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Oral hygiene practices and factors influencing the choice of oral hygiene materials among undergraduates in selected universities in Osun State, Nigeria

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Abstract

Introduction and Objective. Oral health is a crucial part of general health and wellbeing to be maintained throughout a life, and the oral health status is usually determined by the level of oral hygiene practices. This study aimed at investigating oral hygiene practices and factors influencing the choice of oral hygiene materials among undergraduates in Osun State, Nigeria.

Materials and method. A cross-sectional descriptive research design was adopted using a multistage sampling technique to select 440 undergraduates from two universities in Osun State. Osun State is one of the 36 states of Nigeria with an estimated population of about 4.7 million, as of 2016. The research instrument used was a self-structured questionnaire, data retrieved was coded, entered and analyzed using SPSS version 21.

Results. More than half of the respondents 232 (52.7%) were between 21–25 years. Only 59% perceived that their oral health status was excellent. A small percentage of the respondents (3.2%) visit the dentist regularly and only 26% brush their teeth twice daily and change their toothbrush every six months. Less than half of the respondents (33.9%) exhibited good oral hygiene practices. Gender and institution attended had a significant relationship with oral hygiene practices with P value of.010 and.001, respectively.

Conclusions. More than half of the respondents perceived their oral health status to be excellent and less than half of the respondents claimed they exhibited good oral hygiene practices. The most identified factor affecting their choice of oral hygiene materials was cost. Socio-demographic variables of significance for the practice of oral hygiene were gender and institution of study. There is need to promote oral health through health education about oral hygiene at various levels of learning and during campaigns to all age groups.

Key words

practice, oral hygiene, oral hygiene materials, undergraduates

INTRODUCTION

Good oral hygiene has been advocated, promoted, and supported by world health bodies such as the World Health Organization (WHO) and the Centers for Disease Control [1]. Oral health is a crucial part of general health and wellbeing to be maintained throughout life, and the oral health status is usually determined by the level of oral hygiene practices in the population [2]. Maintenance of optimum oral health is dependent on visits to a dental clinic, as well as the efficacy of oral self-care, which includes the use of toothbrushes, dental floss and other inter-dental aids. [3] **…?…** also confirms that oral health has a significant impact on the overall health and well-being of an individual.

It has been estimated that worldwide about 3.6 billion people are affected by oral health problems and due to this high prevalence rate, oral health diseases have been added by the World Health Organization to the list of prioritized non-communicable diseases [4]. In Nigeria, apreviously conducted survey on national oral health revealed that the prevalence rates of dental caries and periodontal diseases stand at 30% and >80%, respectively, showing a pattern of deterioration in the country which is closely linked to poverty and poor economic growth [5]. In a study conducted among university undergraduates by Rana et al. [6],a high prevalence of halitosis was recorded. In another study by Oyetola et al. [7], it was concluded that less than 50% of undergraduate students had good oral hygiene, which is alarming. Poor oral health can have a massive negative effect on the quality of life. The constant experience of pain, endurance of dental abscesses, problems with eating and chewing, embarrassment about the shape of teeth or about missing, discoloured or damaged teeth, can seriously affect people's daily lives and general well-being [8].

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Good oral care habits, healthier oral cavity and control on oral diseases by self-care depends to a large extent on awareness, motivation and knowledge of oral hygiene practices, and not only on the oral hygiene aids [9]. According to Sharda et al. [10], the most widely used oral hygiene products are toothbrush and toothpaste. Apart from these two, there are other oral hygiene aids which are used by the population, either voluntarily or when advised by dentist. Similarly, Opeodu et al. [11] confirm that the majority of the population mostly use a toothbrush and toothpaste as their major oral hygiene materials, and believe that cost, packaging, brand, media advertisement, and their previous experience, were some of the factors that affected their choices.

