

## ORAL HEALTH BEHAVIORS AND PRACTICES AMONG UNDERGRADUATE NURSING AND COMMUNITY MIDWIFERY STUDENTS IN KARACHI, PAKISTAN: A COMPARATIVE CROSS-SECTIONAL STUDY

Ziaul Haq<sup>1</sup>, Muhammad Saleem Khan<sup>1</sup>, Irshad Khan<sup>3</sup>, Amjad Ali<sup>3</sup>, Wajid Zaman<sup>4</sup>, Khanzada<sup>4</sup>, Imtiaz Ali<sup>2</sup>, Rafiq<sup>2</sup>

<sup>1,3,4</sup>Advanced Health Sciences Institute of Nursing, Karachi, Pakistan

<sup>2</sup>Dr. Ruth K. M. Pfau Civil Hospital, Karachi, Pakistan

<sup>2</sup>Sindh Government Qatar Hospital, Karachi, Pakistan

\*[zk8987899@gmail.com](mailto:zk8987899@gmail.com)

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Corresponding Author: \*

Ziaul Haq

### Abstract

**Background:** Oral health is a fundamental component of overall health and well-being, contributing significantly to quality of life, systemic health outcomes, and disease prevention. Poor oral hygiene has been associated with various local and systemic conditions, including dental caries, periodontal diseases, cardiovascular disorders, and metabolic complications. Nursing and midwifery students, as future healthcare professionals, play a vital role in promoting oral health awareness and preventive practices among patients and communities. Therefore, adequate knowledge and appropriate oral hygiene practices among these students are essential for effective health promotion. However, previous evidence suggests that a gap may exist between Oral health behavior and actual practices among healthcare students.

**Objective:** This study aimed to assess oral health behavior among undergraduate nursing students and Community Midwifery students, compare oral health behavior and practice scores between both groups, and determine the association between selected socio-demographic characteristics (age, gender, and year of study) and oral health behavior.

**Method:** A comparative cross-sectional study design was used. Data were collected using a structured self-administered questionnaire adopted from Hiroshima University Dental Behavioral Inventory (HU-DBI). Statistical analysis was performed using SPSS. Descriptive statistics were used to summarize demographic characteristics and study variables. Mann-Whitney U test, Kruskal-Wallis H test, and Spearman's rank-order correlation were applied for inferential analysis.

**Results:** The majority of participants were aged 21–25 years (66.9%), male (74.8%), and single (88.7%). The median oral health behavior score was 55.00 (IQR = 7.00), while the median practice score was 8.00 (IQR = 2.00), indicating moderate-to-adequate levels of awareness about oral health behavior and practices. Inferential analysis showed no statistically significant differences in behavior and practice scores across gender and age groups. However, a statistically

significant weak negative correlation was observed between knowledge and practice scores ( $r_s = -0.314$ ,  $p < 0.001$ ), indicating an inverse relationship.

**Conclusion:** The study concluded that undergraduate nursing students and midwifery students showed relatively adequate knowledge about Oral health behavior and practices, with no significant differences across socio-demographic variables. However, a significant knowledge practice gap was identified. The findings highlight the need for strengthening competency-based and behavior-focused oral health education within nursing curriculum to enhance the translation of knowledge into practice.

## INTRODUCTION

Oral health is a fundamental component of overall health and well-being and is recognized as an essential aspect of quality of life (Valdivia et al., 2023). Despite significant advances in preventive dentistry and oral healthcare services, oral diseases remain among the most prevalent non-communicable diseases worldwide, affecting approximately 3.5 billion people and imposing substantial social and economic burdens on individuals and healthcare systems (Mohammed, 2025).

Good oral health behavior, including regular tooth brushing, flossing, use of fluoride-containing products, and routine dental visits, plays a critical role in preventing oral diseases such as dental caries, gingivitis, and periodontal diseases (Cui et al., 2023). Evidence suggests that inadequate oral hygiene practices are associated with poor oral health outcomes, reduced quality of life, and increased healthcare expenditures. Consequently, the promotion of positive oral health behaviors has become a major public health priority globally (Saarela et al., 2022).

