

Oral Health Knowledge Attitude and Behaviour among Secondary School Children: A Quasi-Experimental Study.

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ABSTRACT

Objective: Improving oral health knowledge is considered to be a prerequisite for oral health-related behaviour. The aim of this study is to determine the effectiveness of an oral health education package (OHE package) on oral health knowledge, attitude and practices of senior secondary school students.

Methods: This is a quasi-experimental study where schools (experimental and control) were selected in Abakaliki urban area. Baseline data on oral health knowledge, attitude, and behaviour were collected from both groups with an intervention in the experimental group in the form of an OHE package but none in the control. Another set of data was collected from both groups after four months. Knowledge was rated high or low, attitude was rated good or poor, and behaviour was rated good or poor. Descriptive and inferential analyses were performed; while chi-square statistics and fisher exact tests were used for comparisons. The significance for all tests was set at ≤ 0.05 .

Results: Both groups had a good knowledge of oral health at baseline with significant improvements in the experimental group on all the knowledge questions following the OHE package ($p < 0.05$). Overall attitude in the experimental group improved by 68.1% ($p = 0.000$). Also, there were signs of progress in the behavioral assessments, however, the overall practice level of the experimental group increased marginally by 6.85% ($p = 0.006$).

Conclusion: The OHE package improved the oral health knowledge, attitude, and behaviour of the participants considerably. There were positive behavioral outcomes although not commensurate with the level of attitudes improved. To consolidate the gains of this study, regular interventional programmes in the schools, which for emphasis, could be taken further into their curricula are recommended.

Keywords: School, Oral Health Education, Knowledge, Attitude and Behaviour

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INTRODUCTION

Oral diseases are significant public health issues that require care, and the knowledge of oral health is seen as a foundation for healthy behaviour¹ Oral hygiene is an important factor for good oral health which is linked to the overall health and well-being of any individual.² Although not much is known about the knowledge, attitudes, and practices relating to oral health among children in developing nations, it is a sign of the success of programmes for oral health education in developed climes.³ Dental caries and periodontal diseases, the commonest oral health conditions for which people attend the dental clinic can be avoided by adopting measures like educating people about the causes to limit their exposure to the associated risk factors.⁴⁻⁶ Caries can be prevented if one is armed with information on plaque control through appropriate oral hygiene practices; diet especially frequency and types of sugary foods and drinks; and use of fluoride.⁷⁻⁹ Gingivitis is the dominant form of periodontal disease and is more prevalent in young people. Among the risk factors are poor oral hygiene, smoking, genetic factors, psychosocial stress, pre-existing conditions, and low level of utilization of dental services.¹⁰ Regular oral hygiene practices like daily brushing and flossing, plaque control programmes, and scaling and root planing are considered preventive and decisive therapies.¹¹

Within the context of the knowledge, attitude, and behaviour (K-A-B) model which is based on the fact that an increase in knowledge in an individual leads to change in their behaviour,¹² the transition from a bad to a good attitude can occur if there is enough information and proper motivation which would then translate to good practice.¹³ Credible reports from a systematic review of 18 articles that evaluated the effectiveness of school dental health education on oral health status, oral health-related knowledge, and practice showed that OHE had a positive impact on oral health status, knowledge, and practice, such as frequency and duration of brushing, use of fluoride toothpaste, in 6 to 12-year-old children.¹⁴ Edomwonyi et al, in a study conducted in Lagos, Nigeria, observed that OHE intervention had a significant impact on schoolchildren's practices, whether it was administered by the teachers or dental professionals.¹⁵ Furthermore, school health programmes have merits such as cost-effectiveness,¹⁵ a lingering effect until latter years,¹⁶ with a wider reach and improving the health and well-being of students, staff, families, and community

members.¹⁷ It has been estimated that school-based programmes reach one billion children worldwide, and so are platforms for promoting health, and creating awareness of healthy behaviours which is a key component of the preventive programme.¹⁸ Although a good number of studies have been carried out in different parts of the world, just a few were Nigerian-based and virtually none in the South-Eastern part. Hence this study aimed to determine the effectiveness of an oral health education package (OHE package) on oral health knowledge, attitude, and practices of students in secondary schools in an urban city in South-Eastern, Nigeria. The findings will provide baseline information for planning oral health programs among schoolchildren in this environment and increase the awareness of risk factors for the oral conditions the students are exposed to.

