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Oral hygiene knowledge, practices, attitude, and awareness among primary school students in a rural area of mardan, pakistan

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ABSTRACT

Introduction: Poor oral hygiene significantly impacts quality of life, manifesting in pain, dental abscesses, eating difficulties, and social embarrassment due to dental issues. While oral hygiene knowledge is crucial, its effectiveness hinges on the development and implementation of positive attitudes and habits. The aim is to determine the level of oral hygiene knowledge, practices, attitudes, and awareness among primary school students in a rural area of Mardan, Pakistan.

Materials and Methods: A cross-sectional, school-based study was conducted employing a self-administered structured interview questionnaire to evaluate oral hygiene knowledge, practice, attitude, and awareness among 384 primary students aged 7–15 years residing in rural areas of Mardan. Descriptive statistics were utilized for data analysis using SPSS version 22.

Results: The study of 384 students aged 7–12 found that 58.4% used toothbrushes, 32.1% used miswak, 7.2% used toothpicks, and 2.3% used dental floss. While 79.4% valued regular checkups, 52.1% visited the dentist only when in pain, with 67.28% citing fear as the main deterrent. Most students knew the harm of high-sugar diets (62.26%), soft drinks (58.45%), and gum diseases (57.14%).

Conclusion: The study concludes the importance of targeted interventions crucial to improving students' oral hygiene. Despite a strong understanding of dental issues, gaps in practice and attitudes remain. Enhancing oral hygiene habits and access to dental care services are essential.

Keywords: Knowledge, Oral hygiene, Students, Awareness, Practice, Mardan

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1. Introduction

Dental hygiene constitutes a scientific discipline and practical application focused on the identification, therapeutic intervention, and prophylaxis of oral pathologies. Effective oral hygiene serves as the fundamental pillar for sustaining oral health, effectively averting approximately 80% of prevalent dental afflictions (1). Encouraging people to keep their mouths clean is important for having healthy teeth and gums. When we stick to regular brushing and flossing, we can lower the chances of experiencing common mouth problems such as gum disease and cavities. This way of taking care of our mouths not only keeps our smiles bright but also helps to keep our whole bodies healthy.

Oral diseases are regarded as significant public health challenges due to their elevated frequency within populations and substantial societal repercussions (2). Oral conditions afflict 3.9 billion individuals worldwide, with the global burden experiencing a notable increase of 20.8% between 1990 and 2010 (3).

Oral health constitutes an indispensable element of overall well-being for individuals and has emerged as a significant public health concern, bearing considerable social ramifications (4). Oral diseases are the most widespread non-communicable health conditions that people experience during their lives. They cause pain, discomfort, and changes in appearance, and in severe cases, they can even lead to death (5). Assessing the oral health habits of children is crucial for designing and assessing the effectiveness of programs aimed at promoting oral health. Maintaining excellent oral health in school-aged children is essential to minimizing disruptions in daily activities at home and school stemming from oral health concerns. The negative effects of poor oral health extend beyond physical discomfort, impacting social interactions and psychological well-being and thereby reducing the overall quality of life for school-aged children (4).

In developed nations, there has been a noticeable decrease in the prevalence and severity of oral diseases over the past five decades (6). Previous research indicates a high prevalence of dental caries among both preschool-aged and school-aged children (7). Dental caries impacts a substantial proportion, ranging from 60% to 90%, of school-age children and the majority of adults. Moreover, periodontal disease is prevalent in 50% to 90% of adults, with severity increasing in 10% to 15% of cases. Additionally, gingival diseases are common among the majority of children and adolescents (3).

Limited research has been conducted on the knowledge, awareness, and practices related to oral hygiene and their impact on the oral hygiene status of students, particularly in Pakistan. The significance of oral hygiene among primary school students, particularly in rural areas where access to oral hygiene services may be constrained, underscores the necessity of this study. A profound grasp of oral hygiene knowledge, practices, attitudes, and awareness within this demographic is essential for formulating targeted interventions aimed at enhancing oral hygiene outcomes. Through the identification of specific needs and challenges encountered by primary school students in rural areas of Mardan, Pakistan,

this study provides valuable insights that can facilitate the development of efficacious oral hygiene promotion strategies for the population. Early intervention in tackling oral hygiene problems has the potential to bring lasting benefits to overall health and well-being. The objective of this study was to determine oral hygiene knowledge, practices, attitudes, and awareness among primary school students in a rural area of Mardan, Pakistan.

