

The prevalence, perception, and behavior of self-reported gingival bleeding in two communities in Lagos state. Lagos. Nigeria

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Abstract

Background: Periodontal disease is an inflammatory reaction that progresses from gingival inflammation (gingivitis) to loss of attachment, alveolar bone resorption, and eventual tooth loss. The earliest sign, gingival bleeding (GB) is often reported as bleeding while brushing and bleeding on probing (BOP) during clinical intraoral examination. Periodontal disease at this stage is completely reversible. Therefore, this cross-sectional survey assessed the prevalence and perception of self-reported gingival bleeding (SRGB) as well as oral hygiene practices of the studied population.

Methodology: 250 Healthy adults who were not mentally disabled were drawn by convenient sampling method from residents in two communities, Iyana Iba and Ipodo in Ojo and Ikeja local government areas of Lagos State. Approval was obtained from the Ethical Committee of Lagos State University Teaching Hospital (LASUTH) Ikeja, and informed consent from all the participants. A structured, interviewer-administered questionnaire was used to obtain the sociodemographic, and other relevant data, including oral hygiene practices and perception of GB. Data was analysed using SPSS 24 (IBM SPSS Inc). Continuous and nominal variables were described with means, standard deviations and frequencies. Significance was set at $P < 0.05$.

Result: The overall prevalence of SRGB was 55.6%, with 50.0% bleeding during tooth brushing; and two-thirds (67%) took no action with GB experience. 80.0% of the participants knew gingival bleeding is abnormal.

Conclusion: The prevalence of SRGB was high. Majority acknowledged GB is not normal, yet, many did nothing after experiencing GB. Hence, an enlightenment program is necessary to improve their perception of GB.

Keywords: Gingival bleeding; Self-reported gingival bleeding; Gingival inflammation; Oral health behaviour; Gum disease perception

1. Introduction

Gingival bleeding (GB) is one of the first clinical manifestations of periodontal diseases such as gingivitis and periodontitis. Gingivitis is the reversible form of periodontal disease, the inflammation of the gingiva without destruction of the tooth-supporting tissues but may progress to periodontitis; the inflammation of the periodontal supporting tissues (periodontal ligament, alveolar bone and cementum) for certain patients if left untreated, leading eventually to tooth loss [1-3].

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Gingiva is a pink and firm, tapered contoured tissue surrounding the teeth, which in health does not bleed on probing and toothbrushing [4].

Gingival bleeding (GB) is the easiest identifiable sign of gingivitis and a prevalent manifestation of periodontal diseases [5]. Bleeding can appear after toothbrushing or on probing, it may also be spontaneous. Gingival bleeding associated with tooth brushing is a form of provoked gingival bleeding, a vital feature and probably one of the most frequent complaints among patients with periodontal disease. Gingival bleeding during tooth brushing or on probing is an indication of active gingivitis [6].

Gingival bleeding occurs mainly due to inadequate plaque removal which results in the thinning, ulceration, and necrosis of gingival epithelia coupled with engorgement of blood vessels. Gingival bleeding may also result from direct trauma, viral, fungal, or bacterial infection, drugs, pregnancy, dermatoses, and systemic conditions [4,7]. However, persistent gingival bleeding may be due to serious medical conditions such as leukaemia, and bleeding and platelet disorders [8,9].

Gingivitis presents with specific clinical features such as redness and oedema of the gingival tissue, bleeding upon probing, changes in contour, and the presence of calculus or plaque with no radiographic evidence of crestal bone loss [10]. Bleeding on probing (BOP) has been accepted as the gold standard for clinical assessment of gingival inflammation [11]. Bleeding on probing (BOP) is easily detected clinically and therefore is of value for early diagnosis and the prevention of more advanced gingival pathology. BOP is considered one of the earliest signs of gingival inflammation and appears earlier than a change in colour or other visual signs of inflammation [10]. The use of bleeding provides additional advantages to diagnosing early gingival inflammation by being a more objective sign that requires less subjective estimation by the examiner [12].

