

Oral Mucosal Lesions Associated with Tobacco Use - A Retrospective Study

Research Article

Vinaya Swetha T¹, Archana Santhanam^{2*}, Kiran Kumar Pandurangan³

¹ Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.

² Assistant Professor, Department of Oral Pathology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.

³ Assistant Professor, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.

Abstract

Introduction: Tobacco has become a global epidemic and the abuse of tobacco is a worldwide health problem. The oral mucosa serves as a protective barrier against trauma, pathogens, and cariogenic agents. It can be affected by a wide variety of lesions and conditions. Oral mucosal lesions are more prevalent in Indian subcontinent. The lesions are mainly due to smoke or smokeless forms of tobacco. Common tobacco associated lesions are leukoplakia, oral submucous fibrosis, tobacco pouch keratosis, and oral squamous cell carcinoma. Thus the aim of this study is to determine the oral mucosal lesions associated with tobacco use in patients visiting a private Dental Institution.

Materials and Methods: A retrospective cross sectional study, We reviewed the case record of 86000 patients between June 2019 and March 2020 and then 312 data with the habit of tobacco usage were extracted. Demographic details like age, gender, and history of habit and type of oral mucosal disease of all the patients were retrieved from patients records. All the data were transferred to the excel sheet. Data was analysed by SPSS software. Chi square test was used to find out association between the study variables with p value < 0.05 considered as statistically significant.

Results: Among the 312 studied subjects 299 were males and 13 were females. The prevalence of oral mucosal lesion is more among 40-50 years of age (42.5%) with male predilection (95.7%). The most prevalent oral mucosal lesion is leukoplakia (34.2%), followed by OSMF(30%). The most prevalent site is buccal mucosa (84%). The prevalence of gender and oral mucosal lesions shows a positive correlation (P=0.001).

Conclusion: The results from the present study acknowledges the importance of screening and preventive protocols to increase the community awareness regarding the adverse effects of smoking.

Keywords: Tobacco Lesion; Leukoplakia; Smoking; Smokeless.

Introduction

Smoking and smokeless forms of tobacco habits are highly prevalent in India and is one of the most important risk factors for the development of oral mucosal lesions including potentially malignant disorder and oral squamous cell carcinoma [1]. Many studies show that betel nut chewing and smoking are more prevalent in Asian regions than other regions across the world [2]. Consumption of tobacco is alarmingly increasing in the past two decades. Areca nuts are the most commonly used smokeless tobacco form. The proven carcinogenic contents of areca nuts are the alkaloids

such as arecoline, arecaidine, guvacine, and guvacoline [3]. There is a gradual reduction in the repair of the epithelium as it gets exposed to tobacco products leading to constant mucosal irritation and subsequent development of oral mucosal lesion [4]. Correction of ankyloglossia would lead to improved oral hygiene and enhanced phonetics [5].

The effect of tobacco on oral mucosa starts from initial mucosal changes such as gingival recession to oral cancer and these changes are in turn dependent on various forms of tobacco usage, frequency, duration and immune response of the host [6]. Tobacco use and alcohol drinking are clear risk factors for oral cancer in In-

*Corresponding Author:

Dr. Archana Santhanam,
Assistant Professor, Department of Oral Pathology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.
E-mail: drarch.s@gmail.com

Received: August 08, 2019

Accepted: August 28, 2019

Published: August 30, 2019

Citation: Vinaya Swetha T, Archana Santhanam, Kiran Kumar Pandurangan. Oral Mucosal Lesions Associated with Tobacco Use - A Retrospective Study. *Int J Dentistry Oral Sci.* 2019;54:02:006:25-29. doi: <http://dx.doi.org/10.19070/2377-8075-SI02-04006>

Copyright: Archana Santhanam ©2019. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

dia [7, 8]. Oral mucosal lesions associated with tobacco are more common among the elderly population. The most common oral mucosal lesions are leukoplakia, oral submucous fibrosis (OSMF), tobacco pouch keratosis, smokers palate and oral cancer.

