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Knowledge And Practice of Oral Hygiene Among Primary School Pupils in Bichi Local Government Area of Kano State, Nigeria

Musa Nasiru[1*] & Sulaiman Hamza Muhammad[2]
[1,2]Department of Biology Education, FCE (T) Bichi, Kano State
[*]Corresponding Author Email: musanasirubch@gmail.com

ABSTRACT
This study investigated the knowledge and practice of oral hygiene among primary school pupils in public schools in Bichi Local Government Area of Kano State, Nigeria. A descriptive survey research design was employed, and a total of 400 pupils were selected using a two-stage simple random sampling procedure. Data were collected using a validated and reliable researcher-developed questionnaire (KP-OH-PP-PS-Q). Descriptive statistics were used to summarize demographic information, while inferential statistics including Chi-square, Independent Samples t-test, and Pearson Product Moment Correlation were used to test the hypotheses at a 0.05 significance level. Findings revealed that pupils generally exhibited average oral hygiene knowledge and practice, with a mean score of 5.63. Significant differences were found in oral hygiene practices based on gender and location, with female and urban pupils demonstrating better practices than their male and rural counterparts. The study concludes that although pupils show moderate oral hygiene awareness and behaviour, disparities exist across demographic groups. It recommends strengthened school-based oral health education, regular dental outreach programmes, and targeted interventions to improve oral hygiene among males and rural pupils.

Keywords:
Hygiene,
Practices,
Dental,
Disparities,
Awareness,
Behaviour

INTRODUCTION

Oral diseases have been a persistent public health problem globally, with almost every individual experiencing poor oral health at least once in their lifetime. Poor oral hygiene in children and adolescents has been documented throughout the world due to plaque and calculus deposits that increase with age (World Health Organization (WHO) (2017). Only a minor proportion of the school going children in developing nations like Nigeria has good oral hygiene compared to larger population among developed nations. A state of having good oral health means being free from conditions that affect the mouth and face, such as persistent facial and mouth pain, oral and throat cancer, ulcers, and birth defects including cleft lips and palates (Saud, et al., 2016). Oral health affects the general health, well-being, education and development of children and their families, and diminishes the quality of life. Diabetes, cardiovascular problems including stroke, respiratory illnesses, low birth weight, and preterm deliveries are all at risk from chronic mouth infections (Saud, et al., 2016). The majority of oral health disorders can be treated when they are detected earlier and are mainly avoidable.

Dental caries (tooth decay), periodontal diseases, oral cancers, oro-dental trauma, cleft lip and palate, and noma (a severe gangrenous disease beginning in the mouth that primarily affects children) account for most of the instances (The Global Cancer Observatory, 2020). According to the Global Burden of Illness Study (GBD) (2019), the most common oral disease, caries of the permanent teeth, affects over 3.5 billion people globally. With increased urbanization and changes in living conditions, oral illnesses are becoming more common in the majority of low-and middle-income countries. This is mostly caused by inadequate fluoride exposure (found in toothpaste and water supplies), accessibility to and affordability of foods high in sugar, and a lack of access to oral health care services in the community. The promotion of sugary foods and drinks, as well as alcohol and cigarettes, has increased consumer use of goods that worsen oral health problems and non-communicable illnesses (Afolabi *et al*, 2025). Oral health care and education have a direct relationship with the whole child's health and well-being. Studies have shown that appropriate oral health education can help to cultivate oral health practice (Ab-murat & Watt, 2016).

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School age is a crucial stage in the development of the individual. Students/pupils spend most of their time in school with teachers; therefore, the knowledge and skills needed to attain future goals and to nurture hidden potentials are acquired during the school years. Education not only gives pupils the ability to separate good from bad, but also contributes to the improvement of knowledge and lifestyle choices (Onwudi, et al., 2017).

