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Correlating The Knowledge Of The Complications Of Poor Oral Hygiene With Oral Hygiene Practices In A Population Of Nigerians.

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Abstract

Introduction

Poor oral hygiene and its complications have been well studied; research has revealed the positive impact of good oral hygiene practices on both oral and systemic health. However, the impact of the knowledge of these complications and oral hygiene practices demands more research attention.

Objectives

To evaluate the level of knowledge of oral and systemic complications of poor oral hygiene and the correlation of this knowledge with oral hygiene practices of the participants in this study.

Methodology

This was a cross-sectional study involving 248 patients of the Family Medicine Department at the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos. Data collection was done with a self-administered questionnaire to obtain socio-demographics, knowledge of the oral and systemic complications of poor oral hygiene, and their oral hygiene practices. Data analysis was carried out using SPSS version 24. Descriptive statistics were used for socio-demographics and knowledge of oral and systemic complications associated and oral hygiene practices. Bivariate analysis was done to test for the association between knowledge of the complications and oral hygiene practices. Statistical significance was determined at $p \leq 0.05$. Phi and Cramer's V correlation coefficients were used to assess the correlation between the knowledge of the complications and the oral hygiene practices.

Results

The majority of the subjects in the study were between 20 and 39 years old. The Mean age was 40±16.5. The male-female ratio was 1.25:1. 190(76.6%) of the subjects attained up to the tertiary level of education. 224(90.3%) and 146(58.9%) of the subjects believed that poor oral hygiene can predispose to oral and systemic complications, respectively. The knowledge of the oral complications of poor oral hygiene showed a significant association with brushing techniques of the respondents ($p = 0.001$), their dentifrices ($p=0.001$) and dental floss use ($p=0.003$) while the Cramer's V correlation coefficient and Phi coefficient were 0.29, 0.28, and 0.19 respectively. The knowledge of the respondents of systemic complications of poor oral hygiene had a significant association with their toothbrush texture ($p=0.03$), brushing technique ($p=0.03$) and dental visit ($p=0.001$), and Cramer's V correlation coefficient of 0.17, 0.19 and 0.33, respectively.

Conclusion

This study showed that the knowledge of the complications of poor oral hygiene is strongly associated with a few aspects of oral hygiene practices. More emphasis should be placed on educating the population about the systemic complications of poor oral hygiene and also on other aspects of oral hygiene practices.

Keywords: *Correlation, Poor Oral Hygiene, Systemic complications, Oral hygiene Practices*

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I. Introduction

Oral health disorders include a range of largely preventable diseases, including periodontal disease, dental caries, mouth sores, oral malodour, plaque and calculus deposits, gingival bleeding, gingival swelling, dry mouth, cancers and many others. Studies have established a significant relationship between oral diseases and systemic health [1, 2]. The World Health Organisation (WHO) (2016) reported that almost 4 billion people worldwide suffer from one oral disease or another [1]. Commendable oral hygiene practices involve meticulous hygiene procedures aimed at keeping the teeth and the soft tissues, including the gingiva, palate and the tongue, clean to maintain a healthy mouth. Good oral hygiene practice prevents consequent loss of teeth resulting from dental caries and periodontal disease [1, 2].

In a study assessing a cohort of data from the British Regional Health Study (BRHS) involving more than 2000 subjects aged between 71 and 92 years, and the Health, Ageing and Body Composition (HABC) Study (USA), which involved more than 3000 subjects aged between 71 to 80 years. Findings suggest that poor oral health among the subjects is associated with mortality from cardio-respiratory causes. This emphasises that improving oral health can lengthen survival among the aged [3]. Poor oral hygiene and its sequelae have been associated with many systemic disorders, such as cardiovascular diseases, metabolic diseases such as diabetes mellitus, autoimmune diseases such as rheumatoid arthritis, cognitive decline as in Alzheimer's disease, obstructive sleep apnea and many others.[4]

Dental caries, caused by bacterial destruction of hard tooth tissue, is associated with systemic inflammation, which is a contributing factor to hypertension. Dental caries, predominantly caused by Streptococcus mutans and Lactobacillus species, is one of the most common oral diseases. However, the impact of the oral bacteria goes beyond the mouth into the blood circulation and affects other regions of the body, especially when poor oral hygiene is persistent. This oral-systemic microbial migration, in many cases, potentiates the onset and severity of several systemic disorders [5,6,7]. In the same vein, periodontal disease, which is usually exemplified by inflammation of the gingiva and other periodontal tissues, has been associated with impaired glycemic control in diabetes mellitus. Several other systemic conditions, such as rheumatoid arthritis, cardiovascular disease, neurological diseases, poor birth outcomes and many others have been related to such inflammation. Proinflammatory mediators like interleukin-6 and tumour necrosis factor-alpha, which are found in the mouth, are also transferred through the circulation and eventually lead to systemic inflammation [5].

