OPEN ACCESS JOURNALS
Indiana Journal of Multidisciplinary Research
Abbreviated Tittle- Ind J Multi Res
ISSN *(Online)*- 2583-3820
Journal Homepage Link- https://indianapublications.com/Journals/IJMR
DOI: https://doi.org/10.5281/zenodo.24368355

INDIANA PUBLICATIONS
PRODUCTIVE AND QUALITY RESEARCH

Research Article

Volume-06|Issue-06|2026

Prevalence of Gingivitis and Its Associated Risk Factors Among Adults in Hayatabad, Peshawar, Khyber Pakhtunkhwa, Pakistan

Hafiz Kashif Ullah1*, Sumayya Rashid2

[1]Post Graduate Research Scholar, University of Essex Colchester, United Kingdom. Email: hafizkashifullah@gmail.com
[2]Graduate Research Scholar, University of Swat, Khyber Pakhtunkhwa, Pakistan.

Article History
Received: 10.10.2026
Accepted: 15.11.2026
Published: 19.11.2026

Citation
Ullah, H. K. & Rashid, S. (2026). Prevalence of Gingivitis and Its Associated Risk Factors Among Adults in Hayatabad, Peshawar, Khyber Pakhtunkhwa, Pakistan. *Indiana Journal of Multidisciplinary Research, 6*(6), 1-11.

Abstract: Gingivitis is a frequent and mild form of gum disease (periodontal disease) that causes irritation, redness and inflammation of the gums surrounding the base of the teeth. Gingivitis should be taken seriously and treated properly. Gingivitis is a mild, early stage of gum disease caused by bacteria and plaque accumulation in the mouth, which can develop into a more serious infection and progress to periodontitis if left untreated.

The study's goal was to investigate the impact of students' knowledge and attitudes about the condition of gingivitis. The study aimed to determine the knowledge and attitudes regarding gingivitis among students and patients by asking them specific questions.

This was a descriptive cross-sectional study to determine students' and patients' knowledge and attitudes about the prevalence of gingivitis and its associated risk factors among adults in Hayatabad Peshawar, Khyber Pakhtunkhwa. The study was conducted at Iqra National University, CECOS University, Rehman Medical Institute, Hayatabad Medical Complex and Hayatabad Dental Clinic.

In contrast, the current study found that among the total sample of 250 students and patients, 154 (61.6%) were males and 96 (38.4%) were females. Of the total participants, 218 (87.2%) were students, 14 (5.6%) were doing house jobs, 13 (5.2%) were doing government jobs and 5 (2.0%) were doing private jobs. Regarding smoking habits, 41 (16.4%) were smokers and 208 (83.4%) were non-smokers. Regarding oral hygiene practices, 28 (11.2%) used Miswak, whereas 178 (71.2%) used toothpaste, 42 (16.8%) used both Miswak and toothpaste and 02 (0.8%) used other materials to brush their teeth. Regarding the use of dental floss among the 250 students and patients, 67 (26.8%) participants replied yes, 144 (57.6%) said no and 38 (15.2%) used dental floss occasionally.

The students and patients of Hayatabad Peshawar, were educated about gingivitis, however, this knowledge was not reflected in their attitudes and practices regarding oral hygiene and gingivitis. Gingivitis was not well recognized. There was a need to raise awareness regarding the understanding of periodontal diseases, their prevention and the importance of maintaining proper oral hygiene. According to the findings of the study, students and patients were unable to maintain proper oral hygiene.

Keywords: Gingivitis, Prevalence, Risk Factors, Oral Hygiene, Periodontal Disease, Adults, Hayatabad, Peshawar.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (**CC BY-NC 4.0**).

INTRODUCTION

Gingivitis

Gingivitis is a common and mild form of gum disease characterized by irritation, redness and swelling (inflammation) of the gingiva surrounding the teeth. It is primarily caused by the accumulation of bacterial plaque along the gum line. Gingivitis should be taken seriously and treated appropriately, as untreated inflammation may persist and, in susceptible individuals, progress to more serious forms of periodontal disease.

Although gingivitis may not always cause noticeable symptoms, common signs include red, swollen gums and bleeding during brushing or flossing. With appropriate treatment and good oral hygiene practices, gingivitis is generally reversible, helping to prevent its progression to periodontitis.

Prevalence of Gingivitis

The prevalence of periodontal disease varies from region to region around the world, with high prevalence and severity reported in Asian countries. (1) The majority of the population suffers from moderate and severe periodontitis, which begins at a young age and presents with clinical symptoms after the age of 35. If left untreated, it can eventually lead to tooth loss. (2)

Gingivitis affects 82% of adolescents in the United States. The National Health and Nutrition Examination Survey III (NHANES III) was conducted between 1988 and 1994. (3) Poor oral hygiene is considered one of the

***Corresponding Author:** Hafiz Kashif Ullah

main risk factors for periodontitis. (4) Periodontal diseases are among the most common chronic diseases affecting people of all ages around the world. However, severe forms of the disease become more pronounced in older people, mainly due to prolonged exposure to risk factors. (5)

A healthy diet rich in fiber and whole grains has been associated with a reduced risk of gum disease in several population groups. (6) A study in India found that governments and dental committees considered interventions to improve oral health and life satisfaction. (7) A study on the global prevalence of periodontal disease showed considerable variations in its prevalence across different countries: 60% in Norway, 30% in Iran, 15% in Belarus and 14% in Germany and Taiwan. (8)

Periodontitis has been associated with preterm birth since 1996, when Offenbach and colleagues were among the first to describe the relationship between maternal periodontitis and preterm birth. (9) Gingival inflammation is commonly characterized by bleeding and swollen gums. If the underlying plaque-induced inflammation remains untreated, periodontitis may develop in susceptible individuals as a result of the loss of periodontal attachment and supporting bone. (10)

Gingivitis is relatively common among all age groups. The prevalence of gingivitis affecting the oral cavity, papillae and gingival margins has been found to have a strong connection. Thus, the proportion of affected papillae or gingival margins in the oral cavity, compared with unaffected areas, appears to vary only within narrow limits. (11) Generally, gingivitis develops during childhood and becomes more prevalent and severe as people grow older. (12)

A large number of epidemiological studies conducted in countries such as the United States, India and Scandinavia have shown that approximately 100 per cent of the adult population suffers from gingivitis or periodontitis (Russell, 1967; Waerhaug, 1967; Hugoson & Koch, 1979). (13)

According to a study published by the Dental Health Foundation of Ireland, gingivitis is characterized by red and swollen gum edges and bleeding during brushing. Gingivitis occurs in both chronic and acute forms. Acute gingivitis is associated with certain infections, microorganisms or trauma. (14)

In addition to professional care, such as regular dental prophylaxis, a variety of oral health products have been developed to control plaque-induced periodontal disease. Studies have shown that good oral hygiene practices, such as brushing and using an appropriate mouthwash, can reduce gingivitis. (15)

Etiology

Gingivitis is caused by the accumulation of microbial plaque near the gum line. Microorganisms strongly implicated in the development of gingivitis include *Streptococcus*, *Fusobacterium*, *Actinomyces*, *Villanella* and *Treponema* species. *Bacteroides*, *Capnocytophaga* and *Eikenella* may also be implicated in the disease. Other local or systemic etiological conditions may worsen the tissue's sensitivity to plaque accumulation or microbial invasion. (16)

Based on its etiology, gingivitis can be classified into different types.