METHODOLOGY

This study was conducted in Abakaliki the capital and largest town in Ebonyi State, South-Eastern Nigeria. It is located at the intersection of Enugu, Afikpo, and Ogoja Roads. Before it became the State capital, it was a small town known for its overflowing food markets but has grown into a much larger town with modern facilities and a workforce.¹⁹ There were eight public secondary schools, and twenty-five registered private secondary schools at the time of data collection.²⁰ The study had a quasi-experimental design incorporating pre-intervention, intervention, and post-intervention phases in both the experimental and control groups. The minimum sample size for each group was calculated using the formula:

$$n = \frac{[A+B]^2 [(P1(1-P1)+(P2(1-P2))]}{[P1-P2]^2} \quad .21$$

Where n = the sample size required in each group, p₁ = Proportion of those with good oral health practice in an urban area, p₂ = Expected increase in oral health practice after the intervention, p₁ - p₂ = Size of difference of clinical importance, A= Zα where α = 0.05; Z = 1.96, B= Zβ which is the critical ratio at 1-β. Where β = 20% (i.e. power of 80%) Zβ = 0.84. Since there was no reasonable estimate for p₁, it was set at 0.5(50%) and p₂ set a 0.65 (65%).

$$n = [1.96+0.84]^2 [(0.5(1-0.5) + (0.65(1-0.35))]^2 = 166. [0.65-0.5]$$

To make room for attrition and non-response, the anticipated response rate was 90%. Therefore the final sample size = 166/0.9 = 184 for each of the groups: - experimental and control. A simple random sampling method was used to

select two schools from the list of secondary schools in the study area, one school as the experimental group and another to serve as the control. Both the experimental and control schools were mixed schools within Abakaliki urban area but in different communities. From each school, 3 classes were selected from Senior Secondary School Forms 1 and 2 (SS1 and SS2). Lastly, all students present in the selected classes were recruited into the study except those who declined. Senior secondary form three (SS3) students were excluded because they were writing their final examination at the time of data collection.

The participants were assured of confidentiality and informed that participation was voluntary and that the study was solely for research purposes. Ethical clearance was obtained from the Research and Ethics Committee of Ebonyi State University, with permission from the school authorities and parents of students in the selected institutions where the study was carried out.

Data collection: The data collection was in phases: pre-intervention (baseline data) and at 4 months post-intervention; the intervention was an oral health education package (OHE package) built around the rational model of health education. The OHE package was designed to fill up the gap detected in the knowledge, attitude and practices during the pre-intervention phase. The package consisted of:

Oral health education was given by the principal researcher assisted by other dental personnel at two weekly intervals. Three sessions were delivered.

An interactive demonstration session on the ideal tooth-brushing technique was explained to them, demonstrated and they were made to practice in school with new toothbrushes given to them.

Distribution of handbills on oral health to reinforce what has been taught.

The oral health talk was on good oral hygiene, the causes of bleeding gum and mouth odour, the processes involved in tooth decay and its associated risk factors, measures of prevention of oral diseases and what to do when they have dental symptoms/complaints(s). The contents of the educational messages included the role of sugar in dental caries, the importance of brushing twice a day with an emphasis on the timing of the tooth brushing, proper tooth brushing technique demonstrated using a dental demonstration model and toothbrush; when to change a toothbrush, the need for regular visit to the dental clinic, and routine

scaling and polishing of the teeth for preventive and therapeutic purposes.

The data collection tool was a pretested self-administered questionnaire in the English language (Appendix I). To establish face and content validity for the instrument, an initial draft of the instrument was administered to a smaller group of students in the same target group who were not part of the study. Their critical appraisal allowed for revision for clarity and reliability. The questionnaire had five parts. Part 1 – elicited the respondents' demographic data; Part 2- their oral health knowledge. Part 3- assessed their attitude toward oral health, Part 4- the practice of oral health, and Part 5- assessed the respondents' socioeconomic status. The maximum score for knowledge was 8 marks. For each correctly answered question, 1 mark was awarded, and 0 mark for the wrong answer. A score of 5 and above was considered high knowledge, while a score of 4 and below was considered poor knowledge. For attitude, the maximum score was 4 marks. Each correctly answered question carried 1 mark, and 0 marks for wrong answers. A score of 3-4 was considered good while a score of 2 and below was considered a poor attitude. For behaviour, the maximum score was 12 marks. Each correctly answered question carried a maximum of 2 marks. One mark was awarded for a partially answered question and 0 mark for wrong answers. A score of 7-12 was considered good behavior, while a score of 6 and below was considered poor behavior.

