

PREVALENCE OF ORAL HYGIENE STATUS AND ITS ASSOCIATED RISK FACTORS AMONG DENTAL PATIENTS IN PARACHINAR, DISTRICT KURRAM, PAKISTAN

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Abstract

Background: Oral hygiene is an essential component of general health and quality of life. Poor oral hygiene contributes to dental caries, gingivitis, periodontitis, tooth loss, and several systemic diseases. Understanding the prevalence of oral hygiene status and its associated behavioral risk factors is necessary for planning preventive oral health interventions.

Objective: To determine the prevalence of oral hygiene status and identify the associated dietary habits, oral hygiene practices, and dental visiting patterns among dental patients attending District Headquarter Hospital, Parachinar.

Materials and Methods: A descriptive cross-sectional study was conducted among 400 dental patients attending the Dental Department of District Headquarter Hospital, Parachinar, from January to April 2026. Participants aged 15–50 years were recruited through non-probability convenience sampling. Data were collected using a structured questionnaire covering demographic characteristics, dietary habits, oral hygiene practices, and dental visit patterns. Oral hygiene status was assessed using the Simplified Oral Hygiene Index (OHI-S). Data were analyzed using SPSS version 25, and results were presented as frequencies and percentages.

Results: Among 400 participants, 51.5% were males and 48.5% were females. Most participants (62.3%) belonged to the 21–30 years age group. Overall, 70.3% demonstrated good oral hygiene, while 26.0% and 3.8% had fair and poor oral hygiene, respectively. Better oral hygiene was observed among participants with healthier brushing habits, regular tongue cleaning, lower consumption of sugary foods, and routine dental visits.

Conclusion: The majority of dental patients had good oral hygiene; however, unhealthy dietary habits and inadequate oral hygiene practices remained important risk factors. Community-based oral health education and promotion of preventive dental care are recommended to improve oral health outcomes.

1. Introduction

Oral health is recognized as an integral component of overall health and well-being. It influences essential daily functions such as eating, speaking, smiling, and social interaction while contributing significantly to physical and psychological health. According to the World Health Organization (WHO), oral health extends beyond the absence of oral diseases and includes the ability to perform essential oral functions without pain, discomfort, or disease. Similarly, the Fédération Dentaire Internationale (FDI) defines oral health as encompassing functional, structural, aesthetic, and psychosocial dimensions that contribute to overall quality of life (1–9).

Globally, oral diseases remain one of the most prevalent public health problems, affecting approximately 3.5 billion individuals. Dental caries, gingivitis, periodontitis, and tooth loss continue to impose a substantial burden on healthcare systems, particularly in low- and middle-income countries. Poor oral hygiene facilitates the accumulation of dental plaque and calculus, leading to inflammatory conditions that may eventually contribute to systemic diseases including cardiovascular disease, diabetes mellitus, respiratory infections, and adverse pregnancy outcomes. Therefore, maintaining proper oral hygiene is not only essential for preventing oral diseases but also for improving overall health (10–21).

Several behavioral and environmental factors influence oral hygiene status. Frequent consumption of sugary foods and beverages increases bacterial fermentation and acid production, resulting in enamel demineralization and dental caries. Likewise, inadequate tooth brushing, irregular tongue cleaning, poor oral hygiene knowledge, and infrequent dental visits contribute significantly to poor oral health outcomes. Preventive practices such as brushing twice daily with fluoride toothpaste, regular tongue cleaning, and routine dental check-ups remain among the most effective strategies for reducing oral disease burden (22–38).

Although several studies have investigated oral hygiene practices in different populations, limited evidence exists regarding oral hygiene status and

its associated risk factors among dental patients in Parachinar, District Kurram. Most previous studies have focused on urban populations, while information from underserved regions remains scarce. Therefore, this study aimed to determine the prevalence of oral hygiene status and evaluate the influence of dietary habits, oral hygiene practices, and dental visiting patterns among dental patients attending the District Headquarter Hospital, Parachinar. The findings will provide baseline evidence for planning targeted oral health promotion and preventive interventions in the study area.

