Scientific Knowledge Group

Research Article

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A Questionnaire Based Assessment of Knowledge, Attitude and Practices of Dental Hygiene among School Children in Nigeria

Aminat Sani[1], and Benjamin Odeka[2*]

[1]BSc, MSc Microbiology (Research Fellow Lady Helen Child Health Foundation)
[2]MBBS DCH MA FRCP FRCPCH (Director of Research Lady Helen Child Health Foundation)

[*]Corresponding author:
Dr Benjamin Odeka, MBBS DCH MA FRCP FRCPCH (Director of Research Lady Helen Child Health Foundation) Nigeria. Email: ben@ladyhelenchildfoundation.com.

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Abstract

Background: Oral health is an important aspect of human wellbeing. The effect of poor oral hygiene is oral diseases. WHO guideline has stipulated the active involvement of civil societies in promoting oral hygiene.

Objectives: Lady Helen Child Health Foundation (LHCHF) in commemoration of the oral hygiene day 20th March carried out an outreach to secondary schools in Nigeria to educate and enquire about practices, attitude and knowledge of school children in relation to their oral health to determine influencing factors and design interventions.

Method: Two public secondary schools in Abuja and Lagos metropolis were randomly selected. 281 school children in senior secondary school three were involved. Self-administered questionnaires were used to get information from the participants.

Results: The level of education of the parent was significant in association with participants knowledge of nutrition for oral health (p value- Abuja = 0.022, Lagos= 0.034) also parent's income with treatment of gum diseases (p value- Abuja = 0.049). There was a significant association between having attended educational programme and who provided them with education (p value- Abuja = 0.026, Lagos = 0.018) and a high significance between wanting to receive oral health education and the person providing it (p value- Abuja < 0.001).

Conclusion: This study highlights a high level of knowledge, good practice and attitude to oral health of the participating school children. The role of parents in the oral health of their children is highly significant. In designing interventions this study encourages the collaboration between policy makers, educators and parents.

Research In Context: Healthy teeth showcase self-confidence, well-being, allowing individuals socialize and work without having pain, discomfort and embarrassment. Good oral practices promote oral health. There is a surge in the incidence of oral diseases. Prevention and management of oral diseases include promoting oral education especially among vulnerable groups. Civil societies should be actively involved in promoting oral health. This was gathered from WHO fact sheets, guidelines and database (2019- 2023).

This study highlights the effect of good oral practices on oral health as seen among the participants. It also reflects the significance of parents' involvement in the prevention and management of oral health from an early age. It encourages the involvement of civil societies in the promotion of oral health.

Collaboration between policy makers, educators and parents should be emphasized within the health economy. LHCHF in its mission is committed to improving the health outcomes of children. In collaboration with the Ministries of Women Affairs, Health, and National planning.

Keywords: Oral Health, Oral Hygiene, Parents, Civil Societies, Oral Education.

Introduction

Oral health is the state of the mouth, teeth and the orofacial structure that allows a person carryout important functions such as eating, breathing and speaking. It also showcases self-confidence, well-being, allowing individuals socialize and work without having pain, discomfort and embarrassment [1].

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The adverse effect of poor dental hygiene is oral diseases. This includes dental caries (tooth decay), periodontal diseases, tooth loss and oral cancers [2]. Maintaining good oral hygiene practice is key to preventing these diseases [3]. Oral diseases comprise of both intrinsic and extrinsic risk factors. Intrinsic factors include age, sex, and hereditary while extrinsic include unhealthy diet (especially high in sugar), excess alcohol intake, smoking. Though high sugar intake is the cause of tooth decay, smoking and excessive alcohol intakes are the leading cause of oral cancers and periodontal diseases [4].

The World Health Organization has noted that oral health has improved over the years but, dental caries is predominant in urban settlements [5]. The prevalence of untreated caries of deciduous teeth among children in Nigeria is at 35.5% [6]. In the global strategy for oral health by WHO there is the inclusion of civil societies in the increase in knowledge promotion and access to essential oral health care for the poor, vulnerable and children [7].

The Knowledge of oral hygiene refers to the understanding of proper dental practices that influence dental health. Attitude towards oral health reflects willingness, perception and beliefs to engage in good oral health practices. The knowledge and attitude towards oral health affect oral health practices [3]. In middle-income setting like Nigeria, oral health does not receive proper attention at the Primary health care and school health programs stage. Other factors also influence the knowledge, attitude and practices of children towards their oral health including their parent's contributions and limited surveillance data around oral health [4].

The prevention and management of oral diseases include creating awareness of the existence of oral diseases, developing human capacity needed in the promotion, prevention and management of oral health, including oral health in primary health care and public health programs, having good surveillance system around oral health, developing policies that help manage oral health and creating funds for it [4].

The present Alpha generation (Gen A's) were born into digitalization and early internet exposure this defined their learning and behavioral preferences [8]. Several studies have shown the effect oral disease on the attendance and performance of school-going children. The incidence of oral disease in school-going children can be related to their knowledge and attitude towards oral health practices. Increased knowledge-based programs on good oral health practices and also providing free or cost-effective treatment can drastically reduce the incidence of oral health problems among school-going children [9].

WHO guideline for national health system response to the burden of oral health diseases in Nigeria involves: the implementation of excise tax on sugar sweetened beverages, the implementation of policies, strategies and action plan for the prevention and management of oral health, the dedication of a technical/ professional staff in the Ministry of health specifically for oral health and the recognition of Noma as a national public health problem in the country [6].

In commemoration of the oral hygiene day 20th March 2023, Lady Helen Child Health Foundation carried out an oral hygiene outreach to four public secondary schools in Abuja and Lagos on 4th and 6th and 11th and 12th October respectively 2023. The objectives of the event was to enable school-going children know about oral hygiene, importance of oral hygiene, common oral hygiene diseases, dental hygiene habits, steps to reduce and prevent risk of oral diseases, and how to properly brush and floss their teeth. Questionnaires were distributed to the students before the start of the event in order to find out their awareness on oral hygiene practices, importance and tools, professional oral hygiene and oral diseases, generate data on oral health among school children and determine factors that influence oral health in order to devise interventions necessary for oral health promotion.

Material and Method

Study Design: In Nigeria there are two major cities, Abuja and Lagos. Lagos is the commercial centre of Nigeria located in the South and Abuja is the administrative hub located in the North. Lagos had a population of 15 946 000 and Abuja was 3 840 000 [9]. Through random selection two public secondary schools each were selected in Abuja and Lagos. The study was a community (Secondary school) based research.

Ethical Approval

The research was approved by the Research Committee of Lady Helen Child Health Foundation. Consent to test was given by the Secondary education board and the school.

Study Setting

The study was carried out in Abuja and Lagos metropolis in two public secondary schools each on 4th and 6th October, 2023, 11th and 12th October, 2023 respectively. Student were informed about the aim of the study and consent was gotten. The questionnaires were then distributed physically by direct distribution and filled by each student in front of their teachers and were retrieved after they had completed filling. The students were then educated on importance of oral hygiene, good oral hygiene practices and oral diseases. Study Location: Abuja Municipal Area Council has a total of 21 Public Senior Secondary Schools [10]. Two public schools in Abuja were visited: Government Day Secondary School Apo and Government Secondary School Garki. Lagos District VI has a total of 106 secondary schools [11]. Two public schools were also visited in Lagos Okota Senior Secondary School and Grammar School

Study Population

The study population included school-going children in senior secondary school 3 regardless of gender.

Study Size

A prevalence of 23% as reported from the study of Afolabi, A.O et al., 2024 [12].

Using the formula, n=z2pq/L2.

Where: Standard deviation (z) is at 95% confidence interval.

Allowable error of 5%\

Number of samples= 272 samples

A total of 281 samples were collected.

Data Collection tool: Questionnaire was used to collect data.

Validity and Reliability: the sample questionnaire used was validated through a pilot study then, questionnaire was reviewed by a team of pediatrician, oral hygienist and pediatric nurse [13].

Data Collection

Questionnaires were self-administered and used to collect information from the school- going children. The questions were closed ended questions. The questionnaire was designed by a researcher after reviewing related literatures and templates. The questionnaire was split into three sections.

Section one was used to collect information about demographics of the child and parents. This included the gender of the child, Age, Religion and the level of education of the parent, occupation and monthly income.

Section two was used to gather information about the child's oral hygiene practices and tools used. It included questions on if they brush their teeth, how many times they brush them, what type of toothbrush they use, if they use toothpaste, if they know dental floss and whether ever used, if they use any other material, if the tongue should be cleaned, their awareness on how to properly brush and clean their teeth, if they agree they should brush in circular motion side-to-side, their believe on the importance of nutritious food for maintaining dental health.

