

## Effect of health education intervention conducted by Primary Health Care workers on oral health knowledge and practices of nursing mothers in Lagos State

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### Abstract

Educational interventions on oral health care is traditionally carried out mainly by oral health workers in Nigeria. Despite the introduction of the National Oral Health Policy, oral health services/education is virtually non-existent in PHC centres in Nigeria. This study sought to determine the effect of a health education intervention delivered by Community Health Officers (CHO) on the oral health knowledge and practices of mothers attending a PHC centre in Lagos State. A pre-experimental, Before-After study design was employed. An interviewer-administered questionnaire was administered at baseline to assess the oral health care knowledge and practices of 267 mothers who enrolled in the programme. After enrolling the participants, CHO's previously trained commenced a health education intervention on oral health. The intervention, which consisted of 2 lecture sessions, a demonstration session and a return demonstration session, utilising flipcharts and health information leaflets spanned a six-month period. Oral health knowledge and practices of participating mothers was evaluated 3 and 6 months after the intervention commenced using a standardised checklist. Data entry and analysis was done using SPSS version 20, P-value of <0.05 was considered significant. The mean oral health knowledge score at baseline was 4.58 ( $\pm 1.37$ ) while at 3-month and 6-month post-intervention the mean scores were 4.68 ( $\pm 0.97$ ) and 4.96 ( $\pm 0.49$ ), respectively. There was a statistically significant increase ( $P=0.000$ ) in the mean knowledge scores at 6 months post-intervention. Mothers who were 36 years or older and those with more than 12 years education displayed signifi-

cantly better knowledge scores ( $P<0.05$ ). Most (78.3%) reported using cotton wool or foam with water for their infants' oral hygiene. By the second post-intervention visit, there was a significant change in the perception of the mothers on correct oral hygiene tool for infants (52.3%;  $P=0.000$ ). Furthermore the percentage of mothers actually using toothbrush to clean their child's mouth (98.1%;  $P=0.000$ ) had increased.

The oral health knowledge of the participants increased significantly following the intervention especially at the 6-month evaluation. PHC workers can successfully carry out oral health educational interventions at PHC level. The greatest value will occur with reinforced repetition of the messages.

### Introduction

Oral health is a state of being free from chronic orofacial pain, oral and pharyngeal cancer, oral soft tissue lesion, birth defect such as cleft lip and palate and disorders that affect oral, dental and craniofacial tissues.<sup>1</sup> Oral health problems are a major public health burden in African Region of WHO developing countries like Nigeria, due to their high prevalence (30-43% for dental caries;<sup>2</sup> 15-58% for periodontitis;<sup>3</sup> 25% for edentulousness<sup>4</sup>), the low level of public oral health awareness and poor access to oral health care services especially preventive oral health care.<sup>5,6</sup> Importantly, children in developing countries are known to suffer disproportionately from the burden of dental diseases. Children with poor oral health experience pain and tooth loss, which affect their feeding and negatively impact their nutrition, self-esteem, speech, socialisation, quality of life, and school attendance.<sup>7,8</sup> Expectedly, the utilisation of oral health services is low and often driven by symptoms,<sup>9</sup> there is therefore a need to promote a preventive approach to the management of oral diseases for the populace in Nigeria.<sup>10</sup> The Primary Health Care (PHC) system is an approach designed to address the leading health problems at community level.<sup>11</sup> It is an important part of the country's health system; as it seeks to bring healthcare as close as possible to where people live and work. The PHC system has been identified as a good platform for promoting preventive oral health because of its focus on prevention and early intervention.<sup>12</sup> However, oral health services at PHC level are virtually non-existent in Nigeria.<sup>12</sup>

Inadequate oral health manpower due to the high training cost for oral health personnel, inadequate infrastructure and low budg-

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etary allocation to oral health have led to calls for the utilization of ancillary PHC workers for some aspects of preventive oral health care such as oral health education.<sup>12-14</sup> Furthermore, the recently adopted national oral health policy focuses on the integration of oral health with general health and identifies PHC workers as a good medium for promoting oral health.<sup>15</sup> Presently, all local government areas in Nigeria have PHCs which are staffed by personnel trained in preventive care; albeit their training has been largely geared towards preventing medical conditions. However this cadre of staff can be trained to provide oral health education as a component of health education activities in PHC settings.<sup>14</sup> This approach will increase the number of health workers promoting oral health care in the country.<sup>14</sup>