Knowledge of oral health is a fundamental prerequisite for healthy behaviour, enabling individuals to take measures to protect their own health. Tadin, in a study involving 1088 university students in Croatia, found that 1045(96%) believe that poor oral hygiene can lead to oral health complications, while 1006(95.5%) believe that oral health is closely associated with systemic health [6]. They also found out that less than 30% go for a dental check-up every 6 months [6]. In a Rwandan study involving 426 participants, Poor oral health knowledge, poor oral health attitudes, and poor oral health practice was found in 42%, 12.44% and 67.37% of the participants respectively, High school level of education was found to be significantly associated with better oral health knowledge OR: 1.79, 95% CI 1.14; 2.82; p = 0.011 [7]

A Nigerian survey revealed that 94% of 404 participants agreed that poor oral hygiene can result in intraoral complications. More than 90% of the participants believed that visiting the dentist was important. Poor oral hygiene was believed to result in bad breath by 82% of the participants. In the same study, 62.8% of the participants primarily used the vertical stroke technique when brushing, while 17.4% used the horizontal scrub technique. Moreover, 67.4% and 26.5% of the participants brushed twice daily and once daily, respectively. The use of dental floss was, however, found to be low in the study [8]. In another Nigerian study involving 2097 secondary school students, the mean oral health knowledge score was 15.1% ± 6.6%. The mean oral health attitude score was 44.5% ± 14.3% while the mean oral health practices score was 42.5% ± 13.8% [9].

Sorunke et al. (2021) assessed the awareness of a Nigerian population regarding the link between periodontal disease, an oral complication of poor oral hygiene, and systemic diseases. It was found that a higher proportion of the study participants had poor knowledge about systemic complications of poor oral hygiene (66.1%), while about 40% had a good knowledge of periodontal disease. It was also found that participants from the upper socioeconomic class had a significantly higher proportion of those with good knowledge of periodontal disease (56.0%; p = 0.002) and systemic complications (19.0%; p = 0.008) [10].

While several studies have affirmed the relationship between poor oral hygiene and several oral/systemic conditions [1-5], and some others have examined the oral hygiene practices of different populations [11,12], none have assessed the correlation between them. Ascertaining this relationship will reveal the direction of intervention and enhance the depth of oral health education applicable, especially as regards the choice of wholesome oral hygiene practices in the population. This study, therefore, aims to assess the knowledge of a population of Nigerians about the complications of poor oral hygiene and also to determine the correlation between it and their oral hygiene practices.

II. Methodology

The study location was the Family Medicine Department at the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos, Nigeria. LASUTH is a major tertiary and referral hospital in Southwest Nigeria. The Department of Family Medicine has an influx of more than 2000 new patients monthly, presenting with various medical conditions. A substantial number of them were referred to specialist clinics in the hospital, while quite a number were entirely managed in the centre.

This was a cross-sectional study involving 248 patients, 110 of whom were males and 138 females. Sample selection was by convenient sampling. Inclusion Criteria included subjects who were aged 16 years and above. Excluded were subjects who were dental students, dental nurses, dental technologists and dental surgeons.

Ethical approval for this research was obtained from the Health Research and Ethics Committee of Lagos State University Teaching Hospital (LASUTH).

Data collection was done with a self-administered questionnaire, which comprises both open and closed-ended questions. This was used to obtain the biodata such as age, sex, occupation, marital status, and educational status. The respondents' knowledge of the oral and systemic complications of poor oral hygiene was assessed on the questionnaire. The oral hygiene practices of the respondents were also assessed and recorded with the questionnaire. Written informed consent was obtained from the subjects before they participated in the study.

