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#### SELF-ASSESSED DENTAL HEALTH KNOWLEDGE OF NIGERIAN DOCTORS

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### ABSTRACT

**Objectives:** To assess medical doctors' knowledge of common dental diseases and the need to include dental education in the Nigerian undergraduate medical curriculum.

**Design:** Cross-sectional multicentre non-random survey using a convenience sample.

**Setting:** Tertiary hospitals across two geo-political zones of Nigeria. Participants were mostly recruited while attending seminars and other departmental events which brought doctors together.

**Subjects:** Medical doctors in tertiary hospitals across two geo-political zones of Nigeria.

**Main outcome measures:** Knowledge of common dental diseases namely, dental caries, gingivitis and periodontitis was evaluated using an open-ended questionnaire. The definition, etiology, treatment and age-related risk were assessed. Exposure to dental education during undergraduate training was assessed. Opinion on desirability and suggested length of future training were also assessed.

**Results:** A total of 127 doctors (35 interns, 30 residents, 34 senior residents and 28 consultants) participated in the study. Overall, knowledge of definition, etiology, treatment and relative prevalence were recorded. About 69 doctors (54.3%) correctly defined dental caries, 120 (94.5%) correctly defined gingivitis while only only 29 (22.8%) correctly defined chronic periodontitis. The proportions of respondents who correctly identified disease etiology were 26 (20.5%) for caries, 31 (24.4%) for gingivitis and 12 (9.4%) for chronic periodontitis. The proportions of respondents who correctly identified appropriate treatment modalities were 39 (30.7%) for caries, 18 (14.2%) for gingivitis and 6 (4.7%) for periodontitis. Those who correctly identified the relative, age-related prevalence of the three diseases were 81 (63.8%) for caries, 51 (40.2%) for gingivitis and 47 (37%) for periodontitis.

**Conclusion:** Most of the medical doctors who participated in the study demonstrated inadequate knowledge of common dental diseases and about 97% of respondents supported the idea of including dental education into the current Nigerian undergraduate medical curriculum.

### INTRODUCTION

Unlike the dental undergraduate and postgraduate curricula which include a high medical content, the undergraduate medical curriculum in many medical schools currently includes little or no dental content. This negatively impacts on the basic dental knowledge of medical graduates and significantly lowers their confidence in offering basic oral health advice. It also negatively impacts on basic dental diagnosis and appropriateness of referrals.

Dental caries and its sequelae remain the major reasons for dental patronage and dental extractions-the highest treatment modality in Nigeria (1). This is a reflection of poor dental awareness which necessitates urgent action. Dental needs are the highest single unmet health needs of children (2). Most dental patients are still unaware of the causes and prevention of dental caries and periodontitis (1). There is also poor utilization of other treatment modalities outside extraction (1).

In a recent study (3), 95% of Nigerian medical

doctors admitted being consulted for dental health advice. The advice given by these doctors could be assumed to be of good quality if the general assumption that medical doctors are aware of basic oral health conditions is true (4). Unfortunately, current evidence suggests otherwise. For example, while 84% of medical doctors professed the importance of oral examination for elderly patients in a report (5), only 19% performed intra-oral examination in their routine practice. This is a clear reflection of the wide gap existing between the precept and practice of oral health promotion among medical doctors.

Also, the current dental health education content of many medical schools is either deficient or non-existent as attested to by 83.4% of medical doctors (6). This culture of neglect often continues into postgraduate medical education as reflected by 72.4% of medical doctors conceding extremely poor oral health knowledge (6).

Interestingly, oral health knowledge can be effectively improved through oral health education, usually well-received by medical doctors (7,8) which explains the second justification for the present study, to provide evidence for modifying the current Nigerian undergraduate medical curriculum.

## MATERIALS AND METHODS

The study satisfied the declaration of Helsinki in all areas. The study had the approval of the committee on dental education and practice of the country's Dental Association. No sensitive or personal identifiable information were collected.

**Study settings:** Tertiary centers in two geo-political zones served as the recruitment grounds for study participants. For convenience, data were obtained at locations where medical doctors were congregated for faculty/departmental events like seminars and clinical presentations. The choice of the two geo-political zones was based on the practice locations of the authors. The inclusion criterion was being a medical doctor practicing within these two geopolitical zones.

