



PREVALENCE OF ORAL MUCOSAL LESIONS AMONG TOBACCO HABITUERS IN MARBLE FACTORY WORKERS OF KISHANGARH CITY, RAJASTHAN- AN EPIDEMIOLOGICAL STUDY.

Epidemiology

Dr. Neha Nyati

Assistant Professor, Department of public health dentistry, Darshan Dental College & Hospital, Udaipur

Dr. Gopal Damani*

Consultant Ophthalmologist, Mittal Hospital & Research Centre, Ajmer. *Corresponding Author

ABSTRACT

Background- Today, of the 1.1 billion who smoke world-wide 182 million (16.6%) live in India. The easy availability and cheap cost has made one to be addicted. The majority of marble factory workers consists of illiterate workers who have the habit of tobacco use. Hence the study on marble factory workers of Kishangarh city, Rajasthan, has been conducted. Objective-To collect data on use of tobacco, assess the prevalence of mucosal lesions and correlate occurrence of oral lesions with the type of tobacco use in the study population. **Methods-** A cross sectional survey of 1500 Marble factory workers was carried out for which 22 factories were selected. Data was collected by both questionnaire method and clinical examination. **Results-** A total of 1500 workers over the age of 15 years were examined. Among them 916 (61.07%) were females- of which 67% had betel chewing habit and none smoking; whereas 584 (38.93%) were males- of which 78% were tobacco habitués. Commonest lesions found were 54 (3.6%) leukoplakia, 35(2.33%) melanosis, 70(4.67%) smoker's palate, 68(4.53%) melanosis and smoker's palate. **Conclusion-** The overall prevalence of smoking and chewing was 20.4% and 51.13% respectively. The long working hours in the factories and peer group influence were the reasons for initiation and continuation of habit. Increased awareness about the risk of habits & health education through the use of models, visual media and community group discussion need to be undertaken.

KEYWORDS

Tobacco, Oral Mucosal Lesions, Factory workers, Kishangarh

INTRODUCTION

Cancer is a major cause of disease and death throughout the world.¹ Oropharyngeal cancer is the 5th most common cancer worldwide in men and 7th in women with marked geographical variations.² Oral cancer accounts for about 3-4% of all cancers. Of all oral cancers, 96% are carcinomas and 4% are sarcomas. The most common type of oral cancer is squamous-cell carcinoma, constituting about 90% of oral malignancies. Most common intraoral site for carcinoma are the posterior ventrolateral border of the tongue, floor of the mouth and retromolar area. Together these three areas form a horse shoe shaped zone, which is the zone of increased cancer susceptibility accounting for 75-85% of all intraoral cancers.³

Geographic variations in the epidemiology of oral and lip cancer exist and most likely are connected to habits and environmental conditions.⁴ India has the highest rate of oral cancer in the world. The high incidence of intra oral cancer in India and certain other parts of South East Asia is attributed to the habit of chewing tobacco alone or along with betel leaf, areca nut, slaked lime and spices. India was one of the first countries in the world to report the adverse health consequences of tobacco use. Niblock in 1902 reported that about 1/3 of all cancer admissions to Madras General Hospital were because of cancer of cheek associated with tobacco chewing.⁵ The fact that carcinoma of the oral mucosa may be associated with other mucosal lesions has been known for a long time. These lesions often take the form of white patches or plaques, may precede the appearance of cancer by months or years or they may be present together with the carcinoma.⁶

Tobacco habits are practiced in various different forms and many of them are specific to certain areas of India. The reasons for the initiation of tobacco use are many. Generally, the most important reason is by peer-group influence. Parents can play a very important role in initiation of tobacco use by a young child or adolescent if they use tobacco products in front of their children and the habit that has developed its root in adolescence remains till adulthood and later stages of life.⁷ Tobacco is smoked, chewed, sucked or applied to teeth and gums in diverse ways. Many of these methods are specific to particular geographic regions. Bidi and cigarette smoking are practiced widely in all regions. Other smoking habits include chutta and dhunti, which are also smoked in reverse (i.e., with the lighted end inside the mouth), hookli (clay pipe), chillum and hookah. Chewing tobacco in betel quid is the most popular form of smokeless tobacco use. Others comprise tobacco-lime mixture (Khaini), tobacco-areca nut preparations like Mawa, Manipuri tobacco and Pan Masala. Mishri, Gudhaku and creamy snuff are initially used as teeth cleaning material, but quickly become addictive.⁸

A wide variety of mucosal changes are noted in habitual users of

smoked and smokeless tobacco. The significant mucosal changes noted in tobacco users are, Oral cancer, Leukoplakia, Nicotine palatinus, Smokeless tobacco keratosis, Smokers melanosis, Sub mucous fibrosis, Leukoedema, and Hairy tongue.⁹

Epidemiologic studies of oral mucosal lesions with the association of tobacco habits have been conducted in the past. The results of the few epidemiologic surveys showed the prevalence of Leukoplakia ranged from 0.2 to 4.9%,¹⁰ Lichenplanus 0.4%, Leukokeratosis nicotinapalati 2.3%, Erythroplakia 0.1%, Submucous fibrosis 0.1% and cancer 0.03%.¹¹ All these studies have showed the positive correlation between the oral pre-cancer and cancer and tobacco habits.

