



# EXPLORING SELF-REPORTED GINGIVAL BLEEDING AMONG DENTAL COLLEGE UNDERGRADUATES AND INTERNS

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## Abstract

**Introduction:** Gingival bleeding (GB) is a common clinical finding in periodontal diseases. It is one of the most easy and reliable parameters for evaluating periodontal status. Self-reported GB provides vital information about periodontal diseases of a population and their periodontal treatment needs.

**Aim:** To assess self-awareness and experiences of gingival bleeding among undergraduate students and interns at a dental college.

**Methodology:** This descriptive cross-sectional study was conducted among 204 undergraduate students and interns at Rama Dental College Hospital & Research Centre, Kanpur using online questionnaire. Participants were selected by convenience sampling from July 2023 to December 2023 after ethical clearance. Responses entered into Google Forms were exported to Microsoft Excel Sheet 2019 and descriptive analysis for calculation of frequency, percent, mean, and standard deviation was done.

**Results:** A total of 204 undergraduate students (Female: 153, 40.1% and Male: 51, 13.4%) participated with ages ranging from 17-31 years. Most respondents (204, 53.4%) were from BDS. About two-third participants (139, 83.0%) experienced gingival bleeding. Most participants (102, 68.1%) believed there was a relation between the gingival disease and systemic disease. However, very few of the participants believed that antihypertensive (126, 38.2%), anticonvulsant (90, 36.1%), and immunosuppressive (118, 43.5%) drugs could increase gingival bleeding. Not even half (75, 32.7%) believed they knew about gingivitis.

**Conclusion:** The majority of participants reported experiencing gingival bleeding (GB). While many demonstrated awareness of the connection between gingival health and systemic diseases, a notable lack of knowledge was observed regarding the potential adverse effects of antihypertensive, anticonvulsant, and immunosuppressive drugs on gingival health. This highlights the necessity to reinforce gingival health awareness among undergraduate students, addressing specific gaps in understanding related to the impact of certain medications on gingival conditions.

**Keywords:** Gingival bleeding, Periodontal diseases, Dental students, Systemic diseases, Medication effects, Oral health awareness.

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## Introduction

Gingival bleeding serves as a significant clinical parameter in the assessment of periodontal status.<sup>1</sup> Gingivitis, characterized by reversible inflammation of the gingiva, is often attributed to bacterial plaque. The occurrence of gingival bleeding is linked to bacteriological and clinical shifts that occur during the initiation and progression of inflammatory periodontal diseases. Studies indicate that individuals experiencing bleeding on four consecutive occasions have a 30% higher risk of further disease progression.<sup>2</sup>

Controlling gingivitis holds the potential for profound health benefits; leading to a reduced prevalence of destructive periodontitis.<sup>3</sup> The attitudes and behaviors of health professionals toward their own oral health reflect their grasp of the importance of preventive dental procedures and their commitment to enhancing the oral health of their patients. While limited literature exists on this subject, it is generally recognized that educated individuals in society are more cognizant of the correlation between general health and oral diseases.

Given this context, fostering adequate awareness and knowledge about oral health and promoting good oral hygiene practices contribute to maintaining optimal oral and general health.<sup>4</sup> Importantly, the awareness of oral health among undergraduate health students can exert a substantial impact on the overall oral health of society.<sup>5</sup> Therefore, this study aims to assess gingival health awareness through self-reported bleeding among undergraduate students and interns at a dental college.

## Methodology

204 undergraduate students and interns at Rama Dental College Hospital & Research Centre in Kanpur participated in a descriptive, cross-sectional study that was carried out utilizing an online questionnaire. Convenience sampling was used to choose participants between July 2023 and December 2023, after ethical approval from the Institutional Review Committee (IRC) of RDC. An online self-administered, structured, closed-

ended, and open-ended questionnaire created in Google Forms (Alphabet Inc., USA) was used to gather the data, and a consent section derived from questions from previously published publications was also included.<sup>1-4, 6-7</sup> Twenty-five people who had already finished an undergraduate degree at RDC participated in the pretesting of the questions, and following analysis and comments, some changes were made. Given that it was an online survey conducted using Google Forms, only those who clicked on the on the Informed Consent box after reading about the research information and thus consented to participate in the study could give the responses and thus participate in the study.

