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**Dental Health Knowledge, Attitude
and Practice on the Occurrence of Dental Caries Among
Adolescents in a Local Government Area (LGA) of Oyo State, Nigeria***

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Abstract: This study was carried out in order to identify the extent of dental caries occurrence and to relate it with the dental health knowledge, attitude and practice among adolescents in Ibadan North (LGA) of Oyo State Nigeria. Descriptive survey research design was adopted for the study. Self structured questionnaire and dental examination were instruments used for obtaining the necessary information. A total number of six hundred and thirty seven adolescents, who were drawn from ten schools within Ibadan North (LGA) of Oyo State Nigeria, participated in the study. Participants displayed significantly high knowledge, positive attitude and sound practices towards dental health. Percentage dental caries occurrence was 6.1% and this was found to be prevalent among females (69.2%), among those within the age bracket 14-16 years (61.5%) and those attending public Schools (76.9%). Dental caries occurrence among these adolescents was also observed to be negatively correlated with their dental health knowledge ($r = -0.026$), attitude ($r = -0.031$) and practice ($r = -0.060$). Health instructional programs that encourage healthful dental habits among adolescents should be intensified in schools.

Key words: Dental caries, dental health, knowledge, attitude, practice

INTRODUCTION

Oral diseases are public health problems worldwide (Petersen *et al.*, 2005). Their impact on individuals and communities in terms of pain and suffering, functional impairment and reduced quality of life is considerable and are the fourth most expensive to treat in most industrialized countries (Petersen, 2004). One of the most common of the oral diseases is dental caries. It is an affliction, which invades all age groups and the most important cause of tooth loss in children and young people (Jacobs, 2005). Adolescents represent a challenging group in terms of oral health because they have vulnerable permanent teeth erupting by the time they are establishing their independence from parental influence (Stokes *et al.*, 2006). In addition, practices such as frequent consumption of sweets, sugary foods and drinks, which have being identified by several researchers (Lingzhu *et al.*, 2003; Oloffson and Bratthall, 2003; Jacobs, 2005) as predisposing factors to dental caries are prominent among the adolescents.

In Nigeria, dental caries constitutes one of the major oral health problems with its prevalence being particularly high among young children and adolescents and the occurrence closely related to oral hygiene and socio economic class (Akpata, 2004).

Enwonwu (1966) observed and reported the prevalence of destructive periodontal diseases to range between 15% in Northern Nigeria and 10% in Western Nigerians aged 15 to 19 years. Adegbembo and El-Nadeef (1995) also reported caries experience as high as 30 and 43% among Nigerians aged 12 and 15 years, respectively.

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Most of the studies on dental caries among Nigerian adolescents have been centered on the prevalence of the disease while little have been done to investigate adolescents' knowledge attitude and practice in relation to dental health. Such information however is necessary as it serves as an eye opener to factors among the adolescents that can predispose them to dental caries. This study thus aimed at describing the knowledge, attitude and practice of adolescents in Ibadan North (LGA) of Oyo State Nigeria towards preventing dental caries.

MATERIALS AND METHODS

Study Design

The study was a descriptive study to identify and describe the extent of knowledge, attitude and practice of adolescents in Ibadan North (LGA) towards maintaining dental health and to relate these with the occurrence of dental caries among them.

Subjects

The subjects for this study were drawn from 10 secondary schools located within Ibadan North Local Government Area of Oyo State, Nigeria. The schools were selected using sampling with replacement method. Each of the schools selected was divided to clusters namely: junior secondary schools one, two, three and senior secondary schools one, two and three. Two clusters each (one junior and one senior) were selected randomly from each school. Thirty students from each cluster in the junior schools and forty from each cluster in the senior schools (making a total of seven hundred) were intended to form the participants for this study. However, six hundred and thirty-seven students (91%), completed the questionnaire. In addition, the subjects were both male and female with age ranging from 11 to 19 years.

Instrument

The instruments for collecting the data required for this study were dental examination and a self-structured close-ended questionnaire. The content of the questionnaire was guided by review of literature on ways of maintaining dental health and presented to lecturers in the Department of Human Kinetics and Health Education University of Ibadan Nigeria and final year dental students from the university college hospital Ibadan for content and construct validity. The reliability of the instrument was carried out using the cronbach alpha coefficient and this yielded 0.75. However, because the items did not follow the same response format, reliability was based on items in sections B and D.

