

## **Assessment of Oral Hygiene Knowledge and Practice among Secondary School Students in Owerri Municipal Area, Imo State, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author SCO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author SNOI supervised the research work. Authors PCO and BU managed the analyses of the study. Authors CN and CLA managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aim:** The aim of this study were to assess the oral hygiene knowledge and practice among secondary school students in Owerri Municipal Area, Imo State, Nigeria.

**Study Design:** This study employed a descriptive survey design.

**Place and Duration of Study:** This study were carried out in Secondary Schools in Owerri Municipality, Imo State, Nigeria within September 2014 and June 2015.

**Methodology:** Data were collected using structural pretested questionnaire administered to 500 randomly selected consenting respondents (students) with 251 female and 249 male students. Data were analyzed descriptively and inferentially using SPSS version 20. The hypotheses were

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tested at 0.05 level of significance and data generated were subjected to percentage findings presented by the use of tables.

**Results:** The results affirmed that 84% of the respondents had oral hygiene knowledge, 78% were of the opinion that major source of oral hygiene knowledge were parents/guardians, and 20% of the respondents acquiring information through their school teachers. It was noted that 44% of the respondents had good oral hygiene practices in Secondary School in Owerri Municipal Area, Imo State, Nigeria. The result of the statistical analyses shows that there was a significant relationship (342.624;  $P = .001$ ) between the age of the students and the knowledge of oral hygiene, there was significant relationship (337.910;  $P = .001$ ) between major source of oral hygiene information and the knowledge of oral hygiene and there was a significant relationship (390.988;  $P = .001$ ) between major source of oral hygiene information and the practice of oral hygiene. The study therefore provided information on oral hygiene knowledge and practice in secondary school in Owerri Municipal Area, Imo State, Nigeria.

**Conclusion:** It can be recommended to Students/Parents/Government and School Teachers to embrace the idea that oral diseases can be prevented or mitigated by individual action of daily brushing and other oral hygiene related practices to avert the negative oral health consequences.

*Keywords: Assessment; knowledge; practice; oral hygiene; Owerri municipal.*

## 1. INTRODUCTION

Oral health care Professionals have recognized that assessing the outcomes and status of individual's oral health are of great significance for developing and promoting oral health care intervention [1]. Oral hygiene as the practice of keeping the mouth and teeth clean is essential in preventing oral conditions and diseases [2]. These oral pathologic conditions in which good oral hygiene is required for healing and regeneration of the oral tissues include gingivitis, periodontitis and dental trauma [3] such as subluxation [4], oral cysts, [5] and following wisdom tooth extraction. Base on this, basic oral hygiene knowledge is essential for effective oral hygiene practices [2].

Oral health education is an integral part of health education which modifies individual's oral health knowledge and consequently changes their oral health behaviours [6]. It is believed that health education is a cost-effective method for promoting oral hygiene knowledge and practice through schools, where all students irrespective of their socioeconomic status or ethnicity can be reached [7]. Evidence has shown that an increase in knowledge about risk factors for oral disease and strong knowledge of oral hygiene demonstrates better oral care practices with the aim of promoting healthy habits [8]. This knowledge will, in theory, lead to a change in attitudes, which will in turn lead the individual to make changes in their daily lifestyle [9]. Also, students with inadequate oral hygiene knowledge shows twice as likely to have caries when

compared to students with adequate knowledge [7].

Therefore, Students must be knowledgeable of not only the causes of oral diseases, but also the current preventive measures to avoid them, such as fluoridation of drinking water [10]. Even at home, oral hygiene routine which is most-likely the responsibilities of parents and guidance to teach and supervise their children on regular or daily brushing and flossing cannot be over-emphasized. A healthy diet that is low in sugary foods is an essential part of good oral hygiene practice. Regular dental visits every six months allow a Dentist or Oral Hygienist to provide oral hygiene instructions [2]. Bad oral habits can affect speech, chewing, self-esteem and overall health.