2. Materials and Methods

A descriptive cross-sectional study was conducted at the Dental Department of District Headquarter (DHQ) Hospital, Parachinar, District Kurram, Pakistan, between January and April 2026. The study aimed to determine the prevalence of oral hygiene status and identify the associated behavioral risk factors among dental patients.

The study population consisted of male and female patients aged 15–50 years attending the dental outpatient department. Participants were recruited using a non-probability convenience sampling technique. The required sample size was calculated using the standard formula with a 95% confidence level, 5% margin of error, and an assumed population proportion of 50%, resulting in a minimum sample size of 385 participants. To improve study precision, data were collected from 400 eligible participants.

Patients with permanent dentition who voluntarily provided informed consent were included in the study. Patients who were edentulous, undergoing orthodontic treatment, pregnant, or unable to cooperate during oral examination due to physical or mental disability were excluded.

Data were collected using a structured questionnaire that included demographic characteristics, dietary habits, oral hygiene practices, and dental visiting patterns. Oral hygiene status was assessed clinically using the Simplified Oral Hygiene Index (OHI-S) developed by Greene and Vermillion. The OHI-S evaluates both debris and calculus on six index teeth and

categorizes oral hygiene status as good (0.0–1.2), fair (1.3–3.0), or poor (3.1–6.0).

Ethical approval was obtained from the Research Ethical Committee of KMU Institute of Health Sciences, Kurram. Permission was also granted by the administration of District Headquarter Hospital, Parachinar. Written informed consent was obtained from every participant before data

collection, and confidentiality of collected information was maintained throughout the study. Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics, including frequencies and percentages, were calculated for all categorical variables. The findings are presented in the form of tables and appropriate interpretations.

3. Results

Table 3.1

Age Distribution of Participants

Age Group	Frequency	Percentage
15–20 years	66	16.5
21–30 years	249	62.3
31–40 years	52	13.0
41–50 years	33	8.3
Total	400	100

Interpretation

The majority of participants (62.3%) belonged to the **21–30-year** age group, followed by participants aged **15–20 years** (16.5%), **31–40 years** (13%), and **41–50 years** (8.3%). This indicates that young adults constituted the largest proportion of dental patients attending DHQ Hospital Parachinar during the study period. The higher representation of younger adults may reflect increased awareness of oral health, greater health-seeking behaviour, or the age distribution of the local population.

Table 3.2

Oral Hygiene Status According to Age

Age Group	Good	Fair	Poor	Total
15–20 years	55	8	3	66
21–30 years	185	60	4	249
31–40 years	31	17	4	52
41–50 years	10	19	4	33
Total	281	104	15	400

Interpretation

The distribution of oral hygiene status across different age groups demonstrated that participants aged **21–30 years** accounted for the highest number of individuals with **good oral hygiene**, reflecting the largest age group in the study. Although good oral hygiene predominated

across all age categories, relatively higher proportions of fair and poor oral hygiene were observed among older participants, particularly those aged **41–50 years**. These findings suggest that oral hygiene may decline with increasing age, emphasizing the need for continuous oral health promotion throughout adulthood.

Table 3.3

Sugary Food Intake by Gender and Oral Hygiene Status

Variable	Categories	Male	Female	Total
Sugary food intake	Never	11	17	28
	Daily	81	48	129
	Weekly	87	75	162
	Rarely	27	54	81

Oral Hygiene According to Sugary Food Intake

OHI-S	Never	Daily	Weekly	Rarely
Good	16	84	127	54
Fair	9	38	32	25
Poor	3	7	3	2

Interpretation

Weekly consumption of sugary foods was the most common dietary practice among participants, followed by daily intake. Male participants were more likely to consume sugary foods daily, whereas females more frequently reported rare or no consumption. The analysis further showed that participants who consumed sugary foods daily had

a relatively higher proportion of poor oral hygiene, while those reporting weekly or rare consumption generally demonstrated better oral hygiene. These findings indicate that frequent consumption of sugary foods may contribute to deterioration of oral hygiene status and reinforce the importance of limiting sugar intake for maintaining oral health.