Plaque-Induced Gingivitis

This is the most prevalent cause of gingivitis. Plaque is a thin coating that forms on the surface of the teeth as a result of inadequate oral hygiene. If it is not removed regularly, it can harden and form calculus. Dental plaque contains a large number of bacteria that cause inflammation of the gum tissue.

Certain local factors, such as dental irregularities that make plaque removal difficult, can contribute to plaque accumulation. Misaligned teeth frequently require orthodontic correction, and cleaning can become more difficult, resulting in increased plaque accumulation. Furthermore, a dental prosthesis that is not correctly fitted or properly finished might act as a site for plaque accumulation. In children, tooth eruption is commonly associated with gingivitis because plaque deposition tends to increase in the areas where primary teeth are exfoliating and permanent teeth are emerging, making oral hygiene more difficult to maintain. This condition is known as eruption gingivitis.

Nutritional Factors

Nutritional deficiencies, particularly vitamin C deficiency, can contribute to gingival inflammation and other gum-related problems. Furthermore, modern dietary habits characterized by increased consumption of refined carbohydrates and a higher ratio of omega-6 to omega-3 fatty acids may promote inflammatory processes in the body (17). High-glycemic-index carbohydrates may contribute to inflammation through mechanisms involving the activation of nuclear factor kappa B (NF-κB) and increased oxidative stress (18).

Hormonal Factors

Hormonal changes can influence the response of gingival tissues to bacterial plaque accumulation and contribute to gingival inflammation. Estrogen and testosterone receptors are present in gingival tissues, indicating that these tissues can respond to changes in steroid hormone levels. Such hormonal influences may increase the inflammatory response of the gums, even without a corresponding increase in plaque accumulation. Estrogen levels have also been suggested to influence the severity of gingival inflammation in response to bacterial biofilms at the gingival margin (19). Hormonal changes during puberty are associated with pubertal gingivitis,

***Corresponding Author:** Hafiz Kashif Ullah

which has been reported to develop earlier in girls, typically between 11 and 13 years of age, than in boys, generally between 13 and 14 years of age (20). Although these age groups fall outside the present study's population, this evidence helps explain the influence of hormonal changes on gingival inflammation.

Drug-Induced Gingival Changes

Several medications used to treat systemic diseases can cause gingival changes as side effects. For example, phenytoin, which is used to treat epileptic seizures and calcium-channel blockers, which are prescribed for angina and high blood pressure, are associated with drug-induced gingival enlargement. Other medications, including certain anticoagulants, fibrinolytic agents, oral contraceptives, protease inhibitors and vitamin A analogues, have also been discussed in relation to gingival changes. One possible mechanism of drug-induced gingival enlargement involves increased fibroblast activity and an imbalance between the synthesis and breakdown of the extracellular matrix. This may result in the accumulation of collagen and other extracellular matrix components, leading to gingival enlargement (21).

In addition to drug-related influences, several factors may contribute to gingival inflammation and other gingival conditions. These include smoking and chewing tobacco, systemic disorders, genetic factors and local conditions such as dry mouth and crowded teeth.

Signs and Symptoms

Many people may be unaware that they have gingivitis because it does not always cause noticeable symptoms. However, common signs and symptoms of gingivitis include:

- Red or reddish-purple gums.
- Tender or swollen gums.
- Bleeding gums during brushing or dental flossing.
- Persistent bad breath (halitosis).
- Changes in gum texture and appearance.
- Mild gum discomfort or tenderness.

In some cases, gingivitis may occur without noticeable pain or discomfort. If left untreated, it may progress to periodontitis in susceptible individuals, which can involve additional signs such as gum recession, separation of the gums from the teeth, pus formation, tooth mobility and pain during chewing. Drug-induced gingival enlargement may also occur as a separate medication-related gingival condition.

Diagnosis

The diagnosis of gingivitis involves reviewing the patient's dental and medical history and identifying any underlying conditions or factors that may contribute to gingival inflammation. A clinical examination of the teeth, gums, oral cavity and tongue is performed to identify plaque accumulation, gum redness, swelling and bleeding. The presence of dental plaque and bleeding on probing helps assess gingival inflammation. The depth of the periodontal pockets is measured using a periodontal probe to evaluate the condition of the gingival tissues and identify possible periodontal involvement. Dental X-rays may be recommended when periodontitis is suspected to assess potential bone loss. Other findings, such as persistent bad breath (halitosis), may also be noted during the examination (22).

Complications

One of the most serious complications of persistent gingival inflammation is its possible progression into the deeper periodontal tissues and supporting bone, resulting in periodontitis. Advanced periodontitis can lead to tooth mobility and in severe cases, tooth loss. However, gingivitis does not invariably progress to periodontitis and appropriate treatment and proper oral hygiene can help prevent its progression.

RATIONALE OF THE STUDY

The purpose of this study was to assess knowledge and attitudes regarding gingivitis, its prevalence and associated risk factors among patients at Hayatabad Medical Complex (HMC) and Hayatabad Dental Clinic, as well as students at CECOS University, Rehman Medical College and Iqra National University. Limited knowledge of gingivitis and poor attitudes towards oral health may contribute to inadequate awareness and improper oral hygiene practices. Since poor oral hygiene is an important contributing factor to several dental diseases, it is essential to improve awareness and understanding of gingivitis, its associated risk factors, preventive measures and proper oral hygiene practices among students and patients.

