

## Tobacco and oral health

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**Abstract:** Oral cancer is one of the leading causes of human morbidity and mortality especially in developing countries like India. Tobacco consumption in smokeless and smoking form along with alcohol is considered as the primary risk factors. Tobacco is a major health challenge with various tobacco products available for use which are known to have deleterious effects on the oral mucosa. The oral lesions caused by tobacco are inclusive of those that are less likely to progress to cancer; lesions with increased tendency to develop into cancer and cancerous lesions. In India, tobacco use is incredibly linked to poverty and accounts for the high public health costs of treating tobacco-related diseases. In India, major population resides in rural areas and most of the cancers are found in the oral cavity, due to inadequate medical facilities, no proper primary care infrastructure or cancer screening tools and high levels of illiteracy all contribute to poor oral cancer (OC) outcomes.

**Keywords:** Oral cancer, oral health, tobacco cessation, tobacco.

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### I. Introduction

Oral cavity is prone for a myriad of changes with advancing age as well as a result of the environmental and life style related factors. Oral mucosal lesions can occur as a result of infections, local trauma or irritation, systemic diseases and excessive consumption of tobacco, betel quid and alcohol.<sup>1</sup> The prevalence and incidence rates of oral mucosal lesions are available from various countries, but the information thereby obtained may not always be applicable to Indian population due to the existence of cultural, ethnic and demographic differences. Despite the efforts made by the different groups, establishment of prevalence data related to oral mucosal lesions is meager in Indian literature.<sup>2</sup> Chewing and smoking of tobacco along with consumption of alcohol beverages have become common social habits in India.<sup>3</sup> Tobacco was introduced in India by the Portuguese nearly 400 years ago and since then it rapidly became a part of socio-cultural milieu in various communities.<sup>4</sup> India is the second largest producer and consumer of tobacco next only to China.<sup>5</sup> The prevalence of tobacco use among Indian adults is 35%.<sup>6</sup>

Tobacco use is one among the five greatest risk factors for mortality, and also the single most preventable cause of death.<sup>7</sup> In developing countries like India, the disease burden, health care costs as well as other fiscal losses resulting from premature deaths attributable to tobacco consumption are increasing rapidly. World Health Organization (who) estimates in 2004 projected 58.8 million deaths to occur globally, of which 5.4 million are attributed to tobacco use. As of 2002, 70% of the deaths are in developing countries. It is predicted that 1.5–1.9 billion people will be smokers in 2025. India is the second largest consumer of tobacco in the world. The prevalence of all types of tobacco use among men has been reported to be high in most parts of the country (generally exceeding 50%). Further, a national level survey on tobacco use in India has reported that 16.2% are current smokers and 20.5% are tobacco chewers. This survey also showed that beedi is the most popular form of tobacco smoking, followed by cigarette smoking; similarly, pan with tobacco is the major chewing form of tobacco.<sup>8</sup>

Studies have shown that India has the highest rate of oral cancer in the world. Annually almost 7% of all cancer deaths in males and 4% in females are due to tobacco-related oral cancers.<sup>9</sup> Moreover, it is estimated that 56,000 new cases of tobacco-related oral cancers occur every year, which would lead to more than 100,000 individuals suffering from the disease in the population in any given year. Nearly 95–100% of tobacco users develop periodontal diseases which have a diminishing effect on oral health. As a result, tobacco-related oral manifestations have a negative impact on oral health and quality of life.<sup>10</sup>

Tobacco cessation (quitting) is a relatively new area in tobacco control in India. It is considered to be the most cost-effective intervention as compared to other tobacco control programs. In the year 2002, WHO in collaboration with Government of India has identified tobacco cessation centers and they were operationalized on 31st of May, 2002, on the occasion of “World No Tobacco Day,” with a multidisciplinary approach. In connection to this approach, the role of public health dentist has been strongly emphasized in assisting the

tobacco users to quit and has become a contemporary issue in the field of public health dentistry in achieving “Tobacco Free Oral Environment.”<sup>11, 12</sup>

In India, tobacco consumption is responsible for half of all the cancers in men and a quarter of all cancers in women, in addition to being a risk factor for cardiovascular diseases and chronic obstructive pulmonary diseases. India also has one of the highest rates of oral cancer in the world. The World Health Organization predicts that tobacco deaths in India may exceed 1.5 million annually by 2020. However, considerable research is required to comprehend the actual trends. Nationally representative and reliable prevalence data on tobacco consumption are scarce.

Dentists have an important role to play in preventing the harmful effects of smoking in the mouth, and consequently smoking counseling should be as much a part of the dentist’s job as plaque control and dietary advice.<sup>13</sup>

The present article attempts to compile the effects of tobacco on oral health induced leading to oral mucosal lesions in India that is documented in the literature with a note on the different preventive measures that could be implemented at various levels.