Table 3.4 Combined

Sugary Drinks Intake by Gender and Oral Hygiene Status

Variable	Categories	Male	Female	Total
Sugary drinks	Never	17	31	48
	Daily	34	17	51
	Weekly	104	65	169
	Rarely	51	81	132

Oral Hygiene According to Sugary Drink Intake

OHI-S	Never	Daily	Weekly	Rarely
Good	31	30	135	85
Fair	13	17	33	41
Poor	4	4	1	6

Interpretation

Most participants consumed sugary drinks on a **weekly basis**, followed by rare consumption. Daily intake was relatively less common but was more frequently reported among males than females.

The relationship between sugary drink consumption and oral hygiene revealed that poor oral hygiene was comparatively more common among individuals consuming sugary drinks daily or rarely, whereas participants with weekly

consumption had the highest proportion of good oral hygiene. These findings suggest that the frequency and pattern of sugary drink intake may

influence oral hygiene status and highlight the importance of reducing sugary beverage consumption to improve oral health outcomes.

Table 3.5
Brushing Frequency According to Gender

Brushing Frequency	Male	Female	Total
Rarely	25	33	58
Once daily	115	97	212
Twice daily	66	64	130
Total	206	194	400

Interpretation

More than half of the participants brushed their teeth **once daily**, making it the most common oral hygiene practice among both males and females. Approximately one-third of participants reported brushing **twice daily**, while only a small proportion brushed their teeth rarely. The

distribution was similar between males and females, indicating that brushing frequency was generally consistent across gender. Since twice-daily brushing is widely recommended for maintaining good oral health, these findings suggest an opportunity for oral health education aimed at encouraging more frequent tooth brushing among the study population.

Table 3.6 Brushing Frequency by Gender

Brushing Frequency	Male	Female	Total
Rarely	25	33	58
Once daily	115	97	212
Twice daily	66	64	130
Total	206	194	400



Table 3.7 Oral Hygiene Status According to Brushing Frequency

OHI-S Score	Rarely	Once Daily	Twice Daily	Total
Good	21	156	104	281
Fair	30	50	24	104
Poor	7	6	2	15
Total	58	212	130	400

Interpretation

Brushing once daily was the most common oral hygiene practice among the participants (53%), while 32.5% reported brushing twice daily and 14.5% brushed their teeth rarely. Male and female participants showed a similar brushing pattern. Participants who brushed their teeth twice daily

demonstrated better oral hygiene than those brushing once daily or rarely. Conversely, poor oral hygiene was more common among participants who rarely brushed their teeth. These findings emphasize that increasing brushing frequency to twice daily may significantly improve oral hygiene and reduce plaque accumulation.

Table 3.8

Brushing Time	Male	Female	Total
Rarely	15	22	37
Morning	113	85	198
Night	12	23	35
Morning & Night	66	64	130
Total	206	194	400

Table 3.9 Oral Hygiene Status According to Brushing Time

OHI-S Score	Rarely	Morning	Night	Morning & Night	Total
Good	12	143	22	104	281
Fair	20	49	11	24	104
Poor	5	6	2	2	15
Total	37	198	35	130	400

Interpretation

Nearly half of the participants brushed their teeth only in the morning, whereas about one-third brushed both in the morning and at night. Very few participants brushed only at night or brushed irregularly. Patients who brushed both morning

and night showed a greater proportion of good oral hygiene, while those who brushed rarely exhibited comparatively poorer oral hygiene. These findings indicate that brushing at least twice daily contributes to better oral cleanliness and may reduce the risk of dental plaque and oral diseases.