Many researchers have focused their study on oral hygiene on secondary school students, and only very limited studies have been found conducted among undergraduate students, especially in Southwest Nigeria. Hence, this study was targeted at exploring oral hygiene practices and the factors influencing the choice of oral hygiene materials among undergraduates in selected universities in Osun State, Nigeria.,

OBJECTIVE

The broad objective is to assess the oral hygiene practices of undergraduates in selected Universities in Osun State, as well as some of the factors influencing their choice of oral hygiene materials. The specific objectives are:

1) to assess the perceived oral health status of the undergraduate students;
2) to determine perceived oral hygiene practices among undergraduate students;
3) to identify the factors influencing the choice of oral hygiene materials of the undergraduate students.

MATERIALS AND METHOD

A descriptive cross-sectional study was employe and a quantitative research approach was used to explore the perceived oral hygiene practices of the undergraduates, as well as the factors influencing their choice of oral hygiene materials.

Osun State is one of the 36 states of Nigeria, it is the ninth smallest in area and nineteenth most populous with an estimated population of about 4.7 million, as of 2016. GDP *per capita* is $2,076 (2007). Economically, Osun State is largely based around agriculture, mainly of cocoa, cassava, millet, maize, potato and yam crops. Other key industries are services, especially in urban areas, along with artisanal mining and livestock herding. The State's tourist attractions include the Mbari Arts Centre at Oshogbo, the residential palaces of Yoruba rulers in Ilesha and Ile-Ife, and the Osun-Osogbo Sacred Grove, a forest that contains several shrines and artwork in honour of the Yoruba deity Osun. It has nine universities, namely, Bowen, Adeleke, Obafemi Awolowo, Fountain, Redeemers, Joseph Ayo Babalola, Osun State, Osogbo, Westland, and Kings University.

A multistage sampling technique was used for this study.

Stage 1) Simple random sampling was used, and two universities (one public and one private) were randomly selected from Osun State (Bowen University and Obafemi Awolowo University).

Stage 2) College of Agriculture, Engineering and Sciences (COAES) and College of Law (COL) were randomly selected using a paper ballot method from seven (7) Colleges at Bowen University. The Faculty of Clinical Sciences and Faculty of Administration were also randomly selected using the paper ballot method from 13 faculties in Obafemi Awolowo University.

Stage 3) A department was selected randomly from each college/faculty in the two universities. Hence, the departments used for the study were Food Science and Technology (FST) and Law in Bowen University, while Nursing with Management and Accounting (M&A) in Obafemi Awolowo University (OAU).

Stage 4) A convenience sampling technique was used in selecting respondents from each of the selected department to participate in the study.

From the departments of Management and Accounting (M&A) and Nursing in OAU, there were 1717 students; for Food Science and Technology (FST) and Law in Bowen, there were 377 students – a total of 2,094 students from both schools. Using Taro Yamane's formula, a total of 440 undergraduate students participated in the study.

Yamane's formula: $n = \frac{N}{1 + N(e)^2}$

n= Sample size
N= Size of population
e= assumed error of 0.05

$$\text{Sample size (n)} = \frac{2094}{1 + 2094\,(0.05)^2} = 399.8 \approx 400$$

Attrition rate = 10%
Sample size/100 × 10 = 400/100 × 10 = 40
Attrition rate + sample size = 400+ 40 = 400.

Therefore, a total of 440 questionnaires were distributed. Only undergraduates in the two universities who provided informed consent participated in the study

Quantitative data collection was performed using a self-structured questionnaire, which had four sections:

– section A included demographic information;
– section B on oral health status;
– section C on perceived oral hygiene practices;
– section D on factors affecting the choice of oral hygiene materials.

Section C on perceived oral hygiene practice was categorized into bad (50%), fair (60% – 80%), and good (>80%), depending on the responses. The first five questions were considered and a correct response was allotted 20 marks and incorrect response 10 marks

The face validity was ascertained when the instrument was read through and modified by experts in dental care. The items included in the questionnaire were ensured to be appropriate for the study.

