Knowledge on Periodontal Diseases and Systemic Health Inter-Relationship Among Nursing and Dental Surgery Technician Students in Southwest Nigeria

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Background: Periodontal disease is a potential source of systemic inflammation that impacts overall health. Systemic diseases can modulate the relationship between dental plaque biofilm and the inflammatory response which may alter the progression and severity of periodontal diseases. Therefore, successful management of the disease is pivotal in avoiding systemic inflammation and its associated complications.

Objective: To assess and compare the level of knowledge about periodontal diseases and its interrelationship with systemic diseases among nurses and dental surgery technicians (DSTs) in training.

Methods: This study is a descriptive cross-sectional type that was conducted among DST and nursing students, utilizing a structured questionnaire which consisted of questions on bio-data and assessment of their knowledge on the relationship between periodontal disease and systemic diseases. Questions regarding their oral hygiene practices and dental service utilization were also asked. Data was analyzed using SPSS version21.

Result: Respondents consisted of 31 (10.8%) males and 257 (89.2%) females with their mean age being 21.5 ± 2.5 years, having more nursing students 173 (60.1%) compared to DST students 115 (39.9%). Based on their responses, majority (79%) revealed good knowledge on the interrelationship between periodontal disease and systemic health, with a greater level of knowledge significantly noted among the DST students (85.3%), compared to the nursing students (75%) [p= 0.041]. Similarly, the level of knowledge about symptoms of periodontal diseases was high (85%) and significantly more reported by the DST students (98.2%), compared to the nursing students (76.1%). Assessment of the respondents' dental service utilization revealed that only 40% had ever visited a dentist, more significantly noted by the DST students (64.0%), compared to the nursing students.

Conclusion: Respondents generally exhibited a good level of knowledge on periodontal-systemic interrelationship. Their dental service utilization and oral hygiene practices were also found to be fair. However, there is an inevitable need for interdisciplinary collaboration between nursing and dental professionals for the development of oral health curriculum to enable nurses promote oral health and prevent dental diseases in the community.

INTRODUCTION

Oral health is considered to be an integral part of the systemic health rather than an independent entity separate from the general systemic condition.[1] Periodontitis is a chronic inflammatory disease affecting tooth supporting structures, causing gingivitis, loss of periodontal attachment, alveolar bone destruction, and eventually tooth loss.[2] Globally, about 20-50% of the populace have been reported to be affected

by periodontal diseases.[3] However, most of these periodontal diseases are caused by bacteria within dental plaque, a microbial biofilm that makes the bacteria resistant to phagocytosis and destruction by the host immune system.[4]

Overtime, growing scientific evidence has revealed the association between oral infection and systemic diseases. Systemic diseases can modulate the relationship between dental plaque biofilm and the inflammatory response which may alter the progression and severity of periodontal diseases.[2–5] Several authors have documented the bidirectional relationship between periodontal diseases and systemic conditions such as cardiovascular disease, adverse pregnancy outcomes, respiratory disease, chronic kidney disease, rheumatoid arthritis, cognitive impairment, obesity, metabolic syndrome, cancer, diabetes mellitus, with diabetes mellitus being the most widely reported.[1–3,5,6] In diabetes mellitus, alterations occur in the gingival crevicular fluid, collagen metabolism, host response, and microflora. Periodontal infections interfere with glycemic control via inflammatory mediators produced in response to inflamed periodontal tissues that can affect glucose and lipid metabolism.[2] Also, periodontal infections may play a role in atherosclerotic plaque formation, could predispose one to stroke, as well as lead to myocardial infarction.[6,7] Furthermore, there are reports of the possible relationship between periodontal diseases with pregnancy and pregnancy outcomes. Periodontal disease has been found to stimulate the host immune-inflammatory response causing altered cytokine and prostaglandin levels which may lead to premature rupturing of the membrane and preterm birth.[5,8] These scientifically-based evidences have been postulated on how periodontal inflammation may impact overall systemic health, thus, adequate knowledge on preventive measures and treatment of periodontal diseases are essential to mitigate its deleterious effect.[1,5]

