

ASSESSMENT OF ORAL HEALTH CARE PRACTICES AMONG HEALTH SCIENCES STUDENTS AT KMU INSTITUTE OF HEALTH SCIENCES, KURRAM

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ABSTRACT

Background: Oral health is observed as an important aspect of physical comfort, functional capacity, and quality of life. Despite this importance, oral disorders continue to be widespread worldwide, particularly in underdeveloped nations where preventative measures and access to dental care are typically restricted.

Objectives: This study is primarily designed to assess oral health practices and associated behaviors among students.

Materials and methods: A descriptive cross-sectional research included 276 individuals. A self-modified structured questionnaire was used to collect information on demographics and typical oral hygiene behaviors such as teeth brushing routines, toothbrush replacement, and the usage of dental floss.

Results: The results revealed that the majority of participants (59.4%) were female, while 40.6% were male. The bulk of participants (66.3%) were aged 19 to 23. In terms of oral hygiene habits, 47.5% of participants brushed once a day and 46.7% brushed twice a day. More than half of participants (55.4%) claimed to change their toothbrush when the bristles were deformed. For flossing practices, 40.2% of participants occasionally used floss, 26.4% used floss every time, 20.7% used floss often, and a few participants never used floss.

Conclusion: From the findings, it is clear that students demonstrate generally acceptable basic oral hygiene practices, although there are a number of preventive practices that are insufficient. To encourage and develop oral hygiene behaviors, it is crucial to enhance preventative dental treatment and oral health education.

Keywords: Oral hygiene, behaviors Oral and preventative hygiene habits

Introduction

Background of the Study

Oral health is a vital component of overall health and well-being. The World Health Organization defines it as the absence of conditions that impair a person's ability to bite, chew, smile, speak, and maintain psychosocial well-being. These conditions include dental caries, periodontal disease, oral infections, tooth loss, and oral cancers, all of which are strongly associated with systemic illnesses such as diabetes and cardiovascular disease (WHO, 2020). Oral health influences physical comfort, functional capacity, psychological well-being, and social relationships, making it essential for quality of life (Petersen, 2003).

Globally, oral diseases affect nearly 3.5 billion people, making them among the most prevalent noncommunicable diseases. Untreated dental caries in permanent teeth remain the most common health condition worldwide, while severe periodontal disease affects over 1 billion individuals (GBD, 2017). Caries in primary teeth impact 530 million children, with the burden disproportionately higher in low- and middle-income countries due to limited access to preventive and restorative care (Peres et al., 2019).

Oral Health in Developing Countries

In developing nations, oral disorders are widespread due to poor access to preventive and therapeutic care, weak health systems, and uneven workforce distribution (Petersen, 2005). Rapid urbanization, increased sugar consumption, and lack of integration of oral health into primary healthcare have worsened the burden. Socioeconomic inequalities further contribute to disparities, with low-income and less-educated populations experiencing higher rates of tooth loss, caries, and periodontal disease (Watt & Sheiham, 2012). Rural communities face additional challenges, including fewer practitioners and reliance on emergency-based care (Singh et al., 2014).

Oral Health Care Practices

Preventive practices such as brushing twice daily with fluoride toothpaste, flossing, tongue cleaning, and routine dental visits are essential for reducing oral disease burden. Brushing with proper

technique, such as the modified Bass method, significantly reduces plaque and gingivitis (American Dental Association, 2019). Fluoride use strengthens enamel and prevents demineralization, while flossing and antimicrobial mouthwashes complement plaque control. Tongue cleaning reduces halitosis and bacterial load (Addy, 2008).

Knowledge and Attitudes Toward Oral Health

Knowledge plays a crucial role in shaping oral hygiene behaviors. Individuals with greater awareness of caries prevention, plaque control, and risk factors such as tobacco and sugar consumption demonstrate better oral health outcomes (Kwan et al., 2005). Positive attitudes toward oral hygiene are linked to consistent preventive practices and regular dental attendance, while negative perceptions and dental anxiety often lead to neglect and delayed treatment (Armfield, 2010).

Oral-Systemic Health Relationship

Oral health is closely connected to systemic health through microbial and inflammatory pathways. Periodontal disease has been associated with cardiovascular disease, diabetes, respiratory infections, and adverse pregnancy outcomes (Tonetti & Van Dyke, 2013). This highlights the importance of preventive oral care not only for dental health but also for overall systemic well-being.

Role of Health Sciences Students

Health sciences students, as future healthcare providers, play a critical role in oral health promotion. They are expected to identify early signs of oral disease, provide preventive counseling, and integrate oral health into general healthcare delivery. However, studies reveal gaps in knowledge, particularly regarding periodontal disease and oral-systemic interactions, underscoring the need for structured oral health education within curricula (Rabiei et al., 2012). Peer-led health promotion programs and inter-professional education models have shown positive impacts on awareness and preventive practices (Kwan et al., 2005).

