Original Article

Oral Health Knowledge and Behavior among Public Primary Schoolchildren in Lagos, Nigeria

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Abstract

Aim: To evaluate the oral health knowledge and behavior among primary school pupils. **Patients, Materials and Methods:** This was a cross-sectional, descriptive study, in which a systematic sampling method was used to enroll 450 subjects into the study. The data collection tool was a self-administered, structured, pretested questionnaire. **Results:** Of the 450 enrollees, 434 pupils who duly completed their questionnaires participated in the study. Their mean age was 11.7 ± 1.64 years and more than half (229, 52.8) of the pupils were of male gender. About half (52.3%) of the pupils had adequate level of oral health knowledge. Majority had never visited a dentist (75%) before and had never used dental floss (66.6%). A higher proportion (72.3%) of the pupils with adequate level of oral health knowledge received parental supervision during brushing, had visited the dentist, and had frequent dental visit. **Conclusion:** The study revealed that about half of the study population had adequate level of knowledge. It also revealed inadequate oral health behaviour among the pupils. Pupils who had adequate knowledge had better behaviour.

Keywords: Behavior, knowledge, oral health

Introduction

Oral health is very essential to the overall health and well-being of children and adolescents.[1] Good oral health enables individuals to communicate effectively and to eat and enjoy a variety of foods and is important in overall quality of life, self-esteem, and social confidence.[2] In addition, oral diseases pose a major health burden in many countries and affect people throughout their lifetime, causing pain, discomfort, disfigurement, and even death.[3]

Oral health knowledge is considered an essential requirement for health-related practices,[4] and studies[5,6] have demonstrated the association between increased knowledge and better oral health. Individuals who have imbibed good knowledge and feel a sense of personal control over their oral health are more likely to adopt self-care practices.[7]

Health behavior refers to a person's actions regarding their health and well-being which is often a reflection of their belief.[8] Oral health behavior consists of individual and professional care and entails tooth brushing, dental flossing, visiting a dentist, and following a proper diet plan.[9] However, some factors such as frequency, duration, techniques of tooth brushing, and dental flossing play important roles in the effectiveness of this behavior.[10] Oral health behaviours as well as beliefs and attitudes develop during childhood and adolescence.[11,12] Childhood and adolescent periods are receptive periods for new information and establishment of lifelong healthy behaviours. The earlier, an individual imbibes and establishes healthy habits, the greater the impacts on the individual.[11] Levin and Shenkman[13] in their study among young Israelis observed that adolescents with less dental caries had better oral health attitude and behavior. Undoubtedly, one of the methods for the prevention of diseases is to improve the knowledge of the individual and the community regarding positive health behaviour.

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In Tanzania, oral health education has been part of the primary school curriculum and implemented by teachers at primary school level.[14] However, it was observed to be deficient in content and methods.[15] In Nigeria, oral health education is not yet incorporated in the school curriculum. Second, school health policies that encourage healthy eating habit and discourage the sales of sugary foods and drinks in the school premises have not yet been implemented. Children are therefore left to obtain both correct and incorrect information from various sources. It is therefore necessary to initiate young minds early in life and impart correct and adequate oral health knowledge at an early stage. It is known that adequate information, motivation, and practice when given can bring about the needed change to healthy attitude and practice.[16]

To create this desired level of health education, the assessment of the knowledge, attitude, and practice is essential for baseline information and future planning.[17] This will also assist in the specification of oral health messages as well as the development of behaviour modification strategies relevant to Nigerian children.

The aim of this study therefore was to assess the level of oral health knowledge and behavior among primary school pupils in Lagos, Nigeria.

Patients, Materials and Methods

Study location

The study was carried out in Alimosho Local Government Area (LGA) of Lagos State, Nigeria, and it is the largest LGA in Ikeja division, Lagos, with 1,288,714 inhabitants according to the Official 2006 Census. At the time of this study, there were 60 public primary schools and 31 public secondary schools in this LGA. Alimosho LGA. has about 50,583 primary school pupils, which is the highest number of primary school pupils in Lagos state (according to the records of the State Universal Basic Education Board).

Study design

A cross-sectional, descriptive study design was used for the study to assess oral health knowledge and behavior among primary school pupils.

Sampling methods

Participants were selected using the multistage sampling technique where six primary schools were selected from 60 primary schools in Alimosho LGA. This was done using the simple random sampling technique for the first school and subsequent ones were selected by systematic random sampling. From each of the selected schools, a range of 3–5 arms constitute a class (A, B, C, D, and E). Two arms in each Basic 5 and 6 classes of the schools were selected randomly using the lottery method by drawing from a hat. Using the class register, 20 pupils were selected from each of the selected arm of Basic 5 and 6 classes in each of the schools using a table of random numbers.