Section three was used to get information about their awareness of oral diseases and professional oral care. The information gathered included their awareness of factors that increase their risk of oral diseases and oral hygiene in a professional way, if they had undergone professional oral care, if they had visited a dentist and if yes, at what age, if no, why they had not gotten oral care. If they had gotten treatment for gum diseases, loose teeth without injury, tissue abuse habits such as use of toothpick, cavities. This also included questions asking if they were embarrassed about their teeth, areas where they had discomfort in their teeth, information around who provided them with training on oral hygiene, if they had ever attended a program on its awareness and if they would like to receive more information about their oral health.

Statistical Analysis

The data was entered into Excel sheet, tables and figures were devised statistical analysis was then performed using SPSS version 27.0. Chi square test was used to study the significance of association between variables. Statistical significance was measured using P value of ≤ 0.05.

Role of Funding Source

This work was supported by Lady Helen Child Health Foundation (LHCHF). LHCHF decided the locations of the study, collected samples from the site, analyzed and interpreted the data, wrote reports of the research. The decision to submit the paper for publication was taken by LHCHF Research Group.

Results

In Abuja a total of 200 questionnaires were distributed. 131 were retrieved at a response rate of 65.5%.

Table 1, shows response to the level of education of the parents of the participants. 57 participants have parents with tertiary level of education and 54 participants have parents with secondary education. Therefore, majority (44%) of participants' parents have undergone tertiary education.

Table 2, shows response about the occupation of the parents, a total of 91 parents are business owners and 18 parents are civil servants and private workers. Therefore, most (70%) parents are business owners.

Table 3, indicates response to the monthly income of the parents with majority, 66.4% participants' parents earning within the range of less than NGN 50 000 – 149 000. 20.6% parents earn above 200 000 and the least earned is 13% parents NGN 149 000- 200 000.

Table SM1, shows their response to the number of times and time when they brush their teeth. 66 participants brush their teeth twice, in the morning and evening with a large number being male participants within the age range of 13-16. 63 participants brush once in the morning with majority being females within the age range of 13-16. Therefore, 50.4% of participants brush their teeth twice in a day.

Figure SM1, shows response about highest representation of times and time is among the females in the age range of 13-16 who brush once in the morning and the least is those who brush once in the evening. Females have more participants who brush once in the morning and males have more participants who brush twice.

Table SM2, shows response to their knowledge and use of dental floss. It shows that 96 participants know dental floss though 71 participants say they have never used it only 35 participants use it sometimes and six (6) say they always use it. Therefore, 73% of the participants know dental floss but 54% say they have never used it and only 4.6% use it always.

Table SM3, tests their knowledge of proper brushing of teeth. 90.8% say the know how to properly brush their teeth, 88.6% say the teeth should be brushed in circular motion side-to-side and 76% say the tongue should also be cleaned after brushing the teeth.

Figure SM2, shows that equal number of participants who say the teeth should be brushed in circular motion also say the tongue should be brushed while also equal amount who say the teeth should not be brushed in circular motion say the tongue should not be brushed.

Figure SM3, shows their response to their knowledge on diet playing a role in the health of the teeth. It indicates that majority (80%) of the participants know that diet plays a role in the health of the teeth.

Figure SM4, shows response to their knowledge of the risk factors for oral diseases. It indicates that a higher number of females think consuming a lot of sugar can cause oral diseases while a higher number of males think not brushing the teeth can cause oral diseases. 40% of participants think consuming a lot

of sugar can cause oral diseases and 28% think not brushing the teeth is a risk factor.

Table SM4, shows response about their knowledge of professional advice on oral hygiene. It indicates that 82.4% of the participants say they know professional advice about oral hygiene, though 53% say they have never undergone oral hygiene in a professional way. The highest percentage of participants, 38% said they could not afford it while the next highest, 33% said they did not know they needed it.

Figure SM5, makes enquiry if the participants have undergone treatment for gum diseases or cavities. It shows that (77% -gum diseases, 73%- cavities), a high number of participants have not undergone any of these treatments.
Figure SM6, also makes enquiry around treatment for loose of teeth without injury or treatment as a result of tissue abuse habits like use of tooth picks. It appears that the highest number of participants have not undergone treatment for this (79%- loose teeth, 71%- tissue abuse).

Figure SM7, shows the part of their mouth where they say they feel discomfort. Majority (39%) of the participants said their teeth, next (24%) were their gums. A high number of participants (19%) among the age range 13-16 both male and female said none.

Figure SM8, shows their response to where they get oral hygiene information. It reflects that most participants (70%) got their information from their parents next (15%) is internet though with a large difference.

Figure SM9, shows their response to their involvement and interest in educational programme on oral hygiene. Majority (70%) of the participants have attended a form of educational programme and 87% are interested in attending more.

Figure SM10, shows response to their use of other materials in brushing their teeth. It is observed that 51% of the participants use other materials in brushing their teeth. Generally, all participants use toothpaste in brushing their teeth.

Table SM5, highlights that a large percentage of participants have not visited a dentist before.

Figure SM11, shows their response to the type of toothbrush they use. Most participants use manual toothbrush.

Table 1: Parent level of Education

	Parent Level of Education				
Socio-Demographic Factor	**No Formal Education**	**Primary**	**Secondary**	**Tertiary**	**Grand Total**
13-16	2	12	30	35	79
Female	-	6	21	17	44
Christianity	-	3	15	13	31
Muslim	-	3	6	4	13
Male	2	6	9	18	35
Christianity	2	2	7	12	23
Muslim	-	4	2	6	12
17-20	1	5	24	22	52
Female	1	5	16	11	33
Christianity	1	1	8	6	16
Muslim	-	4	8	5	17
Male	-	-	8	11	19
Christianity	-	-	1	7	8
Muslim	-	-	7	4	11
Grand Total	**3**	**17**	**54**	**57**	**131**

Table 2: Parent Occupation

	Parent Occupation					
Socio-Demographic Factors (Age, Sex, Religion)	**Artisan**	**Business person**	**Civil Servant**	**Private sector**	**Retired person**	**Grand Total**
13-16	**1**	54	11	12	1	79
Female	**1**	28	8	6	1	44

Christianity		20	6	5		31
Muslim	1	8	2	1	1	13
Male		26	3	6		35
Christianity		17	2	4		23
Muslim		9	1	2		12
17-20	**1**	37	7	6	1	52
Female	**1**	23	5	4		33
Christianity		10	3	3		16
Muslim	1	13	2	1		17
Male		14	2	2	1	19
Christianity		6	1		1	8
Muslim		8	1	2		11
Grand Total	**2**	**91**	**18**	**18**	**2**	**131**

Table 3: Parent Monthly Income

Socio-DemographicFactors (Age, Sex, Religion)	Less than N50, 000	N51, 000-N99, 000	N100, 000 -N149, 000	N150, 000 -N200, 000	More N200, 000	Grand Total
13-16	14	20	19	8	18	79
Female	**7**	10	13	6	8	44
Christianity	**2**	7	11	3	8	31
Muslim	5	3	2	3		13
Male	7	10	6	2	10	35
Christianity	**4**	8	3	2	6	23
Muslim	3	2	3		4	12
17-20	15	9	10	9	9	52
Female	**12**	4	7	6	4	33
Christianity	**7**	1	3	2	3	16
Muslim	5	3	4	4	1	17
Male	3	5	3	3	5	19
Christianity		2	3	1	2	8
Muslim	3	3		2	3	11
Grand Total	**29**	**29**	**29**	**17**	**27**	**131**

Note - $1= NGN 905 (2023).

Table SMI: Number of Times they Brush their Teeth a Day

How many times a day do you brush your teeth?				
Socio-Dem0graphic Factors (Age, Sex, Religion)	**Once (in the evening)**	**Once (in the morning)**	**Twice (in the morning and in the evening)**	**Grand Total**
13-16	1	39	39	79
Female		27	17	44
Male	1	12	22	35
17-20	1	24	27	52
Female	1	19	13	33
Male		5	14	19
Grand Total	**2**	**63**	**66**	**131**

Table SM2: Knowledge and Use of Dental Floss

Socio-Dem0graphic Factors (Age, Sex, Religion)	Do you know Dental Floss		No, I have never used it	Have ever used Dental Floss	No, I tried it, but I did not like it	Yes, I use it sometimes	Grand Total
	No	Yes		Yes, I always use it			
13-16	22	57	45	3	12	19	79
Female	15	29	25	1	7	11	44
Christianity	10	21	20	1	4	6	31
Muslim	5	8	5		3	5	13
Male	7	28	20	2	5	8	35
Christianity	6	17	14	1	2	6	23
Muslim	1	11	6	1	3	2	12
17-20	13	39	26	3	7	16	52
Female	8	25	15	2	6	10	33
Christianity	4	12	8		3	5	16
Muslim	4	13	7	2	3	5	17
Male	5	14	11	1	1	6	19
Christianity	1	7	3	1		4	8
Muslim	4	7	8		1	2	11
Grand Total	**35**	**96**	**71**	**6**	**19**	**35**	**131**