The epidemiologic studies also showed that the habits were associated with low socio- economic conditions and in illiterates since the awareness of adverse effects of tobacco are poor in them. In recent times an epidemiological study in the Indian context relating to occurrence of oral mucosal lesions of tobacco habitués though forming the baseline data for other interventional and investigative studies have been rather rare. A search of contemporary literature revealed very few such studies, more so with regard to the study population i.e marble factory workers of Kishangarh city, Rajasthan, with no such studies reported in published literature.

Kishangarh's marble and granite industry is spread across 40 kilometres. Kishangarh's economy mainly depends on the marble trading. The widest range of Indian, Italian and Makrana marble is on display in this area. The majority of marble factory workers consists of illiterate workers who have the habit of tobacco use. Hence the epidemiological study on marble factory workers of Kishangarh city, Rajasthan, has been conducted to seek the data on prevalence of various mucosal lesions among Tobacco habitués in marble factory workers of Kishangarh. The study also provides detailed data of tobacco use in the study population.

MATERIALS & METHODS

A cross sectional survey of 1500 Marble factory workers was carried out for which 22 factories were selected. Data was collected by both questionnaire method and clinical examination.

All subjects having tobacco habit either in smokeless/ other forms were included in the study group. Subjects showing tobacco associated oral lesions with clinically evident coexistent hematological, endocrinal, developmental diseases were excluded from the study. The subjects were examined by the investigator. Two mouth mirrors for soft tissue retraction and sunlight illumination was used for clinical examination of oral cavity. Personal details and information on habits were obtained using standardized, interviewer based questionnaire.

Personal information included name, age, sex, occupation and address. The information on habits included the presence or absence of habits. In the event of presence of habit: the nature of habit- Smokeless/smoked tobacco, initiation of habit, duration of habit, frequency calculated on per day basis, area of placement with special reference to smokeless tobacco variety and duration of placement were recorded. In the event of smoked tobacco information on form of habit, filtered and non-filtered variety, in case of cigarettes were also procured.

Since this was essentially a field study, care was taken to follow aseptic precautions during the course of clinical examination. In the presence of oral mucosal lesions, clinical diagnosis was arrived upon, the inspectory and palpatory findings along with lesions were recorded.

Statistical analysis

Prevalence of oral mucosal lesions in tobacco habituers was estimated by using SPSS for windows (Version 16). The Frequencies procedure was used for describing types of lesions, tobacco forms and its frequency in a population. Descriptive procedure was used for univariate summary statistics of lesions and for calculation of standardized values. Cross tabs procedure was used for correlation of the lesions with age group and gender, prevalence of lesions and anatomical site. Chi-Square test procedure was done for comparison between each category. One-Way ANOVA procedure for one-way analysis of variance for a quantitative dependent variable by a single factor (independent) variable.

RESULTS

Profile of the study subjects

A total of 1500 workers over the age of 15 years were examined. Among them 584 (38.93%) were males and 916 (61.06%) were females. Out of 584 males 457 (78.25%) had the habits of chewing and smoking and 127 (21.74%) with no habits. Among 457 males 142 (37.01%) had chewing habit, 273 (59.73%) had habit of smoking and 42 (9.19%) had both smoking and chewing habit. Out of 916 females 616 (67.24%) had chewing habit and 300 (32.75%) with no habits. Among 616 females, 260 (42.2%) had betel quid chewing habit and 356 (57.79%) had betel quid with tobacco chewing habit. (Table 1).

Among 1500 workers examined 54 (3.6%) were diagnosed of leukoplakia, 35 (2.33%) diagnosed of melanosis, 70 (4.67%) diagnosed of smokers palate, 68 (4.53%) diagnosed of melanosis and smokers palate, 1 (0.07%) diagnosed of squamous cell carcinoma, 1 (0.07%) diagnosed of verrucous carcinoma, 1 (0.07%) diagnosed of verrucous hyperplasia, 10 (0.6%) diagnosed of tobacco pouch keratosis, 7 (0.46%) diagnosed of betel chewers mucosa, 9 (0.6%) diagnosed of Leukoedema, 5 (0.33%) diagnosed of oral submucous fibrosis, 2 (0.13%) diagnosed of lichenoid reaction, 1 (0.07%) diagnosed of candidiasis and 1 (0.07%) diagnosed of lichen planus. (Table 2)

Prevalence of habits

The overall prevalence of smoking and chewing was 20.4% and 51.13% respectively. The prevalence of smoking was higher among men (66.95%), most commonly with beedi. The chewing habit was more prevalent in women (67.24%) compared to men (25.85%). The women of study population were more likely to chew betel quid and quid with tobacco, whereas men use to chew madhu, hans and panparag.

