

Undergraduate medical students' knowledge and attitude on early childhood caries and infant oral health

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ABSTRACT

Oral health is an important part of the general health of children. Collaborative relationships between physicians and dentists can help improve oral and overall health of children. The purpose of this study was to assess the knowledge and attitude of undergraduate medical students on early childhood caries (ECC) and infant oral health (IOH). A cross-sectional study was conducted among undergraduate medical students to assess their knowledge and attitude on ECC and IOH through a self-administered questionnaire which consisted of four parts. The questionnaire assessed the students' knowledge of IOH, which included IOH care visits, time of tooth eruption, oral hygiene measures in children, the etiology, prevention, transmission of ECC and the students' attitude concerning general IOH and ECC. A total of 129 students participated in the study with a mean age of 24.2 ± 3.0 years. There were 74 males and 55 females. Concerning tooth eruption, most of the students (75.2%) knew that a child's first tooth erupts at about 6-7 months of age. Only 32.6% of the respondents agreed that a child's first visit to the dentist should be on or before the age of 1 year, 70.5% knew that a mother should start cleaning her child's teeth as soon as the first primary tooth erupts. Only 14.7% of them knew that ECC is transmissible from mother to child, about 74.4% agreed that putting babies to sleep with a bottle containing infant formula/breast milk can predispose to ECC. Among the students, 23.3% of them associated on demand/prolonged breastfeeding with ECC. Majority of the students had good knowledge of general IOH but had poor knowledge with regards to the etiology and prevention of ECC. Conclusion: There is a need to increase the knowledge of medical students on IOH especially in the etiology and prevention of ECC.

Key words: Attitude, Early childhood caries, Infant oral health, Knowledge, Lagos, Medical students

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INTRODUCTION

Infant oral health (IOH) is one of the foundations on which dental care and preventive education must be built to allow a lifetime opportunity free from preventable oral diseases.^[1] Dental caries has major implications for the overall health and well-being of a child. This is because of the intimate relationship between oral health and general health and the association between caries and mortality.^[2] When caries is left untreated, it can lead to infection which can spread to other parts of the body including the brain.^[3-5] Furthermore, untreated caries in the primary dentition can affect a child's growth, early loss

of a carious tooth can affect speech, cause malocclusion, low self-esteem, and generally diminish the quality of life.^[1,6,7] Infants and their mothers are more likely to

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visit physicians than dentists. Therefore, it is important for medical personnel to have a knowledge of etiology and other associated risk factors of early childhood caries (ECC), to support appropriate decisions regarding timely and effective intervention, as well as facilitate the establishment of a dental home.^[8-10] The American Association of Paediatric Dentistry recommends healthcare professionals and stakeholders in children's oral health to support the identification of a dental home for all infants by 12 months of age.^[1] Therefore, integrating child oral health disease prevention and promotion strategies into the medical curriculum can improve access to appropriate dental health education and referring time for a dental intervention.^[11-14]

The purpose of this study was to determine the baseline knowledge and attitude of undergraduate medical students regarding ECC and IOH and to propose ways to improve the undergraduate medical and dental curriculum particularly in the prevention of IOH diseases.

MATERIALS AND METHODS

Study location, design, and population

A cross-sectional study was carried out among final year students of the College of Medicine, University of Lagos in January 2015. The College of Medicine University of Lagos is one of the oldest Medical Schools in Nigeria. It was founded in 1962 and has admitted students annually into a 6 years degree course in medicine.

This study was approved by the Health Research and Ethics Committee of the Lagos University Teaching Hospital. Participation was voluntary, and the students were free to withdraw from the study at any point in time.

Sampling methodology

Purposive sampling method was employed. All final year medical students were invited to participate in the study. One hundred and forty-nine students were eligible to participate in the study. Of the 149 questionnaires distributed, 129 were returned giving a response rate of 86.6%. All the returned questionnaires were analyzed.

Data collection

Data were collected with the aid of a structured self-administered questionnaire. The questionnaire was researcher developed, based on articles on the perception of ECC and child oral health among medical students.^[15,16] Face validation of the questionnaire was done by experts in child dental health and dentistry. All, but one question was closed ended. The questionnaire contained no identifiers and questionnaires were distributed by the co-investigators immediately after scheduled lectures and retrieved after 15 min.

The participating students completed a 20-question survey that included four sections. The first part contained questions on sociodemographic characteristics (age and gender). The second part assessed the knowledge of IOH, which included IOH care visits, time of tooth eruption, and oral hygiene measures in children while the third part of the questionnaire evaluated the knowledge of the etiology, prevention, and transmission of ECC. The fourth part assessed the students' attitude concerning general IOH and ECC.

