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ORIGINAL ARTICLE

An assessment of medical doctors' perception of possible interrelationship between oral and general health

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ABSTRACT

Background: The possibility of some systemic diseases having oral manifestation is well established with the recent discovery that some oral diseases also adversely affect the general health of an individual. The question is, is the relationship casual or causal? **Aim:** To assess the perception of medical doctors concerning the possible link of oral diseases as causal/confounding factors of systemic diseases. **Materials and Methods:** A cross-sectional survey of 250 medical doctors was carried out in three tertiary health institutions in Nigeria. Questionnaires were distributed to resident doctors to assess their perception as to the possibility of any causal relationship between the general systemic diseases and oral diseases. **Results:** Two-hundred and seven completely filled questionnaires were returned out of the 250 distributed. Over 50% of the respondents strongly agreed to the fact that there is a link between oral diseases and conditions such as diabetes mellitus, rheumatic heart disease, valvular heart disease, and human immunodeficiency virus/acquired immune deficiency syndrome HIV/AIDS. Hypertension and premature low birth weight has the highest percentage (18.8%) of respondents strongly disagreeing with the possibility of having any link with the state of the oral health. There was a statistically significant difference in the perception of the possible link between the state of oral health and myocardial infarction between male and female respondents ($P < 0.04$) and also when the age-groups were considered in relationship with valvular heart disease ($P < 0.02$). **Conclusion:** This study revealed that doctors' perception of the influence of dental disease/condition on the general state of patients' health was deficient and, therefore, require improvement through health education and awareness.

Key words
Medical condition, medical doctors, oral health, perception

INTRODUCTION

Oral health problems are frequently overshadowed by other health needs, which are perceived to be more obvious and urgent by the attending physician, the individual patients themselves, and their relatives. However, recent evidence has confirmed that as much as there are general health conditions with possible oral manifestations, there are also oral diseases that have some influences on the general state of the body. Examples of such interrelationship between the general health status and the state of the oral health includes the effect of the periodontal disease on the cardiovascular system, glycemic control, and pregnancy outcome. Some studies have linked the prevalence and severity of systemic diseases with periodontal diseases, with individuals that had poorer periodontal health or oral hygiene having worse cardiovascular disease or glycemic control.[1-9]

Some of the studies that have suggested a relationship between the oral and general health include a longitudinal single blind pilot intervention trial with 6-months follow-up by D'Aiuto *et al.*[10] The study was carried out among patients that were not previously diagnosed with any systemic diseases involving the cardiovascular, respiratory, or renal systems, and the study concluded that effective control of periodontal infection reduced the serum inflammatory markers, suggesting that there was a causal link between periodontitis and the systemic inflammatory status and thus cardiovascular disease.[10] Possible adverse effect of uncontrolled diabetes mellitus on periodontal health is well documented,[11] but

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recent findings have also pointed out that those with worse periodontal health tend to have poorer glycemic control.[4,11] The possible link has been explained with a theory called focal infection theory, with the mouth serving as a source of microorganisms from lesions that are not symptomatic. The microorganisms and/or their products, e.g. lipopolysaccharide (LPS), flow into the blood stream during procedures such as tooth brushing, mastication, and some dental procedures. This is then followed by the stimulation of the host immune-inflammatory response, which is primarily protective but may predispose to tissue injury due to the numerous antigens that are shared by both microorganisms and humans causing a cross-reaction with the generated antibody in the presence of bacteria or bacterial products.[3,12] However, a recent review of literature concluded that though a contribution of periodontal disease to atherosclerotic vascular disease (ASVD) is biologically plausible, periodontal diseases may not be a cause of ASVD as both periodontal and cardiovascular diseases share multiple common risk factors such as tobacco use and age.[13]

The knowledge of the possibility of this inverse relationship between oral and general systemic health is essential for optimal patient care, as it will afford the attending physician the opportunity to counsel and refer patients appropriately. Therefore, the present study was embarked on, in order to assess the perception of medical doctors on the possible effect of oral diseases on the general well-being of patients. This is important as a sizeable number of patients who require dental treatment usually present first to the general medical practitioners.[14,15]

MATERIALS AND METHODS

A cross-sectional survey of 207 medical doctors was carried out in three tertiary health institutions namely the University College Hospital (UCH), Ibadan, Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife and Ladoke Akintola Teaching Hospital (LAUTECH), Ogbomoso, Nigeria. Self-administered questionnaires were distributed through the chief residents in various departments to the rotating resident doctors. The completion and return of the questionnaire was taking as consent to participate in the study. The questionnaire was used in the assessment of the perception of the doctors as to the possibility of any causal relationship between oral disease and the general systemic disease/condition. The questionnaire sought to know, among other things, the perception of the doctors on the possible link between the oral health and some systemic diseases such as diabetes mellitus (DM), renal disease, hypertension, stroke, rheumatic heart disease, valvular heart disease, and human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS). Ethical approval was obtained from the local Institutional Review Committee (U.I/U.C.H IRC) before the commencement of the study. The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 14.0. Chi-square test was used to assess the difference in the perception of the doctors based on their age-groups and gender. Level of statistical significance was set at $P < 0.05$.