Prevalence of lesions

Oral mucosal lesions were found in 17.32% of the study population. In this study, smoker's palate was found to be the most common mucosal lesion with the prevalence 4.67%. Combination of melanosis and smoker's palate (4.53%) and leukoplakia (3.6%) were the second and third most common lesions. Table 2 shows that the prevalence of all lesions were more common in males when compared to females, except for tobacco pouch keratosis, betel chewer's mucosa, lichenoid reaction and lichen planus. Among males smokers melanosis and smokers palate were more prevalent compared to the other mucosal lesions, whereas among females leukoplakia, tobacco pouch keratosis and betel chewers mucosa were more prevalent. Majority of oral mucosal lesions were found among people aged from 31-60 years. Most of the lesions were present on the buccal mucosa including the commissures when the anatomical location is considered.

Prevalence of lesions in relation to habits

Study population who smoked had much higher prevalence of oral mucosal lesions compared to those who did not. Smokers were more

likely to develop smoker's palate and smoker's melanosis compared to other lesions (Table- 3). The prevalence of leukoplakia was higher with smokers when compared with chewers. But in women the prevalence of leukoplakia and tobacco pouch keratosis was with the chewing habit (Table- 4).

DISCUSSION

Kishangarh is a city and a Municipal Council in Ajmer district in the Indian state of Rajasthan. It was built by the Rajgharanas and Maharajas of Jaipur and Jodhpur. It lies 18 miles northeast of Ajmer and 90 km far away from Jaipur. It is connected via Kishangarh Airport, Indian Railways' Kishangarh Railway Station and National Highway no 8. It is the birthplace of the Kishangarh style of painting, which is known for the depiction of a courtesan known as BaniThani. Kishangarh has come to be known as the Marble city of India. It has Heritage Lake named as Gundolav Lake. Kishangarh Nepheline Syenite, located about 500 m after the bypass bifurcation of Kishangarh towards Jaipur on NH-8, has been notified as one of the National Geographical Monument of India. Kishangarh has more than 1,000 gangsaws, 5,000 edge cutting machines, around 25,000 godowns and more than 25,000 marble traders and it gives employment to around 1 lac people with about 25000 factory workers. The majority of these unskilled workers live in the workers quarters present in and around the marble factories. The workers put in 10-12 man-hours per day of labor. The remote location of the marble factories, unavailability of schools in the vicinity of factories/ living quarters and the modest income are few of the causes for the low socio-economic status of the workers.

High illiteracy rates, limited access to urban areas and scarcity of entertainment options, monotonous nature of the work and peer pressure all contribute to a dependency on addictive habits. A pilot project undertaken by us also confirmed the high use of tobacco related habits among the marble factory workers.

The smoked form of tobacco was preferred more in males over the smokeless form. This is in contrast with the finding that all habituers among females (100%) were quid chewers. Several epidemiologic studies undertaken in India and other parts of the world on the use of tobacco also have highlighted the increased preference of smokeless tobacco/ quid amongst females.

Tobacco was smoked in three main forms: Cigarette- filtered, Cigarette-nonfiltered and Beedi. The other two forms considered in the questionnaire Cigar and Pipe were not used by the study population. This could be due to their non-availability and increased cost. Also, no other variants of the smoked form of tobacco were in use. Only commercially available forms were preferred for smoked tobacco with local preparations not found in vogue among the population.

The ready availability and low cost appears to have played a role in the high prevalence beedi use (84.9%) among the smoked tobacco habit, followed by cigarette- nonfiltered (3.29%) and cigarette- filtered (1.83%). 9.89 % of factory workers with smoking habit were found to be using both beedi and cigarette. The overall prevalence of smoking (20.4%) in the present study is lower to the findings of Ariyawadana et al (28.9%).¹¹

The mean frequency of smoking beedi was one pack (24 beedis)/day. The mean frequency of cigarette use was 5/day. Subjects who had combined smoking habits were predominantly beedi smokers and occasionally smoked cigarettes.

Both commercial and local preparations of smokeless/ chewed form of tobacco were found to be used by the marble factory workers. Betel quid, with or without tobacco, prepared by the habituers with ingredients which are locally available was used by 47.93% of the 1500 workers. None of the female subjects had the habit of chewing plain tobacco or commercial forms of chewed tobacco. Peer influence and social barrier could be the reason for this disparity. Two forms of quid were generally used among both males and females. Quid containing betel leaf, areca nut and lime. The areca nut used was boiled and sun-dried. The second form additionally contained tobacco flakes. Among 616 of the female subjects who were habituers 260 (42.2%) were betel quid chewers. Betel quid with tobacco was found in 356 female workers (57.79%).