Data management and statistical analysis

The questionnaires were entered into excel worksheet for cleaning and imported into Statistical Package for Social Sciences (SPSS) version 21.0 (SPSS Inc., Chicago, IL, USA) for analysis. Continuous variables were expressed as means with standard deviation or frequencies with accompanying percentages in parenthesis. Chi-square test or Fishers exact test (where applicable) was used to determine associations between categorical variables. Nonparametric tests were employed for data that were not normally distributed. Eighteen questions assessed the knowledge of the students on ECC and child oral health. A score of 1 was assigned for a correct response to a question while 0 was assigned for an incorrect response, "do not know" response or no response to a question. The sum of the scores was computed for each student. A score of $\geq 50\%$ was described as good knowledge while a score of $< 50\%$ was described as poor knowledge. Statistical significant was set a $P < 0.05$.

RESULTS

A total of 129 students participated in the study with a mean age of 24.2 ± 3.0 years. There were 74 (57.4%) males and 55 (42.6%) females. Majority of the students had good knowledge of general IOH (85.3%) but had poor knowledge of ECC (71.3%) [Figures 1 and 2].

Concerning tooth eruption, most of the students (75.2%) knew that a child's first tooth erupts at about 6-7 months of age. Only 32.6% of the respondents agreed that a child's first visit to the dentist should be on or before the age of 1 year. Eighty-nine (69%) of them stated that a child should visit the dentist routinely at least twice a year also 91 (70.5%) knew that a mother should start cleaning her child's teeth as soon as the first primary tooth erupts. Twenty-two (17.1%) of them replied that a baby's tooth should be cleaned with soft toothbrush/toothpaste while (61.2%) agreed that the amount of toothpaste to be used for brushing a child's tooth should be pea size [Table 1].

With regards to the etiology of dental caries, 93% agreed that that refined sugars can cause dental caries and that dental caries is a preventable disease. One hundred and twenty-two (94.6%) stated that fluoride in water or

toothpaste can make teeth stronger and also prevent dental caries [Figure 3].

The respondents' awareness of causative factors for ECC was poor (71.3%). Only 14.7% of them knew that ECC is transmissible from mother to child, about 74.4% agreed that putting babies to sleep with a bottle containing infant formula/

Table 1: Knowledge of the students on infant oral health

Questions	n (%)
The mouth of a neonate is free from bacteria	
Yes	31 (24.0)
No*	77 (59.7)
Do not know	21 (16.3)
At what age does the first tooth erupt?	
At birth	0 (0.0)
12 months	6 (4.7)
6-7 months*	97 (75.2)
8-9 months	11 (8.5)
Do not know	15 (11.6)
When should a child go for the first dental visit?	
When there is toothache/tooth decay	3 (2.3)
After the age of 2 years	23 (17.8)
When all the baby teeth have erupted	12 (9.3)
On or before the age of 1 year*	42 (32.6)
Do not know	49 (38.0)
How often should a child visit the dentist?	
Once a year	23 (17.8)
Twice a year*	89 (69.0)
When a dental problem is noticed	6 (4.7)
Do not know	11 (8.5)
When should a mother start cleaning her child's teeth?	
When the first milk tooth erupts*	91 (70.5)
When all milk teeth have erupted	12 (9.3)
When the first permanent tooth erupts	9 (7.0)
When all permanent teeth have erupted	2 (1.6)
Do not know	15 (11.6)
What should be used in cleaning babies' teeth?	
Cotton wool and salt	18 (14.0)
Cotton wool and toothpaste	68 (52.7)
Face towel and water	2 (1.6)
Soft toothbrush and toothpaste*	22 (17.1)
Do not know	19 (14.7)
What size of toothpaste should be placed on a child's toothbrush?	
Pea size*	79 (61.2)
Bean size	10 (7.8)
Half the length of a toothbrush	16 (12.4)
The entire length of a toothbrush	3 (2.3)
Do not know	21 (16.3)
At what age should a child start brushing unassisted?	
1-3 years	5 (3.9)
4-6 years	54 (41.9)
7-9 years*	52 (40.3)
>15 years	5 (3.9)
Do not know	13 (10.1)

