



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2022; 8(2): 561-564
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www.oraljournal.com
Received: 16-03-2022
Accepted: 21-04-2022

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Association between periodontal disease and systemic disease: Awareness and knowledge among medical outpatients in Lagos state university teaching hospital (LASUTH)

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DOI: <https://doi.org/10.22271/oral.2022.v8.i2h.1559>

Abstract

Background: The bidirectional relationship between periodontal diseases and systemic health has recently attracted research attention. Knowledge of this relationship among the populace has not been encouraging. Hence this study is aimed at determining the level of knowledge of the medical outpatients of the Lagos State University Teaching Hospital (LASUTH) Lagos Nigeria about periodontal disease, and its association with general health.

Method: A cross-sectional survey involving 400 medical outpatients in LASUTH. Demographic characteristics, knowledge of periodontal disease, and its association with systemic illnesses were collected via a self-administered questionnaire. Each correct response attracted a score of 1 and 0 respectively. Data was analyzed using SPSS 23 software. Mean and standard deviation was calculated for quantitative variables and appropriate tests were used for hypothesis testing. Bivariate association of the age, sex, level of education, and knowledge of periodontal diseases and the relationship with systemic diseases were estimated. Binary logistic analysis was carried out to control for confounders. Significance was determined at $p \leq 0.05$.

Result: Age ranged from 20-79 years. 51-65 years old formed the largest age group in the study. Male to female ratio was 1:1.2, 124 (31%) had adequate knowledge of periodontal disease while 31 (7.8%) had adequate knowledge of the association between periodontal and systemic diseases. Age ($p=0.00$) was statistically significant with knowledge of both periodontal disease and its association with systemic diseases. Level of education shows statistical significance ($p \leq 0.05$) with knowledge of periodontal disease only. Logistic regression reveals a significant association between age, educational status, and the knowledge of periodontal disease ($p \leq 0.05$), while the secondary level of education was the only significant factor in the knowledge of the association between periodontal disease and systemic diseases $p \leq 0.05$.

Conclusion: Knowledge of Periodontal disease and its association with systemic illnesses among the population studied is grossly inadequate, especially among the lower rung in educational status and the elderly. There is a need for a widespread awareness program via lectures and social media to engage all age groups and social status.

Keywords: Awareness, bidirectional, knowledge, periodontal, systemic

Introduction

Current pieces of evidence suggest that periodontal infection may significantly enhance the risk for certain systemic diseases or alter the natural course of systemic conditions. Examples are cardiovascular diseases (atherosclerosis, coronary heart disease, myocardial infarction, and angina) stroke, Diabetes mellitus, Preeclampsia, Low birth weight infants, and respiratory diseases (chronic obstructive pulmonary disease and pneumonia) [1-6]. A study in Pakistan associated tooth loss with systemic diseases of varying severity [6]. Despite the established bidirectional link between several systemic diseases and periodontal disease, many patients tend to neglect their periodontal health [7-10], this is more exemplified by the chronically ill.

In a Turkish study involving 1,766 medical doctors, about 90% of the respondents consented that there was an association between periodontal disease and systemic diseases compared to about 56% in an Indian study [11, 12]. The majority of them believed that Diabetes mellitus was the most frequently associated with systemic diseases, while more than 50% of the medical doctors have referred their patients to periodontists most commonly for gingival bleeding. Although the majority of the participants had some knowledge of the relationship between periodontal disease and systemic diseases, the knowledge was inadequate.

While some studies have assessed the awareness of medical practitioners about the relationship between periodontal diseases and systemic illnesses [13, 14] none has evaluated the patients' awareness of this relationship in Nigeria. Umeizudike *et al.* in a study involving internal medicine residents in Lagos Nigeria reported that most of the respondents unequivocally implicated periodontal disease as a risk factor for systemic diseases including cardiovascular diseases, type II diabetes mellitus, and preterm birth and hospital-acquired pneumonia. The majority of the residents assert television is their primary source of education on periodontal health [15]. The same team of researchers reported a relatively high level of awareness of periodontal disease among non-medical professionals in a tertiary hospital in the same location in another study. Male gender and higher education were significantly associated with adequacy of knowledge of periodontal disease. It was also reported that 42.7% of the respondents brushes their teeth twice or more daily, while about one-third used other oral hygiene aids such as dental floss [16]. Their dental attendance pattern was less preventive than problem-directed (83.5%). In Another study involving school teachers in Benin city Nigeria, the majority of the respondents reported that periodontal disease is preventable by daily cleaning of the mouth. One-third of the respondents believed that periodontal disease can lead to tooth loss and that dental plaque is the primary aetiology they also agreed that gingival bleeding and swelling are the commonest manifestations of periodontal disease. However, more than 80% were unaware of the role of age and gender as predisposing factors [17]. It is noteworthy that majority of the previous studies emphasised inadequate knowledge of the respondents about periodontal disease and much less the relationship with systemic diseases which only a few studies have assessed in Nigeria. Hence, the objective of this study was to determine the extent of knowledge of periodontal disease among medical outpatients and their knowledge of the association between periodontal disease and systemic disease in a metropolitan Nigerian setting.

