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Oral Health Status of Children in Government and Private Secondary Schools in Lagos State, Nigeria

*Modupeoluwa Omotunde SOROYE (BDS, MPH, FMCDS), *Omoigberai Bashiru BRAIMOH (BDS, MPH, FWACS)

*Department of Preventive Dentistry, Faculty of Dentistry, College of Health Sciences, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria

ABSTRACT

Objective: Oral diseases are significantly influenced by socio-demographic factors. Therefore, assessing the oral health status of school children in government and private schools may provide information on the oral health status of children from different socioeconomic background. This study assessed and compared the oral health status between government-owned (public) and private school children in Lagos State, Nigeria.

Methods: Subjects were selected using multi-stage sampling technique. Caries and oral hygiene status were assessed using WHO criteria and the Simplified Oral Hygiene Index of Greene and Vermillion. Data was analysed using Statistical Package for Social Science Version 20.0. Statistical significance was determined at $P < 0.05$.

Results: A total of 598 students were examined, among these, 300 (50.2%) were from government schools and 298 (49.8% vs 7.4%) from private schools. More students from the government schools than those in public schools had poor oral hygiene (36.7%). Students from government schools had a significant higher mean OHIS score (1.82 ± 1.41) than those from private schools (1.47 ± 1.08) ($P < 0.001$). The prevalence of dental caries was 10.7% and 8.7% among children from government school and private schools respectively. The mean DMFT score of children from government schools was significantly higher ($P < 0.001$).

Conclusion: Dental caries prevalence was higher and the oral hygiene status poorer among government school children compared to those in private schools. This indicates the need to develop, implement oral health education program and promote oral health among students especially in government schools yet not neglecting those in private schools.

Keywords: Dental caries, oral health education, oral hygiene status, school children, socio-demographic factors

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Correspondence

Dr. M. O. Soroye
Department of Preventive Dentistry,
Faculty of Dentistry, College of Health
Sciences, University of Port Harcourt, Port
Harcourt, Rivers State, Nigeria
Email: docdupe@yahoo.com

INTRODUCTION

In spite of the considerable improvement in oral health reported in industrialized countries among children and adolescents,¹⁻³ caries and periodontal diseases are on the rise in many developing and underdeveloped countries.^{4,5} This rise is attributed to limited access to oral health services, lack of inadequate exposure to fluorides, lack of awareness about oral diseases and increase consumption of refined sugars.^{2,3,6} Dietary habits modification, improved oral self-care practices, effective use of fluorides, and establishment of school based preventive programs are suggested to account for improvement in oral health globally.^{7,8} Over 1 billion children attend school globally, therefore, schools provide effective avenue for

promoting oral health.⁹ The health and well-being of school staff, families and community members can also be enhanced by programs based in schools.¹⁰ Oral health services can be reinforced throughout the school years, which are the most influential stages of a children's lives, and during which lifelong beliefs, attitudes and skills are developed.⁹

Oral diseases are significantly influenced by socio-demographic factors.¹¹⁻¹⁴ Most schools in Nigeria are owned and run by government and can be found in both rural and urban areas of the country. They are known as public school. Private schools are expensive, effectively administered and better equipped than government schools which are financed by the government. These private schools are mostly located in urban centers and are owned and run by individual proprietors and non-governmental organizations.¹¹ Attending a private school and living in an urban area is a function of socio-economic status.

Oral health is fundamental to general health and well-being and schools can provide supportive environment for promoting oral health. School policies and health education are important in the

attainment of oral health and the control of risk behaviors that are related to diet and nutrition, tobacco use and alcohol consumption. Therefore, assessing the oral health status of school children is necessary for the development of oral health policies and implementation of effective oral health care program for this group. Furthermore, the assessment of oral health status of school children in government and private schools may provide baseline data on the oral health status of children from different socioeconomic background and identify the high risk group. This would help in prioritizing the services to the high risk group. Few studies^{15,16} have been done on the oral health status of government and private school children in Nigeria. The objective of this study was to assess and compare the oral health status between public and private school children in Lagos State, Nigeria.

MATERIALS AND METHODS

Population and sampling

The study was a cross-sectional survey conducted among secondary schools students aged 11-20 years in two Local Government Areas (LGAs) of Lagos State.

A minimum sample size of 368 was estimated to be adequate. The assumptions made were: the prevalence of dental caries among secondary school children was 40%,⁶ precision (d) 5% and confidence interval of 95% and standard normal deviate at 1.96.

Data was obtained from 598 participants. The study units were selected using multistage sampling technique. The participating LGAs were randomly selected from the ballots of all local government areas in Lagos State by simple replacement balloting. Similarly, two schools were selected from each local government area by replacement random sampling and random sampling was again used to select the participating classes in each school. The number of students selected from each school was based on proportional allocation. Finally, the study participants were selected by systematic random sampling with the class register representing the sampling frame. The first student was randomly selected from the sampling frame and subsequent students were selected through a predetermined sequence until final sample size was attained for each school.