RATIONALE OF THE STUDY:

Oral health is a critical component of overall well-being, influencing daily activities such as speaking, eating, and social engagement. Healthcare students, particularly those undergoing medical and dental training, are expected to follow appropriate oral health care practices, as they will serve as future healthcare providers, educators, and role models in society.

Despite professional training, gaps are often observed between recommended oral health practices and those actually followed. However, limited comparative studies have assessed oral health care practices among healthcare students, especially in resource-limited and underserved regions such as Kurram District.

Therefore, the proposed study aims to evaluate and compare oral health care practices among students of KMU-IHS, Kurram, at the Khyber Medical University Institute of Health Sciences. The findings of this study are expected to support improvements in community oral health by informing preventive strategies and promoting effective oral health care practices. Ultimately, this leads to improved oral health results.

1.4 AIM(s) & OBJECTIVE(S):

- To assess the oral health care practices followed by healthcare students in their daily lives.
- To identify common oral health care procedures adopted by healthcare students.
- To evaluate routine oral hygiene behaviors and preventive oral health practices among healthcare students.
-

Materials and Methods

Study Design and Setting

A **descriptive cross-sectional study** was conducted at KMU Institute of Health Sciences (IHS), Kurram, including all students enrolled at the campus.

RESULT

3.1 Gender of the Participants:

Table 3. 1 Gender of the participants

Gender of the Participants

Study Duration

The research was carried out over **four months (January–April 2026)**.

Sample Size and Sampling Technique

A total of **276 students** were included, calculated using the RaoSoft sample size calculator. A **convenience sampling strategy** was employed.

Sample Selection

Inclusion Criteria:

- Students currently enrolled at KMU-IHS Kurram.
- Both male and female students.
- Students who provided voluntary informed consent.

Exclusion Criteria:

- Students using medications causing xerostomia (dry mouth).
- Students absent or unavailable during data collection.

Data Collection Procedure

Data were collected through **self-administered questionnaires** and, when necessary, a Google Form. Informed consent was obtained orally, and confidentiality was strictly maintained.

Data Analysis

Survey responses were entered and analyzed using **SPSS version 25**. Descriptive statistics (frequencies and percentages) were used to assess oral health care practices. Results were presented in **tables and charts** for clarity and visualization.

Ethical Considerations

Ethical clearance was obtained from the **Ethical Research Committee of KMU-IHS Kurram**. Participation was voluntary, and anonymity was preserved throughout the study.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	112	40.6	40.6	40.6
	Female	164	59.4	59.4	100.0
	Total	276	100.0	100.0	

3.2 Age of the participants:

Table 3. 2 Age of the participants

Age of the participants					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19-23 years	183	66.3	66.3	66.3
	24-28 years	93	33.7	33.7	100.0
	Total	276	100.0	100.0	

3. Brushing Frequency:

In the result the distribution of brushing frequency among 276 participants. 0.7% students reported that they rarely or never brush their teeth.

47.5% students reported brushing once per day. 46.7% students reported brushing twice per day. 5.1% students reported brushing more than twice per day shown in Table 3.3 and Figure 3.3 below.

Table 3. 3 How often do you brush your teeth daily?

Brushing frequency					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never/ rarely	2	.7	.7	.7
	Once	131	47.5	47.5	48.2
	Twice	129	46.7	46.7	94.9
	> Twice	14	5.1	5.1	100.0
	Total	276	100.0	100.0	

3.4 Dental Floss Usage:

The results obtained from the study about the use of dental floss by the participants indicated The majority of students claimed to use dental floss on occasion, accounting for 111 students (40.2%). A

significant percentage of students reported to constantly employ dental floss, which included 73 students (26.4%). At exactly the same time, 57 students (20.7%) stated that they frequently used dental floss.

Table 3. 4 Do you use dental floss as part of your oral hygiene routine?

Dental floss usage					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	35	12.7	12.7	12.7
	Always	73	26.4	26.4	39.1
	Often	57	20.7	20.7	59.8
	Sometimes	111	40.2	40.2	100.0
	Total	276	100.0	100.0	

3.6 Mouthwash Usage:

According to the statistical analysis, 13.4% of students reported that they never use mouthwash. 26.1% of students stated that they always use mouthwash, while 24.6% reported that they often use it. The majority of students, 35.9%, indicated

that they sometimes use mouthwash. These results suggest that although a considerable number of students use mouthwash regularly, many still use it only occasionally shown in Figure 3.6 and Table 3.6 below.

Table 3. 5 Do you use mouthwash as part of your oral hygiene routine?

Mouthwash usage					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	37	13.4	13.4	13.4
	Always	72	26.1	26.1	39.5
	Often	68	24.6	24.6	64.1
	Sometimes	99	35.9	35.9	100.0
	Total	276	100.0	100.0	

3.7 Visit a dentist:

According to the data research, 13.4% of students say they never go to the dentist. 18.8% of students responded that they see the dentist every six months. 16.3% of students answered that they see the dentist one time a year. The majority of

students (51.4%) said they only go to the dentist when that they have issues. This demonstrates that the vast majority of kids prefer problem-based dental appointments mentioned in Table 3.7 and Figure 3.7 below.