* correct responses

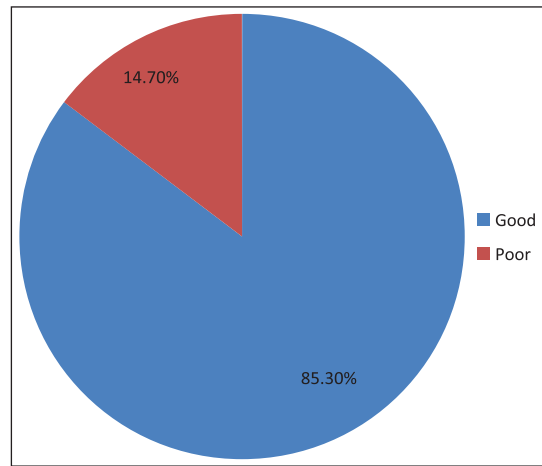


Figure 1: Knowledge score of the students on infant oral health

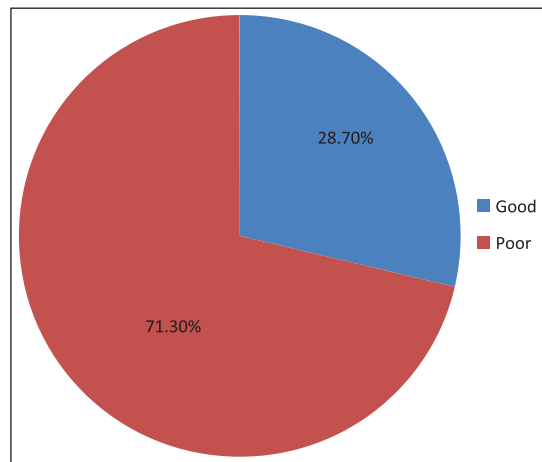


Figure 2: Knowledge score of the students on etiology and prevention of early childhood caries

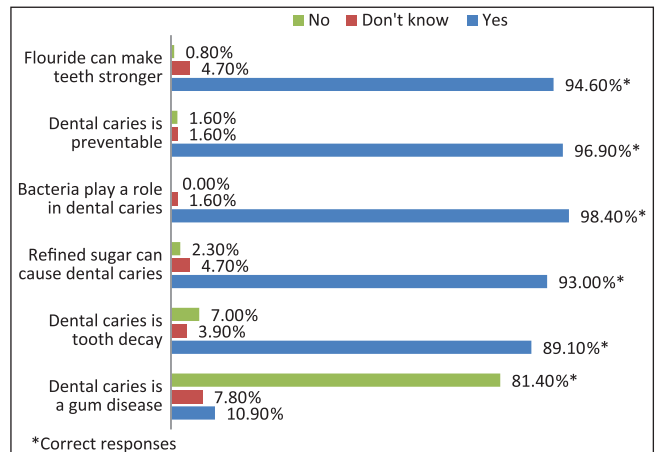


Figure 3: Distribution of correct knowledge responses of the students on the etiology of dental caries. *Correct responses

breast milk can predispose to ECC. Among the students, 23.3% of them associated with demand/prolonged breastfeeding with ECC. About 23% of them opined that a baby's tooth be cleaned with napkin/face towel after feeding [Figure 4].

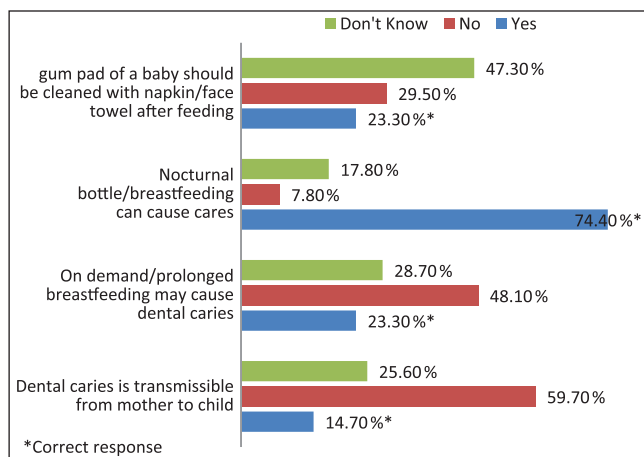


Figure 4: Distribution of correct knowledge responses of students on etiology of early childhood caries. *Correct response

The association of age and gender with the knowledge of IOH and ECC among the students is seen in Table 2. There was no significant association of the students' knowledge of ECC and IOH with their age. However, male students were more knowledgeable concerning general IOH than the female students; this association was significant $P = 0.001$.

Overall the students had a positive attitude, 85% of them were willing to increase their knowledge on IOH and ECC [Table 3].

DISCUSSION

The study assessed graduating medical students' knowledge and attitude regarding IOH and ECC. The results provide valuable information which can help to improve the undergraduate medical particularly in the prevention of IOH diseases. Primary preventive strategies for oral health is an essential public health priority since dental caries is the most common chronic disease among children worldwide.^[11] ECC is a virulent form of dental caries usually affecting children, it progress and can begin soon after the eruption of teeth.^[12,13] If left untreated can result in pain and potential life-threatening infection and diminish the overall quality of life of a child.^[2,3,5,14]

There is a need for other health professionals to be involved in child oral health promotion as pediatricians, and other general medical practitioners are more likely to come in contact with children in their first few years of life before a pediatric dentist.^[5,15] The American Academy of Pediatric Dentistry guideline on IOH recommend that all primary health care professionals who serve parents and infants should provide education on the etiology and prevention of ECC.^[1] Therefore, integrating child oral health disease prevention and promotion strategies into the medical curriculum can improve access to proper