Ideally, good oral health should start in childhood as research has confirmed that attitudes towards oral health and oral disease patterns are often formed in childhood.<sup>16</sup> In addition it has been reported that behaviours adopted at a young age through daily interactions with parents or caregivers,<sup>17</sup> are often sustained till adolescence<sup>18</sup> and most likely adulthood. Mothers are the key decision makers on children's oral health care and maternal attitude to oral health has been reported to be a significant predictor of children's oral health in Nigeria.<sup>19</sup> Thus, early educational interventions targeted at mothers prior to behaviour formation in children may be an appropriate approach for modifying oral health behav-

our in future generations. PHC workers have a lot of contact with young mothers and they have been helpful in promoting exclusive breast-feeding, immunization and proper nutrition in this population in Nigeria. Based on this background, we reason that the inclusion of oral health education in the routine schedule of PHC workers is likely to be an effective method for promoting oral health among the maternal and child population. This view is also premised on the adoption of a common risk approach to the prevention of oral diseases in the country.

A previous study among PHC workers showed average knowledge of oral health issues but a great willingness to include oral health care in their schedule of activities.<sup>10</sup> The present study is part of an interventional study to determine the effect of utilizing PHC workers to provide oral health education in PHC. The aim of this study is to assess the effect of oral health education sessions provided by PHC workers on the oral health knowledge and practices of mothers at selected PHC centres in Ikeja LGA Lagos State. It also sought to assess maternal views of the health education program.

## Materials and Methods

### Study design and setting

A pre-experimental, Before-After study design was employed to evaluate the effectiveness of an educational intervention to promote preventive oral health knowledge and practices among mothers in Ikeja LGA Lagos State. Lagos State in the Southwestern part of Nigeria is the economic nerve centre of Nigeria and comprises 20 Local Government Areas (LGAs), which are the smallest units of administration in the country. This study was conducted in Ikeja Local Government area of Lagos State, which is the capital of Lagos State.

### Ethical considerations

The procedure for this study was presented to the LASUTH Health Research and Ethics Committee and written approval was acquired. Participation was voluntary for all subjects, and they were informed that they were free to decline to enlist and to withdraw from the study. Written informed consent was obtained from all the participants.

### Sample size determination

The sample size for the study (180) was calculated from an equation for longitudinal intervention studies<sup>20</sup> using an effect size of 0.86 derived from a similar study.<sup>21</sup> With a

provision for an attrition rate of 15%, the minimum sample size was 207. Subjects included in the study were mothers 18 years or older, who received care at a selected PHC in Ikeja LGA and were willing to participate in the research. Criteria for inclusion also included the following; mother should be literate, have a child who is three months old or less and should be resident in the community for at least six months after enrolling in the research project. Any mother intending to permanently move out of the community within six months or who was unwilling to participate was excluded from the study.

### Sampling technique

A multistage sampling method was used and sample selection was done in three stages. The first stage involved the selection of the local government where the study was conducted; Ikeja was selected by simple random method using balloting. In the second stage, simple random sampling by balloting was used to select one of the 4 PHCs in Ikeja LGA as the study location. The third stage involved the recruitment of 267 consecutive patients that presented at the selected (Onilekere) PHC over an eight-week period. Mothers who satisfied the inclusion criteria and consented after a detailed explanation of the study protocol were enrolled in the study. The study was conducted from May 2015 to January 2016.

### Health education module used for the study

A research initiative established through a collaborative agreement between Unilever PLC and the Department of Preventive Dentistry LASUCOM provided expertise and funding for developing the module. Oral health education materials, which included flipcharts, posters and oral health information leaflets in English, Pidgin English and the three major Nigerian languages (Yoruba, Hausa and Igbo) were developed for educating PHC attendees. Following the development of the module, the PHC workers were trained on using the health education materials.

### Data collection tool

An interviewer-administered questionnaire was the data collection tool. The same questionnaire was used to evaluate the oral health knowledge and practices of the study participants before the intervention commenced and at 3 and 6 months after the intervention commenced. The questionnaire contained 25 open-ended and close-ended questions divided into three sections. The first section examined the socio-demographic characteristics of the subjects

including gender, age, marital status, level of education, religion and occupation of the subjects. The second section assessing knowledge of preventive oral health included questions on the causes and prevention of dental caries, gingival bleeding and the effect of maternal oral health status on infant oral health and bottle/breast feeding practices. The third section focussed on maternal oral hygiene practices such as the method and frequency of tooth cleaning, infant oral hygiene and dental visits. The questionnaires administered at the 3<sup>rd</sup> and 6<sup>th</sup> month in addition had a fourth section designed to assess the respondent's view of the benefit and value of the health education intervention.