## II. Tobacco and oral disease

Aesthetics Smoking causes discoloration of teeth, dental restorations and dentures. The effect of smoking is more severe than that of the consumption of coffee and tea. Saliva in the short term smoking increases the flow rate of the parotid gland. However, the data on long-term effects on salivary flow rates show no difference between smokers and non-smokers. The pH of saliva rises during smoking. Over longer time periods smokers have a lower pH in stimulated whole saliva. Buffer capacity was found to be lower in smokers. The concentration of thiocyanate, a product present in tobacco smoke and in normal saliva, is increased in the saliva of smokers.<sup>14, 15</sup>

### 2.1 Smell and taste

Many studies have shown that taste and smell acuity are affected by smoking, i.e, smoking is a common cause of halitosis.<sup>16</sup>

### 2.2 Wound healing

Several studies have shown that tobacco influences wound healing in the mouth, eg after periodontal scaling and curettage, periodontal surgery or tooth extraction. The mechanism of impaired healing is likely associated with increased plasma levels of adrenaline and noradrenaline after smoking, leading to peripheral vasoconstriction. Several studies also show impaired PMN function in smokers compared with nonsmokers.<sup>16</sup>

### 2.3 Periodontal diseases:

The role of smoking in periodontal diseases has been extensively studied for many years. An increasing amount of scientific data have demonstrated a clear association between smoking and the prevalence and severity of periodontal diseases, suggesting smoking as an important risk factor for periodontal disease.<sup>16, 17</sup>

### 2.4 Micro flora and host response

The exact mechanisms by which smoking affects the periodontal tissues are not known. Many epidemiological and clinical studies have reported smokers to harbor more supragingival plaque than nonsmokers. However, clinical studies have not reported any differences in plaque accumulation rate between smokers and non-smokers thereby indicating smoker’s excess amount of plaque is probably caused by an inferior oral hygiene. One recent study reported that smokers harboured significantly higher levels of *B. forsythus* than non-smokers, although other studies on patients with periodontal disease have not reported any differences.<sup>18, 19</sup>

### 2.5 Gingivitis

Many earlier studies on smoking and chronic gingivitis have reported both more gingival inflammation and more dental plaque and calculus in smokers. However, in recent studies, when the plaque level has been controlled for, smokers have demonstrated less gingival inflammation and less gingival bleeding when compared with non-smokers, indicating a suppressed gingival inflammation. These results, which suggest a lower bleeding propensity for smokers, are not surprising given the well known effect of nicotine exerting local vasoconstriction on peripheral circulation.<sup>20</sup>

### 2.6 Acute necrotizing ulcerative gingivitis (ANUG)

Many studies have reported smokers to have a higher prevalence of ANUG than non-smokers. Recently, a similar relationship has been reported between smoking and ANUG-like lesions in HIV infected individuals.<sup>21</sup>

### **2.7 Periodontitis**

The association between tobacco smoking and adult periodontitis has been studied during the past 20 years in well controlled studies on large groups of populations. The results from these studies suggest smokers to have an increased prevalence and severity of periodontitis, as reported by greater marginal bone loss, deeper periodontal pockets, more severe attachment loss and more teeth with furcation involvements.<sup>21</sup>

### **2.8 Oral mucosal diseases**

Tobacco use is associated with several changes in the oral mucous membranes ranging from innocent and reversible lesions, such as smoker's palate, to oral cancer. The innocent lesions offer an excellent opportunity to initiate a discussion on tobacco.

#### **2.8.1 Oral cancer**

Tobacco smoke has a direct carcinogenic effect on the epithelial cells of the oral mucous membranes. It has been well demonstrated that there is a dose-response relationship for tobacco use and the risk of the development of oral cancer. From earlier studies it appeared that those who smoked pipe or cigars probably experienced a risk of oral cancer lower than that of cigarette smokers. However, it has been concluded recently that the risks of oral cancer are similar for cigar smokers and cigarette smokers.<sup>21,22,23</sup>

#### **2.8.2 Smoker's melanosis**

Melanin pigmentation of the oral mucous membranes is normally seen in coloured races. In north European Caucasians, however, it is far less prevalent (about 10%) and normally with a subtle appearance. Heavy cigarette smokers show a pigmentation prevalence of about 30% thus giving rise to the designation smoker's melanosis which is most prevalent on the attached gingiva. There are no symptoms, the change is not premalignant, and the pigmentation is reversible although it usually takes a year or more after cessation of the smoking habit.