The questionnaire was organized into five sections. Section A elicited information on demographic attributes of respondents (gender, age and type of school). Section B elicited information on dental health knowledge. Six questions were used to elicit knowledge and the response followed a 2 way dichotomous format of yes or no. Section C had 5 questions related to attitude towards dental health and the response format was in line with the modified likert scale of summative rating with four point scale of strongly agree, agree, disagree and strongly disagree. Section D also had 5 questions to elicit information on practices towards dental health with a yes or no response format. Section E was used to record the result of the dental examination carried out on each of the respondents.

The instruments were administered with the assistance of twelve final year dental students from University College Hospital (UCH) Ibadan, Nigeria. On the spot administration and collection of questionnaire was adopted. The research was carried out between January and June 2006.

Data Analysis

Data analysis was carried out using the SPSS for windows v 11.0. The variables for testing knowledge and practice were dichotomized. The wrong options were assigned 1 while right options

were assigned 2. Frequency counts and percentages of adolescents with right and wrong knowledge and sound and unsound practice of dental health were then obtained. Chi-square test was carried out on each of the items to test for significant difference. In addition, bivariate analysis of the association of each of the items with other variables such as gender, age groups and type of school was performed using Pearson's Chi-square test.

The variables for testing attitude were on a four point scale of strongly agree, agree, disagree and strongly disagree. The best option was assigned 4 followed by the next best option 3 the two wrong options were assigned 2 and 1, respectively. During the course of analysis, the two right options on each of the items were added together to constitute positive attitude while the two wrong options constituted negative attitude. Frequency counts and percentages of adolescents with positive and negative attitude towards dental health based on each of the item tested were obtained. Bivariate analysis of the association of adolescents' attitude with gender, age group and type of school was also carried out.

The result of dental examination carried out on the adolescents yielded the frequency and percentage occurrence of dental caries based on gender, age group and type of school. The relationship that exists between dental health knowledge, attitude and practice and dental caries occurrence among adolescents, was obtained by summing up the right and wrong responses on the knowledge attitude and practice respectively and correlating these with the frequency counts of adolescents with and without dental caries using Pearson product moment correlation. All differences and associations were considered significant at $p < 0.05$.

RESULTS

Table 1 shows the demographic distribution of respondents. Over 50% were females, nearly two-thirds were between 14-16 years and those attending public schools formed 79% of the respondents.

Result of data analysis on adolescents' knowledge (Table 2) revealed that significantly large number of the adolescents displayed right knowledge on the variables tested. Bivariate analysis of the association between adolescents' knowledge and their gender, age group and type of school being attended (Table 5), revealed that knowledge of adolescents was not significantly influenced by gender, age group and type of school. However, analysis of the mean difference in knowledge (Table 5) revealed that male respondents, those within the age range of 11-13 years and those attending private schools, had higher mean dental health knowledge than their counterparts.

Attitude towards dental health among adolescents was significantly positive (Table 3). Majority of the adolescents irrespective of gender, age group and the type of school, saw the care of the mouth and teeth as important as the care of other parts of the body, had a right attitude towards brushing before eating in the morning and towards going for dental checkup whether one is having tooth pain or not, displayed right attitude towards brushing twice daily and showed right attitude to rinsing the mouth with water after each meal. Bivariate analysis (Table 5) revealed that age group of adolescents and type of school being attended had significant influence on their attitude towards dental health. In addition, female respondents, those within the age range of 17-19 years and those attending private schools had more positive dental health attitude than their counterparts.