Figure 3. 1 How often do you visit a dentist for routine check-ups?

Table 3. 6 How often do you visit a dentist for routine check-ups?

Dental visits					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	37	13.4	13.4	13.4
	Every 6 months	52	18.8	18.8	32.2
	Once a year	45	16.3	16.3	48.6
	Problem based	142	51.4	51.4	100.0
	Total	276	100.0	100.0	

3.8 Tongue Cleaning:

The statistical analysis has shown that 14.9% of the students reported that they never clean their tongues. Further, 41.3% of the students reported that they always clean their tongues, whereas

15.2% reported that they often clean their tongues. In addition, 25.0% of the students reported that they sometimes clean their tongues, whereas 3.6% reported that they rarely clean their tongues shown in Table 3.9

Figure 3. 2 How often do you clean your tongue while brushing?

Table 3. 7 How often do you clean your tongue while brushing?

Tongue cleaning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	41	14.9	14.9	14.9
	Always	114	41.3	41.3	56.2
	Often	42	15.2	15.2	71.4
	Sometimes	69	25.0	25.0	96.4
	Rarely	10	3.6	3.6	100.0
	Total	276	100.0	100.0	

3.10 Mouth Rinsing After Meal:

The statistical study showed that the majority of pupils reported that they always rinse their mouths after meals (44.9%, n = 124). Approximately 25.0% (n = 69) of the students reported that they often rinse their mouths after meals, while 21.7% (n = 60) reported that they sometimes rinse their

mouths after meals. However, fewer participants indicated that never rinse their mouths after meals (8.3%, n = 23), which revealed that the majority of students practice the oral hygiene habit of rinsing their mouths after meals. Mentioned in Table 3.12 and Figure 3.12 below.

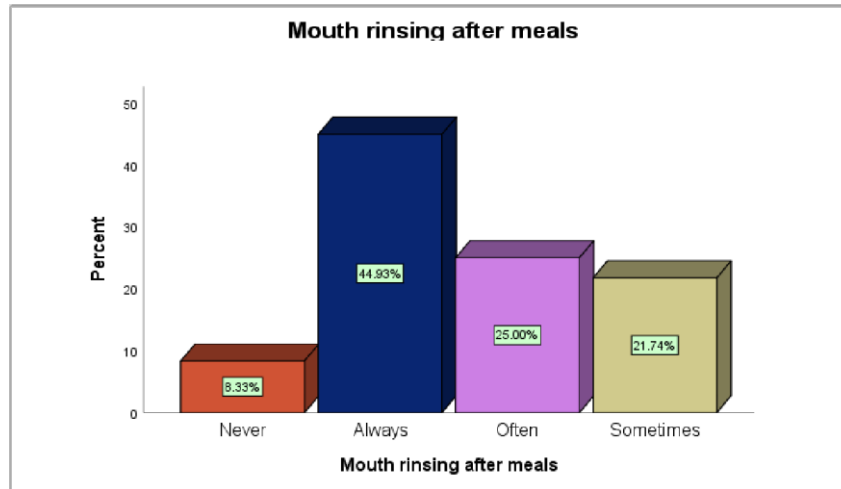


Figure 3. 3 Do you rinse your mouth after meals?

Table 3. 8 Do you rinse your mouth after meals?

Mouth rinsing after meals					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	23	8.3	8.3	8.3
	Always	124	44.9	44.9	53.3
	Often	69	25.0	25.0	78.3
	Sometimes	60	21.7	21.7	100.0
	Total	276	100.0	100.0	

3.13 Sugary Products Intake:

The findings based on the consumption of sugary products by the participants show that the majority of the students who consumed sugary products did so daily, with 32.2% (n = 89) of the participants falling into this category. Others consumed sugary products 2-3 times a week (28.3%, n = 78), while

some consumed them once a week (20.7%, n = 57). It was also found that 18.8% (n = 52) of the participants never or rarely consumed sugary products. These findings show that the majority of the students consumed sugary products frequently, with some consuming them daily mentioned in Table 3.13 and Figure 3.13 below.

