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Prevalence of periodontal disease among students attending selected secondary schools in Enugu-East LGA, Enugu State, Nigeria

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ABSTRACT

Introduction

Chronic periodontal disease is highly prevalent among Nigerians. The disease process can have adverse effects on students. Finding out the prevanlence of periodontal disease among students may help in the planning of intervention.

Purpose

This study was aimed at assessing the prevalence of periodontal disease among students attending selected secondary schools in Enugu-East LGA, Enugu State, Nigeria

Materials and Methods

The study was carried out between May and June, 2014 as part of PhD dissertation submitted to Walden University. Three school types (public, private and faith-based/missionary) were involved in the study; 12 schools (4 from each of the school types) were selected for the study with the students between aged 11-17 years. Proportional stratified sampling technique was adopted to select 20 students from JSS I, II, and III , respectively, from each of the schools (a total of 60 students from each of the selected schools), making a total of 720 students, but only 671 students that indicated interest in the study by filling informed consent form (361 males and 310 females) were involved in the study. Data was collected using intraoral examination by adopting the periodontal disease index (PDI). Data were analyzed using the statistical package for social sciences (SPSS) version 21.0. Bivariate non-parametric tests (Mann Whitney test and Kruskal-Wallis test) were used to determine the normality of the PDI collected.

Results

Results showed that periodontal disease was not prevalent among the students with a general mean PDI of 1.15. Males had a higher mean PDI (1.16) than females with a mean PDI of 1.13. Students within the age range '11-12 years old' had a higher mean PDI (1.27) than the other age groups. . Students from missionary schools had lower levels of periodontal disease than those from public schools, with an odds ratio of 0.612 (95% CI [0.402, 0.934]). Students from the JSS III class tended to have a lower level of periodontal disease than those of the JSS I class (OR: 0.567, 95% CI [0.363, 0.886]).

Conclusions

The incorporation of oral health promotion programmess into school curricula may increase the adoption of preventive oral health strategies by students (such as regular dental attendance), to maintain their good oral health for a lifetime.

INTRODUCTION

Ogundele and Ogunsile (2008), Sa'adu (2012), and Carneiro (2011) reported that secondary school students and adolescents in Nigeria face challenges regarding their oral health, because of the daily high consumption of sugary foods and drinks and because of poor oral hygiene, which predispose them to dental caries and periodontal disease. "Periodontal diseases are those pathological processes of an inflammatory and degenerative type that involve the periodontium. They are clinically characterized as gingivitis, pocket formation, loss of alveolar bone and eventually tooth loss" (World Health Oranization [WHO], 2009). According to Sofola (2010), chronic periodontal disease was found highly prevalent among Nigerians, right from 1960 to date; over 75% of Nigerians suffer from periodontal diseases, due to poor oral hygiene.

Enwonwu (1966,) observed and reported the prevalence of destructive periodontal disease as evaluated by Russell's criteria, to range between 15% in Northern Nigeria, and 40% in Western Nigerians aged 15-19 years. Adegbembo and El-Nadeef (1995) reported that a nation wide study carried out in both rural and urban Nigeria, the prevalence of periodontal pockets 4-5mm deep was 39% at 15 years of age and this increased to 57% among those aged 25-29 years. Akpata (2004) also reported that deep periodontal pockets occur in a relatively high proportion among young adolescents in Nigeria; the prevalence increases with age, being 51-58% in children aged above 15years. Akpata further explained that the occurrence of periodontal disease is related to oral hygiene status and socioeconomic class.

National Institute of Dental and Craniofacial Research (NIDCR) (2012), identified the following risk factors for periodontal disease; smoking, hormonal changes in girls/women, diabetes, medications, genetic susceptibility, and poor oral hygiene. The negative impacts of poor oral health described by Petersen (2004) and Dilip (2005) include pain and suffering, functional impairment, and reduced quality of life.

Given the aforementioned, there was the need to determine the prevalence of periodontal disease among students attending selected secondary schools in Enugu-East LGA, Enugu State, Nigeria.

MATERIALS AND METHODS

Resaecrh design
A quantitative cross-sectional design was used to collect data from selected secondary schools in Enugu-East LGA, Enugu State, Nigeria.

Population
The target population for this study was 270, 889 students aged 11-17 years (133,371 senior secondary students and 137,518 junior secondary students) attending public schools, private schools, and missionary/faith-based schools in Enugu-East LGA, Enugu State, Nigeria (Mba Mike, Planning Officer, Enugu State Ministry of Education, Personal Communication). Twelve secondary schools were involved in the study out of over 35 secondary schools in Enugu East Local Government area.