Leukoplakia is the most commonly encountered oral lesion seen in fourth decades of life in males [9, 10]. Elderly groups of patients are at risk of developing many pathologies such as squamous cell carcinoma, hepatocellular carcinoma due to habits such as tobacco and alcohol [11]. Most oral mucosal lesions in children were being related to either development or tissue reactions [12]. The current rate of prevalence of OSMF in India is about 6.3% [13]. Biopsy being the best investigation measure for the diagnosis of oral mucosal lesions [14]. Metabolomics as a diagnostic tool in detecting Oral Squamous Cell Carcinoma is the study of metabolome which describes the full repertoire of small molecules, and the analysis of salivary metabolomics may help in identifying tumor-specific biomarkers for early diagnosis and prediction of tumor progression for oral mucosal lesions associated with tobacco [15-18]. Dental photography of the oral lesions can be preserved as an evidence for future reference [19].

Understanding the distribution of the oral mucosal lesions, its prevalence is essential to develop primary prevention, early diagnosis, and treatment and also to reduce the risk of malignant transformation of the potentially malignant disorders. Thus the aim of this study is to determine the oral mucosal lesions associated with tobacco use in patients visiting a private Dental Institution.

Materials and Methods

This study is a retrospective cross sectional study conducted among patients with the history of tobacco habit visiting a private Dental Institution, Chennai with approval from the Institutional Review Board (SDC/SIHEC/2020/DIASDATA/0619-0320). It included demographic data of all patients along with the clinical history of the individual.

Data collection

We reviewed the case record of 86000 patients between June 2019 and March 2020 and then 312 data were extracted. A customized examination form was used to collect the data and a special table

for data collection was prepared. A total of 312 patients were retrieved with the habit of smoking from 86000 data of the patients. The data collected was classified according to age, gender, site of the lesion, type of the lesion and tobacco use. Dependent variables were oral mucosal lesion, tobacco-smoke and smokeless forms and independent variables were age and gender.

Data collected was recorded in an excel sheet which was later transformed to SPSS version 20.0 for statistical analysis. Descriptive statistics and Chi square test was used to determine the correlation between the variables where P value < 0.05 is considered statistically significant. The pros were easy availability of data and the Cons were small sample size and restricted geography.

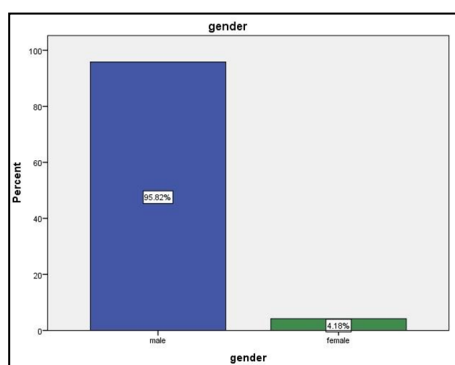
Results

Out of 312 patients with the habit of tobacco 299 were males (95.82%) and 13 females (4.18%) (figure 1). The mean age of study participants with habits and oral mucosal lesions in the present study was 45 years (29.90%) (figure 2). Among 312 patients 165 (53.05%) patients had the habit of smoking tobacco (figure 3). In this study the most prevalent oral mucosal lesion associated with tobacco was leukoplakia (33.44%) followed by osmf (30.55%) and smokers palate (12.86%) and tobacco pouch keratosis (7.7%) (figure 4). The most commonly involved site in the present study was left buccal mucosa (38.26%) followed by right buccal mucosa (20.90%), palate (13.5%), left labial mucosa (1.29%), right and left commissure of lip (0.32%), lower labial vestibule (0.32%), right buccal vestibule (0.32%) (figure 5). In the present study oral leukoplakia (99) is most commonly seen among males (figure 6). In the present study, leukoplakia (102) had a strong association with smoking type of tobacco use and OSMF (94) had a strong association with smokeless type of tobacco (figure 7).

Discussion

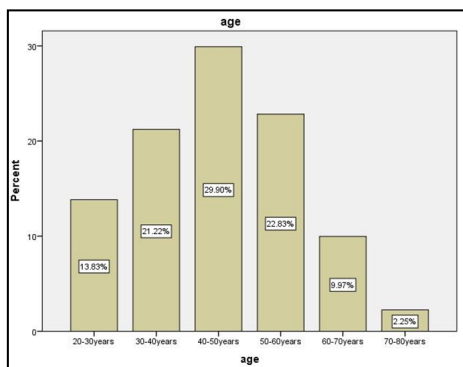
Out of 312 patients with the habit of tobacco 299 were males and 13 females. It was interesting to observe that males had the habit of tobacco, which is nearly double as compared to females. Result of the present study is in agreement with previous published literature where oral mucosal lesions are more prevalent in males compared to females [20, 21]. The reason for this could be due to stress, socioeconomic status and culture.

