Oral Health status of 12-year-old Children in Public and Private Schools in Benin City

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ABSTRACT

Objective: To ascertain the oral health status of 12 years olds in public and private schools in Benin City, Nigeria.

Methods: This was a cross-sectional survey involving a sample of 704 12 year old school children drawn from three Local Government Areas in Benin City, selected through multistage sampling technique. Simplified Oral Hygiene Index (OHI-S), Community Periodontal Index of Treatment Needs (CPITN) and Decayed, Missing and Filled Teeth Index (DMFT) were used to assess their oral hygiene status, periodontal status and caries experience respectively.

Results: The prevalence of dental caries was 10.9%. Females 13.4% and participants from public school (11.4%) had higher prevalence of dental caries than their counterparts. It was only sex that was statistically significant (P=0.029). The mean DMFT was 1.18. Participants from private school had more severe caries (DMFT ≥2) compared to participants from public schools although it was not statistically significant (P=0.593). Sixty two point one percent (62.1%) of the participants had good oral hygiene Female (65.4%) had significantly higher good oral hygiene than males (58.9%) (P=0.043). The prevalence of periodontal disease among the participants was 39.9%. Periodontal disease was significantly higher in public school (47.7%) than private schools (32.0%) (P=0.000).

Conclusion: Our study revealed a lower prevalence of dental caries among the study population compared to the prevalence in the literature. However, prevalence of periodontal disease is relatively high corroborating other studies, while the mean DMFT is slightly higher than those reported by previous studies.

Keywords: Benin City, children, dental caries, oral health, periodontal disease

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INTRODUCTION

Oral health status can be viewed as any level of health along a continuum of oral and related tissues. Oral health has been defined as the 'standard of health of oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being.' It is integral part of the general wellbeing of individuals and populations, hence cannot be treated in isolation. Dental caries and periodontal disease have largely been used to assess the oral health status; however aside from dental caries and periodontal disease, many other problems contribute to oral health status of 12-year-olds. Dental caries and periodontal diseases have been considered in this study as a measure of oral health status because they are the most common oral health problems,[1,2] are largely preventable[1,3] and will allow for objective comparisons.

In Nigeria, the prevalence of dental caries in 12 year old children from reports in scientific literature is low and ranges from 15.8% to 40%[4-6] while periodontal disease occurs in relatively high proportions in young adolescents, the prevalence increases with age and ranges from 15% to 58% in Nigerians above 15 years of age.[7-9] Therefore, knowledge of dental caries and periodontal diseases would go a long way to minimize the incidence of these diseases and improve the standard oral hygiene and dental health in general. In the absence of comprehensive or absolute measures of oral health of a population, the average values of oral health indicators (for example, mean DMFT), the prevalence of preventable diseases (for example, prevalence of dental caries) and availability of oral health services serve as indicators of oral health status.[10] The objective of this study was to ascertain the oral health status of 12 years olds in public and private schools in Benin City, Nigeria using Simplified Oral

Hygiene Index (OHI-S), Community Periodontal Index of Treatment Needs (CPITN) and Decayed, Missing and Filled Teeth (DMFT) as indicators.

MATERIALS AND METHODS
Ethical consideration
This study was conducted according to the principles of Helsinki declaration and approved by the ethical committee of Edo State Ministry of Education on 11th May, 2010. Parent consent was also obtained via the school authorities through the use of consent forms.
Study design/setting
The study was a cross-sectional survey, carried out in junior secondary schools in Benin City, capital of Edo State, South-South zone of Nigeria. Benin City which is a metropolitan capital city comprises of three local government areas: Oredo, Egor and Ikpoba-Okha.
Sampling/sample size
The survey was designed to generate a representative sample thus we obtained a calculated sample size totaling seven hundred and four 12-year-old school children which were selected across 12 schools (6 public and 6 private) from the three Local Government Areas (LGAs) of Benin City.
A multi-stage sampling techniques was used: The wards in each of three LGAs were divided into clusters (each of two consecutive wards) and one of the clusters in each LGA was selected through purposive sampling, by reason of proximity and considering the fact that the socio-economic factors are about the same all through the wards and the three LGAs are almost urban. This was a total of 6 wards. Two schools (one public and one private) were selected from each of the 6 wards through simple random technique of die casting considering the homogeneity of the population, making a total of 12 schools (6 public and 6 private) stratification was made into 6 strata by the school in each set of public and private schools (making a total of 12 strata) and the number of students selected from each school was calculated equal sampling ration (proportional allocation). Systematic random sampling technique was used to select the representative number of pupils in each of the 12 schools. A sample size of 704 was used.
Data collection tool/procedure
Data on demographic characteristics were collected using an interviewer-administered questionnaire. The clinical examination was done using Simplified Oral Hygiene Index by Greene and Vermillion[11] to assess the oral hygiene status, Community Periodontal Index of Treatment Needs