Data Analysis: Data were analyzed using the SPSS Computer Software version 20. The knowledge, attitude, and behaviour variables were multiple constructs and the various determinants for each were scored. Descriptive statistics was performed using frequency tables and simple percentages. Inferential statistics was performed by comparing associations between independent and dependent categorical variables using Chi-square statistics and Fisher's exact test. The significance for all tests was set at $p \leq 0.05$.

RESULTS

A total of 184 questionnaires were administered in both the experimental and control groups. One hundred and seventy-five participants completed pre-intervention and post-intervention rounds in the experimental group (response rate of 95.1%) while 172 did in the control group (response rate of 93.5%). The 16 – 18 years age group had the highest representation in both groups; females and SS1 students were more with an approximate male-

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female ratio of 1:2 in both groups. The mean age in the experimental group was 16.9±1.4 years, and 16.7±1.5 years in the control group (Table 1).

Table 2 shows knowledge of oral diseases and care among experimental and control groups at baseline and post-intervention. Both groups had good knowledge of the causes of dental caries and periodontal diseases. There was no significant difference in knowledge variables between both groups at baseline ($p > 0.05$), but the post-intervention profile showed otherwise ($p = 0.00$).

The attitudes of the respondents toward oral health at baseline and post-intervention are shown in Table 3. While visiting the dentist was the only variable featuring a significant difference in attitudes between the groups at baseline, the need and the reason for the dental visits between the two groups post-intervention were pronounced ($p < 0.05$).

From Table 4, apart from the frequency of consumption of soft drinks, there was no statistically significant difference in the other behaviour questions between the groups at baseline. Post-intervention, there was an increase in the desired good practice like frequency of teeth brushing, decreased frequency of consumption of soft drinks, and improved method of teeth brushing ($p < 0.05$). Also, the proportion of those with good practice increased significantly post-intervention. Summarily, the comprehensive baseline and post-intervention knowledge, attitude, and behaviour level in the experimental group are in Table 5. Table 6 shows their level of KAB variables according to gender; all the females had good knowledge of oral health ($p = 0.04$) but the attitude level was similar to that of males ($p = 0.86$).

Tables

Table 1: Demographic Distribution of the Respondents

Variable	Study n=175 N (%)	Control n=172 N (%)	χ^2	P-value
Age Group				
13-15yrs	27(15.4)	33(19.2)	1.096	0.578
16-18yrs	127(72.6)	122(70.9)		
19-21yrs	21(12.0)	17(9.9)		
Gender				
Male	57(32.6)	58(33.7)	0.052	0.820
Female	118(67.4)	114(66.3)		
Class				
SS1	98(56.0)	102(59.3)	0.387	0.534
SS2	77(44.0)	70(40.7)		

Table 2: Knowledge of Oral Health at Baseline and Post Intervention of Experimental and Control groups

Variables	At Baseline		p - value	Post Intervention		p-value
	Exp. group n=175 N (%)	Control n=172 N (%)		Exp. group n=175 N (%)	Control n=172 N (%)	
Sweet food cause tooth decay						
Yes						
No	154(88.0) 21(12.0)	149(86.6) 23(13.4)	0.701	170(97.1) 5(2.9)	156(90.7) 16(9.3)	0.012*
Gum bleeding means gum inflammation						
Yes	151(86.3)	145(84.3)	0.602	171(97.7)	141(82.0)	0.000*
No	24(13.7)	27(15.7)		4(2.3)	31(18.0)	
Regular teeth brushing prevent bleeding gum						
Yes	157(89.7)	155(90.1)	0.901	174(99.4)	150(87.2)	0.000*
No	18(10.3)	17(9.9)		1(0.6)	22(12.8)	
Decayed teeth can affect facial appearance						
Yes	160(91.4)	154(89.5)	0.548	175(100)	155(90.1)	0.000*
No	15(8.6)	18(10.5)		0(0.0)	17(9.9)	
Sweet can cause teeth decay						
Yes	161(92)	154(89.5)	0.427	174(99.4)	158(91.9)	0.001*
No	14(8.0)	18(10.5)		1(0.6)	14(8.1)	
Sweet drink / chocolate can damage teeth						
Yes	144(82.3)	138(80.2)	0.624	168(96.0)	141(82.0)	0.000*
No	31(17.7)	34(19.8)		7(4.0)	31(18.0)	
Fluoride use strengthens teeth						
Yes						
No	139(79.4) 36(20.6)	124(72.1) 48(27.9)	0.111	168(96.0) 7(4.0)	136(79.1) 36(20.9)	0.000*

