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ORIGINAL ARTICLE

Periodontal health knowledge of nonmedical professionals and their oral hygiene behavior in a teaching hospital in Nigeria

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ABSTRACT

Background: The awareness of periodontal diseases is generally poor among Nigerians. Working within the hospital environment should give an edge to nonmedical professionals, who could help to promote periodontal health awareness in countries with an inadequate number of dental health professionals. This study aimed to determine the awareness, knowledge of periodontal diseases and oral hygiene behavior of nonmedical professionals within a hospital setting. **Materials and Methods:** A cross-sectional descriptive study was conducted on 302 nonmedical professionals in a teaching hospital in Nigeria. Pretested, self-administered, semi-structured questionnaires were utilized for data collection on sociodemography, number of years of work experience in the hospital, work cadre, awareness and knowledge of periodontal diseases, oral self-care and dental attendance pattern. **Results:** The awareness of periodontal disease was relatively high (60.2%) in the nonmedical professionals. However, only 29.8% had adequate knowledge of periodontal diseases. Their knowledge was significantly associated with male gender (P = 0.042), higher education (P = 0.006) and nonYoruba ethnicity (P = 0.015). Their duration of work within the hospital premises did not significantly affect their periodontal health knowledge. Less than half (42.7%) practiced twice or more daily brushing while only 11.9% used interdental floss for interproximal plaque removal. Their dental attendance pattern was mostly (83.5%) problem-oriented rather than preventive. **Conclusion:** The nonmedical professionals had fairly high awareness but inadequate periodontal health knowledge and oral hygiene practices. These findings may make their role as oral health promoters a questionable one, unless, this is addressed urgently.

Key words
Dental attendance, knowledge, nonmedical professionals, oral self-care, periodontal disease

INTRODUCTION

Most periodontal diseases are primarily bacterial, plaque-induced inflammatory diseases that are chronic in nature resulting in the progressive destruction of the supporting tissues of the teeth. Unless there is a timely intervention, tooth loss may be inevitable. These diseases are highly prevalent in both developed and developing countries.[1] Although, periodontal diseases, particularly periodontitis are the leading cause of tooth loss amongst adults globally having adverse consequences on a person's quality of life,[1,2] simple measures including twice daily brushing of teeth (morning and before bedtime) and daily interdental flossing have been reported as being successful in its prevention.[3,4]

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In addition, a good knowledge of oral health care is believed to be an important precursor to oral health-related behavior.[5] It is unfortunate that in a developing country such as Nigeria, the awareness about oral health issues in different population groups is still low.[6-8] This poor awareness may have a direct effect on the illness-seeking behavior of the population including their access to oral health facilities.[9-11] Access to oral health facilities could be in terms of cost, distance, availability of qualified personnel, functioning oral health facilities and location. The hospital environment should have a positive influence on the level of oral health awareness of health workers, especially nonmedical professionals without any previous medical training. These workers are opportune to interact with dental professionals on a regular basis because of their close proximity in terms of better

geographic access to oral health facilities within the hospital, among other benefits. These facilities exist in most government-owned health institutions in Nigeria.[12] Nonmedical professionals represent an important segment of the workforce in hospitals because of their management functions in ensuring consistent, high-quality patient care.[13] They can also play the role of health educators, especially as the general populace belief that anyone working in a health institution must be knowledgeable about health issues. This would in turn support the dental health team and help to promote periodontal health among their family members, as well as the community at large. They can, however, be more efficient provided they are adequately informed about periodontal diseases and are engaging in the appropriate oral hygiene practices. The objectives of this study were to determine the level of awareness, knowledge of periodontal disease and the oral hygiene practices of nonmedical professionals within a hospital setting in Nigeria.