Bleeding is one of the most reliable parameters in evaluating periodontal status. According to the new classification of periodontal diseases [13], the percentage of sites with bleeding on probing (BOP) assessed during a basic periodontal examination, provides information on the presence of gingivitis (BOP \geq 10%) and is considered in the periodontal risk assessment for patients in supportive periodontal therapy [3].

The severity of bleeding and the ease of its provocation depend on the intensity of inflammation. In cases of moderate or advanced periodontitis the presence of BOP is considered a sign of active tissue destruction [10]. Hence, GB can be considered as a warning sign for the patient that should prompt them to consult a dentist [10].

Although the prevalence of gingival bleeding can be assessed objectively by bleeding on probing (BOP), the subjective assessment using gingival bleeding on toothbrushing has been significantly correlated with BOP and clinical findings of bleeding [14].

Very few studies have reported the perception of gingival bleeding and the prevalence of self-reported and clinically diagnosed gingival bleeding of the general population in Nigeria [1,15]. Various studies have been done on selected groups in Nigeria. A study reported a prevalence of self-reported gingival bleeding of 12.7% in Undergraduates [4]. Another study reported a prevalence of 48.3% self-reported gingival bleeding and 54.7% gingival bleeding on clinical examination in primary school children [16]. Studies among pregnant women in Port Harcourt [17] and Lagos [18] reported prevalences of 31.8 % [17] and 35.9 % [18], 27.1% [19] of self-reported gingival bleeding.

Some reports on the perception of gingival bleeding from studies in Nigeria have shown it to be very poor [4,15,17]. Gingival bleeding is so common that it is not given serious attention and even considered normal among Nigerians, despite being an indicator of pathology. Among all the studies investigating periodontal diseases, very few reported patients' attitudes and reactions regarding GB.

There are few recent data about the Perception of gingival bleeding; the prevalence of self-reported and clinically diagnosed gingival bleeding of the general population in Lagos, Lagos state Nigeria.

This cross-sectional survey therefore aims to assess the prevalence, and perception of self-gingival bleeding as well as oral hygiene practices of the population in two communities.

2. Materials and Methods

2.1. Study setting/design

This is a cross-sectional study conducted in 2 communities, Iyana Iba in Ojo and Ipodo in Ikeja in Lagos, Lagos State, Nigeria.

2.2. Sample size/sampling

The Sample size was determined by using the formula for sample size calculation for descriptive studies as stated below [20].

$$N = Z^2 p q/d^2$$

N = Sample size, Z = Standard normal deviation = 1.96 at 95% Confidence limit,

P = Prevalence rate = 18.1% = 0.181, prevalence from a study.^{22[21]}

q = (1 - P) = (1-18.1%) =89.9% = 0.899. d = Error margin = 5%) =0.05,

$N=1.96^2 \times 0.181 \times 0.899/0.0025 = 227.7 =228$

Nonresponsive put at 10% = 10/100 x 228 =23

Total sample size 227+23= 250

2.3. Inclusion criteria

Male and female adults, aged 18 years and above, willing to be part of the study and gave their consent, were recruited into the study.

2.4. Exclusion criteria

Patients who were acutely ill and therefore unable or unwilling to participate in the study and those below 18 years old were excluded from the study. Mentally disabled individuals were also excluded from participating.

2.5. Data collection

The self-administered, structured questionnaire was designed in easy-to-understand English by the author. Questionnaires for this study were distributed to consecutive consenting subjects at the two locations of the study. The questionnaire was verbally explained by the researcher in the local language to participants who do not read or understand English language. The questionnaire assessed the demographic profile of the participant such as age, gender, education, and occupation. Other information elicited were the frequency of tooth brushing, previous dental visits and use of interdental cleaning tools.

2.6. Ethical clearance

Ethical approval for the study was obtained from the Research and Ethical Committee of the Lagos State University Teaching Hospital, Ikeja.