This study were motivated by the researchers' observation in a teenage conference within Owerri Municipality, Imo State, Nigeria. Where majority of teenagers were found with tooth discolouration, halitosis and bleeding gum. These factors hindered some of them from participating actively in the conference. This observed group of teenagers according to National School Health Policy [11] were supposed to be in Secondary School, hence the interest to sample Secondary School Students in Owerri municipality, Imo State, Nigeria. With the aim to determine the knowledge and practice of oral hygiene among them. The findings of this study will form input for programmes that will address the observed gap, oral health education in schools and oral hygiene awareness within the area.

## 2. MATERIALS AND METHODS

This study was carried out in Owerri Municipal Area of Imo state, South Eastern Nigeria. The area constitutes approximately a two third of the Capital City with a population of 127,213 people with 40% (50,885) male and 60% (76,327) female as at the 2006 census [12] and covers an area of 58 km<sup>2</sup>. The area has five (5) Electoral Wards/Communities (Umuoyima, Umuodu, Umuororonjo, Umuonyeche and Amawom).

The municipal area can boast of 23 secondary schools with few among the best in the southern Nigeria and higher institutions like Alvan Ikoku Federal College of Education, Imo State University (IMSU) and Federal Medical Center (FMC) to promote education and healthcare in the area.

This study employed a descriptive survey design with the population of the study comprising of 10,010 registered (4,689 Male and 5,321 Female) students in 23 Secondary Schools in Owerri Municipal Area, Imo State, Nigeria for 2014/15 academic session. A pre tested questionnaire was used to assess the oral hygiene of Secondary School Students in Owerri Municipal Area. The questionnaire was validated using language clarity and content validation. Fifty questionnaires were pretested from five different schools in Imo state outside Owerri municipal but with similar characteristics but not included for actual study. The questionnaire was tested for reliability using kuder-Richardson-21 and Cronbach's alpha reliability coefficient with a value of 0.86 and 0.81 respectively was obtained.

The sample size of the study comprised of 500 Secondary Schools students in Owerri Municipal Area, Imo State, Nigeria which were determined through Nwanna's formula [13], which states that 5% of the total population can be sampled for several thousands of the total population of the study. Therefore, since the total population of the study is of several thousands, 5% of it were selected. And the sample were drawn from four secondary schools selected through multistage sampling technique.

In stage one; the first step were to stratify the schools by kind, hence four strata: public, private, faith based and vocational schools. The next step was the selection of schools from each stratum using simple random sampling (balloting). The schools are; Comprehensive

Development Secondary School with students population of 1,300 Students; Rochas Foundation College (430 Students), Baptist Secondary School (600 Students), and St. Jude Commercial School (783 Students). The second stage were to determine proportional sample size from each of the selected schools. The sample size per school were as follows; Comprehensive Development Secondary School 210 students (42%), Rochas Foundation College 70 students (14%), Baptist Secondary School 125 students (19%) and St. Jude Commercial School 95 students (25%). Then the required sample size per school were spread across the six classes proportionally. According to National School Health Policy [11] Secondary Education in Nigeria is for six years, comprising of one to six (Class 1 to Class 6).

The third stage were the selection of respondents from each class by systematic sampling technique frame. Data collected were collected by administering structured pretested close-ended questionnaire to the students. The students were selected from those within the age bracket of the study and then, used simple random sampling techniques to select the exact number of students allocated to each school. After this were done. The questionnaires were distributed to them and supervised as they fill-in the questionnaire. The data generated from the questionnaire were analyzed using Statistical Package for Social Science (SPSS) version 20 for both descriptive and inferential statistical analysis. Data were subjected to percentage findings presented by the use of tables.

## 3. RESULTS

Result shows that the mean age of the response were 19.0±32.0, while the modal age were 12-14 years (32%); with 251 (50.2%) female and 249 (49.8%) Male. Less than one-fifth (18.8%) were JSS1 students, while less than half (42%) were from public school.