Table SM3: Knowledge of Brushing the Teeth and Cleaning the Tongue

Socio-Demographic Factors (Age, Sex, Religion)	Do you think you Should brush in Circular motion side-side		Do you think you should also clean your tongue after brushing your teeth		Do you know how to properly brush I am here have a healthy smile!			Grand Total
	No	Yes	No	Yes		Yes	No	
13-16	8	71	7	72	9	10	60	79
Female	2	42	5	39	6	4	34	44
Christianity	1	30	3	28	5	1	25	31
Muslim	1	12	2	11	1	3	9	13
Male	6	29	2	33	3	6	26	35
Christianity	3	20	1	22	1	3	19	23
Muslim	3	9	1	11	2	3	7	12
17-20	4	48	8	44	11	1	40	52
Female	3	30	5	28	7	1	25	33
Christianity	1	15	3	13	4	1	11	16
Muslim	2	15	2	15	3		14	17
Male	1	18	3	16	4		15	19
Christianity	1	7	1	7			8	8
Muslim		11	2	9	4		7	11
Grand Total	**12**	**119**	**15**	**116**	**20**	**11**	**100**	**131**

Table SM4: Knowledge of Professional Oral Hygiene

Do you know what oral Hygiene is in a professional way?			Have you ever undergone oral hygiene in a Professional way?		WHY Did not have the tim		I could not afford it	I did not know I needed one	I got oral health care when needed	Oral health care centers are too far	Were afraid to go	Grand Total
Socio-Dem0graphic Factors (Age, Sex, Religion)	No	Yes	No	Yes								
13-16	12	67	42	37	6		34	25	8	3		
Female	7	37	24	20	3		21	15				
Christianity	4	27	19	12	2		14	10	2	1		
Muslim	3	10	5	8	1		7	5	2	1		13
Male	5	30	18	17	3		13	10		2	1	35
Christianity	5	18	14	9	2		8	8	6	1		23
Muslim		12	4	8	1		5	2	4	1	1	12
17-20	11	41	28	24	4		16	18	2	7	1	52
Female	7	26	18	15	3		9	16	6	2	1	33
Christianity	5	11	10	6	2		6	6	2		1	16
Muslim	2	15	8	9	1		3	10	1	2		17
Male	4	15	10	9	1		7	2	1	5		19
Christianity	1	7	4	4	1		5		4	1		8
Muslim	3	8	6	5			2	2	1	4		11
Grand Total	**23**	**108**	**70**	**61**	10		**50**	**43**	**3**	**10**	**4**	**131**

Table SM5: Dentist Visit

Have you ever visited a dentist?			WHEN?				
Socio-Dem0graphic Factors (Age, Sex, Religion)	**No**	**Yes**	**Between 0 and 4**	**Between 10 and 12**	**Between 5 and 9**	**Over 13**	**Grand Total**
13-16	53	26	30	18	11	20	79
Female	34	10	18	12	3	11	44
Christianity	24	7	12	7	3	9	31
Muslim	10	3	6	5		2	13
Male	19	16	12	6	8	9	35
Christianity	13	10	7	5	5	6	23
Muslim	6	6	5	1	3	3	12
17-20	43	9	23	9	13	7	52
Female	30	3	16	5	8	4	33
Christianity	14	2	8	1	4	3	16
Muslim	16	1	8	4	4	1	17
Male	13	6	7	4	5	3	19
Christianity	4	4	3		4	1	8
Muslim	9	2	4	4	1	2	11
Grand Total	**96**	**35**	**53**	**27**	**24**	**27**	**131**

Note - $1= NGN 905 (2023).