Healthcare professionals are expected to serve as role models for healthy lifestyles and contribute actively to health promotion within communities (Ijiga et al., 2024). Undergraduate nursing students and midwifery students, as future healthcare providers, occupy a unique position in promoting preventive health practices and educating patients regarding disease prevention. Their personal oral health behaviors may influence not only their own health status but also their ability to provide oral health education and counseling to patients. Therefore, adequate knowledge, positive attitudes, and appropriate oral health practices among nursing and midwifery

students are essential for effective healthcare delivery and health promotion (Al Agili & Khalaf, 2023).

Several studies conducted internationally have assessed oral health behavior among healthcare students (Riad, Al-Khanati, et al., 2022). Research conducted among nursing students in India reported satisfactory knowledge regarding oral health; however, deficiencies were identified in preventive practices such as dental flossing and routine dental checkups (Bharti et al.). Similarly, found that while the majority of health science students brushed their teeth regularly, fewer students reported the use of dental floss and mouthwash (Das Gupta et al., 2024). Studies from Turkey, Saudi Arabia, Jordan, and China have also demonstrated considerable variations in oral health attitudes and practices among healthcare students, highlighting the influence of educational background and cultural factors on oral hygiene behaviors (Jiang et al., 2025).

In Pakistan, oral health remains a relatively neglected component of healthcare education (Zahra et al., 2024). Although several studies have investigated Oral health behavior and practices among medical, dental, and nursing students, evidence regarding oral health behavior among nursing and midwifery students remains limited.

A study conducted among nursing students in Hyderabad, Pakistan, reported that most participants practiced daily tooth brushing; however, only a small proportion regularly used dental floss, indicating inadequate adoption of comprehensive oral hygiene practices (Tariq et al., 2024). Furthermore, significant differences in oral health behavior have been observed among healthcare students from different educational disciplines, suggesting that curriculum content

and professional training may influence oral health practices (Altaf et al., 2024).

Undergraduate nursing students and Community Midwifery (CMW) students constitute an important segment of the future healthcare workforce in Pakistan. While both groups are involved in health promotion and patient education, differences in educational preparation, clinical exposure, and professional responsibilities may contribute to variations in oral health behavior. However, to date, limited research has compared oral health behavior between undergraduate nursing students and CMW students in Pakistan, particularly in Karachi, the country's largest metropolitan city and a major center for nursing and midwifery education.

Understanding oral health behavior among these future healthcare professionals is important for identifying existing gaps and developing targeted educational interventions aimed at improving oral hygiene practices and strengthening oral health promotion competencies. Therefore, the present study aimed to compare oral health behavior among undergraduate nursing students and Community Midwifery students enrolled in selected nursing institutions in Karachi, Pakistan.

#### Study Objectives

- 1) To assess oral health behavior among undergraduate nursing students and Community Midwifery students in selected institutions of Karachi, Pakistan.
- 2) To compare oral health behavior and oral hygiene practices between undergraduate nursing students and Community Midwifery students.
- 3) To determine the association between socio-demographic characteristics (age, gender, and year of study) and oral health behavior among students.

#### Significance of study

This study is significant because oral health is an essential component of overall health and well-being. Nursing and midwifery students, as future healthcare professionals, play a vital role in health promotion, disease prevention, and patient education. Their personal oral health behaviors

may influence their ability to educate patients and promote healthy lifestyles within the community. The findings of this study will provide valuable information regarding the oral health behavior of Generic BSN and Community Midwifery students in Karachi, Pakistan. The study will help identify gaps in oral hygiene practices and areas requiring educational interventions. Furthermore, the results may assist nursing educators, curriculum developers, and policymakers in incorporating oral health promotion strategies into nursing and midwifery education programs.

The study will also contribute to the existing body of knowledge on oral health behavior among healthcare students in Pakistan and serve as a baseline for future research. Ultimately, improving oral health awareness and practices among future healthcare professionals may contribute to better patient education and improved community oral health outcomes.