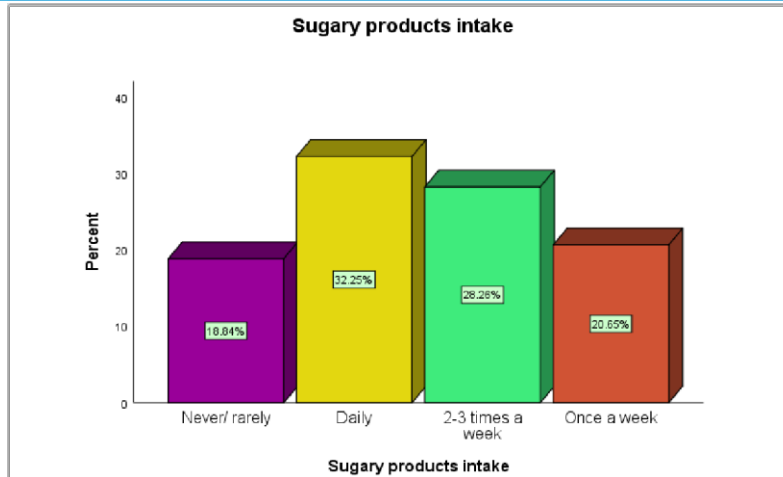


Figure 3. 4 How often do you consume sugary snacks or drinks?

Table 3. 9 How often do you consume sugary snacks or drinks?

Sugary products Intake					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never/ rarely	52	18.8	18.8	18.8
	Daily	89	32.2	32.2	51.1
	2-3 times a week	78	28.3	28.3	79.3
	Once a week	57	20.7	20.7	100.0
	Total	276	100.0	100.0	

3.14 Preventive Treatment:

From the findings on the preventive dental treatments provided to the participants, the majority reported that they sometimes receive preventive dental treatments, which accounted for 43.5% and 120 students in total. This is followed by the ones who reported that they often receive preventive dental treatments, which accounted for

26.1% and 72 students in total. A smaller number reported that they never receive preventive dental treatments, which accounted for 17.0% and 47 students in total. On the other hand, 13.4% and 37 students reported that they always receive preventive dental treatments shown in Table 3.14 and Figure 3.14 below.

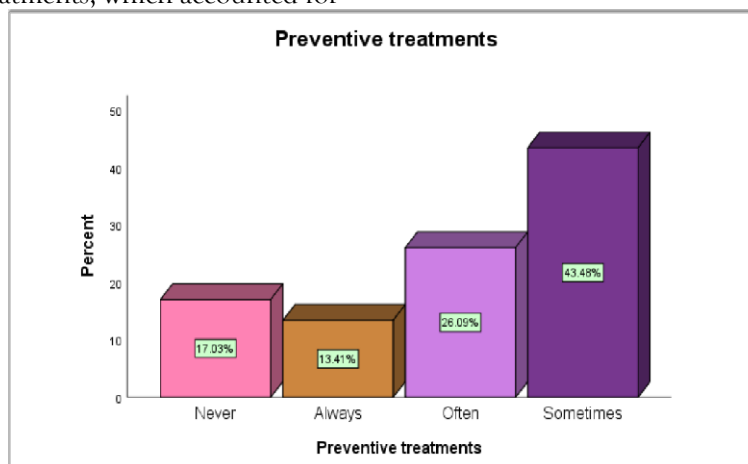


Figure 3. 5 Do you follow any preventive oral health practices (e.g., fluoride treatments, sealants)?

Table 3. 10 Do you follow any preventive oral health practices (e.g., fluoride treatments, sealants)?

Preventive treatments		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	47	17.0	17.0	17.0
	Always	37	13.4	13.4	30.4
	Often	72	26.1	26.1	56.5
	Sometimes	120	43.5	43.5	100.0
	Total	276	100.0	100.0	

3.15 Home Remedies Effect:

According to our statistical analysis, 9.1% Students thought that home cures are ineffective. 19.2% of students stated that home treatments

were highly effective. 50.4% of students said that home treatments were moderately effective. 21.4% of students did not know the impact of home cures as shown in Figure 3.15 and Table 3.15 below.

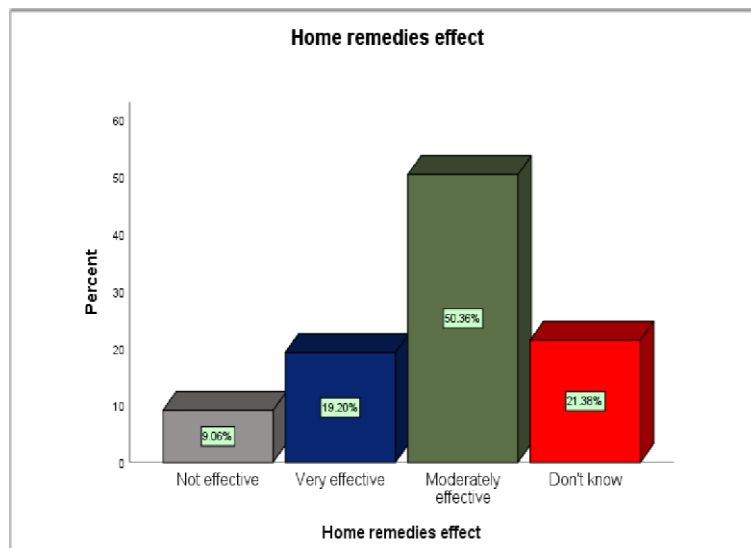


Figure 3. 6 How effective do you believe home remedies are compared to professional dental treatments?