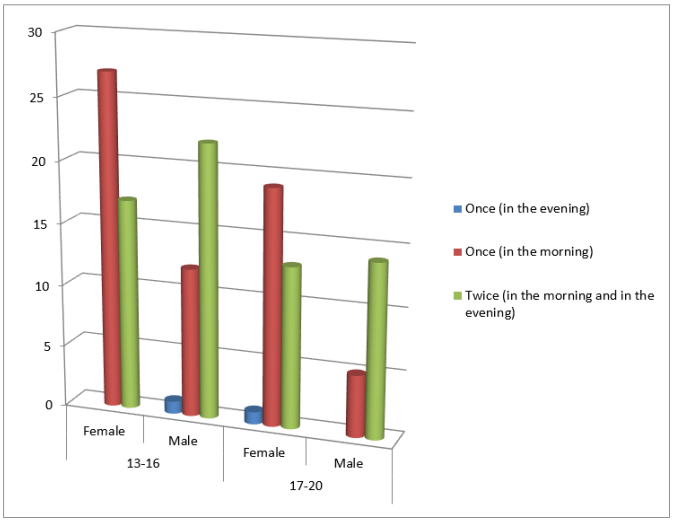

Figure SM1: Number of Times they Brush their Teeth in a Day

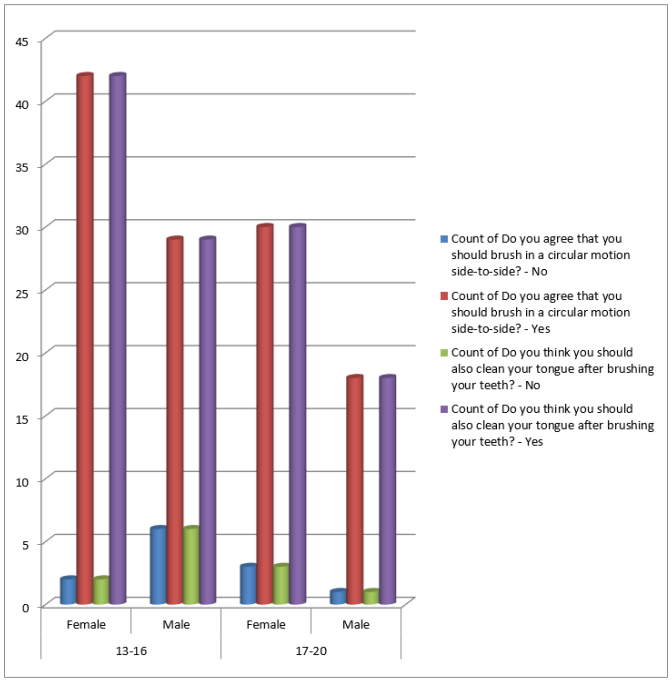

Figure SM2: Knowledge of Proper Brushing of Teeth

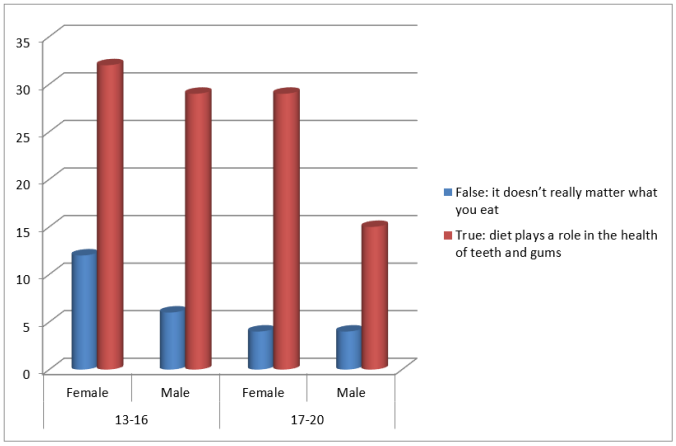

Figure SM3: Knowledge of Nutrition for Teeth Health

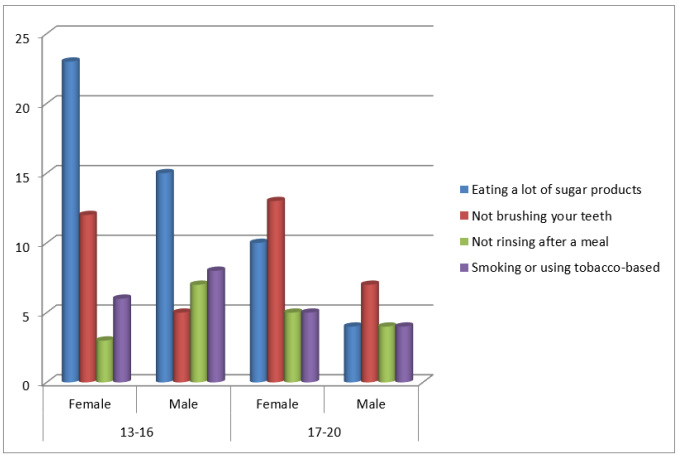

Figure SM4: Knowledge of Risk Factors of Oral Diseases

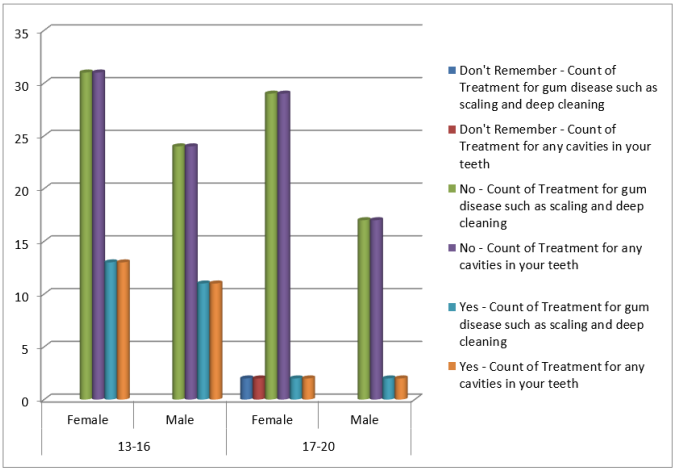

Figure SM5: Enquiry on Treatment for Gum Diseases and Cavities

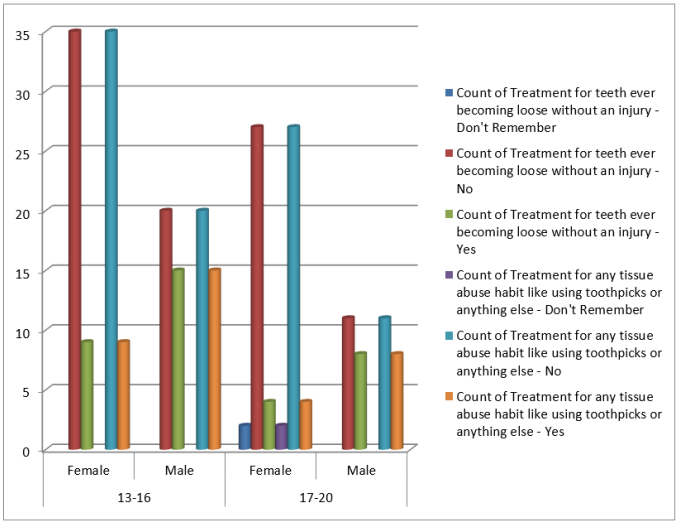

Figure SM6: Enquiry on Treatment for Loose Teeth and Tissue Abuse Habits

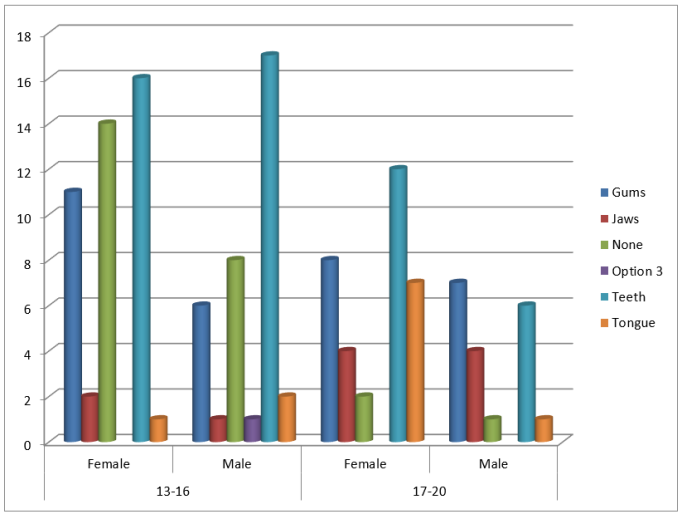

Figure SM7: Parts of the Teeth Causing Discomfort

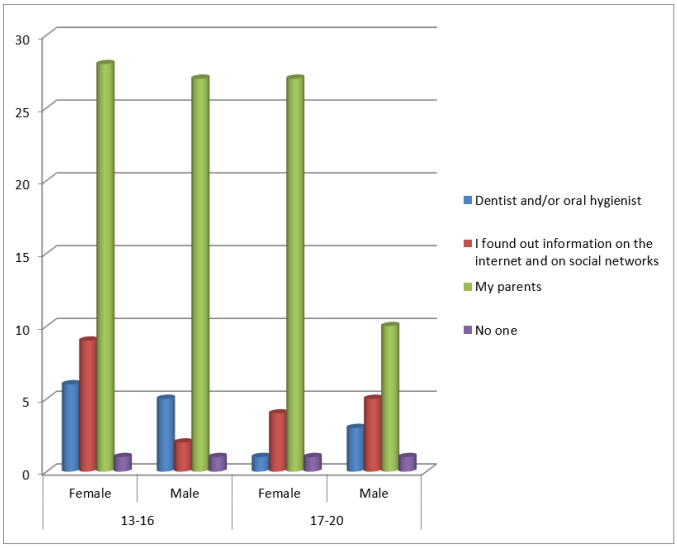

Figure SM8: Education on Oral Hygiene

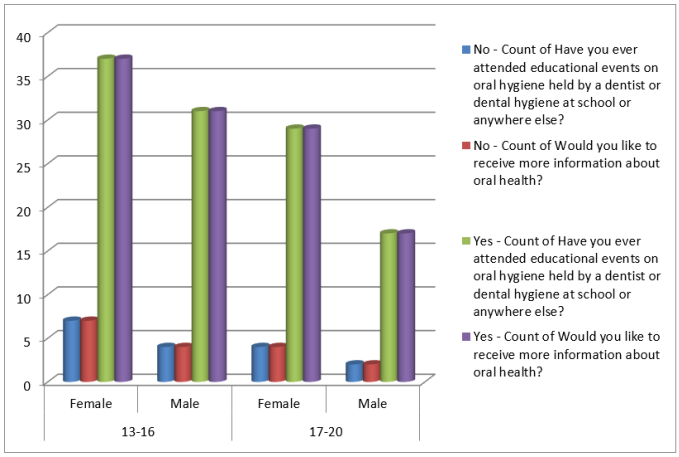

Figure SM9: Involvement and Interest in Oral Hygiene Education

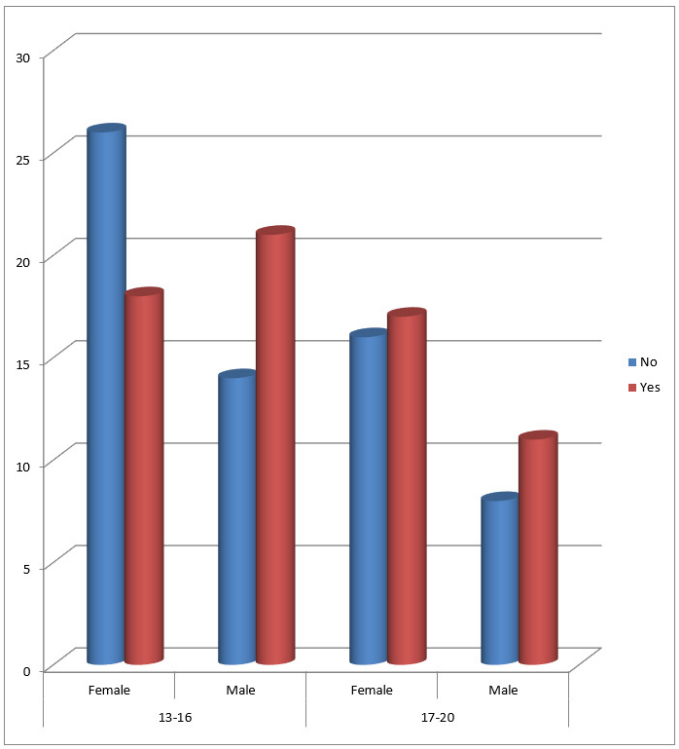

Figure SM10: Materials used for Brushing

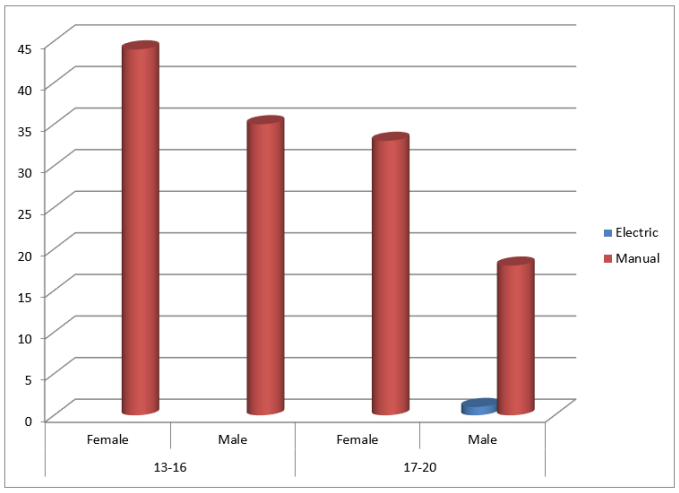

Figure SM11: Type of Brush

In Lagos a total of 200 questionnaires were distributed and 150 was retrieved with a response rate of 75%.