#### Research Questions

- 1) What is the level of oral health behavior among Generic BSN and Community Midwifery students in Karachi, Pakistan?
- 2) Is there a significant difference in oral health behavior between Generic BSN and Community Midwifery students?
- 3) Is there an association between selected socio-demographic characteristics (age, gender, and year of study) and oral health behavior among students?

#### Operational definition

##### Oral health behavior

Oral health behavior refers to the actions and practices performed by students to maintain oral hygiene and prevent oral diseases. In this study, oral health behavior was measured using a structured questionnaire assessing practices such as tooth brushing frequency, use of toothpaste, dental (Taheri et al., 2025).

##### Oral health practices

Oral health practices refer to the daily behaviors and habits performed by individuals to maintain oral hygiene, prevent dental diseases, and promote good oral health (Tadin et al., 2022).

### Literature Review

Oral health is increasingly recognized as a critical component of overall health and quality of life. According to the World Health Organization (WHO), oral diseases affect approximately 3.5 billion people worldwide, making them among the most prevalent non-communicable diseases (Mohammed, 2025). Despite being largely preventable, oral diseases continue to impose a significant burden on healthcare systems and individuals, particularly in low- and middle-income countries. Consequently, promoting positive oral health behaviors among future healthcare professionals has become an important public health priority.

Healthcare students, particularly nursing and midwifery students, are expected to possess adequate Oral health behavior and demonstrate healthy oral hygiene practices because they play a crucial role in patient education and health promotion. A cross-sectional study among healthcare students and found that students with higher Oral health behavior demonstrated significantly better oral hygiene behaviors (Mutluay & Mutluay, 2022). The study emphasized that educational interventions positively influence preventive oral care practices. However, the study included multiple health disciplines and did not specifically focus on nursing or midwifery students, limiting its applicability to these populations.

Similarly, (Mutluay & Mutluay, 2022) reported that university students with greater awareness of oral health were more likely to engage in regular tooth brushing and preventive dental care. While the study highlighted the importance of oral health education, it primarily assessed general university students rather than future healthcare providers. Therefore, the findings may not adequately represent oral health behaviors among nursing and midwifery students who are expected to possess higher levels of health literacy.

Recent evidence from (Ehsan et al., 2023) demonstrated that although health science students exhibited satisfactory tooth-brushing practices, the use of dental floss and routine dental visits remained suboptimal. These findings suggest that basic oral hygiene behaviors may be common

among students, whereas comprehensive preventive oral care practices are less frequently adopted. The study provided valuable insights into oral health behaviors; however, it did not investigate differences among specific healthcare disciplines, leaving uncertainty regarding oral health practices among nursing and midwifery students.

Research conducted among nursing students has revealed mixed findings. (Chandio et al., 2025) Assessed Oral health behavior, attitudes, and practices among nursing students and found satisfactory levels of knowledge but inadequate preventive practices. Although most participants reported brushing their teeth regularly, only a minority attended routine dental checkups or practiced flossing. This discrepancy between knowledge and behavior suggests that possessing knowledge alone may not necessarily translate into positive oral health practices. The study highlighted the need for behavioral interventions in addition to educational programs.

A recent study conducted among undergraduate dental students in Pakistan explored the relationship between health behaviors, perceived stress, self-efficacy, and oral hygiene practices. The study highlighted that academic demands and stress experienced by healthcare students may influence their ability to maintain healthy behaviors, including oral hygiene practices. Using a national online survey among 904 dental students, the researchers assessed demographic characteristics, lifestyle behaviors, perceived stress, self-efficacy, and oral hygiene practices. The findings revealed that students experienced moderate levels of perceived stress and demonstrated high self-efficacy. Although perceived stress was not significantly associated with oral hygiene practices, factors such as female gender, non-tobacco use, regular physical exercise, frequent dental visits, and higher self-efficacy were significantly linked with better oral hygiene behaviors (Tariq et al., 2024). The study emphasized that improving self-efficacy and promoting healthy lifestyles among healthcare students may enhance their personal oral health practices and support their future role as health professionals. However, as the study focused

exclusively on dental students, the findings may not be directly generalizable to other healthcare student populations, including nursing students (Tariq et al., 2024).