#### **2.8.3 Oral candidosis**

Several factors predispose to oral candidosis. During the past two decades a number of studies on oral smokeless tobacco-induced changes have been conducted. The use of smokeless tobacco is well known to induce wrinkled changes in the oral mucosa at the site where the quid is placed. The changes are usually discreet with a colour similar to the surrounding oral mucous membranes or whitish-yellowish to brown. The changes seem to be reversible. Gingival recessions may also be seen in users of smokeless tobacco at the site where the quid is placed. The relationship between the use of oral smokeless tobacco and cancer development has been amply discussed. Snuff use as practiced in Scandinavia carries none or very low risks for development of oral cancer. Differences in habits and between products around the world are probably important when evaluating the harmful effects of oral smokeless tobacco, so that a general statement on this subject cannot be made. However, many forms of oral smokeless tobacco in common use in Asia, the Middle East, and North Africa are carcinogenic.<sup>23</sup>

### **III. Tobacco intervention and the dentist<sup>25</sup>**

Role of the public health dentist has been highlighted at two levels:

- Individual level
- Community

#### **Individual level**

This is approached at chair side, where the public health dentists see the harmful effects of tobacco use and they spend more time with the patient than other physicians. They should use this time to counsel the patient by promoting the oral health and healthy lifestyles. This can be achieved through few minutes of focused talk during oral examination and make the patient aware and conscious of the harmful effects of tobacco use. Thus, every interaction of public health dentist with their patients at every visit can lead to a significant change in patient's attitude and behavior toward tobacco cessation.

Guide to counseling for tobacco cessation (quitting)

A) For those willing to quit

The 5 "A" method

1) Ask – about tobacco use at every visit, 2) Advise – non-users to never use tobacco and users to quit, 3) Assess – the patient’s readiness to quit and the level of dependence, 4) Assist – with quitting, 5) Arrange – follow-up visits.

B) For those not willing to quit

The 5 “R” method

Ask and/or advise the patient about: 1) Relevance of quitting, 2) Risks of continuing tobacco use, 3) Rewards of quitting, 4) Roadblocks to quitting, 5) Repeat these at every visit.

#### **In the community**

A public health dentist can make an immense contribution in tobacco use cessation at the community level by various ways such as the following: by acting as a role model by not using tobacco or By quitting successfully, performing individual or group meetings periodically about the importance of tobacco use cessation, developing and implementing school intervention models for tobacco cessation, displaying educational material during the out-reach programs or in the urban and rural health centers where most of the population visit to seek health care, also writing articles about benefits of tobacco control policies, participating in talk shows, linking with NGOs to spread health awareness, bringing into limelight the success stories of tobacco use cessation which can help in enlightening the community perception about tobacco use, encouraging the farmers for alternative crop initiatives which should be done in consultation and co-ordination with the horticulture department.

Apart from providing health education to the public regarding the harmful effects of tobacco on oral health and general health through pamphlets, role play, mass media, etc. they also help in the following: 1) referring the tobacco users to counseling centers and do the follow-up, 2) identifying the high-risk groups like young adults and pregnant women and supporting them to stop tobacco use, 3) helping in monitoring the action against smoking and other forms of tobacco use at a local level in order to promote implementation through community participation, 4) periodic surveillance and 5) conducting research for developing the newer methods for tobacco control.<sup>23</sup>

#### **IV. Barriers for Tobacco Cessation<sup>24</sup>**

Despite the imperative role of public health dentist in tobacco cessation, there are certain barriers averting their tasks on tobacco cessation. This can be due to the following reasons:

- There is no remarkable internal motivation among the tobacco users due to their deprived socioeconomic conditions, stress, and other allied reasons. This mainly hampers the community participation in tobacco cessation.
- The majority of societal members strongly resist tobacco cessation since they believe smoking is a macho habit.
- Most of the dental professionals do not have sufficient skill, time and desire for participation in tobacco cessation activities.
- In India where there is a predominant influence of socio-cultural practices on tobacco use, it becomes the most challenging task for the public health dentist to assist in its cessation.
- Major difficulty in tobacco cessation is the behavioral aspect of tobacco use. This can be overcome through proper reinforcement of behavior intervention procedures.
- Further, tobacco is considered to be one of the cash crops for farmers and advising them for an alternative crop is the one of the major confront for all the sectors including the public health dentist.

#### **V. Conclusion**

In India, as in most low income countries, death in middle age is increasing in relative importance due to an increase in smoking related deaths. The disease burden, health care costs as well as other fiscal losses resulting from premature deaths attributable to tobacco consumption will rapidly increase. The high levels of tobacco consumption among disadvantaged population groups may lead to a doubling of the disease burden in these social groups from chronic illnesses related to tobacco consumption as well as from communicable and nutrition related diseases, which still account for a large share of total disease burden in the disadvantaged social groups in India.

Tobacco smoking and chewing is one of the prime factors responsible for oral pre-cancer and cancer. The incidence and prevalence of such lesions in South Asian countries like India is high owing to the increased production and consumption of tobacco. Also relative lack of awareness regarding the harmful effects of tobacco is a major reason for the same. In order to determine the overall incidence and prevalence rates, attempts should be made to accumulate epidemiological data over a wide geographical area that may help in formulating appropriate prevention and control measures. Preventive measures should begin at grass root levels aimed at individuals who are at high risk for tobacco usage along with intervention at community level and

policy level interventions by the concerned policy makers. Health professionals including dentists should also play an active role in prevention and control of tobacco induced lesions due to the direct contact with patients who are at increased risk.

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