LITERATURE REVIEW

Fan W. et al. (2016) investigated the prevalence of gingivitis and its association with sociodemographic factors and oral health behaviors. Their study reported a gingivitis prevalence of 29.6% among children aged 12–15 years in Guangdong, China. The findings highlighted the importance of regular dental check-ups, proper oral hygiene practices, and professional dental care in maintaining healthy gums. (23)

A study published in the *Journal of Periodontology* by Page (1986) discussed the role of bacterial plaque in the development of gingivitis. It explained that specific microorganisms contribute to gingival inflammation and that the condition may remain stable, regress, or progress. The study also emphasized the importance of controlling and preventing periodontal diseases through proper oral hygiene. (24)

Janaki Ran et al. (2020), in a systematic review and meta-analysis, examined the prevalence of periodontal diseases among Indian adults. Their analysis included 92,219 adults from 30 studies and reported a pooled prevalence of gingivitis of 46.6%. The findings

***Corresponding Author:** Hafiz Kashif Ullah

highlighted the considerable burden of gum disease among Indian adults and the importance of consistent methods for assessing gingival health. (25)

Chrysanthakopoulos (2016) examined the relationship between gingivitis and sociodemographic characteristics and oral hygiene habits. The study reported a gingivitis prevalence of 72.8%. Male gender, lower parental education and income, irregular dental visits, inadequate tooth brushing, dental plaque, and smoking were identified as associated factors. (26)

Hamid G. et al. (2021) conducted a cross-sectional study among 133 patients at Lady Reading Hospital, Peshawar, Pakistan. The study reported gingivitis in 67 patients (50.37%), with mild, moderate, and severe cases representing 64.17%, 29.85%, and 5.97%, respectively, of the affected patients. The authors emphasized the need for public awareness and improved oral hygiene practices to prevent gingivitis and other oral health complications. (27)

Research Gap

Previous studies have examined the prevalence of gingivitis and its associated factors in different populations, including children, adolescents, adults and elderly patients. These studies have identified several factors associated with gingivitis, such as poor oral hygiene, smoking, inadequate dental care and socioeconomic conditions. However, the reviewed literature provides limited evidence specifically concerning the prevalence of gingivitis and its associated risk factors among adults in Hayatabad, Peshawar.

Furthermore, the existing studies have focused on different age groups and geographical populations, making it important to investigate the condition within the local adult population. Therefore, the present study aims to assess the prevalence of gingivitis and its associated risk factors among adults in Hayatabad Peshawar, Khyber Pakhtunkhwa, Pakistan. It will also examine participants' oral hygiene practices and awareness of gingivitis to identify areas requiring improvement in oral health education and preventive care.

METHODOLOGY

This study employed a descriptive cross-sectional research design and included 250 students and patients aged 20-25 years from selected educational institutions, hospitals and dental clinics in Hayatabad, Peshawar. Primary data were collected through a structured, closed-ended questionnaire to assess participants' knowledge and attitudes regarding gingivitis, oral hygiene practices and associated risk factors. Institutional permissions and ethical approval were obtained before data collection and informed consent was obtained from the participants. The collected data were analyzed using SPSS version 25 and presented through frequencies, tables and charts.

Study Design and Setting

This descriptive cross-sectional study included 250 students and patients from selected educational institutions, hospitals and dental clinics in Hayatabad, Peshawar. The study aimed to assess participants' knowledge and attitudes regarding gingivitis and its associated risk factors. Data were collected from Iqra National University, CECOS University, Rehman Medical Institute, Hayatabad Medical Complex and Hayatabad Dental Clinic.

Sample Size

A total of 250 participants were included in the study. The collected data were analysed using Statistical Package for the Social Sciences (SPSS), version 25.

Sampling Technique

Primary data were collected from students enrolled in different educational institutions and patients visiting hospitals and dental clinics in Hayatabad, Peshawar. Permission to collect data was obtained from the heads of the respective institutions and hospital departments.

Inclusion Criteria

Students and patients aged 20 to 25 years residing in or studying in Hayatabad, Peshawar, were included in the study.

Exclusion Criteria

Individuals below 20 years or above 25 years of age, as well as those from outside Hayatabad, Peshawar, were excluded from the study.

Data Collection Procedure

Ethical approval and institutional permissions were obtained before data collection. Informed consent was obtained from all participants before their participation in the study. Data were collected using a structured, closed-ended questionnaire designed to assess participants' knowledge and attitudes regarding gingivitis and its associated risk factors.

Data Analysis Procedure

The collected data were entered, processed and analyzed using the Statistical Package for the Social Sciences (SPSS), version 25. The results were presented using frequencies, tables and charts.

RESULT AND DATA ANALYSIS

Table: 2.0 Details of sample

		Frequency	Percent
Valid	Male	154	61.6
	Female	96	38.4
	Total	250	100.0

***Corresponding Author:** Hafiz Kashif Ullah

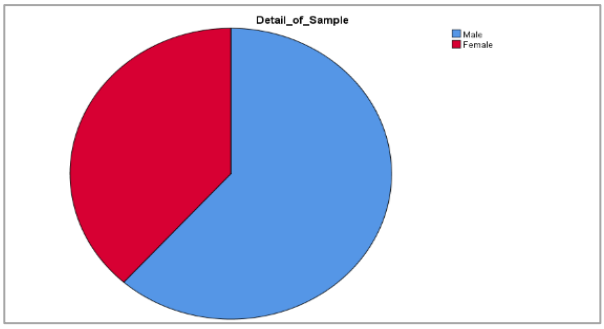


Figure 2.1: Detail of Sample: A total of 250 students and patients participated in the study, including 154 (61.6%) males and 96 (38.4%) females.

Table: 2.2 Occupation of the Participants

		Frequency	Percent
Valid	Student	218	87.2
	house job	14	5.6
	Govt job	13	5.2
	Private job	5	2.0
	Total	250	100.0

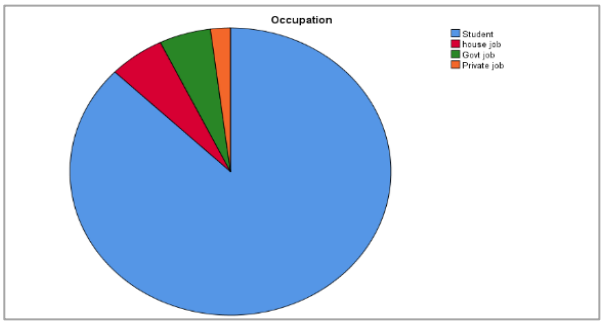


Figure 2.2 Occupation of the Participants: A total of 250 participants included 218 (87.2%) students, 14 (5.6%) house officers, 13 (5.2%) government employees and 05 (2.0%) private-sector employees.

Table: 2.3 Education level

		Frequency	Percent
Valid	Primary	3	1.2
	Secondary	10	4.0
	Undergraduate	236	94.4
	Post graduate	1	.4
	Total	250	100.0

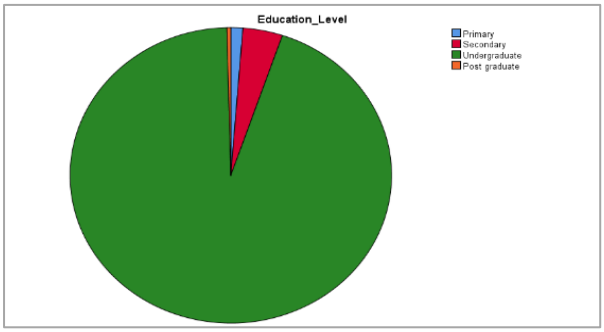


Figure 2.3: Educational Level of Participants: The figure presents the educational levels of the 250 participants. Among them, 3 (1.2%) had primary education, 10 (4.0%) had secondary education, 236 (94.4%) were undergraduates and 01 (0.4%) had postgraduate education.