(Ibrahim et al., 2025) Observed that dental students demonstrated superior oral hygiene practices, including regular brushing, flossing, and preventive dental visits. Similarly, (Riad, Buchbender, et al., 2022) assessed oral health knowledge, attitudes, and behaviors among dental students using the Hiroshima University-Dental Behavioral Inventory (HU-DBI). The cross-sectional study among 508 dental students found that participants demonstrated a high overall level of oral health-related knowledge, attitudes, and behaviors. Clinical-year students showed significantly better oral health behaviors compared with preclinical students, suggesting that exposure to oral health education and clinical training may positively influence preventive practices. The study also reported differences in oral health behaviors according to gender and lifestyle factors, highlighting the importance of integrating preventive oral health education throughout healthcare professional training. These findings suggest that greater exposure to oral health education positively influences oral health behavior. However, the extent to which similar educational exposure affects nursing and midwifery students remains unclear.

Gender differences in oral health behavior have also been widely reported. (Al-Omiri et al., 2012) found that female students exhibited more positive oral health attitudes and preventive practices than male students. Conversely, some studies conducted in South Asian populations have reported better oral health behaviors among male students. These contradictory findings indicate that cultural, social, and educational factors may influence oral health behavior differently across settings. Therefore, further investigation is required to understand the role of demographic characteristics in shaping oral health practices.

Several studies have identified educational level as an important determinant of oral health behavior. (Ahsin & Ahsin, 2021) reported that senior students demonstrated significantly better oral

hygiene practices compared with junior students, suggesting that increased educational exposure contributes to improved oral health awareness and behaviors. However, other studies have reported no significant differences across academic years, indicating inconsistent evidence regarding the influence of educational progression on oral health behavior.

Recent literature has also emphasized the importance of integrating oral health promotion into healthcare curricula. Basheer et al. (2023) reported that students who received formal oral health education demonstrated significantly higher oral health behavior scores compared with those who had not received such training. These findings support curriculum enhancement as a strategy for improving oral health practices among future healthcare professionals.

The existing literature demonstrates that Oral health behavior among healthcare students is generally satisfactory; however, positive knowledge does not consistently translate into appropriate oral health practices. Most studies report acceptable tooth-brushing behaviors but inadequate flossing, mouthwash use, and routine dental visits. Furthermore, findings regarding the influence of gender, academic level, and educational background remain inconsistent across studies.

A notable limitation of existing research is the predominant focus on dental, medical, or nursing students independently. Comparatively fewer studies have investigated oral health behavior among midwifery students. Moreover, most available studies have been conducted in high-income countries or single institutions, limiting their applicability to diverse educational settings. In Pakistan, the majority of studies have focused on nursing, medical, or dental students, while Community Midwifery students have received little attention in oral health research.

Although several studies have assessed oral health behavior among healthcare students, limited evidence exists comparing oral health behavior between Generic BSN (GBSN) students and Community Midwifery (CMW) students. Furthermore, there is a scarcity of multicenter studies conducted in Karachi, Pakistan, examining

oral health behavior among these two important groups of future healthcare professionals. Differences in curriculum content, educational exposure, and clinical training may influence oral health behaviors; however, these differences remain largely unexplored.

Therefore, the present study aims to compare oral health behavior among Generic BSN students and Community Midwifery students in selected institutions of Karachi, Pakistan. The findings will contribute to the existing literature and provide evidence for developing targeted oral health promotion strategies within nursing and midwifery education programs.

