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Prevention of common oral diseases among Senior Secondary School Students in Enugu State, Nigeria

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ABSTRACT

Introduction
Oral diseases are major threats to general health but can be prevented by the adoption of healthy oral hygiene practices.

Purpose
This study was aimed at ascertaining the prevention of common oral diseases among selected Senior Secondary School students in Enugu State, Nigeria.

Materials and Methods
The descriptive survey design was adopted for the study. The population comprised of all the 50,736 Senior Secondary School students in government-owned secondary schools in Enugu State, Nigeria. A sample size of 900 participants was used for the study. This sample was generated through a multistage simple random sampling procedure. One research question and three hypotheses were posed for the study. A researcher-made questionnaire, Prevention of Common oral diseases (PCOD), was the instrument used for the study. The reliability of the instrument was tested using Kuder Richardson's formula – 20 (K –R20) at a 0.05 level of significance and a reliability coefficient of 0.97 was derived. Data was collected from the responses of the respondents to the questionnaire. Frequencies, percentages, and chi-square statistics at a 0.05 level of significance were utilized for the descriptive and inferential analyses of the data.

Results
Results showed that the adherence of the respondents to certain preventive measures was high. 98.9% of the students cleaned their teeth in the morning. However, students didn't adhere to the practice of dental visits and reducing the consumption of refined carbohydrates satisfactorily. There was a significant difference in the preventive measures adopted by students in urban and rural areas **($p<0.05$)**. But, there was no significant age- and gender-difference in the preventive measures adopted by the students **($p>0.05$)**.

Conclusion
Effective sensitization campaigns on the preventive measures for oral diseases need to be carried in all schools to ensure adherence to good oral hygiene practices.

INTRODUCTION

Oral health is multifaceted and includes the ability to speak, smile, taste, touch, chew, swallow and convey a range of emotions through facial expression with confidence and without pain, discomfort, and disease of the craniofacial complex (Glick et al, 2017).

At puberty, there is an increased level of hormones secretion such as progesterone and estrogen and these

cause increased blood circulation to the gums and increase sensitivity to dental plaque, causing irritation. There is a need for adequate oral hygiene practices at this period to prevent oral diseases. The gums when irritated become swollen (gingivitis) and start to bleed more easily (puberty gingivitis). This could lead to juvenile periodontitis. While in school these students consume a lot of refined carbohydrates such as snacks, which are cariogenic. This exposes them to dental caries attacks. These oral diseases cause intense pain and discomfort. Students, when affected and are in pain, have to visit the dental clinic for treatment. This leads to a loss of hours that should have been spent in school learning or utilized for the general good. Physiological changes can also contribute to significant oral concerns in the adolescent. Such changes include loss of remaining primary teeth, eruption of remaining permanent teeth, gingival maturity, facial growth, and hormonal changes (American Academy of Pediatric Dentistry [AAPD], 2017).

Oral health is the retention of a functional, aesthetic, natural dentition of not less than twenty teeth and not requiring recourse to a prosthesis that is artificial appliances throughout life (World Health Organization [WHO], 1983). It was further emphasized that oral health is a key indicator of overall health, wellbeing, and quality of life (WHO, 2019). On the other hand oral diseases are alterations of structures relating to the mouth that impairs the normal functioning of the mouth (Hemphil, 2006). General health could be affected by infections of the teeth and other tissues in the mouth leading to disease or health challenges.

The preventive measures against common oral diseases including dental caries and periodontal disease are the institution of proper oral hygiene practices and dietary discipline by individuals. Others are the use of preventive dentistry procedures, oral health promotion, and oral health education of individuals and communities (Ireland, 2006). Dental caries and periodontal disease have been observed to exist across socio-economic groups. Socio-economic conditions have long been known to influence human health. Oral health is determined primarily by the level of socio-economic development. Persons of higher socio-economic backgrounds tend to exhibit better oral health status than persons from a low socio-economic background. This is so because persons of higher socio-economic backgrounds can access, and are exposed to, better oral health facilities with the resources at their disposal (Centers for Disease Control & Prevention [CDC], 2019).