MATERIALS AND METHODS

The study was conducted over a 2 months period between July and August 2013 at a Tertiary Hospital in Nigeria. The study design was a descriptive, cross-sectional survey of nonmedical professionals working within the hospital premises. The total study population was an estimated 545 nonmedical professionals which were multiethnic. The nonmedical professionals represent a fairly large segment of the hospital workforce and are distributed within the 46 departments of the hospital. The sample size was calculated based on the formula $n = z^2\ pq/d^2$ and the correction factor, $nf = n/1 + n/N$. Twenty-three departments were randomly selected. A purposive sampling method was used to select study participants in each of the selected departments. Prior to the commencement of the study, the questionnaires had been pretested on 10 nonmedical workers in order to correct the questions to improve the response. The pretested, self-administered, semi-structured, questionnaire was distributed to all nonmedical professionals in the selected departments who consented to participate in the study. The questionnaires were printed in English language but interpreted into the appropriate local language by trained investigators when assistance was required by few respondents. The participants were instructed to fill the questionnaires without discussing with each other. The participants were given an average of 12 min, while those with limited English ability were given extra time. Inclusion criteria were workers with no formal medical training who were working within the hospital premises. The reason for this selection was that some employees work at other satellite offices situated outside the hospital premises. Exclusion criteria were any of the health professionals with a formal medical training. The questionnaire had three sections. Section A was used to obtain information on their sociodemographic characteristics (age, gender, educational level, marital status, ethnic affiliation, work cadre and number of years of work experience in the hospital). Their work cadre was stratified according to the Civil Service rule into junior cadre (level 1–6) and senior cadre (level 7–15); Section B assessed the respondent's awareness and knowledge of periodontal disease. There were four questions assessing periodontal health knowledge on the main cause, commonest early symptom, and prevention of periodontal disease and its association with systemic health. All who answered correctly, scored "1" while all who gave incorrect answers or ticked "I don't know" scored "0". The sum of their mean scores of knowledge about periodontal disease was determined. Based on their mean score of 2.00, the knowledge scores were categorized into two; adequate (scores 3–4) and inadequate (scores 0–2). Section C assessed the respondent's oral self-care practices (frequency of tooth cleaning, type of toothbrush, tooth cleaning aid, frequency of changing toothbrush, and interdental cleaning aid). This section also evaluated the dental attendance pattern of the respondents such as previous dental attendance, reason for attendance, previous preemployment screening, previous professional tooth cleaning and last professional tooth cleaning.

Statistical analysis

Collected data were analyzed using the Statistical Package for Social Sciences (SPSS version 17.0, SPSS Inc. Chicago, USA). Categorical variables were reported as frequencies and represented as tables. Continuous variables were reported as mean ± standard deviation. ANOVA test was applied for the analysis of means. Binary logistic regression was applied to determine independent variables (gender, education and ethnicity) associated with the dependent variable (adequate knowledge of periodontal disease). The level of statistical significance was set at a $P \leq 0.05$.

Ethical considerations

Ethical approval for the study was obtained from the Research and Ethics Committee of the Institution before commencing the study. Written informed consent was obtained from each of the respondents prior to their enrollment into the study assuring them of confidentiality and with the full explanation that the findings of the research will be used for educational purposes with the aim of improving their periodontal health and that of the larger community. Permission was also obtained from the hospital management prior to data collection.

RESULTS

Sociodemographic characteristics

A total of 330 questionnaires were distributed, of which 310 were filled and returned giving a response rate of

93.9%. Eight questionnaires were not properly filled and were excluded in the final data analysis. Of the 302 respondents seen, 54.3% constituted males while 45.7% were females. The mean age was 41.1 ± 8.9 years. The respondents were mostly (35.4%) in the age category of 40–49 years. Majority of the respondents (69.5%) had tertiary level of education, with most (50.3%) being in the junior staff cadre. Workers of Yoruba ethnicity were in the majority (73.2%).

Their mean duration of work was 13.9 ± 10.1 years. Table 1 summarizes the sociodemographic characteristics of the respondents.

More than half, (59.9%) of the respondents claimed to be aware of periodontal disease while 40.1% were unaware. Of the group that were aware, dentists were the most common source of health information on periodontal disease (37.6%) followed by the media (29.8%), medical doctors (15.5%), colleagues/neighbors (10.5%), and family/friends (5.5%). Only 1.1% did not respond to this question. Only 29.8% had an adequate level of knowledge of periodontal disease. Table 2 summarizes their knowledge of periodontal disease.

Oral self-care practices

One hundred and twenty-nine (42.7%) workers cleaned their teeth at least twice daily, 98.7% used tooth brush and paste with only 11.9% using interdental floss for interproximal cleaning. Soft/medium texture tooth brush was used by 68.8% of the respondents while 30.2% used a hard bristled tooth brush. More than half (56%) of the respondents changed their tooth brush between 1 and 3 months [Table 3].