Table 1: Respondents' demographic and Dental Caries (DC) occurrence distribution by age, gender and type of school

Age group	DC (%)				Gender	DC (%)				Type of school	DC (%)			
	Freq.	(%)	DC	(%)		Freq.	(%)	DC	(%)		Freq.	(%)	DC	(%)
11-13	148	23.2	10	25.6	Male	279	43.8	12	30.8	Public	503	79.0	30	76.9
14-16	401	63.0	24	61.6										
17-19	88	13.8	5	12.8	Female	358	56.2	27	69.2	Private	134	21.0	9	23.1
Total	637	100.0	39	100.0	Total	637	100.0	39	100.0	Total	637	100.0	39	100.0

Table 2: Frequency counts, percentages and Chi-square value of Adolescents' knowledge of dental health by gender, age group and type of school

		Knowledge		χ^2
		Right (%)	Wrong (%)	
To keep the teeth healthy, we must brush it first thing in the morning and last thing at night	Male	271 (97.1)	8 (2.9)	555.77
	Female	345 (96.4)	13 (3.6)	
	11-13	142 (95.9)	6 (4.1)	
	14-16	386 (96.3)	15 (3.7)	
	17-19	88 (100.0)	0 (0.0)	
	Public	485 (96.4)	18 (3.6)	
	Private	131 (97.8)	3 (2.2)	
It is necessary to always rinse our mouth with water after each meal to remove food debris trapped between teeth	Male	256 (91.8)	23 (8.2)	469.72
	Female	336 (93.9)	22 (6.1)	
	11-13	139 (93.9)	9 (6.1)	
	14-16	369 (92.0)	32 (8.0)	
	17-19	84 (95.5)	4 (4.5)	
	Public	469 (93.2)	34 (6.8)	
	Private	123 (91.8)	11 (8.2)	
Too much of sweets, chewing gum, sugary foods and drinks can cause tooth decay	Male	266 (95.3)	13 (4.7)	544.62
	Female	347 (96.9)	11 (3.1)	
	11-13	140 (94.6)	8 (5.4)	
	14-16	385 (96.0)	16 (4.0)	
	17-19	88 (100.0)	0 (0.0)	
	Public	486 (96.6)	17 (3.4)	
	Private	127 (94.8)	7 (5.2)	
Carrots, milk, bony meat and fish are good for strong bone and teeth	Male	262 (93.9)	17 (6.1)	496.61
	Female	337 (94.4)	20 (5.6)	
	11-13	142 (95.9)	6 (4.1)	
	14-16	374 (93.5)	26 (6.5)	
	17-19	83 (94.3)	5 (5.7)	
	Public	470 (93.6)	32 (6.4)	
	Private	129 (96.3)	5 (3.7)	
It is necessary to go for dental checkup at least once in a year whether one is having tooth pain or not	Male	241 (86.4)	38 (13.6)	329.82
	Female	306 (85.7)	51 (14.3)	
	11-13	123 (83.1)	25 (16.9)	
	14-16	345 (86.3)	55 (13.7)	
	17-19	79 (97.5)	9 (2.5)	
	Public	429 (85.3)	74 (4.7)	
	Private	118 (88.7)	15 (1.3)	

χ^2 cal = 2879.65, χ^2 tab = 11.07, df = 5, p < 0.05

Table 3: Frequency counts, percentages and Chi-square value of Adolescents' attitude towards dental health by gender, age group and type of school

		Attitude		χ^2
		Positive (%)	Negative (%)	
Attitude towards brushing the teeth twice daily	Male	212 (76.8)	64 (23.2)	34.64
	Female	255 (72.0)	99 (28.0)	
	11-13	110 (75.9)	35 (24.1)	
	14-16	293 (73.6)	105 (26.4)	
	17-19	64 (73.6)	23 (26.4)	
	Public	346 (69.3)	153 (30.7)	
	Private	121 (92.4)	10 (7.6)	
The need for rinsing the mouth after each meal	Male	198 (71.2)	80 (28.8)	35.30
	Female	286 (80.6)	69 (19.4)	
	11-13	109 (74.1)	38 (25.9)	
	14-16	300 (75.4)	98 (24.6)	
	17-19	75 (85.2)	13 (14.8)	
	Public	377 (75.1)	125 (24.9)	
	Private	107 (61.3)	24 (38.7)	
Attitude towards care of the mouth being important as	Male	198 (71.2)	80 (28.8)	30.21
	Female	286 (81.0)	67 (19.0)	