Ethical approval was obtained from the Research and Ethical Committee of the Lagos University Teaching Hospital Idi-araba, Lagos. Approval was also sought from Lagos State Ministry of Education and Local Education Authorities. Written informed

consent was obtained from the parents and guardians of the participating subjects after explaining the nature of the study. Students between the ages of 11 years and 20 years were enrolled into the study except those who refused to participate or whose parents or guardians refused to participate.

Data Collection

Data was collected by oral examination. Dental caries was recorded based on World Health Organization (WHO) diagnostic criteria¹⁷ and the oral hygiene status was assessed using Simplified Oral hygiene Index (OHIS) of Greene and Vermillion 1964.¹⁸ The participants were examined by four dentists, who were trained and calibrated. The training ended with double examination of same set of 20 students not part of the study population by each of the examiner. The inter-examiner reliability using the Kappa statistics for dental caries and oral hygiene status were 0.80 and 0.91 respectively. The examination was done under natural day light in the school premises on a plastic chair using a mouth mirror and explorer. The instruments were each time sterilized before used for clinical oral examination of the school children. The subjects were divided into four categories based on the oral hygiene simplified score. According to this index, oral hygiene index of 0 was considered as excellent, between 0.1 and 1.2 was described as good, 1.3 and 3.0 as fair and between 3.1 and 6.0 as poor. Dental caries was categorized into two either as caries free or caries present.

Method of Data Analysis

Collected data were entered into a prepared spread sheet and then into a personal computer. Data was analysed using Statistical Package for Social Science Version 20.0 (IBM Statistics New York, USA). The DMFT and OHIS scores were expressed in mean and standard deviation (SD). The distribution of study participants based on caries experience and oral hygiene status were expressed as frequencies and percentages. The statistical analysis was done using independent sample *t* test and Chisquare test. The statistical significance was fixed at 0.05 at 95% confidence interval.

RESULTS

The participants of this study aged between 11 to 20 years with mean age of 13.61 ± 2.10 years. There was a slight higher female to male preponderance in the government school (F>M; 52% vs 48%) and the reverse in the private schools (M>F; 51% vs 49%). (Table1).

A total of 598 students were examined. Among

these, 300 (50.2%) were from government schools and 298 (49.8%) from private schools. There was no statistical significant difference in age and gender distribution of study participants between government and private schools ($P = 0.16$). Majority of the participants 484 (81%) were aged 11-15 years. Table 2 shows the educational status of the participants' parents. It was significant that the majority of the parents of the children in the private schools had tertiary education. Table 3

shows the dental clinic attendance and reasons for non-attendance of the participants. It was significant that more children in private schools attended dental clinic. The majority of the children who did not attend gave no reason for non-attendance. Majority of the participants used toothbrush and fluoride containing toothpaste for brushing. More children in the private schools than those in the government schools do so (Table 4).

Table 1: Age and gender distribution of the participants

Age(years)	Public			Private			Combined total (%)
	Female	Male	Total	Female	Male	Total	
11-15	125(51.7)	117(48.3)	242(50.0)	119(49.2)	123(50.8)	242(50.0)	484(80.9)
16-20	31(53.4)	27(46.6)	58(50.9)	27(48.2)	29(51.8)	56(49.1)	114(19.1)
Total	156(52.0)	144(48.0)	300(50.2)	146(49.0)	152(51.0)	298(49.8)	598(100)

$\chi^2: 2.43, P: 4.5^0$

Table 2: Educational status of participants' parents

Variables	Public	%	Private	%	Total	%	χ^2	df	P
Mothers' educational status									
No education	15	5.0	1	0.3	16	2.7	225.4	3	<0.001
Primary education	54	18.0	6	2.0	60	10.0			
Secondary education	165	55.0	44	14.8	209	35.0			
Tertiary education	66	22.0	247	82.9	313	52.3			
Total	300	100.0	298	100.0	598	100.0			
Fathers' educational status									
No education	8	2.7	1	0.3	9	1.5	179.8	3	<0.001
Primary education	25	8.3	4	1.3	29	4.8			
Secondary education	161	53.7	29	9.7	190	31.8			
Tertiary education	106	35.3	264	88.7	370	61.9			
Total	300	100.0	298	100.0	598	100.0			