According to Orikpete *et al.*, (2025) oral health promotion through schools is recommended by WHO for improving knowledge, attitude, behaviour related to oral health and for prevention and control of oral health problems among school children. Lack of oral hygiene can lead to various dental problems. School Children learning good habits will help them to follow healthy habits throughout their life time. School Children can act as a catalyst in bringing about desirable changes in the family. Instilling good oral health knowledge and behavior in society is the main goal of oral health educators. The above said knowledge is obtained from health education and gets translated into behaviour change. Behavior is the outcome when that action is sustained. However, only a weak relation exists between knowledge and behavior. Lot of studies shows a positive correlation between oral health and good knowledge (Vishnu & Krishnaprasad, 2016).

A vital component of overall health is oral health. "Health for All by the Year 2025" is one of the WHO's objectives, and oral health is a crucial part of this. A person's ability to eat, speak, and interact socially without experiencing any active illness, discomfort, or embarrassment is referred to as having good oral health, which contributes to overall wellbeing. Oral health is the absence of conditions that affect the mouth and oral cavity, such as chronic mouth and facial discomfort, oral and throat cancer, oral sores, birth deformities such cleft lip and palate, periodontal (gum) disease, tooth decay, tooth loss, and other conditions. The oral tissue is a vital component of every person and is very prone to disease because it has a close link with the outside world and is sensitive to bacterial, chemical, and mechanical interactions (Vishnu & Krishnaprasad, 2016).

Mouth serves as a mirror of the body and therefore, has a direct impact on general health (Togoo, et al., 2012). Parents at home monitor their kids' eating and oral hygiene practices, while pupils/children living in hostels or attending school might not see oral hygiene as a priority. Residential college students frequently engage in unhealthy eating behaviors, such as consuming large quantities of sweets and cold beverages. This can be a significant contributor to oral illnesses (Jameel, et al., 2014). Oral illnesses, particularly in youngsters, limit activities at home, at work, and at school, resulting in several missed school and work hours per year. Additionally, the psychosocial effects of chronic illnesses frequently lower quality of life. Studies have demonstrated that there is a correlation between greater knowledge and improved oral health, with oral health information being regarded as a necessary prerequisite for health-related behaviours. Self-care habits are more likely to be adopted by those who have internalized the information and feel in charge of their oral health (Togoo, et al., 2012).

Additionally, to being linked to heart disease, cancer, and diabetes, poor oral hygiene can cause tooth caries and periodontitis (Cianetti, et al., 2021). Many of these oral diseases are preventable through education about risk factors. Maintaining good oral health is crucial for general health and quality of life, so practicing basic dental hygiene is important. The most effective method for preventing dental caries orperiodontitis is the removal of dental plaque by regular and proper mechanical cleaning of the teeth, a key step in maintaining oral health (Tadin, et al., 2022). Knowledge of oral health is seen as a necessary prerequisite for activities related to health (Carneiro, et al., 2011). Carneiro et al. (2011) also explained that there is a significant relationship between increased knowledge and better oral health because people who assimilate oral health knowledge most probably have a sense of personal control over their oral health, and they are more likely to adopt self-care practice. Oral hygiene represents measures taken to keep the mouth clean and healthy by maintaining plaque-and calculus-free tooth surfaces, (Opoku et al, 2024).

Multiple risk factors at the individual level have been identified for poor oral hygiene in children residing in Nigeria. These risk factors include socioeconomic status, age, maternal age and maternal attitude (Abiola, et al., 2009). According to Sogi & Bhaskar (2002), children from lower socioeconomic groups have worse oral hygiene, which has also been seen in developing countries like Nigeria. Additionally, Olabisi, et al (2015) found that age was a key factor in oral hygiene; older age groups had worse oral hygiene than younger age groups, which may be because parental monitoring of children's oral hygiene decreases about the time they become eight (8) years old. Additionally, studies in Nigeria have repeatedly demonstrated that women and girls have better oral hygiene habits than men do (Olabisi, et al., 2015).