Data analysis was carried out using SPSS version 24. For descriptive variables that are continuous such as age, the mean, minimum, and maximum and measures of variability were determined. While simple frequency and percentages were determined for categorical variables such as age groups, sex, educational status, occupation, knowledge of oral and systemic complications of poor oral hygiene and variables assessing the oral hygiene practices. Bivariate analysis was done using a Pearson's chi-square or Fisher's exact as appropriate for the variables assessing the association between the knowledge of the complications and those assessing the oral hygiene practices to test for a significant difference. Statistical significance was determined at $p \leq 0.05$. Phi and Cramer's V correlation coefficients were used to assess the correlation between the knowledge of the complications and the oral hygiene practices of the respondents. 0 was classified as no correlation, values >0 - 0.05 are considered as very weak correlation, >0.05-0.10 is considered as a weak correlation, and values >0.10 – 0.15 were classified as moderate correlation, >0.15 – 0.25 were considered as strong correlation, while values >0.25 were classified as very strong correlation [13].

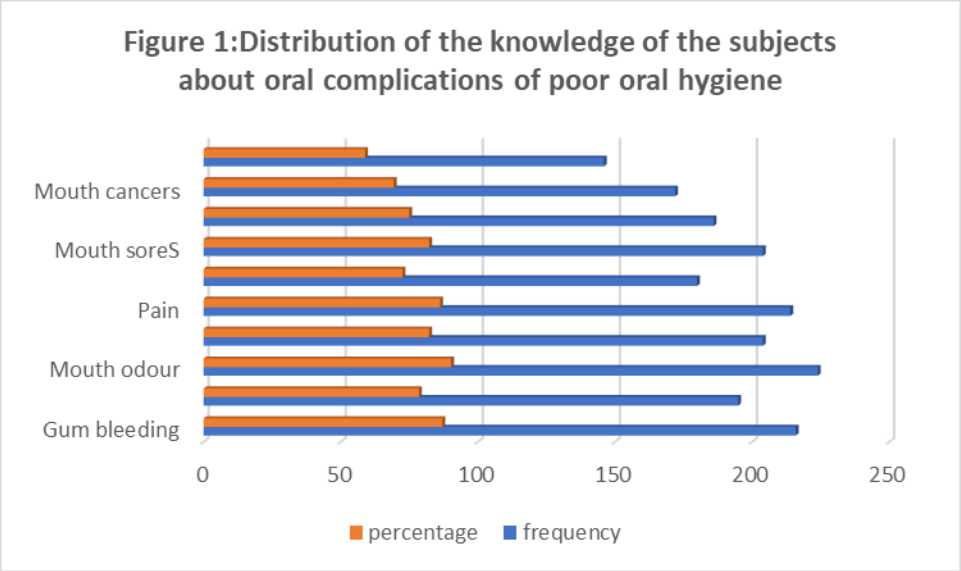
III. Results

Mean age was 40±16.5 with age ranging from 14 to 74. Table 1 shows that the majority of the subjects are in the 20-29 and the 30-39 age groups. There are 138(55.6%) females compared to the males who are 110(44.4%) in this study. Most 190(76.6%) of the subjects attained up to the tertiary level of education. One hundred and twenty-two (49.2%) were single, while 120(48.4%) were married. The professionals 96(38.7%) were more than other occupational groups, followed by the skilled workers 72(29%) the least were the retirees 20(8.1%). Ten(4%) of the subjects reported that they smoke cigarettes, while 214(86.3%) believe that smoking can cause gum disease, and 2(0.8%) do not know if it causes it.

Table 1: Socio-demographics of the respondents

Variable		Frequency	Percentage
Age	10-19	16	6.5
	20-29	66	26.6
	30-39	58	23.4
	40-49	30	12.1
	50-59	36	14.5
	>60	42	16.9
Sex	Male	110	44.4
	Female	138	55.6
Educational level	None	4	1.6
	Primary	2	0.8
	Secondary	52	21.
	Tertiary	190	76.6
Marital status	Single	122	49.2
	Married	120	48.4
	Divorced/separated	6	2.4
Occupational status	Unskilled	12	4.8
	Skilled	72	29
	Student	48	19.4
	Professional	96	38.7
	Retired	20	8.1

Two hundred and twenty-four (90.3%) of the subjects believed that poor oral hygiene can predispose to oral complications, while 146(58.9%) believed that it can give rise to many systemic complications, such as cardiovascular, musculoskeletal, metabolic, and other conditions. For the oral complications, 216(87.1%) believes that poor oral hygiene can lead to gum bleeding, for other oral conditions it is mouth odour 224(90.3%), cavities (dental caries)195(78.6%), loss of teeth 204(82.4%), pain 214(86.3%), poor mastication 180(72.6%), mouth sores 204(82.3%) jaw swelling 186(75%), and mouth cancers 172(69.4%). Figure 1



Knowledge of oral complications of poor oral hygiene versus oral hygiene practices

Table 2 showed that two hundred and forty-two (97.6%) of the respondents use tooth brush clean their mouth. 218(97.3%) of those with the knowledge of the oral complications of poor oral hygiene use a toothbrush, and 6(2.7%) use a chewing stick to clean their mouth. The association was not statistically significant, p>0.05.