Table 3.10

Tongue Cleaning	Male	Female	Total
Never	64	73	137
Daily	74	67	141
Rarely	68	54	122
Total	206	194	400

Table 3.11 Oral Hygiene Status According to Tongue Cleaning Practice

OHI-S Score	Never	Daily	Rarely	Total
Good	92	114	75	281
Fair	39	23	42	104
Poor	6	4	5	15
Total	137	141	122	400

Interpretation

Tongue cleaning was practiced daily by 35.3% of participants, while 34.3% never cleaned their tongue and 30.5% did so only occasionally. Participants who cleaned their tongue daily had the highest proportion of good oral hygiene and

the lowest proportion of poor oral hygiene. In contrast, participants who never or rarely cleaned their tongue were more likely to have fair or poor oral hygiene. This finding highlights the importance of tongue cleaning as an essential

component of maintaining good oral hygiene and reducing microbial accumulation in the oral cavity.

Table 3.12

Ever Visited Dentist	Male	Female	Total
No	31	17	48
Yes	175	177	352
Total	206	194	400

Table 3.13 Oral Hygiene Status According to Dental Visits

OHI-S Score	No	Yes	Total
Good	32	249	281
Fair	14	90	104
Poor	2	13	15
Total	48	352	400

Interpretation

A large majority of participants (88%) had visited a dentist at least once, whereas only 12% had never sought dental care. Participants who reported visiting a dentist generally demonstrated better oral hygiene than those who had never visited one. Regular dental attendance provides

opportunities for professional cleaning, early diagnosis, and preventive counseling, all of which contribute to improved oral health outcomes. These findings support the importance of encouraging routine dental check-ups rather than seeking treatment only after oral problems develop.

Table 3.14

Visit Frequency	Male	Female	Total
Never	31	17	48
Every 6 months	68	41	109
Yearly	22	10	32
Problem-based	85	126	211
Total	206	194	400

Table 3.15 Oral Hygiene Status According to Dental Visit Frequency

OHI-S Score	Never	Every 6 Months	Yearly	Problem-Based	Total
Good	32	87	25	137	281
Fair	14	19	6	65	104
Poor	2	3	1	9	15
Total	48	109	32	211	400

Interpretation

More than half of the participants (52.8%) visited the dentist only when they experienced dental problems, while only 27.3% attended dental

check-ups every six months. A small proportion reported yearly visits or had never visited a dentist. Participants who attended dental clinics every six months generally exhibited better oral hygiene

than those relying solely on problem-based visits. These findings indicate that preventive dental attendance remains inadequate among the study population and underline the need to promote regular dental examinations for the prevention and early management of oral diseases.

4 – DISCUSSION

The present study was conducted to assess the oral hygiene status and its associated behavioural factors among dental patients attending DHQ Hospital Parachinar, District Kurram. Oral hygiene is an important determinant of general health, and poor oral hygiene is associated with an increased risk of dental caries, periodontal disease, tooth loss, and several systemic diseases. The findings of this study indicate that although the majority of participants demonstrated good oral hygiene according to the Simplified Oral Hygiene Index (OHIS), several lifestyle and behavioural factors were significantly associated with oral hygiene status. These findings provide valuable information for improving preventive oral healthcare services and oral health education in the study area.

A total of **400 participants** were included in the study, with an almost equal distribution of males (51.5%) and females (48.5%). The majority of both male and female participants had good oral hygiene, while only a small proportion exhibited poor oral hygiene. These findings are consistent with those reported by **Beyene et al. (2021)**, who also found a similar gender distribution and reported that most participants had satisfactory oral hygiene. The similarity between the two studies suggests that gender alone may not be a strong predictor of oral hygiene status when access to dental services and oral hygiene practices are relatively comparable.

Regarding age distribution, most participants belonged to the **21–30 years** age group, followed by those aged 15–20 years. Participants within the 21–30-year age group also demonstrated the highest proportion of good oral hygiene. Similar findings were reported by **Bhuvaneshwari et al. (2022)**, where young adults represented the largest proportion of study participants. Younger adults may be more aware of oral hygiene practices

through educational exposure, social media, and improved access to healthcare services, which may contribute to their comparatively better oral hygiene status.