All the selected pupils who presented their parent-signed informed consent forms in the selected schools and who met the inclusion criteria were eligible. Pupils with medical conditions such as cerebral palsy, Down syndrome, and intellectual disability and those whose parents did not consent to participate in the study were excluded from the study.

Data collection instrument

A pretested questionnaire adopted from Petersen *et al*.[18] and Stenberg *et al*.[19] was used for data collection. The questionnaire included items designed to evaluate the knowledge and behavior of young schoolchildren regarding their oral health. The self-administered, pretested, structured questionnaires were used to obtain information from the respondents. The questionnaire consisted of three sections; A, B, and C.

Section A consisted of the sociodemographic characteristics of the respondents.

Section B had 12 questions assessing the knowledge of the respondents about oral health with one correct response. A correct response was scored 1 and a wrong response was scored 0. Thus, the level of knowledge had scores ranging from 0 to 12, with 0 being the lowest possible score of a respondent and 12 being the highest possible score of a respondent, indicating better knowledge. The level of knowledge was regrouped into two categories using a mean score: a score of 8 and above was graded as adequate level of knowledge, while a score of 7 and below was graded as inadequate level of knowledge. These criteria were based on a previous study.[20]

Section C assessed the oral health behaviors of the respondents.

Socioeconomic status was calculated for each child and was constructed from a combination of father's occupation and mother's educational status as proposed by Olusanya *et al*.[21]

Ethical clearance

Approval for the study was obtained from the Research and Ethics Committee of the Lagos University Teaching Hospital with an assigned number of ADM/DCST/HREC/APP/1031. Written approval was also obtained from the State Universal Basic Education Board. Permission was obtained from the head teachers in the schools; however, written informed consent and assent were obtained from the parents and pupils, respectively.

Data analysis

Collected data were analyzed using the IBM SPSS software package version 21 (IBM, Armonk, NY, USA). Categorical variables were reported as frequencies and percentages and presented as tables and figures. Continuous variables such as age were reported as mean ± standard deviation. Chi-square test of association was used to determine significant statistical associations for categorical variables such as the association between sociodemographic variables and the level of knowledge. The level of statistical significance was set at $P < 0.05$.

Results

A total of 434 pupils participated in the study, of which more than half were of the male gender (229, 52.8%). Their ages ranged from 8 to 15 years with a mean age of

11.6 ± 1.50 years. Participants aged 10–11 years were in the majority. Majority (273, 62.9%) of the participants were from low socioeconomic class [Table 1].

Almost all the respondents (415, 95.6%) selected tooth brush and tooth paste as the best item for cleaning the teeth. Majority of the respondents had correct response on most questions on oral health knowledge. However, about three-quarters (318, 73.3%) did not know what dental floss was, more than half (240, 55.3%) did not know that it is necessary to visit the dentist for routine checkup, while 248 (57.1%) did not know that general body health has a relationship with oral and dental diseases [Table 2].

About one-third (142, 32%) of the participants knew that fluoride makes teeth stronger while about two-thirds (288, 68%) felt fluoride made teeth whiter, weaker, reduces mouth odor, or did not know what it does [Figure 1].

Table 1: Socio Demographic Characteristics of the Participants

Variables	Frequency	Percentage
Age in years		
8-9	23	5.3
10-11	197	45.4
12-13	170	39.2
14-15	44	10.1
Gender		
Male	229	52.8
Female	205	47.2
Socioeconomic status		
High	111	25.6
Medium	50	11.5
Low	273	62.9
Total	434	100.0

Table 2: Participants responses on knowledge of oral health

Variable	True, *n* (%)	False, *n* (%)
Tooth brush and tooth paste are the best items for cleaning the teeth	415 (95.6)	19 (4.4)
Brushing in the morning and last thing at night keep the teeth healthy	342 (78.8)	92 (21.2)
Teeth are destroyed by sugary foods and drinks	373 (85.9)	61 (14.1)
Poor oral health is caused by swelling and bleeding of gums	369 (85)	65 (15)
Dental visit should be every 6 months	382 (88)	52 (12)
Oral diseases can be prevented by brushing, flossing, avoiding sugary diet	330 (76)	104 (23.9)
Tooth paste should contain fluoride	321 (74)	113 (26.0)
Dental caries means tooth decay	345 (79.5)	89 (20.5)
Dental visits should be made when there is no dental problem*	194 (44.7)	240 (55.3)
Knowledge of dental floss*	116 (26.7)	318 (73.3)
General body health and oral and dental diseases are related*	186 (42.9)	248 (57.1)

*Variables that represented poor knowledge

Although a higher proportion of the participants had adequate level of oral health knowledge, nearly half (47.7%) of the participants had inadequate oral health knowledge [Figure 2].