Table 3. 11 How effective do you believe home remedies are compared to professional dental treatments?

Home remedies effect		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	25	9.1	9.1	9.1
	Very effective	53	19.2	19.2	28.3
	Moderately effective	139	50.4	50.4	78.6
	Don't know	59	21.4	21.4	100.0
	Total	276	100.0	100.0	

3.16 Home Remedies Usage:

The majority of participants reported using salt water gargle (76.1%, n=210) as a home remedy for tonsillitis. A smaller proportion used clove oil (10.5%, n=29) and tea bags (10.1%, n=28), while

3.3% (n=9) stated they had never used any home remedies. Overall, salt water gargling emerged as the most common practice among participants, as shown in Table 3.16 and Figure 3.16.

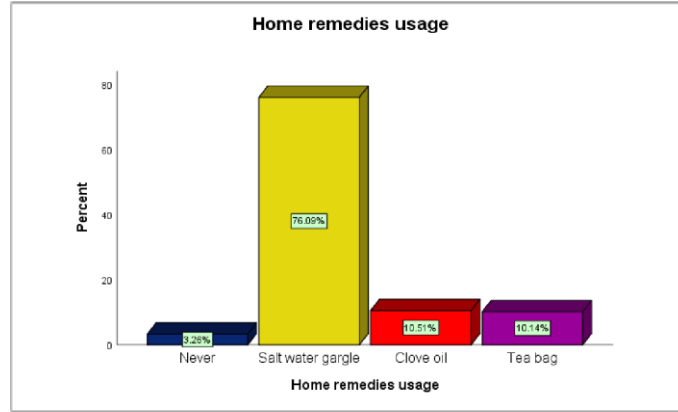


Figure 3. 7 Which of the following home remedies do you use?

Table 3. 12 Which of the following home remedies do you use?

Home remedies usage					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	9	3.3	3.3	3.3
	Salt water gargle	210	76.1	76.1	79.3
	Clove oil	29	10.5	10.5	89.9
	Tea bag	28	10.1	10.1	100.0
	Total	276	100.0	100.0	

3.17 Home Remedies Purpose:

The findings showed that most participants used home remedies for **tooth whitening** (41.3%, n=114), followed by **relief of tooth pain** (35.1%, n=97). A smaller proportion reported using

remedies for **gum bleeding** (14.5%, n=40), while the least common reason was **bad breath** (9.1%, n=25). These results are presented in **Table 3.17** and **Figure 3.17**.

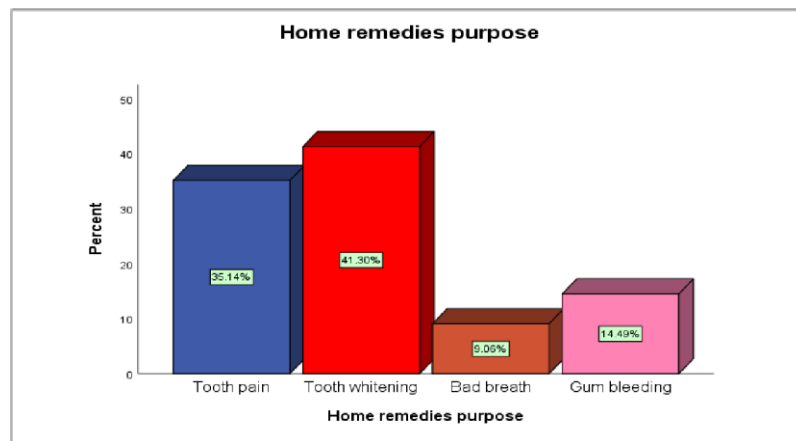


Figure 3. 8 For what purpose do you use home remedies?

Table 3. 13 For what purpose do you use home remedies?

Home remedies purpose					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tooth pain	97	35.1	35.1	35.1
	Tooth whitening	114	41.3	41.3	76.4

Bad breath	25	9.1	9.1	85.5
Gum bleeding	40	14.5	14.5	100.0
Total	276	100.0	100.0	

3.18 Gender and dental floss usage cross-tabulation:

Analysis showed that 48.6% of male and 51.4% of female students never used dental floss. Meanwhile, 34.2% of males and 65.8% of females always used floss, 38.6% of males and 61.4% of females often used it, and 43.2% of males and 56.8% of females sometimes used it. These findings are presented in Table 3.18 and Figure 3.18.