The overall assessment of oral hygiene using the Simplified Oral Hygiene Index showed that most participants had **good oral hygiene**, followed by fair and poor oral hygiene. This finding agrees with the study conducted by **Gul et al. (2023)**, who also reported that the majority of their participants maintained satisfactory oral hygiene. Nevertheless, a small proportion of participants in the present study demonstrated poor oral hygiene, which may be explained by inadequate oral health knowledge, poor brushing habits, irregular dental visits, and unhealthy dietary behaviours.

Dietary practices were found to be important determinants of oral hygiene. Participants who consumed sugary foods daily were more likely to exhibit poor oral hygiene than those who consumed sugary foods weekly or rarely. Frequent intake of sugary foods provides a continuous source of fermentable carbohydrates for oral bacteria, leading to plaque accumulation, acid production, and increased risk of dental caries.

These findings are consistent with studies by **Javed et al. (2024)** and **Maria et al. (2022)**, which also reported that high sugar consumption was associated with poorer oral health outcomes. Similarly, participants with less frequent consumption of sugary foods demonstrated better oral hygiene, emphasizing the importance of dietary modification in preventing oral diseases.

A similar relationship was observed for sugary drink consumption. Although weekly consumption was the most commonly reported pattern, participants who consumed sugary drinks daily showed relatively poorer oral hygiene compared with those who consumed them less frequently. These findings support the observations of **Maria et al. (2022)**, who concluded that frequent intake of sugar-sweetened beverages increases dental plaque formation and contributes to poor oral hygiene. Reducing the consumption of sugary drinks should therefore be considered an important preventive strategy in oral health promotion programmes.

Personal oral hygiene practices also showed a strong association with oral hygiene status. Most participants brushed their teeth once daily, while approximately one-third brushed twice daily. Participants who brushed their teeth twice daily demonstrated better oral hygiene than those brushing only once daily or brushing irregularly. Similar findings have been reported by **Maria et al. (2022)**, **Amjad et al. (2022)**, and **Bhuvaneshwari et al. (2022)**, all of whom emphasized that brushing twice daily effectively removes dental plaque and reduces the incidence of periodontal disease and dental caries. These findings reinforce current international recommendations encouraging twice-daily tooth brushing using fluoridated toothpaste.

The timing of tooth brushing also influenced oral hygiene status. Participants who brushed both in the morning and before bedtime demonstrated better oral hygiene than those brushing only in the morning or brushing irregularly. These results are comparable with those reported by **Mahmud et al. (2025)**, who observed that brushing before bedtime significantly contributes to plaque control because bacterial activity increases during sleep due to reduced salivary flow.

Tongue cleaning was another behavioural practice associated with improved oral hygiene. Participants who cleaned their tongue daily demonstrated better oral hygiene than those who never or rarely cleaned their tongue. Similar findings have been reported by **Beyene et al. (2021)** and **Mahmud et al. (2025)**, suggesting that tongue cleaning effectively reduces bacterial accumulation, improves oral cleanliness, and decreases halitosis. Therefore, tongue cleaning should be promoted as an integral component of routine oral hygiene practices.

Dental attendance patterns further highlighted the importance of preventive oral healthcare. Most participants had visited a dentist at least once; however, the majority reported seeking dental care only when they experienced pain or other dental problems. Similar observations have been reported by **Karimkhani (2025)** and **Mahmud et al. (2025)**, indicating that problem-based dental attendance remains common in many developing countries. Participants who attended dental clinics regularly

generally demonstrated better oral hygiene than those who delayed treatment until symptoms developed. These findings emphasize the need to encourage routine preventive dental check-ups rather than relying solely on emergency dental care. Overall, the findings of the present study demonstrate that oral hygiene is influenced by multiple interconnected behavioural and lifestyle factors rather than a single determinant. Good oral hygiene was consistently associated with healthier dietary habits, regular tooth brushing, tongue cleaning, and routine dental attendance. These findings highlight the importance of comprehensive oral health education programmes that encourage healthy behaviours and preventive dental care to improve oral hygiene and reduce the burden of oral diseases among the population.