2. Methods

A cross-sectional study was conducted between January and March 2024 among school-going students aged 7 to 15 years of both genders in Mardan, Pakistan. The study was conducted across multiple primary schools in the Mardan region. Because the extent of oral hygiene knowledge among school students in the region was unknown during the study period, an estimated prevalence of 50% was assumed. A 95% confidence interval with a margin of error of 5% was employed for the sample size calculation. Utilizing open-epi, the estimated sample size was determined to be 384 students.

A convenience sample of 384 school-going students was selected in January 2024. The inclusion criteria included students being aged 7 to 15 years, willing to participate, and residing continuously in Mardan since birth. The exclusion criteria included students with acute or chronic illnesses under medication, as well as those lacking parental consent. Before initiating the study, ethical clearance was obtained from the Institutional Review Board. Each student received an explanation of the study's purpose and methodology, with informed consent obtained before data collection and clinical examinations. The study spanned three months. The questionnaire, initially composed of English, was translated into Urdu and Pashto to suit the study population, followed by back translation for verification of accuracy. The questionnaire included questions about socio-demographic characteristics, oral hygiene knowledge, attitudes, awareness, and practices. It was distributed to all students in grades five through eight to encourage their participation in the study.

Participants were directed to respond to each item following the provided response format attached to each question. Throughout the completion of the questionnaire, one of the investigators was consistently present and available to address any inquiries the students might have had. Anonymity and confidentiality were ensured by instructing students to abstain from providing any identifying information within the questionnaire.

Data analysis was conducted using SPSS version 22. Descriptive statistics, which included frequency and percentage calculations, were utilized for the analysis of qualitative data.

3. Results

The study enrolled a total of 384 students, achieving a 100% response rate. The majority of participants (39.1%) were between 7 to 10 years old, while 36.2% were in the 10 to 12 years age group. Slightly more than half of the students (53.1%) were male, while the remaining 46.9% were female. In terms of grade level, the largest group was 5th grade students (38.5%), followed by 6th grade (35.4%).

Table 1. Socio-demographic data of participants

Variables	Frequency (n)	Percent (%)
Age		
7 to 10 years	150	39.1%
10 to 12 years	139	36.2%
12 to 15 years	95	24.7%
Gender		
Male	204	53.1%
Female	180	46.9%
Grade		
5th Grade	148	38.5%
6th Grade	136	35.4%
7th Grade	60	15.6%
8th Grade	40	10.4%
Family Size		
Less than 5 members	136	35.4%
More than 6 members	248	64.6%
Father's occupation		
Worker	147	38.3%
Farmer	105	27.3%
Employee	75	19.5%
Unemployed	57	14.8%
Mother's occupation		
Housewife	308	80.2%
Employee	76	19.8%

Families with more than 6 members made up the majority (64.6%) of the participants' household sizes. Regarding parental occupation, the fathers were predominantly employed as workers (38.3%), while the majority of mothers were reported to be homemakers (80.2%). The distribution of students across these demographic variables is summarized in Table 1.

3-1. Oral Hygiene Knowledge

Table 2 provides a comprehensive overview of the students' knowledge about oral hygiene, covering prevalent dental issues, contributing factors, preventive measures, and key insights into dental care. As shown in Figure 1, tooth decay is the most common dental issue, affecting 45.6% of the students, followed by gum disease (20.6%) and halitosis (7%). The primary contributing factors were the consumption of sweets and chocolate (52.6%), inadequate brushing frequency (27.3%), and the presence of bacteria (12.5%). The identified preventive measures included regular tooth brushing (68.5%) and dental check-ups (6%). Dental plaque was reported to consist primarily of food particles (43.8%) and bacteria (24%). Gingival bleeding was commonly attributed to improper brushing technique (51.8%) or gum disease (25.8%). Regular teeth cleaning was recognized as an effective way to prevent dental caries by removing food particles (51%) and eliminating bacteria (25%). To prevent bleeding, students recommended brushing

their teeth twice a day (42.4%), daily flossing (6%), and using a soft-bristled toothbrush (27.3%).

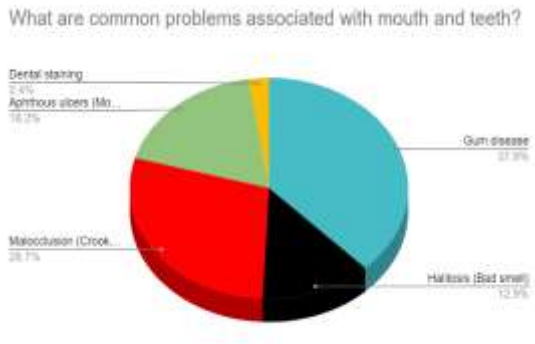

Fig. 1. Common problems associated with mouth and teeth.