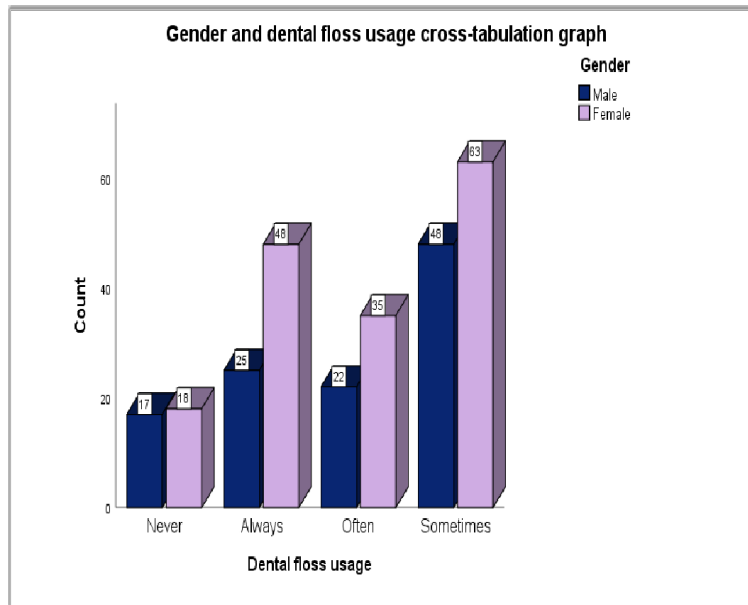


Figure 3. 9 Dental floss usage x Gender Cross-tabulation

Table 3. 14 Dental floss usage x Gender Cross-tabulation

Dental floss usage x Gender Cross-tabulation					
			Gender		Total
			Male	Female	
Dental floss usage	Never	Count	17	18	35
		% within Dental floss usage	48.6%	51.4%	100.0%
	Always	Count	25	48	73
		% within Dental floss usage	34.2%	65.8%	100.0%
	Often	Count	22	35	57
		% within Dental floss usage	38.6%	61.4%	100.0%
	Sometimes	Count	48	63	111
		% within Dental floss usage	43.2%	56.8%	100.0%
Total	Count	112	164	276	
	% within Dental floss usage	40.6%	59.4%	100.0%	

3.19 Brushing frequency x Gender. Cross-tabulation:

Analysis showed that only two female students rarely or never brushed their teeth. Among the rest, 45.8% of males and 54.2% of females brushed once daily, while 34.9% of males and 65.1% of females brushed twice daily. Additionally, 50.0% of both males and females brushed more than twice a day. These findings are presented in Table 3.19 and Figure 3.19.

Figure 3. 10 Brushing frequency x Gender Cross-tabulation

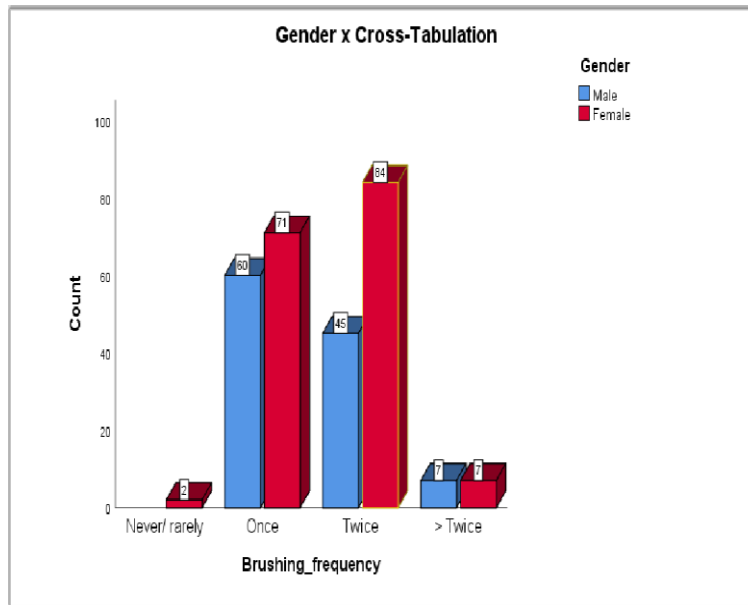


Table 3. 15 Brushing frequency x Gender Cross-tabulation

Brushing frequency x Gender Cross-tabulation					
			Gender		Total
			Male	Female	
Brushing frequency	Never/ rarely	Count	0	2	2
		% within Brushing frequency	0.0%	100.0%	100.0%
	Once	Count	60	71	131
		% within Brushing frequency	45.8%	54.2%	100.0%
	Twice	Count	45	84	129
		% within Brushing frequency	34.9%	65.1%	100.0%
	> Twice	Count	7	7	14
		% within Brushing frequency	50.0%	50.0%	100.0%
Total		Count	112	164	276
		% within Brushing frequency	40.6%	59.4%	100.0%

Discussion

Our study assessed oral health practices among health sciences students at KMU-IHS Kurram and compared them with findings from international research.

Brushing Frequency

In Brazil, de Oliveira et al. reported that most adults brushed three times daily, while only 5% brushed once (56). In our study, 47.5% brushed once daily, 46.7% twice, and 5.1% more than twice, with 0.7% rarely brushing. These results suggest acceptable practices but highlight the need to reinforce twice-daily brushing as a minimum standard.

