



Prevalence, Risk Factors and Pattern of Distribution of Gingival Recession among Hospital-Based Patients in University of Port Harcourt Teaching Hospital

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ABSTRACT

Background: Gingival recession is an undesirable and common condition in dental practice and has multiple etiological factors.

Objective: To determine the prevalence, possible risk factors and pattern of distribution of gingival recession among patients attending the periodontology clinic of the University of Port Harcourt Teaching Hospital, Rivers State.

Materials and method: A descriptive cross-sectional study of all patients attending the Periodontology clinic at the Dental Centre of University of Port Harcourt Teaching Hospital, Rivers State over a three months period from October 2017 to December 2017. A self-administered questionnaire was used to obtain information on socio-demographics and oral health practices. Oral examination was done to determine the presence of plaque, calculus and gingival recession. Data analysis was done using the Statistical Package for Social Sciences (Version 21.0. Armonk, NY: IBM Corp.). P -value ≤ 0.05 was considered to be significant.

Results: One hundred and nine patients attended the periodontology clinic during the study period. The age range was 17 to 74 years with a mean age of 33.9 ± 13.8 years and a male 47 (43.1%) to female 62 (56.9%) ratio of 1:1.3. The prevalence of gingival recession in this study was 32.1%. Thirty-five patients (32.1%) comprising 18 males and 17 females had gingival recession. The overall mean number of recessed teeth was 5.28 ± 5.07 . Maxillary left premolars had the highest number of affected sites 26 (14.1%). Age, occupation and brushing technique ($p < 0.05$) were the significant risk factors for gingival recession. The mean number of sites with recessions increased with age, rising from 3.6 in the 20-29 years age group to 17.1 in the >60 years age group, although there was no statistically significant association ($p > 0.05$) between age and recession.

Conclusion: About one-third of the study population had gingival recession. Age, occupation and brushing techniques were the significant risk factors. Males and maxillary left premolars had more sites with gingival recession.

Keywords: Gingival Recession, Prevalence, Risk Factors





INTRODUCTION

Gingival recession is an undesirable and common condition in dental practice with multiple etiological factors. It is defined as the apical migration of the marginal gingiva from the cemento-enamel junction exposing the root surface to the oral environment.¹ Exposure of the root surface can result in unpleasant aesthetics, dentinal hypersensitivity and a higher risk of root caries. People of all ages are increasingly concerned about their smile. Hence gingival recession affecting the anterior teeth can create anxiety and other psychological problems.²

The aetiology of gingival recession is multifactorial and is always the result of more than one factor acting together.^{1,2} Some of the established etiological risk factors include; plaque, calculus, high frenal attachment, use of hard bristles toothbrush, faulty tooth brushing technique, smoking, tooth malposition and occlusal trauma.^{1,2,3}

Globally, the prevalence of gingival recession is 33.6 to 88%^{1,4-8} A systematic review by Kassab and Cohen⁴ revealed that 88% of people 65 years of age and older and 50 % of people 18 to 64 years of age have one or more sites with gingival recession. The presence and extent of gingival recession was also found to increase with age. Gingival recession in the USA has been reported in 51 to 88% of middle-aged individuals, affecting 22.3 to 38.4% teeth per person.⁵ In Turkey, the prevalence of gingival recession was 78.2%.⁶ In a young Brazilian population, Susin et al⁷ reported a prevalence of 51.6%. However, in Tanzania, the prevalence of gingival recession among women was 33.6%.⁸ The odds of having gingival recession was high

with increased in age, the presence of calculus, gingival bleeding on probing and horizontal brushing method.^{7,8}

The prevalence of gingival recession ranged from 13.2% to 27.7% in the South-West^{3,9} of Nigeria; which is low when compared to the prevalence of 57.6% reported by Udoye¹⁰ in the South-East. The prevalence commonly increases with age^{2,11} but the gender distribution of gingival recession has been inconclusive.^{1-3,9} Previous studies reported high prevalence on the buccal surfaces of the teeth with the mandibular incisors being most affected.^{9,10-13}

To the authors' knowledge, the prevalence of gingival recession is yet to be documented in the South-south of Nigeria. The perception of the occurrence of gingival recession in a given population is a basic need for their prevention and control. Detailed information on the epidemiology of this condition and its etiologic factors will help in establishing preventive measures in our health centres. Therefore, the aim of this study was to determine the prevalence, potential risk factors and pattern of distribution of gingival recession in an adult population attending the periodontology clinic of the University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria.