Preventive health care or prophylaxis consists of measures taken for disease prevention. Disease prevention relies on anticipatory actions that can be categorized as primordial, primary, secondary, and tertiary prevention (Parks, 2013). In oral health primordial prevention includes measures taken by the mother to protect the unborn child from conception to one year, primary prevention may be taking adequate diet and good oral hygiene practices; secondary prevention may be the application of fissure sealants and filling materials while tertiary prevention involves restorations and rehabilitative oral care when the disease is initiated. As individuals, there is a need to adopt adequate oral hygiene practices to prevent common oral diseases (Aballa, 2016).

Oral hygiene practices include cleaning the teeth twice daily, eating healthy diets, avoiding refined carbohydrates, and visiting oral health professionals routinely (at six months intervals) for check-up and prophylaxis (Aballa, 2016). According to Ireland (2006), the preventive measures against common oral diseases include increasing the resistance of the teeth, physical and mechanical methods of combating microbial dental plaque, diet modification, preventive interventions, and routine dental checks. Van and Duggal (2004) posited that Preventive oral health is concerned with the prevention of dental diseases. This includes dietary counseling, advice on oral hygiene, application of fluoride and fissure sealants to the teeth.

With the burden of common oral diseases on the rise, there is an ardent need to institute and practice adequate preventive measures to forestall their proliferation (Aballa, 2016).

Physical and mechanical methods of combating dental plaque include personal use of chewing sticks, a toothbrush with toothpaste, dental floss, digits to remove deposits from the teeth. When these are used against the teeth effectively, they remove dental plaque which is a major culprit in aetiology of common oral diseases.

Diet modification entails limiting the consumption of refined carbohydrates that have been implicated as one of the aetiological factors of oral diseases. When these foods are taken, they should be taken with meals and after intake, the mouth should be thoroughly rinsed with water. Diet

modification equally entails finishing meals with deserts such as fibrous and self-cleansing fruits.

MATERIALS AND METHODS

Research Design

The researcher adopted a descriptive survey design for this study. Descriptive survey research describes the current state of affairs at the time of the study. Survey research attempts to study the characteristics of populations directly (Salkind, 2009). Salkind further stated that surveys examine the frequency and relationship between psychological and sociological variables and tap into constructs such as attitudes, beliefs, prejudices, preferences, and opinions. A descriptive survey answers the questions of what, how, when, and where.

Study Population

The population for this study comprised 50,736 students in all the 292 government-owned secondary schools in Enugu State (Planning, Research, and Statistics [PRS] Department, PPSMB Enugu, 2019).

Sample Size and Sampling Technique

The sample used for this study was 900 students. A multi-stage cluster sampling procedure was adopted by the researchers. A total of six schools were sampled for the study. For each school sampled, proportionate sampling was adopted to generate the sample size used.

Data Collection

The researcher used a researcher-made questionnaire, Prevention of Common Oral Disease (PCOD) to collect the data needed for this study. The questionnaire had two sections, A and B. Section A contained 7 items that elicited information on the demographic data of the respondents section B contained 11 items that elicited information on the prevention of common oral diseases. Parents' consents and ethical clearance were obtained for this study.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. Descriptive statistics of frequency distribution, percentages, mean and standard deviation were utilized. Hypotheses were tested using the chi-square statistics at a 0.05 level of significance. When the p-value was less than the stipulated 0.05 level of significance, the hypothesis was rejected. When the p-value was greater than 0.05 level of significance, the hypothesis was not rejected but upheld.

RESULTS

The results of the data analyzed are presented in frequency tables according to the research questions and hypotheses.

Research Question 1

Whata are the preventive measures adopted by the students of Senior Secondary School in Enugu State, Nigeria?

Table 1:
Percentage responses on the preventive measures adopted by Senior Secondary School Students in Enugu State, Nigeria

	Preventive Measures	Yes		No		Total
		f	%	f	%	
1.	Do you brush your teeth every morning?	890	98.9	10	1.1	900
2.	Do you brush your teeth every night?	325	36.1	575	63.9	900
3.	Do you use toothpaste to brush?	861	95.7	39	4.3	900
4.	Do you tooth powder to brush?	444	49.3	456	50.7	900
5.	Have you ever used the chewing stick?	503	55.9	397	44.1	900
6.	Do you rinse your mouth after snacks/food?	523	58.1	377	41.9	900
7.	Do you use mouthwash solutions?	189	21.0	711	79.0	900
8.	Do you take refined carbohydrates frequently e.g. biscuits, cakes, sweets, carbonated drinks, etc	790	87.8	110	12.2	900
9.	After intake do you rinse the mouth?	464	51.6	436	48.4	900
10.	Have you been to a dental clinic before?	158	17.6	742	82.4	900
11.	Have you received oral health education before?	670	74.4	230	25.6	900