Most of the subjects, 130(52.4%), brush their mouth once daily, while 112(45.2%) brush twice daily. Of those with the knowledge of the complications of poor oral hygiene, 114(50.9%) brush once daily, while 104(46.4%) brush twice daily. This association was not significant, p>0.05.

A majority, 158 (63.7%), use a medium-textured toothbrush, followed by 56 (22.6%) who use a soft toothbrush, and 34 (13.7%) who use a hard toothbrush. Out of those with knowledge of the oral complications of poor oral hygiene, 140 (62.5%) use medium-textured brushes, followed by 52 (23.2%) who use soft-textured brushes. This association is also not significant, p >0.05.

Assessment of the brushing technique of the subjects showed that most of the respondents use mostly vertical strokes, 94(37.9%), followed by 86 (34.7%) who use horizontal strokes. Of those with appreciable knowledge of the oral complications of poor oral hygiene most 94(42%) use the horizontal strokes, mainly followed by vertical strokes 82(36.7%), while 10(4.5%) use the vibratory strokes. This association was statistically significant, p = 0.001, while the Cramer's V correlation coefficient was 0.29, showing a very strong correlation

One hundred and eighty-eight (75.8%) of the subjects use fluoridated toothpaste to brush their teeth, followed by 26(10.5%) who use tooth powder, and 24 (9.7%) use herbal toothpaste. Of those knowledgeable of the oral complications of poor oral hygiene, 170(75.9%) use fluoridated toothpaste, 24(10.7%) use toothpowder, 22(9.8%) use herbal toothpaste and 8(3.6%) use charcoal. This association is significant, p=0.001; the Cramer's V correlation coefficient was 0.28, which showed a very strong correlation.

One hundred and thirty-two (53.2%) use dental floss compared to 116(46.8%) who do not. Of those who are knowledgeable of the oral complications of poor oral hygiene, 126(56.3%) use dental floss, against 98(43.8%) who do not. This association is also very significant, p=0.003; the Phi correlation coefficient was 0.19, which also showed a strong correlation.

Assessment of the respondents' routine dental checkup showed that 164(66.1%) never visited the dentist for a checkup, while 84 (333.8%) did, and of those who are knowledgeable about the oral complications of poor oral hygiene, 146(65.2%) never had a routine visit to the dentist, against 78(34.8%) respondents

who did. This is not statistically significant. Most of the respondents, 158(63.7%), never visited the dentist for any reason, similar to the 140(62.5%) of those knowledgeable of the oral complications. Forty-six (20.5%) had visited the dentist once a year with a complaint, and 32(14.2%) visited at least twice a year. This was not statistically significant, p>0.05.

One hundred and two (41.1%) of the subjects never had scaling of their teeth done, while 60(24.2%) had it done once. Of those with knowledge of oral complications, 90 (40.2%) never had scaling of their teeth done, while 54 (24.1%) had it done once, and 32 (14.3%) had it done more than twice. This association was, however, not significant (p> 0.05).

Table 2: Correlation of the knowledge of oral complications and oral hygiene practices