2.7. Data analysis

This was carried out using SPSS 24 (IBM SPSS Inc). Descriptive statistics were carried out for socio-demographic variables such as age, gender, marital status, and educational status. For descriptive variables that are continuous, parameters such as mean, median, minimum, and maximum and measures of variability were determined. For descriptive variables that are categorical, simple frequency and percentages were determined. The perception of the subjects about gingival bleeding was determined statistically using Pearson's chi square and Fisher's exact as appropriate. Multivariate logistic regression method was used to determine the effect of covariates in the prevalence of gingival bleeding and to adjust for confounders including sex and age. Statistical significance was inferred at $p < 0.05$.

3. Results

A total of 250 people from the two communities participated in the study, with 157(62.8%) females and 93(37.2%) males. The mean age was 45.64 ± 10.76 years (18-70years), while the 40 to 60 years olds formed the largest in this study. Table 1.

Table 1 Sociodemographic characteristics of all the participants

Sociodemographic Characteristic	No %
Age	
18-40	73 (29.2)
40-60	163 (65.2)
>60	14 (5.6)
Gender	
Female	157 (62.8)
Male	93 (37.2)
Educational level	
Primary	7 (2.8)
Secondary	23 (9.2)
Tertiary	220 (88.0)
Total	250 (100)

Among 250 respondents, 139 (55.6%) reported GB, with 125 (89.9%) bleeding during tooth brushing and 14 (10.1%) bleeding spontaneously. Most of the subjects reported experiencing gingival bleeding sometimes or occasionally 124(49.6%) Only 50(20.0%) perceived gingival bleeding as normal. (Table 2).

Table 2 Self-reported gingival bleeding of the participants

Characteristic of Gingival bleeding	N %
Self-reported gingival bleeding	
No	111(44.4)
Yes	139 (55.6)
Type of bleeding	
Spontaneous	14 (10.1)
While brushing	125 (89.9)
Frequency of bleeding	
No	111 (44.4)
Often/always	15 (6.0)
Sometimes/occasionally	124 (49.6)
Is gingival bleeding Normal	
No	200 (80.0)
Yes	50 (20.0)

Regarding the actions taken to manage bleeding from the gingiva, 67(28.8%) of the participants reported that they ignored the condition, 30(12.0%) brushed more, and only 8(3.2%) had an appointment with a dentist. Table 3.

Table 3 Self-Reported Actions Taken for Gingival Bleeding

Response /Reaction to gingival bleeding	N %
Nothing	67 (28.8)
Brushed more	30 (12.0)
Used mouthwash	18 (7.2)
Changed toothbrush	19 (7.6)
Took more vitamins	7 (2.8)
Saw a dentist	8 (3.2)
Others	25 (10.0)

Table 4 compares the perception of the subjects about gingival bleeding among the participants in the two study centers. 83(33.2%) participants from Ikeja study center think that gingival bleeding is not normal while 117(46.8%) from the Ojo study center think so, this difference is not statistically significant $p>0.05$. There was a statistically significant difference between the participants who think age, tooth decay, worms, and smoking are associated with gingival bleeding $p<0.05$ in the two centers. There was no significant difference between the centers even though more of the subjects thought that gingival infection 162(35.2%), poor oral hygiene 142(56.8%), and toothpicks 145(58%) were associated with gingival bleeding. More of the subjects believe that systemic diseases 118(75.2%) and wrong toothbrushing 126(50.4%) were not associated with gingival bleeding, this is also not statistically significant $p>0.05$

Table 4 Comparison of perception of gingival bleeding among participants in the study centres