Table 4, shows response to the level of education of parents of the participants. It shows that 75 participants have parents who have attended up to secondary education and 67 participants whose parents have attended up to tertiary education. Only three (3) participants had parents who have no formal education. Therefore, the highest percent, 50% of the participants have parents who had attended up to secondary education and 47% tertiary education.

Table 5, shows response to the occupation of the parents of the participants. It shows that 77% of the participants have parents who are business owners.

Table 6, shows response to the monthly income earned by parents of the participants. It shows that the highest percentage, 30% of parents of the participants earn within NGN 51000-99000. This is followed by, 20% earning NGN 100000-150000 then 21% earning less than NGN 50000, 16% earn more than NGN 200000 lastly, 13% earn NGN 151000- 200000.

Table SM6, shows response about the number of times and the time they brush their teeth. 50.1% brush their teeth twice in a day morning and evening while 48.7% brush once in the morning.

Figure SM12, shows response to the number of times and the time they brush their teeth. It indicates that most of the female participants brush twice in a day though most of the male participants brush once in the morning.

Table SM7, shows response to their knowledge and use of dental floss. 72.7% say they know dental floss, 60.7% say they have never used it and 25.3% say they use it sometimes.

Table SM8, shows response about their knowledge on how to properly brush their teeth. 78.7% say they know how to properly brush their teeth, 84.7% say it should be done in circular motion side-to-side and 86.7% say the tongue should also be cleaned after brushing the teeth.

Figure SM13, shows response to their knowledge on how to properly brush their teeth. It is observed that a close number of participants say the teeth should be brushed in circular motion side-to-side and the tongue should be cleaned after brushing the teeth.

Figure SM14, shows response to their knowledge of diet playing a role in healthy teeth. It is observed that a large number of participants, 84% know diet play a role in the health of the teeth. Figure SM15, shows response to their knowledge about the risk factors associated with oral diseases. Majority (67%) of the participants think consuming lot of sugar can cause oral diseases followed by smoking tobacco among female participants in age range 13-16 and male participant's age range 17-20.

Figure SM16, shows response to them having undergone treatment for gum diseases or have cavities. A large number of participants (75%- cavities, 73%- gum diseases) in each group have not had treatment for gum diseases or cavities except for male participants in the age group 17-20 who have a small margin between a high number participants who have not had treatment and a smaller number of participants who have had treatment.

Figure SM17, shows response to enquiry on treatment for loose teeth without injury or treatment for tissue abuse habits. Just as in gum diseases and cavities, other groups have more participants (73%- tissue abuse, 78%- loose teeth) who have not had treatment and less participants who have had with a large difference but not in male participants in the age range 17-20.

Table SM9, shows response to their knowledge and experience of professional advice on oral hygiene. 78.7% say they know professional advice on oral hygiene, 50.7% say they have undergone oral hygiene in a professional way. Majority (35%) of the participants say they did not undergo oral hygiene in a professional way because they could not afford it and 25% say, they got it when they needed it.

Figure SM18, shows response to the part of their mouth where they felt discomfort. Majority (44%) of the participants feel discomfort on their teeth next is (29%) their gum.

Figure SM19, shows the response to the person from whom information about oral hygiene was obtained. This shows that a very high number of participants (83%) get information from their parents.

Figure SM20, shows their response on enquiry on receiving information from an educational programme and wanting to still receive information.57% of the participants have received information and 89% would like to receive information. It can be seen that majority of the female participants have received information on oral hygiene from a programme and would still want to receive more information but, very close number of male participants have and have not received information on their oral hygiene and are and are not interested in receiving information.

Figure SM21, shows the materials they use in brushing their teeth, toothpaste or other materials. A high number of participants (99%) use toothpaste from this number 57% also use other materials in brushing their teeth.

Figure SM22, shows response to the type of brush they use. Most Participants (91%) use manual toothbrush.

Table SM10, shows response about their visit to the dentist, of which only 35% have done so.

Table 4: Parent Level of Education

Parent Level of Education					
Socio-Demographic (Age, Sex, Religion)	**No Formal Education**	**Primary**	**Secondary**	**Tertiary**	**Grand Total**
13-16	1	3	36	34	74
Female		2	16	19	37
Christianity			12	17	29
Muslim		2	4	2	8
Male	1	1	20	15	37
Christianity		1	14	12	27

Muslim	1		6	3	10
17-20	2	2	39	33	76
Female			15	19	34
Christianity			12	15	27
Muslim			3	4	7
Male	2	2	24	14	42
Christianity	1	2	13	9	25
Muslim	1		11	5	17
Grand Total	**3**	**5**	**75**	**67**	**150**

Table 5: Parent Occupation

Parent occupation					
Socio-Demographic (Age, Sex, Religion)	**Artisan**	**Businessperson**	**Civil servant**	**Private sector**	**Grand Total**
13-16	1	56	11	6	74
Female	1	27	6	3	37
Christianity		21	5	3	29
Muslim	1	6	1		8
Male		29	5	3	37
Christianity		19	5	3	27
Muslim		10			10
17-20	3	59	7	7	76
Female		23	6	5	34
Christianity		17	6	4	27
Muslim		6		1	7
Male	3	36	1	2	42
Christianity	3	19	1	2	25
Muslim		17			17
Grand Total	**4**	**115**	**18**	**13**	**150**

Table 6: Parent Monthly Income

Parent monthly income						
Socio-Demographic (Age, Sex, Religion)	**Less than N50, 000**	**N51, 000-N99, 000**	**N100, 000-N149, 000**	**N150, 000-N200, 000**	**More than N200, 000**	**Grand Total**
13-16	15	26	11	8	14	74
Female	7	10	6	6	8	37
Christianity	7	7	3	4	8	29
Muslim		3	3	2		8
Male	8	16	5	2	6	37
Christianity	6	8	5	2	6	27
Muslim	2	8				10
17-20	16	19	19	11	11	76
Female	7	10	7	4	6	34
Christianity	5	9	5	3	5	27
Muslim	2	1	2	1	1	7
Male	9	9	12	7	5	42
Christianity	4	6	9	4	2	25
Muslim	5	3	3	3	3	17
Grand Total	31	45	30	19	25	150

Note $1=NGN905

Table SM6: Number of Times they Brush their Teeth a Day

How many times a day do you brush your teeth?				
Socio-Demographic (Age, Sex, Religion)	**Once (in the evening)**	**Once (in the morning)**	**Twice (in the morning and in the evening)**	**Grand Total**
13-16		40	34	74
Female		16	21	37
Male		24	13	37
17-20	1	33	42	76
Female		10	24	34
Male	1	23	18	42
Grand Total	**1**	**73**	**76**	**150**

Table SM7: Knowledge and Use of Dental Floss

Do you know dental floss?			Have you ever used dental floss?				
Socio-Demographic (Age, Sex, Religion)	**No**	**Yes**	**No, I have never used it**	**No, I tried it, but I did not like it**	**Yes, I always use it**	**Yes, I use it sometimes**	**Grand Total**
13-16	23	51	46	6	2	20	74
Female	12	25	23	3		11	37
Christianity	8	21	16	2		11	29
Muslim	4	4	7	1			8
Male	11	26	23	3	2	9	37
Christianity	8	19	16	3	2	6	27
Muslim	3	7	7			3	10
17-20	18	58	45	7	6	18	76
Female	12	22	22	3	2	7	34
Christianity	8	19	18	3	1	5	27
Muslim	4	3	4		1	2	7
Male	6	36	23	4	4	11	42
Christianity	3	22	16	3	3	3	25
Muslim	3	14	7	1	1	8	17
Grand Total	41	109	91	13	8	38	150

Table SM8: Knowledge of Brushing the Teeth and Cleaning the Tongue

Do you know how to properly brush and clean your teeth?		Do You think you should brush your teeth in circular motion Side-to-side			Do you think you should also clean your tongue after brushing your teeth				
Socio-Demographic (Age, Sex, Religion)	**I am here to learn and have a healthy smile!**	**No**	**Yes**		**No**	**Yes**	**No**	**Yes**	**Grand Total**
13-16	9	8	57		10	64	8	66	74
Female	5	3	29		5	32	3	34	37
Christianity	4	3	22		5	24	3	26	29
Muslim	1		7			8		8	8
Male	4	5	28		5	32	5	32	37
Christianity	3	2	22		3	24	4	23	27
Muslim	1	3	6		2	8	1	9	10
17-20	7	8	61		13	63	12	64	76
Female	4	3	27		6	28	4	30	34
Christianity	4	2	21		4	23	4	23	27