Table:2.4 Your Income

		Frequency	Percent
Valid	More than 21000	41	16.4
	Less than 21000	20	8.0
	Not applicable	185	74.0
	4.00	4	1.6
	Total	250	100.0

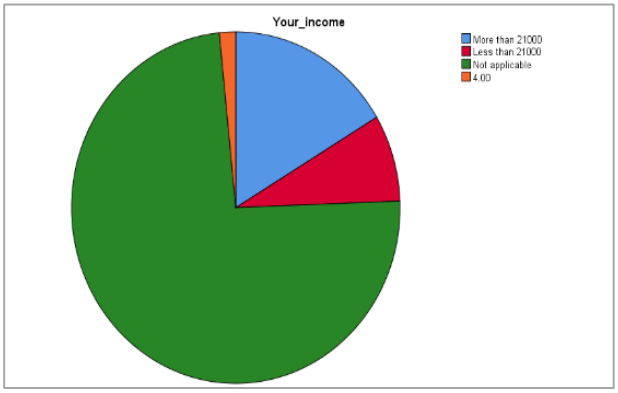


Figure 2.4: Monthly Income of Participants: The figure presents the monthly income status of the 250 participants. Among them, 41 (16.4%) reported a monthly income of more than 21,000, while 20 (8.0%) reported an income of less than 21,000. For the remaining 185 (74.0%) participants, income was not applicable.

Table: 2.5 Smoking

		Frequency	Percent
Valid	Yes	41	16.4
	No	208	83.2
	3.00	1	.4
	Total	250	100.0

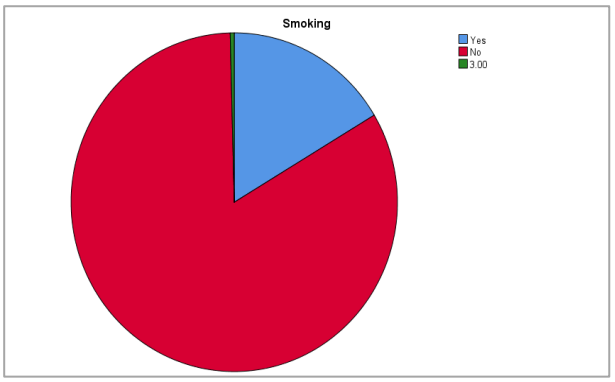


Figure 2.5: Smoking Status of Participants: The figure presents the smoking status of the 250 participants. Among them, 41 (16.4%) were smokers, while 208 (83.2%) were non-smokers.

***Corresponding Author:** Hafiz Kashif Ullah

Table: 2.6 Material for brushing

		Frequency	Percent
Valid	Miswak	28	11.2
	Toothpaste	178	71.2
	Both	42	16.8
	Others	2	.8
	Total	250	100.0

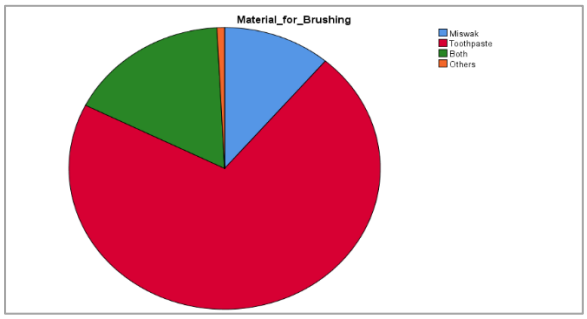


Figure 2.6: Materials Used for Brushing Teeth: The figure presents the materials used by the 250 participants for brushing their teeth. Among them, 28 (11.2%) used Miswak, 178 (71.2%) used toothpaste, 42 (16.8%) used both Miswak and toothpaste, while 2 (0.8%) used other materials for brushing their teeth.

Table: 2.7 Frequency of brushing

		Frequency	Percent
Valid	Once	91	36.4
	Twice	136	54.4
	Thrice	20	8.0
	Never	3	1.2
	Total	250	100.0

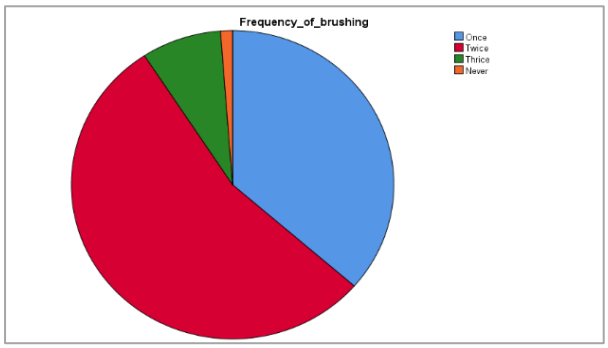


Figure 2.7: Frequency of Daily Tooth Brushing: The figure presents the daily tooth-brushing frequency of the 250 participants. Among them, 91 (36.4%) brushed their teeth once a day, 136 (54.4%) brushed twice a day, 20 (8.0%) brushed three times a day, while 3 (1.2%) did not brush their teeth daily.

Table: 2.8 Dental floss

		Frequency	Percent
Valid	Yes	67	26.8
	No	144	57.6
	Occasionally	38	15.2
	4.00	1	.4
	Total	250	100.0

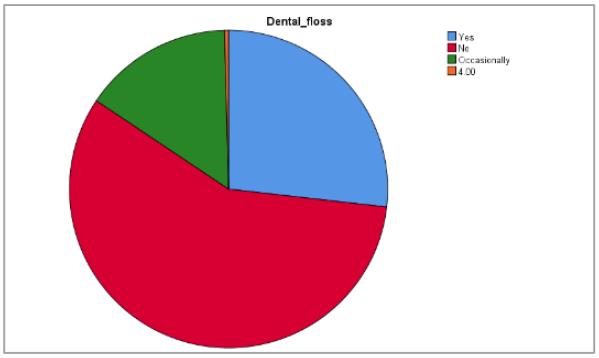


Figure 2.8: Use of Dental Floss Among Participants: The figure presents the use of dental floss among the 250 participants. Among them, 67 (26.8%) reported using dental floss, 144 (57.6%) reported not using it, while 38 (15.2%) reported using it occasionally.

