

Knowledge of Caries Preventive Measures for Children among Medical and Dental Students in Benin City

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ABSTRACT

Objective: To assess the knowledge of caries preventive measures for children among clinical medical and dental students in the University of Benin.

Methods: A descriptive cross-sectional study was carried out among medical and dental students of the University of Benin, Nigeria. Respondents were selected using systemic sampling techniques. Data was obtained using a structured self-administered questionnaire. Oral health behaviour among respondents and knowledge of caries preventive measures in children were determined and analyzed using IBM SPSS version 22.0. $P < 0.05$ was considered statistically significant.

Results: The age of participants varied from 18-30 years with a mean age of 22.6 ± 5 years. The oral health behaviour of most of the respondents was fair (50.0%), while 33.3% and 16.7% had good and poor oral health behaviour respectively. The knowledge of caries preventive measures for children among the respondents, only 22.3% of the respondents had good knowledge while about 49.2% had an average knowledge and 28.4% had a low knowledge.

Conclusion: This study showed that the knowledge of caries preventive measures in children was low among medical and dental students. There is need for a more focused approach to oral health education to ensure the medical and dental students are equipped with sufficient knowledge for their future practice.

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INTRODUCTION

Prevention is defined as the efforts made to avoid the development of a disease or disability in healthy individuals (Last, 2001). Preventive dental care begins soon after the child's first tooth erupts. The American Dental Association (ADA) recommends an initial visit to the dentist by 6 months of age which is when the first tooth appears in the mouth (Johnson, 2013). It provides benefits such as reducing risk of developing tooth

decay and gingival disease as lesions are detected early and treatment instituted, helps promote good oral hygiene habits in children such as twice daily toothbrushing with soft toothbrush and fluoride containing toothpaste, flossing, advice on healthy eating habits.

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Routine dental X-rays also help track jaw and teeth development (American Academy of Pediatric Dentistry, 2019).

Dental caries may be defined as a localized destruction of susceptible dental hard tissues, over time, by acid by-products from bacterial fermentation of dietary carbohydrates. The disease usually starts as demineralization of the dental hard tissues and may proceed to the formation of a carious lesion (Selwitz et al., 2007). Although dental caries is not life threatening, its consequences include pain, difficulty in eating, sleeping, reduced quality of life at all ages along with socio-economic burdens on the caregiver (Ismail, 2004). Caries is one of the most common chronic diseases of childhood with a prevalence five times more common than asthma. With this high prevalence, there has been a shift from the conventional surgical approach to a preventive approach (Folayan et al., 2014a).

Caries prevention can be categorized into four: Plaque control, diet, fluoride and fissure sealing (Duggal et al., 2013). These could be incorporated in every preventive treatment plan with the goal of preventing gingivitis, periodontal disease and dental caries. Prevention is the foundation of all treatment plans and needs to be individualized for each patient. It should start at the first visit, continue and be reinforced as the course of treatment continues (American Academy of Pediatric Dentistry, 2019).

The burden of caries is high among children living in Nigeria (Folayan et al., 2014b) and several regional studies in the country continue to support the assumption of high prevalence of dental caries with a caries prevalence among 7-15 years old reported to be 15.7% in Benin (Chukwumah et al., 2012). Implementation of curative and restorative approaches to combat dental caries at the population level appears not to be cost effective in many countries, thus, the World Health Organization (WHO) put more emphasis on prevention in setting global oral health goals for the year 2020 (WHO, 2003). Measures and strategies designed to promote the prevention of dental caries has not been effective in Nigeria (Folayan et al., 2014b).

