



# Medox Journal of Public Health

Homepage: <https://journals.medoxhrc.org/index.php/mjph>

## Original Article

# Oral Hygiene Knowledge Among Senior Secondary School Students in Southern Senatorial District of Cross River State, Nigeria

Clare Uchenna Emeagha<sup>1,2\*</sup>, Nelson C Osuchukwu<sup>1</sup>

<sup>1</sup>Department of Public Health, University of Calabar, Calabar, Cross River State, Nigeria

<sup>2</sup>Department of Restorative Dentistry, University of Calabar Teaching Hospital, Calabar, Cross River State, Nigeria

**Article history:** Received: 29 Apr 2026 | Revised: 06 Jun 2026 | Accepted: 18 Jun 2026 | Published online: 27 Jun 2026

\* **Corresponding author:** Clare Uchenna Emeagha | Email: [clarealbert18@gmail.com](mailto:clarealbert18@gmail.com)

## ABSTRACT

**Background:** The fundamental driver that protects adolescents from tooth decay is their understanding of oral health according to research findings about oral health knowledge. The existing evidence linking poor oral health knowledge to poor hygiene practices among secondary school students in sub-Saharan Africa remains insufficient. The research aimed to evaluate the oral hygiene understanding of senior secondary school students in the Southern Senatorial District of Cross River State Nigeria.

**Materials and Methods:** The team conducted a cross-sectional descriptive study which used multi-stage random sampling to select 394 participants from five public secondary schools located in five different Local Government Areas. The researchers collected data through a validated 55-item structured questionnaire which had a Cronbach alpha score of 0.82, and they used Statistical Package for the Social Sciences (SPSS) Version 23 to perform descriptive statistics and chi-square tests for data analysis.

**Results:** About 38.1% of participants demonstrated good oral hygiene knowledge, 42.1% demonstrated fair knowledge, and 16.8% demonstrated poor knowledge. The study found that 65.5% of participants correctly identified soft drinks as substances which harm teeth, while 61.4% of participants understood dental visits as treatments that improve oral health. The study found that age directly affected knowledge acquisition because older students had superior knowledge than their younger counterparts. The study found no sex, caregiver type, or religious affiliation-based differences. The students who possessed good oral health knowledge demonstrated critical knowledge gaps which existed because they lacked understanding about how sweets cause dental caries.

**Conclusion:** Schools should establish targeted oral health education programs focused on dietary risk and dental hygiene for students.

**Keywords:** Oral Hygiene Knowledge, Dental Health, Secondary School Students, Cross River State, Nigeria

**Cite this article as:** Emeagha CU, Osuchukwu NC. Oral Hygiene Knowledge Among Senior Secondary School Students in Southern Senatorial District of Cross River State, Nigeria. *Medox J Public Health*. 2026;1(1):e4. <https://doi.org/10.66531/mjph.2026.v1i1.e4>

© The Author(s) 2026. Published by Medox Healthcare and Research Centre Limited, Dodoma, Tanzania.

**Open Access.** This article is distributed under the terms of the [Creative Commons Attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, sharing, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source.



## INTRODUCTION

Oral health is an integral part of overall health and is essential to human wellbeing throughout life (1). The World Health Organization (WHO) defines good oral health as a state free from chronic mouth and facial pain, oral and throat cancer, oral sores, periodontal disease, tooth decay, and tooth loss (2). Good oral health enables individuals to speak, smile, smell, taste, chew, and convey emotions with confidence and without pain (3).

Globally, oral diseases affect an estimated 3.5 billion people, constituting one of the most widespread non-communicable disease burdens worldwide (3, 4). The Global Burden of Disease Study 2019 estimated that 2 billion people suffer from caries of permanent teeth and 520 million children suffer from caries of primary teeth (4). In Nigeria, dental caries affects approximately 6–23% of the population, with up to 90% of cases going untreated (5). The prevalence of periodontal disease affects between 15% and 58% of Nigerians aged 15 years and above (5).

Adolescence represents a critical window for establishing long-term health behaviours (6). The developmental stage makes young people open to developing dietary patterns which include excessive sugar and soda consumption that led to dental caries and periodontal disease (6, 7). The unique lifestyle of students combined with their high intake of sugary and carbonated foods creates a situation which makes them particularly vulnerable to health problems (7).