### Educational intervention

At baseline, a trained interviewer obtained information from each participant. The educational interventions commenced after the recruitment of the 267 participants. The intervention, which consisted of 2 lecture sessions, a demonstration session and a return demonstration session, utilising flipcharts and health information leaflets spanned a six-month period. The educational sessions included topics on eruption and shedding of teeth, teething, tooth brushing, nutrition, appropriate dietary habits and how to prevent common oral health problems. The sessions typically lasted 10 to 15 minutes. Each mother also received an oral health information leaflet after the health education intervention commenced. The leaflets were written in simple English and were also translated into pidgin English, Hausa, Igbo and Yoruba languages. These leaflets were given to all participants immediately after completing the first evaluation after 3 months of participating in the programme.

### Evaluation

Participants were requested to return for further evaluation after 3 months and defaulters were reminded of the evaluation through phone calls. This was done to reduce the dropout rate from the study. At three months post-intervention evaluation, 218 subjects were interviewed using a standardised checklist. A second evaluation to further assess the participants oral health knowledge was conducted 6 months after the pre-intervention data was collected on 215 subjects. (Attrition rate was 19.5%) This second evaluation also sought to determine the participants' views of the program.

### Statistical analysis

Data management and analysis were carried out, using the statistical software SPSS-PC version 20.0 (SPSS Inc., Chicago,

IL, USA). Descriptive statistics were presented as frequency, percentages, means, standard deviations and charts. Basic education in Nigeria consists of 9 years of study and a high school diploma is obtained after 12 years of study. Therefore we graded education in this study into three categories; persons with 9 years of education or less, those with 9-12 years of education and those with more than 12 years of education. Based on occupation, the respondents were classified as unskilled, semi-skilled, technical or skilled, professionals and management level workers.

The respondent's level of oral health knowledge was assessed by 7 questions and each correctly answered question earned one mark giving a maximum obtainable score of 7. Scores 0-3 were graded as inadequate knowledge while scores 4 and above were graded as adequate knowledge. The Chi square test was used to determine the level of association between categorical variables while the Student's paired *t* tests and Anova tests were used to compare means between groups. Pearson's correlation was also used to determine the level of association between continuous variables. A 95% confidence interval and a 5% level of significance were adopted.

## Results

Of the 267 subjects recruited for the study, only 215 subjects completed the study thus final data analysis was based on 215 subjects. The ages of the 215 participants ranged between 17 and 50 years; mean (SD) = (29.8±4.8) years. Majority of the participants (73.5%) had less than 9 years of education while only 24 (11.2%) had more than twelve years of education. Majority of the subjects 159 (74%) were semi-skilled workers and only one participant (0.5%) reported a previous dental visit (Table 1).

A good number of the respondents

(>50%) exhibited gaps in their knowledge of oral health before the educational intervention commenced. More than half (54.6%) did not know the cause of dental caries while about half (50.5%) did not know that maternal oral health impacts infant oral health. Similarly, only 54.6% knew that unhealthy deciduous teeth could affect adult dentition while only 50.5% agreed that brushing at night was important. Majority 188 (86.2%) however knew that bleeding gums during pregnancy was abnormal. The knowledge scores pre-intervention ranged from 1 to 7 with a mean score (SD) of 4.58 (±1.37). At the first post-intervention evaluation, the knowledge scores obtained ranged from 2 to 7 with mean score (SD) of 4.68 (±0.97). At the second post-intervention evaluation, the knowledge score ranged from 3 to 7 with mean (SD) of 4.96 (±0.49). Figure 1 displays the proportion of participants who provided correct responses to the oral health knowledge questions before and after the intervention.

There was an increase in the mean knowledge scores at the 6-month post-intervention evaluation. The difference in the mean oral health knowledge scores obtained at baseline and the 3 months post-intervention evaluation was not statistically significant (P=0.286). However, there was a significant difference between the knowledge scores at baseline and at 6 month post-intervention (P=0.000); as well as between the scores at the 3 months post-intervention and 6 months post-intervention (P=0.000) (Table 2).