MATERIALS AND METHODS

The study was a descriptive cross-sectional study of all the patients that attended the Periodontics clinic at the Dental Centre of University of Port Harcourt Teaching Hospital (UPTH), Rivers State over a three months period from October 2017 to December 2017. Informed consent was obtained from each respondent and

confidentiality of data was maintained. Ethical approval was obtained from the UPTH Research and Ethics Committee.

A pre-tested self-administered questionnaire was used to obtain information on socio-demographics and oral health practices. A full-mouth examination was done by a trained examiner who was calibrated in performing the clinical evaluations, before and during the study. The presence of plaque, calculus, and gingival recession was determined. Gingival recession was scored as present whenever the free gingival margin was apical to the cemento-enamel junction, and root surface was exposed according to Miller's Classification.¹⁴ Oral hygiene status was assessed using the Simplified Oral Hygiene Index (OHI-S) of Greene and Vermillion.¹⁵ The oral hygiene was categorised as 'good' when the OHI-S score was 0-1.2, 'fair' (1.3-3.0) and 'poor' (3.1-6.0). The Statistical Package for Social Sciences version 20.0 (IBM SPSS statistics, Armonk New York) was used for data analysis. Chi-Square was used to determine the significant difference between socio-demographic factors and oral hygiene practices with the presence of gingival recession. While Student t-test was used to determine the difference in the mean recessed sites among the different age groups, gender and OHI-S. Binary logistic regression was used to identify the risk factors that were strongly associated with gingival recession. Statistical significance was considered at $p \leq 0.05$.

RESULTS

One hundred and nine patients attended the periodontology clinic during the study period. The age range was 17 to 74 years with a mean age of 33.9 ± 13.8 years and a male

47(43.1%) to female 62(56.9%) ratio of 1:1.3. Most (42.2%) of the participants were students as shown in Table 1.

Table 1: Prevalence of gingival recession according to sociodemographic variables

Variables	Yes		No		Total		Statistical Analysis (Fisher's exact p-value)
	N	%	N	%	N	%	
Age Group							
<19	0	0.0%	6	100.0%	6	5.5%	
20-29	1	19.6%	4	80.4%	5	46.8%	
	0		1				
30-39	7	35.0%	1	65.0%	20	18.3%	X ² =19.14 df=6 p=0.004*
			3				
40-49	7	53.8%	6	46.2%	13	11.9%	
50-59	6	50.0%	6	50.0%	12	11.0%	
60-69	3	60.0%	2	40.0%	5	4.6%	
70-79	2	100.0%	0	0.0%	2	1.8%	
Gender							
Male	1	38.3%	2	61.7%	47	43.1%	X ² =1.45 p=0.301 *OR=1.64(0.73-3.69)
	8		9				
Female	1	27.4%	4	72.6%	62	56.9%	
	7		5				
Occupation							
Civil servant	1	45.0%	2	55.0%	40	36.7%	X ² =14.0 df=3 p=0.003*
	8		2				
Retired	3	100.0%	0	0.0%	3	2.8%	
Business	6	30.0%	1	70.0%	20	18.3%	
			4				
Student	8	17.4%	3	82.6%	46	42.2%	
			8				
Total	3	32.1%	7	67.9%	109	100.0%	
	5		4				

*Statistically significant
*OR=Odds Ratio at 95% Confidence Interval

Thirty-five patients (32.1%) comprising 18 males and 17 females had gingival recession. A total of 185 recession sites (106 sites in males, 79 sites in females) were in 35 patients. Mean number of recession for males was 5.88 ± 4.5 and for females, was 4.60 ± 5.6 . The mean number of sites with recessions increased with age, rising from 3.6 in the 20-29 years age group to 17.1 in the >60 years age group, though there was no statistically significant association ($p > 0.05$). The overall mean number of recessed teeth was 5.28 ± 5.07 as shown in Table 2.