On the assessment of oral hygiene knowledge, (61.4%) of the respondent got the definition of oral hygiene. Minority of the respondent (23%) knew oral hygiene as only the process of cleaning the mouth. It was observed that majority of the respondents (70%) knew the object used for cleaning the mouth. More than half (58.8%) do not know the correct time for brushing daily. A greater percentage of the respondents were not able to identify the best option for cleaning the mouth after meal based on the multiple options;

use of toothpick (27%), rinse mouth with water (16.6%), brush after meal (5.4%), flossing (10.4%), and all of the above (40.6%). Greater percentage (55.4%) of the respondents were right about the food good for their teeth. Concerning ways to prevent oral diseases, 61% of the respondents got the correct answer. On consequences of poor oral hygiene, more than average (58.4%) of the respondents got the correct answer.

**Table 1. Distribution of respondents by socio-demographic characteristics, n=500 (100%)**

Variables	Respondents	Percentage
<b>*Age of Respondents</b>		
Less than 12 years	110	22.0
12 - 14 years	160	32.0
15 - 17 years	135	27.0
17 years and above	95	19.0
<b>Total</b>	<b>560</b>	<b>100</b>
<b>Gender of the Respondents</b>		
Male	249	49.8
Female	251	50.2
<b>Total</b>	<b>500</b>	<b>100</b>
<b>Class of the Respondents</b>		
JSS 1	94	18.8
JSS 2	78	15.6
JSS 3	75	15.0
SS 1	83	16.6
SS 2	88	17.6
SS 3	82	16.4
<b>Total</b>	<b>500</b>	<b>100</b>
<b>Kind of school Respondents</b>		
Public school	210	20.0
Private school	70	20.0
Mission/Faith-based.	95	20.0
Vocational school	125	20.0
<b>Total</b>	<b>500</b>	<b>100</b>

\*Mean age: 19.0±32.0

It is shown in Table 3 that majority of the respondents (84%) were aware of oral hygiene. Majority (78%) were of the opinion that their source of awareness are parents and guardians. On the major source of oral hygiene information, 44.8% of the respondents also affirmed that parents and guardians were their major source of oral hygiene information. While on the current or recent source of oral hygiene information, 41% agreed that media gives them current and updated information than any other sources. For

the common source of oral hygiene information, 40% confirmed that parents and guardians remains the most common and readily accessible source of oral hygiene information.

As shown in Table 4, 64.6% admitted to brush their teeth once daily while 31.4% do theirs twice daily. It is noted also more than half (57.4%) uses toothpick as an agent in cleaning their mouth/teeth after each meal. On prevention of oral diseases, 60.6% affirmed that among the options provided, all of the above can be prevented through daily brushing of teeth.

The data analyzed with Fisher's Exact Test showed that there is statistically significant relationship (342.624;  $P = .000$ ) between age of the students and the knowledge of oral hygiene.

Linear-by-Linear Association inferred that there is statistically significant relationship (53.464;  $P = .000$ ) between gender of the students and the knowledge of oral hygiene.

Fisher's Exact Test showed that there is statistically significant relationship (376.939;  $P = .000$ ) between class of the students and the knowledge of oral hygiene.

The data analyzed with Fisher's Exact Test showed that there is statistically significant relationship (337.910;  $P = .000$ ) between major source of oral hygiene information and the knowledge of oral hygiene

The data analyzed with Fisher's Exact Test showed that there is statistically significant relationship (471.225;  $P = .000$ ) between age of the students and practice oral hygiene as per brushing teeth.

The data analyzed with Fisher's Exact Test showed that there is statistically significant relationship (200.300;  $P = .000$ ) between gender of the students and practice oral hygiene as per brushing teeth.

The data analyzed with Fisher's Exact Test showed that there is statistically significant relationship (543.947;  $P = .000$ ) between class of the students and practice oral hygiene as per brushing teeth.