The result displayed in **Table 1** shows the preventive measures adopted by senior secondary school students in Enugu State, Nigeria to avert common oral diseases. The following measures were adopted by most of the students; brushing of teeth in the morning (98.9%), using toothpaste to brush teeth (95.7%), using a chewing stick (55.9%), rinsing the mouth after snacks/food (58.1%), rinsing the mouth after taking refined carbohydrates (51.6%), and receiving oral health education (74.4%). This oral health education came mostly from the teachers as indicated by 47.5% of those that received oral health education.

Test of Hypotheses

Hypothesis 1

There is no significant difference in the preventive measures adopted by Senior Secondary School students in Enugu State, Nigeria based on their location

Table 2:
Chi-square analysis on the difference in the preventive measures adopted by the Senior Secondary School students based on school location

		Urban (N=604)		Rural (N=296)		df	X^2	P-value	Remark
		Yes N(%)	No N(%)	Yes N(%)	No N(%)				
1	Do you brush your teeth every morning?	597 (98.8)	7 (1.2)	293 (99)	3 (1)	1	.04	.845	NS
2	Do you brush your teeth every night	225 (37.3)	379 (62.7)	100 (33.8)	196 (66.2)	1	1.04	.309	NS
3	Do you use toothpaste to brush?	583 (96.5)	21 (3.5)	278 (93.9)	18 (6.1)	1	3.25	.071	NS
4	Do you tooth powder to brush?	324 (53.6)	280 (46.4)	120 (40.5)	176 (59.5)	1	13.64	.000	S
5	Have you ever used the chewing stick?	367 (60.8)	237 ((39.2)	136 (45.9)	160 (54.1)	1	17.69	.000	S
6	Do you rinse your mouth after snacks/food?	404 (66.9)	200 (33.1)	119 (40.2)	177 (59.8)	1	58.11	.000	S
7	Do you use mouthwash solutions	136 (22.5)	468 (77.5)	53 (17.9)	243 (82.1)	1	2.55	.111	NS
8	Do you take refined carbohydrates frequently e.g. biscuits, cakes, sweets, carbonated drinks, etc	540 (89.4)	64 (10.6)	250 (84.5)	46 (15.5)	1	4.53	.033	S
9	After intake do you rinse the mouth?	349 (57.8)	255 (42.2)	115 (38.9)	181 (61.1)	1	28.50	.000	S
10	Have you been to a dental clinic before?	116 (19.2)	488 (48.3)	19 (45.2)	254 (85.8)	1	3.45	.063	NS
11	Have you received oral health education before?	467 (77.3)	137 (22.7)	203(68.6)	93(31.4)	1	7.97	.005	S

Table 2 shows that there was a significant difference in the preventive measures adopted by students in Senior Secondary Schools in urban and rural areas. p-values for 6 out of the 11 items ranging from 0.000 to 0.033 were less than the stipulated 0.05 level of significance. The null hypothesis was therefore rejected.

Hypothesis 2

There is no significant difference in the preventive measures adopted by Senior Secondary Schools students in Enugu State, Nigeria based on their gender

Table 3:
Chi-square analysis on the difference in the preventive measures adopted by the Senior Secondary School students based on gender

		Males (N=286)		Females (N=614)		df	X^2	P-value	Remark
		Yes N(%)	No N(%)	Yes N(%)	No N(%)				
1	Do you brush your teeth every morning?	280(97.9)	6(2.1)	610(99.3)	4(0.7)	1	3.72	,054	NS
2	Do you brush your teeth every night	110(38.5)	176(61.5)	215(35)	399(65)	1	1.00	,316	NS
3	Do you use toothpaste to brush?	272(95.1)	14(4.9)	589(95.9)	25(4.1)	1	.32	.572	NS
4	Do you tooth powder to brush?	139(48.6)	147(51.4)	305(49.7)	309(50.3)	1	.09	.764	S
5	Have you ever used the chewing stick?	150(52.4)	136(47.6)	353(57.5)	261(42.5)	1		.000	S
6	Do you rinse your mouth after snacks/food?	173(60.5)	113(39.5)	350(57)	264(43)	1	.97	.324	NS
7	Do you use mouthwash solutions	85(29.7)	201(70.3)	104(16.9)	510(83.1)	1	19.2	.000	NS
							2		
8	Do you take refined carbohydrates frequently e.g. biscuits, cakes, sweets, carbonated drinks, etc	248(86.7)	38(13.3)	542(88.3)	72(11.7)	1	.44	.506	NS
9	After intake do you rinse the mouth?	162(56.6)	124(43.4)	542(88.3)	72(11.7)	1	4.35	.037	S
10	Have you been to a dental clinic before?	67(23.4)	219(76.6)	91(14.8)	523(85.2)	1	9.98	.002	NS
11	Have you received oral health education before?	191(66.8)	95(33.2)	479(78)	135(22)	1	12.9	.000	S
							3		