Table 3: Continued

		Attitude		χ^2
		Positive (%)	Negative (%)	
care of other parts of the body	11-13	103 (70.5)	43 (29.5)	
	14-16	309 (77.8)	88 (22.2)	
	17-19	72 (81.8)	16 (18.2)	
	Public	373 (74.3)	129 (25.7)	
	Private	111 (86.0)	18 (24.0)	
Attitude towards brushing the teeth first thing in the morning before eating	Male	213 (77.2)	63 (22.8)	55.21
	Female	288 (75.5)	67 (24.5)	
	11-13	116 (79.5)	30 (20.5)	
	14-16	317 (79.6)	81 (20.4)	
	17-19	68 (78.2)	19 (21.8)	
Attitude towards going for dental checkup when the tooth is not given any visible problem	Public	392 (78.2)	109 (21.8)	20.16
	Private	109 (83.8)	21 (16.2)	
	Male	176 (63.5)	101 (36.5)	
	Female	123 (34.7)	231 (65.3)	
	11-13	85 (58.2)	61 (41.8)	
14-16	263 (66.2)	134 (33.8)		
17-19	59 (67.0)	29 (33.0)		
Public	317 (63.4)	183 (26.6)		
Private	90 (68.7)	41 (31.3)		

χ^2 cal = 175.52, χ^2 tab = 9.49, df = 4, p < 0.05

Table 4: Frequency counts, percentages and Chi-square value of Adolescents' practice towards dental health by gender, age group and type of school

		Practice		χ^2
		Sound (%)	Unsound (%)	
Tooth brushing twice daily	Male	194 (69.8)	84 (30.2)	76.58
	Female	232 (65.5)	122 (34.5)	
	11-13	92 (62.2)	56 (37.8)	
	14-16	277 (69.8)	120 (30.2)	
	17-19	57 (65.5)	30 (34.5)	
	Public	350 (70.0)	150 (30.0)	
	Private	76 (57.8)	56 (42.2)	
	Male	207 (75.3)	68 (24.7)	
Female	260 (73.0)	96 (27.0)		
11-13	117 (79.1)	31 (20.9)		
14-16	288 (72.5)	109 (27.5)		
17-19	62 (72.1)	24 (27.9)		
Public	383 (76.8)	116 (23.2)		
Private	84 (63.6)	48 (36.4)		
Use of tooth brush and fluoride tooth paste for tooth brushing	Male	268 (97.1)	8 (2.9)	145.50
	Female	338 (94.9)	18 (5.1)	
	11-13	142 (95.9)	6 (4.1)	
	14-16	381 (95.7)	17 (4.3)	
	17-19	83 (95.4)	4 (4.6)	
	Public	478 (95.6)	22 (4.4)	
	Private	128 (96.2)	5 (3.8)	
	Tooth brushing using up, down and sideways technique	Male	226 (82.5)	
Female		294 (82.8)	61 (17.2)	
11-13		125 (85.0)	22 (15.0)	
14-16		319 (80.6)	77 (19.4)	
17-19		74 (88.1)	10 (11.9)	
Public		398 (80.2)	98 (19.8)	
Private		122 (91.3)	11 (8.7)	
Go for dental checkup once in a year		Male	127 (46.4)	147 (53.6)
	Female	160 (45.2)	194 (54.8)	
	11-13	78 (53.1)	69 (46.9)	
	14-16	177 (44.8)	218 (55.2)	
	17-19	32 (37.2)	54 (62.8)	
	Public	229 (46.2)	267 (53.8)	
	Private	58 (43.9)	74 (56.1)	

χ^2 cal = 530.50, χ^2 tab = 9.49, df = 4, p < 0.05

Table 5: Mean difference and Pearson Chi-square test of Adolescents' knowledge, attitude and practice of dental health base on gender, age group and type of school

Characteristics	Knowledge			Attitude			Practice		
	Mean±SD	Pearson χ^2	df	Mean±SD	Pearson χ^2	df	Mean±SD	Pearson χ^2	df
Gender									
Male	9.09±0.92	10.54	7	19.50±4.13	21.17	21	25.50±2.07	13.58	14
Female	9.06±1.02			19.78±3.58			25.63±1.74		
Age group (years)									
11-13	9.16±1	8.68	14	19.73±4.01	65.75*	42	25.76±2	27.80	28
14-16	9.09±1.01			19.54±3.58			25.50±1.9		
17-19	8.86±0.76			20.05±4.57			25.57±1.72		
Type of school									
Public	9.04±0.99	12.41	7	19.37±3.95	36.89*	21	25.39±1.95	33.49*	14
Private	9.22±0.94			20.74±3.11			26.24±1.46		

*Significant at $p < 0.05$.