**Sampling:** Since the acceptable margin of error in research is 5 – 10%, the upper limit (10%) at 95% confidence level was adopted in the present study. The estimated number of doctors in the three centers was 3500 and a response distribution of 50% gives a required sample size of 94 participants. However, based on a non-random, purposive

sampling method using captive audiences as described above, the sample size of 127 as captured in this study was considered to be of adequate power.

**Study instrument:** Self-administered questionnaires were pretested in a teaching hospital and ambiguous questions and anomalies corrected. Adjusted questionnaires were subsequently filled by consenting participants. Knowledge of caries, gingivitis and periodontitis were assessed. Open-ended questions were used to assess the definition, etiology, treatment and age-related risk of common dental diseases. Opinions about the inclusion of dental education into the undergraduate medical curriculum were assessed and recommendations for the length of such dental education recorded.

In order to keep knowledge assessments basic and non-technical, terms like "tooth decay" or "holes in the teeth" were accepted as correct for caries definition. Also, in answer to the questions; "*What is gingivitis?*" and "*What is chronic periodontitis?*", gingivitis and periodontitis were considered to have been correctly defined once "gums" / "periodontal inflammation" were mentioned in any combination.

Etiology of dental caries assessed as "*what is the cause of dental caries?*" was accepted as any statement that recognized the link between refined sugars and dental caries. A statement linking gingivitis/ periodontitis with poor oral hygiene was also accepted as correct in whatever combination.

Knowledge of treatment of caries and periodontal disease was assessed through open ended questions phrased as "*What is the treatment for dental caries?*", "*What is the treatment for gingivitis?*" and "*What is the treatment for chronic periodontitis?*". Answers were accepted as correct when respondents used terms like "filling" or "dental filling" or "amalgam filling" for dental caries treatment as well as any mention of scaling and polishing or oral hygiene measures in whatever combination for the treatment of gingivitis and periodontitis.

Other details obtained included Yes/No answers to questions like "*Did you receive formal dental lectures during your undergraduate medical training?*" while recommendations for such inclusion was assessed as "*Would you recommend the inclusion of dental education into the undergraduate medical curriculum?*". Finally, the suggested length of the proposed dental education was assessed as "*If yes, how long?*"

**Statistical analysis:** Statistical analysis was performed using SPSS version 189. Simple tables were generated to assess numbers and percentages of respondents. Gender-based analysis were not performed because more than one-third of medical doctors declined to indicate their gender. Years of experience were recorded into two variables namely "1-10 years" and ">10 years." Analysis based on type of practice were not performed because 99.2% of respondents practiced in tertiary institutions. Participants were also recorded into four levels namely, House officer-level, Residents, Senior Residents and Consultants. Knowledge of the age-related susceptibility, proneness or "risk" of common dental diseases was assessed as "Who is at higher risk of dental caries- Children or Adults?", "Who is at higher risk of gingivitis- Children or Adults?" and "Who is at higher risk of periodontitis- Children or Adults?". The correct answer for caries and gingivitis was recorded as "children", while "adults" were accepted as the correct answer for chronic periodontitis. The questions were framed to test the knowledge of respondents

on the relative age-related prevalence and risk of the three common dental diseases.

Cross-tabulations were performed for different categories of explanatory and outcome variables using chi-square statistics while Fisher's exact test was performed for 2x2 tables. The study was analysed at 95% confidence level therefore p-values for chi-statistic and Fisher's exact tests yielding value < 0.05 were considered statistically significant.

## RESULTS

A total of 127 medical doctors comprising of 35 (27.6%) intern-level doctors, 30 (23.6%) residents, 34 (26.8%) senior residents and 28 (22.0%) consultants filled and returned self-administered questionnaires. Overall, 69 doctors (54.3%) defined caries correctly, 26 (20.5%) stated the correct etiology of caries, 39 (30.7%) stated the correct treatment for caries and 81 (63.8%) correctly identified the age-related prevalence of caries. (Table 1)

**Table 1**  
*Knowledge assessment on four aspects of dental caries.*

Dental Caries Knowledge Assessment		
Definition	n	%
Wrong	58	45.7
Correct	69	54.3
Total	127	100.0
Cause	n	%
Wrong	101	79.5
Correct	26	20.5
Total	127	100.0
Treatment	n	%
Wrong	88	69.3
Correct	39	30.7
Total	127	100.0
Risk	n	%
Wrong	46	36.2
Correct	81	63.8
Total	127	100.0

Correct answers:

Caries defined as "decay," or "holes" or "cavity"

Cause (etiology) expressed as "sugar," or "sugary foods," or "refined carbohydrates"

Treatment expressed as "filling," or "tooth filling"

Risk defined as "children" being more frequently affected.