Muslim		1	6		2	5		7	7
Male	3	5	34		7	35	8	34	42
Christianity	2	3	20		5	20	5	20	25
Muslim	1	2	14		2	15	3	14	17
Grand Total	**16**	**16**	**118**		**23**	**127**	**20**	**130**	**150**

Table SM9: Knowledge of Professional Oral Hygiene

Socio-Demographic (Age, Sex, Religion)	No	Yes	Have you ever undergone oral hygiene in a professional way? No	Yes	WHY Did not have the time	I could not afford it	I did not know I needed one	I got oral health care when needed	Oral health care centers are too far	Were afraid to go	Grand Total
13-16	11	63	38	36	5	20	22	19	4	4	74
Female	7	30	23	14	2	11	8	13	2	1	37
Christianity	5	24	17	12	1	8	8	10	1	1	29
Muslim	2	6	6	2	1	3		3	1		8
Male	4	33	15	22	3	9	14	6	2	3	37
Christianity	3	24	11	16	2	6	11	5		3	27
Muslim	1	9	4	6	1	3	3	1	2		10
17-20	21	55	36	40	6	33	10	19	6	2	76
Female	8	26	16	18	3	10	4	12	5		34
Christianity	8	19	14	13	3	9	4	7	4		27
Muslim		7	2	5		1		5	1		7
Male	13	29	20	22	3	23	6	7	1	2	42
Christianity	6	19	11	14	2	15	3	3	1	1	25
Muslim	7	10	9	8	1	8	3	4		1	17
Grand Total	**32**	**118**	**74**	**76**	**11**	**53**	**32**	**38**	**10**	**6**	**150**

Table SM110: Dentist Visit

Have you ever visited a dentist?			If yes, when was the first time you visited? Years old				
Socio-Demographic (Age, Sex, Religion)	No	Yes	Between 0 and 4	Between 10 and 12	Between 5 and 9	Over 13	Grand Total
13-16	48	26	36	6	32		74
Female	26	11	19	3	15		37
Christianity	19	10	15	2	12		29
Muslim	7	1	4	1	3		8
Male	22	15	17	3	17		37
Christianity	14	13	11	3	13		27
Muslim	8	2	6		4		10
17-20	49	27	29	10	36	1	76
Female	24	10	18	3	12	1	34
Christianity	18	9	13	3	10	1	27
Muslim	6	1	5		2		7
Male	25	17	11	7	24		42
Christianity	14	11	7	3	15		25
Muslim	11	6	4	4	9		17
Grand Total	97	53	65	16	68	1	150

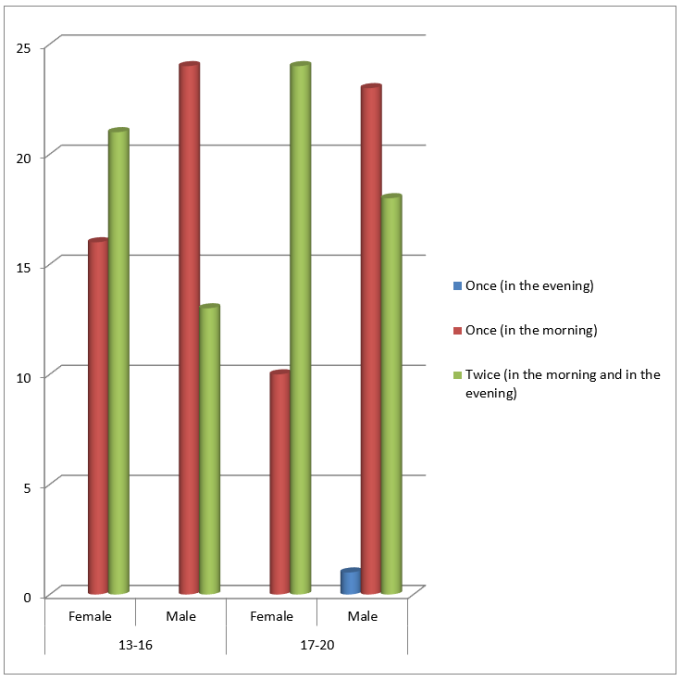

Figure SM12: Number of Times they Brush their Teeth in a Day

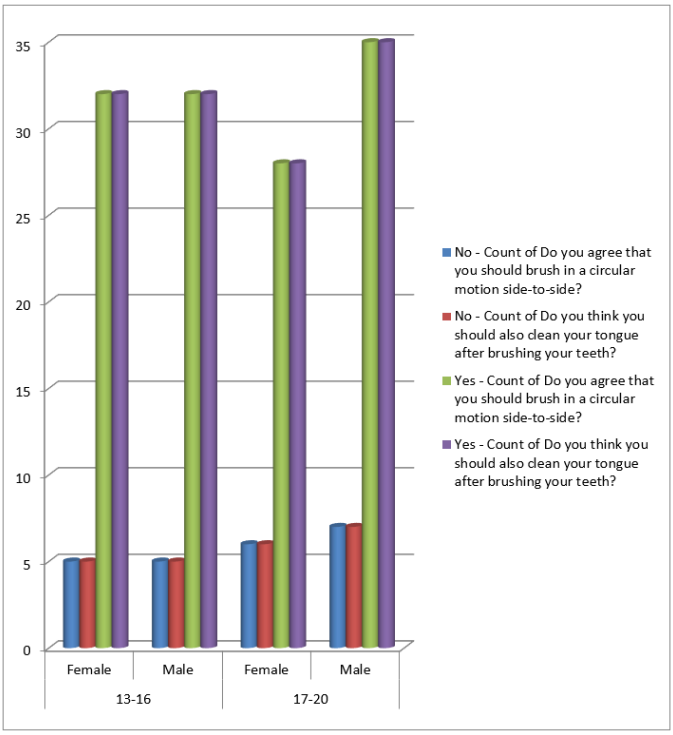

Figure SM13: Knowledge of Proper Brushing of Teeth.