Table: 2.9 Dental follow up

		Frequency	Percent
Valid	Twice a year	31	12.4
	Once a year	57	22.8
	When in pain	117	46.8
	Never	45	18.0
	Total	250	100.0

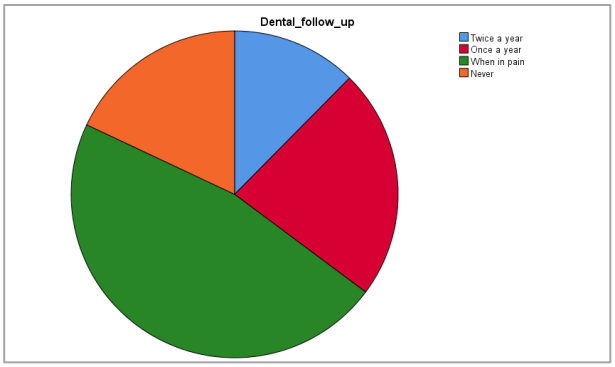


Figure 2.9: Dental Follow-Up Practices Among Participants: The figure presents the dental follow-up practices of the 250 participants. Among them, 31 (12.4%) reported visiting a dentist twice a year, 57 (22.8%) visited once a year, 117 (46.8%) visited a dentist only when experiencing dental pain, while 45 (18.0%) had never visited a dentist for a dental check-up.

2.10: Dental Problems During the Previous Two Months

Tables of 2.10 presents the dental problems experienced by participants during the previous two months. The findings provide an overview of the frequency and types of dental problems reported by the participants during this period.

Table: 2.10.1 Pain

		Frequency	Percent
Valid	Yes	100	40.0
	No	150	60.0
	Total	250	100.0

***Corresponding Author:** Hafiz Kashif Ullah

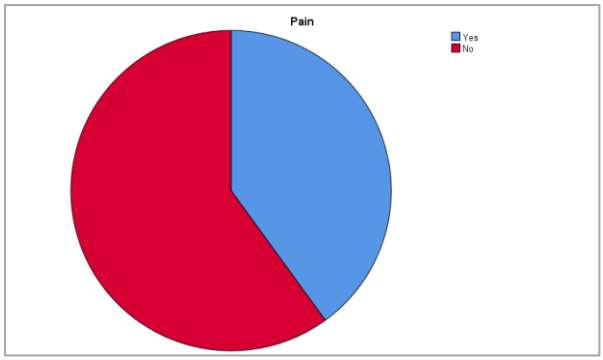


Figure 2.10.1: Toothache Experienced by Participants During the Previous Two Months: The figure presents the occurrence of toothache among the 250 participants during the previous two months. Among them, 100 (40.0%) reported experiencing toothache, while 150 (60.0%) reported that they had not experienced any toothache during this period.

Table: 2.10.2 Bleeding

		Frequency	Percent
Valid	Yes	100	40.0
	No	150	60.0
	Total	250	100.0

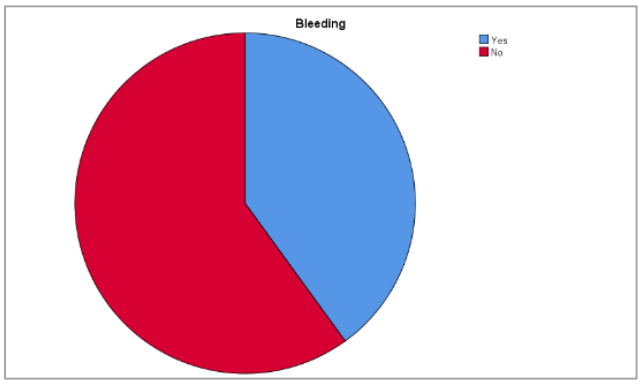
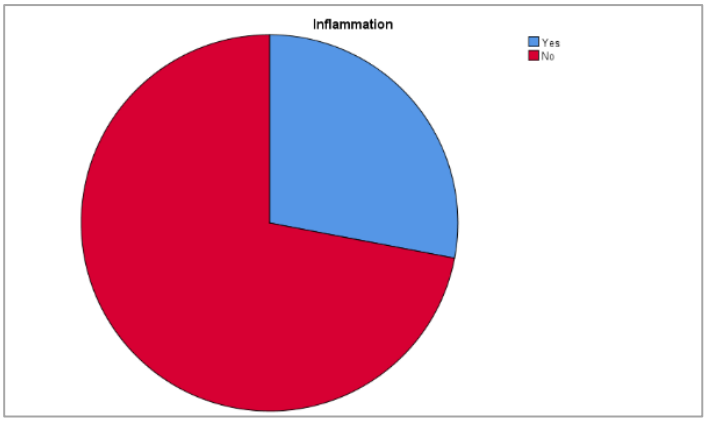


Figure 2.10.2: Bleeding History Among Participants During the Previous Two Months: The figure presents the occurrence of bleeding among the 250 participants during the previous two months. Among them, 100 (40.0%) reported experiencing bleeding, while 150 (60.0%) reported no history of bleeding during this period.

Table: 2.10.3 Inflammation

		Frequency	Percent
Valid	Yes	70	28.0
	No	180	72.0
	Total	250	100.0



.

Figure 2.10.3: Gum Inflammation Among Participants During the Previous Two Months: The figure presents the occurrence of gum inflammation among the 250 participants during the previous two months. Among them, 70 (28.0%) reported experiencing gum inflammation, while 180 (72.0%) reported no gum inflammation during this period.

Table: 2.11 You experienced gingival bleeding

		Frequency	Percent
Valid	Frequently	30	12.0
	Rarely	116	46.4
	No bleeding	104	41.6
	Total	250	100.0

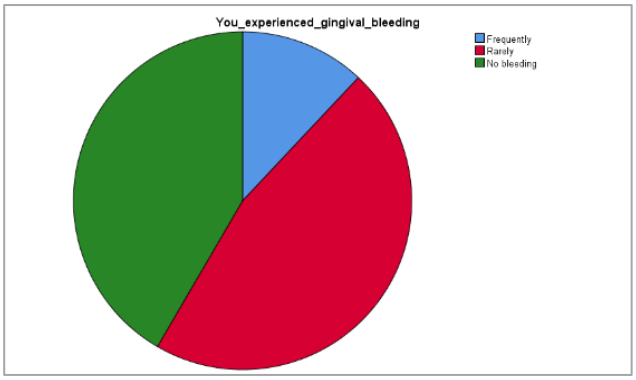


Figure 2.11: Frequency of Gingival Bleeding Among Participants: The figure presents the frequency of gingival bleeding among the 250 participants. Among them, 30 (12.0%) reported frequent gum bleeding, 116 (46.4%) reported occasional gum bleeding, while 104 (41.6%) reported no gum bleeding.