### Theoretical Framework

This study was guided by Nola J. Pender's Health Promotion Model (HPM). The model explains the factors influencing individuals' engagement in health-promoting behaviors. According to Pender's model, personal characteristics, previous experiences, perceived benefits, perceived barriers, self-efficacy, and interpersonal influences affect the adoption of health behaviors. In the present study, oral health knowledge and practices among undergraduate nursing and Community Midwifery students were considered health-promoting behaviors. Students' demographic characteristics (age, gender, and year of study) represent individual factors, while oral health knowledge and preventive practices reflect behavior-specific factors influencing oral health outcomes. The model provides a framework for understanding how nursing and midwifery students translate oral health knowledge into daily preventive practices (Pender, 2011).

### Research Methodology

#### Study Design and Setting

A comparative cross-sectional study was conducted among Generic Bachelor of Science in Nursing (GBSN) students and Community Midwifery (CMW) students enrolled in five selected nursing and midwifery institutions in Karachi, Pakistan. Data were collected from January 2026 to March 2026.

#### Study Population

The study population comprised undergraduate Generic BSN students and Community Midwifery students enrolled in the selected institutions during the study period.

#### Inclusion and Exclusion Criteria

Students enrolled in Generic BSN and Community Midwifery programs, and willing to participate in the study were included. Students who declined participation, or submitted incomplete questionnaires were excluded from the study.

#### Sampling Technique and Sample Size

A purposive sampling technique was used to recruit participants. The sample size was calculated using OpenEpi version 3.01, assuming a 50% prevalence of adequate oral health behavior, a 95% confidence level, and a 5% margin of error. The minimum required sample size was 151 participants, all of whom were included in the final analysis.

#### Data Collection Instrument

Data were collected using a structured self-administered questionnaire adapted from the Hiroshima University Dental Behavioral Inventory (HU-DBI). The questionnaire consisted of two sections. The first section collected socio-demographic information, including age, gender, academic year, program of study, and institution. The second section assessed oral health behavior and oral hygiene practices, including tooth-brushing frequency, use of fluoride toothpaste, dental flossing, mouthwash use, dental visits, and other oral hygiene behaviors.

#### Data Collection Procedure

Data were collected using a structured online questionnaire administered through Google Forms. The questionnaire consisted of demographic questions and the Hiroshima University Dental Behavioral Inventory (HU-DBI). Participants were required to provide informed consent electronically before accessing the survey. Ethical approval was obtained from the Institutional Review Board (IRB) of AHS ION,

ON 02/01/2026). Confidentiality and anonymity of participants were maintained throughout the study, and no identifying information was collected. The completed responses were securely stored and used solely for research purposes.

### Result

Data were entered, cleaned, and analyzed using the IBM SPSS Statistics version 27. Descriptive statistics were used to summarize demographic characteristics and oral health behaviors. Frequencies and percentages were calculated for categorical variables, while means and standard

deviations were computed for continuous variables.

The normality of oral health behavior scores was assessed using the Shapiro-Wilk test. Mann-Whitney U and Kruskal Wallis test were used to compare oral health behavior scores between Generic BSN and Community Midwifery students. Associations between socio-demographic variables and oral health behavior were assessed using Chi-square tests, Kruskal-Wallis tests. A p-value of less than 0.05 was considered statistically significant.

*Table 01: Demographic and nursing education characteristic (N=151)*

Variable	Category	N	%
<b>Age (Years)</b>			
	16- 20	39	25.8
	21 - 25	101	66.9
	26- 30	11	7.3
<b>Gender</b>			
	Male	113	74.8
	Female	38	25.2
<b>Marital Status</b>			
	Single	134	88.7
	Married	17	11.3
<b>Year of Education</b>			
	1st Year	134	88.74%
	2nd Year	17	11.26%
	3rd Year	0	0%

Among the 151 participants included in the study, the majority were within the age group of 21–25 years (66.9%), followed by participants aged 16–20 years (25.8%) and 26–30 years (7.3%). Regarding gender distribution, the sample comprised predominantly male participants (74.8%), while female participants represented 25.2% of the study population. In terms of marital status, the majority of participants were single

(88.7%), whereas 11.3% were married. Regarding educational characteristics, the majority of participants were first-year students (88.74%), followed by second-year students (11.26%). Overall, the findings indicate that the study population mainly consisted of young, unmarried nursing and midwifery students, with greater representation from the middle academic level.