Toothbrush Replacement

According to Singh et al., toothbrush bristles deteriorate after 1–3 months, reducing effectiveness (57). Our findings showed 55.4% of students replaced their toothbrush when bristles deformed, 36.6% sometimes, and 5.4% rarely. This reflects awareness but also inconsistency, supporting ADA recommendations for regular replacement.

Dental Floss Usage

In a randomized trial, Johnson et al. found only 16% flossed daily, citing barriers such as bleeding and discomfort (58). Similarly, our study showed 40.2% used floss occasionally, 26.4% always, 20.7% often, and 12.7% never. This highlights the need for education on flossing's role in preventing interproximal caries.

Mouthwash Use

Okeke et al. demonstrated that Nigerian students recognized mouthwash as effective for oral hygiene (59). Our findings showed 26.1% always used mouthwash, 24.6% often, 35.9% sometimes, and 13.4% never. This indicates growing awareness but occasional use suggests mouthwash is seen as supplementary.

Dental Visits

Ferreira et al. reported that only 37% of Brazilian preschool children had ever visited a dentist, with socioeconomic factors influencing attendance (60). In our study, 51.4% visited only when problems arose, 18.8% every six months, 16.3% annually, and 13.4% never. This reflects problem-based attendance patterns and emphasizes the need for preventive education.

Brushing Duration

Axelsson et al. showed that brushing for 180 seconds removed 55% more plaque than 30 seconds (61). Our study found 39.1% brushed for 1–2 minutes, 37.0% for 2–3 minutes, 11.6% <1 minute, and 12.3% >3 minutes. Most students met recommended durations, though reinforcement is needed.

Tongue Cleaning

Yokoyama et al. reported that 18.4% of Japanese outpatients cleaned their tongues daily, mainly to reduce halitosis (62). Our study found 41.3% always cleaned their tongue, 25.0% sometimes, 15.2% often, 3.6% rarely, and 14.9% never. This indicates good awareness but some neglect.

Rinsing After Meals

Sharma et al. found that 42% of children rinsed after meals (63). In our study, 44.9% always rinsed, 25.0% often, 21.7% sometimes, and 8.3% never. This shows students recognize rinsing as beneficial, though consistency varies.

Sugar Consumption

Khan et al. in Peshawar reported high sugar intake linked to 68% caries prevalence (64). Our findings showed 32.2% consumed sugary products daily, 28.3% weekly, 20.7% occasionally, and 18.8% rarely. This highlights the need for dietary counseling.

Preventive Practices

Marinho et al. demonstrated that fluoride varnish and sealants significantly reduced caries in children (65). Our study found 43.5% sometimes received preventive treatments, 26.1% often, 17.0% never, and 13.4% always. This indicates underutilization of preventive care among students.

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION:

This research indicates that most students have fairly decent oral hygiene practices. Many of them clean their teeth one or two times per day and change their toothbrush when it's bristles deformed. Also, it's observed that a considerable number of students pay attention to tongue hygiene and occasionally use mouthwash and dental floss. However, not all of them follow proper preventive measures. For instance, more than half of the students only go to the dentist if they are experiencing a dental issue. They don't go to the dentist for routine examinations. Regular use of dental floss, mouthwash, and brushing for the right amount of time is not commonly practiced among students. It's observed that there

is basic awareness of oral hygiene among students; however, more comprehensive and preventive measures of oral hygiene need to be improved among students.

5.2 RECOMMENDATIONS:

Based on the findings of this study, we recommend that:

- 1) Oral health instruction should be included in the course of health sciences study to improve students' knowledge of preventive dental health procedures and the significance of dental exams.
- 2) Awareness campaigns and workshops should be conducted in universities to improve students' understanding of proper dental hygiene habits, including daily brushing, flossing, and dental check-ups.
- 3) Students should be encouraged to adopt healthy lifestyles by reducing their intake of sugary foods and beverages to avoid tooth cavities.
- 4) Students should be encouraged to adopt evidence-based oral hygiene habits and avoid relying on home remedies as a solution to oral health problems.
- 5) Future studies should be conducted with larger sample sizes to examine the relationship between knowledge, attitudes, and state of oral health.
- 6) Health sciences related students should be encouraged to become oral health advocates in their communities as future healthcare providers.

REFERENCES

Addy, M. (2008). Oral hygiene products and practices: Periodontal considerations. *Periodontology* 2000, 48(1), 6-20.

American Dental Association (2019). Oral health topics: Toothbrushing. ADA.

Armfield, J. M. (2010). Dental anxiety and fear: Research overview. *Australian Dental Journal*, 55(3), 302-307.

GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. (2017). Global burden of oral conditions. *Lancet*.

Kwan, S., Petersen, P. E., Pine, C., & Borutta, A. (2005). Health-promoting schools: An opportunity for oral health promotion. *Bulletin of the WHO*, 83(9), 677-685.

Peres, M. A., et al. (2019). Oral diseases: A global public health challenge. *Lancet*, 394(10194), 249-260.