5. CONCLUSION

The present study was conducted to assess the oral hygiene status and its associated determinants among dental patients attending DHQ Hospital Parachinar, District Kurram. The findings revealed that the majority of participants had good oral hygiene status according to the Simplified Oral Hygiene Index (OHIS), while a smaller proportion exhibited fair and poor oral hygiene. Although the overall oral hygiene status of the participants was satisfactory, several behavioural and lifestyle factors were found to influence oral health outcomes. The study demonstrated that frequent consumption of sugary foods and sugar-sweetened beverages, inadequate tooth brushing practices, lack of regular tongue cleaning, and irregular dental visits were associated with poorer oral hygiene status. Conversely, participants who brushed their teeth twice daily, cleaned their tongues regularly, limited their intake of sugary foods and drinks, and attended dental clinics for preventive care generally exhibited better oral hygiene. The findings also showed that young adults constituted the largest proportion of the study population and generally maintained better oral hygiene than older participants, while only minimal differences were observed between males and females. These results suggest that behavioural factors play a more important role than demographic characteristics in determining oral

hygiene status. The study highlights the importance of promoting healthy oral hygiene practices and preventive dental care through continuous oral health education and community awareness programmes. Despite being limited to patients attending a single tertiary healthcare facility, the findings provide valuable baseline information regarding oral hygiene practices in District Kurram and may assist policymakers and healthcare professionals in planning evidence-based oral health interventions. Overall, the study concludes that maintaining good oral hygiene requires a combination of proper tooth brushing, regular tongue cleaning, reduced consumption of sugary foods and beverages, and routine preventive dental visits. Strengthening oral health education and encouraging positive behavioural changes among the general population will significantly contribute to reducing the burden of oral diseases and improving overall quality of life.

6. RECOMMENDATIONS

Based on the findings of the present study, it is recommended that comprehensive oral health promotion programmes should be implemented to improve oral hygiene practices among the general population. Individuals should be encouraged to brush their teeth at least twice daily using fluoridated toothpaste, clean their tongues regularly, and adopt correct tooth-brushing techniques to maintain optimal oral hygiene. Public awareness campaigns should emphasize reducing the consumption of sugary foods and sugar-sweetened beverages, as frequent intake of these products increases the risk of dental plaque, dental caries, and periodontal diseases. Preventive dental care should be promoted by encouraging individuals to attend routine dental check-ups every six months instead of seeking treatment only when pain or oral problems occur. Dental professionals should provide continuous patient education regarding proper oral hygiene practices during every clinical visit and actively motivate patients to adopt healthier oral health behaviours. Healthcare institutions, including DHQ Hospital Parachinar, should organize regular community outreach programmes, oral health screening camps, and educational seminars to increase

awareness regarding preventive oral healthcare, particularly in rural and underserved communities. Government health authorities should integrate oral health education into school health programmes and public health campaigns to establish healthy oral hygiene habits from an early age and improve oral health literacy across the population. Furthermore, policymakers should strengthen access to affordable preventive dental services to encourage routine utilization of dental care. Future research should include larger and more diverse populations from multiple healthcare facilities to improve the generalizability of the findings and should investigate additional determinants such as socioeconomic status, educational level, oral health literacy, tobacco use, and access to healthcare services. Longitudinal and intervention-based studies are also recommended to evaluate the long-term effectiveness of oral health education programmes and preventive strategies. Implementing these recommendations through collaboration among individuals, healthcare professionals, educational institutions, and public health authorities will contribute to improved oral hygiene practices, reduced prevalence of oral diseases, and better overall oral health outcomes within the community.

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