We observed a statistically significant relationship (P=0.043) between the respondents age category and mean oral health knowledge score. Subjects aged 36 years and above had significantly improved mean knowledge scores at the second post-intervention evaluation (Table 3). Similarly a statistically significant relationship was observed between the respondent's educational status and mean knowledge score

(P=0.039). Participants with more than 12 years of education had significantly improved mean knowledge scores at the 3-month post-intervention evaluation (Table 3). Before the educational intervention, most of the participants (99.6%) agreed that taking care of their teeth is very important but majority (98.6 %) reported cleaning their teeth only once daily. In addition, only 7.3% agreed that a toothbrush was the right tool for oral hygiene for their infants. Most (78.3%) reported using cotton wool or foam with water for their infants' oral hygiene. By the second post-intervention visit, there was a significant change in the perception of the mothers on correct oral hygiene tool for infants (52.3%; P=0.000). Furthermore the percentage of mothers actually using toothbrush to clean their child's mouth (98.1%; P=0.000) had increased (Table 4). Most of the mothers opined that the educational program was good (94.4%) and majority (94.8%) also found the information received from the Primary Health Care workers useful (Table 5).

**Table 1. Socio-demographic characteristics of the study subjects.**

	Frequency	Percentage
Age category		
≤25	40	18.6
26-35	155	72.1
≥36	20	9.3
Ethnic group		
Yoruba	119	55.4
Igbo	51	23.7
Hausa	6	2.8
Other	39	18.1
Education		
≤9 years of education	158	73.5
9-12 years of education	33	15.3
>12 years of education	24	11.2
Previous dental visit		
Yes	1	0.5
No	214	99.5
Total	215	100

**Table 2. Comparison of the mean participants' scores at the pre-intervention, 3-month post-intervention and the 6-month post-intervention.**

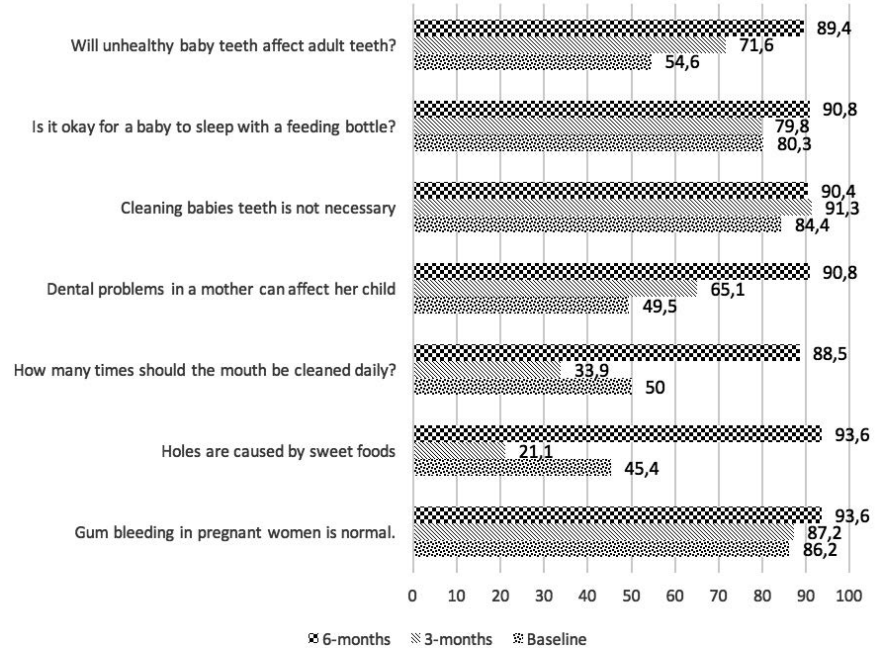
	Mean score	Correlation	Sig	Paired difference	Sig
Pre-intervention	4.58 (1.37)				
versus					
Immediate post test	4.68 (0.97)				
Pre-intervention	4.58 (1.37)	0.022	0.759	-3.869	0.000*
versus					
6 month post test	4.96 (0.49)				
Immediate post-intervention	4.68 (0.97)	0.026	0.724	-3.813	0.000*
versus					
6 month post test	4.96 (0.49)				

\*Significant.

## Discussion

One of the major challenges to reduction in the prevalence of oral diseases is the translation of knowledge and experience in oral disease prevention and health promotion into active programmes.<sup>16</sup> This research explored the feasibility of incorporating an oral health education component into existing Maternal and Child Health services provided at a Primary health care facility where oral health care services are not offered routinely. The low level of dental clinic attendance among the study subjects further justifies the need for such community based preventive programs; only one participant reported a previous visit to a dental clinic. A good number of the mothers that participated in this study exhibited inadequate knowledge of the aspects of oral health explored in this survey before the educational intervention. They did not know that frequent sugar consumption was a cause of dental caries and that maternal oral health affects infant oral health status. This result is similar to the findings obtained by previous researchers in Nigeria.<sup>6,19</sup> The gaps identified in maternal knowledge may reflect the little importance mothers place on taking care of children's primary teeth. This further justifies the need for the intervention since recent studies have observed correlations between oral health status and overall health<sup>4</sup> while maternal oral health also impacts the development of dental attitudes and habits in children.<sup>19</sup>