In Nigeria, Ogundele & Ogunsile (2008) carried out a cross sectional survey among adolescents in Oyo State, Nigeria, to assess their dental health knowledge, attitude, and practice on the occurrence of dental caries, and a low level of dental health knowledge was found. Ogundele & Ogunsile (2008) observed that secondary school students and adolescents in Nigeria regularly consumed sugary foods and drinks, which are widely identified as risk factors for dental caries

Research Questions:

The study is guided by the following questions:

1. What is the knowledge of oral hygiene among pupils in public primary schools in Bichi Local Government Area of Kano State?
2. What is the practice of oral hygiene among pupils in public primary schools in Bichi Local Government Area of Kano State?
3. What is the relationship between knowledge and practice of oral hygiene among pupils in public primary schools in Bichi Local Government Area of Kano State?

Hypotheses:

In order to achieve the objectives of this study, three (3) hypotheses are formulated and tested at 0.05 level of significance:

1. Pupils in public primary schools in Bichi Local Government Area of Kano State do not have significant knowledge of oral hygiene
2. Pupils in public primary schools in Bichi Local Government Area of Kano State do not significantly practice oral hygiene
3. There is no significant relationship between knowledge and practice of oral hygiene among pupils in public primary schools in Bichi Local Government Area of Kano.

MATERIALS AND METHODS

Description of the Study Area

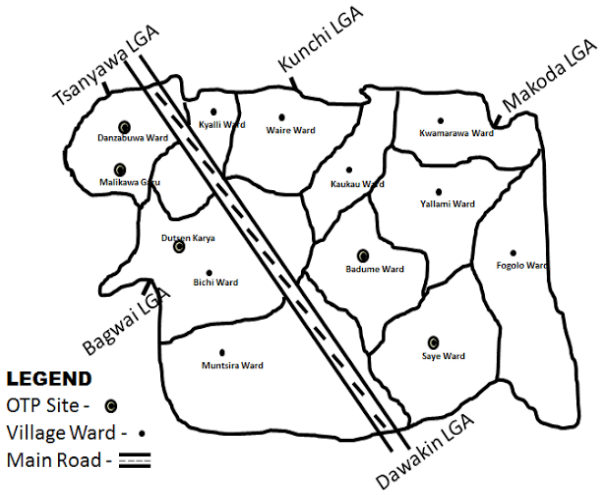

Fig 1: Bichi Local Government Area Map

This study will be carried out in Bichi Local Government Area of Kano State. Bichi is one of the forty-four (44) local government areas of Kano State. Bichi shares boundaries with Kunchi LG (North), Tsanyawa LG (East), Bagwai LG (South-East), Dawakin Tofa (South-West) and Danbatta LG (North-West). There are many primary schools, both private and public in Bichi town.

Research Design

A descriptive survey research design is adopted for the study. Patrick (2009) observed that this design enables the researcher to describe an event, situation or phenomenon as it is at the time of the study. The design is appropriate for this research study because it makes it possible to collect data quickly and affordably from a large population. It will also help in describing pupils' knowledge and practices of oral hygiene as they are currently without any treatment or intervention

Population of the Study

All the pupils in all the public primary schools in Bichi Local Government Area of Kano State will make up the study's population. It is predicted to be more than 50,000.

Sample and Sampling Technique

Sample size for this study was determined using Cochran's (1977) formula:

$n_0 = (Z^2 * p(1-p)) / e^2$. Using Z = 1.96 (95% confidence), p = 0.5, and e = 0.05, the computed initial sample size is 384.16 ≈ 385. Applying the finite population correction for large populations (N ≥ 50,000) produces an adjusted sample size of approximately 381, which aligns with the recommendation of The Research Advisors (2006).

To accommodate possible questionnaire mortality among pupils, the sample size was increased by approximately 5%, giving a rounded total of 400 respondents. A two-stage simple random sampling technique will be used: ten (10) primary schools will be selected randomly, and from each school forty (40) pupils will be selected, totaling 400 pupils.