Figure 1. Bar chart depicting gender distribution of patients with tobacco habit.



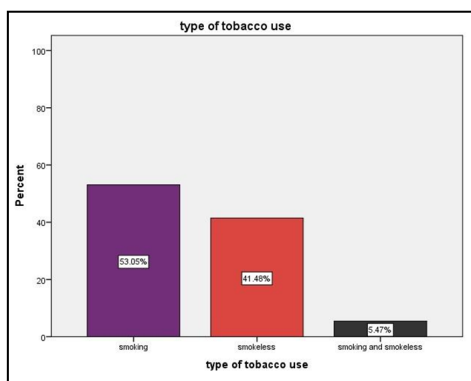
Bar chart depicting gender distribution of patients with tobacco habit. X axis represents gender and Y axis represents the percentage of patients with tobacco habit. Where blue colour denotes Male and green colour denotes Female. 95.82% were males and 4.18% were females.

Figure 2. Bar chart depicting age distribution of patients.



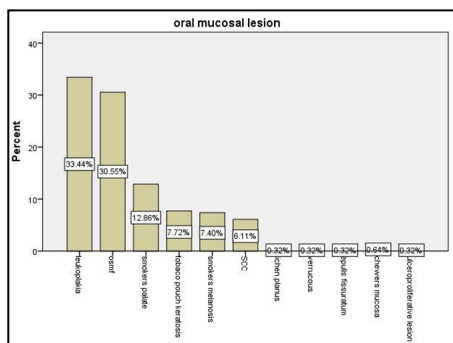
Bar chart depicting age distribution of patients. X axis represents age and Y axis represents the percentage of patients with tobacco habit. Majority of the study participants were in the age group of 40-50 years (29.90%).

Figure 3. Bar chart depicting percentage distribution of various forms of tobacco among study participants.



Bar chart depicting percentage distribution of various forms of tobacco among study participants. X axis represents the type of tobacco used and Y axis represents the percentage of study participants. Where purple colour denotes smoking type of tobacco, red colour denotes smokeless type of tobacco, black colour denotes smoking and smokeless type of tobacco. 53.05% had the habit of smoking, 41.48% had the habit of smokeless tobacco, 5.47% had the habit of smoking and smokeless tobacco.

Figure 4. Bar chart depicting percentage distribution of type of oral mucosal lesion.



Bar chart depicting percentage distribution of type of oral mucosal lesion. X axis represents oral mucosal lesion and Y axis represents the percentage of patients with tobacco habit . Oral leukoplakia is the most prevalent lesion(33.44%), followed by OSMF(30.55%).

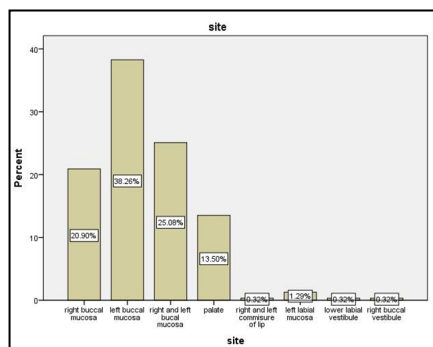
The mean age of study participants with habits and oral mucosal lesions in the present study was 45 years. Similar results were seen in a study, where the oral lesions are prevalent in 40 to 50 years of age group [22]. The result of the present study was in contrast to the study done by [23], with the mean of 35 years. The reason for this could be different small size and age groups.

Among 312 patients 165 patients had the habit of smoking form of tobacco, 129 with smokeless form of tobacco and 18 had the habit of both forms of tobacco. In this study the most prevalent oral mucosal lesion associated with tobacco was leukoplakia (33%) followed by osmf (30%) and smokers palate (12.8%) and

tobacco pouch keratosis (7.7%). The study results are in consensus with other studies done by Prashant patil et al, Krishna priya et al, Axell et al. The reason for this could be due to chronic smoking habits, more use of cigarettes than smokeless forms such as areca nuts [24-26].