The data analyzed with Fisher's Exact Test showed that there is statistically significant

relationship (390.988;  $P = .000$ ) between major source of oral hygiene information and practice oral hygiene as per brushing teeth.

#### 4. DISCUSSION

The findings of this study forms input for programmes that will address the observed gap with the aim to determine the knowledge and practice of oral hygiene among them. In this present study, majority of the studied

respondents were females (50.2%). Greater proportions of the respondents (18.8%) are JSS1 students, while (42%) respondents were from public school. The result shows that majority of the respondents were more informed about tooth brushing, have more interest in oral health and perceive their own oral health to be good. And this is similar to a study on assessment of knowledge, attitude, and practice toward oral hygiene among governmental secondary school students in Debre Tabor Town, Amhara Region,

**Table 2. Distribution of respondents based on oral hygiene knowledge n=500 (100%)**

<b>Variables</b>	<b>Respondents</b>	<b>Percentage</b>
<b>What is Oral Hygiene</b>		
Keeping only the mouth clean	117	23.4
Keeping the teeth clean only	41	8.2
Brushing the teeth only	35	7
Keeping the mouth and teeth clean	307	61.4
None of the above	-	-
<b>Objects for cleaning the mouth</b>		
Chewing stick	130	26
Charcoal	-	-
Dental Floss	20	4
Tooth brush	350	70
<b>Time for teeth brushing daily</b>		
Morning only	294	58.8
Afternoon only	-	-
Night only	-	-
Morning and Night	206	41.2
<b>Best for mouth cleaning after food</b>		
Use of tooth pick	135	27
Raise with water	83	16.6
Brush the teeth	27	5.4
Flossing	52	10.4
All of the above	203	40.6
<b>Which of these foods are good for your teeth</b>		
Sweet	3	0.6
Chewing gum	200	40
Ice cream	7	1.4
Cakes ice	13	2.6
Vegetables	292	55.4
<b>Ways to prevent oral diseases</b>		
By Brushing	139	27.8
By flossing	15	3.00
By reducing regular sugar intake	24	4.8
By Regular mouth wash	14	2.8
All of the above	308	61.6
<b>Poor oral Hygiene leads</b>		
Dental Caries	15	3
Bad Breathe	25	5
Swelling of the gum	9	1.8
Bleeding gum	159	31.8
All of the above	292	58.4

**Table 3. Distribution of respondents based on oral hygiene information source n=500 (100%)**

<b>Variables</b>	<b>Respondents</b>	<b>Percentage</b>
<b>Awareness of oral hygiene</b>		
Yes	420	84
No	80	16
<b>If yes, how?</b>		
Parents and Guardians	380	78.0
School Teacher	100	20.0
Media	10	2.0
Dentist	10	2.0
Nobody	-	-
<b>Major source of oral hygiene information</b>		
Parents and Guardians	224	44.8
School Teacher	208	41.6
Media	68	13.6
No body	-	-
<b>Current information on oral Hygiene</b>		
Parents and Guardians	182	36.4
School Teacher	113	22.6
Media	205	41.0
Nobody	-	-
Others (specify)	-	-
<b>Most common source of oral hygiene information</b>		
Parents/Guidance	200	40.0
School Teacher	249	49.8
Media	51	10.2
Nobody	-	-
Others (specify)	-	-

North Central Ethiopia by Gualie and Tayachew [14] shows that 253 (60%) students had good oral hygiene knowledge which reflect that there is a chasm that 40% of students had poor knowledge toward oral hygiene.