RESULTS

Two-hundred and seven completely filled questionnaires were returned out of the 250 distributed, giving a response rate of 82.8%. The age of the respondents ranged from 24 to 45 years with a mean of 31.6 ± 4.4 years. One hundred and five (50.7%) of the respondents were in the age range of 30-35 years, about 29% (60/207) of them were younger than 30 years, while 8 (3.9%) were older than 40 years of age. One hundred and forty-one (68.1%) of the respondents were males and 66 (31.9%) were females. Almost 60% of the respondents were from UCH (124/207), 41 (19.8%) from OAUTHC, and 42 (20.3%) from LAUTECH. The doctors were distributed in the following departments, general surgery 46 (22.2%), internal medicine 10 (4.8%), preventive and social medicine (PSM) 17 (8.2%), family medicine 18 (8.7%), radiotherapy 7 (3.4%), anesthesia 2 (1.0%), obstetrics and gynecology (O and G) 14 (6.8%), with 11 (5.3%) doctors from each of the departments of radiology and ophthalmology. Other respondents were doctors from the department of Ear, Nose, and Throat 16 (7.7%), psychiatry 12 (5.8%), pediatrics 25 (12.1%), with 9 (4.3%) each from pathology and accident and emergency department. More than 50% of the respondents strongly agreed to the fact that there is a link between oral health and general health conditions such as diabetes mellitus, rheumatic heart disease, valvular heart disease, and HIV/AIDS, while such perception was not so strong for the other conditions. Hypertension and premature low birth weight had the highest percentage (18.8%) of respondents strongly disagreeing with the possibility of having any link with the state of the oral health [Table 1]. There was a statistically significant difference in the perception of the possible link between the oral health and myocardial infarction between the male and female respondents ($P < 0.04$) [Table 2] and also when the age-groups were considered in relationship with valvular heart disease ($P < 0.02$) [Table 3]. There was also a statistically significant relationship ($P < 0.004$) between the perception of the respondents of the possible link between oral health and rheumatic heart disease. This relationship is stronger with increased year of residency/postgraduate training [Table 4].

DISCUSSION

The present study revealed that it was only in the cases of DM, rheumatic heart disease, valvular heart disease, and HIV/AIDS that more than 50% of the doctors strongly

Table 1: Perception of the respondents on the possible link between oral and systemic health

Systemic conditions	Frequency (%)					Total (%)
	Strongly agreed	Partly agreed	Don't know	Partly disagreed	Strongly disagreed	
Renal failure	101 (48.8)	35 (16.9)	29 (14.0)	21 (10.1)	21 (10.1)	207 (100)
Diabetes mellitus	115 (55.6)	31 (15.0)	19 (9.2)	19 (9.2)	23 (11.1)	207 (100)
Hypertension	56 (27.1)	34 (16.4)	54 (26.1)	24 (11.6)	39 (18.8)	207 (100)
Stroke	76 (36.7)	34 (16.4)	50 (24.2)	18 (8.7)	29 (14.0)	207 (100)
Rheumatic heart disease	127 (61.4)	22 (10.6)	16 (7.7)	7 (3.4)	35 (16.9)	207 (100)
Valvular heart disease	124 (59.9)	21 (10.1)	19 (9.2)	13 (6.3)	30 (14.5)	207 (100)
Stress	74 (35.7)	40 (19.3)	45 (21.7)	25 (12.1)	23 (11.1)	207 (100)
HIV/AIDS	132 (63.8)	18 (8.7)	18 (8.7)	12 (5.8)	27 (13.0)	207 (100)
Myocardial infarction	67 ((32.4)	29 (14.0)	61 (29.5)	27 (13.0)	23 (11.1)	207 (100)
Asthma	48 (23.2)	33 (15.9)	67 (32.4)	26 (12.6)	33 (15.9)	207 (100)
*COPD	67 (32.4)	41 (19.8)	46 (22.2)	24 (11.6)	29 (14.0)	207 (100)
Preeclampsia	43 (20.8)	29 (14.0)	67 (32.4)	31 (15.0)	37 (17.9)	207 (100)
†PLBW	50 (24.2)	27 (13.0)	66 (31.9)	25 (12.1)	39 (18.8)	207 (100)
Atherosclerosis	41 (19.8)	25 (12.1)	77 (37.2)	33 (15.9)	31 (15.0)	207 (100)

*COPD – Chronic obstructive pulmonary disease; †PLBW – Premature low birth weight; HIV – Human immunodeficiency virus; AIDS – Acquired immune deficiency syndrome

Table 2: Comparison of the perception of the possible link between oral health and myocardial infarction based on respondents' gender

	Perception of respondents (%)					Total (%)
	Strongly agreed	Partly agreed	Don't know	Partly disagreed	Strongly disagreed	
Gender						
Male	48 (34.0)	25 (17.7)	35 (24.8)	16 (11.4)	17 (12.1)	141 (100)
Female	19 (28.8)	4 (6.1)	27 (40.9)	11 (16.6)	5 (7.5)	66 (100)
Total	67 (32.4)	29 (14.0)	62 (30.0)	27 (13.0)	22 (10.6)	207 (100)