The role of a health care professional to improve oral health of the population depends on their level of knowledge about oral diseases and their effect on general health, as well as routine practices done to maintain oral health.[9] Notably, nurses constitute the largest healthcare workers who play an important role in providing health care services and health promotion. Therefore, their relevance in detecting oral diseases and educating patients cannot be over emphasized, especially in countries with limited human resources and a shortage of dental professionals.[10] In our local environment, nurses, in their various categories, are commonly approached for healthcare tips and interventions. Therefore, it is imperative that all cadres of health workers be well informed about periodontal disease and its bilateral relationship with systemic conditions, to ensure excellent healthcare delivery in patient care. The relevance of nurses in dental care provision has been well documented, emphasizing that oral health should receive adequate importance in the nursing curriculum, including clinical training in diagnosing oral diseases, thereby building oral-systemic health curricula and inter-professional education programs.[11,12]

In Nigeria, different population groups, including healthcare professionals, have been noted to have low awareness about oral diseases and its relationship to their systemic health.[13–16] Given the grossly inadequate dentist-to-population ratio in Nigeria, patients are more likely to seek oral health care from medical professionals than from dentists.[15] A curriculum with more emphasis on oral-systemic health may help instill future health care professionals with a better understanding of the diverse issues that affect oral health care needs and access among different population groups[17]. This study, therefore, aimed to assess and compare the level of knowledge about periodontal diseases and its interrelationship with systemic diseases among nursing and dental surgery technician (DST) students. The respondents' attitude toward dental service utilization and oral hygiene practices were also assessed.

MATERIALS AND METHODS

Study design: This was a descriptive cross-sectional study.

Study population: The respondents were healthcare professionals-in-training: dental surgery technicians and undergraduate nursing students of the University of Ibadan, and diploma nursing students from the School of Nursing, University College

Hospital, Ibadan.

Study settings: The DST students were from various technical schools in Osun, Ondo, Ekiti and Ogun states. They were reenrolled during their clinical training at the Dental center of University College Hospital, Ibadan. The undergraduate nursing students were enrolled during their rural community posting, while the diploma nursing students were from School of Nursing, University College Hospital, Ibadan. This study was conducted between February 2017 to May 2017.

Data collection: Data was obtained using structured self-administered questionnaires which included age, gender and institution of study. Questions to test their knowledge about periodontal diseases included initiating factors of periodontal disease, as well as its signs and symptoms. Their knowledge on periodontal-systemic disease inter-relationship was also assessed. Questions regarding their oral hygiene practices and dental service utilization were also asked.

Data analysis: SPSS version 21 was used. Continuous variables such as age were summarized using means and standard deviation while qualitative variables such as gender, knowledge of periodontal diseases and oral hygiene practices were expressed as proportions and percentages. Statistical differences for the categorical variables were evaluated by Chi square, and statistical significance was inferred at $p< 0.05$.

Ethics: Approval was obtained from the University of Ibadan/ University College Hospital, Ibadan Joint Ethical Review Committee (UI/EC/ 16/0436).

RESULTS

A total of 288 respondents participated in the study; their ages ranged from 17 - 33 years with a mean age of 21.5 (SD=2.5) years. (Table 1) Majority of the respondents (79%) had good knowledge on the interrelationship between periodontal disease and systemic health, with a greater level of knowledge significantly noted among the DST students (85.3%), compared with the nursing students (75%) [p= 0.041]. Similarly, the level of knowledge about symptoms of periodontal diseases was high (85%) and significantly more reported by the DST students (98.2%) compared to the nursing students (76.1%) [p= 0.000]. (Table 2)

Table 1: Socio- demographic features of the study respondents

Characteristics		N (%)
Sex		
	Male	31 (10.8)
	Female	257 (89.2)
Course of study		
	Nursing	173 (60.1)
	Dental Surgery Technology	115 (39.9)
Age range		
	15-20 years	127 (44.1)
	21-25 years	143 (49.6)
	>26 years	18 (6.3)

Table 2: Comparison of Periodontal disease knowledge between DST and Nursing students

Questions	Course of study of participants	Yes (%)	No (%)	p-value
Is there any relationship between periodontal disease and systemic health?	DST students	93 (85.3)	16 (14.7)	
	Nursing students	120 (75.0)	40 (25.0)	*0.041
Do you know the symptoms of periodontal disease?	DST students	107 (98.2)	2 (1.8)	
	Nursing students	124 (76.1)	39 (23.9)	*0.000

(*statistically significant)

Concerning their knowledge about systemic conditions related with periodontal diseases, diabetes mellitus was most reported. Other systemic illnesses identified were cerebrovascular diseases, osteoporosis, kidney diseases, respiratory diseases and obesity (Figure 1).