Regarding oral hygiene information source, most of the students affirmed that their parents were the major source of oral hygiene information followed by school teachers. Unlike the case of previous research which stated that television broadcasts were the main sources of oral health education [15] and within Bayelsa East Senatorial District, the majority of the respondents (29.8%) gained the knowledge of oral health through the dentists during their visit and closely followed by television broadcasts (26.8%). However, the outcome of this study indicates that Parents have great influence on their children's oral hygiene practice and more care should be given to students that may not receive adequate information from their parents. Some tend to seek for current information on oral hygiene through the media which is 41% of the respondent affirmed that their current and most updated source of oral hygiene is media-internet, radio and television programmes, which provide

credible, reliable and timely information [16] unlike the teachers and parents that may not have such adequate and current information may not provide adequate oral hygiene information to their children since they are the major source of information based on this study. Hence parents' education must be included in any program that promotes preventive oral care in schools during Parent Teachers Association (PTA) meetings as well as in other oral health educational programs aimed at general public.

Regarding oral hygiene practice, most of the respondents agreed that toothbrush is the best brushing tools compared to chewing stick. Brushing the teeth daily is also a better means of cleaning the mouth for the purpose of preventing oral issues like dental carries, bad breathe, swelling gum and so on but on the other hand, a study done on assessment of the oral hygiene practices of respondents in secondary school in Bayelsa show that good oral hygiene was practiced by the majority of respondents. These included the use of toothpaste and toothbrush as oral hygiene mouth cleaning aids which has been found to be one of the most effective ways to remove oral debris and prevent the occurrence of

**Table 4. Distribution of respondents by oral hygiene practices**

<b>Variables</b>	<b>Respondents</b>	<b>Percentage</b>
<b>How often do you practice oral hygiene as per brush your teeth</b>		
Once a day	323	64.6
Twice daily	157	31.4
Sometimes a week	20	4
Never	-	-
Others	-	-
<b>Agents you use in cleaning your mouth/teeth after each meal</b>		
Toothpick	288	57.6
Dental floss	23	4.6
Rinse mouth with water	172	34.4
Brushing the teeth	17	3.4
Both tooth brush and paste	-	-
All of them	-	-
Others	-	-
<b>Often do you choose above meal</b>		
Always	291	58.2
Sometimes	182	36.4
Never	27	5.4
Others	-	-
<b>Name any other materials you use in teeth cleaning</b>		
Charcoal	93	18.6
Chewing stick	103	20.6
Dental Powder	78	15.6
None	226	45.2
Others	-	-
<b>Often you use the choice above</b>		
Always	74	14.8
Sometimes	200	40.0
Never	226	45.2
Others	-	-
<b>Pattern of Brushing teeth</b>		
Up, down and sideways	213	42.6
Sideways technique	287	57.4
None of the above	-	-
Others	-	-
<b>Brushing of teeth prevents Oral Diseases like</b>		
Dental Caries	23	4.6
Bad Breathe	80	16.0
Swelling of the gum	97	19.4
All of the above	303	60.6
Others specify	-	-

oral diseases [17]. However, result gotten from this study shows that brushing daily does not only prevent diseases but also tends to eliminate psychological trauma most students may face due to the consequences of not brushing daily. But the use of toothpick after meal rather than the use of dental floss or mouth rinsing shows

that adequate instruction and supervision is needed for proper oral hygiene practice among students in school within Owerri municipality, Imo State, Nigeria. More so, another study in Nigeria, also affirmed the use of tooth pick is not good for the teeth and the gum; it widens the interdental spaces [18].

**Table 5. Age of respondents and knowledge of oral hygiene**

Age of respondents		Knowledge of oral hygiene		Total
		Yes	No	
Age of respondents	Less than 12 years	110	0	110
	12-14 years	160	0	160
	15-17 years	135	0	135
	17 years and above	15	80	95
Total		420	80	500

*Fisher's Exact Test = 342.624; P = .000*

**Table 6. Gender of the respondents and knowledge of oral hygiene**

Gender of the respondents		Knowledge of oral hygiene		Total
		Yes	No	
Gender of the Respondents	Male	249	0	249
	Female	171	80	251
Total		420	80	500