Questions on participants' perception		Center		Total	P value
		Ikeja	Ojo		
Do you think bleeding gum is normal?	Yes	15(6%)	35(14%)	50(20%)	0.91
	No	83(33.2%)	117(46.8%)	200(80%)	
Aging makes gum bleed	Yes	19(7.6%)	71(28.4%)	90(36%)	0.001*
	No	79(31.6%)	81(32.4%)	160(64%)	
Gum infection makes gum bleed	Yes	66(26.4%)	96(38.4%)	162(35.2%)	0.30
	No	32(12.8%)	56(22.4%)	88(64.8%)	
Gum swelling makes gum bleed	Yes	50(20%)	75(30%)	125(50%)	0.45
	No	48(19.2%)	77(30.8%)	125(50%)	
Tooth decay makes gum bleed	Yes	52(20.8%)	112(44.8%)	164(65.6%)	0.001*
	No	46(18.4%)	40(16%)	86(34.4%)	
Poor Oral Hygiene makes gum bleed	Yes	50(20%)	92(36.8%)	142(56.8%)	0.09
	No	48(19.2%)	60(24%)	108(43.2%)	
Wrong brushing technique makes gum bleed	Yes	46(18.4%)	78(31.2%)	124(49.6%)	0.29
	No	52(20.8%)	74(29.6%)	126(50.4%)	
Use of toothpicks make gum bleed	Yes	54(21.6%)	91(36.4%)	145(58%)	0.27
	No	44(17.6%)	61(24.4%)	105(42%)	

Worms Makes Gum Bleed	Yes	30(12%)	78(31.2%)	108(43.2%)	0.001*
	No	68(27.2%)	74(29.6%)	142(56.8%)	
Diseases in other parts of the body	Yes	23(9.2%)	39(15.6%)	62(24.8%)	0.41
	No	75(30%)	113(45.2%)	188(75.2%)	
Smoking Makes Gum Bleed	Yes	28(11.2%)	69(27.6%)	97(38.8%)	0.005*
	No	70(28%)	83(33.2%)	53(61.2%)	

*Statistically significant

Assessment of the oral hygiene practices of the participants in the study (Table 5) showed that the tooth brushing technique displayed a statistically significant difference between the two study centers. Other variables such as dental visits, toothbrush and toothpaste use, and other oral hygiene aids were not significantly different between the two centers.

Table 5 Comparison of participants’ oral hygiene practices in the two study centers

Questions on participants' oral hygiene practices practice		Centers		Total	P value
		Ikeja	Ojo		
Do you go for routine dental visit	Yes	14(5.6%)	14(5.6%)	28(11.2%)	0.15
	No	84(33.6%)	138(55.2%)	222(88.8%)	
What do you use to clean your teeth?	Toothbrush	87(34.8%)	136(54.4%)	223(89.2%)	0.57
	chewing stick	1(0.4%)	4(1.6%)	5(2%)	
	both	10(4%)	12(4.8%)	22(8.8%)	
Do you use fluoridated toothpaste	Yes	74(29.6%)	110(44%)	184(73.6%)	0.34
	No	24(9.6%)	42(16.8%)	66(26.4%)	
What type of toothbrush do you use?	Soft	21(8.4%)	35(14%)	56(22.4%)	0.72
	Medium	50(20%)	82(32.8%)	132(52.8%)	
	hard	27(10.8%)	35(14%)	62(24.8%)	
How do you brush your teeth?	Horizontally	3(1.2%)	14(5.6%)	17(6.8%)	0.008*
	Vertically	6(2.4%)	28(11.2%)	4(13.6%)	
	horizontal & vertical	69(27.6%)	88(35.2%)	157(62.8%)	
	roll technique	6(2.4%)	6(2.4%)	12(4.8%)	
	vertical & roll	14(5.6%)	16(6.4%)	30(12%)	
Do you use dental floss?	Yes	14(5.6%)	25(10%)	39(15.6%)	0.39
	No	84(33.6%)	127(50.8%)	211(84.4%)	
Do you use toothpick?	Yes	66(26.4%)	100(40%)	166(66.4%)	0.45
	No	32(12.8%)	52(20.8%)	84(33.6%)	
Do you use interdental brushes?	Yes	4(1.6%)	3(1.2%)	7(2.8%)	0.27
	No	94(37.6%)	149(59.6%)	243(97.2%)	
Freq of toothbrushing	Once	66(67.3)	98(64.5)	164(65.6)	0.64
	Twice	32(32.7)	54	86 (34.4)	

*Statistically significant

Multivariate analysis (Table 6) shows that only age was related to self-reported gingival bleeding among the subjects in the study $p < 0.05$ with an odd of -0.22.