Though the knowledge of the definition of gingivitis was excellent, with 120 (94.5%) correctly defining gingivitis, the knowledge of other aspects of gingivitis was poor being 31 (24.4%) for etiology and 18 (14.2%) for treatment. The knowledge of age-related prevalence was fair, being 51 (40.2%) (Table 2)

**Table 2**  
*Knowledge assessment on four aspects of gingivitis*

Gingivitis Knowledge Assessment		
	n	%
Definition		
Wrong	7	5.5
Correct	120	94.5
Total	127	100.0
Cause	n	%
Wrong	96	75.6
Correct	31	24.4
Total	127	100.0
Treatment	n	%
Wrong	109	85.8
Correct	18	14.2
Total	127	100.0
Risk	n	%
Wrong	76	59.8
Correct	51	40.2
Total	127	100.0

Correct answers:

Gingivitis defined as inflammation of the gums/ gingiva.

Cause (etiology) expressed as "dental plaque," or "plaque," or "poor oral hygiene"

Treatment expressed as scaling and polishing, or "cleaning," or "improving oral hygiene"

Risk defined as "children" as being more likely to suffer from gingivitis than periodontitis.

Chronic periodontitis was the least-known dental disease among respondents. Only 29 (22.8%) could give an acceptable definition of periodontitis, 12 (9.4%) knew the association between periodontitis and poor oral hygiene while a disappointing 6 (4.7%) knew that simple scaling and improvement of oral hygiene was the treatment for chronic periodontitis. However, 47 (37%) correctly identified the age-related prevalence of chronic periodontitis as being higher in adults than children (Table 3).

**Table 3**  
*Knowledge assessment on four aspects of chronic periodontitis*

Periodontitis Knowledge Assessment		
	n	%
Definition		
Wrong	98	77.2
Correct	29	22.8
Total	127	100.0
Etiology	n	%
Wrong	115	90.6
Correct	12	9.4
Total	127	100.0

Treatment	n	%
Wrong	121	95.3
Correct	6	4.7
Total	127	100.0
Risk	n	%
Wrong	80	63.0
Correct	47	37.0
Total	127	100.0

Correct answers:

Periodontitis defined as inflammation of the periodontium or supporting tissues of the teeth

Cause (etiology) expressed as "dental plaque," or "plaque," or "poor oral hygiene"

Treatment expressed as scaling and polishing, or "cleaning," or "improving oral hygiene"

Risk defined as "adults" being more frequently affected by periodontitis than children.

The knowledge of most aspects of the assessed dental diseases was poor irrespective of professional level. Knowledge among various medical cadres followed no definite pattern. The minor observed differences in knowledge failed to achieve statistical significance except in respect of the knowledge of gingivitis risk. Resident doctors displayed a significantly higher knowledge that children are more likely to suffer from gingivitis than they are from periodontitis. ( $p < 0.05$ ) (Table 4).

**Table 4**  
*Knowledge of common dental diseases according to percentage of correct responses by level.*

Knowledge according to Percentage of correct responses by level					p-value
	House Officers n = 35	Residents n = 30	Senior Residents n = 34	Consultants n = 28	
<b>Dental Caries</b>					
Definition	57.1%	40.0%	58.8	60.7%	.394
Etiology	25.7%	16.7%	23.5%	14.3%	.712
Treatment	32.4%	20.0%	44.1%	25.0%	.248
Risk	71.4%	56.7%	64.7%	60.7%	.730
<b>Gingivitis</b>					
Definition	94.3%	100%	94.1%	89.3	Invalid*
Etiology	25.7%	26.7%	23.5%	21.4	.959
Treatment	20.6%	10%	5.9%	21.4%	Invalid*
Risk	37.1%	66.7%	29.4%	28.6%	.013
<b>Periodontitis</b>					
Definition	22.9%	33.3%	20.6%	14.3%	.487
Etiology	8.6%	10%	5.9%	14.3%	Invalid*
Treatment	0.0%	0.0%	11.8%	7.1%	Invalid*
Risk	37.1%	36.7%	35.2%	39.3%	.949

\*Cells with expected count less than 5 are greater than 20% therefore,  $\chi^2$  invalid.