There was a statistically significant relationship between gender and level of oral health knowledge with more female participants (130, 59.9%), showing adequate knowledge compared to the males (97, 44.7%) ($P = 0.001$) [Table 3].

With regard to oral health behavior, almost all the respondents used tooth brush and tooth paste for cleaning their teeth (400, 92.2%). About one-third of the participants (141, 32.4%) used soft tooth brushes, 138 (31.8%) did not receive assistance from their parents during brushing, and about half of the participants (220, 50.7%) cleaned their teeth twice a day. Three-quarters (326, 75.1%) had never visited a dentist before, and about two-thirds (289, 66.6%) had never used dental floss. Among those who had not visited the dentist before, nearly half of them (159, 48.8%) did not visit because they felt they had no problems with their teeth [Table 4].

Majority of the respondents with adequate level of knowledge received parental assistance during brushing (164, 72.3%), had used dental floss (85, 37.4%), had visited the dentist (65, 28.9%), and had visited the dentist within the recommended period of six months (61, 91%), and these associations were statistically significant [Table 5].

Discussion

Results from this study revealed a high proportion of pupils with adequate level of knowledge on oral health. Most of the pupils had adequate knowledge on the various preventive measures of oral diseases, such as knowing the best item for cleaning the teeth, knowing that it is ideal to brush their teeth after breakfast in the morning and last thing at night, that foods and drinks contain sugar destroy teeth, that it is necessary to go for dental check-up at least once in a year, that dental decay means dental caries, and that it is possible to prevent oral diseases by brushing, flossing, and avoiding sugary diet. These findings are similar to those reported in Malaysia[17] and Nepal[23] but contrary to other reports in Nigeria,[24,25]

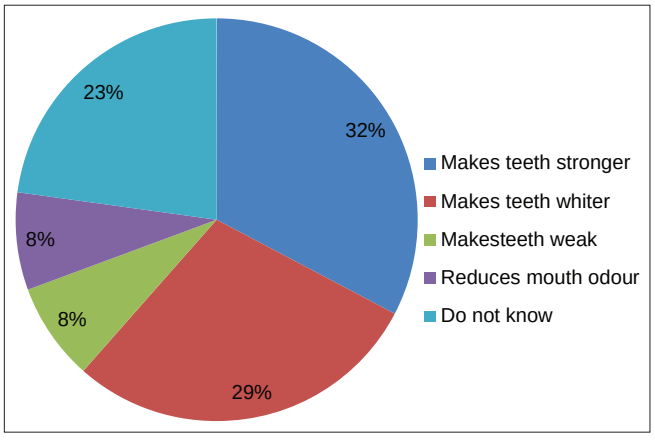

Figure 1: Participants responses on the action of fluoride on teeth

Table 3: Association between sociodemographic characteristics of respondents and the level of knowledge of their oral health

Variables	Adequate knowledge, *n* (%)	Inadequate knowledge, *n* (%)	χ^2	Df	*P*
Age					
≤11	55 (51.4)	52 (48.6)	0.0108	3	0.415
>11	172 (52.6)	155 (47.4)			
Gender					
Male	97 (42.4)	132 (57.6)	9.458		0.001*
Female	130 (63.4)	75 (36.6)			
Socioeconomic class					
High	61 (55)	50 (45)	1.716	2	0.424
Moderate	22 (44)	28 (56)			
Low	144 (52.7)	129 (47.3)			

*$P \leq 0.05$

Table 4: Respondents responses to questions on oral health behaviour

Variable	Frequency (%)
Item used to clean your teeth	
Tooth brush and tooth paste	400 (92.2)
Chewing stick	8 (1.8)
Mouthwash	19 (4.4)
Cotton wool	7 (1.6)
Type of tooth brush used	
Hard	130 (30)
Medium	125 (28.8)
Soft	141 (32.4)
Don't know	38 (8.8)
Frequency of cleaning the teeth	
Once a day	159 (36.6)
Two times a day	220 (50.7)
More than two times	55 (12.7)
Dental visit	
Yes	108 (24.9)
No	326 (75.1)
Reason for visiting a dentist	
Fill your teeth	9 (8.3)
Remove your teeth	5 (4.6)
Clean your teeth	37 (34.3)
Routine visit	57 (52.8)
Reason for not visiting a dentist	
No problem with my teeth	159 (48.8)
My mother did not take me	80 (24.5)
Toothache is not too much	17 (5.2)
My parents do not have enough money to take me	52 (16.0)
Scared of what people told you about the dentist	18 (5.5)
Have you used dental floss before?	
Yes	145 (33.4)
No	289 (66.6)
Do your parents assist you when brushing?	
Yes	296 (68.2)
No	138 (31.8)