3-2. Oral Hygiene Practices

Table 3 provides insights into the oral hygiene practices among the students, covering various aspects of their tooth cleaning routines. As shown in Figure 2, the majority of students (64.3%) primarily rely on toothbrushes and toothpaste for cleaning their teeth.

Table. 2 Oral Hygiene Knowledge

Variables	Frequency (n)	Percent (%)
Common problems associated with mouth and teeth		
Tooth decay	175	45.6%
Gum disease	79	20.6%
Halitosis (Bad smell)	27	7%
Malocclusion (Crooked teeth)	60	15.6%
Aphthous ulcers (Mouth ulcers)	38	9.9%
Dental staining	5	1.3%
Primary factors contributing to dental problems		
Consumption of sweets and chocolates	202	52.6%
Inadequate brushing frequency	105	27.3%
Failure to rinse mouth after eating	16	4.2%
Bacterial presence	48	12.5%
Unsure	13	3.4%
How can dental problems be prevented?		
Limiting intake of sweets and chocolates	57	14.8%
Regular tooth brushing	263	68.5%
Dental check-ups	23	6%
Gargling after taking meal	32	8.3%
Unsure	9	2.3%
What primarily constitutes dental plaque?		
Bacteria	92	24%
Food particles	168	43.8%
Saliva	43	11.2%
All of the above	81	21.1%
What commonly causes gingival bleeding?		
Improper brushing technique	199	51.8%
Gum disease	99	25.8%
Both	86	22.4%
How does regular teeth cleaning help prevent dental caries?	196	51%
Removal of food particles	96	25%
Elimination of bacteria	92	24%
Both		
How can you prevent bleeding gums?		
Brushing teeth twice a day	163	42.4%
Daily flossing	23	6%
Use of a soft-bristled toothbrush	105	27.3%
All of the above	93	24.2%

This was followed by the use of traditional miswak (19%) and tooth powder (15.4%), while dental floss and thread were less commonly utilized. Regarding the frequency of brushing, most students (78.9%) reported brushing their teeth twice daily, while a small percentage did so only once daily (3.1%) or rarely (18%). Parental supervision during brushing was reported by 28.9% of students, while 40.6% were unaware of any supervision. In terms of the duration of brushing, 52.9% of the students allocated around 1 minute, while 28.9% spent less than a minute. The preferred method was using a toothbrush (77.6%), while 22.4% preferred using their fingers.
When it came to toothbrush replacement, 71.6% of the participants changed their toothbrush when it was worn out, and 7.8% did so every 6 months. However, rinsing after meals was not a common practice, with only 1.3% of students always rinsing and 36.2% doing so sometimes, while 62.5% never rinsed. Lastly, a small proportion of students (5.2%) used fluoride-containing toothpaste, while a significant majority (62%) were unsure if their toothpaste contained fluoride, and 32.8% reported not using fluoride-containing toothpaste.

3-3. Oral Hygiene Practices

Table 3 provides insights into the oral hygiene practices among the students, covering various aspects of their tooth cleaning routines. As shown in Figure 2, the majority of students (64.3%) primarily rely on toothbrushes and toothpaste for cleaning their teeth. This was followed by the use of traditional miswak (19%) and tooth powder (15.4%), while dental floss and thread were less commonly utilized. The frequency of brushing revealed that most students (78.9%) brushed their teeth twice daily, while a small percentage did so only once daily (3.1%) or rarely (18%). Parental supervision during brushing was reported by 28.9% of students, while 40.6% were unaware of any supervision. In terms of the duration of brushing, 52.9% of the students allocated around 1 minute, while 28.9% spent less than a minute. The preferred method was using a toothbrush (77.6%), while 22.4% preferred using their fingers.

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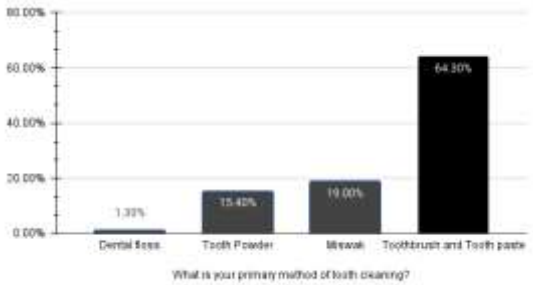

Fig. 2. Shows Primary method of tooth cleaning.