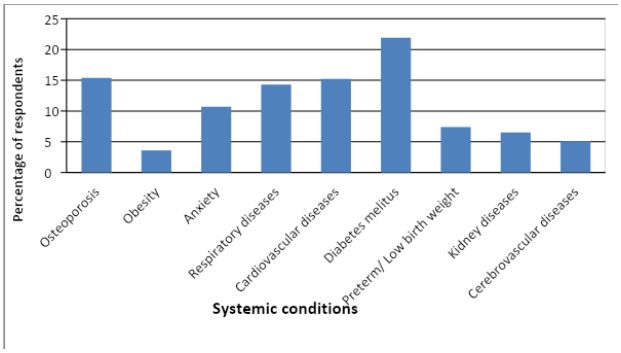

Figure 1 Respondents' knowledge on periodontal and systemic disease inter-relationship

The respondents' level of knowledge on factors associated with periodontal diseases, as well as its prevention, were assessed. A greater number of the participants understood many factors that initiate periodontal disease, except for hereditary factors. Most of the symptoms and signs associated with periodontal diseases were also well known to the participants, except for tooth migration. High level of knowledge on various preventive measures against periodontal diseases was also recorded among the

study participants, except for use of mouth rinse. (Table 3)

Table 3 Respondents' knowledge on factors associated with periodontal diseases

Question	Yes (%)	No (%)	I don't know (%)
What is the initiating factor of periodontal disease?			
-Bacterial plaque	89.8	3.1	7.1
-Dental Calculus	88.5	2.4	9.1
-Malnourishment	79.2	10.8	10.0
-Hereditary	51.8	26.1	22.1
-Diabetes Mellitus	71.5	11.5	17.0
-Infection	93.7	1.6	4.7
Which of the following signs/symptoms can be associated with periodontal disease?			
-Gum bleeding	93.0	2.6	4.4
-Gum swelling	95.1	0.7	4.2
-Gingival abscess	88.7	3.1	8.2
-Bad breath	88.3	3.9	7.8
-Gum recession	83.4	2.8	13.8
-Toothmobility	81.1	6.1	12.8
-Tooth migration	65.1	13.4	21.5
-Root exposure to the furcation area	76.4	5.5	18.1
Which of the following will you advise an individual to use in preventing periodontaldisease?			
-Use tooth brush twice daily	94.8	2.2	3.0
-Use of dental floss daily	83.3	6.6	10.1
-Over the counter mouth rinse	56.0	31.0	13.0
-Good nourishment	97.0	0.8	2.2
-Regular visits to the dentist	96.4	1.4	2.2

Concerning their sources of knowledge about periodontal diseases, the participants mostly reported dental practitioners, followed by lectures and workshops, internet, journals, books and newspaper was the least reported. (Figure 2)

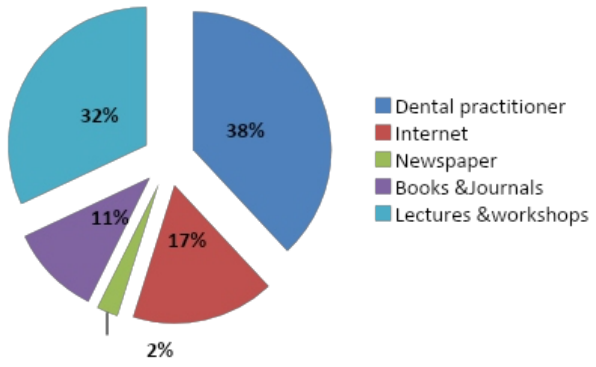

Figure 2: Participants' sources of knowledge on periodontal disease

Assessment of the respondents' dental service utilization revealed that only 40% had ever visited a dentist, more significantly noted among the DST students (64.0%) compared to the nursing students (36.0%) [p=0.000]. Table 4

The most identified reason for their visit was scaling and polishing (23.4%), followed by dental pain (4.1%), and extraction (2.7%), while routine dental checkup was the least identified reason (2.2%). Those who did not visit a dentist mainly noted that they did not have any dental problem (75.1%). Other reasons indicated for their non-visit were inability to afford the cost (10.7%), unavailability (4.7%), self-medication (4.1%), and lack of dental facility (3.6%).