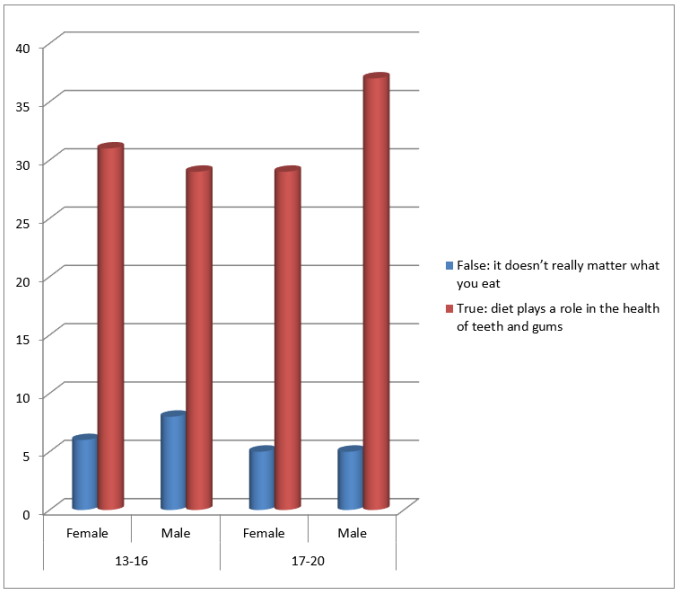

Figure SM14: Knowledge of Nutrition for Teeth Health

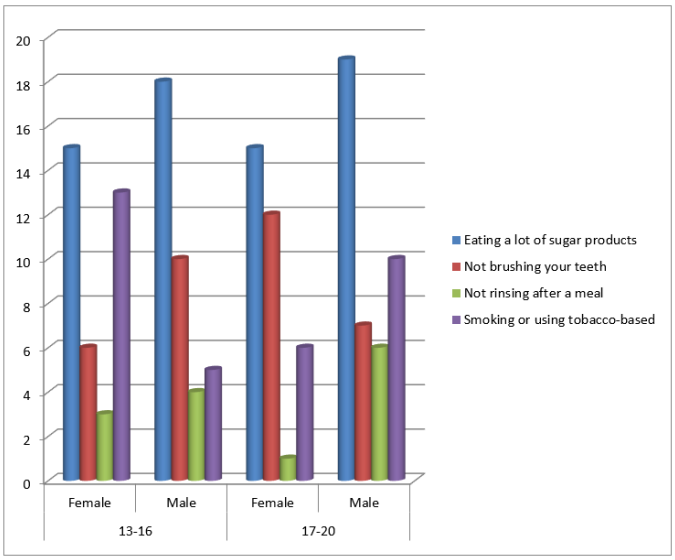

Figure SM15: Knowledge of Care for the Teeth

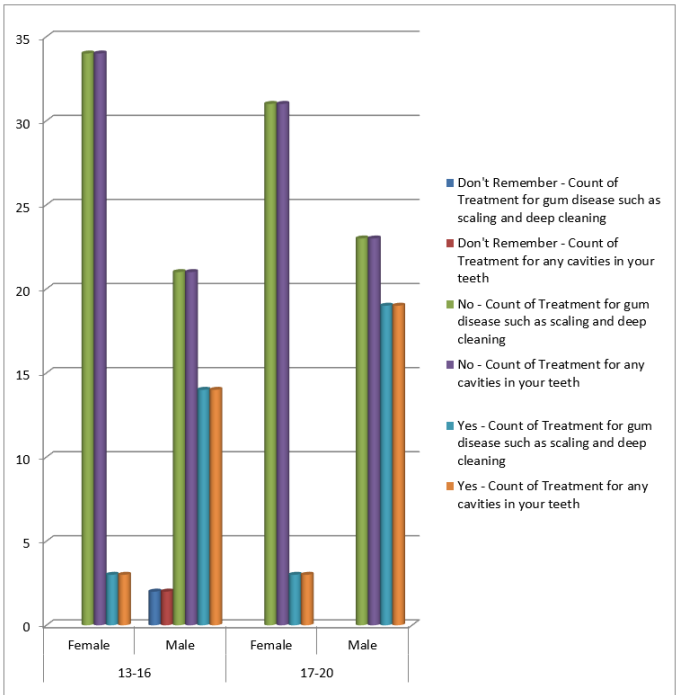

Figure SM16: Enquiry on Treatment for Gum Diseases or Cavities

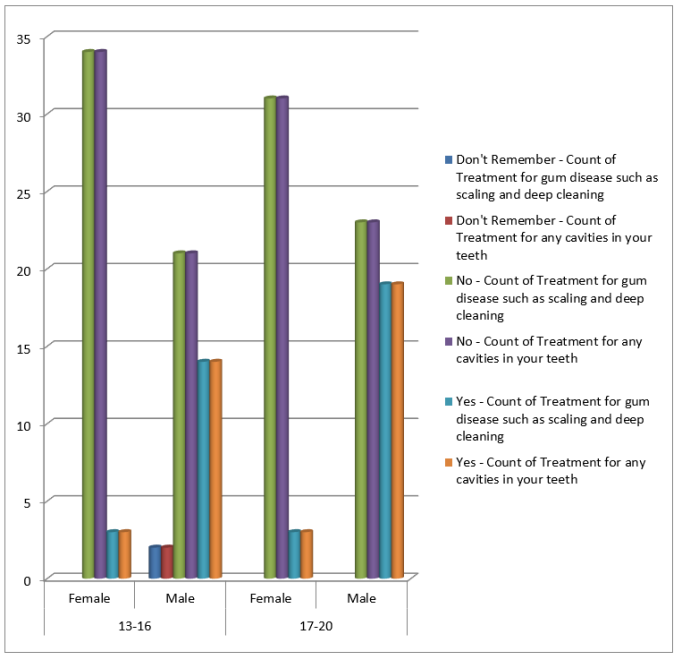

Figure SM17: Enquiry on Treatment for Loose Teeth and Tissue Abuse Habits

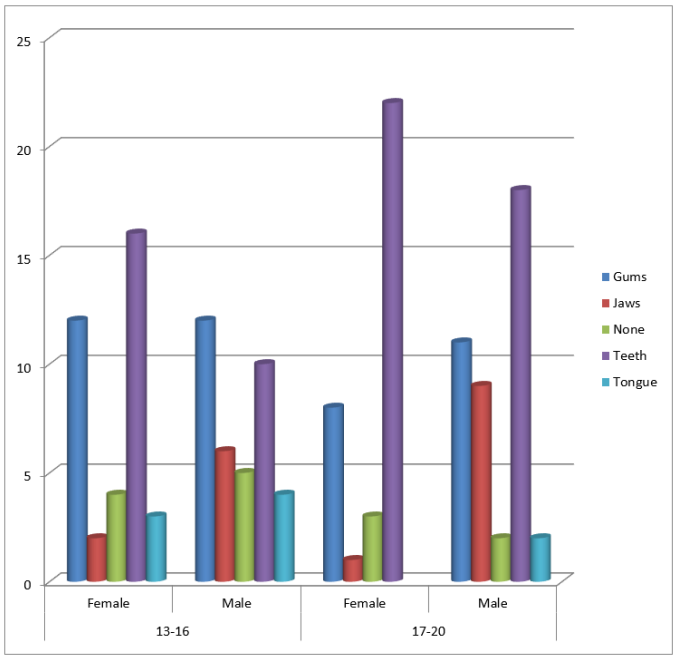

Figure SM18: Parts of the Teeth Causing Discomfort.