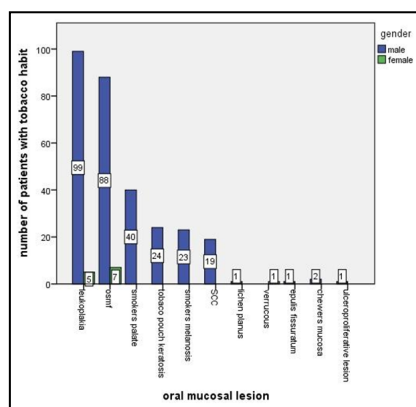
The most commonly involved site in the present study was buccal mucosa (84%) followed by palate (13.5%), left labial mucosa (1.29%), right and left commissure of lip (0.32%), lower labial vestibule (0.32%), right buccal vestibule (0.32%). Similar results were reported by Shaik P et al wherein oral lesions were more prevalent in buccal mucosa(22%)[27]. According to Zain b et al,

Figure 5. Bar chart depicting site of oral mucosal lesion.



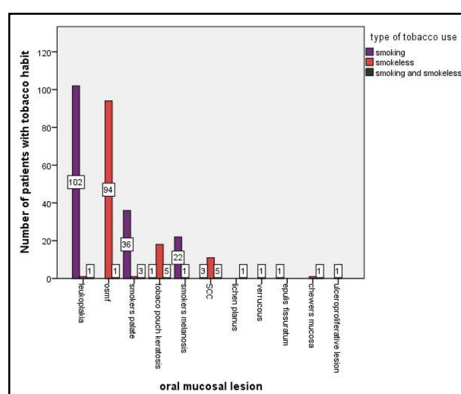
Bar chart depicting percentage distribution of site of oral mucosal lesion. X axis represents the site of the lesion and Y axis represents the percentage of patients with tobacco habit. Left buccal mucosa is the most involved site(38.26%), followed by right and left buccal mucosa(25.08%).

Figure 6. Bar chart represents the association between gender and oral mucosal lesion.



Bar chart represents the association between gender and oral mucosal lesion where the blue colour denotes Male, green colour denotes Female. The X axis represents the oral mucosal lesion and Y axis represents the number of patients with tobacco habit . Association between oral mucosal lesions and gender was found to be statistically significant. Oral leukoplakia is the most commonest oral mucosal lesion in males with tobacco habit(99- blue). P value = 0.00 (<0.05), statistically significant using Chi square test.

Figure 7. Bar chart represents association between oral mucosal lesion and the type of tobacco.



Bar chart represents association between oral mucosal lesion and the type of tobacco. Where purple colour denotes smoking type of tobacco, red colour denotes smokeless type of tobacco, black colour denotes smoking and smokeless type of tobacco. The X axis represents the oral mucosal lesion and Y axis represents the number of patients with tobacco habit. Association between oral mucosal lesion and type of tobacco was found to be statistically significant. Leukoplakia (102 -purple) is the most common oral mucosal lesion seen in patients with the habit of smoking tobacco. P Value 0.01 (<0.05), statistically significant using Chi square test.

labial mucosa was the most commonly involved site(53.3%). The reason for this could be due to the type of tobacco used and site of placement [28].

Correlation between type of tobacco and oral mucosal lesion, p=0.001 which shows a positive correlation. In the present study, leukoplakia had a strong association with smoking type of to-

bacco use and OSMF had a strong association with smokeless type of tobacco. Squamous cell carcinoma was most commonly associated with smokeless and smoking types of tobacco Tobacco pouch keratosis had a strong association with smokeless types of tobacco. This could be attributed to the constituents of different types of tobacco and its placement in the oral cavity.

If tobacco were to be introduced today, it would not be approved for human consumption anywhere in the world. Thousands of compounds are found in both forms of tobacco, Many of these compounds not only irritants and toxins they are also carcinogens. The smoking form of tobacco contains over 4000 different chemicals and at least 50 known carcinogens [29]. The limitation of the present study could be Shorter sample size, single centered study, and this study does not represent ethnic groups. Future scope of the study is to identify the need for awareness in control of tobacco use and the need for oral hygiene education. The study reveals that oral mucosal lesion is still a major oral health problem among the male population as it has the risk of malignant transformation potential. Thus the health care professional and government need to be focused on implementing preventive measures such as cessation of the habit, the importance of having regular screening preventive protocols to increase the community awareness regarding the adverse effects of smoking.