Note; there were 35 interns, 30 residents, 34 senior residents and 28 consultants. These numbers are constant all through the table.

The poor knowledge of common dental diseases was also observed among medical doctors irrespective of years of experience. The minor observed differences in knowledge by experience followed no definite pattern and failed to achieve statistical significance. ( $p > 0.05$ ) (Table 5).

**Table 5**  
*Knowledge of dental diseases according to percentage of correct responses by experience.*

Knowledge according to Percentage of correct responses by Experience			
	< 10 years Experience n = 70	>10 years Experience n = 46	Fisher's Exact
<b>Dental Caries</b>			
Definition	51.4%	60.9%	0.209
Etiology	20.0%	21.7%	0.499
Treatment	35.7%	26.1%	0.189
Risk	64.3%	65.2%	0.540
<b>Gingivitis</b>			
Definition	97.1%	91.3%	0.168
Etiology	25.7%	23.9%	0.503
Treatment	15.7%	13.0%	0.454
Risk	44.3%	34.8%	0.205
<b>Periodontitis</b>			
Definition	24.3%	15.2%	0.173
Etiology	8.6%	13.0%	0.318
Treatment	2.9%	6.5%	0.308
Risk	35.7%	41.3%	0.340

Note; there were 70 doctors in the < 10 years Experience group and 46 doctors in the >10 years Experience age group. These numbers are constant all through the table. Note also that 11 respondents failed to indicate their levels of experience accounting for the disparity in the overall total of 116 instead of 127.

Positive association between exposure to undergraduate dental education and higher dental knowledge was observed in 8 of 12 assessments. Medical doctors who had received undergraduate dental education were more likely to answer questions on knowledge about common dental diseases correctly. Only in one instance did such differences achieve statistical significance.(p<0.05) (Table 6).

**Table 6**  
*Knowledge of common dental diseases according to percentage of correct responses by dental taster exposure.*

Knowledge according to Percentage of correct responses by exposure to dental education			
	Dental "Taster" Received n = 44	Dental "Taster" NOT Received n = 83	Fisher's Exact
<b>Dental Caries</b>			
Definition	52.3%	55.4%	0.439
Etiology	27.3%	16.9%	0.125
Treatment	34.1%	28.9%	0.342
Risk	75.0%	57.8%	0.041
<b>Gingivitis</b>			
Definition	95.5%	94.0%	0.540
Etiology	22.7%	25.3%	0.463
Treatment	18.2%	12.0%	0.247
Risk	34.1%	43.4%	0.205
<b>Periodontitis</b>			

Definition	29.6%	19.3%	0.138
Etiology	13.6%	7.2%	0.194
Treatment	4.5%	4.8%	0.656
Risk	40.9%	34.9%	0.318

Note that 44 doctors had received dental education while 83 doctors had not. These numbers are constant all through the table.

## DISCUSSION

This study assessed medical doctors' knowledge on oral health diseases. It also provided evidence for the inclusion of dental education in the undergraduate medical curriculum.

A recent report that 95% of medical doctors admitted being consulted for dental advice is a reflection of poor dental awareness among Nigerians. However, since most dental patients still depend on medical doctors for advice, increasing the dental knowledge of those medical doctors should positively impact on their confidence in basic recognition of common dental problems as well as correct and prompt referral to the dentist for proper management. The observed poor dental health awareness among participating doctors irrespective of level and years of experience is a cause for concern. The only parameter which seemed to be well-known among respondents was the definition of gingivitis. The observed wide gap between the knowledge of gingivitis and other aspects of the disease appears paradoxical. It is however possible that respondents simply applied a "smart guess" that gingivitis means inflammation of the gingiva. The fact that one respondent defined periodontitis as inflammation of the "periodon" supports this idea.