One of the requirements for the success of oral health promotion strategies is the availability of knowledgeable and prevention-oriented health service practitioners who serve individuals and groups in need of dental care, including children (Hobdell et al., 2003). Thus, preventive oral health care for children will need to be implemented through clinical care and community-based school intervention programs which would certainly

require a prevention-oriented medical and dental workforce (Kwan et al., 2005). The use of recommended oral self-care (twice-daily tooth brushing, use of fluoridated toothpaste and avoidance of consumption of refined carbohydrates between meals) for the prevention of caries is low with only 7.8% of children from Southern Nigeria practicing the recommended oral self-care (Ola et al., 2013). A large number of children consume sugar in between meals and more than once a day, do not brush twice-daily and do not use dental floss (Ola et al., 2013). These statistics highlights the magnitude of the problem with caries prevention for children in Nigeria.

It is of great importance to understand the preventive oral health practice of medical and dental students as they are critical to the implementation of prevention in the near future. It is also equally critical to identify how the preventive needs of children can be addressed by the medical and dental workforce in training in our immediate environment. The medical field should be incorporated especially the Pediatricians and General practitioners as they tend to see the children at an early age making it possible for them to recommend visiting a dentist and also in giving preventive advice. This research aimed to assess the oral health behaviour of clinical medical and dental students as well as their knowledge of caries preventive measures in children among clinical medical and dental students in the University of Benin.

MATERIALS AND METHODS

Study area: This study was carried out at the University of Benin, Edo State, Nigeria.

Study design: The study was a cross-sectional study.

Study population: Study was carried out among clinical (4th-6th year) medical and dental students in the University of Benin.

Inclusion criteria: All 4th-6th year medical and dental students present in school on the day of data collection who consented to filling the questionnaires.

Duration of study: The study was carried out over a 6-month period from February to July 2021

Sample size determination: The sample size was estimated using the Cochran formula for sample size determination (Cochran, 1977), using a prevalence value from a previous study of students with high acceptable caries preventive dental practice which was reported to be 22% (Murtoma et al., 2007). The calculated minimum sample size was 264.

Sampling technique: A convenient sampling technique was used.

Data collection: Primary data was obtained using a structured self-administered questionnaire. The questionnaire comprised of open- and close-ended questions. The questionnaire contained three sections which covered the set objectives for the study.

Section A: Sociodemographic data: This section contained questions about the sociodemographic characteristics of the study participants which included age, gender, ethnic group, religion and level in school.

Section B: Assessment of oral health behaviour: This section consisted of questions on the general knowledge of caries and its preventive measures and its practice among study participants.

Section C: Knowledge of caries preventive measures in provision of caries preventive care for children.

Data Analysis: The filled questionnaires were scrutinized for consistency and completeness. Data coding and cleaning were done and the data was entered and analyzed using IBM SPSS version 22.0. Descriptive statistics was used to detect outliers and missing data. Frequency distributions and cross tabulations were computed for categorical variables. The level of significance of all statistical associations was set at $p < 0.05$. Results were presented as tables, pie chart and bar chart to aid interpretation.

RESULTS

Two hundred and sixty-four (264) fully completed questionnaires were returned giving a 91% response rate. Mean age of study participants was 22.6 ± 5 years (18-30 years age range), with more than half (56.1%) within the 24-26 years old category. Males constituted 186 (70.5%), the Bini ethnic group was the highest making up 91 (34.5%), medical students were in majority 164 (62.1%), Christians 248 (93.9%) and the 600 level students were more in number 84 (31.8%). (Table 1)

Concerning toothbrushing, half of the participants 132 (50.0%) believed toothbrushing should be performed once daily, 70 (26.5%) agreed that tooth brushing should last for 2 minutes while 141 (53.4%) agreed it should be greater than 2 minutes. Majority of respondents used fluoride containing toothpaste 243 (94.7%) and only 98 (37.1%) and 111 (42.0%) reported fluoride as a source of fluoride and flossed daily respectively. Some participants

92 (34.8%) acknowledged that the age of first dental visit should be at 6 months while more than half 175 (66.3%) reported that dental visits should be every 6 months and less than a third 65 (24.6%) felt that dental visits should be only when there are complaints (Table 2)