Here is a revised version of the text on oral hygiene attitudes:

3-4. Oral Hygiene Attitudes

Table 4 provides valuable insights into the oral hygiene attitudes among the students. A significant portion (75.8%) of the students reported visiting the dentist only when experiencing pain, while a smaller

fraction (9.1%) visited regularly every six months, and 15.1% never visited the dentist. Despite the infrequent dental visits, the majority of students (77.1%) acknowledged the necessity of regular dental check-ups. However, 10.2% were uncertain, and 12.8% disagreed with the importance of regular dental visits. For the last dental visit, the primary reason cited was toothache (69.8%), followed by parental endorsement (8.1%), the dentist's advice (10.4%), and other reasons (11.7%). The main reasons for not visiting the dentist were fear (75.5%), the absence of nearby dental clinics (19%), and no specific reason (5.5%). Regarding information provision during dental examinations, a considerable portion (54.4%) of the students reported that dentists did not provide information about their dental problems. In contrast, 23.4% affirmed receiving such information, and 22.1% remained uncertain.

Table 3. Oral hygiene practices

Variables	Frequency (n)	Percent (%)
Primary method of tooth cleaning		
Toothbrush and Tooth paste	247	64.3%
Miswak	73	19%
Tooth Powder	59	15.4%
Dental floss	5	1.3%
Thread for teeth cleaning	0	0
How frequently do you brush your teeth?		
Once daily	303	78.9%
Twice daily	12	3.1%
Rarely	69	18%
Are you supervised by your parents while brushing?		
Yes	111	28.9%
No	117	30.5%
Not Aware	156	40.6%
How much time do you allocate for brushing your teeth?		
Less than 1 minute	111	28.9%
1 minute	203	52.9%
2 minutes	16	4.2%
Uncertain	54	14.1%
What is your preferred method of teeth cleaning?		
Using Finger	86	22.4%
Using Toothbrush	298	77.6%
How often do you change your toothbrush?		
When it becomes worn out	275	71.6%
Every 6 months	30	7.8%
Uncertain	79	20.6%
Do you rinse your mouth after meals?		
Never	240	62.5%
Sometimes	139	36.2%
Always	5	1.3%
Do you use fluoride-containing toothpaste?		
Yes	20	5.2%
No	126	32.8%
Unsure	238	62%

3-5. Oral Hygiene Awareness

According to Table 05, the majority of students (65.4%) recognized bleeding gums as an indicator of gum disease due to poor oral health. However, 15.9% remained unsure about the association, and 18.8% attributed it to general illness. Regarding the maintenance of healthy gums, a vast majority of students (89.8%) recognized the importance of daily brushing, using mouthwash, or flossing, while a smaller fraction (10.2%) was unsure. When it came to the impact of diet on dental decay, the majority of students (90.9%) acknowledged that a sugary diet contributes to dental decay. Only 7% expressed uncertainty, and 2.1% disagreed with this association. Similarly, most students (90.6%) agreed that carbonated soft drinks affect dental hygiene, while 4.7% were unsure and 4.7% disagreed. As for the sources of their oral health information, the majority of students cited parents (51.3%), followed by books (19%), TV (20.6%), and teachers (9.1%). Radio and newspapers were not significant sources.

Table 4. Oral Hygiene Attitudes

Variables	Frequency (n)	Percent (%)
How frequently do you visit the dentist?		
Regularly/once every 6 months	35	9.1%
When experiencing pain	291	75.8%
Never	58	15.1%
Is regular visit to the dentist necessary?		
Yes	39	10.2%
No	296	77.1%
Unsure	49	12.8%
What was the reason for your last dental visit?		
Toothache	268	69.8%
Parents endorsement	31	8.1%
Dentists' Advice	40	10.4%
Other reason	45	11.7%
Why have you not visited the dentist?		
Fear	290	75.5%
Absence of nearby dental clinic	73	19%
No specific reason	21	5.5%
Does the dentist provide information about dental problems during examination?		
Yes	90	23.4%
No	209	54.4%
Unsure	85	22.1%