There was marginal improvement in the knowledge scores of the study participants at the 3-month post-intervention evaluation. The observed improvement however increased at the second post-intervention



**Figure 1. Proportion of respondents with correct responses to oral health knowledge questions before and after the intervention.**

**Table 3. Relationship between the age and level of education of study subjects and mean knowledge scores before and after the intervention.**

	Baseline	3 months	6 months
<b>Years of education</b>			
≤9 years of education	4.50	4.56	4.70
9-12 years of education	4.58	4.65	4.90
>12 years of education	4.65	4.85	5.0
<b>Maternal age</b>			
≤25	4.65	4.74	4.82
26-35	4.50	4.61	5.01
≥36	5.00	5.11	5.22

**Table 4. Oral health practices of the participants.**

Description	Baseline Yes (%)	1 <sup>st</sup> Evaluation Yes (%)	2 <sup>nd</sup> Evaluation Yes (%)	p value
Proportion who clean their mouth only once daily.	98.6	99.1	99.1	0.906
Proportion who have visited a dentist.	0.5	0.5	0.5	0.995
Proportion Whose Child Has visited a dentist.	0.9	0.9	0.9	0.995
Proportion who clean their child's teeth when the first tooth appears.	7.3	23.2	52.3	0.000*
Proportion who use Baby brush for cleaning their child's mouth.	0.5	27.2	98.1	0.000*

\*Significant.

**Table 5. Opinion of mothers on the health education program.**

Item No	Description	Yes	%
1	This dental program is good for pregnant women.	203	94.4
2	The dental information I got from the Primary Health Care workers helped me a lot.	204	94.8
3	I found the written dental information useful.	203	94.4
4	I am glad I came to this dental program.	204	94.8

evaluation. The introduction of the health information leaflets at the first evaluation may have contributed to the significant increase in the mean knowledge scores at the second evaluation. The pamphlets would have served as a means of reinforcing information obtained during the health education sessions. Printed materials such as pamphlets have been shown to be effective in broadening knowledge and promoting behaviour change.<sup>22-25</sup> Educational level and maternal age category were observed to significantly influence the oral health knowledge scores in this study. Poor literacy is linked with lower perceptions of health, reduced utilization of services and poorer understanding of instructions on self-care.<sup>26</sup> This finding emphasizes the importance of targeting educationally disadvantaged and young mothers with preventive interventions.

Prior to the educational intervention, most of the mothers did not know when to start using toothbrush for infants and majority used either cotton wool or foam with water to maintain oral hygiene for their children. This was in contrast to a previous Australian study where majority of parents believed that cleaning children's teeth should commence soon after eruption.<sup>26</sup> A major observation from this study was the change in the perception of the mothers on when to start brushing their child's tooth as well as in the percentage of mothers that had started using toothbrush to clean their child's mouth by the second evaluation visit. These findings are similar to results obtained from a one-year intervention study that demonstrated a positive effect of health promotion on tooth brushing with toothpaste and the use of fluoride supplements.<sup>20</sup>

Maintaining oral hygiene is imperative to controlling dental plaque the precursor of the two most common oral diseases namely dental caries and periodontal disease. Effective tooth brushing appears to be the most effective to achieve good oral hygiene. Cleaning a child's mouth ideally should start before teeth erupt and tooth-brushing should commence when the first tooth erupts at least once daily.<sup>27</sup> There was however no difference in dental visits by the mothers or their infants at both evaluation visits possibly indicating a need to refocus the dental attendance pattern of participants towards a preventive based approach.

The survey findings suggest that PHC workers can successfully give oral health education as a component of health education activities. The American Association of Paediatric Dentistry (AAPD) recommends that doctors and other health care professionals educate pregnant women about perinatal and infant oral health since they are far

more likely to see new mothers and infants than are dentists.<sup>28</sup> The greatest potential for the realisation of this recommendation is through the integration of oral health into general health care within the Primary Health Care system. The key limitation of this study was the absence of a control group.

## Conclusions

Oral health knowledge of the participants increased following the intervention and the greatest improvement was at 6 months. PHC workers can successfully carry out oral health educational interventions at PHC level. The greatest value will occur with reinforced repetition of the messages. Clinical trials are needed to further validate and assess the long-term sustainability of the impact of the educational intervention.

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