There was no significant difference in the preventive measures adopted by male and female senior secondary school students. The p-values for 9 out of the 11 main measures, ranging from 0.054 and 0.764, were greater than the 0.05 significance level. The null hypothesis was therefore accepted. However, male and female Senior Secondary School students in Enugu State differ in terms of treatment received during visits to dentists as most p-values were less than 0.05 **(Table 3)**.

Hypothesis 3

There is no significant difference in the preventive measures adopted by Senior Secondary School students in Enugu State, Nigeria based on their age.

Table 4:
Chi-square analysis on the difference in the preventive measures adopted by Senior Secondary School students based on age

		Age											
		12 – 14years (N=132)		15-17years (N=648)		18-20years (N=116)		21-23years (N=4)		df	X^2	P-value	Remark
		Yes N(%)	No N(%)	Yes N(%)	No N(%)	Yes N(%)	No N(%)	Yes N(%)	No N(%)				
1	Do you brush your teeth every morning?	132(100)	-	642(99.1)	6(0.9)	112(96.6)	4(3.4)	4(100)	-	3	7.50	.058	NS
2	Do you brush your teeth every night	50(37.9)	82(62.1)	230(35.5)	418(64.5)	43(37.1)	73(62.9)	2(50)	2(50)	3	.67	,881	NS
3	Do you use toothpaste to brush?	127(96.2)	5(3.8)	623(96.1)	25(3.9)	108(93.1)	8(6.9)	3(75)	1(25)	3	6.41	.093	NS
4	Do you tooth powder to brush?	68(51.5)	64(48.5)	316(48.8)	332(51.2)	58(50)	58(50)	2(50)	2(50)	3	.36	.949	NS
5	Have you ever used the chewing stick?	78(59.1)	54(40.9)	359(55.4)	289(44.6)	65(56)	51(44)	1(25)	3(75)	3	2.16	.540	NS
6	Do you rinse your mouth after snacks/food?	82(62.1)	50(37.9)	367(56.6)	281(43.4)	71(61.2)	45(38.8)	3(75)	1(25)	3	2.38	.498	NS
7	Do you use mouthwash solutions	20(15.2)	112(84.8)	136(21)	5129790	31(26.7)	85(73.3)	2(50)	2(50)	3	7.04	.071	NS
8	Do you take refined carbohydrates frequently e.g. biscuits, cakes, sweets, carbonated drinks, etc	120(90.9)	12(9.1)	562(86.7)	86(13.3)	105(90.5)	11(9.5)	3(75)	1(25)	3	3.29	.349	NS
9	After intake do you rinse the mouth?	73(55.3)	59(44.7)	324(50)	324(50)	64(55.2)	52(44.8)	3(75)	1(25)	3	2.86	.414	NS
10	Have you been to a dental clinic before?	20(15.2)	112(84.8)	105(16.2)	543(83.8)	31(26.7)	85(73.3)	2(50)	2(50)	3	10.99	.012	S
11	Have you received oral health education before?	105(79.5)	27(20.5)	477(73.6)	171(26.4)	87(75)	29(25)	1(25)	3(75)	3	7.20	.066	NS

Results in **Table 4** shows that there was no significant difference in the preventive measures adopted by the Senior Secondary School students in Enugu State, Nigeria based on their age. p-values for all items, except one, ranged from 0.058 to 0.965. These values were greater than the stipulated 0.05 level of significance. The null hypothesis was accepted. It was decided that Senior Secondary School students of different age ranges do not differ significantly in the preventive measures adopted.