A pilot study was conducted among 10 undergraduate students of Ladoke Akintola University of Technology (LAUTECH) Ogbomosho. The internal consistency reliability (Cronbach's alpha coefficient) of the instrument was 0.85. Ethical approval was obtained from the Ethical Review Board of Bowen University Teaching Hospital Ogbomoso, since Bowen University Iwo does not have an

Ethical Review Board. Permission to carry out the study was obtained from the Heads of Departments of Management and Accounting (M&A) and Nursing in OAU, and Heads of Departments of Food Science and Technology (FST) and Law in Bowen. Data was collected using goggle forms using a built-in feature that allows respondents to submit only one response during the rain semester in the two schools. A survey link was distributed via the Heads of Department and class representatives to the targeted population, and class announcements were used to increase awareness of the survey to ensure that only registered university students of the selected departments participated in the study.

The questionnaires were coded and analyzed using Statistical Package for Social Science (SPSS 21). Descriptive and inferential methods were used in the analysis which included frequency tables, and percentages to describe the demographic data, and Pearson's Chi-Square was used to test the hypotheses. The survey was completed by all the students, giving a response rate of 100%.

RESULTS

The majority of respondents were within ages 21–25, were females and Christians -52.7%, 64.5% and 86.4%, respectively. Less than 3% of the population received a monthly allowance less than 5,000 naira (Tab. 1).

Table 1. Socio-demographic characteristics of respondents

Variable	Frequency (n=440)	Percentage (%)
Age		
Less than 15	1	0.2
16–20 years	193	43.9
21–25 years	232	52.7
26–30 years	14	3.2
Gender		
Female	284	64.5
Male	156	35.5
Level of study/ class		
100 Level/ 1st Year	58	13.2
200 Level/ 2nd Year	98	22.3
300 Level/3rd Year	108	24.5
400 Level/4th Year	128	29.1
500 Level/5th Year	48	10.9
School		
Bowen University	175	39.8
Obafemi Awolowo University (OAU)	265	60.2
Course of study		
Accounting	196	44.5
Nursing	70	15.9
Law	145	33.0
Food science and technology (FST)	29	6.6
Religion		
Christianity	380	86.4
Islam	52	11.8
Others	8	1.8
Ethnicity		
Yoruba	311	70.7
Hausa	23	5.2
Igbo	62	14.1
Others	44	10.0
Monthly allowance		
Less than 5,000	10	2.3
5,000–15,999	49	11.1
16,000–30,999	211	48.0
31,000–45,999	152	34.5
46,000 and above	18	4.1

Table 2 showed that 74.8% of the respondents were very satisfied with the way their teeth looked; 7% perceived their oral health status was poor, and 6.4% claimed they had cavities. Only 3.2% of the respondents visited a dentist regularly.

Table 2. Perceived oral health status of respondents

Variable	Frequency (n=440)	Percentage (%)
How satisfied are you with the way your teeth look?	329	74.8
Very satisfied	69	15.7
Adequately satisfied	14	3.2
Barely satisfied	28	6.4
Not satisfied		
What is your perceived health status of your teeth and gums?	261	59.3
Excellent	19	4.3
Very good	81	18.4
Good	3	.7
Average	31	7.0
Poor	41	9.3
Very poor	4	1.0
I don't know		
Do you smoke?		
Yes, less than or up to 10 cigarettes per day	8	1.8
Yes, more than 10 cigarettes per day	23	5.2
No	409	93.0
Do you bleed when brushing your teeth?		
Yes	28	6.4
No	102	23.2
Sometimes	310	70.5
How often do you visit a dentist?		
Once a month	14	3.2
Once in three months	14	3.2
Once in six months	17	3.9
Whenever I'm in pain	61	13.9
Never	334	75.9
Are there cavities in your teeth?		
Yes	28	6.4
No	139	31.6
I don't know	273	62.0
Do you have toothaches?		
Yes	40	9.1
No	112	25.5
Sometimes	288	65.5

Table 3 presents data on the oral hygiene practices among respondents. Only 25.5% brushed their teeth twice daily and changed their toothbrush every six months. More than three- quarters of the population brushed their teeth in a side-to-side direction, and only 15.5% brushed their teeth in an up-to-down direction. Based on the categorization of responses, overall, oral hygiene practice was bad 4 (0.9%), fair 287 (65%), and good 149 (33.9%).