Table 6: Correlation coefficient of Adolescents' knowledge, attitude and practice towards dental health on the occurrence of dental caries

Independent variables	Correlation coefficient (r)	Sig. (2-tailed)	N
Dental health knowledge	-0.016	0.518	637.000
Attitude to dental health	-0.031	0.138	634.000
Practice of dental health	-0.060	0.454	633.000

The practice of dental health among adolescents was significantly sound (Table 4). Many of them irrespective of gender, age group and type of school being attended, brushed twice daily, use good toothbrush and tooth paste, use the up down and sideways technique for brushing and claimed to always rinse the mouth with water after each meal. Findings of this study however showed that only few of the adolescents go for dental check up at least once a year. Bivariate analysis (Table 5) further revealed that the type of school the adolescents attend significantly influenced their dental health practice. Moreover, further analysis (Table 5) revealed that female respondents, those within the age range 11-13 years and those attending private schools had better dental health practice than their counterparts.

The result of the dental examination (Table 1) showed that only 39(6.1%) of the adolescents had dental caries. More females (69.2%) than male (30.8%) had dental caries. About 25.6, 61.6 and 12.8% of adolescents with dental caries were between the ages 11-13 years, 14-16 years and 17-19 years respectively. In addition, majority of the adolescents (76.5%) with dental caries were from public schools. Dental caries occurrence was negatively non-significantly correlated with adolescents' dental health knowledge, attitude and practice (Table 6).

DISCUSSION

A significantly high knowledge, positive attitude and sound practices of dental health were found to exist among these adolescents. This is most likely the reason for the low percentage occurrence of dental caries (6.1%) observed among them. Negative relationship existed between the knowledge, attitude and practice of dental health and dental caries occurrence among the respondents. This indicates that as these variables increased among the respondents, occurrence of dental caries reduced and vice versa.

This research confirms the fact that healthful knowledge, when allowed to influence our attitude and practice is capable of reducing disease occurrence. Knowledge influences people health. Through basic education and public knowledge individuals become aware of the meaning of self-protection and personal hygiene (Badran, 1995). It can thus be recommended that schools incorporate health instructions that relate to maintaining dental health, into their health instructional programs and make it as practical as possible.

The finding of this study that female respondents displayed more positive dental health attitude and practice than their male counterparts, is similar to that of Ostberg *et al.* (1999), Fukai *et al.* (1999) and Al-Omari and Hamasha (2005). Respondents attending private schools displayed better dental health knowledge, attitude and practice and had lower percentage occurrence of dental caries (23.1%) than their counterparts in the public schools (76.9%). Hoffmann *et al.* (2004) also found out in their study that caries index was highest among public school children. Students in private schools are often those of high self-esteem and whose parents can afford means of keeping their dental health in good shape. It should however be noted that dental problems constitute one of the reasons for students' absenteeism from schools hence schools whether private or public should make all efforts to assist their students to keep off dental problems.

Schools can make arrangement for periodic visit by the dentists in their provinces so as to give room for early detection of carious activity among the students. In addition, schools can organize in-service training programs for their health teachers to enable them acquire necessary practical skills relevant to dental health.

The low percentage occurrence of dental caries (Table 1) observed in this study can be attributed to the significantly high dental health knowledge, attitude and practice displayed by these adolescents. This is similar to the findings of Petersen *et al.* (2001) that positive oral health attitude was highly correlated with low risk of dental problems among school children in Southern Thailand. The finding of this research also supports the fact that caries is age related. One of the peaks reported by Lewis and Ismail (1995) for the initiation of dental caries is 14 years and present findings (Table 1) revealed that majority of the caries discovered were observed among adolescents between 14 and 16 years of age.

CONCLUSION

The findings of this research revealed a low percentage occurrence of dental caries, which was negatively correlated with dental health knowledge, attitude and practice among adolescents. This implies that occurrence of dental caries among these adolescents reduced with an increase in knowledge, positive attitude and sound practices towards attaining dental health and vice versa. It can thus be concluded that having a good knowledge, positive attitude and a sound practice of healthful habits is capable of reducing disease occurrence.

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