Table: 2.12 Mostly think may cause gingival bleeding

		Frequency	Percent
Valid	Tooth brushing	143	57.2
	Eating an apple	33	13.2
	Early morning	28	11.2
	Others	46	18.4
	Total	250	100.0

***Corresponding Author:** Hafiz Kashif Ullah

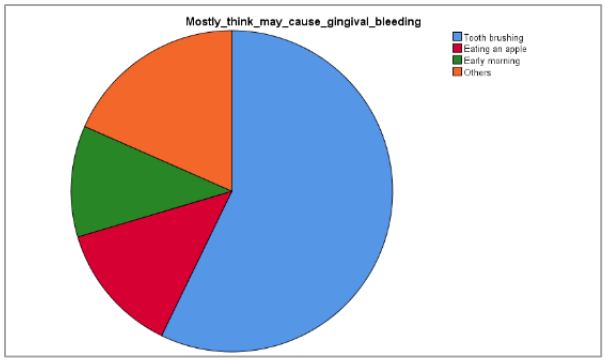


Figure 2.12: Reported Causes or Circumstances of Gingival Bleeding: The figure presents the reported causes or circumstances associated with gingival bleeding among the 250 participants. Among them, 143 (57.2%) reported bleeding while brushing their teeth, 33 (13.2%) reported bleeding while eating an apple, 28 (11.2%) reported bleeding in the early morning, while 46 (18.4%) identified other circumstances associated with gingival bleeding.

Table: 2.13 You visited a dentist for gingival bleeding

		Frequency	Percent
Valid	Yes	46	18.4
	No	203	81.2
	3.00	1	.4
	Total	250	100.0

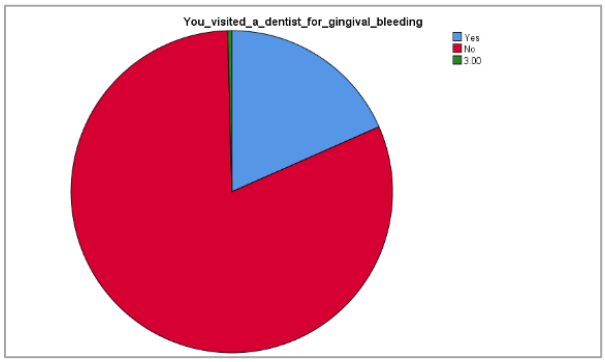


Figure 2.13: Dental Visits Due to Gum Bleeding: The figure presents the dental visit patterns of participants experiencing gum bleeding. Among the 250 participants, 46 (18.4%) reported visiting a dentist because of gum bleeding, while 203 (81.2%) reported that they did not visit a dentist regularly for this problem.

Table: 2.14: Respiratory Diseases

		Frequency	Percent
Valid	Yes	16	6.4
	No	203	81.2
	Don't know	31	12.4
	Total	250	100.0

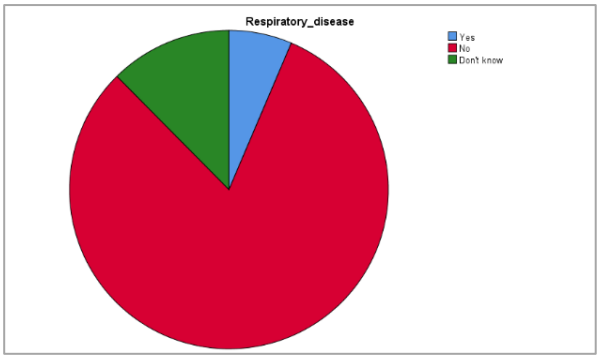


Figure 2.14: History of Respiratory Diseases Among Participants: The figure presents the reported history of respiratory diseases among the 250 participants. Among them, 16 (6.4%) reported having a respiratory disease, 203 (81.2%) reported having no such disease, while 31 (12.4%) were unsure whether they had a respiratory disease.

FINDINGS OF THE STUDY

The major findings of the study are summarized as follows:

1. **Demographic Characteristics:** The study included 250 participants, comprising 154 males (61.6%) and 96 females (38.4%). The majority were students (218; 87.2%), while 236 participants (94.4%) had undergraduate-level education.
2. **Oral Hygiene Practices:** Most participants (178; 71.2%) used toothpaste for cleaning their teeth, while 28 (11.2%) used Miswak and 42 (16.8%) used both. Regarding brushing frequency, 136 participants (54.4%) brushed twice daily, 91 (36.4%) brushed once daily and 20 (8.0%) brushed three times daily.
3. **Use of Dental Floss:** The findings revealed that 144 participants (57.6%) did not use dental floss, 67 (26.8%) used it regularly, and 38 (15.2%) used it occasionally.
4. **Dental Care and Follow-up:** A considerable proportion of participants (117; 46.8%) visited a dentist only when experiencing pain, while 45 (18.0%) reported never visiting a dentist. Only 31 participants (12.4%) visited a dentist twice a year.
5. **Reported Dental and Gum Problems:** During the previous two months, 100 participants (40%) reported toothache, 100 (40%) experienced gum bleeding, 70 (28%) reported gum inflammation and 80 (32%) reported gum swelling.
6. **Frequency of Gingival Bleeding:** Regarding the frequency of gum bleeding, 30 participants (12.0%) reported frequent bleeding, 116 (46.4%) reported rare bleeding and 104 (41.6%) reported no bleeding.
7. **Circumstances Associated with Gum Bleeding:** Brushing was the most frequently reported circumstance associated with gum bleeding (143; 57.2%), followed by eating an apple (33; 13.2%) and early morning (28; 11.2%). These responses represent participants' reported experiences rather than clinically established causes.

***Corresponding Author:** Hafiz Kashif Ullah

8. **Seeking Professional Dental Care:** Only 46 participants (18.4%) reported visiting a dentist because of gum bleeding, whereas 203 (81.2%) did not seek dental care regularly for this problem. This indicates a gap in seeking professional dental advice and treatment.

DISCUSSION

A study conducted at the Islamic International Dental Hospital Islamabad in 2011, reported a gingivitis prevalence of 69 per cent. According to the National Oral Health Survey, only 28 per cent of 12-year-olds, 26.5 per cent of 15-year-olds, 16.8 per cent of adults aged 35 to 44 years, and 6.7 per cent of individuals aged 65 years and above were in good oral health. These findings indicated a considerably high burden of oral health problems and highlighted the importance of oral health awareness and preventive care (28).

Another study conducted among 360 schoolchildren at Isfahan Azad University Dental School Clinic Iran, reported a gingivitis prevalence of 73 per cent. The findings showed that gingivitis became more severe with increasing age, particularly between 06 and 11 years. Poor oral hygiene, mouth breathing, low family income and lower maternal education were associated with gingival health. The study emphasized the importance of early oral health education and preventive programs (29).