*Linear-by-Linear Association = 53.464; P = .000*

**Table 7. Class of the respondents and knowledge of oral hygiene**

Class of the respondents		Knowledge of oral hygiene		Total
		Yes	No	
Class of the Respondents	JSS1	94	0	94
	JSS2	78	0	78
	JSS3	75	0	75
	SS1	83	0	83
	SS2	81	7	88
	SS3	0	82	82
Total		411	89	500

*Fisher's Exact Test = 376.939; P = .000*

**Table 8. Major source of oral hygiene information and knowledge of oral hygiene**

Major source of oral hygiene information		Knowledge of oral hygiene		Total
		Yes	No	
Major source of oral hygiene information	Parents and Guardians	224	0	224
	School teacher	196	12	208
	Media	0	67	67
	No body	0	1	1
Total		420	80	500

*Fisher's Exact Test = 337.910; P = .000*

**Table 9. Age of respondents and practice of oral hygiene as per brushing teeth**

Age of respondents		Practice oral hygiene as per brushing teeth			Total
		Once a day	Twice daily	Sometimes a week	
Age of respondents	Less than 12 years	109	0	0	109
	12-14 years	160	0	0	160
	15-17 years	53	82	0	135
	17 years and above	0	75	20	95
Total		322	157	20	499

*Fisher's Exact Test = 471.225; P = .000*



**Table 10. Gender of the Respondents and Practice oral hygiene as per brushing teeth**

		Practice oral hygiene as per brushing teeth			Total
		Once a day	Twice daily	Sometimes a week	
Gender of the Respondents	Male	179	0	0	179
	Female	143	157	20	320
Total		322	157	20	499

*Fisher's Exact Test = 200.300; P = .000*

**Table 11. Class of the respondents and practice oral hygiene as per brush your teeth**

Class of the respondents		Practice oral hygiene as per brushing teeth			Total
		Once a day	Twice daily	Sometimes a week	
Class of the respondents	JSS1	93	0	0	93
	JSS2	78	0	0	78
	JSS3	75	0	0	75
	SS1	31	52	0	83
	SS2	0	88	0	52
	SS3	0	62	20	82
Total		277	202	20	499

*Fisher's Exact Test = 543.947; P = .000*

**Table 12. Major source of oral hygiene information and Practice oral hygiene as per brushing teeth**

		Practice oral hygiene as per brushing teeth			Total
		Once a day	Twice daily	Sometimes a week	
Major source of oral hygiene information	Parents and Guardians	223	0	0	223
	School teacher	99	109	0	208
	Media	0	49	19	68
	No body	0	0	1	1
Total		322	158	20	500

*Fisher's Exact Test = 390.988; P = .000*

**Table 13. Major source of oral hygiene information and practice oral hygiene as per brushing teeth**

		Practice oral hygiene as per brushing teeth			Total
		Once a day	Twice daily	Sometimes a week	
Major source of oral hygiene information	Parents and Guardians	223	0	0	223
	School teacher	99	109	0	208
	Media	0	49	19	68
	No body	0	0	1	1
Total		322	158	20	500

*Fisher's Exact Test = 390.988; P = .000*

This study had some challenges which took the researchers extra time, regular visit and effort to stay with respondents as they are basically secondary school students, to ensure proper filling of the questionnaire as some of them were reluctant and needed close guide, why some selected students that their parent didn't grant consent were replaced. It is recommended that

more elaborate study be made covering the entire State and Federation to highlight the problem and deal with it comprehensively.

## 5. CONCLUSION

Majority of students had knowledge on oral hygiene, but with poor oral hygiene practices.

The toothbrush with toothpaste is the most common oral hygiene aid used for cleaning teeth; it was observed that a greater number of students brushed their teeth in the morning hour only instead of morning and night. The results of this study will help us to evaluate the efficacy of oral health education programs in schools within Owerri Municipality, Nigeria as a strong way to break out of bad oral hygiene rut thereby promoting oral hygiene awareness and practice.

## CONSENT

A formal verbal consent were sorted and received from the School Principals and parents of the selected students after the concept and methodology were explained to them.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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