Table 6 Logistic regression showing the relationship between the variables and self-reported gingival bleeding

		Odd	S.E	Wald	Df	Sig	Exp(B)
Step1a	Study	0.158	0.275	0.330	1	0.565	1.171
	Age group	-0.219	0.123	3.186	1	0.043*	0.803
	Sex	-0.128	0.278	0.211	1	0.646	0.880
	Are you pregnant?	0.702	1.457	0.232	1	0.630	2.018
	Highest educational level completed	0.348	0.314	1.232	1	0.267	1.417
	Do you a smoke?	-21.397	12082.052	0.000	1	0.999	0.000
	Constant	20.026	12082.053	0.000	1	0.999	497934805.800

*Statistically significant

4. Discussion

In this study, the overall prevalence of self-reported gingival bleeding was 55.6%. similar to the study by Wong et al [22] on the Hong Kong Chinese that reported a prevalence of (62.2%) of self-reported gingival bleeding. Soroye et al [1] in their study reported a prevalence of self-reported gingival bleeding of 42.5%. Veynachter et al [5] conducted a Multicenter Study in France and reported a prevalence of 63.2% self-reported gingival bleeding, with 58.7% bleeding after toothbrushing and 4.5% bled spontaneously.

Soroye et al [1] in their study reported that (70%) of participants knew that it's abnormal to bleed from the gum. This is similar to our report, where 80% of the participants knew that gingival bleeding is abnormal

Bleeding of the gingiva either spontaneously or by mechanical stimuli (brushing or upon probing) is amongst the early signs of gingival inflammation and is considered a predictor of poor prognosis in patients with periodontitis. Regarding the actions taken to manage bleeding gingiva, a higher percentage (75%), than ours (28.8%), of the Wong et al [21] study reported that they preferred to ignore the condition and wait for 'spontaneous recovery. Seeking dental care for bleeding gingiva (22.2%) in Wong et al [21] study was low similar to what was observed in this study.

The responses of people to the actions taken on GB showed their awareness and attitude toward GB. Their awareness was low, and their attitudes were not at all appropriate. The absence of reaction to GB can be explained by the fact that some people perceived GB as a common and almost normal phenomenon. These responses showed a lack of knowledge regarding periodontal diseases, their causes, and responses to GB. There is a need to inform the population about the causes of the GB and its potential impact on systemic diseases. The best adequate responses to SRGB are to use interdental cleaning aids and make a dental appointment. Visiting the dentist to manage gingival bleeding is in line with the fact that periodontal therapy reduces inflammation and gingival bleeding [22].

The perceived causes of gingival bleeding by participants include age, dental infection, Vitamin C deficiency, worms, and use of toothpicks, wrong tooth brushing technique, systemic disease, smoking. Over 50% of the participants in this study, mentioned poor oral hygiene, gum infection, and use of toothpicks.

More than half (56.8%) of our study participants believed that poor oral hygiene was the cause of gingival bleeding. Wong et al [21] and Soroye et al [1] reported respectively that 39% and 16.8% of the participants respectively believed that poor/inadequate oral hygiene was associated with gingival bleeding. In our study, 49.6% mentioned the use of hard brush, and 65.6% mentioned tooth decay as a cause of gingival bleeding. 23.7% and 6.1% of participants mentioned the use of hard toothbrushes and dental infections such as tooth decay respectively as causes of gingival bleeding in the study by Soroye et al [1].

Some systemic diseases, conditions, and medications increase the likelihood of periodontal disease and gingival bleeding. These conditions include patients with diabetes mellitus, nutritional deficiency, and immune deficiency

[5,18,23-26]. Only a few of the participants (24.8%) believed that there was a relationship between gingival bleeding and systemic conditions.

The perceived causes of gingival bleeding by participants to which the difference was statistically significant were age, tooth decay, worms, and smoking. The responses of the participants to the causes of gingival bleeding showed the limited knowledge of this population about gingival bleeding and its causes.