**Table 02: Frequency and Percentage Distribution of Oral Health-Related Factors (N = 151)**

Variable	Response	Frequency (N)	Percentage (%)
Do you smoke or use tobacco products?	Yes	11	7.3
	No	140	92.7
Do you frequently consume sugary foods or drinks?	Yes	64	42.4
	No	87	57.6
How often do you visit the dentist?	Every 6 months	39	25.8
	Once a year	112	74.2
Do you believe oral health affects overall health?	Yes	65	43.0
	No	86	57.0
Have you ever been diagnosed with an oral health problem (e.g., cavities, gum disease)?	Yes	130	86.1
	No	21	13.9

The majority of participants did not smoke or use tobacco products (92.7%, n = 140). More than half (57.6%, n = 87) reported not frequently consuming sugary foods or drinks. Most participants visited the dentist once a year (74.2%, n = 112), while 25.8% (n = 39) visited every six

months. Slightly more than half (57.0%, n = 86) did not believe that oral health affects overall health. Additionally, a large majority (86.1%, n = 130) reported having been diagnosed with an oral health problem, whereas only 13.9% (n = 21) had never been diagnosed.

**Table 03. Distribution of Oral health behavior and practice scores among nursing and midwifery students (N=151)**

Variable	Median	IQR
Practice score	8.00	2.00
Oral health behavior Knowledge score	55.00	7.00

The distribution of Oral health behavior and practice scores was assessed using the median and interquartile range due to the non-normal distribution of data. The median practice score among participants was 8.00 (IQR = 2.00), indicating generally satisfactory reported oral health practices. Oral health behavior was assessed

using a scoring system with a possible score range of 15-75, where higher scores indicated better knowledge. The median knowledge score was 55.00 (IQR = 7.00), demonstrating a relatively satisfactory level of Oral health behavior among undergraduate nursing and community midwifery students.

**Table 04. Comparison of Mean Oral health behavior and Practice Scores among Undergraduate Nursing and Community Midwifery (CMW) Students (N=151)**

Outcome variable	GBSN Median (IQR) / Mean Rank	CMW Median (IQR) / Mean Rank	Mann-Whitney U	p-value
Practice score	74.77	79.66	2008.00	0.530
Oral health behavior Knowledge score	73.32	83.96	1844.50	0.194

The Mann Whitney U test was performed to examine differences in Oral health behavior and

practice scores between undergraduate and Community midwifery student's participants. The

findings indicated that there was no statistically significant difference in practice scores between undergraduate and Community midwifery student's ( $U=2008.00$ ,  $Z=-0.628$ ,  $p=0.530$ ). Similarly, no significant difference was observed in knowledge scores between gender groups

( $U=1844.50$ ,  $Z=-1.300$ ,  $p=0.194$ ). Although Community midwifery student's demonstrated slightly higher mean ranks for both practice and knowledge scores, the differences were not statistically significant.

**Table 05: Kruskal-Wallis Test for Association of Age Group with Practice and Knowledge Scores**

Variable	Age Group	N	Mean Rank	Kruskal-Wallis H	df	p-value (Sig.)
Practice Score	16-20 years	39	74.65	1.058	2	0.589
	21-25 years	101	75.17			
	26-30 years	11	88.36			
Oral Health behavior Knowledge Score	15-20 years	39	76.88	0.488	2	0.783
	21-25 years	101	74.76			
	26-30 years	11	84.23			

A Kruskal-Wallis H test was performed to examine differences in practice and knowledge scores across age groups (15-20, 21-25, and 26-30 years).

For practice scores, the results showed no statistically significant difference among age groups ( $H = 1.058$ ,  $df = 2$ ,  $p = 0.589$ ). Although the 26-30 years group had a slightly higher mean rank, the difference was not meaningful.