Sampling technique
Proportional stratified sampling technique was used in selecting 12 schools out of over 35 secondary schools in Enugu East local government area, Enugu-East LGA, Enugu State, Nigeria. The schools were divided into strata, based on school type (public, private, or missionary/faith-based school); four schools were drawn from each stratum, and 60 students were selected from each school using the stratified sampling technique (the class was divided into strata of JSS I, II and III respectively. Twenty students who met the inclusion criteria were selected from each of the classes using a table of random sampling numbers).

Sample size and informed consent
Approximately 720 students were selected for the study, but 671 students that filled the informed consent form participated in the study.

Data collection procedure
Before the data collection proper, Enugu State Post Primary School Management Board (ESPPSMB), principals, and administrators of the selected secondary schools and Federal School of Dental Technology and Therapy (FSDT&T), Enugu, gave their consents before approval was granted by Walden University's Institution Review Board (IRB) – because this was part of a Ph.D. dissertation.

A pilot test was conducted by the researchers and three Dental Therapists in the FSDT&T clinic on 5 patients, to be acquainted with the data collection process, using the periodontal disease index (PDI) in line with the guidelines

provided by Russell Ramfjord in 1967, to determine the prevalence of periodontal disease among the participants. The intra-oral examination was carried out on the selected students, in the various school halls, with mouth mirrors, periodontal probes, tweezers, and the instruments were sterilized using JIK (a Sodium hypochloride solution).

Data analyses

Data were analyzed using the statistical package for social sciences (SPSS) version 21.0. Bivariate non-parametric tests (Mann Whitney test and Kruskal-Wallis test) were used to determine the normality of the PDI collected. The linear regression (Pearson Product Moment Correlation) was also suggested to be used for data analysis, but this was not actualized.

Before hypothesis testing for the research, Shapiro-Wilk tests were performed with each independent variable and the dependent variables, mean PDI to determine normality. The results of the Shapiro-Wilk tests were that all the variables were not normally distributed; therefore, Bivariate parametric tests (Mann-Whitney U and Kruskal Wallis) were used.

RESULTS

The results of this study indicated that out of the 671 students who completed the survey, 226 participants were in public school (33.7%), 213 were in private school (31.9%) and 231 were in missionary/faith-based schools (34.4%). Three hundred and sixty-one were males (53.8%) and 310 were females (46.2%). There were 211 students between 11-12 years old (31.4%), 331 were between 13-14 years old (49.3%), 112 were between 15-16 years old (16.7%), and 17 were above 16 years (2.5%). For the different classes involved in the study, 202 were in JSS I Class (30.1%), 236 were in JSSII (35.2%) and 233 were in the JSS III class (34.7%) **(Table 1)**.

RQ2: What are the relationships between demographic variables (age, gender, class, and type of institution), and the periodontal health status of the students?

Table 1

Differences of PDI indices in Students by Demographic Parameters. Mean Scores and Standard Deviations in Parenthesis.

Demographic factor	N	PDI[2]
Sex		
Male	361	1.16 (4.33)
Female	310	1.13 (4.68)
Mann-Whitney u test, p <0.165[2]		
School type		
Public	226	1.65 (3.93)
Private	214	0.96 (1.28)
Missionary	231	0.85 (0.36)
Kruskal Wallis test, p<0.001[2]		
Age group		
11-12	211	1.27 (5.67)
13-14	331	1.16 (4.52)
15-16	112	0.92 (0.33)
17 and above	17	0.95 (0.41)
Kruskal Wallis test, p<0.717[2]		
Class		
JSS I	202	1.33 (5.79)
JSS II	236	0.94 (0.34)
JSS III	233	1.20 (5.39)
Kruskal Wallis test,p<0.002		
Total	671	1.15 (4.49)

The results also indicated that male respondents had a mean PDI of 1.16 (SD 4.33), and female respondents had a mean PDI of 1.13(SD4.68) **(Table 1)**.

Students in public schools had a mean PDI of 1.16 (SD 3.93) private schools had a mean PDI of 0.96 (SD 1.28) and students in missionary/faith-based schools had a mean PDI of 0.85(SD 0.36) **(Table 1)**.

Students in the age group 11-12 years had a mean PDI of 1.27(SD 5.67). Those in the age group 13-14 had a mean PDI of 1.16(SD 4.52). Those between 15-16 years had a mean PDI of 0.92 (SD 0.33) and students that were 17 years and above had a mean PDI of 0.95(SD 0.41) **(Table 1)**.

Students in JSSI class had a mean PDI of 1.33(SD 5.79). Those in JSSII class had a mean PDI of 0.94(SD 0.34). Those in the JSS III class had a mean PDI of 1.20(SD 5.39).