Table 2: Number of teeth with gingival recession by gender and age group

	N	Number of teeth with recession	%	Mean	Std. Deviation	P-value
Gender						
Male	18	106.00	57.3%	5.88	4.53	0.477
Female	17	79.00	42.7%	4.64	5.64	
Age group						
20-29	10	36.00	19.5%	3.60	3.30	0.148
30-39	7	33.00	17.8%	4.71	4.92	
40-49	7	33.00	17.8%	4.71	2.28	
50-59	6	45.00	24.3%	7.50	4.80	
60-79	5	38.00	20.5%	17.16	18.77	
Total	35	185.00	100.0%	5.28	5.07	

The prevalence of gingival recession in relation to oral hygiene practices include; use of tooth brush(94.3%), brushing frequency once/day (60.0%), use of medium bristle toothbrushes(51.4%), horizontal technique of tooth brushing (51.4%), and use of interdental cleaning aids (42.9%). The association of gingival recession with oral hygiene practices was not statistically significant except for the use of horizontal brushing technique with a p-value of 0.026 as shown in Table 3.

Table 3: Association of oral hygiene practices with the prevalence of gingival recession

Oral Hygiene Practices	Variable	Gingival Recession	%	p-value
Cleaning Method	Toothbrush	33	94.3%	0.343
	Chewing Stick Only	0	0.0%	
	Both	2	5.7%	
Frequency of Cleaning	Once/Day	21	60.0%	0.225
	Twice/Day	14	40.0%	
Toothbrush Texture	Soft	7	20.0%	0.231
	Medium	18	51.4%	
	Hard	10	28.6%	
Brushing Technique	Horizontal	18	51.4%	0.026*
	Vertical	3	8.6%	
	Both	14	40.0%	
Interdental Cleaning	Yes	15	42.9%	0.098
	No	20	57.1%	

*Statistically significant, * OR=Odds Ratio at 95% Confidence Interval

There was no statistical difference in the mean simplified oral hygiene index(OHI-S) of those with or without gingival recession as shown in Table 4. However, those with poor oral hygiene have a higher mean number of recessed sites.

Table 4: The association of gingival recession and recessed sites with OHI-S

Presence of Gingival Recession	N	Mean OHI-S	Std. Deviation	Statistics
Yes	35	2.15	1.05	F=0.004 p=0.947
No	74	2.16	0.98	
Total	109	2.16	0.99	

OHI-S index	N	Mean recessed sites	Std. Deviation	Statistics
Good	10	2.90	1.59	F=1.607 p=0.216
Fair	17	6.23	4.60	
Poor	8	6.25	7.85	
Total	35	5.28	5.06	

Maxillary left premolars have the highest number of sites affected (26/185,14.1%), followed by the mandibular right incisors (18/185) as shown in Table 5.

Table 5: Distribution of gingivally recessed teeth

	Maxillary		Mandibular		Total
	Right	Left	Right	Left	
Central Incisor	6	5	12	10	33
Lateral Incisor	5	4	6	5	20
Canine	4	5	8	6	23
First Premolar	6	14	11	7	38
Second Premolar	2	12	4	4	22
First Molar	4	10	5	7	26
Second Molar	3	5	3	3	14
Third Molar	2	3	2	2	9
Total	32	58	51	44	185

Regression analysis: Variables which were found to be significant following the univariate analysis reported above were further subjected to regression analysis using the presence of gingival recession as the dependent variable. Variables such as occupation and brushing technique which were initially significant on univariate analysis lost their significance on regression analysis. The variable which retained significance was the age of the patients. (Table 6).

Table 6: Logistic regression model

Independent Variables	B	S.E.	Wald	df	p-value	OR	95% Confidence Interval for OR	
							Lower	Upper
Age	0.058	0.019	8.769	1	0.003*	1.059	1.020	1.101
Sex	-0.334	0.503	0.440	1	0.507	0.716	0.267	1.920
Occupation	-0.083	0.149	0.307	1	0.579	0.921	0.687	1.233
Frequency of brushing	0.526	0.535	0.966	1	0.326	1.693	0.593	4.835
Texture of toothbrush	0.667	0.383	3.028	1	0.082	1.948	0.919	4.127
Brushing technique	-0.324	0.277	1.374	1	0.241	0.723	0.420	1.244
Interdental cleaning	-0.741	0.508	2.125	1	0.145	0.477	0.176	1.291
Constant	-2.199	1.935	1.292	1	0.256	0.111		