Conclusion

Based on the findings of the present study it can be concluded that oral mucosal lesions are common among 40-50 years with male predilection. Leukoplakia is the most common oral mucosal lesion associated with smoking form of tobacco and OSMF is commonly seen in patients with smokeless form of tobacco.

Acknowledgement

The authors would like to thank the study participants for their participation and kind cooperation throughout the study.

References

- [1]. Viveka TS, Shyamsundar V, Krishnamurthy A, Ramani P, Ramshankar V. p53 Expression Helps Identify High Risk Oral Tongue Premalignant Lesions and Correlates with Patterns of Invasive Tumour Front and Tumour Depth in Oral Tongue Squamous Cell Carcinoma Cases [Internet]. Vol. 17, Asian Pacific Journal of Cancer Prevention. 2016. p. 189–95.
- [2]. Jayaraj G, Sherlin HJ, Ramani P, Premkumar P, Natesan A. Stromal myofibroblasts in oral squamous cell carcinoma and potentially malignant disorders. *Indian J Cancer*. 2015 Jan;52(1):87–92.
- [3]. Jayaraj G, Ramani P, Herald J. Sherlin, Premkumar P, Anuja N. Inter-observer agreement in grading oral epithelial dysplasia – A systematic review [Internet]. Vol. 27, Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2015. p. 112–6.
- [4]. Sivaramkrishnan SM, Ramani P. Study on the Prevalence of Eruption Status of Third Molars in South Indian Population [Internet]. Vol. 07, Biology and Medicine. 2015.
- [5]. Jangid K, Alexander A, Jayakumar N, Varghese S, Ramani P. Ankyloglossia with cleft lip: A rare case report [Internet]. Vol. 19, Journal of Indian Society of Periodontology. 2015. p. 690.
- [6]. Naveen-Kumar B, Tatapudi R, Sudhakar-Reddy R, Alapati S, Pavani K, Sai-Praveen KN. Various forms of tobacco usage and its associated oral mucosal lesions [Internet]. *Journal of Clinical and Experimental Dentistry*. 2016. p. 0–0.
- [7]. Znaor A, Brennan P, Gajalakshmi V, Mathew A, Shanta V, Varghese C, et al. Independent and combined effects of tobacco smoking, chewing and alcohol drinking on the risk of oral, pharyngeal and esophageal cancers in Indian men [Internet]. Vol. 105, International Journal of Cancer. 2003. p. 681–6.
- [8]. Balaram P, Sridhar H, Rajkumar T, Vaccarella S, Herrero R, Nandakumar A, et al. Oral cancer in southern India: The influence of smoking, drinking, paan-chewing and oral hygiene [Internet]. Vol. 98, International Journal of Cancer. 2002. p. 440–5.
- [9]. Jayaraj G, Sherlin HJ, Ramani P, Premkumar P, Anuja N. Cytomegalovirus and Mucoepidermoid carcinoma: A possible causal relationship? A pilot study. *J Oral Maxillofac Pathol*. 2015 Sep;19(3):319–24.
- [10]. Sridharan G, Ramani P, Patankar S. Serum metabolomics in oral leukoplakia and oral squamous cell carcinoma [Internet]. Vol. 0, Journal of Cancer Research and Therapeutics. 2017. p. 0.
- [11]. Gheena S, Ezhilarasan D. Syringic acid triggers reactive oxygen species-mediated cytotoxicity in HepG2 cells [Internet]. Vol. 38, Human & Experimental Toxicology. 2019. p. 694–702.
- [12]. Ganapathi A, Bachelor of Dental surgery, Saveetha Dental College and hospitals No., Road PH, Chennai-600077., A G, et al. PREVALENCE OF ORAL AND MAXILLOFACIAL LESION IN PAEDIATRIC PATIENTS [Internet]. Vol. 5, International Journal of Advanced Research. 2017. p. 1989–92.
- [13]. Nigam NK, Aravinda K, Dhillon M, Gupta S, Reddy S, Srinivas Raju M. Prevalence of oral submucous fibrosis among habitual gutkha and areca nut chewers in Moradabad district. *J Oral Biol Craniofac Res*. 2014 Jan;4(1):8–13.