Table 3: Participants' dental clinic attendance and reasons for non-attendance

Üz ^h ǎj ű ^l	Ö j űk	γ	Ö ^h Ö ^z γ	γ	Ŝÿ ^v zÜ	γ	3 ²	uÄ	Ö
Čz [~] γ ⁻ Ÿ ⁻ γ [~] γ ^h ~đ Ÿγüz Ÿγü ^v đ ^v Ÿ									
ŸŸ ^l	KG	EC4	CGJ	GE4	DGE	FD4	EK4	D	ξ B4BC
Ī Ÿ	DBG	HJ4	CEK	FH4	EFF	GI4			
UŸüŸ [~] ƧüŸ	B	B4	C	B4	C	B4			
Ŝÿ ^v zÜ	EBB	CBB4	DKJ	CBB4	GKJ	CBB4			
Ĥz ^l v Ÿγü ^v zÜ [~] đ ä									
B -6months	DG	DH4	FD	DH4	HI	DH4	D4G	F	B4
C E -24months	J	J4	CG	K4	DE	K4			
o _D - YZ ^{hl}	HD	HG4	CBC	HE4	CHE	HF4			
Ŝÿ ^v zÜ	KG	CBB4	CGJ	CBB4	DGE	CBB4			
Öy ^z l Ÿü Ä ^h ű ^l v Ÿγü ^v zÜ [~] đ Ÿ									
Uγü ^v zÜkōŸkŸ-up	EH	EI4	IC	FF4	CBI	FD4	E4	F	B4D
Kü Friend's advice	J	J4	J	G4	CH	H4			
Özǎj	DE	DF4	ED	DB4	GG	DC4			
Ŝÿ ^v zÜ Ä ^h ű ^l	DB	DC4	DJ	CI4	FJ	CK4			
K ^v öY ^{hl}	J	J4	CK	CD4	DI	CB4			
Ŝÿ ^v zÜ	KG	CBB4	CGJ	CBB4	DGE	CBB4			
Öy ^z l Ÿü Ä ^h Ÿü ^v -dental clinic attendance									
Oäüǎđ Ä ^h	I	E4	B	B.0	I	D4	EB4	G	ξ B4BC
OŸ ^l v	DG	CD4	F	D4	DK	J4			
ÄYz ^h ŸÄŸγü ^v zÜ ^{vh} Yz ^v Ÿü ^v	DF	CC4	H	F4	EB	J4			
Ī Ÿ ^e zǎj	HH	ED4	FC	DK4	CBI	EC4			
Ī Ÿ ^v ǎŸ γ	CH	I4	K	H4	DG	I4			
Ī Ÿ ^h Yz ^l Ÿü	HI	ED4	IK	GH4	CFH	FD4			
Ŝÿ ^v zÜ	DBG	CBB4	CEK	CBB4	EFF	CBB4			

Though more Children (46% vs 10%) in the private schools had good oral hygiene status than their counterparts in the government schools, the majority of the participants had fair oral hygiene status (Public:53.3%, Private: 46.6%). Conversely, poor oral hygiene was significantly higher in public schools (36.7%) than in private schools (7.4%)

($P=0.01$, Table 5)

The mean OHIS score was 1.67 (± 1.25). Students from government schools had a significantly higher mean OHIS score 1.82 (± 1.41) than those from private schools 1.47 (± 1.08) ($P < 0.001$, Table 6).

Table 4: Participants oral hygiene practice

Variables	Public	%	Private	%	Total	%	χ^2	Df	P
Cleaning items									
Toothbrush(TB)	207	69.0	234	78.5	441	73.7	11.8	3	0.01
Chewing stick(CS)	5	1.7	0	0.0	5	0.8			
TB & CS	88	29.3	63	21.1	151	25.3			
Finger	0	0.0	1	0.3	1	0.2			
Total	300	100.0	298	100.0	598	100.0			
Cleaning agents									
Fluoride containing toothpaste	190	63.3	231	77.5	421	70.4	16.5	5	<0.0001
Non-fluoride containing toothpaste	5	1.7	6	2.0	11	1.8			
Toothpaste powder	71	23.7	36	12.1	107	17.9			
Others	34	11.3	25	8.4	59	9.9			
Total	300	100.0	298	100.0	598	100.0			
Frequency of brushing									
Once	24	8.0	14	4.7	38	6.4			
Twice	224	74.7	236	79.2	460	76.9			
Others	52	17.3	48	16.1	100	16.7			
Total	300	100.0	298	100.0	598	100.0			

Table 5: Oral hygiene status of the participants

Schools	Oral hygiene status (N (%))			
	Good	Fair	Poor	Total
Public	30 (10.0)	160 (53.3)	110 (36.7)	300 (100)
Private	137 (46.0)	139 (46.6)	22 (7.4)	298 (100)
Total	167 (27.9)	299 (50.0)	132 (22.1)	598 (100)
Significant text	χ^2 : 286, P : 4.46		χ^2 : 253, P : 4.45	

Table 6: Mean DMFT and oral hygiene status of the participants

Schools	D	M	F	DMFT Mean (SD)	OHI-S Mean (SD)
Public	0.17 (0.59)	0.43 (1.20)	0.01 (0.18)	0.26 (0.89)	1.82 (1.41)
Private	0.08 (0.47)	0.07 (1.51)	0.06 (0.38)	0.11 (0.42)	1.47 (1.08)
Total	0.15 (0.6)	0.4 (1.5)	0.06 (.29)	0.19 (0.66)	1.67 (1.25)
P value	0.04	0.003	0.08	0.01	<0.001

The prevalence of dental caries among the participants in the present study was 9.7%. The prevalence was 10.7% among government school children and 8.7% among children from private schools. However the difference was not significant ($P=0.82$).