Figure 1 shows that 158 (35.9%) of the respondents always use fluoride toothpaste and 57 (13%) always use herbal toothpaste. The majority of respondents never used ordinary toothpaste without fluoride, and never used dental floss – 349 (79.3%) and 307 (69.8%), respectively. Only 46 (10.5%) of respondents always rinse their mouth after eating.

Data presented in Table 4 reveals that most of the respondents (45%) confirmed that cost affected their choice of toothpaste, 51.4% of respondents revealed that texture influenced their choice of toothbrush, and as many as 69.8%

Table 3. Oral hygiene practices among respondents

Variables	Frequency	Percentage
Number of times teeth are brushed		
Once	317	72.0
Twice	112	25.5
Three times	10	2.3
More than three times	1	0.2
Texture of toothbrush used		
Hard	59	13.4
Medium	304	69.1
Never noticed	7	1.6
Soft	70	15.9
Frequency of changing toothbrush		
Every month	9	2.0
Every 3 months	106	24.1
Less than 6 months	112	25.5
More than 6 months	108	24.5
When it is bad	105	23.9
Oral hygiene method used beside tooth brushing	23	5.2
Dental floss	169	38.4
Mouth wash	51	11.6
None	24	5.5
Sugar free gum	173	39.3
Toothpick		
Direction of brushing teeth		
Circular	19	4.3
Side-to-side	353	80.2
Up-to-down	68	15.5
Whether they often have bad breath		
Yes	48	10.9
No	392	89.1

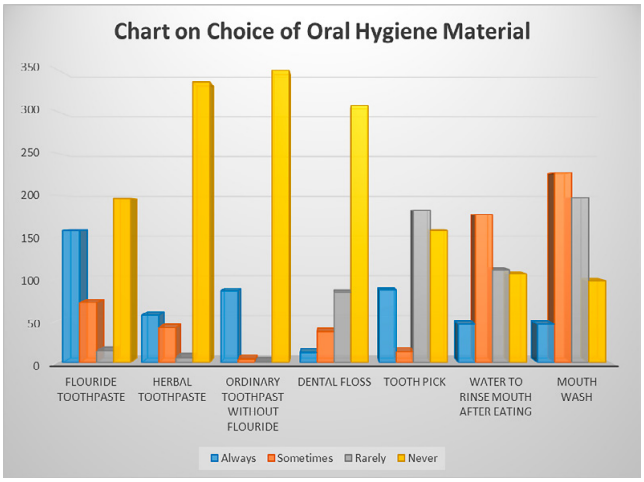

Figure 1. Choice of oral hygiene material

and 22.3% declared that they were not familiar with dental floss and mouthwash, respectively.

Table 5 shows the results of correlation analysis between respondents' perceived oral hygiene practice and demographic variables. No significant relationship was found between the age of the students, level of study, course of study, religion, ethnicity and monthly allowance. Gender and institution attended had a significant relationship with perceived oral hygiene practice with a P value of 0.010 and 0.001, respectively.

Table 4. Factors affecting the choice of oral hygiene materials

Variable	Frequency	Percentage
Toothpaste		
Colour	9	2.0
Cost	198	45.0
Fluoride content	119	27.0
Market availability	18	4.1
Media	33	7.5
Significant other	15	3.4
Taste	48	11.0
Toothbrush		
Colour	20	4.5
Cost	77	17.5
Market availability	26	5.9
Media	35	8.0
Significant other	56	12.7
Texture	226	51.4
Dental floss		
Colour	7	1.6
Cost	29	6.6
I do not know about dental floss	307	69.8
Market availability	55	12.5
Media	20	4.5
Significant other	22	5.0
Mouth wash		
Coloor	7	1.6
Cost	45	10.2
Fluoride content	41	9.3
I do know about mouth wash	98	22.3
Market availability	89	20.2
Media	35	8.0
Significant other	53	12.0
Taste	72	16.4