Table 4 Dental service utilization by the study participants

	Yes (%)	No (%)	p-value (* significant)
Have you ever visited a dentist before?			
DST students	73(64.0)	41 (24.0)	*0.000
Nursing students	41 (36.0)	130(76.0)	
When was the last time you visited adentist?	(%)		
One month ago	29.1		
Six months ago	27.2		
One year ago	20.0		
Twoyearsandabove	23.6		

DISCUSSION

This study revealed that all the study participants demonstrated good level of knowledge about the relationship between periodontal diseases and systemic health, being more significantly reported among the DST students compared to the nursing students. Although some authors found low/inadequate level of knowledge among their various study population groups[18–20], more authors reported good level of knowledge about periodontal and systemic disease interactions[13,14,21,22] which is in agreement with our study's findings. As such, the implication of good knowledge level noted in this study is that basic assessment of oral health issues can be addressed by allied healthcare professionals, thereby reducing the burden of oral diseases and improving oral health-related quality of life.

Nurses, being primary care providers, need adequate knowledge to be able to provide effective oral health care. In this study, the demonstration of good knowledge on factors associated with periodontal diseases and its prevention by the respondents further strengthens their ability to diagnose basic oral disease for appropriate first aid care and referral to dental specialists. This finding is in agreement with that of Alzammam et al[21], but contrary to Al Zarea et al[23] who noted poor level of knowledge about periodontal diseases among university students,

especially among those in humanities compared to those from science-based disciplines. With this emphasis, interdisciplinary collaboration between nursing and dental professionals is needed for the development of an oral health curriculum, to enable nurses promote oral health and prevent dental ailments.[10]

Dental practitioners were the most identified sources of knowledge by participants in this study, similarly reported by Umeizudike et al.[13] This indicates that cordial/mutual inter-relationships among various cadres of healthcare professionals will promote knowledge sharing and acquisition for the improvement of healthcare practices in our environment. Nonetheless, other authors[19,24] noted media and internet as the most common sources of knowledge being identified among their respondents. Thus, media houses should be sensitized on promoting oral health information and practices at minimized cost for private dental practitioners, much more at no cost for educational purposes.

Out of all the systemic diseases that have been implicated with periodontal health, diabetes mellitus ranks highest and this has been more documented globally at various levels of scientific reports.[2,6,25] In this study, diabetes was the most identified systemic disease linked with periodontal health, which agrees with findings by Sharrad et al[22] and Alzammam et al[21]. Likewise, studies conducted among dental students by Alade et al[26] and Javed et al[27] reported that they had a fair knowledge about the relationship between periodontal diseases and systemic diseases, being able to identify a link between periodontal diseases and mainly diabetes mellitus. On the contrary, a study conducted among non-dental university students found very poor knowledge regarding the relationship between periodontal disease and systemic diseases.[28] Therefore, it is imperative to emphatically promote oral health education about periodontal-systemic disease relationship, particularly with Diabetes Mellitus, since optimal glycemic control is pivotal and beneficial for periodontal health and vice versa.[26,29]

Only two out of every five of our study participants had ever visited a dentist, significantly noted among DST students compared to the nursing students. Whereas, three out of five were found to had visited a dentist, among healthcare professionals at Chennai, India.[20] This therefore demonstrates a need to ensure increased dental service uptake, especially among healthcare professionals who are at a vantage position to encourage the community at large. As a recommendation, the educational needs assessment of nurses on oral health will motivate the incorporation of a specially-designed nursing dental curriculum for training of undergraduates, as well as continuing nursing education forum.

Dental service utilization and oral hygiene practices were found to be fair, especially among our DST students which is similar to the findings by Aladeet al.[30] Whereas, poor utilization of dental services was reported among secondary students and no perceived need was a major barrier was identified by the authors.[31] Likewise, a Chinese study on the utilization of oral services among college students was reported remarkably low, despite the availability of long-term and favorable health insurance policies.[32] It is, therefore, strongly recommended that oral health Education, should be promoted, and well-equipped dental facilities provided for all population groups. Overall, good knowledge about periodontal-systemic interrelationship was observed more significantly among the DST students.

There is an inevitable need for interdisciplinary collaboration between nursing and dental professionals for the development of oral health curriculum so that nurses can effectively promote oral health and prevent dental diseases in the community. Also, it is imperative that healthcare providers are adequately informed concerning periodontal-systemic interaction. This would motivate them to prioritize oral health care for their patients and appropriately refer patients to dental specialists, thereby improving patients' quality of life.

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Authors' Contributions

EO- conceptualization, data collection and analysis, manuscript writing

OI- data analysis and manuscript writing

MO- conceptualization and manuscript writing