Dental attendance pattern

Majority (84.1%) of the respondents had attended the dental clinic previously. Of these, their frequency of attendance was due to a perceived dental problem by the majority (83.5%) while only 15.7% attended on a regular basis every 6–12 months. Further analysis of the respondents revealed that only 20.5% had attended within the last 12 months with 47.2% attending because of a dental complaint. Among the respondents who received preemployment dental screening (n = 220), 65% had attended the dental clinic within the hospital premises. Overall, less than half (48.3%) had undergone professional oral prophylaxis, with only 14.4% having this treatment within the preceding 6 months [Table 4].

Association between socio-demography and knowledge of periodontal disease

In a bivariate analysis, periodontal disease knowledge had a statistically significant relationship with, gender (P = 0.042), education (P = 0.006) and ethnicity (P = 0.015) using ANOVA to compare the mean knowledge scores [Table 5]. Table 6 shows the binary logistic regression analysis of factors associated with adequate knowledge of

Table 1: Sociodemographic characteristics of respondents

Variable	*n* (%)
Age group (years)	
<40	34 (11.3)
≥40	268 (88.7)
Gender	
Male	164 (54.3)
Female	138 (45.7)
Marital status	
Single	59 (19.5)
Married	231 (76.5)
Widowed	12 (4.0)
Ethnicity	
Yoruba	221 (73.2)
NonYoruba	81 (26.8)
Level of education	
Secondary	92 (30.5)
Tertiary	210 (69.5)
Work cadre	
Junior	152 (50.3)
Senior	150 (49.7)
Duration of work (years)	
≤10	146 (48.3)
>10	156 (51.7)

Table 2: Respondents' knowledge of periodontal disease

Variable	*n* (%)
Main cause of periodontal disease	
Food debris	109 (60.2)
Poor nutrition	29 (16.0)
Dental plaque*	27 (14.9)
Didn't know	6 (3.3)
Calculus	6 (3.3)
Inherited from parents	4 (2.2)
Most common sign of periodontal disease	
Bleeding gum*	78 (43.1)
Swollen gum	76 (42.0)
Bad breath	16 (8.8)
Didn't know	5 (2.8)
Pain	1 (0.6)
Best method for preventing periodontal disease	
Cleaning with toothbrush and paste*	124 (68.5)
Rinsing with mouthwash	30 (16.6)
Rinsing with water	25 (13.8)
Didn't know	2 (1.1)
Relationship between periodontal disease and general health	
Yes*	132 (73.0)
No	37 (20.4)
Didn't know	12 (6.6)
Level of knowledge	
Adequate	54 (29.8)
Inadequate	127 (70.2)

*Correct response

Table 3: Oral self-care practices of respondents

Variable	*n* (%)
Frequency of cleaning teeth	
Once or less a day	173 (57.3)
Twice or more a day*	129 (42.7)
Tooth cleaning aid used	
Toothbrush and paste alone*	260 (86.1)
Toothbrush/paste with chewing stick*	38 (12.6)
Chewing stick	4 (1.3)
Type of toothbrush used (*n*=298)	
Soft/medium*	205 (68.8)
Hard	90 (30.2)
Didn't know	3 (1.0)
Frequency of changing toothbrush	
1-3 months*	169 (56.0)
4 months or more	129 (44.7)
Not applicable	4 (1.3)
Interdental cleaning aid most often used	
Dental floss*	36 (11.9)
Toothpick/pin/broomstick/fingernails/none	266 (88.1)

*Recommended practice

Table 4: Dental attendance pattern of respondents

Variable	*n* (%)
History of previous dental attendance	
Yes	254 (84.1)
No	48 (15.9)
Frequency of dental attendance (*n*=254)	
When I have a dental problem	212 (83.5)
Once in 12 months	30 (11.8)
Once in 6 months	10 (3.9)
When I have the time	1 (0.4)
Did not indicate	1 (0.4)
Last dental attendance (*n*=254)	
Within the last 12 months	52 (20.5)
More than 12 months ago	202 (79.5)
Reason for last dental attendance (*n*=254)	
Preemployment screening	50 (19.7)
Dental problem	120 (47.2)
Dental check-up	84 (33.1)
Preemployment dental screening	
Yes	220 (72.8)
No	82 (27.2)
Dental attendance after preemployment screening	
Yes	143 (65.0)
No	159 (35.0)
Professional cleaning of teeth at the dental clinic	
Yes	146 (48.3)
No	156 (51.7)
Last time teeth was cleaned at the dental clinic (*n*=146)	
Within the last 6 months	21 (14.4)
More than 6 months ago	125 (85.6)

periodontal disease. Male gender, tertiary education, and nonYoruba ethnicity remained significantly associated with adequate knowledge.