On participants' self-reported awareness of caries preventive measures in children, more than half of the study participants 171 (54.8%) strongly agreed that fluoridation of water was an effective means of preventing cavities, less than half 115 (43.6%) strongly agreed that brushing twice daily with a fluoride containing toothpaste is effective in prevention of cavities. Majority of study participants 201 (76.1%) strongly agreed that the number of times sugary foods are consumed played a great role in formation of cavities, but less than half 60 (22.7%) strongly agreed that fissure sealants were effective in the prevention of cavities developing in newly erupted molars and 115 (43.6%) strongly agreed that brushing twice daily with a fluoride containing toothpaste was effective in prevention of cavities. About 162 (61.4%) of the participants strongly agreed that it was important to visit the dental clinic regularly as a measure to prevent cavity formation while 92 (34.8%) of the respondents reported that the appropriate age for the first dental visit was 6 months after birth. Table (3)

The relationship between medical and dental students' oral health behaviour such as knowledge of flossing, use of fluoridated toothpaste, routine dental visits, age at first dental visit and length of toothbrushing was not statistically significant ($p=0.820$; $p=0.832$; $p=0.179$; $p=0.209$; $p=0.077$) respectively. Also, the relationship between medical and dental students' caries preventive measures such as use of water fluoridation in caries prevention, frequency of snack consumption in caries formation, effectiveness of fissure sealants in caries prevention, rinsing with small amounts of water after meals, use of fluoridated toothpaste and importance of routine dental visits ($p=0.390$; $p=0.500$; $p=0.500$; $p=0.253$; $p=0.500$; $p=0.924$) respectively.

The oral health behaviour for most of the study participants was fair 132 (50.0%), while 88 (33.3%) and 44 (16.7%) had good and poor oral health behaviour respectively. (Figure 1). On the level of knowledge of caries preventive measures for children, only 59 (22.3%) of the participants had a high level of knowledge while 130 (49.2%) exhibited average level of knowledge. (Figure 2)

Table 1: Socio demographic distribution of study participants

Variable	Frequency (n)	Percent (%)
Gender		
Male	186	70.5
Female	78	29.5
Age (years)		
18-20	7	2.7
21-23	64	24.2
24-26	148	56.1
27-30	45	17.0
Ethnic Group		
Bini	91	34.5
Esan	45	17.0
Ibo	50	18.9
Yoruba	24	9.1
Urhobo	8	3.0
Isoko	2	0.8
Others	44	16.7
Religion		
Christian	248	93.9
Muslim	16	6.1
Marital status		
Single	263	98.9
Married	3	1.1
Department		
Dental	164	62.1
Medical	100	37.9
Level		
400	81	37.9
500	50	23.5
600	84	38.6

DISCUSSION

A good knowledge of caries preventive measures is important due to the high prevalence of dental caries in the nation. Dental caries can be prevented by simple oral health measures like tooth brushing using fluoride containing toothpaste twice daily, flossing and reduction in the frequency of sugary snacks consumption.

The oral health behaviour, in this present study only 33.3% brushed twice daily compared with other studies which reported 57.0% and 74.3% among Iranian and Indian students (Khami et al., 2007; Kumar et al., 2017). The values in this study were much lower which indicates that the students were not incorporating their oral health knowledge into their lifestyle. The frequency of brushing at least once a day was 83.0% and is comparable to Khami et al (2007), who reported 93% once daily brushing. Current knowledge emphasizes brushing twice daily and is widely publicized, this shows that students are slow to evolve. This study reported

42.0% flossing daily among medical and dental students which was low compared to 76% found in a previous report (Kumar et al., 2017). The reason for this may be the attributable to the low knowledge of the importance and benefits of flossing. About 66.3% of the students reported that dental visits should be every 6 months which is in consonance with Indian students (60.4%) (Prabhakar et al., 2015) and other Nigerian students (61.0%) Folayan et al. (2014c), indicating that majority of the participants knew the importance of dental visits in relation to oral health. This study also found that 94.7% of students believed using fluoridated toothpaste could prevent cavities and is in line with another study among Nigerian dental students which reported 95.0% (Folayan et al., 2014c), this is also in contrast to another study by Kumar et al. (2017) which reported a 74% among Indian students. This may be due to abundant information via lectures, outreaches and public adverts.