Table 2: Association of age and gender with knowledge

Demographics	ECC			IOH		
	Good	Poor	P	Good	Poor	P
Gender, n (%)						
Male	21 (28.4)	53 (71.6)	0.541	57 (77.0)	17 (23.0)	0.001*
Female	16 (29.1)	39 (70.9)		53 (96.4)	2 (3.6)	
Age (years)						
>23	24 (28.9)	59 (71.1)	0.553	69 (83.1)	14 (16.9)	0.258
<23	13 (28.3)	33 (71.7)		41 (89.1)	5 (10.9)	

ECC: Early childhood caries, IOH: Infant oral health

Table 3: Attitude of the respondents to ECC and IOH

Questions	Yes (%)	No (%)	Do not know (%)
Do you think you have adequate knowledge of oral health in children?	23.1	10.1	66.7
Will you like to increase your knowledge on oral health in children?	85.3	7.8	7.0

ECC: Early childhood caries, IOH: Infant oral health

dental health education as well as appropriate and timely referral for dental intervention.^[5,15]

In the present study, the knowledge of the students concerning IOH was adequate but their knowledge on etiology and prevention of ECC was inadequate. Only about 14.7% of them knew that dental caries is an infectious disease and can be transmissible from mother to child this is comparable to a value of 19.5% in a study by Bhat *et al.*^[16] Dental caries is a transmissible disease, the causative microorganisms include mutans streptococci (MS) and *Lactobacillus* species. MS can be transmitted vertically from caregiver to a child through salivary contact, children who have mothers with a high level of MS are at greater risk of acquiring the earlier than children whose mothers have low levels.^[17,18] Horizontal transmission forms other members of the family, day care or school. Eliminating the sharing of utensils such as cups, spoons, pacifiers can help reduce a child's acquisition of cariogenic microbes.^[1,18] Experts have recommended that parents/siblings should reduce their levels of MS to decrease the transmission of cariogenic microbes.^[1,18] Concerning oral hygiene practices, 23% of the students responded that the gum pads should be cleaned, this is comparable to 25% in a study by Kumari *et al.*^[19] but lower than the study by Bhat *et al.*^[16] (79.4%). Almost all the students (70.5%) agreed that mothers should start cleaning their children's teeth as soon as the first milk erupts and but only a few of them knew the appropriate material to use for cleaning. More than half of the students (68%) suggested that cotton wool and toothpaste should be used. Oral hygiene measures for a child should start not later than when the first tooth erupts. A soft toothbrush of appropriate size should be used by the parents to clean their children's teeth.

Children under the age of 3 years should use a smear of fluoridated toothpaste while children 3-6 years should use a pea size amount of toothpaste.^[1] Most of the students were in line with this.

Feeding practices such as high sugar diets, the frequency of consumption of sugar-containing snacks and drinks in between meal have been associated with ECC.^[20,21] Furthermore, frequent night time bottle feeding with infant formula and "at will" breastfeeding have been associated with ECC but not consistently implicated.^[1,22,23] Almost all the students (93%) were aware that high sugar diet is a causative factor for ECC. Also, 74% agreed that bottle feeding babies at night with infant formula can also predispose to ECC as compared to 63.5% by Kumari *et al.*^[19] and 72.6% by Shivaprakash *et al.*^[24] With regards to the frequency and duration of breastfeeding, 23% of the students responded that on demand and prolonged duration of breastfeeding may cause ECC this is similar to another recent study.^[15] Although there are many inconsistent reports in the literature regarding the relationship between ECC and breastfeeding, the policy statement by the American Academy of Pedodontists and the American Academy of Pediatrics says that infants should not be put to sleep with bottle filled with milk or liquid containing sugar, ad libitum breastfeeding should be avoided after the eruption of the first tooth and other dietary carbohydrates should be commenced, parents should encourage their infants to drink from cup as they approach their age of 1 year, and they should be weaned from bottle between the age of 12 and 18 months.^[1,25]

There was a significant association of the students' knowledge of IOH with their gender, with the male having better knowledge than the female. This was a surprise finding. This may be due to some unmeasured variations in the class composition and background of the students such as having children.

Overall although the students had adequate knowledge on IOH, their knowledge on the etiology and prevention of ECC was poor. The students agreed that they had insufficient knowledge and will like to increase their knowledge.

The limitation of this study is that this survey was done in one institution, and the results may not be generalized to the full body dental and medical students in Nigeria. This will be a thrust for further research.

CONCLUSION

This study identifies a need to increase the knowledge of medical students on IOH especially in the etiology and prevention of ECC. We recommend that undergraduate

medical curriculum should emphasize on oral health topics of public health importance like ECC and its prevention.

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Conflicts of interest

There are no conflicts of interest.

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