DISCUSSION

From the present study's findings on the preventive measures against COD adopted by the students, 98.9% brushed their teeth daily with toothbrushes and toothpaste while 1.1% did not; 36.1% brushed twice daily (morning and night) while 63.9% did not. These results are in agreement with the findings of Orji (2015) that reported 93.1% once-daily tooth brushing and 8.3% occasional tooth brushing. The results were also in agreement with the findings of Adekoya-Sofowora et al. (2006) that reported 75% regular tooth brushing. The findings of this research also reported that 87.8% of the respondents engaged in the frequent consumption of refined carbohydrates and snacks while 12.2% did not. This key finding of the present study also agrees with a finding of the study of Orji (2015) that reported that 73.8% of the participants consumed refined carbohydrates while 26.4% did not.

Results on the source of oral health education revealed that 74.4% of the respondents received oral health education while 25.6% did not. Furthermore, 75.2% received the education from their teachers, 51.4% from health officers, and 13.3% from social media. These findings are in agreement with the findings of Orji (2015) in which 34.7% received oral health education from health officers, 16% from social media, and 13.9% from their teachers. 15.2% have attended the dental clinic while 84.8% have not. This finding is in agreement with the finding of Adekoya-Sofowora et al. (2006) that stated that over 80% of their study participants have never visited the dentist.

There was a significant difference in the preventive measures adopted by students in urban and rural areas **($p<0.05$)**. This finding corroborates the assertion of CDC (2019) that oral health is determined primarily by the level of socio-economic development.

There was no significant age- and gender-difference in the preventive measures adopted by the respondents **($p>0.05$)**. This finding suggests that different individuals adopt different oral hygiene measures based on their environment (extent of their exposure the the measures) and demonstrates the fact that age and gender may not be counted as modifying factors of the type or preventive measures adopted by the students. The influence of environmental factors may have cancelled out any bias that age and gender may have portended (CDC, 2019).

CONCLUSIONS

Given that the study participants didn't adhere to some good oral hygiene practice satisfactorily, for example, the practice of dental visits and reducing the consumption of refined carbohydrates, effective sensitization campaigns on the preventive measures for oral diseases need to be carried in all schools to ensure adherence to good oral hygiene practices.

Recommendations

Based on the findings of the study the following recommendations have been made:

1. Sensitization campaigns on common oral diseases should be intensified and spread out to all schools and communities by oral health professionals.
2. School oral health services should be embarked upon by government and other stakeholders by engaging oral health professionals and posting them to take charge of students' oral health.
3. Oral health issues ahould be broadcast frequently by the electronic and print media.

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Conflict of Interest: The authors declare no conflict of interest.

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REFERENCES

Aballa, A., N. (2016). *Basic concepts of primary oral health care.* Adlac Press Company.

American Academy of Pediatric Dentistry. (2017) Best practices: adolescents oral health care. Reference manual of pediatric dentistry, 233-240.

Centre for Disease Control and Prevention. (2019). *Oral health surveillance report in America*. CDC.

Enugu State Government Ministry of Information. (2019). About Enugu State. https://www.enugustate.gov.ng.

Glick, M., Wilham, D., Kleinan, D., Vujicic, Walt, R. & Wayant, R. (2017). A new definition of oral health

developed by FDI World Dental Federation opens the door to a universal definition of oral health. American Journal of Orthodontics and Dentofacial Orthodontics. *151*(2), 229-231. doi: 10.1016/j.ajodo.2016.11.010. PDMID: 28153139

Hemphil, L. (2006). Oral health of children and adolescents still reflects disparities. *International and American Association for Dental Research*. https://eurekalert.org/news-releases/501500

Ireland, R. (2006). *Clinical Textbook of Dental Hygiene and Therapy*. Blackwell Munksgaard.

Orji, N. M. (2015). Prevalence of dental caries among secondary school children in Ihiala L.G.A. Anambra State Nig. *International Journal of Innovation and Research in Educational Sciences, 2*(3), 148-153.

Parks, K. (2013). *Parks Textbook of Preventive and Social Medicine.* India M/S Banarsidas Bhanot.

Salkind, N.J. (2009). *Exploring research.* London: Pearson Education Ltd

Van, L. C., & Duggal, M. S. (2004). Experts' opinions on the role of diet in caries prevention. *Caries Res 38,16-23.*

World Health Organization. (1983). Epidemiology, etiology, and prevention of periodontal disease technical report series 621. Geneva: WHO.