Similarly, for knowledge scores, there was no statistically significant difference across age groups ( $H = 0.488$ ,  $df = 2$ ,  $p = 0.783$ ). Mean ranks were comparable across all groups.

Overall, the findings indicate that age has no significant association with either practice or knowledge scores in this study population.

**Table 06: Spearman's Correlation between oral health behavior Knowledge and Practice Scores**

Variables	N	Spearman's rho ( $r_s$ )	p-value (Sig. 2-tailed)	Interpretation
Behavior Practice vs	151	-0.314**	< 0.001	Significant negative (weak-moderate) correlation

Spearman's rank-order correlation showed a statistically significant weak negative relationship between knowledge and practice scores among participants ( $r_s = -0.314$ ,  $p < 0.001$ ). This indicates

that as knowledge scores increased, practice scores slightly decreased, showing an inverse association. However, the strength of this relationship was weak, suggesting that knowledge and practice are not strongly aligned in this study population. This

implies that higher knowledge levels do not necessarily translate into improved practice behaviors, and other factors may be influencing practice outcomes.

### Discussion

This study found that nursing and midwifery students had generally good Oral health behavior (median = 55.0) and practices (median = 8.0), indicating satisfactory awareness and hygiene behaviors. Most participants reported healthy habits, including avoiding tobacco use and limiting sugary food consumption. However, a high proportion had experienced oral health problems, suggesting that adequate knowledge does not always translate into optimal oral health outcomes. Furthermore, no significant differences in knowledge or practice scores were observed across gender or age groups, indicating relatively consistent oral health behaviors among participants.

A noteworthy finding was the statistically significant negative correlation between knowledge and practice scores ( $r_s = -0.314$ ,  $p < 0.001$ ). Although the relationship was weak, it indicates that higher knowledge levels did not necessarily correspond to better oral health practices. This finding suggests that factors beyond knowledge, such as attitudes, motivation, accessibility to dental care, and behavioral habits, may influence oral health practices. Therefore, increasing knowledge alone may not be sufficient to improve oral health behavior.

### Ethical Considerations

Ethical approval was obtained from the relevant Institutional Review Board (IRB) prior to the commencement of the study (IRB/AHS/Approval/02/01/2026). Participation in the study was entirely voluntary, and informed consent was obtained from all participants before data collection. Participants were informed about the purpose of the study, their right to withdraw at any time without any consequences, and the confidentiality of the information they provided. To protect participants' privacy, no identifying information was collected, and all data were kept anonymous and confidential. The collected data

were used solely for research purposes and were securely stored with access restricted to the research team. All procedures performed in this study were conducted in accordance with the ethical principles of the Declaration of Helsinki and its subsequent amendments and revisions.

### Recommendations

- 1) Oral health education programs should emphasize practical skills, behavioral change strategies, and regular awareness activities to improve oral hygiene practices among students.
- 2) Students should be encouraged to undergo routine dental check-ups and adopt preventive oral healthcare measures to maintain good oral health.
- 3) Future studies should use larger and more representative samples and investigate additional factors influencing Oral health behavior and practices.

### Weakness

- 1) The study used a comparative cross-sectional design, which limited the ability to establish cause-and-effect relationships between Oral health behavior and practices.
- 2) Data were collected using self-reported questionnaires, which may have been affected by recall bias and social desirability bias.
- 3) The unequal gender distribution and convenience sampling approach may have reduced the representativeness of the study findings.

### Strengths

1. A validated instrument (Hiroshima University Dental Behavioral Inventory - HU-DBI) was used to assess Oral health behavior and practices, enhancing the reliability of the findings.
2. Ethical standards were maintained through IRB approval, informed consent, and confidentiality measures.
3. Appropriate statistical tests were applied according to the distribution of the data, improving the validity of the results.
4. The study explored both Oral health behavior and practices, providing a comprehensive assessment of oral health behavior among

undergraduate nursing and community midwifery students.

#### Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research study. The study was conducted independently, and no financial, personal, or institutional relationships influenced the design, data collection, analysis, interpretation of findings, or preparation of the manuscript.

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