People need to understand oral hygiene before they can develop effective dental care habits which protect their teeth (8). The research studies conducted throughout sub-Saharan Africa prove that there exists a serious problem which prevents people from applying what they learn even after they obtain knowledge (9-11). The study in Lagos State, Nigeria found that 65.5% of secondary school students in Lagos State had good knowledge of oral hygiene, while the study in Tanzania reported that 88.4% of secondary students demonstrated adequate knowledge of dental caries (8, 11). The two situations show that people who acquired knowledge about a subject failed to implement their knowledge properly.

The available research on secondary school students' oral hygiene knowledge in Cross River State Nigeria demonstrates a complete absence of published data. The present investigation exists because of this evidence gap. The study was developed from clinical findings at the University of Calabar Teaching Hospital (UCTH) which showed that dental technology students made up about 60 percent of monthly clinic visitors while they mostly came with dental problems instead of preventive dental care needs.

This paper is the first of a three-part series examining knowledge, attitude, and practice (KAP) of oral hygiene among senior secondary school students in the Southern Senatorial District of Cross River State, Nigeria. Companion papers address oral hygiene attitude and oral hygiene practice respectively. The specific objectives of this paper are to: (i) determine the level of oral hygiene knowledge among the students; and (ii) examine associations between knowledge level and socio-demographic characteristics.

## MATERIALS AND METHODS

### Study Design and Setting

A cross-sectional descriptive study design was adopted for this investigation (12). This design is appropriate because it enables the collection of data from a defined population at a single point in time, allowing description of current states and examination of associations without manipulation of study variables. The study was conducted in the Southern Senatorial District of Cross River State, Nigeria, comprising seven Local Government Areas: Akamkpa, Akpabuyo, Bakassi, Biase, Calabar Municipality, Calabar South, and Odukpani. The study population comprised all senior secondary school students enrolled in public secondary schools within the district, totalling 4,888 students (13).

### Sample Size and Sampling Procedure

Sample size was calculated using the Freund and William (1994) formula for infinite populations (14):  $n = Z^2 pq / e^2$ . Where:  $p = 0.64$ , prevalence of positive dental attitude (11),  $q = 1 - p = 0.36$ ,  $Z = 1.96$  (95% confidence level),  $e = 0.05$  (margin of error). Substituting:  $n = (1.96)^2 \times 0.64 \times 0.36 /$

$(0.05)^2 = 3.8416 \times 0.2304 / 0.0025 = 354$ . With a 10% non-response rate adjustment:  $n = 354 + 36 = 390$ , rounded to a target of 400 respondents. A four-stage multistage random sampling technique was employed (12). Five LGAs were selected by simple random ballot from seven; one school was selected per LGA by ballot (five schools); four senior secondary classrooms were randomly selected per school (twenty classrooms); and 25–30 students per classroom were selected by ballot. A total of 394 respondents participated, yielding a response rate of 97.7%.

### Data Collection Instrument

A 55-item structured self-administered questionnaire was developed and validated through expert review by supervisors and a measurement specialist (12). The knowledge section (Section B) comprised six items using Yes/No/I Don't Know response options, covering: (i) sweet food and dental caries; (ii) tooth brushing and dental protection; (iii) teeth appearance; (iv) soft drinks and enamel damage; (v) systemic health linkage; and (vi) dental visit benefits. Reliability was established via test-retest with a pilot sample of 43 respondents (10% of target), yielding a Cronbach alpha reliability coefficient of 0.82, exceeding the minimum threshold of 0.70 recommended for health research instruments (12). Respondents scoring above the section mean were classified as having good knowledge. The knowledge section comprised six items, each scored 1 for a correct response and 0 for an incorrect or uncertain response (maximum score = 6). Based on total score, respondents were classified as: Good knowledge (score 4–6, i.e., above section mean); Fair knowledge (score 2–3, i.e., at or near section mean); and Poor knowledge (score 0–1, i.e., below section mean).

### Data Analysis

Data were entered and cleaned in Microsoft Excel, then exported to and analysed in SPSS Version 23 (12). Descriptive statistics - frequencies and percentages summarised socio-demographic and knowledge variables. Chi-square tests examined associations between socio-demographic characteristics and knowledge levels. Statistical significance was set at  $p < 0.05$  for all tests.

## RESULTS

### Socio-Demographic Characteristics of Respondents

A total of 394 students participated in this study. Table 1 presents the full socio-demographic profile. Females comprised, 270 (68.5%) and males 124 (31.5%). The largest age cohort was 16–19 years, 156 (39.6%), followed by 20 years and above by 152 (38.6%), and 10–15 years by 86 (21.8%). The majority of respondents, 159 (40.4%) lived with both parents. Most caregivers had primary-level education, 156 (39.6%). Christianity was the declared religion of 393 (99.7%) of respondents.