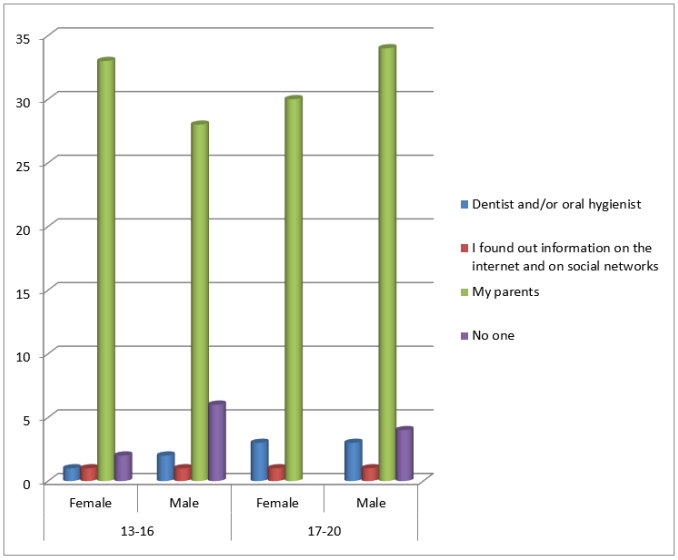

Figure SM19: Education of Oral Hygiene

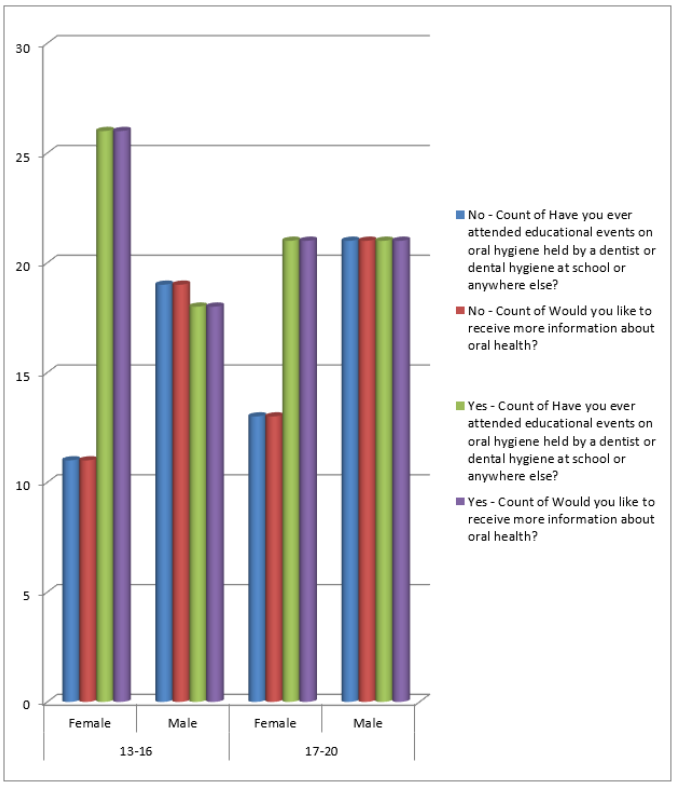

Figure SM20: Involvement and Interest in Oral Hygiene Education

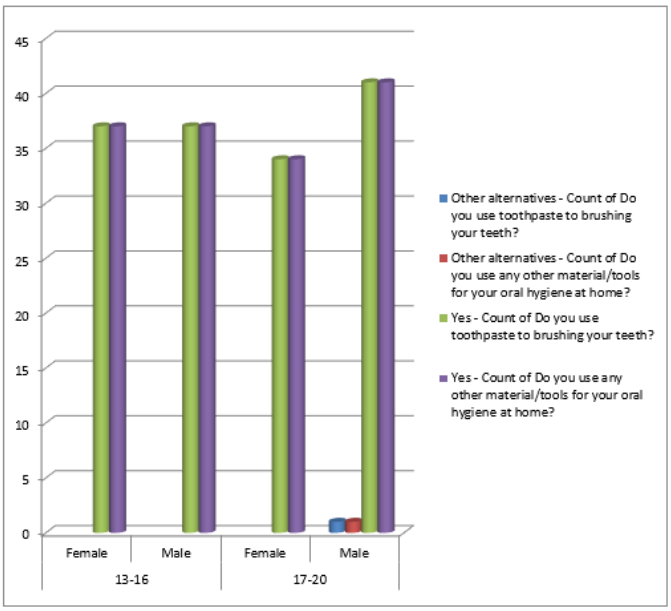

Figure SM21: Materials for Brushing

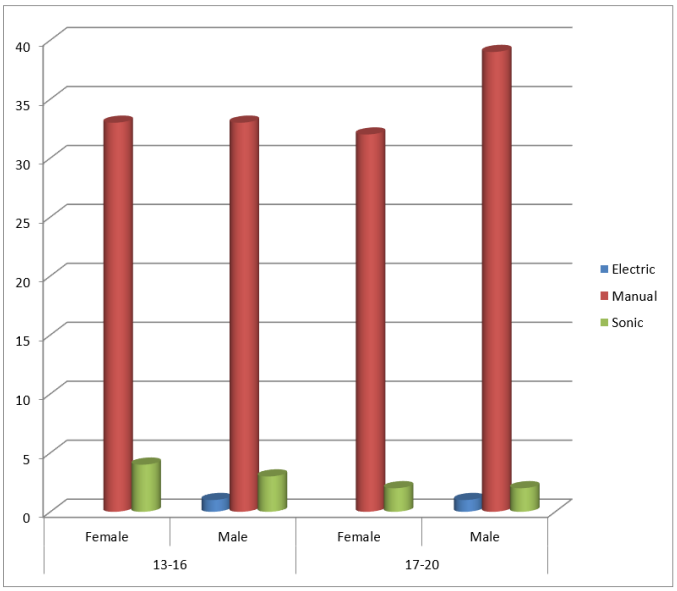

Figure SM22: Type of Brush.

Discussion

Oral health is an integral part of an individual's well-being. The knowledge, attitude and practice of oral hygiene among children are a major contributor to their oral health.

The level of education of parents of the participants in this study is shown to be high as majority of the parents have a formal form (Tertiary and Secondary) of education- 85% in Abuja and 97% in Lagos. Majority of their parents are business owners- 70% in Abuja and 77% in Lagos. Most parents in Abuja and Lagos earn between NGN50 000- 149 000. An average number of participants brush their teeth twice in a day, morning and evening- 50.4% in Abuja and 50.1% in Lagos. A large percentage of participants think the teeth should be brushed in circular motion side-to-side- 86.65% in Abuja and 84.7% in Lagos. 76% in Abuja say the tongue should be cleaned after brushing the teeth and 86.7% in Lagos. Most of the participants believe diet plays a role in oral health- 80% in Abuja and 84% in Lagos. Most participants think high consumption of sugar is a major risk factor- 40% in Abuja and 67% in Lagos. All participants in Abuja use toothpaste and 99% in Lagos. Majority of the participants have not visited a dentist. Majority of the participants say they know oral hygiene advice in a professional way- 82.4% in Abuja and 78% in Lagos while 38% in Abuja say they did not get professional oral hygiene because they could not afford it and 35% in Lagos. Above 70% of the participants have not undergone treatment for gum diseases, cavities, loose teeth and tissue abuse habits. Above 70% of participants have attended educational programme on oral hygiene and are willing to get more information in Abuja, 57% in Lagos have attended programme but over 70% would love to get more information. Over 70% of participants in Abuja and Lagos get oral hygiene information from their parents.

The importance of oral health knowledge among school children especially focusing on the practice of brushing two times in a day, proper brushing technique of brushing in a circular motion side-to-side and cleaning the tongue, the role of diet in oral health and the effect of consuming high sugar is a major contributor to oral diseases. This study shows majority of the participants brush their teeth twice in a day morning and evening and a high percentage know the proper way to brush their teeth and aware that the tongue should also be cleaned. Also majority of the participants know the role played by diet in oral health. They are also aware of the effect of high consumption of sugar in oral diseases. This good knowledge reflects the outcome of a high number not having undergone treatment for gum diseases, cavities, loose teeth and tissue abuse habits.

This study indicates the importance of oral health knowledge among school children which is a major factor influencing oral practices and attitude that can adversely affect oral health. In agreement to this is the new definition of oral health by FDI world dental federation which extends dentistry from just treating diseases to providing care and support for oral health. Another study found the reduction in plaque and gingival disease after oral health education relating to the number of times and proper way to brush the teeth [14]. However, contrary to this, found no significant improvement in gingival health after education [15].

The level of education of parents affects the oral literacy of a child, their oral hygiene practices, preventative behavior and awareness of oral services. From this study majority of the parents have formal form of education and their children have a good knowledge of oral hygiene as shown in their awareness of how to brush their teeth, influence of diet and sugar as a risk factor of oral diseases and knowledge of professional oral hygiene advice. They also have a good level of oral hygiene practices as a large number of them brush their teeth twice in a day. Almost all participants use toothpaste in brushing their teeth showing a high preventative behavior. Though only a few have visited the dentist. The income earned by parents affects their access to oral care, inform of oral care tools and services. Deducing from our study most of the parents earn up to the minimum wage of NGN 30 000 as of 2023. This explains the fact that almost all participants use toothpaste, though a third percent of participants could not afford oral hygiene access in a professional way.

The occupation of parents also impacts the oral practices and access to oral care and prevention of participants. A large number of the participants' parents are business owners. This occupation appears to give considerable stable and high income and may create time and availability for parenting. This may be a reflection in the participants' access to oral tools- toothpaste, their good oral practices- brushing twice in a day, morning and evening. However, access to prevention as related to visit to dentist and undergoing professional oral hygiene is low, this could be because they do not have economic means to access health insurances and benefits.

It is apparent from the findings in this cohort that the level of education, income and occupation of a parent appear to influence the oral hygiene knowledge, practice and attitude of a child. The level of education of the parent was significant in association with their knowledge of nutrition for oral health (p value- Abuja = 0.022, Lagos= 0.034) also parent's income with treatment of gum diseases (p value- Abuja = 0.049). In agreement to this is a global literature review which states that the socio-economic status of a child which is determined by the parents' level of education and income has a long-lasting impact on a child's oral health [16].

The WHO global strategy for oral health includes promotion of oral health through educational programs in schools and educational venues, care homes and workplace. This study shows a high number of participants have received a form of oral health education from educational programs and are still interested in receiving more, this explains their knowledge base, attitude and practice of dental care. It also shows that most participants receive this education from their parents. Therefore, parents should also be involved in oral health education programs. There was a significant association between having attended educational programme and who provided them with education (p value- Abuja = 0.026, Lagos= 0.018) and a high significance between wanting to receive education on oral health and the person who provides education (p value- Abuja < 0.001). In agreement to this is a study conducted in Saudi Arabia which states the importance of promoting dental care education among children while involving parents, educators and policy makers. This is in resonance with the mission of the Lady Helen Child Health Foundation in consonance with the Federal Ministry of Health, Federal Ministry of Women Affair and Ministry of National Planning.

Conclusion

In conclusion, this study highlights a high level of knowledge, good practice and attitude to oral health of the participating school children

Lagos being the commercial hub of Nigeria and Abuja the administrative center was expected to have a difference in the response. However, the findings indicate similarity in response. The effect of knowledge on the practice and attitude of children to dental care which adversely affect their dental health cannot be overemphasized. Therefore the implementation of oral hygiene programs in schools should be encouraged. School children as demonstrated in our cohort are eager to learn and participate in measures to enhance their dental health status and our cohort shows their level of understanding of the subject matter.

The role of parents in the oral health of their children is highly significant and important. Collaboration between policy makers, educators and parents should be emphasized within the health economy. Lady Helen Child Health Foundation in its mission is committed to improving the health outcomes of children. In collaboration with the Ministries of Women Affairs, Health, and National planning.

Declaration of Interest

There was no conflict of interest.

Contributorship

Dr Benjamin Odeka brought the concept of the research. Aminat Sani designed the questionnaire and the methodology, the data collection was supervised by Dr Benjamin Odeka and Aminat Sani. Aminat Sani analyzed the data and wrote the report and paper. The analysis and paper were reviewed by Dr Benjamin Odeka.

Data Sharing Statement

Data collected from this study is analyzed and that would be made available not the raw data. The questionnaire used would be made available. These data would be made available along with the manuscript during submission. The data would be made available with the investigators support through a signed data access agreement.

Acknowledgement

We would like to acknowledge the support the Lady Helen child Health Foundation team for their contribution to the success of this research. Our appreciation also goes to the Secondary Education Board FCT for the opportunity to carry out the outreach in their school. A big thank you to the principals, staff and students of Government Day Secondary School Apo and Government Secondary School Garki, Abuja; Okota Senior Secondary School and Grammar School Lagos.

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