Exp. refers to Experimental group; *Statistically significant

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Table 3: Attitude toward Oral Health at Baseline and Post Intervention of Experimental and Control groups

Variables	At Baseline		p -value	Post Intervention		p -value
	Exp. group n=175 N (%)	Control n=172 N (%)		Exp. group n=175 N (%)	Control n=172 N (%)	
Do you think there is need for dental check						
Yes	166(94.8)	158(91.9)	0.262	171(98.3)	159(92.4)	0.009*
No	9(5.2)	14(8.1)		3(1.7)	13(7.6)	
Each person should visit a dentist every 6-12 months						
Agree	90(51.4)	107(62.2)	0.043*	140(80.0)	100(58.1)	0.000*
Disagree	85(48.6)	65(37.8)		35(20.0)	72(41.9)	
People need to see a dentist for routine check and not just when they have teeth problem						
Agree	57(32.6)	69(40.1)	0.144	119(68.0)	77(44.8)	0.000*
Disagree	118(67.4)	103(59.9)		56(32.0)	95(55.2)	
People don't visit the dentist because of lack of dentist & lack of money and not for any other reason						
Agree	128(73.1)	124(72.0)	0.458	123(70.0)	135(78.5)	0.002*
Disagree	47(26.9)	48(28.0)		52(30.0)	37(21.5)	

Exp. refers to Experimental group; *Statistically significant

Table 4: Practice of Oral Health at Baseline and Post Intervention of Experimental and Control Groups

Variables	At Baseline		p -value	Post Intervention		p -value
	Exp. group n=175 N (%)	Control n=172 N (%)		Exp. group n=175 N (%)	Control n=172 N (%)	
Frequency of teeth brushing						
Good practice	166(94.9)	166 (96.5)	0.449	174(99.4)	154(89.5)	0.000*
Bad practice	9(5.1)	6(3.5)		1(0.6)	18(10.5)	
Freq. of consuming Candy/sweet/chocolate						
Good practice						
Bad practice	138(78.9)	126(73.3)	0.221	152(86.9)	148(86.0)	0.825
	37(21.1)	46(26.7)		23(13.1)	24(14.0)	
Freq. of consuming soft drinks						
Good practice	150(85.7)	130(75.6)	0.017*	165(94.3)	142(82.6)	0.001*
Bad practice	25(14.3)	42(24.4)		10(5.7)	30(17.4)	
Method of teeth brushing						
Good practice	17(9.7)	20(11.6)	0.564	46(26.3)	30(17.4)	0.046*
Bad practice	158(90.3)	152(88.4)		129(73.7)	142(82.6)	
Material use in teeth brushing						
Good practice	158(90.3)	145(84.3)	0.094	162(92.6)	157(91.3)	0.659
Bad practice	17(9.7)	27(15.7)		13(7.4)	15(8.7)	
Freq. of changing tooth brush						
Good practice	153 (87.4)	144(83.7)	0.325	150(85.7)	149(86.6)	0.805
Bad practice	22 (12.6)	28 (16.3)		25(14.3)	23(13.4)	

Exp. refers to Experimental group; *Statistically significant

Table 5: Baseline and Post Intervention K-A-B Level in the Experimental Group

Variables	At Baseline N =175 n (%)	Post- intervention N =175 n (%)	% change in good K-A-B	χ^2	p-value
KNOWLEDGE					
Poor knowledge	9(5.1)	2(1.1)		4.599	0.032*
Good knowledge	166(94.9)	173(98.9)	4.21		
ATTITUDE					
Poor attitude	90(51.4)	32(18.3)		42.238	0.000*
Good attitude	85(48.6)	143(81.7)	68.1		
BEHAVIOR					
Poor practice	14(8.0)	3(1.7)		7.481	0.006*
Good practice	161(92.0)	172(98.3)	6.85		