**Table 1:** Socio-Demographic Characteristics of Study Participants (n = 394)

Socio-Demographic Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	124	31.5
	Female	270	68.5
Age (years)	10–15	86	21.8
	16–19	156	39.6
	20 and above	152	38.6
Caregiver	Both Parents	159	40.4
	Father or Mother	125	31.7
	Relatives	110	27.9
Caregiver Education	Primary	156	39.6
	Secondary	91	23.1
	Tertiary	147	37.3
Religion	Christianity	393	99.7
	Islam	1	0.3

### Knowledge of Oral Hygiene

Table 2 shows respondents' knowledge of oral hygiene. As shown in Table 2, 150 respondents (38.1%) demonstrated good oral hygiene knowledge, 166 (42.1%) demonstrated fair knowledge, and 66 (16.8%) demonstrated poor knowledge. Specifically, 216 (54.8%) stated that eating sweet food can cause dental decay and caries, while 144 (36.5%) stated otherwise and 34 (8.6%) were not sure. 258 (65.5%) correctly stated that regular tooth brushing protects the teeth. 234 (59.4%) agreed that teeth appearance is affected by dental caries. 258 (65.5%) correctly identified that soft drinks can damage the teeth. 258 (65.5%) affirmed that general body health has a relationship with oral hygiene. 242 (61.4%) agreed that regular dental visits improve oral health. Teachers were the most commonly cited source of oral health information (54.8%), followed by parents (36.5%).

**Table 2:** Knowledge Responses of Secondary School Students on Oral Hygiene (n = 394)

Knowledge Item	Yes / Correct, n (%)	No/Incorrect, n (%)	Not Sure, n (%)
Eating sweet food causes dental decay and caries	216 (54.8)	144 (36.5)	34 (8.6)
Regular tooth brushing protects the teeth	258 (65.5)	136 (34.5)	—
Teeth appearance is affected by dental caries	234 (59.4)	160 (40.6)	—
Sweets can cause tooth decay	194 (49.2)	142 (36.0)	58 (14.7)
Soft drinks can damage the teeth	258 (65.5)	136 (34.5)	—
General body health is linked to oral hygiene	258 (65.5)	136 (34.5)	—
Regular dental visits improve oral health	242 (61.4)	152 (38.6)	—

### Association Between Socio-Demographics and Knowledge Level

Chi-square analysis (Table 3) revealed a statistically significant association between age group and knowledge level ( $\chi^2 = 13.42$ ,  $df = 3$ ,  $p = 0.039$ ), with older students demonstrating more advanced oral health awareness. No significant associations were found between knowledge and sex ( $\chi^2 = 3.939$ ,  $df = 1$ ,  $p = 0.280$ ), caregiver type ( $\chi^2 = 1.41$ ,  $df = 8$ ,  $p = 0.964$ ), caregiver education ( $\chi^2 = 6.49$ ,  $df = 8$ ,  $p = 0.188$ ), or religious affiliation ( $\chi^2 = 4.75$ ,  $df = 2$ ,  $p = 0.576$ ).

**Table 3:** Chi-square Analysis of Socio-Demographics and Knowledge Level (n = 394)

Variable	Good Knowledge n (%)	Fair Knowledge n (%)	Poor Knowledge n (%)	Chi-square ( $\chi^2$ )	p-value
Sex — Male	40 (32.3)	56 (45.2)	22 (17.7)	3.939	0.280
Sex — Female	110 (40.7)	110 (40.7)	44 (16.4)		
Age 10–15 yrs	38 (43.7)	33 (37.9)	13 (14.9)	13.42	0.039*
Age 16–19 yrs	55 (35.5)	79 (51.0)	18 (11.6)		
Age 20+ yrs	57 (37.5)	54 (35.5)	35 (23.0)		
Caregiver: Both Parents	56 (35.2)	72 (45.3)	26 (16.4)	1.41	0.964
Caregiver Education: Primary	63 (40.4)	63 (40.4)	26 (16.6)	6.49	0.188
Religion: Christian	150 (38.2)	166 (42.2)	65 (16.5)	4.75	0.576

\* $p < 0.05 =$  statistically significant

## DISCUSSION

This study assessed oral hygiene knowledge among senior secondary school students in the Southern Senatorial District of Cross River State. Overall, 38.1% of participants demonstrated good knowledge, 42.1% fair knowledge, and 16.8% poor knowledge. When combined, 80.2% of respondents achieved at least fair knowledge scores, indicating a broad foundational awareness of oral health in this population. This finding is broadly consistent with levels reported in comparable sub-Saharan African settings, though the proportion with specifically good knowledge is lower than the 88.4% adequate knowledge reported in Tanzania among secondary school students and the 65.5% good knowledge reported among students in Lagos State, Nigeria (8, 11). The comparatively smaller proportion with good knowledge in the present study may reflect real differences in the depth and specificity of oral health curriculum delivery across settings, rather than simply overall awareness. This distinction between general awareness and deeper knowledge is well documented in the literature (9, 10) and has significant implications for how oral health education is designed and evaluated.