Oral hygiene practice		Knowledge of oral complications			P value	Cramer's V correlation coefficient	Phi coefficient
		Yes n(%)	No n(%)	Total n(%)			
		224(90.3)	24(9.7)	248(100)			
What do you use to clean your teeth	Chewing stick	6(2.7)	0	6(2.4)	0.42	0.052	0.052
	Toothbrush	218(97.3)	24(100)	242(97.6)			
How often do you brush your teeth daily?	Once	114(50.9)	16(66.7)	130(52.4)	0.20	0.10	-0.10
	Twice	104(46.4)	8(33.3)	112(45.2)			
	More than twice	6(2.7)	0	6(2.4)			
What texture of toothbrush do you use?	Soft	52(23.2)	4(16.7)	56(22.6)	0.40	0.078	0.078
	Medium	140(62.5)	18(75)	158(63.7)			
	Hard	32(14.3)	2(8.3)	34(13.7)			
Brushing technique	Horizontal scrub	94(42)	2(8.3)	86(34.7)	0.001*	0.29	0.29
	Vertical	82(36.7)	12(50)	94(37.9)			
	Circular	38(17)	10(41.7)	48(19.4)			
	Vibratory	10(4.5)	0	10(4)			
What do you use with your toothbrush?	Fluoridated toothpaste	170(75.9)	18(75)	188(75.8)	0.001*	0.28	0.28
	Toothpowder	24(10.7)	2(8.3)	26(10.5)			
	Charcoal	8(3.6)	0	8(3.2)			
	Herbal toothpaste	22(9.8)	2(8.3)	24(9.7)			
	Others	0	2(8.3)	2(0.8)			
Do you use dental floss?	Yes	126(56.3)	6(25)	132(53.2)	0.003*	0.19	0.19
	No	98(43.8)	18(75)	116(46.8)			
Do you go for routine dental visits?	Yes	78(34.8)	6(25)	84(33.9)	0.23	0.061	0.061
	No	146(65.2)	18(75)	164(66.1)			
How often have you visited the dental clinic?	Never	140(62.5)	18(75)	158(63.7)	0.06	0.16	0.16
	Once/year	46(20.5)	4(16.5)	50(20.2)			
	Every 3 months	6(2.7)	2(8.3)	8(3.2)			
	Every 6 months	32(14.3)	0	32(12.9)			
How many times have you had your teeth scaled?	Never	90(40.2	12(50)	102(41.1)	0.73	0.073	0.073
	Once	54(24.1)	6(25)	60(24.2)			
	Twice	48(21.2)	4(16.5)	52(21)			
	More than twice	32(14.3)	2(8.3)	34(13.7)			

* significant

Knowledge of the systemic complications of poor oral hygiene versus the oral hygiene practices

Table 3 shows that 146 (58.9%) of the subjects believe there are systemic complications associated with poor oral hygiene, while 102 (41.1%) believe there are no systemic complications. 144(98.6%) of those who knew that there are systemic complications use a toothbrush to clean their teeth, while 2(1.4%) use a chewing stick. The association was not significant, p>0.05.

Most of the subjects knowledgeable about the systemic complications brushed between once 72(49.3%) and twice 70(49%) daily, the association was also not significant, p>0.50.

The majority, 84(57.6%) of them use a medium-textured toothbrush, while 36(24.7%) use soft-textured, and 26(17.8%) use hard. The association in this case was significant, p=0.03, and the Cramer's V correlation coefficient was 0.17, which indicates a strong correlation.

Horizontal brushing technique was the most common among this group of respondents, 62(42.5%). Fifty-six (38.4%) use vertical strokes, the least were those who use vibratory movements, 8(5.5%). This association was also significant (p=0.03) with Cramer's V correlation coefficient of 0.19, showing a strong correlation.

One hundred and ten (75.3%) of this group of subjects use mainly fluoridated toothpaste, while 14(9.6%) use toothpowder and herbal toothpaste, and 8(5.5%) use charcoal to clean the teeth. The association was not significant, p>0.05.

Seventy-eight (53.4%) of those knowledgeable about the systemic complications used dental floss, while 68(46.6%) did not. Fifty (34.2%) visit the dental clinic for a routine check-up, while 90(65.6%) do not. The association of these two practices with the knowledge of systemic complications was not significant p>0.05. Ninety-four(64.4%) of them have never visited the dentist for any reason, while 20(13.7%) had visited once and 30(20.6%) twice. This association was significant, p=0.001, with Cramer's V correlation coefficient of 0.33; this indicates a very strong correlation. Sixty (41.4%) had never had scaling of their teeth done, those that had ever had it done once and twice or more were 38(26%), 30(20.6%) and 18(12.3%) respectively. The association of this with the knowledge of systemic complications was not significant, p=0.70.

Table 3: Correlation of the knowledge of systemic complications and the oral hygiene practices.