OR = Odds Ratio * statistically significant (p<0.05)

DISCUSSION

The prevalence of gingival recession in this study is 32.1%. This is higher than 13.2% reported by Nwhator et al³ in the South West and less than 57.6% reported by Udoye et al¹⁰ in the South- East of Nigeria. This study also showed that the prevalence of gingival recession increases with age, a finding consistent with several previous studies.^{3,4,7-}

^{9,13}The increased number of sites with gingival recession among the old age group has been attributed to the cumulative effect of previous plaque-induced periodontal disease and toothbrushing trauma.¹³ Furthermore, the mean number of recessed sites was more in males compared to females; this is consistent with previous studies.^{3,9,12}

The high number of teeth with gingival recession found in males in this study showed no statistical significance; this is similar to findings by Nwhator et al.³ However, some studies observed a significantly high frequency of gingival recession among males when compared to females.^{5,16,17} The higher prevalence of gingival recession observed in males than in females might be attributed to the fact that females have better oral hygiene than males.³ Although some studies have reported a strong association between gingival recession and good oral hygiene.^{12,18}

The aetiology of gingival recession has been described to involve several factors acting in

consonance.¹⁸ Marini et al¹³ identified two major groups in the aetiology of gingival recession, i.e.” factors predisposing to the area and occurrence of gingival recession – called predisposing factors; and factors that lead to the onset of the disturbance – named precipitating factors, in charge of the induction of gingival recession”.In the literature, the main predisposing factors that favoured the occurrence of gingival recession were high frenal attachment,¹⁸ buccal tipping, functionally unsatisfactory quantity and quality of attached gingiva¹⁹, bone dehiscence, and traumatic occlusion.²⁰ While the precipitating factors were bacteria plaque, use of hard bristled toothbrushes, the wrong technique of toothbrushing⁹ and smoking.^{13,20}

The majority (60%) of those with gingival recession in this study brushed once daily and 51.4% used medium bristled toothbrushes. This was not consistent with the previous studies^{1,3,9} that observed a higher prevalence among those that brushed more frequently and used hard-bristled toothbrushes. The direction and amount of force applied during tooth brushing are more likely to cause gingival recession irrespective of the frequency and texture of toothbrush that was used. However, the higher prevalence among those that used the horizontal technique of toothbrushing was consistent with previous studies.^{1,9,20} The vigorous use of hard or medium bristled toothbrushes in a horizontal direction have been found to result in gingival soft tissue injury with resultant cleavage detachment and resorption of underlying alveolar bone.¹⁶ Hence, there is a need to educate the patients about the proper tooth-brushing techniques.



The association of poor oral hygiene with an increased number of mean recessed sites in this study was consistent with previous reports.^{1,9,10} The interaction between bacteria present in the plaque and immune response of the host results in matrix degradation, bone resorption, and down-growth of the epithelium, resulting in pockets and gingival recession^{16,17}

In the present study, the maxillary premolars displayed the highest frequency of gingival recession. This was consistent with previous reports that found a high prevalence of recession in the upper canine and premolar region due to traumatic toothbrushing among those that practised faulty brushing techniques.^{10,21} However, other studies^{3,9,13,17} reported higher prevalence in the mandibular incisors which was attributed to the accumulation of dental plaque and calculus.

Limitation of the study

The design (cross-sectional study) of the study makes it difficult to establish a cause-effect relationship. Longitudinal studies should be conducted to establish the risk indicators for gingival recession in different populations. Our study being an hospital-based study makes it difficult to precisely defined the community population at risk. More also, we did not determine the gingival biotype of the patients. Reduced gingival thickness is one of the factors that can cause periodontal attachment loss and gingival recession.¹²

CONCLUSION

The prevalence of gingival recession in this study was comparable to that reported by other studies in Nigeria. Age, occupation,

brushing technique were the significant risk factors. Males and maxillary left premolars had more sites with gingival recession. Though the aetiology of gingival recession is multifactorial, routine professional scaling and education on proper toothbrushing techniques will go a long way in improving oral hygiene status and reduce the prevalence of GR.

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