DISCUSSION

The present study was predicated on the fact that few studies have reported the possible influence of hospital facilities such as the dental clinic on nonmedical professionals within the hospital environment particularly in developing countries. Do these workers who have no formal medical training have better periodontal health knowledge and oral hygiene practices, by being in close proximity to the dental health professionals and the dental clinics around them? This is important in view of the fact that most periodontal diseases advance slowly and may be unnoticed by people largely because of their insidious nature and periodontitis in particular has been associated more recently with some systemic medical conditions.[14,15] It is imperative, therefore, to be aware and possess adequate knowledge of periodontal health. This study revealed a fairly high level of awareness of periodontal disease (60.2%) among this group of nonmedical professionals. This was not completely surprising though and could have been due to their past dental attendance experience within the dental facility in the hospital premises during their preemployment dental screening. The workers are likely to have received some oral health education from dentists, dental auxiliaries about common oral diseases such as periodontal diseases. This was further buttressed by their most common source of oral health information, which were dentists.

Further analysis of the 181 respondents who had heard of periodontal disease revealed that only 29.8% had adequate knowledge of periodontal diseases and its prevention, while 14.9% knew dental plaque to be the primary cause of periodontal disease. This highlights the need to educate nonmedical professionals on the role of dental plaque in inflammatory periodontal disease.

A positive observation in this study were the large number of respondents (73%) who correctly affirmed a relationship between periodontal disease and general health which is encouraging in view of the studies linking periodontal health with some systemic conditions such as increased time to conception in women and cardiovascular diseases.[15,16]

The inadequate knowledge of periodontal disease displayed by the respondents could be attributed to their limited exposure to "periodic" oral health education programs within the hospital. The "mandatory" preemployment dental screening which takes place is only once, in the course of the duties of all hospital workers in the present study location. Although, dental health seminars and workshops are organized on a regular basis by different departments in the hospital, it is not really clear how often nonmedical professionals are invited to them, particularly those that may be of relevance to them. It appears that these workers are

often side-lined. This is further buttressed by the lack of a significant association between the knowledge of periodontal disease and the work duration of the workers [Table 3]. Furthermore, the fact remains that people are more likely to practice what they have learnt. Poor knowledge of periodontal disease has also been reported in other Nigerian studies, among office workers though outside hospital premises.[17] The mean knowledge score was significantly associated with gender, educational level, and ethnicity. The significant association with education highlights the importance of formal education in enhancing oral health knowledge as demonstrated in other studies.[6,17-19] Respondents with tertiary education are more likely to have better access to appropriate sources of information on periodontal disease, especially in this era of technological advancement. A relationship between ethnicity and level of dental health knowledge has also been reported in other studies.[19,20] It could be a function of underlying cultural perspectives and beliefs by some of the respondents particularly those of Yoruba ethnicity, which may serve as barriers to oral health information. The higher knowledge observed in male respondents compared with their female workers upon further analysis revealed that males were actually better educated than the females.

Table 5: Relationship between sociodemographic characteristics and knowledge of periodontal disease among respondents

Variable	Mean knowledge score	*P*
Age (years)		
<40	2.07	0.373
≥40	1.95	
Gender		
Male	2.14	0.042*
Female	1.87	
Education		
Secondary	1.66	0.006*
Tertiary	2.11	
Marital status		
Single	2.16	0.097
Married	2.01	
Widow	1.38	
Ethnicity		
Yoruba	1.91	0.015*
NonYoruba	2.30	
Work cadre		
Junior	1.95	0.468
Senior	2.05	
Work duration (years)		
≤10	2.01	0.936
>10	2.00	

*Statistically significant

The importance of good oral hygiene practice in the maintenance of oral health, particularly in the prevention of periodontal disease cannot be overemphasized. Most of the respondents in this study used tooth brush and tooth paste, which is a key measure in the prevention of periodontal disease. The use of the chewing stick has however also been advocated among the populace particularly in developing countries because of its affordability, wide availability, antibacterial, and anti-plaque properties.[21]

Despite the importance of the recommended twice daily cleaning to periodontal health,[8] less than half (42.7%) of the respondents in the present study practiced this. This is similar to a study among administrative staff in a Saudi Arabian University which reported 47.5%.[22] Our finding however contrasts with the 78% reported among Virginia residents in the United States.[23] More than two-thirds (68.8%) of the respondents in this study used soft/medium textured toothbrush which is the preferred texture.[24] Although, literature is sparse about the factors influencing the choice of toothbrush selection and effect of texture on tooth tissues, soft/medium brushes are less likely to cause damage to the gum than hard bristle brushes.