Oral hygiene practice		Knowledge of systemic complications			P value	Cramer's V correlation coefficient	Phi coefficient
		Yes n(%)	No n(%)	Total n(%)			
		146(58.9)	102(41.1)	248(100)			
What do you use to clean your teeth	Chewing stick	2(1.4)	4(3.9)	6(2.4)	0.20	0.082	-0.082
	Toothbrush	144(98.6)	98(96.1)	242(97.6)			
How often do you brush your teeth daily?	Once	72(49.3)	58(56.7)	130(52.4)	0.50	0.075	0.075
	Twice	70(49)	42(41.2)	112(45.2)			
	More than twice	4(2.7)	2(2)	6(2.4)			
What texture of toothbrush do you use?	Soft	36(24.7)	20(19.6)	56(22.6)	0.03*	0.17	0.17
	Medium	84(57.5)	74(72.6)	158(63.7)			
	Hard	26(17.8)	8(7.8)	34(13.7)			
Brushing technique	Horizontal scrub	62(42.5)	34(33.3)	86(34.7)	0.03*	0.19	0.19
	Vertical	56(38.4)	38(37.3)	94(37.9)			
	Circular	20(13.7)	28(27.5)	48(19.4)			
	Vibratory	8(5.5)	2(2)	10(4)			
What do you use with your toothbrush?	Fluoridated toothpaste	110(75.3)	78(76.5)	188(75.8)	0.06	0.19	0.19
	Toothpowder	14(9.6)	12(11.8)	26(10.5)			
	Charcoal	8(5.5)	0	8(3.2)			
	Herbal toothpaste	14(9.6)	10(9.8)	24(9.7)			
	Other	0	2(2)	2(0.8)			
Do you use dental floss?	Yes	78(53.4)	54(52.9)	132(53.2)	0.90	0.005	0.005
	No	68(46.6)	48(47.1)	116(46.8)			
Do you go for routine dental visits?	Yes	50(34.2)	34(33.3)	84(33.9)	0.90	0.009	0.009
	No	96(65.6)	68(66.7)	164(66.1)			
How often have you visited the dental clinic?	Never	94(64.4)	64(62.8)	158(63.7)	0.001*	0.33	0.33
	Once/year	20(13.7)	30(29.4)	50(20.2)			
	Every 3 months	2(1.4)	6(5.9)	8(3.2)			
	Every 6 months	30(20.6)	2(2)	32(12.9)			
How many times have you had your teeth scaled and polished?	Never	60(41.1)	42(41.2)	102(41.1)	0.70	0.064	0.06
	Once	38(26)	22(21.6)	60(24.2)			
	Twice	30(20.6)	22(21.6)	52(21)			
	More than twice	18(12.3)	16(15.7)	34(13.7			

*significant

Table 4: Binary logistic regression to show the relationship of the subjects' knowledge of the complications of poor oral hygiene and their oral hygiene practices

Variables in the Equation									
Oral hygiene practices		Odds	S.E.	Wald	df	Sig.	Odds ratio(OR)	95% Confidence interval (CI).	
								Lower	Upper
	Dental cleaning tool	8.998	7825.287	.000	1	.999	8089.767	.000	.
	Frequency of brushing	-.454	.537	.716	1	.397	.635	.222	1.818
	Texture of toothbrush	-.242	.357	.459	1	.498	.785	.390	1.580
	Technique of brushing	.812	.271	8.950	1	.003	2.252	1.323	3.833
	Choice of Dentrifice	.186	.200	.872	1	.351	1.205	.815	1.781
	Dental floss use	1.403	.638	4.839	1	.028	4.068	1.165	14.200
	Frequency of dental visits	-.942	.670	1.979	1	.159	.390	.105	1.448
	Routine dental visit	-2.066	1.069	3.734	1	.053	.127	.016	1.030

	Teeth scaling experience	-.403	.234	2.969	1	.085	.668	.423	1.057
	Constant	-27.275	23475.860	.000	1	.999	.000		
.									

Table 4 shows that the technique of toothbrushing OR = 2.25, 95% CI(1.32, 3.83), use of dental floss OR = 4.07, 95% CI(1.17, 14.20) and routine dental visits OR = 0.13, 95% CI(0.02, 1.03) were the factors related to the knowledge of the complications of poor oral hygiene by the participants $p \leq 0.05$, when the confounders were controlled for.

IV. Discussion

The majority of the subjects in the study were between 20 and 39 years old. The female-to-male ratio was 1.26:1. More than three-fifths of the subjects attained up to the tertiary level of education. About half of the participants were married. More than 70% were skilled workers, and the least were the retirees. Cigarette smoking was low among the subjects, as just 4% reported in the affirmative, and almost 90% believe that smoking can predispose to periodontal disease. A previous study in Nigeria reported a 10.4% prevalence in Nigeria [14]. More than 90% of the subjects believed that poor oral hygiene can predispose to complications in the mouth, which is comparable to 81% reported in another study [15]. This is higher than just about 60% who believed that it can give rise to systemic complications, such as cardiovascular, musculoskeletal, metabolic, and other conditions, in this study. A study showed that only about 30% of university students knew that poor oral hygiene can lead to systemic complications in Cyprus [16].