Table 2: Assessment of oral health behaviour of the respondents

Variable	Frequency (n)	Percent (%)
Frequency of Tooth brushing		
Irregularly	10	3.8
One a day	132	50.0
Weekly	9	3.4
2-3 times weekly	25	9.5
Twice a day	88	33.3
Duration of tooth brushing		
Less than 2 mins	26	9.8
2 mins	70	26.5
>2 mins	141	53.4
I don't know	27	10.2
How often should fluoride toothpaste be used when brushing		
Always	250	94.7
Quite often	4	1.5
Seldom	1	0.4
Not at all	1	0.4
I don't know	8	3
Frequency of flossing		
Irregularly	15	5.7
Weekly	21	8.0
2-3 times a day	50	18.9
Once a day	111	42.0
Twice a day	67	25.4
Sources of fluoride		
Food	47	17.8
Milk	26	9.8
Topical	58	25.8
Toothpaste	98	37.1
Water	24	9.1
Age of first dental visit		
1 month	38	14.4
6 months	92	34.8
1 year	57	21.6
2 years	77	29.2
Frequency of dental visits		
Once a month	7	2.7
Every 6 months	175	66.3
When there are complaints	65	24.6
1-2 years	15	5.7
Never	2	0.8

In this study only 54.8% students agreed that fluoridation of water is effective in preventing dental caries which is low when compared to 90.0% for other Nigerian students (Folayan et al, 2014c) and 62.5% for Indian students (Prabhakar et al, 2015). This study also found that 76.1% of participants agreed that the frequency of sugary snack consumption could cause caries. This finding was higher than that among Indian students (Prabhakar et al, 2015) which reported only 19.1% agreement but lower than in another Nigerian study (Folayan et al, 2014c) who reported 98.5%. This may be due to differences in levels of

awareness between countries and the differences in types of snacks consumed as one may presume that majority of snacks consumed in the country may be considered healthy snack thus cannot cause dental caries.

This current study showed only 41.0% agreed that fissure sealants is an effective means of caries prevention compared to other studies (Folayan et al, 2014c; Prabhakar et al., 2015) who reported 92.7% and 49.0% of their students respectively agreed it was effective. This low figure when compared to Folayan et al. (2014c) may be as a result of the combination of medical and dental

students as opposed to their strict dental students' study, but is comparable to Prabhakar which also had a combination of medical and dental students. Thus, the importance of fissure sealants as a means

of preventing dental caries should be emphasized when carrying out oral health campaigns and educating other health professionals.

Table 3: Self-reported knowledge and awareness on caries prevention measures

Variable	Frequency (n)	Percent (%)
Fluoridation of water is an effective means in preventing formation of holes		
Strongly Agree	171	54.8
Agree	73	27.7
Undecided	15	5.7
Disagree	4	1.50
Strongly Disagree	1	0.4
Fluoride toothpaste is an effective way to prevent holes in the teeth		
Strongly Agree	152	57.6
Agree	100	37.9
Undecided	12	4.5
Frequency of snacks consumption has a great role in formation of caries		
Strongly Agree	201	76.1
Agree	54	20.5
Undecided	7	2.7
Disagree	1	0.4
Strongly Disagree	1	0.4
Fissure sealants is effective in prevention of holes in newly erupted molars		
Strongly Agree	60	22.7
Agree	75	28.4
Undecided	115	43.6
Disagree	9	3.4
Strongly Disagree	5	1.9
Rinsing with small amounts of water		
Strongly Agree	67	25.4
Agree	80	30.3
Undecided	75	28.4
Strongly Disagree	31	11.7
Disagree	11	4.2
Importance of regular visits to the dental clinic		
Strongly Agree	162	61.4
Agree	93	35.2
Undecided	6	2.3
Disagree	3	1.1
Brushing twice daily with a fluoride toothpaste is effective in prevention of cavities		
Strongly agree	115	43.6
Agree	83	31.4
Undecided	32	12.1
Disagree	21	8.0
Strongly Disagree	13	4.9
Using fluoride toothpaste is more important than tooth-brushing per se for preventing holes in the teeth		
Strongly agree	39	14.8
Agree	63	24.0
Undecided	81	28.5
Disagree	60	11.4
Strongly Disagree	20	4.2