Interdental cleaning aids such as dental floss was used by only 11.9% of the respondents. This is only slightly higher than that reported among in a study among school teachers in Nigeria,[8] but contrasts with the 28% reported in a study in the United States.[23] Most workers

Table 6: Binary logistic regression of factors associated with adequate knowledge of periodontal disease

Independent variable	*B*	SE	Significant	OR	95% CI for OR	
					Lower	Upper
Education: Tertiary						
Yes/no	0.901	0.464	0.052*	2.462	0.991	6.113
Ethnicity: NonYoruba						
Yes/no	1.026	0.377	0.006*	2.791	1.334	5.842
Sex: Male						
Yes/no	0.709	0.347	0.041*	2.033	1.029	4.015
Constant	−2.247	0.497	0.000	0.106		

The dependent variable in this analysis is adequate knowledge of periodontal disease coded as 0 - inadequate knowledge and 1 - adequate knowledge. SE - Standard error, OR - Odds ratio, CI - Confidence interval, *Statistically Significant

in the present study indulged in the use of potentially traumatic interdental cleaning aids to the gum such as toothpicks, pins, and broomsticks. Probable reasons for this are that habitually, people are used to toothpicks which are cheaper and more readily available in markets, shops and are even circulated in social gatherings in Nigeria. There is however a need to promote the proper use of interdental floss for optimal periodontal health in social gatherings and at home.

In the present study, 84.1% had attended the dental clinic before, with majority (72.8%) attributing their visit to the preemployment dental screening which is a commendable hospital policy. About two-thirds (65%) of these subsequently attended the dental clinic within the hospital premises which is an encouraging observation. Another important finding in this study was the low percentage (15.7%) of workers whose frequency of attending the dental clinic was every 6–12 months. Most (83.5%) attended only when they had a perceived dental problem. This is further corroborated by the few respondents (33.1%) whose reason for their last dental attendance was for a dental problem. A recent pilot study among administrative workers in a hospital setting also reported oral problems as their most common reason for dental attendance.[25] This contrasts with the 63% reported among United States citizens in Virginia whose reason for attending was preventive rather than curative.[23] Furthermore, only 20.5% had attended the clinic within the previous year which is comparable to the 19.8% reported in a Nigerian study among the general population.[26] Researchers have highlighted the poor health-seeking habits of Nigerians, which is mainly for emergency relief of pain through tooth extractions.[27] In addition, others have identified negative attitudes to oral health as probable reasons.[8,26]

This could indicate the little impact of the existing oral health facility on these office workers, despite their relatively long duration (13 years) of service within the hospital. This draws attention to an obvious communication gap between dental health professionals and nonmedical professionals regarding the impartation of periodontal health knowledge. Is this perhaps the findings among nonmedical professionals in other hospital settings?

In the light of these findings, and in tandem with the National Oral Health Policy of Nigeria, which has oral health promotion as one of its major thrusts, health personnel such as nonmedical professionals ought to possess adequate knowledge of periodontal disease and adopt good oral hygiene practices. With this, they themselves can be good role models reflecting the values of their workplace and complimenting the efforts of dental health personnel. Only then, can they serve as positive change agents by first applying the knowledge to benefit themselves, their families, neighbors and the community at large.

CONCLUSION

Despite the close proximity of the nonmedical professionals to the oral health care facility within the hospital, their knowledge of periodontal disease was limited, although they had a fairly high awareness level. Their preventive oral hygiene practices were also less than optimal. This may compromise their role in promoting oral health.

Recommendations

There is thus an urgent need by dental health professionals to encourage attendance and active participation of nonmedical professionals in hospital organized health seminars and workshops to educate them about the importance of good periodontal health. Hospital management should also incorporate "periodic" dental attendance as part of their policy in addition to the existing preemployment screening.

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