by Ainamo and adopted by WHO/FDI[12] to assess periodontal disease status and Decayed, Missing and Filled Teeth[13] to assess the dental caries status.

Data analysis
Statistical analysis was done using SPSS (Statistical Package for Social Sciences) version 15.0. Independent t- test used to compare mean DMFT, DT and MT and type of school. Chi square test of association was used to assess between variables. Statistical significance was set at $P<0.05$.

RESULTS
Seven hundred and four (704) were recruited and 700 participated, giving a participation rate of 99.4%. The majority of the participants mothers (n=518; 74.0%) had tertiary education while only 1.0% had no formal education. Most of the participants' parents (more than half in both cases) were senior civil servants (father 65.6% and mother 54.9%) (Table 1). The overall prevalence of dental caries was 10.9%, with 13.4% in females and 8.3% in males. The gender difference was statistically significant (P=0.029). The prevalence of dental caries showed 11.4% in participants from public school and 10.3% in participants from private school. The majority (89.0%) of the participants did not require any form of dental caries treatment. The participants that required restorative treatment were 5.9%, prosthetic treatment 4.0% and both restorative and prosthetic treatment 1.0% (Table 2). Among the participants with dental caries, half of them 38 (50.0%) had DMFT score of 1. Participants from private school also had more severe care (DMFT ≥2) compared to participants from public schools although it was not statistically significant (Table 3). The mean DMFT, DT and MT were 1.18, 1.11 and 1.04 respectively. There was no statistical significant difference in mean DMFT, DT and MT for private and public schools (Table 4). Sixty two point one percent (62.1%) of the participants had good oral hygiene with 65.4% in female than 58.9% in males. This difference is statistically significant (P=0.043) (Table 5). The overall prevalence of periodontal disease among the participants was 39.9%. Periodontal disease in participants from public school was 47.7% compared to 32.0% of participants from private schools. This difference is statistically significant (P=0.000). Treatment needs including home care and professional scaling/removal of plaque retentive factors were [132 (37.7%); 18 (5.1%)] in public school and [124 (35.4%); 5 (1.4%)] in

private school. This difference is statistically significant (P=0.013) (Table 6).

Table 1: Demographic characteristics of the participants

Characteristics	Frequency	Percent
Sex		
Male	350	50.0
Female	350	50.0
Type of school		
Private	350	50.0
Public	350	50.0
Mother level of education		
Non formal	7	1.0
Primary	47	6.7
Secondary	128	18.3
Tertiary	518	74.0
Fathers occupation		
Senior civil servant	459	65.6
Junior civil servant	50	7.1
Self employed	189	27.0
Not employed	2	0.3
mothers occupation		
Senior civil servant	384	54.8
Junior civil servant	30	4.3
Self employed	268	38.3
House wife	18	2.6

Table 2: Dental caries status of participants

Characteristics	Present n (%)	Absent n (%)	P-value
Sex			0.029
Male	29 (8.3)	321 (91.7)	
Female	47 (13.4)	303 (86.6)	
Type of school			0.627
Private	36 (10.3)	314 (89.7)	
Public	40 (11.4)	310 (88.6)	
Total	76 (10.9)	624 (89.1)	