It has been shown that there is an association between periodontal disease and smoking. It is known that smoking may mask the symptoms of periodontal disease including gingival bleeding [27]

Various studies conducted among different groups in Nigeria [28-33] have reported irregular dental visits. Our study recorded that 88.8% of participants ~~reported~~ had never had a dental visits, closely related to the studies conducted among elderly persons by Taiwo et al [34] and Akinyanmoju et al [35] who revealed that 65.7% and 75.5% of their study participants respectively, had never visited a dentist in their lifetime. This indicates that this study population doesn't know the importance of visiting a dentist to maintain good oral health.

Almost all the participants (89.2%) in the present study used toothbrushes and toothpaste as their cleaning tools. This is comparable to 88.6% reported by Umoh et al [36] among the adult population in Plateau and 90.7% by Olusile et al [37]. 73.6% of our participants used fluoridated toothpaste, similar to 68.3% reported in the Ibadan study by Akinyanmoju et al [35].

Toothbrush bristles can be classified as soft, medium or hard. Medium bristles are generally recommended because they cause less damage to the periodontal tissues and can be cleaned adequately [38] than soft or hard toothbrush bristles. In this current study, 52.8% utilized the recommended medium textured toothbrush, in contrast to 32.0% reported in the Plateau study [36].

The majority of our study participants used the horizontal and vertical methods of toothbrushing. This is similar to the study report of Kaphle et al [39].

The combination of horizontal and vertical tooth brushing techniques removes plaque and food particles from the gingiva margin effectively. It is a good technique and easy to teach people in a community [40].

The results of a single-blind, split-mouth design study suggested that both vertical and horizontal tooth-brushing methods are effective in plaque removal; nevertheless, the vertical brushing method has been demonstrated to remove more plaque from the interproximal surfaces than the horizontal one [41].

The use of oral hygiene adjuncts such as the dental floss and interdental brushes was not popular among the participants in the present study. Majority used toothpicks which are helpful in dislodging food from the teeth but do not clean plaque from interdental surfaces. Toothpicks are not designed for inter-dental cleaning and should not be substituted for flossing or brushing. The standard toothpicks can splinter into the gingiva and damage the gingival tissues. The usually recommended interdental cleaning aids are dental floss, interdental brushes, and wood sticks [26].

Many Studies in Nigeria [26,41,42] have also reported that most participants brush their teeth once daily as against the recommended twice-daily cleaning [43]. In this current study, 34.4% brushed twice daily, this is similar to the reports from the study on traders in Ibadan [34], and Olusile et al[37] that reported that 36.5% and 41.2% of their participants brushed twice daily respectively. However, the study among adults in Plateau [35] reported that (51.9%) cleaned their mouth twice daily. Studies conducted in France [5] and Hong [21] reported 58.4% and 97.7% respectively. The gingival health has been shown to significantly improve by increasing the frequency of tooth brushing [44].

However, it has been reported that the presence of age-associated alterations in innate immune function within the periodontium could affect not only the initiation but also the resolution of inflammation [5]. The result of the logistic regression in this study revealed a significant association of age and self-reported gingival bleeding but in an inverse direction, signifying that increasing age potentiates a decrease in self-reported gingival bleeding. This is consistent with the study by Veynachter et al [5] that reported 40.6% of 18-40 years old reporting SRGB compared to 20.2% in the group above 60 years [5]. The result disagrees with an Argentinian study [45] that reported 36.9% for below 30years old and 52.4% for subjects 30 years and above. Decreased vascularity and increased fibrosis in the gingiva of the elderly may be responsible for the result in this study.

5. Conclusion

The prevalence of SRGB was high. Majority acknowledged GB is not normal, yet many did nothing after experiencing GB. Hence, an enlightenment program is necessary to improve their perception of GB thereby encouraging them to act appropriately by seeking help when they experience GB. This will result in early diagnosis of periodontal disease and prevention of late complications.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Approval was obtained from the Ethical Committee of Lagos State University Teaching Hospital (LASUTH) Ikeja.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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