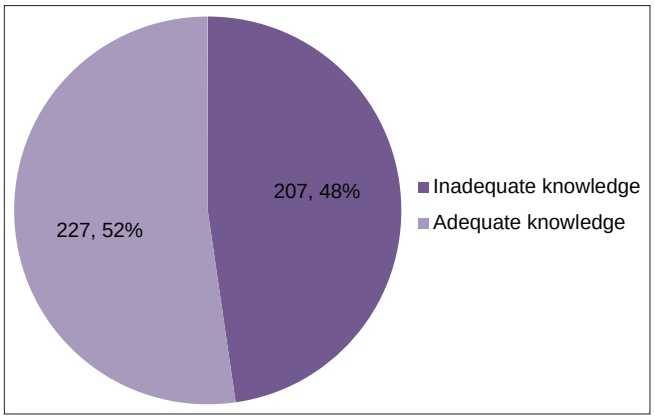

Figure 2: Respondents' level of knowledge of oral health. *Level of knowledge was computed based on the recommendation by Adeniyi *et al*.[20]

Sweden,[26] Kuwait,[22] Iran,[27] and China,[28] which reported inadequate knowledge. These differences in knowledge among different studies could be as a result of using different oral health questions, sample sizes, location of the study, and the method of analysis used for the study and the characteristics of the population. The high knowledge observed in this study could be because the study was conducted in Lagos, an urban city, where children have more access to media compared to those who dwell in rural areas. The children also acquire knowledge during marketing promotions of oral health products by companies in schools. In addition, several dental care product manufacturing companies have sprung up, thus encouraging competition in the sales of these products. These companies promote and advertise their products in schools, hoping the children would have an influence over their choices of oral health products by their parents.

Despite all these exhibitions of adequate knowledge about oral health, majority of them did not know what dental floss is and did not know that it is needful to visit a dentist for routine checkup. This confirms the reason why many studies[29-31] reported poor utilization of dental services, with majority of the people visiting the dentist only when they have pain.[27,29]

In this study also, most of the participants did not know the action of fluoride on teeth; majority of them felt that fluoride either makes teeth whiter, weaker, or causes the teeth not to smell. Yet, fluoride is one of the most important components of Nigerian-used tooth pastes and is highly recommended that tooth paste should contain a certain amount of fluoride to help make teeth stronger.

Again, majority of the participants were not aware that general body health has a relationship with oral and dental diseases regardless of the Surgeon General's report that oral health is an integral part of general health.[1] This is a category of knowledge that an individual will possess through teachings in schools and by oral health professionals. Unfortunately, oral health is not part of the primary school curriculum in Nigeria unlike in Tanzania,[14] where oral health is part and parcel of the primary school curriculum and continues through

Table 5: Association between respondents' level of knowledge and their oral health behavior

Variables	Adequate knowledge, *n* (%)	Inadequate knowledge, *n* (%)	χ^2	*P*
Parental assistance during brushing				
Yes	164 (72.3)	132 (63.8)	3.209	0.02*
No	63 (27.8)	75 (36.2)		
Frequency of brushing				
Once	77 (33.9)	82 (39.6)	1.276	0.11
More than once	150 (66.1)	125 (60.4)		
Use of dental floss				
Yes	85 (37.4)	60 (29)	3.113	0.03*
No	142 (65.6)	147 (71.0)		
Dental visit				
Yes	65 (28.9)	43 (20.7)	3.171	0.02*
No	162 (71.4)	164 (79.2)		
Frequency of dental visit (months)				
≤six	61 (91.0)	6 (9.0)	4.853	0.01*
>six	30 (73.1)	11 (26.8)		
Gum bleeding				
Yes	108 (47.6)	89 (43)	0.741	0.17
No	119 (52.4)	118 (57)		

*$P<0.05$

secondary school with the involvement of professionals in the field. Osazuwa-Peters[32] reported that in Nigeria, school curriculum, from primary to secondary, still lacks a primary oral health education program. He noted that if oral health education and counseling have been incorporated into the curriculum of these schools (e.g., appropriate oral hygiene, topical fluoridation, and regular dental visits), there would have been a lot of improvement regarding oral health attitudes and behaviors of Nigerian children.[32]

The knowledge that oral health is an integral part of general health will enable individuals pay more attention to their oral health as diseases of the oral cavity can affect an individual's physical, emotional, and social well-being.