Table 5. Hypothesis testing between socio-demographic characteristics of participants and their perceived oral hygiene practice

Variables	Perceived Oral Hygiene Practices	x^2	Level of Significance	Remarks
Age	Good	32.14	.181	Not Significant
Less than 15	Fair			
16–20 years	Bad			
21–25 years				
26–30 years				
Gender	Good	28.65	.010	Significant
Female	Fair			
Male	Bad			
Level of study/ class	Good	40.41	.483	Not significant
100 Level/ 1st Year	Fair			
200 Level/ 2nd Year	Bad			
300 Level/3rd Year				
400 Level/4th Year				
500 Level/5th Year				
School	Good	12.98	.001	Significant
Bowen University	Fair			
Obafemi Awolowo University	Bad			
Course of study	Good	31.55	.682	Not Significant
Accounting	Fair			
Nursing	Bad			
Law				
Food science and technology (FST)				
Religion	Good	1.37	.414	Not Significant
Christianity	Fair			
Islam	Bad			
Others				
Ethnicity	Good	11.85	.500	Not Significant
Yoruba	Fair			
Hausa	Bad			
Igbo				
Others				
Monthly allowance	Good	34.40	.078	Not significant
Less than 5,000	Fair			
5,000–15,999	Bad			
16,000–30,999				
31,000–45,999				
46,000 and above				

DISCUSSION

This study revealed that the majority (52.7%) of the respondents were within the age group 21–25, this is contrary to a study conducted by Bashiru & Anthony at the University of Port Harcourt [2], where the majority (36%) of respondents were within the age group 26–35. This could be because of the early year of entrance into schools in this environment. Furthermore, most of the respondents (86.4%) were Christians while 11.8% were Muslims, Bowen University is a faith-based university owned by the Baptist Convention, which could be the reason why there were more Christian participants in the study. More than three-quarter of the respondents were Yoruba (70.7%), this is because Osun State where the universities were located is in the southwestern region of Nigeria.

Perceived oral health status. This study shows that 74.8% of the respondents were very satisfied with the way their teeth looked. This is similar to a report in a study among adults where more than 50% were 'comfortable' or 'very comfortable' with their oral state, and also similar to the findings of Mhaske et al. [12] among 550 public school students where 55% of the respondents felt it was necessary to maintain the teeth and gums in good condition.

The majority of the students were aware of the importance regular visits to the dentists, but most of them had never been to a dentist before or they only visited whenever they were in pain. This is similar to the study carried out by Soroye & Braimoh [13] on oral health practices and associated caries experienced among school students in Lagos State, Nigeria, which revealed that the majority of the participants (57.6%) had never visited the dentist. 'Lack of pain' (31.1%) and 'no reason' (42.5%) were the reasons given for not visiting a dentist. Lack of access or cost of dental care services would not likely be the reason for this since most of the secondary and tertiary health facilities in Nigeria operate dental clinics providing care for patients. The possible reason for this may be because making regular visits to a dentist was usually not seen as important as other services rendered at a hospital, such as the antenatal services, ear nose and throat services, ophthalmic services, etc.

More than half of the respondents (70.5%) sometimes bled while brushing their teeth, while 23.4% did not experience any bleeding while brushing. Only 6.4% of the respondents indicated they had cavities in their teeth, which could be the reason for the bleeding. This was supported by Alam et al. [14] in their study among undergraduate students where about 60% of the students reported having bleeding gums. This could be attributed to their attitude towards the importance of oral health