The questionnaire asked about the students' experiences with gingival bleeding, normal gingival features and how they change during inflammation (such as color, size, etc.), and how they resolved the issue, taking other precautions against oral hygiene problems or by seeing a dentist to treat bleeding gingiva. In addition, the questionnaire asked the students if they were aware that systemic disorders and gingivitis were related. Since, tobacco use is a key risk factor for periodontal disease and does impact gingival bleeding, the population's smoking status was also evaluated. Smokers were categorized as per the Centre for Disease Control and Prevention (CDC, USA) guidelines, that has been accepted by World Health Organization: i) Current smoker = Smoked >100 cigarettes in lifetime and currently smoke; ii) Former smoker = Smoked >100 cigarettes in lifetime but do not currently smoke; and Never smoker = Never smoked or Smoked ≤100 cigarettes in lifetime.<sup>8</sup>

The participants were Rama Dental College Hospital & Research Center undergraduate students and interns pursuing a Bachelor of Dental Surgery (BDS) from first to fifth year batches. The selection of undergraduate students and interns was based on their potential as future health professionals as well as their proficiency in the English language and ability to read and comprehend the study's questions. Through social media (Emails,



Whatsapp and Facebook Messenger), students from different batches posted links to Google Forms.

**Statistical Analysis**

With reference to the study by Abe et al.,9 p = 0.365 (36.5% of university students who experienced gum bleeding whenever they brushed their teeth) and e = margin of error = 0.05 (5%) were taken, the formula  $n = Z^2p(1-p)/e^2$  was used to determine the minimum sample size of 227. The method of convenience sampling was employed to gather data. There were 204 responders in all. Utilizing Microsoft Excel Sheet 2019, an analysis of 204 samples was conducted following data cleaning and filtering. Frequency and percentage have been used to provide descriptive statistics.

**Results**

This online survey was self-administered by 204 undergraduate students and interns from Rama Dental College Hospital & Research Centre, Kanpur. The proforma included 13 questions regarding gingival bleeding experience, potential causes, and strategies for prevention and seeking care for the same in addition to the standard demographic questions. The students were between the ages of 17 and 31 (22.33±2.45 years). Of these, women made up the majority (204, 53.4%). Interns made up the largest group of participants (49, 12.8%). The fewest pupils were in their second year. Fourth-year students made up the minority among them (43, 11.3%) (Table 1).

**Table 1: Distribution of participating students according to gender, faculty, and year of study, n (%).**

		BDS
<b>Gender</b>	Female	153 (40.1 %)
	Male	51 (13.4%)
<b>Year</b>	First year	36 (9.4%)
	Second year	27 (7.1%)
	Third year	49 (12.8%)
	Fourth year	43 (11.3%)
	Intern	49 (12.8%)
<b>Total</b>		204 (53.4%)

The proforma's initial section looked into the student's smoking history. Table 2 indicates that 170 (44.5%) of the students who took part might be classified as "never smokers."

**Table 2: Smoking status of the participants according to gender and faculty, n (%).**

Gender	Smoking Status	BDS
<b>Female</b>	Current	-
	Former	8 (3.3%)
	Never smoker	145 (59.4%)
<b>Male</b>	Current	15 (10.9%)
	Former	11 (8.0%)
	Never smoker	25 (18.1%)
<b>Total</b>	Current	15 (3.9%)
	Former	19 (5.0%)
	Never smoker	170 (44.5%)
<b>Total</b>		204 (53.4%)

When it came to the fundamental understanding of gingiva color, 97 (65.7%) of the participants believed that red was the typical color. Gingival bleeding was seen by the

majority of participants (139, or 83.0%) as an indicator of gingivitis. When asked if they thought there was a connection between systemic illness and gingivitis, 102 individuals



(68.1%) said that indeed there was. Sixty-six percent of the students believed that gingival bleeding is more common in diabetics. 97 participants (65.7%) said that they believed there had been a color shift after gingival bleeding when asked if they had seen any size or color changes. According to the study's findings, 121 (31.7%) of the students believed that smoking caused more gingival bleeding.

Only 134 (55.5%) students thought that women who are trying to conceive and are already pregnant should be referred to a dentist. Many were doubtful about it some believed it was not necessary. Of all, 100 (36.4%) respondents thought gingival bleeding was mainly caused due to poor oral hygiene rest thought due to hard toothbrush and hard foodstuffs (Table 3).