The females in this study had better knowledge than the males and the respondents with adequate knowledge also used dental floss more than those with inadequate knowledge. This is similar to some studies in Iran[27] and Qatar[33] with reports that females were more knowledgeable than males when it comes to oral health. However, Darout *et al*.[34] reported gender equality in knowledge and practice among their participants, while Gao *et al*.[28] reported no significant difference between gender and oral health knowledge among their participants in Western China.

This study also showed that individuals who were more knowledgeable visited the dentist more regularly and received assistance from their parents during tooth brushing. Blaggana *et al*.[35] in their study reported better oral hygiene knowledge and practices among students who visited dentists regularly. Drummond *et al*.[36] and Habibian *et al*.[37] have shown that it is beneficial for an adult to assist in tooth brushing until a child has the dexterity to remove plaque effectively by themselves and this is when the child is about 8–10 years old.

Tooth brush and tooth paste were the most commonly used oral hygiene aids, similar to what has been reported in Nigeria,[38] Kuwait,[26] China,[39] and Saudi Arabia.[40]

Despite the fact that majority of the participants used tooth brush and tooth paste to take care of their teeth, some still made use of chewing sticks alone regardless of the fact that the study was conducted in an urban city. This depicts the fact that as children, they would make use of that which is made available by their parents. It could also be due to learned cultural practices and beliefs of their parents which were adopted by the children. In addition, as reported by Rotimi and Mosadomi,[41] chewing sticks are readily available, cheap, and efficacious and thus easier to afford as majority of the respondents in this study are in the low socioeconomic class.

In this study, however, the oral health behavior of the pupils was not a reflection of their high knowledge about oral health. For example, most of them still used hard bristled tooth brushes instead of the recommended soft textured tooth brushes for their ages. Tooth brushes as cleaning aids should be well selected and taken care of for effective cleaning. It is possible that the choices of their tooth brushes were made by their parents who also may not have adequate knowledge about oral health and its practices and therefore do not take into consideration the qualities and specifications of tooth brushes made available for their children.

It is also of interest to note that more than three quarter of the participants had not visited the dentist before in their lifetime. This can be described as having poor knowledge and poor health-seeking behavior. The reason given by majority of them was that they did not have any problem with their teeth. This is similar to the report of Denloye[30] and Eigbobo,[31] where 82.2% and 64.3% of the participants in Ibadan and Port-Harcourt, respectively, gave a report of no perceived need to see a dentist. It is recommended that dental visits be at least twice a year for prophylaxis and parents should be involved in oral health education programs involving children so as to draw their attention toward practicing regular dental visit and thus prevent future dental diseases.[27]

From the findings of this study, dental floss, one of the important interdental cleaning aids used in maintaining oral hygiene, was still poorly utilized. More than half of the participants had never used dental floss before, and this exhibits poor oral health behavior. In previous reports, only 5.8% and 3% of university students in Nigeria[42] and Turkey,[43] respectively, had used dental floss. In contrast, it is the finding in San Francisco where 75% of the 12–14-year-old students used dental floss at least once per day.[44] Poor utilization of dental floss, in this study, may be due to several reasons such as the dental floss not being readily available in Nigeria

like other basic daily oral hygiene products. It is also more expensive than tooth paste and only available in big malls and super marts. In addition, oral health education in Nigeria places more emphasis on tooth brushing (frequency, methods, and materials) and rarely discusses adjunct dental cleaning, interdental cleaning, and/or flossing.

This study was able to assess only pupils from one locality in Lagos, Nigeria. The authors therefore recommend further studies from other regions or geopolitical zones so as to compare similar parameters among pupils of the same grades.

Conclusion

Adequate level of knowledge of oral health was seen in about half of the study population. Majority of pupils who had adequate level knowledge of oral health had better oral health behavior. However, most of the respondents' oral behavioral practices were inappropriate and needed improvement, especially in relation to dental visits, use of dental floss, and parental assistance/supervision during tooth brushing.

It can be concluded that oral health knowledge among this group of children did not absolutely translate to good behavioral practices.

Recommendation

Oral health knowledge of pupils should be further enhanced by organizing oral health programs involving dental professionals and not sales representatives of oral health products. Mothers and caregivers should be involved and included in oral health programs to enable them gain knowledge which will impact their children and other family members. In addition, oral health should be incorporated into the primary school.

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Conflicts of interest

There are no conflicts of interest.

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