curricula place early emphasis on preventive concepts (13). However, the comparatively lower rates of flossing, inadequate brushing duration, and irregular use of mouthwash mirrored trends reported in Saudi Arabia, Malaysia, and Turkey, where dental students also demonstrated stronger theoretical understanding than practical application during the early years of training (14). These observations support the notion that awareness alone does not guarantee adherence to optimal oral hygiene practices (15). The lack of a significant correlation between knowledge and practice scores was particularly noteworthy. This finding suggests that factors beyond cognitive understanding, such as personal habits, cultural influences, and perceived importance of oral care, may play decisive roles in shaping behavior (16). Earlier reports from dental schools in Europe and the Middle East have similarly documented weak associations between knowledge and practice, reinforcing the view that behavioral reinforcement requires more than didactic instruction (17). The slightly better performance among urban students compared with their rural counterparts could be attributed to greater exposure to preventive dental services and better access to oral hygiene products. Gender-based differences, though small and statistically insignificant, showed a pattern of slightly higher scores among male students, which contrasts with studies from India and Nigeria where female students often demonstrated superior oral hygiene habits (18). Such discrepancies highlight the influence of local cultural norms and personal lifestyle factors on oral care behaviors.

These results carry important implications for curriculum planning and student support within dental education. The moderate overall knowledge scores reflect a reasonable foundation for first-year students, yet the gaps in daily practices call for structured interventions at the earliest stages of training (19). Integrating behavior-focused modules, hands-on demonstrations, and motivational interviewing techniques within the first-year curriculum may strengthen the link between theoretical understanding and practical execution. Furthermore, promoting peer-led campaigns and incorporating routine self-assessment tools could encourage students to critically evaluate and improve their own oral hygiene behaviors while also preparing them to counsel future patients more effectively (20). The strengths of this study include a clearly defined cohort, a validated questionnaire, and a robust statistical approach that ensured the reliability of the findings (21). The sample size was adequate to detect meaningful differences between subgroups, and the inclusion of both knowledge and practice domains allowed for a comprehensive assessment of baseline oral hygiene behaviors. Conducting the study within a single institution ensured uniformity in academic background, which minimized confounding related to variability in curriculum exposure at the time of data collection.

Nevertheless, several limitations warrant consideration. The cross-sectional design precluded assessment of changes over time and prevented causal inference regarding the relationship between knowledge and practices. Self-reported practices may have been influenced by social desirability bias, potentially leading to overestimation of positive behaviors such as brushing frequency or dental check-up attendance (22). The study was limited to a single dental college in Lahore, which restricts generalizability to other regions of Pakistan or to different educational settings. Additionally, potential confounders such as socioeconomic status, dietary habits, and previous dental experiences were not explored and could have provided further context for interpreting the results. Future research should consider longitudinal designs to monitor the progression of oral hygiene knowledge and behaviors as students advance through their training. Multi-institutional studies could provide a broader understanding of regional differences and curriculum-related variations. Incorporating qualitative methods such as focus group discussions or in-depth interviews would allow exploration of motivational factors and perceived barriers to optimal oral hygiene, thereby informing more tailored educational interventions. Furthermore, evaluating the impact of structured behavior-change modules or skill-based workshops on long-term student practices would be a valuable next step in strengthening the preventive focus of dental education.

Conclusion

This study demonstrated that first-year BDS students possessed satisfactory oral hygiene knowledge but exhibited inconsistencies in translating this understanding into daily practices. The absence of a strong relationship between knowledge and behavior emphasizes the necessity for early, structured interventions in dental education that reinforce both theoretical learning and personal application to prepare students as effective advocates of oral health.

AUTHOR'S CONTRIBUTIONS

Author	Contribution
Abdul Samad*	Designed the study, performed data collection and analysis, and prepared the manuscript. Approved the final draft for submission.
Aleena Jabir	Contributed to study design, data acquisition, interpretation of findings, and performed critical review and editing of the manuscript. Approved the final draft for submission.
Ramsha Zuberi	Significantly contributed to data collection and analysis. Reviewed and approved the final manuscript for publication.

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