Almost every participant in this study uses a toothbrush to clean their mouth, which is higher than a previous Nigerian study by Osadolor and Osadolor [17] that reported 82.5% of the participants use a toothbrush only as an oral hygiene aid; they also reported that 67.2% of the subjects in their study brush once a day while 32.8% brush twice a day. This differs from this study, where almost an equal number of them brush once and twice daily. The medium-textured toothbrush was the most common form used, followed by soft, and a few used a hard toothbrush, similar to a study in Ile Ife, Nigeria, that reported about 53% of the subjects used a medium-textured toothbrush. They also reported majority of the correspondents used the vertical strokes technique in brushing their teeth [18], as was found in this study. Most of the subjects use fluoridated toothpaste to brush their teeth, while about 10% use herbal toothpaste. A study by Adegbulugbe in Lagos, Nigeria, revealed that the presence of fluoride determined the choice of dentrifice by 53.7% of the participants [19]. A little more than 50% of the subjects in this study use dental floss routinely. This is a far cry from another study among Nigerian undergraduates, where 79.2% of the respondents used toothpicks, and only 9.1% used dental floss [20]. But in the same study [20], 54.7% had visited the dentist before, compared to less than 40% in this study. The use of dental floss in this study may be because of the metropolitan location of our study, where there is a lot more media advertising of the oral hygiene aids, which may also reduce their hospital visits because of the resultant fewer dental complaints.

The brushing technique, choice of dentrifice and use of dental floss by the subjects all displayed a significant association and strong correlation with the knowledge of oral complications associated with poor oral hygiene. These significant factors seemed to focus more on the aesthetics and function of the oral tissues, as they mainly involve just the use of dental hygiene aids. The dental cleaning tools (toothbrushes/chewing sticks) used, the frequency of toothbrushing, the choice of toothbrush texture, dental visits, and scaling experience were not associated with knowledge of oral complications resulting from poor oral hygiene. This showed the limited level of oral/dental health literacy among the subjects, which is similar to other studies [8,21].

Concerning the knowledge of the systemic complications of poor oral hygiene, there was a significant association and strong correlation with the choice of toothbrush texture, the brushing technique and the frequency of dental visits by the participants. The higher risk morbidity and mortality associated with systemic diseases may belie the association of dental visits with the knowledge of the systemic complications of poor oral hygiene. This is supported by a study that propounds that when a patient is conversant with the severity of their disease, their illness perception and self-care are enhanced [22].

Other factors considered, such as dental cleaning tool, frequency of brushing, choice of dentrifice, dental floss use, and teeth scaling experience, showed no association with the knowledge of the systemic complications of poor oral hygiene. The technique of toothbrushing OR ;2.25, 95% CI (1.32, 3.83), use of dental floss OR; 4.07, 95% CI (1.17, 14.20) and routine dental visits OR; 0.13, 95% CI (0.02, 1.03) were the factors related to the knowledge of the complications of poor oral hygiene by the participants $p \leq 0.05$, when the confounders were controlled for this still emphasized that other oral health practices need to be reinforced among the population.. Integrating oral health education into the training of public health officers and nurses will further enhance the oral health attitude and behaviour of the larger population [23].

V. Conclusion

It is evident from this study that only some of the oral hygiene practices correlate with the knowledge of the oral (Brushing technique, choice of dentrifice, use of dental floss) and systemic (texture of toothbrush, brushing technique, frequency of dental visit) complications of poor oral hygiene. It is also noted that a higher level of knowledge of the systemic complications of poor oral hygiene can enhance dental visits by the people. An intense effort and policies directed at educating the population on preventive oral hygiene practices without deemphasising anyone, including the frequency of toothbrushing, choice of correct toothbrushing aids and the need for regular dental checkups. It is also important that the population should be well educated about the systemic complications of poor oral health, which may be debilitating and can be the cause of death. Oral health education should also be included in the curriculum of nursing and public health students so that they reach out to the wider population about the complications of poor oral hygiene.

Conflict of interest- Nil

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