Unfortunately, there is a paucity of comparable local literature for meaningful comparison. However, a wide gap exists between the dental knowledge and practices of Nigerian medical doctors and their foreign counterparts (10).

This position is further supported by the poor knowledge of Nigerian medical doctors compared with their Italian counterparts where 89% of medical doctors prescribe fluoride supplements 11 and Chennai where 90% of medical doctors were aware of the caries-sugar link and 97% aware of the periodontitis – poor oral hygiene link. In contrast, only 30.8% of Nigerian physicians currently checked Children's mouths for dental caries (12). These differences are quite disturbing because of the impact of inadequate knowledge on oral health education (13).

Admittedly, simply increasing oral health knowledge through adjustment of the undergraduate medical curriculum does not guarantee a change in health behavior (12). However, such improved knowledge could be harnessed for the benefit of oral

health education especially to children.

The observed poor oral health knowledge of medical doctors in this study is a direct consequence of non-exposure to dental education in most undergraduate medical curricula. Similar observations were made in Indian cities of Mangalore, Kerala and Bangalore showing poor dental health knowledge of medical doctors. These reports corroborate our findings (4, 14,15).

Of particular interest is the almost complete ignorance about chronic periodontitis among participating medical doctors in the present study with 29% being aware of the definition chronic periodontitis, 12% of its etiology and a disappointing 6% being aware of the treatment for chronic periodontitis.

Medical and dental specialists should be concerned about the danger inherent in such poor knowledge especially because the interactions between chronic periodontitis and diabetes, pregnancy outcomes and other systemic conditions are well documented (16, 17). It is therefore important to include lectures on such interactions in dental health education curricula as has already been suggested (18).

There was a positive association between exposure to some form of formal undergraduate dental education and improved oral health knowledge in the present study(albeit marginal). However, the marginal difference probably highlights the potential benefits of adjusting the undergraduate medical curriculum as this could be indicative of the ineffectiveness of current oral health education attempts.

Improving the knowledge of medical doctors as a tool for increased oral health awareness of the populace has been advocated in the USA,19 and experimented in Kentucky where it was termed the Physicians' Oral Health Education in Kentucky (POHEK) curriculum (20). The program was a success with evidence of improvement in knowledge and attitude of the participating family medicine physicians. Though tried among family medicine residents, developing countries can adopt and adapt this for undergraduate medical curriculum adjustments.

The authors passionately believe that the paradigm shift as being proposed in the present study holds the key for improving the oral health

awareness in developing nations. The authors also believe that the proposed curriculum changes will be well-received because current evidence indicates that most medical doctors (98%) are dissatisfied with their oral health knowledge (21).

Also, 95% of physicians agree that a physician ought to know about oral health care with 77% expressing the willingness to add preventive oral health activities to their routine practice while 62% expressed the willingness to acquire further oral health education (22). This level of willingness and enthusiasm towards improved oral health knowledge among medical doctors should be used as a leverage to introduce desirable changes in the current Nigerian undergraduate medical curriculum.

Finally, medical doctors' poor oral health knowledge is not limited to Nigeria. A 2013 Indian study demonstrated that many medical doctors refer oral conditions to other medical specialists rather than to dentists (23) and a 2010 Jordan survey showed that only a third of medical doctors agreed that oral health was an issue in diabetes (24). Nigerian oral health experts and stakeholders stand the chance of pioneering this paradigm shift which has already been adopted in postgraduate medical education in the United States of America (25).

## CONCLUSIONS

This study showed that the knowledge of the three common dental diseases was poor among medical doctors irrespective of level and years of experience except for the knowledge of the risk of gingivitis. Exposure to dental education during undergraduate years was positively associated with improved knowledge of most parameters but failed to attain statistical significance in most instances. Virtually all respondents recommended an inclusion of dental education in the undergraduate medical curriculum. There is therefore a clear need to modify the current undergraduate medical curriculum to include formal dental education in developing countries. The modal suggested length of such education in the present study was four weeks.

## LIMITATIONS

In order to reflect a better picture of the current level of knowledge, it would be good to replicate this study using a larger sample size. Also, since only two geo-political zones were included in this study based on the location of the authors, it is desirable to replicate this study in other geo-political zones of the country to know if the findings would be the same.

Finally, comparisons of this work with other studies was limited by the paucity of literature in this area.

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