Petersen, P. E. (2003). The World Oral Health Report. *Community Dentistry and Oral Epidemiology*, 31(Suppl 1), 3-23.

Petersen, P. E. (2005). Priorities for research in oral health in the 21st century. *Community Dentistry and Oral Epidemiology*, 33(2), 66-73.

Rabiei, S., Mohebbi, S. Z., & Yazdani, R. (2012). Oral health knowledge among Iranian medical students. *Journal of Public Health Dentistry*, 72(4), 292-298.

Singh, A., et al. (2014). Oral health disparities in rural populations. *International Journal of Public Health Dentistry*, 4(2), 86-92.

Tonetti, M. S., & Van Dyke, T. E. (2013). Periodontitis and systemic diseases. *Journal of Clinical Periodontology*, 40(Suppl 14), S1-S7.

Watt, R. G., & Sheiham, A. (2012). Inequalities in oral health: A global perspective. *Community Dentistry and Oral Epidemiology*, 40(Suppl 2), 1-6.

WHO (2020). Oral health fact sheet. World Health Organization.

de Oliveira BH, Nadanovsky P. Tooth-cleaning frequency and oral health. *Community Dent Oral Epidemiol*. 2006;34(5):337-344.

Singh P, et al. Toothbrush bristle wear and effectiveness. *J Dent Res*. 2015;94(3):281-287.

Johnson T, et al. Dental flossing habits in adults: RCT findings. *J Clin Periodontol*. 2012;39(2):115-122.

Okeke C, et al. Mouthwash use among Nigerian students. *Niger J Clin Pract*. 2018;21(4):456-462.

Ferreira SH, et al. Dental visits among Brazilian preschool children. *Int J Paediatr Dent*. 2014;24(3):211-217.

- Axelsson P, et al. Brushing duration and plaque removal. *J Clin Periodontol.* 2004;31(3):187–192.
- Yokoyama T, et al. Tongue cleaning practices in Japan. *J Oral Rehabil.* 2010;37(3):210–216.
- Sharma R, et al. Oral hygiene practices among children. *Indian J Dent Res.* 2016;27(2):123–128.
- Khan AA, et al. Sugar consumption and dental caries in Peshawar. *Pak Oral Dent J.* 2017;37(1):45–50.
- Marinho VC, et al. Fluoride varnish and sealants efficacy: meta-analysis. *Cochrane Database Syst Rev.* 2013;(7):CD002279.
- Petersen PE. The World Oral Health Report. *Community Dent Oral Epidemiol.* 2003;31 Suppl 1:3–23.
- Peres MA, et al. Oral diseases: global public health challenge. *Lancet.* 2019;394(10194):249–260.
- Watt RG, Sheiham A. Inequalities in oral health. *Community Dent Oral Epidemiol.* 2012;40 Suppl 2:1–6.
- Tonetti MS, Van Dyke TE. Periodontitis and systemic diseases. *J Clin Periodontol.* 2013;40 Suppl 14:S1–S7.
- Kwan S, Petersen PE, Pine C, Borutta A. Health-promoting schools and oral health. *Bull World Health Organ.* 2005;83(9):677–685.
- . *East Mediterr Health J.* 2023;29(2):145–152.
- Saturnino G, et al. Oral hygiene practices in university students. *Eur J Dent Educ.* 2022;26(5):455–462.
- Raval D, et al. Oral hygiene knowledge in Indian undergraduates. *J Indian Soc Pedod Prev Dent.* 2021;39(2):123–129.
- Armfield JM. Dental anxiety overview. *Aust Dent J.* 2010;55(3):302–307.
- Addy M. Oral hygiene products and practices. *Periodontol* 2000. 2008;48(1):6–20.
- American Dental Association. Toothbrushing guidelines. ADA; 2019.
- Rabiei S, Mohebbi SZ, Yazdani R. Oral health knowledge among Iranian medical students. *J Public Health Dent.* 2012;72(4):292–298.
- Singh A, et al. Oral health disparities in rural populations. *Int J Public Health Dent.* 2014;4(2):86–92.
- Petersen PE. Oral health priorities in developing countries. *Community Dent Oral Epidemiol.* 2005;33(2):66–73.
- Jehan N, et al. Oral hygiene practices among Pakistani students. *Pak J Med Sci.* 2024;40(2):215–220.
- Azam A, et al. Oral hygiene practices in healthcare students. *J Coll Physicians Surg Pak.* 2025;35(1):45–50.
- Sood P, et al. Oral health knowledge among Indian medical students. *Indian J Dent Res.* 2024;35(3):189–195.
- Kandasamy M, et al. Oral health knowledge in Malaysian students. *J Dent Educ.* 2023;87(4):512–520.
- Ehsan M, et al. Oral health awareness in Afghan students
- WHO. Oral health fact sheet. World Health Organization; 2020.
- GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global burden of oral conditions. *Lancet.* 2018;392(10159):1789–1858.