A notable knowledge gap identified in this study was poor recognition of sweet foods as a cariogenic risk: 36.5% of participants were unable to correctly link sweet food consumption with dental caries. This specific deficit - despite general oral health awareness, mirrors findings of previous studies (9,10), which reported that dietary risk knowledge is consistently weaker than structural knowledge (e.g., about brushing or dental visits) among Nigerian secondary school students. Similarly, another study in Casablanca observed that adolescents frequently underestimate the cariogenic risk of their dietary patterns, particularly sugary snacks and carbonated beverages (7). This dissociation suggests that existing oral health education tends to focus on broad principles rather than specific dietary behaviours. Targeted school-based curricula that explicitly address sugar consumption and cariogenesis may more effectively translate knowledge into protective behaviour. Teachers (54.8%) and parents (36.5%) were identified as the primary sources of oral health information in this study. This is consistent with the findings of the study of Zimbabwe, which emphasised that proximal trusted adults, particularly teachers and parents, are the most effective conduits of health information for school-age adolescents (15). These findings reinforce the importance of investing in teacher training and parental engagement as core components of school oral health promotion strategies, as has been recommended in the Nigerian context (9, 16).

The statistically significant association between age group and knowledge level ( $\chi^2 = 13.42$ ,  $p = 0.039$ ) indicates that older students possess greater oral health awareness than their younger counterparts, which is consistent with the general pattern of cumulative health knowledge acquisition through schooling and lived experience. This finding aligns with the broader principle that health knowledge increases with age-related exposure to education and social interaction (6). Importantly, the youngest cohort (10–15 years) showed the weakest knowledge scores, identifying them as the most critical target group for early oral health intervention. The absence of significant associations between knowledge and sex, caregiver type, caregiver education, or religious affiliation is a positive finding, suggesting that oral health knowledge is distributed equitably across the socio-demographic spectrum in this population. This contrasts with earlier Nigerian studies reporting sex-based differences in health knowledge (17), and may reflect the relatively homogeneous educational context of public secondary schools in the district. The common risk factor approach proposed by Sheiham and Watt (2010) supports building on this equitable baseline by embedding oral health within broader school health curricula that do not target single demographic subgroups but benefit all students (18).

## STRENGTHS AND LIMITATIONS

This study employed a standardized and validated data collection instrument and used a multistage random sampling technique to obtain a representative sample of the target population, thereby enhancing the reliability and generalizability of the findings. However, the study relied on self-reported data, which may have introduced recall and social desirability biases. In addition, the cross-sectional study design limits the ability to establish causal relationships between variables. Despite these limitations, the study provides valuable evidence that can inform oral health policy, school-based interventions, clinical practice, and future research in similar settings.

## CONCLUSION

The majority of senior secondary school students in the Southern Senatorial District of Cross River State possess good oral hygiene knowledge, particularly regarding the protective role of regular tooth brushing, the link between oral and general health, and the damaging effects of soft drinks. However, significant knowledge gaps persist around the cariogenic potential of sweet foods and the importance of proactive, routine dental attendance.

Age is the only statistically significant socio-demographic predictor of knowledge level, highlighting younger cohorts (10–15 years) as a priority target group. Governments, non-governmental organisations, and educational authorities should strengthen school-based oral health education, integrate dental health into secondary school curricula, and leverage teachers as frontline oral health educators. Radio, online, and community platforms should also be used to reinforce key oral health messages across Cross River State and Nigeria more broadly.

## DECLARATIONS

**Ethical Approval:** Ethical approval was obtained from the Cross River State Health Research Ethics Committee (CRS-HREC), Government of Cross River State of Nigeria, Ministry of Health, Calabar. Full Ethical Approval was granted under REC Number CRSMOH/HRP/REC/2023/399 (File Reference: CRS/MH/HREC/023/Vol.V1/222), dated 24th July 2023.