Practice of oral hygiene. This study revealed that most of the respondents (72%) brushed their teeth once daily, only 25.5% brushed their teeth twice daily, 25.5% changed their toothbrush in less than six months and 23.9% changed it only when it was in a bad condition. This was supported by Raval & Shaikh [15] who noted that brushing was the general method of cleaning, but only about 21% of students brushed their teeth twice daily regularly. 59% of the students changed their toothbrush between three months and six months. Only 36.3% of students were conscious of the proper method of brushing and about 7.3% of the participants knew about dental flossing. Shah & El Haddad [16] also revealed that most students reported cleaning their teeth once daily (48.7%). Moreover, this study also showed that 353 (80%) of the respondent brushed their teeth in a side-to-side direction, only about 15% brushed their teeth in an up-down direction as refuted by Gainza-Cirauqui et al. [17] who concluded that almost half of the participants brushed their teeth in a circular movement; however, 59.4% of the participants used a medium tufted toothbrush

The current study shows that there was a significant relationship between gender and institution attended, and perceived oral hygiene practice with p values of.010 and.001, respectively. More students from Bowen University exhibited good oral hygiene practices than students from Obafemi Awolowo University, this could possibly be because of the students' background as most of the students in Bowen University were from affluent homes where all details in health care matters are taken seriously. More female students in the current study also exhibited good oral hygiene practices compared to the male students; this could likely be because of the general notion that females usually have a conscious self-care nature. This was negated by Iwuala et al. [18] who concluded that there was no difference in the oral hygiene practices based on gender, designation or geopolitical zone.

Factors affecting choice of oral hygiene materials. The presented study shows that cost, fluoride content and taste were the most identified factors affecting the choice of toothpaste – 45%, 27% and 10.9%, respectively, while texture (51.4%) and cost (17.5%) were factors identified for the choice of toothbrush. A study by Awais et al. [19], stated that the cost of oral-hygiene products (82%) was the biggest influence; Soroye & Braimoh [11] stated that the least influential were media advertising in the choice of toothpaste (29.2%) and toothbrush (24.3%).

SUMMARY

The study was carried out to examine the oral hygiene practices of undergraduates, as well as the factors affecting their choice of oral hygiene materials. A multistage sampling technique was used to select the sample size of 440 among the undergraduates at Bowen University and Obafemi Awolowo University (OAU). Data was collected using a self-structured questionnaire. Descriptive and inferential statistics were used to analyze the data collected.

The majority of respondents perceived that their oral hygiene status was average while some believed that theirs was poor. Only a small percentage of respondents had bad oral hygiene practices, and more than half had fair oral hygiene practices. Most of the respondents identified cost as a factor that influenced their choice of toothpaste, texture influenced their choice of toothbrush, and although majority do not make use of dental floss or mouthwash, the most perceived factors was market availability of both. The factor least recognized as an influencer for all oral hygiene materials listed was colour. There was no significant relationship between age of the students, level of study, course of study, religion, ethnicity and monthly allowance, and the practice of oral hygiene. Only gender and institution of study had a significant relationship with perceived oral hygiene practice.

Limitations of study. The limitation of this study include the possibility of respondent bias in completing the questionnaire. The actual practice could not be ascertained because the study was limited only to the perceived practices of participants. A wider coverage would mean a higher level of generalization of the study findings.

CONCLUSIONS

More than half of the respondents perceived their oral health status to be excellent, and less than half claimed they exhibited good oral hygiene practices. Oral hygiene materials commonly utilized were fluoride toothpaste, herbal toothpaste and ordinary toothpaste. The most identified factors affecting their choice of oral hygiene materials were cost, texture and ignorance. Socio- demographic characteristics of significance in the practice of oral hygiene were gender and institution of study. There is a need to promote oral health through health education on oral hygiene at various levels of learning and during campaigns to all age groups.

Further research could explore the oral hygiene practices of older adults. Also, further large scale studies could be carried out to improve the generalization of the findings to other undergraduates in various disciplines worldwide.

In view of the findings in this study, the following recommendations were made:

1) health education on the importance of proper oral hygiene practices;
2) encouragement of periodic visits to a dental care hospital;
3) advocacy to oral care agencies to make dental flosses and mouth washes more readily available at affordable prices;
4) information should be made available on the proper choice of oral hygiene materials, and the right approach to oral hygiene;
5) establishment of oral health education programmes as a component of a health curriculum, performed during the first year in all universities.

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