**Table 3: Responses to the questions on gingival bleeding, n (%).**

Questions	Yes	No	Maybe
Is red the normal colour of gingiva?	75 (32.7%)	100 (54.5%)	29 (12.8%)
Is gingival bleeding a sign of gingivitis?	139 (83.0%)	12 (3.1%)	53 (13.9%)
Is gingival bleeding associated with systemic conditions?	102 (68.1%)	23 (6.0%)	79 (25.9%)
Is gingival bleeding associated with hormonal changes?	119 (55.8%)	36 (12.0%)	49 (32.2%)
Do individuals with diabetes have more gingival bleeding?	126 (62.0%)	24 (6.3%)	54 (31.7%)
Is there any colour change in gingiva when bleeding occurs?	97 (65.7%)	40 (11.5%)	67 (22.8%)
Does smoking increase gingival bleeding?	121 (31.7%)	12 (33.0%)	71 (35.3%)
Do you think women who are trying to conceive or are already pregnant should be referred to a dentist?	134 (55.5%)	23 (6.0%)	47 (38.5%)
Can antihypertensive drugs increase gingival bleeding?	126 (38.2%)	24 (14.15)	54 (47.6%)
Can anticonvulsant drugs increase gingival bleeding?	90 (36.1%)	36 (9.4%)	78 (54.5%)
Can immunosuppressant drugs increase gingival bleeding?	118 (43.5%)	31 (8.1%)	55 (48.4%)
Is gingival bleeding associated with history of asthma?	53 (13.9%)	68 (28.3%)	83 (57.9%)
Is gingival bleeding associated with otitis media/externa?	45 (17.0%)	60 (23.0%)	99 (59.9%)
Is Poor oral hygiene, Eating hard foodstuff and Hard toothbrush are the main causes of gingival bleeding?	100 (36.4%)	39 (17.1%)	65 (51.2%)

**Discussion**

Periodontal disease may cause discomfort or go undetected at times. Therefore, the majority of the time, individuals don't realize it until it has progressed to a point where the prognosis is dire.<sup>2,7</sup> A moderate case of gingivitis and a poor response to periodontal therapy are indicated by gingival bleeding. To prevent this condition

and preserve the best possible state of periodontal health, it is crucial to be aware of and knowledgeable about it.<sup>2,4-6</sup>

One of the earliest indicators of gingival inflammation is bleeding of the gingiva, which can occur naturally or in response to mechanical stimulation (brushing or probing). It is thought that bleeding of the gingiva is a poor



prognosis indicator for individuals with periodontitis.<sup>8</sup> By creating the questionnaire in this manner, the study's authors were able to gauge the students' comprehension levels. Medical college interns and students are well-versed in a variety of health and disease-related topics.

However, not everyone is aware of this early indication of periodontal disease. Therefore, the purpose of this study was to evaluate the interns' and students' self-reports of gingival bleeding as well as their understanding of the causes, progression, and treatment of gingival bleeding. Gingiva's normal color is known as "salmon pink" or "coral pink," although depending on the level of keratinization, vascularization, and pigmentation, it can range from light pink to deep brown or black.<sup>2,8</sup> Gingival color changes are among the first clinical indicators of inflammation and have clinical significance as they may indicate mild gingivitis.

The majority of participants (204, 53.4%) understood that red is not the typical color of gingiva, although many of them (75, 32.7%) thought it was. However, several of them were unsure of the gingiva's color. This could be because various individuals have varied opinions on what color is and since color is a subjective concept.<sup>2</sup>

When the students were asked if they had ever experienced gingival bleeding, more than half (204, 53.4%) responded that they had experienced gingival bleeding while 139 (36.9%) had not experienced gingival bleeding. This was similar to that reported by Zorab et al. in Iraqi dental students where 98 (32.6%) had not experienced gingival bleeding.<sup>2</sup> When asked if they had experienced bad breath (halitosis) along with gingival bleeding, 47 (17.0%) reported in affirmative. This was similar to that reported by Zardawi et al. in Iraqi dental students where 125 (41.7%) reported to have experienced bad breath.<sup>7</sup> Similarity could be due to similar participating population. It is also common to experience bad breath along with gingival bleeding as the aetiology for both the conditions are similar. The prevalence of self-

reported gingival bleeding(204, 53.4%) was also similar to the study done in French population (63.2%) and reported by Veynachter et al. and Baudet et al.<sup>1,4</sup> That study was done in adult population and both French and Nepali studies had similar group of smokers (70.3% never smoker in French study while 273, 71.5% individuals were "never smokers" in current study). However, it was in contrast with the Brazilian study done by Nadanovsky et al.<sup>6</sup> which reported only 18.4% answered positively for gum bleed and in a Japanese study reported by Abe et al.<sup>9</sup> showed only 36.5%. The difference could be due to different geography and age of the population.