Only pupils (male and female) who are primary 4, 5 and 6 during the time of the study will participate in the study. (See Table 1)

Table 1: Proposed Sample Size for the Study

S/N	Name of Institutions	Status	Sample
1	Hagagawa Primary School, Bichi (HPSB)	Public	40
2	Chiranchi Primary School, Bichi (CPSB)	Public	40
3	Hagagawa Model Primary School, Bichi (HMPSB)	Public	40
4	Kanti Primary School, Bichi (KPSB)	Public	40
5	Kanawa Primary School Bichi (KPSB)	Public	40
6	DamarguPrimary School Bichi (DPSB)	Public	40
7	SabonLayi Primary School, Bichi (SLPSB)	Public	40
8	Hagawa Primary School, Bichi (HPSB)	Public	40

9	LawanShehu Science Primary School, Bichi (LSSPSB)	Public	40
10	Sabo Special Primary School, Bichi (SSPSB)	Public	40
Total			**400**

Data Collection Instrument:

During data collection, self-developed questionnaire on Knowledge and Practice of Oral Hygiene among Pupils in Public Primary Schools in Bichi Local Government Area of Kano State (KP-OH-PP-PS-Q) was used. The instrument is divided into three (3) sections. Section A is based on demographic data of the respondents; Section B seeks information on knowledge of oral hygiene while Section C requests for information on practice of oral hygiene. To suit the objective of the study and because the respondents are minors (under 18 years of age), the instrument is a Yes or No type.

Validity and Reliability of the Instrument

To ensure that the instrument measures what it is supposed to measure, vetting of the face and content validity of the research instrument was done by five (5) specialists. Three (3) of them are specialists in Biology and Microbiology from Colleges of Education; one dentist and one dental technologist from the college clinic of Federal College of Education (Technical), Bichi.

To ascertain the reliability of the instrument, a pilot study was conducted using test-retest method. The instrument was administered to forty (40) pupils who are outside the study area (Government Primary School Naibawa in Kumbotso Local Government Area of Kano State) but have the same characteristics with the intending respondents. The same instrument is re-administered after two weeks from the first administration on the same participants. Results obtained from both first and second tests are used to estimate the reliability of the instrument using Spearman Brown Prophecy.

Data Collection Procedure

The researchers wrote letters of introduction and took to the management of all the selected public primary schools in order to seek permission from the school authorities to carry out the study. The purpose of the research was clarified and participants were assured that the information provided would retain privacy and confidentiality. The pupils (participants) were met at the assembly ground and classrooms; and the questionnaire was administered through the research assistants (teachers from the selected schools). The research assistants were trained; read and interpret the questionnaire in local Language (Hausa) to those that could not read and guide the respondents in filling the questionnaire in a manner that will not influence their responses. After the administration of the instrument, Focus Group Discussions (FGDs) were organized for two weeks to sensitize the pupils on the importance of oral hygiene practices.

RESULTS AND DISCUSSION

Data Analysis

The researchers used descriptive statistics of frequency and percentage to organize and describe the demographic data of the respondents. Also, inferential statistics of Chi-square was used to test hypotheses 1 and 2 while Pearson Product Moment Correlation Coefficient (PPMCC) is used to test hypothesis 3. All the hypotheses were tested at a significance level of 0.05 and a Statistical Package for Social Science (SPSS) version 20 was used in the data analysis.

Research question 1 is meant to determine the extent of oral hygiene among primary school pupils in Kano state. The data obtained was analysed using descriptive statistics. The summary of the result is presented in table 2.

Table 2: Descriptive Analysis of pupils Oral Hygiene

	N	Minimum	Maximum	Mean	Std. Deviation
SCORE	400	2.00	10.00	5.6325	1.41862
Valid N (listwise)	400				

From the table 2, mean of the sampled population was 5.63 which is higher than the midpoint or average of the score on the test. The results showed a general average oral hygiene among the pupils.