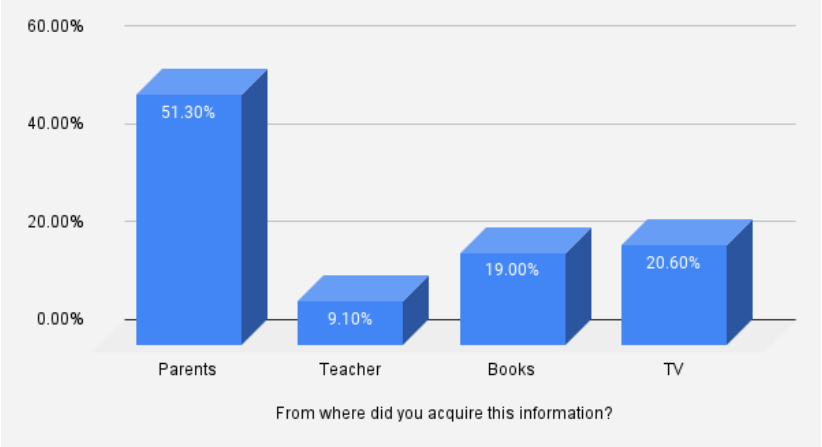

Fig. 3. Shows that from where did you acquire this information?

Table 5. Oral Hygiene Awareness

Variables	Frequency (n)	Percent (%)
What does bleed from gums indicate?		
Gum disease due to poor oral health	61	15.9%
General illness	251	65.4%
Unsure	72	18.8%
How can you maintain healthy gums?		
Brushing teeth daily/using mouthwash/using dental floss	345	89.8%
Unsure	39	10.2%
Does a sugary diet contribute to dental decay?		
Yes	349	90.9%
No	27	7%
Unsure	8	2.1%
Do carbonated soft drinks affect dental health?		
Yes	348	90.6%
No	18	4.7%
Unsure	18	4.7%
From where did you acquire this information?		
Parents	197	51.3%
Teacher	35	9.1%
Books	73	19%
TV	79	20.6%
Radio	0	0
News Paper	0	0

4. Discussion

The emphasis placed by the World Health Organization (WHO) on advancing adolescent oral health through health-promoting schools underscores the global initiatives dedicated to improving oral health universally (3). Dental caries represents the prevailing oral disease worldwide, with dental plaque accumulation on tooth surfaces serving as its primary causative factor. The principal focus for disease prevention lies in

mitigating plaque deposition through various methodologies.

Within the context of the current investigation, a notable proportion of students residing in rural areas exhibited limited yet discernible awareness concerning the significance of regular brushing practices and demonstrated engagement in such activities (8). This finding aligns with previous epidemiological studies on dental caries among school children, which often focus solely on prevalence rates or utilize predetermined ratios cited in the literature for analysis (7). A study (15) comparing oral hygiene practices revealed that 64.3% of students utilized a toothbrush with toothpaste as their primary method of teeth cleaning, whereas only 19% employed traditional methods such as miswak. This proportion was lower than that reported in a study conducted in Saudi Arabia (7). Nonetheless, toothbrushes and toothpaste remained the predominant oral hygiene tools, consistent with findings reported elsewhere. Over 71.6% of the students in the current study replaced their toothbrushes when they were worn out, while only 7.8% did so after six months, which is significantly lower than findings from prior studies (9). The study also revealed that 78.9% of students clean their teeth once daily, a rate significantly higher than findings reported in several developed countries (12).

One study (10) highlighted fear as the primary motivating factor for patients to visit a dentist. Many students in this study reported irregular dental attendance, possibly aligning with findings from other studies. Routine dental examinations play a critical role in preventing oral diseases, educating patients, and promoting good oral hygiene maintenance (9). In the current study, 43.8% of the students were aware that dental caries could be caused by food particles, diverging from the findings of Dhull et al. (5). The study also revealed discrepancies in awareness of general illness as a primary indicator for periodontal disease, which was not aligned with results from previous studies (2). Schools serve as a vital platform for promoting effective oral health among school staff, students, and their families. The integration of oral health promotion with general health initiatives, school curricula, and activities is feasible. Oral health interventions in schools have proven effective when reinforced, provided at shorter intervals, and complemented with affordable dental cleaning aids (3).

Conclusion and recommendations

This study revealed a significant prevalence of tooth decay among students attributed to dietary habits and inadequate oral hygiene practices. Despite the importance of regular dental visits, a reactive approach persists, with fear and limited access to clinics hindering preventive care. A lack of supervision during brushing and insufficient time allocation are notable concerns.

Recommendations include educational initiatives to raise awareness, active parental supervision during brushing, promoting regular dental check-ups, addressing barriers to access, and improving communication between dentists and patients. Emphasis on fluoride use, dietary education, and encouraging healthier habits can foster better oral health outcomes among students in the long run.

Schools play a vital role in promoting oral health by providing guidelines, integrating education into the curriculum, and facilitating access to dental care services.

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Conflicts of interest

There are no conflicts of interest to declare.

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