- [14]. Shrin H, Ramani P, Premkumar P, Kumar A, Natesan A. Expression of CD 68, CD 45 and human leukocyte antigen-DR in central and peripheral giant cell granuloma, giant cell tumor of long bones, and tuberculous granuloma: An immunohistochemical study [Internet]. Vol. 26, Indian Journal of Dental Research. 2015. p. 295.
- [15]. Shree KH, Hema Shree K, Ramani P, Herald Sherlin, Sukumaran G, Jeyaraj G, et al. Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma – a Systematic Review with Meta Analysis [Internet]. Vol. 25, Pathology & Oncology Research. 2019. p. 447–53.
- [16]. Swathy S, Gheena S, Varsha SL. Prevalence of pulp stones in patients with history of cardiac diseases [Internet]. Vol. 8, Research Journal of Pharmacy and Technology. 2015. p. 1625.
- [17]. Thangaraj SV, Shyamsundar V, Krishnamurthy A, Ramani P, Ganesan K, Muthuswami M, et al. Molecular Portrait of Oral Tongue Squamous Cell Carcinoma Shown by Integrative Meta-Analysis of Expression Profiles with Validations. *PLoS One*. 2016 Jun 9;11(6):e0156582.
- [18]. Gupta V, Ramani P. Histologic and immunohistochemical evaluation of mirror image biopsies in oral squamous cell carcinoma. *J Oral Biol Craniofac Res*. 2016 Sep;6(3):194–7.
- [19]. Hannah R, Ramani P, Herald J. Sherlin, Ranjith G, Ramasubramanian A, Jayaraj G, et al. Awareness about the use, Ethics and Scope of Dental Photography among Undergraduate Dental Students Dentist Behind the lens [Internet]. Vol. 11, Research Journal of Pharmacy and Technology. 2018. p. 1012.
- [20]. Beachy RN. Local Lesion Formation in Tobacco Tissue Culture [Internet]. Vol. 61, Phytopathology. 1971. p. 877.
- [21]. Anulekha CK, Tejasvi MLA, Afroze M, Shenai K, Chatra L, Bhayya H. A correlation between oral mucosal lesions and various quid-chewing habit patterns: A cross-sectional study [Internet]. Vol. 15, Journal of Cancer Research and Therapeutics. 2019. p. 620.
- [22]. Lucchiarri C, Masiero M, Botturi A, Pravettoni G. Helping patients to reduce tobacco consumption in oncology: a narrative review [Internet]. Vol. 5, SpringerPlus. 2016.
- [23]. Singh A, Thomas S, Bhateja G, Dagli R, Hans R, Sharma A. Prevalence oral mucosal lesions among moist snuff users in Jodhpur, India [Internet]. Vol. 1, Journal of Health Research and Reviews. 2014. p. 54.
- [24]. Patil PB, Bathi R, Chaudhari S. Prevalence of oral mucosal lesions in dental patients with tobacco smoking, chewing, and mixed habits: A cross-sectional study in South India. *J Family Community Med*. 2013 May;20(2):130–5.
- [25]. Priya MK, Krishna Priya M, Srinivas P, Devaki T. Evaluation of the prevalence of oral mucosal lesions in a population of eastern coast of South India [Internet]. Vol. 8, Journal of International Society of Preventive and Community Dentistry. 2018. p. 396.
- [26]. Axell T, Zain RB, Siwamogstham P, Tantniran D, Thampipit J. Prevalence of oral soft tissue lesions in out-patients at two Malaysian and Thai dental schools [Internet]. Vol. 18, Community Dentistry and Oral Epidemiology. 1990. p. 95–9.
- [27]. Shaik P, Pachava S, Ravoori S, Palli C, Lodagala A, Yaddanapalli S. Assessment of oral mucosal changes among tobacco users and nonusers in southern India [Internet]. Vol. 7, International Journal of Oral Care and Research. 2019. p. 92.
- [28]. Zain RB, Ikeda N, Gupta PC, Warnakulasuriya S, Wyk CW, Shrestha P, et al. Oral mucosal lesions associated with betel quid, areca nut and tobacco chewing habits: consensus from a workshop held in Kuala Lumpur, Malaysia, November 25–27, 1996 [Internet]. Vol. 28, Journal of Oral Pathology & Medicine. 2007. p. 1–4.
- [29]. Bernstein ML. Oral mucosal white lesions associated with excessive use of Listerine mouthwash [Internet]. Vol. 46, Oral Surgery, Oral Medicine, Oral Pathology. 1978. p. 781–5.