The mean DMFT score recorded in this study was 0.19 (± 0.66). The mean DMFT score among children from government school was 0.26 (± 0.89)

and was significantly higher compared to that of private school children 0.11 (± 0.42) ($P = 0.01$, Table 6).

DISCUSSION

Comprehensive information about the occurrence of oral diseases in school children is limited in Nigeria despite the fact that dental caries and periodontal diseases are recognized as major

public health problems. Although, a number of studies have reported caries occurrence among school children in Nigeria,^{11,13,15,16,19-21} only few compared its occurrence between public and private schools.^{20,21} The present study was undertaken to assess and compare caries occurrence and oral hygiene status of children from government and private schools. This became imperative because of existing socio-economic and cultural differences among children attending these schools in Nigeria.

In the present study, a higher percentage of children from the government schools had poor oral hygiene status compared to those in private schools. On the other hand, a higher percentage of children from the private schools had good oral hygiene status than those from the government school. This may be attributed to differences in oral hygiene practices and utilization of dental care services among the study population. Dental care utilization²² and oral hygiene practices^{23,24} are reported to be better among children from private schools. These results are consistent with the findings of other studies²²⁻²⁴. In two Nigerian studies^{20, 21}, the percentage of students who had good oral hygiene status was higher in private schools compared to those in public schools. Another study from Uganda²⁵, reported that poor oral hygiene status was significantly higher among children from government schools compared to those from private schools. Similar results was reported from Hyderabad, India.²⁶

The mean oral hygiene score was higher among children in government schools in comparison to those in private schools in the present study. This is in agreement with the findings reported in India.²⁶ The difference may be attributed to poor oral hygiene practices among children in government schools as reported above.^{23, 24} Oral hygiene status is a measure of the state of oral cleanliness and this is dependent on the effectiveness and regularity of oral self-care practices as well as regular utilization of dental care services for routine scaling and polishing. Again, a major determinant of utilization of dental services is socioeconomic status, the higher the socio-economic status, the greater the use of dental services.²⁷ Private schools are expensive, effectively administered and better equipped than government schools and students in private schools are believed to belong to higher socio-economic class.¹¹

The overall prevalence of dental caries among the school children was 9.7% with a mean DMFT score of 0.19 (0.66). The low prevalence of dental caries in this study is consistent with recent studies conducted among school children in Nigeria.^{28,29} Earlier studies indicated that the prevalence of

dental caries among Nigerian children is relatively low compared to what is reported in the developed countries.^{30,31} The same is true in the present study. However, when compared to similar studies carried out among secondary school children in other parts of the country (Benin,¹¹ 33%; Enugu,¹² 24.1%), the reported prevalence in this study was low. This may be explained by the difference in socio-economic background, oral hygiene practices and frequency of intake of refined sugar. The caries prevalence was higher among the children attending public schools than that of children in private schools. Similar results were obtained in the studies of Shailee *et al.*²⁴ and Sukhabogi *et al.*²⁶ Underutilization of dental services, socio-economic factors and lack of awareness may account for these variations. The mean DMFT score was also higher among children in the government schools in comparison to those in private schools in this study. While the mean number of decayed teeth and teeth missing as a result of dental caries were significantly higher among government school children, the mean number of filled teeth was higher among private school children. The parents of children in the private schools are well educated and this may account for a higher dental awareness among them and this may have translated to the good attitude towards oral health found among their children and consequently the higher mean filled teeth observed among them.

CONCLUSION

Dental caries prevalence was higher and the oral hygiene status was poorer among government school children compared to children in private schools. There is need to develop and implement oral health education programs, raise the level of dental awareness and promote oral health among students in government schools while not neglecting those in private schools. This could lead to improvement in oral hygiene practices and a change in attitude towards utilization of dental services. Oral health promotion strategies aimed at increasing access to affordable tooth brushes and fluoride-containing dentifrices would also help in preventing caries and improve oral hygiene status in school children.

CLINICAL SIGNIFICANCE

Assessing the oral health status of school children is necessary for the development of oral health policies and implementation of effective oral health care programs for this group. Furthermore, the assessment of oral health status of school children in government and private schools may provide baseline data on the oral health status of

children from different socioeconomic background and help identify the high risk group.

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