Methods

A cross-sectional survey using a self-administered questionnaire was conducted among 400 medical outpatients in LASUTH between July-September 2021. Demographic characteristics, knowledge of periodontal disease and its association with systemic illnesses; and, attitudes towards periodontal health were collected. Each correct response to the questions assessing the knowledge of periodontal disease and the association between periodontal disease and systemic disease/medication attracted a score of 1, and a score of 0 for wrong response. 0-11 was scored for knowledge about periodontal disease, and 0-22 was scored for knowledge about the association between periodontal & systemic diseases. The scores were dichotomized into 0-5 (Inadequate) and 6-11 (Adequate) for knowledge about periodontal disease. 0-11 (Inadequate) 12-22 (Adequate) for knowledge about the association between periodontal & systemic diseases.

Data was analyzed using SPSS software. Mean and standard

deviation was calculated for quantitative variables such as age. The Chi-square and Fisher's exact tests were used for hypothesis testing and bivariate association of age, sex, level of education, and the knowledge of periodontal diseases and the relationship with systemic diseases. Multivariate binary logistic analysis was carried out to control for confounders and test for the relationship between Periodontal diseases' knowledge and association with systemic diseases. A p-value of ≤ 0.05 was considered statistically significant.

Results

A total of 400 subjects participated in this study. Age ranged from 20-79 years 51-65 years old formed the largest age group in the study. The male to females ratio was 1:1.2, 124 (31%) had adequate knowledge of periodontal disease while 31 (7.8%) had adequate knowledge of association between periodontal and systemic diseases. 24.5% of respondents correctly identified periodontal disease as a risk factor for heart disease. 7.3% identified for chronic kidney disease, 17.3% for rheumatism and 18% for diabetes mellitus. 92% of participants were willing to learn more about periodontal disease via the 2 most preferred means were 21.5% with lectures, 38.5% with social media.

Table 1: Sociodemographic variables of the medical outpatients

Variable	Unit	Frequency	Percent
Age (years)	20-35	74	18.5
	36-50	99	24.8
	51-65	170	42.5
	>65	57	14.2
Gender	Male	186	46.5
	Female	214	53.5
Level of Education	Primary	9	2.2
	Junior Secondary	10	2.5
	Senior Secondary	186	46.5
	Tertiary		48.8

Table 2: Association of sociodemographic level and awareness of periodontal disease

Variable	Unit	Inadequate	Adequate	P-value
Age (years)	20-35	32	42	0.000*
	36-50	76	23	
	51-65	131	39	
	>65	37	20	
Gender	Male	129	57	0.914
	Female	147	67	
Level of Education	Primary	8	1	0.000*
	Junior Secondary	3	7	
	Senior Secondary	147	39	
	Tertiary	118	77	

*significant

Table 3: Association between sociodemographic variables and level of knowledge of association between systemic diseases and periodontal disease.

Variable	Unit	Inadequate	Adequate	P-value
Age (years)	20-35	70	4	0.005*
	36-50	84	15	
	51-65	158	12	
	>65	57	0	
Gender	Male	168	18	0.194
	Female	201	13	
Level of Education	Primary	9	0	0.080
	Junior Secondary	10	0	
	Senior Secondary	177	9	
	Tertiary	173	22	

*significant

Age ($p=0.00$) showed to be statistically significant with knowledge of both periodontal disease and its association with systemic diseases (Table 2&3). Level of education and socioeconomic status also show statistical significance ($p\leq 0.05$) with knowledge of periodontal disease but not for association with systemic disease (Table 2&3). The male gender constituted a lower percentage (45.9%) of those with adequate knowledge of periodontal disease and a higher

percentage (58.1%) of those with adequate knowledge of the association between periodontal and systemic diseases. The relationship is not statistically significant in both cases (periodontal disease knowledge $p=0.914$, and association of periodontal and systemic diseases ($p=0.914$). There was significant relationship between patients with Diabetes mellitus, stroke, rheumatoid arthritis ($p\leq 0.05$) and knowledge of periodontal disease this was insignificant for others.