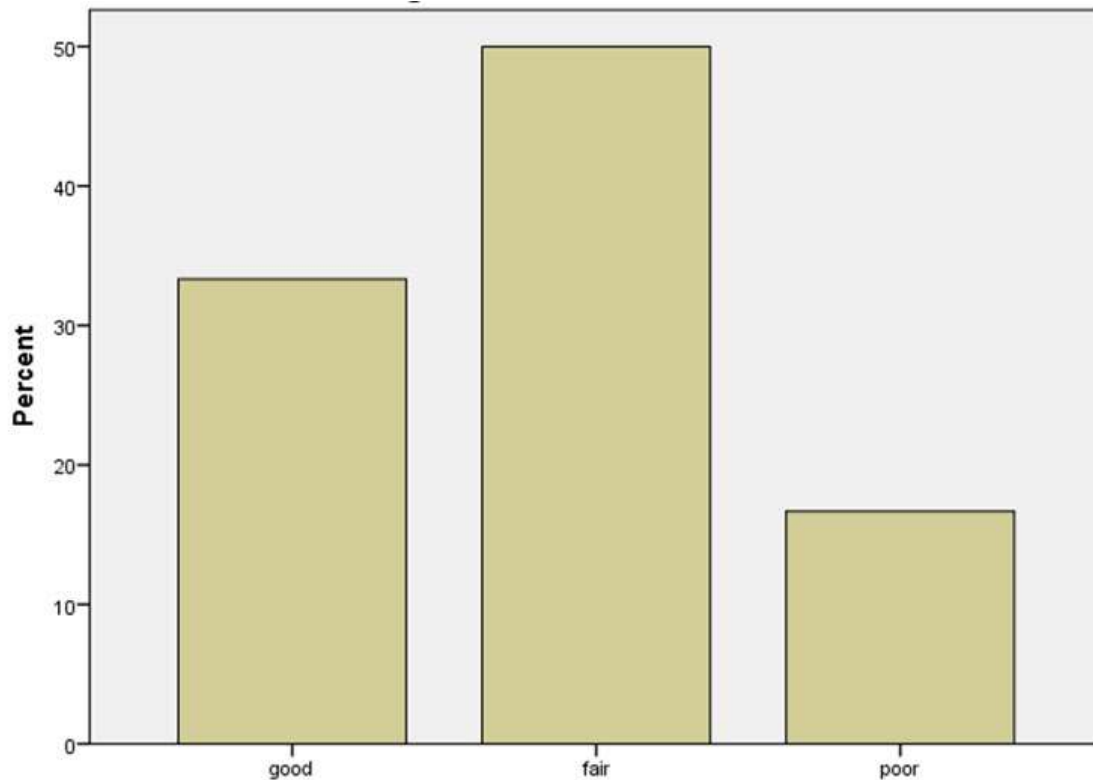


Figure 1: Oral health behavior amongst the participants

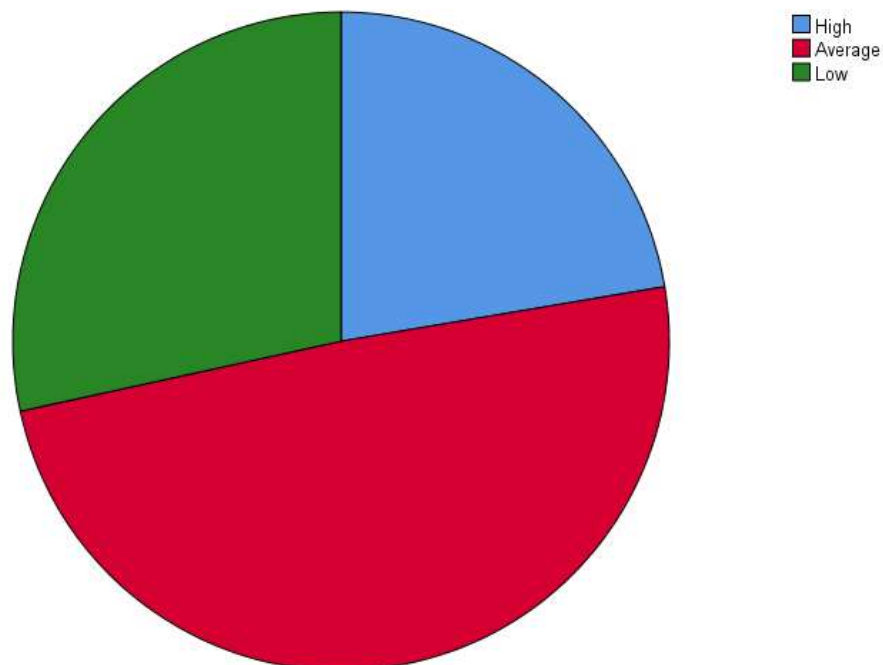


Figure 2: Level of knowledge of caries preventive measures in children

About 57.6% of the students strongly agreed that fluoride toothpaste was an effective means of caries prevention which is comparable to an Indian

(Prabhakar et al, 2015) and another Nigerian study (Folayan et al., 2014c) at (53% vs 47.5%) but lower than that for Iranian students, (76%) (Khami et al

2007). This study showed that 44.1% did not know or disagreed that using fluoride toothpaste is more important than tooth-brushing per se for preventing holes in the teeth compared to Folayan et al. (2014c) who stated that 53.7% disagreed. This may be due to a poor understanding of the role of fluoride in toothpaste and emphasis on toothbrushing thus bringing their personal beliefs to the fore which would play a very important role in guiding practice.

Only 22.3% had high knowledge and awareness of caries preventive measures in children while 28.4% had low knowledge and awareness in this study this is low when compared to a previous study which reported 52.9% for high awareness and 47.1% for low awareness and knowledge of caries preventive measures (Folayan et al., 2013). This difference may be due to the addition of medical students to this study whose curriculum does not include oral health education thus lack formal knowledge of preventive caries measures. The percentage of dental students with higher percentage of knowledge of caries preventive measures and better oral health behaviour was greater than the medical students and is in agreement with studies by Janada et al. (2019) and Kumar et al. (2017) in Northeastern Nigeria and Eastern India respectively. The reason for this may be due to dental students having formal knowledge of the caries preventive measures which they have also imbibed to improve their oral health and in turn oral health behaviour. There is also the possibility that some may have managed patients with dental caries and learnt the treatment protocols thus improved their knowledge of caries preventive measures in children.

CONCLUSION

This study showed that the oral health behaviour of clinical medical and dental student was fair but only one-fifth had high knowledge of caries preventive measures in children. There is need for a more focused approach to oral health education to ensure the medical and dental students are equipped with sufficient knowledge for their future practice.

RECOMMENDATIONS

There should be more emphasis on oral health education in undergraduate training to improve the knowledge and practice among medical and dental students. There is a need to develop or review of the curriculum for medical and dental undergraduate students with emphasis on caries prevention in children.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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