**Informed Consent:** Written informed consent was obtained from all participants prior to data collection.

**Consent for Publication:** Not applicable.

**Conflict of Interest:** The authors declare no conflict of interest.

**Funding:** This research received no external funding.

**Authors' Contributions:** Conceptualisation, study design, instrument development and validation, data collection, data analysis and interpretation, manuscript writing, critical revision, and final approval: CUE. Research supervision, critical intellectual input, review and approval of the final manuscript: NCO.

**Data Availability:** The datasets generated and analyzed during this study are not publicly available due to ethical and confidentiality restrictions. However, they may be obtained from the corresponding author upon reasonable request, subject to approval by the relevant ethics committee.

**Acknowledgments:** The authors thank Dr. Antor O. Ndep, the Head of Department, Public Health, University of Calabar), all departmental lecturers, participating school principals and students, and the Daughters of Divine Love (DDL) Congregation for their invaluable support.

## REFERENCES

1. Dental Health Foundation Ireland. Link between oral and general health. Dental Health Foundation, Dublin; 2018. Available from: <https://www.dentalhealth.ie/dentalhealth/causes/general.html>. Accessed 24 July 2023.
2. World Health Organization. Oral health surveys: Basic methods. 5th ed. Geneva: WHO Press; 2013.
3. World Health Organization. Oral health. World Health Organization, Geneva; 2007. Available from: <https://www.who.int/news-room/fact-sheets/detail/oral-health>. Accessed 24 July 2023.
4. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019). Seattle: Institute of Health Metrics and Evaluation (IHME); 2019.
5. Federal Ministry of Health Nigeria. National Oral Health Policy. Federal Ministry of Health, Abuja; 2012.

6. Eaton DK, Kann L, Kinchen S, Shanklin S, Flint KH, Hawkins J, et al. Youth risk behavior surveillance - United States, 2011. *MMWR Surveill Summ.* 2012;61(4):1-162.
7. Mestaghanmi H, Labriji A, M'Touguy I, Kehailou FZ, Idhammou S, Kobb N, et al. Impact of eating habits and Lifestyle on the oral health status of a Casablanca's Academic Population. *Open Access Libr J.* 2018;5(11):1-6. <https://doi.org/10.4236/oalib.1104682>.
8. Carneiro L, Kabulwa M, Makyao M, Mrosso G, Choum R. Oral health knowledge and practices of secondary school students, Tanga, Tanzania. *Int J Dent.* 2011;8(6):258. <https://doi.org/10.1155/2011/259265>.
9. Johnson JO. Oral health knowledge, attitudes, and practices among secondary school students in Nigeria [Doctoral dissertation]. Minneapolis: Walden University; 2014.
10. Musa O, Kamaldeen A, Abu-Saeed MA. Determinants of oral hygiene status among junior secondary school students in Ilorin West Local Government Area of Nigeria. *IOSR J Pharm Biol Sci.* 2012;2(1):26-30.
11. Balogun FA. Knowledge, attitude and practice of good oral hygiene among secondary school students of Yaba Local Council Development Area of Lagos State. *Afr J Educ Manag.* 2022;22(2):147-163.
12. Elendu IC. *Fundamentals of research and statistics for students in human kinetics and other educational disciplines.* Port Harcourt: The glory of the latter house publishing company. 2010;36(3):115-21.
13. Secondary School Education Board, Cross River State Ministry of Education. Register of public secondary schools - Southern Senatorial District, Calabar: Cross River State Ministry of Education; 2022.
14. Freund JE, William FJ. *Elementary business statistics: The modern approach.* 6th ed. Englewood Cliffs: Prentice Hall; 1994.
15. Mafuvadze BT, Mahachi L, Mafuvadze B. Dental caries and oral health practice among 12-year-old school children from low socio-economic background in Zimbabwe. *Pan Afr Med J.* 2013;164. <https://doi.org/10.11604/pamj.2013.14.164.2399>.
16. Dosumu TO, Betiku A, Ademuyiwa G, Olabisi O, Adebisi T, Oyekale R. Oral hygiene practices and factors influencing the choice of oral hygiene materials among undergraduates in selected universities in Osun State, Nigeria. *J Pre-Clin Clin Res.* 2022;16(4):137-142. <https://doi.org/10.26444/jpccr/154998>.
17. Jibo AM, Adeleke OA, Yahaya IA. Oral hygiene habits and practices among primary school children attending public and private schools in Gwale local government, Kano State. *Niger J Med.* 2000;9(3):108-111.
18. Sheiham A, Watt RG. The common risk factor approach: A rational basis for promoting oral health. *Community Dent Oral Epidemiol.* 2010;28(6):399-406. <https://doi.org/10.1034/j.1600-0528.2000.028006399.x>.