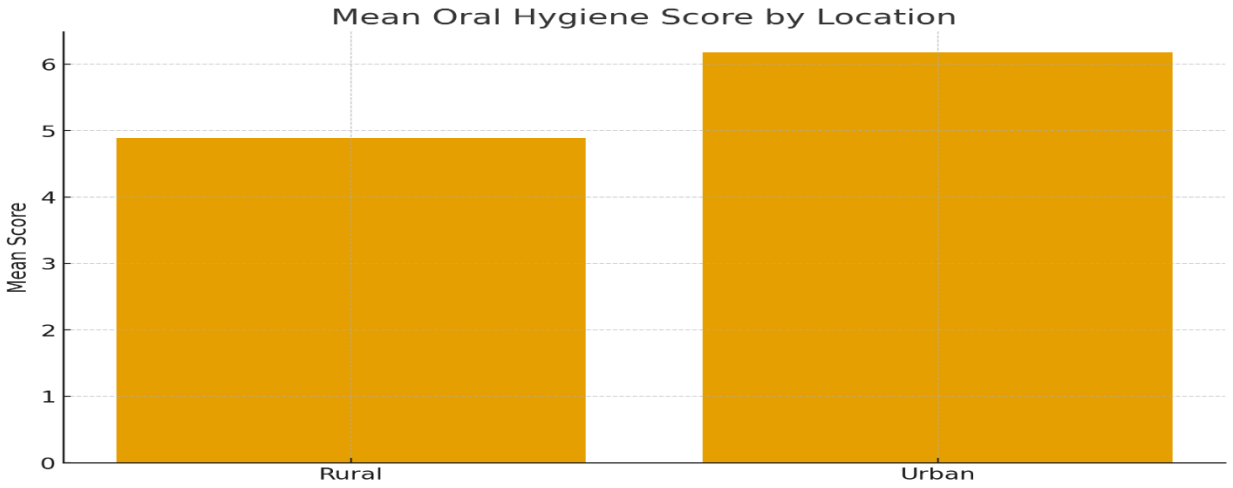

Fig 2: Mean Oral Hygiene Score by Location

Research question 2 sought the difference in the oral hygiene practices between male and female students. The corresponding hypothesis to the research question is stated as follows:

There is no significant difference in the oral hygiene practices among male and female pupils in the Kano state primary schools.

To test the hypothesis, the data collected was analysed using the Independent Sample t – test statistic at 0.05 level of significance. The summary of the analysis is presented in table 3.

Table 3: Comparison of oral hygiene practice among urban rural pupils

GENDER	N	Mean	S. D.	df	T	p value
FEMALE	175	4.89	1.12	398	10.57	0.001
MALE	224	6.22	1.35			