X^2=9.862, P<0.04, df=4, likelihood ratio=10.38

Table 3: Comparison of the perception of the possible link between oral health and valvular heart disease based on respondents' age-groups

	Perception of respondents (%)					Total (%)
	Strongly agreed	Partly agreed	Don't know	Partly disagreed	Strongly disagreed	
Age-groups						
≤30 years	45 (51.7)	7 (8.1)	5 (5.8)	13 (14.9)	17 (19.5)	87 (100)
>30 years	72 (60.0)	14 (11.7)	14 (11.7)	8 (6.6)	12 (10.0)	120 (100)
Total	117 (56.5)	21 (10.1)	19 (9.2)	21 (10.2)	29 (14.0)	207 (100)

X^2=11.827, P<0.02, df=4, likelihood ratio=11.916

Table 4: Comparison of the perception of the possible link between oral health and rheumatic heart disease based on the respondents' year of graduation from medical school

	Perception of respondents (%)					Total
	Strongly agreed	Partly agreed	Don't know	Partly disagreed	Strongly disagreed	
Year of graduation (years)						
<5	17 (26.6)	5 (7.8)	2 (3.1)	5 (7.8)	35 (54.7)	64 (100)
5-10	11 (11.3)	4 (4.1)	10 (10.3)	6 (6.2)	66 (68.1)	97 (100)
>10	5 (10.9)	4 (8.7)	3 (6.5)	10 (21.7)	24 (52.2)	46 (100)
Total	33 (15.9)	13 (6.3)	15 (7.3)	21 (10.1)	125 (60.4)	207 (100)

X^2=22.34, likelihood ratio=21.1, P<0.004

agreed that there is a possible causal link between oral diseases and systemic condition of individual patient. This is against the widely reported possible links between many of these conditions and the oral health.[1-9] More than 10% of the respondents strongly disagreed as to the existence of any possible link between oral health

and each of the systemic diseases that were assessed in the study, while quite a number claimed ignorance of the possible relationship [Table 1]. This finding suggests that the respondents were not conversant with the vast body of evidence linking oral and systemic health. The implication includes the dilemma of patients being managed by these respondents that may need a dental referral, but are denied due to the ignorance of such a physician.[16-18] Defective referral may lead to a delayed diagnosis of malignancy, which increases morbidity and mortality of the condition.[17] Some of the cases may not need outright referral of the patient, but may need being co-managed along with a dentist or a specialist in one of the dental fields, and knowledge of dentistry by the physician will definitely help in making such a decision as to which of the dental specialty is to be involved.

Majority of the female respondents (26/65) claimed ignorance of any possible relationship between oral disease and myocardial infarction, while majority of their male counterparts strongly agreed to the possible relationship. This finding suggests that male respondents were more knowledgeable about the possible relationship, which could have been as a result of their interaction with their dental colleagues. The present curriculum in most of the medical schools in the country does not include postings and lectures in dentistry, which is partly due to the fact that many of the medical schools are yet to commence training for undergraduate students. The limited dental knowledge as demonstrated by the physicians is comparable to the findings by Patel and Driscoll, where only 29% of their respondents gave the optimal antibiotic therapy in a scenario of a dental abscess and 6% of the respondents did not know which antibiotics to prescribe.[19] This obviously calls for a review of the medical school curriculum in order to include some dental topics in the training of undergraduate medical students in the country. This will aid better integration between medicine and dentistry as well as the provision of preventive dental practice and appropriate referral, where needed.[15,20] The dental knowledge of physicians seen by Srinidhi *et al.* was however considered to be good and the authors concluded that this could have been due to the inclusion of dental posting in the curriculum of medical students in India. Another factor that the authors put forward as being helpful in creating dental awareness among the physicians was the continuing medical education programmes jointly organised for both the medical and dental practitioners in order to update their knowledge.[20]

More of the older respondents agreed that dental diseases adversely affect valvular heart disease and the same trend was seen when the years following graduation from medical school was considered. Those that had left medical schools for some time as against those that left not too long ago tend to agree as to the possible relationship between oral disease and the general well-being of an individual. The fact that years of experience significantly affect the perception of respondents in this study is in agreement with the findings by Srinidhi *et al.* who reported that those physicians that had postgraduate training are better aware of dentistry.[20] The present respondents were all resident doctors undergoing their postgraduate training in various medical fields, but their different levels into the program was not sought, which possibly could have differentiated between the impact of postgraduation experience and that of years so far spent in residency.

In conclusion, the authors will like to advocate for better enlightenment of the medical students/practitioners concerning the possible relationship between oral and systemic condition so as to improve on the quality of care given to individual patients, especially those that may benefit from assessment by a dentist. This could be accomplished through the introduction of some dental topics in the curriculum of medical students as well as through continuing medical education programs for medical practitioners.

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