Both periodontitis and gingivitis are more common in those with diabetes mellitus.<sup>8, 13, 14</sup> The majority of participants (204, 53.4%) concurred that there is increased gingival bleeding in diabetic individuals. This was comparable to a study conducted among Jordanian university students, where 597 (65.9%) individuals believed that having diabetes increased the risk of gum disease. It can be due to the faculty of study population's comparable age. People in the medical field are more aware of the connections between diabetes and dental health.

Similarly, hormonal changes during pregnancy increase the chance of gingivitis.<sup>5,8,11,12</sup> More than half(119, 55.8%) of the participants believed that there was an association between hormonal changes and gingival bleeding. This could be due to the fact that students and interns of a medical college have more knowledge of the various hormonal effects, systemic diseases, and conditions. Gingivitis causes the gingiva to be red and enlarged. Majority of the participants (75, 32.7%) believed that there are colour and size changes during gingival bleeding. This was similar to study done in Jordan university students.<sup>13</sup> It could be because of similar age group of the population. Majority students in Jordanian study belonged to health sector.

Smoking has been identified a major risk factor for periodontal disease and many studies have shown poor response to periodontal treatment

in a smoker than a non-smoker.<sup>8,13</sup> However, smoking has been known to mask gingival inflammation and smokers experience less bleeding on probing than non-smokers. This confusion was reflected in the participants' responses where one-third participants chose each of the options: Yes (121, 31.7%), No (12, 33.0%), and Maybe (71, 35.3%) when they were asked whether smoking increases gingival bleeding. This was in contrast with that reported in Jordan university students. The difference could be in the way the question was raised in both the studies. In current study, participants were asked regarding gingival bleeding whereas in the Alzammam and Almaki study they were asked regarding increase in the chance of developing gum disease.<sup>14</sup> As we know, the gum (gingival) disease is definitely increased due to smoking but not necessarily bleeding.

There is a correlation between maternal periodontal health and newborn birth weight, which suggests that women who are attempting to conceive or are already pregnant should see a dentist.<sup>5,12</sup> Low birth weight babies were more common in mothers with periodontitis or gingivitis.<sup>12</sup> A majority of the participants (134, 55.5%) said that women who are attempting to conceive or who are currently pregnant ought to be sent to a dentist. However, a startling amount of people (147, 38.5%) had their doubts. Gingivitis has been linked to antihypertensive, anticonvulsant, and immunosuppressive medications. Relatively few individuals thought that immunosuppressive (118, 43.5%), antihypertensive (126, 38.2%), and anticonvulsant (90, 36.1%) medications caused gingival hemorrhage.

Finally, the majority of research participants (139, 83.0%) reported having either experienced or suspected gingival bleeding. This is a concerning amount. Studies demonstrate a correlation between the oral cavity's microbial diversity and self-reported periodontal disease or gingival bleeding.<sup>15</sup> It can be an indication of the participants' dental health. Conversely, it also indicates the participants' knowledge of gingival health, which is a positive thing. Health

professionals should be more conscious of their own general health, and specifically their dental health, in order to be better equipped to prevent, treat, and manage health disorders in a community or a nation. This research was a meager effort to raise awareness of their own general health as well as oral health to be specific. This study was a small attempt to increase the awareness of gingival health at undergraduate level.

This study has certain limitations that need to be acknowledged. Firstly, the tool employed for data collection was a self-administered questionnaire, which may introduce biases related to self-reporting. Additionally, the study was confined to students from a single dental college, leading to a relatively small sample size. The exclusive focus on one institution might limit the generalizability of the findings to a broader population.

### Conclusions

This study delves into the perceptions and comprehension of future health professionals, specifically undergraduate dental college interns, regarding gingival bleeding and its potential correlation with both oral and systemic health. Despite their ready access to oral treatment and knowledge of periodontal health, the prevalence of self-reported gingival bleeding was noteworthy among this group. Moreover, the concerning aspect lies in their awareness, or lack thereof, regarding the connection between gingival diseases and systemic conditions.

To gain a more comprehensive understanding of the implications surrounding oral and periodontal health, it is recommended to conduct further multicentric research with a larger sample size and a robust study design. Such research could delve deeper into exploring the association between self-reported gingival bleeding and periodontal diseases, shedding light on critical aspects that warrant attention within this population of future health professionals.

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