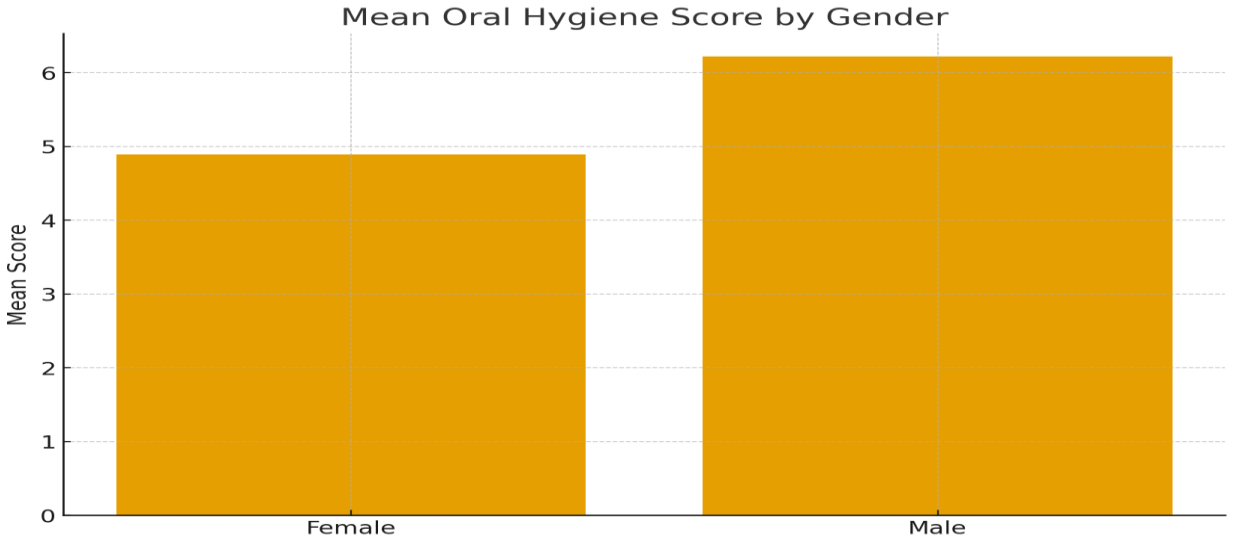

Fig 3: Mean Oral Hygiene Score by Gender

Results from table 3, t (398) = 10.57, $p < 0.05$, this shows that there is significant difference in the personal hygiene practices of male and female pupils in favour of the female pupils that have higher mean scores. Hence the null hypothesis is rejected.

Research question 3 sought the difference in the oral hygiene practices between urban and rural pupils in Kano State. The corresponding hypothesis to the research question is stated as follows

There is no significant difference in the oral hygiene practices among male and female pupils in the Kano state primary schools.

To test the hypothesis, the data collected was analysed using the Independent Sample t – test statistic at 0.05 level of significance. The summary of the analysis is presented in table 4.

Table 4: Comparison of oral hygiene practice among urban rural pupils

Location	N	Mean	S. D.	df	t	p value
Rural	171	4.89	1.09			
				398	10.052	0.001
Urban	229	6.18	1.38			

From the table 4, t (398) = 10.052, $p < 0.05$, this shows that there is significant difference in the personal hygiene practices of the urban and rural pupils in favour of the urban pupils that have higher mean scores. Hence the null hypothesis is rejected.

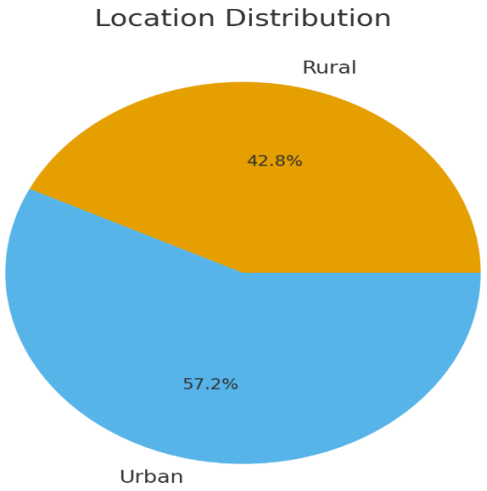

Fig 4: Location Distribution Pie chart

Summary of findings

This study examined the level of knowledge and practice of oral hygiene among pupils in public primary schools in Bichi Local Government Area of Kano State. Oral health is an essential component of general well-being, and poor oral hygiene among children has been associated with dental caries, periodontal diseases, and broader systemic health issues.

A descriptive survey design was adopted, using a sample of 400 pupils drawn from ten public primary schools. Data were gathered with a yes/no questionnaire focusing on demographic characteristics, oral hygiene knowledge, and oral hygiene practices. The instrument underwent expert validation and reliability testing through the test-retest method.

Results showed that the pupils had average oral hygiene practices, and many demonstrated an understanding of basic oral health concepts. Female pupils displayed significantly better oral hygiene practices than males, and pupils in urban schools showed higher levels of practice compared to their rural counterparts. Hypotheses tested revealed statistically significant differences across gender and location, indicating that socio-demographic factors influence oral hygiene behaviour.

The study highlights the need for continuous and inclusive oral-health education, especially among male pupils and rural communities. It also underscores the role schools can play in promoting lifelong oral-hygiene habits through sustained health-education programmes.

The present study reveals that primary pupils in Bichi Local Government Area generally exhibit good oral hygiene practices, with females and urban residents scoring higher than their male and rural counterparts. These results align with the broader literature that identifies gender and urban-rural residence as consistent predictors of oral health behaviour (Olabisi et al., 2009; WHO, n.d.). The finding that female pupils demonstrate better hygiene supports the notion that health related attitudes may be shaped by sociocultural norms that encourage girls to be more attentive to personal care (Carnerio et al., 2011).