Table 4: Binary logistic regression to test association of the covariates and knowledge of the respondents

	Variables	Odds ratio	Standard error	Degree of freedom	P value	Confidence interval	
						Lower	Upper
Knowledge of periodontal disease	Age groups	-.383	.128	1	.003*	.531	.877
	Sex	-.039	.250	1	.877	.590	1.570
	Uneducated	-1.456	1.090	1	.182	.028	1.976
	Primary	1.739	.758	1	.022*	1.288	25.157
	Secondary	-.870	.240	1	.000*	.262	.670
	Tertiary	.673	.273	1	.014*	1.148	3.347
Knowledge of association between periodontal disease and systemic diseases	Age groups	-.267	.210	1	.204	.507	1.156
	Sex	.350	.407	1	.390	.639	3.151
	Uneducated	-18.755	13328.635	1	.999	.000	
	Primary	-18.760	12683.062	1	.999	.000	
	Secondary	-.915	.417	1	.028*	.177	.908
	Tertiary	.290	.447	1	.517	.556	3.211

*Significant

Logistic regression (Table 4) significant association between age, educational status (primary, secondary and tertiary) and the knowledge of periodontal disease among the medical outpatients ($p\leq 0.05$), while secondary level of education was the only significant factor for the knowledge of association of periodontal disease and systemic diseases ($p\leq 0.05$).

Discussion

A larger proportion of the participants in this study were between the fourth to the sixth decade of life, which signifies that a lot of them were managing at least one systemic disease (Table 1). This study revealed inadequate knowledge of periodontal disease in the population studied as about 30% of the subjects gave evidence of adequate knowledge, this is similar to the results of previous studies [15, 16, 17]. The assessment of the subjects' knowledge about the association between periodontal disease and systemic diseases showed a much lower response at less than 10% (Table 2&3), this emphasizes the low level of periodontal health education among Nigerians corroborated by a systematic review that assessed twenty-four studies from fourteen countries [18]. The fact that about one-fifth of the respondents could associate periodontal disease and Diabetes mellitus underscores the recent efforts by Periodontologists targeted at educating Diabetics about the bidirectional relationship between their oral health status and control of their blood sugar, this was far less for other systemic diseases [19]. The inadequate knowledge of medical practitioners about periodontal disease and the association with systemic diseases is quite alarming [11, 12, 13, 15].

Age and educational status (primary, secondary and tertiary) were significant determinants of the knowledge of the periodontal disease among the population studied (Table 4), this is not unexpected as the majority of the subjects were in their fifth decade and above. The secondary level of education was the only significant factor for the knowledge of the association between periodontal disease and systemic diseases in this study, this is because the secondary level of education was the highest for the majority of the respondents, a larger non-hospital-based survey may reflect a more representative

result. Education cannot be overemphasized in making healthy choices.

While a lot of the respondents got their information through the television, almost all the participants in this study were willing to learn more about periodontal disease and its association with systemic diseases, their most preferred modes of enlightenment were through public lectures and social media, this further established the preference of the respondents in previous studies in Benin-city and Lagos [14, 15], two metropolitan settings in Nigeria. The use of print and electronic mass media need also to be further enhanced.

Conclusion

This study emphasized the important role education and age plays in the awareness of periodontal diseases and the associated systemic diseases among patients. Knowledge of Periodontal disease and its association with systemic illnesses among medical outpatients is grossly inadequate, especially among the lower rung in educational status and the elderly. There is a need for a widespread awareness program via lectures and social media to engage all age groups and social status. Adequate awareness of this subject will motivate patients to seek preventive dental care which will impact positively their general health. Medical doctors and other health personnel irrespective of the cadre should also be a target of further enlightenment on the role of the periodontal status of their patients in the management of their overall health and treatment outcomes. There is no conflict of interest.

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