Yiming Li et al. (2010) investigated the prevalence and severity of gingivitis among American adults. Their findings showed that 55.7 per cent of participants had a Gingival Index (GI) of 1.0 or higher, while 93.9 per cent had a GI of 0.50 or higher. An earlier examination of dental records of 1,107 United States Navy members also reported gingivitis in 76 per cent of individuals. The study suggested that regular professional dental care might contribute to lower gingivitis prevalence and severity (30).

In the present study, a total of 250 students and patients participated, including 154 (61.6%) males and 96 (38.4%) females. Regarding occupational status, 218 (87.2%) were students, 14 (5.6%) were house officers, 13 (5.2%) were government employees and 05 (2.0%) were private-sector employees.

Regarding educational status, 03 (1.2%) participants had primary education, 10 (4.0%) had secondary education, 236 (94.4%) were undergraduate students, and 01 (0.4%) was a postgraduate student. In terms of monthly income, 41 (16.4%) participants reported an income above 21,000, 20 (8.0%) reported an income below 21,000, while income was not applicable to 185 (74.0%) participants.

Regarding smoking habits, 41 (16.4%) participants were smokers, while 208 (83.2%) were non-smokers. Concerning oral hygiene practices, 28 (11.2%) participants used Miswak, 178 (71.2%) used toothpaste, 42 (16.8%) used both Miswak and toothpaste and 02 (0.8%) used other cleaning materials.

Regarding tooth-brushing frequency, 91 (36.4%) participants reported brushing their teeth once a day, 136 (54.4%) twice a day, 20 (8.0%) three times a day and 03 (1.2%) did not brush their teeth daily. Regarding dental floss, 67 (26.8%) participants used it, 144 (57.6%) did not use it and 38 (15.2%) used it occasionally.

Regarding dental follow-up, 31 (12.4%) participants visited a dentist twice a year, 57 (22.8%) once a year, 117 (46.8%) only when experiencing pain and 45 (18.0%) had never visited a dentist.

Regarding oral health conditions during the previous two months, 100 (40.0%) participants experienced dental pain, while 150 (60.0%) did not. Similarly, 100 (40.0%) reported gum bleeding, whereas 150 (60.0%) did not. Gum inflammation was reported by 70 (28.0%) participants, while 180 (72.0%) reported no inflammation. Furthermore, 80 (32.0%) participants experienced gum swelling, whereas 170 (68.0%) did not.

Regarding family history, 123 (49.2%) participants reported that their family members had experienced gingival bleeding, while 125 (50.0%) reported no family history of gingival bleeding. Concerning the frequency of gingival bleeding, 30 (12.0%) participants experienced it frequently, 116 (46.4%) rarely and 104 (41.6%) reported no bleeding.

Regarding the possible causes or circumstances associated with gingival bleeding, 143 (57.2%) participants reported bleeding during tooth brushing, 33 (13.2%) while eating an apple, 28 (11.2%) in the early morning, and 46 (18.4%) due to other reasons. Furthermore, 46 (18.4%) participants reported visiting a dentist because of gum bleeding, while 203 (81.2%) did not visit a dentist regularly.

Regarding respiratory diseases, 16 (6.4%) participants reported having a respiratory condition, 203 (81.2%) reported no such condition and 31 (12.4%) were unsure.

Overall, the findings revealed that participants reported several gum-related symptoms, including gingival bleeding, inflammation and swelling. Although some participants followed regular oral hygiene practices, the limited use of dental floss and irregular dental visits indicated a gap in preventive oral healthcare. The findings also showed that a considerable number of participants experienced gum bleeding and other dental problems. These results highlight the importance of improving oral health education, encouraging regular dental check-ups and promoting proper oral hygiene practices. Participants from different universities, institutes, hospitals and clinics in Hayatabad, Peshawar, demonstrated a need for greater awareness and better maintenance of oral hygiene.

***Corresponding Author:** Hafiz Kashif Ullah

RECOMMENDATIONS

1. Students and patients should be educated about gingivitis, its causes, associated risk factors, preventive measures and the importance of maintaining good oral health.
2. Oral health awareness programs should be conducted in educational institutions, hospitals and dental clinics to promote proper oral hygiene practices.
3. Individuals experiencing gum bleeding, swelling, inflammation or other dental problems should consult a qualified dentist promptly to prevent further complications.
4. Regular dental check-ups, proper tooth brushing and the use of dental floss should be encouraged to maintain good oral health.
5. Greater attention should be given to preventive dental care and public awareness to reduce the risk of gingivitis among adults in Hayatabad, Peshawar.
6. Educational institutions, hospitals and dental clinics should encourage routine oral health screening to identify early signs of gingivitis and refer affected individuals for appropriate dental care.
7. Further research should be conducted among larger and more diverse populations in different areas of Peshawar to obtain a broader understanding of gingivitis and its associated risk factors.

CONCLUSION

The findings of this study revealed that although students and patients in Hayatabad Peshawar, had some awareness of gingivitis, their knowledge was not adequately reflected in their oral hygiene attitudes and practices. The results indicated that gingivitis was not fully recognized and that many participants did not follow proper oral hygiene practices. Poor oral hygiene, limited use of dental floss and irregular dental check-ups highlighted the gap between oral health awareness and preventive practices. The study therefore emphasizes the need for effective oral health education, greater public awareness, regular dental check-ups and improved personal oral hygiene practices to prevent gingivitis and promote better oral health among adults in Hayatabad Peshawar, Khyber Pakhtunkhwa, Pakistan.