*Significant

Table 6: Knowledge, Attitude and Practice of Experimental group according to gender

K-A-B Variables		Gender		p-value*
		Male (N =57) n (%)	Female (N = 118) n (%)	
Knowledge level	Poor	2(3.5)	0(0.0)	0.041
	Good	55(96.5)	118(100)	
Attitude level	Poor	10(17.5)	22(18.6)	0.860
	Good	47(82.5)	96(81.4)	
Behaviour level	Poor	1(1.8)	2(1.7)	0.977
	Good	56(98.2)	116(98.3)	

*Fishers exact test

DISCUSSION

This study aimed at determining the effects of an oral health education package on the knowledge, attitude, and behaviour of secondary school students in the urban area of the state. The ratio of females to males seen in both groups was similar to the demography of an Ibadan-based study.²² Barring other factors, Bature and Nwosu, had observed that the locality of the current study is fraught with a high incidence of male children dropping out of school due to poverty and the urgent need to go into business.²³ Generally, good oral health knowledge increased to 98.9% in the experimental group at the end compared to 94.9% at baseline ($p = 0.032$) as more precise answers were recorded - a pointer that aetiologies of gum bleeding and tooth decay were better understood. It could be inferred that the knowledge level was positively influenced by the oral health intervention consistent with similar studies.²⁴⁻²⁶ While 79.4% of the experimental group knew from the beginning that fluoride strengthens teeth, more of them were abreast of this information at the end. The need for regular use of fluoride to fortify tooth enamel cannot be over-emphasized and is considered an economic and central component in strategies for preventing dental caries.²⁷ Our observations agreed with those from the study in Karachi where 88.4% of students had good knowledge of the causes, signs, and prevention of dental caries, and 96% of the causes and prevention of periodontal diseases.²⁸ As regards attitude, a high proportion of the respondents in both groups saw the need for a regular dental check at the beginning but may have had the wrong reasons for not visiting the dentist. There was a significant improvement in attitude in the experimental group following the intervention in conformity with preventative rather than symptom-based visits. This was in tune with the observations by Cheah et al, where more than half of their participants (60.8%) were primed for a regular dental check but divergent from findings by Onwudi et al, where the majority of both teachers and students showed no compliance.^{29,30} Furthermore, the practice level also improved marginally (6.85% overall) in the experimental group, and this calls for more efforts towards achieving the optimal level of practice. However, we noted that the demonstrated tooth-brushing method in the experimental group reflected a significant difference at the end of the study. Possibly, the demonstration exercise cast in the similitude of the "tell, show and do technique"

which is one of the most effective means of learning played out here.³¹ This pattern resonates with findings in India where pretest and posttest oral hygiene practices of school-aged children have significant differences but discordant with that in Pakistan where only 9% of students had good practice post-intervention.^{24,32} It is pertinent to iterate that the relationship between knowledge, attitude, and behavior is not always linear as some social and environmental factors may be co-actors in determining behavioral change arising from knowledge.³⁰ This could account for the variances in behaviours in our experimental group as the percentage change in behaviour was not commensurate with that of attitude. We also noted that OHE had a greater effect on the knowledge, attitude and behaviour of females than males; this is in agreement with the trends in similar studies.^{13,22,32} The present study is not without limitation; apart from the recall bias that might have trailed the responses to some questions, the study was conducted in two urban schools in Abakaliki affecting the generalizability of our findings. It no doubt thrives on the strength of selecting both the experimental and control groups under similar conditions of class, age, and location for a good match. It also sensitized the children to key information on oral health, this could be further developed in future studies or programmes. Schools serve as an important platform for promoting dental health, being the most formative time in a child's life when they form beliefs, attitudes, and abilities that will last a lifetime; repeated oral health lessons in classes if built into their curricula will further sustain the gains in line with the World Health Organization Global school health initiative.¹⁸

CONCLUSION

The oral health K-A-B parameters improved significantly in the experimental group at the end of the study compared to the control group. The improvements in practices were more visible in the method of tooth brushing which had a demonstration session driving home the importance of the "tell, show and do" blueprint. This could be sustained through regular school-based OHE, and further strengthened by integrating basic oral health education in their curricula at an early stage, with follow-ups in higher classes to produce an oral health-friendly attitude and healthier behaviours.

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Conflict of Interest

None declared

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