The observation that urban pupils outperform rural pupils can be interpreted through the lens of access to resources. Urban settings typically benefit from better equipped schools, more frequent dental outreach programmes, and greater availability of fluoride toothpaste, all of which are known to enhance oral hygiene practices (Vishnu & Krishnapsad, 2016). In contrast, rural areas may face barriers such as limited supplies and lower health-education exposure, which could explain the disparity reported here.

Consistent with the World Health Organization's definition of oral health, the study underscores that oral hygiene is not merely the absence of disease but a fundamental component of overall wellbeing, influencing the ability to eat, speak and interact socially without

discomfort or embarrassment (WHO). The literature further emphasises that poor oral hygiene is linked to systemic conditions, including cardiovascular disease, diabetes and certain cancers (Cianett et al., 2021). The modest but significant relationship between increased knowledge and better oral health observed in this sample corroborates earlier findings that education interventions can translate into measurable behavioural improvements (Carnerio et al., 2011).

However, several limitations should be noted. The cross-sectional design precludes causal inference, and self-reported measures may be subject to social desirability bias, potentially inflating the prevalence of good practices. Moreover, the study did not control for household income or parental education, which could confound the observed gender and urban-rural differences.

CONCLUSION

This study concludes that primary school pupils in Bichi Local Government Area possess average levels of oral hygiene knowledge and practice. However, significant disparities exist based on gender and school location female and urban pupils show superior oral-hygiene behaviour compared to their male and rural peers. These differences point to unequal exposure to oral health information, varying levels of parental supervision, sociocultural influences, and accessibility to dental hygiene resources.

The findings reaffirm the importance of early and consistent oral health education, especially in public primary schools. School-based interventions, periodic sensitization programmes, and involvement of parents and health professionals can help reinforce positive oral-hygiene habits. To improve overall oral health among pupils, policymakers and stakeholders should prioritize community-wide awareness campaigns, provide affordable dental care materials, and ensure regular dental outreach visits. Strengthening these strategies will contribute significantly to preventing oral diseases and promoting long-term well-being among school-aged children.

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APPENDIX

ORAL HYGIENE KNOWLEDGE AND PRACTICE QUESTIONNAIRE (KP-OH-PP-PS-Q)

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (☐) the correct option.

1. Age: ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13+
2. Gender: ☐ Male ☐ Female
3. Class: ☐ Primary 4 ☐ Primary 5 ☐ Primary 6
4. School Location: ☐ Urban ☐ Rural

SECTION B: KNOWLEDGE OF ORAL HYGIENE (YES / NO)

1. I know that brushing my teeth keeps my mouth clean. YES ☐ NO ☐
2. I know that dirty teeth can cause toothache. YES ☐ NO ☐
3. I know I should brush my teeth at least twice a day. YES ☐ NO ☐
4. I know that sugary foods can spoil the teeth. YES ☐ NO ☐
5. I know that brushing removes germs from the mouth. YES ☐ NO ☐
6. I know it is important to visit the dentist. YES ☐ NO ☐
7. I know that using fluoride toothpaste protects the teeth. YES ☐ NO ☐
8. I know that not brushing can lead to bad breath. YES ☐ NO ☐
9. I know that rinsing after meals keeps the mouth clean. YES ☐ NO ☐
10. I know that clean teeth help me smile confidently. YES ☐ NO ☐

SECTION C: PRACTICE OF ORAL HYGIENE (YES / NO)

1. I brush my teeth every day. YES ☐ NO ☐
2. I brush my teeth twice a day. YES ☐ NO ☐
3. I brush before going to school. YES ☐ NO ☐
4. I brush before sleeping at night. YES ☐ NO ☐
5. I use toothpaste whenever I brush. YES ☐ NO ☐
6. I use a toothbrush that is not too old. YES ☐ NO ☐
7. I rinse my mouth after eating. YES ☐ NO ☐

8. I avoid too many sugary snacks.
YES ☐ NO ☐
9. I have visited a dentist before.
YES ☐ NO ☐
10. I keep my toothbrush clean and safe.
YES ☐ NO ☐