REFERENCES

1. Albandar, J. M. (2002). Global risk factors and risk indicators for periodontal diseases. *Periodontology 2000, 29*(1), 177–206. https://doi.org/10.1034/j.1600-0757.2002.290109.x
2. Albandar, J. M., & Kingman, A. (1999). Gingival recession, gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988–1994. *Journal of Periodontology, 70*(1), 30–43. https://doi.org/10.1902/jop.1999.70.1.30
3. Corbet, E. F., Zee, K.-Y., & Lo, E. C. M. (2002). Periodontal diseases in Asia and Oceania. *Periodontology 2000, 29*(1), 122–152. https://doi.org/10.1034/j.1600-0757.2002.290107.x
4. Le, C. T., & Boen, J. R. (1995). *Health and numbers: Basic biostatistical methods*. Wiley-Liss.
5. Singh, A., Agarwal, V., Tuli, A., & Khattak, B. P. (2012). Prevalence of chronic periodontitis in Meerut: A cross-sectional survey. *Journal of Indian Society of Periodontology, 16*(4), 529–532. https://doi.org/10.4103/0972-124X.106895
6. Bansal, M., Khatri, M., Kumar, A., & Bhatia, G. (2013). Relationship between maternal periodontal status and preterm low birth weight. *Reviews in Obstetrics & Gynecology, 6*(3–4), 135–140. https://pmc.ncbi.nlm.nih.gov/articles/PMC4002189/
7. Bansal, M., Mittal, N., & Singh, T. B. (2015). Assessment of the prevalence of periodontal diseases and treatment needs: A hospital-based study. *Journal of Indian Society of Periodontology, 19*(2), 211–215. https://doi.org/10.4103/0972-124X.145810
8. Eke, P. I., Dye, B. A., Wei, L., Thornton-Evans, G. O., & Genco, R. J. (2012). Prevalence of periodontitis in adults in the United States: 2009 and 2010. *Journal of Dental Research, 91*(10), 914–920. https://doi.org/10.1177/0022034512457373
9. World Health Organization. (2018). *Oral health*. https://www.who.int/news-room/fact-sheets/detail/oral-health
10. Zare Javid, A., Seal, C. J., Heasman, P., & Moynihan, P. J. (2014). Impact of a customised dietary intervention on antioxidant status, dietary intakes and periodontal indices in patients with adult periodontitis. *Journal of Human Nutrition and Dietetics, 27*(6), 523–532. https://doi.org/10.1111/jhn.12184
11. Akpata, E. S., & Jackson, D. (1979). The prevalence and distribution of gingivitis and gingival recession in children and young adults in Lagos, Nigeria. *Journal of Periodontology, 50*(2), 79–83. https://doi.org/10.1902/jop.1979.50.2.79
12. Hugoson, A., Koch, G., & Rylander, H. (1981). Prevalence and distribution of gingivitis-periodontitis in children and adolescents: Epidemiological data as a base for risk group selection. *Swedish Dental Journal, 5*(3), 91–103.
13. Li, Y., Lee, S., Hujoel, P., Su, M., Zhang, W., Kim, J., Zhang, Y. P., & DeVizio, W. (2010). Prevalence and severity of gingivitis in American adults. *American Journal of Dentistry, 23*(1), 9–13.
14. National Institute of Dental and Craniofacial Research. (n.d.). *Periodontal (gum) disease*. https://www.nidcr.nih.gov/health-info/gum-disease
15. Russell, A. L. (1971). The prevalence of periodontal disease in different populations during the circumpubertal period. *Journal of Periodontology, 42*(8), 508–512. https://doi.org/10.1902/jop.1971.42.8.508
16. Bilińska, M., & Sokalski, J. (2016). Pregnancy gingivitis and tumor gravidarum [Pregnancy

***Corresponding Author:** Hafiz Kashif Ullah

gingivitis and pregnancy tumor]. *Ginekologia Polska, 87*(4), 310–313.
17. Bosma-den Boer, M. M., van Wetten, M. L., & Pruimboom, L. (2012). Chronic inflammatory diseases are stimulated by current lifestyle: How diet, stress levels and medication prevent our body from recovering. *Nutrition & Metabolism, 9*, Article 32. https://doi.org/10.1186/1743-7075-9-32
18. Dickinson, S., Hancock, D. P., Petocz, P., Ceriello, A., & Brand-Miller, J. (2008). High-glycemic index carbohydrate increases nuclear factor-kappaB activation in mononuclear cells of young, lean healthy subjects. *The American Journal of Clinical Nutrition, 87*(5), 1188–1193. https://doi.org/10.1093/ajcn/87.5.1188
19. Nakagawa, S., Fujii, H., Machida, Y., & Okuda, K. (1994). A longitudinal study from prepuberty to puberty of gingivitis: Correlation between the occurrence of *Prevotella intermedia* and sex hormones. *Journal of Clinical Periodontology, 21*(10), 658–665. https://doi.org/10.1111/j.1600-051X.1994.tb00787.x
20. Trombelli, L., Farina, R., Silva, C. O., & Tatakis, D. N. (2018). Plaque-induced gingivitis: Case definition and diagnostic considerations. *Journal of Clinical Periodontology, 45*(Suppl. 20), S44–S67. https://doi.org/10.1111/jcpe.12939
21. Caton, J. G., Armitage, G., Berglundh, T., Chapple, I. L. C., Jepsen, S., Kornman, K. S., Mealey, B. L., Papapanou, P. N., Sanz, M., & Tonetti, M. S. (2018). A new classification scheme for periodontal and peri-implant diseases and conditions: Introduction and key changes from the 1999 classification. *Journal of Clinical Periodontology, 45*(Suppl. 20), S1–S8. https://doi.org/10.1111/jcpe.12935
22. Fan, W., Liu, C., Zhang, Y., Yang, Z., Li, J., & Huang, S. (2021). Epidemiology and associated factors of gingivitis in adolescents in Guangdong Province, Southern China: A cross-sectional study. *BMC Oral Health, 21*, Article 311. https://doi.org/10.1186/s12903-021-01666-1
23. Janakiram, C., Mehta, A., & Venkitachalam, R. (2020). Prevalence of periodontal disease among adults in India: A systematic review and meta-analysis. *Journal of Oral Biology and Craniofacial Research, 10*(4), 800–806. https://doi.org/10.1016/j.jobcr.2020.10.016
24. Page, R. C. (1986). Gingivitis. *Journal of Clinical Periodontology, 13*(5), 345–359. https://doi.org/10.1111/j.1600-051x.1986.tb01471.x
25. Tungare, S., & Paranjpe, A. G. (2022). Drug-induced gingival overgrowth. In *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK538518/
26. Chrysanthakopoulos, N. A. (2016). Prevalence of gingivitis and associated factors in 13–16-year-old adolescents in Greece. *European Journal of General Dentistry, 5*(2), 58–64. https://doi.org/10.4103/2278-9626.179536
27. Hamid, G., Shahzad, A., & Mian, A. H. (2021). Frequency of gingivitis among 12 to 70 years old patients visiting Lady Reading Hospital, Peshawar, Pakistan: A cross-sectional study. *Journal of Biomedical Research & Environmental Sciences, 2*(11), 1074–1077. https://doi.org/10.37871/jbres1350
28. Ketabi, M. A., Tazhibi, M., & Mohebrasool, S. (2006). The prevalence and risk factors of gingivitis among the children referred to Isfahan Islamic Azad University (Khorasgan Branch) Dental School, in Iran. *Dental Research Journal, 3*(1), 33–36.
29. Li, Y., Lee, S., Hujoel, P., Su, M., Zhang, W., Kim, J., Zhang, Y. P., & DeVizio, W. (2010). Prevalence and severity of gingivitis in American adults. *American Journal of Dentistry, 23*(1), 9–13.
30. Ali, S., Nasir, N., Masood, A., & Bashir, U. (2012). Prevalence of gingivitis in patients visiting Islamic International Dental Hospital. *Annals of the Pakistan Institute of Medical Sciences, 8*(2), 150–152.

***Corresponding Author:** Hafiz Kashif Ullah