H_0: There is no significant relationship between demographic variables (age, gender, class, and type of institution) and students' periodontal health status.

Table 2

Binary Logistic Regression Between Independent and Mediating Variables vs. Low and High PDI Score (Dependent Variable).

Predictor	B	S.E.	Wald	df	p	OR	95% CI	
							LL	UL
School type (missionary, ref: public)	-.490	.215	5.180	2	**.023**	.612	.402	.934
Class (JSS III, ref: JSS I)	-.507	.227	6.206	1	**.013**	.567	.363	.886
Poor oral hygiene causes perio	-.050	.125	.158	1	.691	.952	.745	1.215
dx (swollen & bleeding gum)	-.033	.078	.182	1	.670	.967	.830	1.128
When was your last dental visit?	-.299	.506	.348	1	.555	.742		

Note.B = B coefficients; S.E. = standard error; Wald = Wald test, df= degrees of freedom, p = probability value, OR = odds ratio, CI = confidence interval for odds ratio, LL = lower level, UL = upper level

Table 2 presents the relationship between PDI scores and demographic information; binary logistic regression was conducted using a new binary PDI variable as the dependent variable, and covariates (predictors) as those variables that were found significant from the bivariate tests. Mean PDI scores were recoded into categorical variables: low and high PDI score--where the low score was all data below and at the median cut-off point of PDI distribution and the high score was all data above the median level of PDI scores.

The logistic regression model was statistically significant, $\chi^2(6)$ = 14.876, p< .021, and explained 3.2% (NagelkerkeR^2) of the variance in PDI scores and correctly classified 72.8% of cases. The Hosmer and Lemeshow test support the model (p=.187). Of the four predictor variables, only two were statistically significant: school type (p<.023) and work setting (p<.016) (Table 2).

School type appeared to be the strongest predictor of periodontal diseases, with an odds ratio of .612 (95% CI [.402, .934]), pointing out that the students from missionary school were less likely to show a higher mean level of PDI scores than those from public schools. The class was another predictor with an odds ratio of .567 (95% CI [.363, .886]), indicating that students from the JSS III class were less likely to have a higher mean level of PDI scores than those of the JSS I class (Table 2).

DISCUSSION

According to the results of the study, low occurrences of periodontal diseases (mean PDI 1.15) were recorded among the students. This interpretation was in agreement with Wilkins (1999) who also inferred that PDI value between 0-3 indicated gingival involvement only. Male students had higher mean PDI scores than female students. This result is not in line with the findings from a similar study conducted by Ogundele and Ogunsile (2008) who found that periodontal disease and dental caries were prevalent among female students. Public schools had a higher mean PDI score than the private and missionary/faith-based schools (even though one of the missionary schools had a higher PDI computed value), and students between the age group 11-12 years old had a higher mean PDI score. This was also in disagreement with the findings of Ogundele and Ogunsile (2008), which revealed that the majority of periodontal disease observed among the junior secondary school students was among those aged 14-16 years.

Results from the binary logistic regression revealed that school type was the strongest demographic predictor of periodontal diseases, as measured with the PDI scale. Students from public schools demonstrated a higher mean PDI score than those from the missionary/faith-based schools. This result was somehow expected because most of the students attending public schools have low socioeconomic status (SES), and therefore their level of awareness on oral health and practice could be lower compared to the one of students attending private and missionary schools ("Field obserbation", n.d). According to Akpata (2004), students attending private and missionary schools in Nigeria are widely considered to receive an education of better quality than their counterparts attending public schools, even though oral health education is not inculcated into the existing school curricula in Nigeria.

Class type as another significant predictor of having a low or high PDI score indicated that the youngest students (JSS I) were more likely to have a higher mean PDI score than the oldest students (JSS III). No previous studies from available literature had established a relationship between class type and prevalence of periodontal diseases in populations similar to the study sample. Possible explanations for this finding may be that the JSS III students may have brushed their teeth more frequently compared to JSS I students, have had more visits to the dentist, and usually give more attention to their appearance as adolescents (Nyamuryekung'e, 2012).

CONCLUSIONS

Good oral health behavior and attitude play a fundamental role for general wellbeing by preventing common oral diseases, such as dental caries and periodontal disease, especially in children who live in developing countries. As such, the Enugu State Ministry of Education may need to incorporate oral health education into the existing school curricula. This may help students to have access to information on how to prevent common oral diseases such as dental caries and periodontal disease. Also, the Federal School of Dental Technology and Therapy, Enugu may organize oral health intervention programs for schools and communities within the Enugu metropolis.

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