Table 3: Severity of dental caries among affected participants

DMFT score	Public school n (%)	Private school n (%)	Total n (%)	P-value
1	22(55.0)	16(44.4)	38 (50.0)	0.593
2	14 (35.0)	14 (38.9)	28 (36.9)	
>2	4 (10.0)	6 (16.7)	10 (13.2)	
Total	40 (100.0	36 (100.0	76 (100.0)	

Table 4: Mean DMFT among the participants

Variable	Public school Mean±SEM	Private school Mean±SEM	Total Mean±SEM	P-value
DMFT	1.18±0.03	1.19±0.03	1.18±0.02	0.850
DT	1.10±0.02	1.13±0.03	1.11±0.02	0.376
MT	1.02±0.02	1.06±0.02	1.04±0.01	0.460

Table 5: Oral hygiene status of the participants

Status	Male n (%)	Female n (%)	Total n (%)	P-value
Good	206 (58.9)	229 (65.4)	435 (62.1)	0.043
Fair	130 (37.1)	116 (33.1)	246 (35.1)	
Poor	14 (10.9)	5 (1.4)	19 (2.7)	
Total	350 (100.0)	350 (100.0)	700 (100.0)	

Table 6: Periodontal disease status and treatment needs among the participants

Variable	Public school n (%)	Private school n (%)	Total n (%)	P-value
Bleeding/calculus				0.000
Present	167 (47.7)	112 (32.0)	279 (39.9)	
Absent	183 (52.3)	238 (68.0)	624 (60.1)	
Treatment need				0.013
No treatment	200 (57.1)	221 (63.1)	421 (60.1)	
Improvement in home care	132 (37.7)	124 (35.4)	256 (36.6)	
Professional scaling/removal of plaque retentive factor	18 (5.1)	5 (1.4)	23 (3.3)	
Total	350 (100.0)	350 (100.0)	700(100.0)	

DISCUSSION

In Nigeria, the prevalence of dental caries in 12 year old children from reports in scientific literature is low ranging from 15.8% to 40%.[4-6] In this study however, we reported a lower prevalence of 10.9% among the study population. While some authors in Europe and Asia have also reported similarly low prevalence,[14] other studies carried out in Western, Asia and Middle Eastern countries have reported a much higher caries prevalence rate.[15,16] The gender difference was statistically significant (P=0.029). The World Health Organization recognizes a caries-free level of 20% as indicating low caries prevalence in a population.[17] Earlier studies carried out in 1960's and 1970's in Nigeria[18,19] reported caries-free levels of 98% and 49% respectively. The caries-free level in this study was 89.1% which is comparable to the 1960's study but much higher than studies conducted in 1970's.[18,19] This can be explained by increased sugar intake associated with higher income of Nigerians during the oil boom era of the 1970's while the dwindling economy of the 1960's and 2000's may be responsible for the observed drop in caries prevalence. This is also evidenced by various studies[4,6] carried out in 1995 and 2001 respectively which reported lower caries prevalence; more so, the study population from this study were all born in the past oil boom era. The prevalence of dental caries was also noted to be significantly higher in females (13.4%) than males (8.3%) thereby adding to the established gender variation of dental carious status in the literature.

The mean DMFT was found to be 1.18±0.02 which was much lower than studies carried out in Middle Eastern, Asian, and European countries.[15,20] This result is also well below the WHO/FDI goal of not more than a mean DMFT of 3.0 at age 12. Numerous studies especially those from African including Nigeria have also reported comparable values.[4,6,21,22] Two previous national surveys carried out in Nigeria[4,5] about a decade apart, reported a much lower DMFT values of 0.7 and 2.2 respectively. This lower caries severity may largely be attributed to the use of fluoride containing toothpastes in recent times by the majority of the Nigeria school children.

Sixty-two point one percent of the participants had good oral hygiene status which contrasted with other studies which reported mostly poor oral hygiene in their study population.[23,24] More female participants had significantly better oral hygiene status compared to males. This gender differences also collaborates a study by Honkala et al.[25] who suggested that the differences may partly be explained by the fact that girls tend to have more interest in their appearance than boys. It has been shown that oral hygiene status of children is largely influenced by attitude, awareness, educational level and socioeconomic status of their parents.[26,27]

The prevalence of periodontal disease among the participants in this study was 39.9%. This value is