Commercially available forms of smokeless tobacco were used by 39

(27.46%) of the male workers with tobacco chewing habit. The commercial forms of smokeless tobacco are also readily available and have the advantages of ease of availability, storage, transport and use. These products were in two forms: Khaini and Gutkha. Khaini is a mixture of tobacco, lime with added flavors. Madhu and Hans were the brands of Khaini preferred by the habituers in the study population. Gutkha is a mixture of tobacco, lime, betel nut with added flavors. Panparag and Star brand names were preferred. 3 of the habituers among males used both Panparag and Hans.

Quid in all forms including commercial products were kept and chewed in the oral cavity for duration of 5-10mins/time by 385 and 25-30 mins/ time by 217 subjects. Frequency of chewing habit was 2-3/day among 457, 4-6/day among 146 and >6/day was seen in 97 chewers.

Tobacco habits, both smoked and smokeless forms, among different age groups calculated decade wise from 11-20 years to 81-90 years showed a high prevalence of habits in 31-40 age group onwards, with the 11-20 and 21-30 age group also showing substantial numbers of habituers. The long working hours in the factories and peer group influence were the reasons offered by the habituers for initiation and continuation of habit. The percentage of lesions showed a steady increase with the increasing age groups. Cumulative effect of the various carcinogens along with the diminished reparative ability due to increased age might have played a role.

Increased awareness about the risk of habits and access to hospitals or health personnel could be important deterrent factors for tobacco related habits. Health education through the use of models, visual media and community group discussion need to be undertaken to discourage a habituer and to dissuade a potential habituer.

Tobacco contributes to pathogenesis of oral mucosal lesions through several pathways with many included variables giving rise to a variety of lesions. The focus of epidemiologic studies has been in the identification and collection of data of these mucosal lesions in an attempt to understand the disease process and prevention of oral cancer.

In the present sample the overall prevalence of tobacco associated oral mucosal lesions was 17.6% with 265 lesions being diagnosed. The high prevalence of oral mucosal lesions can be correlated with the high prevalence of tobacco associated habits (71.53%). This overall prevalence rate is high when compared to the studies conducted earlier.^{11,12}

Amongst oral mucosal lesions found, Smokers palate (4.67%), Smokers palate with melanosis (4.53%), Leukoplakia (3.60%) and Smokers melanosis (2.33%) were the predominant lesions. The prevalence rate of smokers palate and smokers melanosis is more but the prevalence rate of leukoplakia is less when compared to the previous studies conducted.^{13,14}

The overall prevalence of smoking habit in the present study is 20.4% and the high prevalence of smoking habit among habituers (25.44%) could have contributed to the high prevalence of Smokers palate, Smokers palate with melanosis and Smokers melanosis. This prevalence of smoking is higher when compared to the results reported by the various authors¹⁵ and lower prevalence when compared with other studies.¹⁶

The number of lesions in males (221) is greater when compared to number of lesions found in females (44). Among male habituers the prevalence of lesions in percentage was 48.35% as compared to 7.14% in female habituers. The difference in usage of tobacco could account for the low prevalence of lesions in female habituers. While tobacco was used by females only in the chewed form, smoked form of tobacco was prevalent among males. A total of 210 lesions were seen in males who smoked or had combined habit, both smoking and chewing.

This is further reflected in the type of lesion present in males and females. Smokers palate and melanosis were prevalent more in males. Leukoplakia, tobacco pouch keratosis, betel chewers mucosa and leukoedema was more prevalent among females.

This study also showed the presence of oral precancers and cancer. The oral precancers seen were Leukoplakia, Oral submucous fibrosis and

Lichen planus. One case each of Squamous cell carcinoma and Verrucous carcinoma were suspected and sent for further evaluation i.e biopsy.

Leukoplakia had an overall prevalence of 3.6% with 54 lesions seen among the study population, 33 lesions (2.2%) seen in males and 21 lesions (1.4%) seen in females. Both forms of tobacco seem to contribute to pathogenesis of leukoplakia. Out of the 33 leukoplakias found in males, 24 were associated with beedi smoking, 2 with cigarette smoking, 2 with betel quid with tobacco and 5 with combined chewing and smoking habit. Among the 21 leukoplakias found in females, 2 were associated with betel quid and 19 were related to betel quid with tobacco. Majority of the leukoplakias were seen in the buccal mucosa with three cases seen bilaterally. Commissural area was seen to be involved in 6 cases, four of them in the right side. One case of leukoplakia was noted in the labial mucosa.

5 cases of oral submucous fibrosis were present, 3 in males and 2 in females. All of the cases were associated with smokeless tobacco either in the form of betel quid with tobacco or commercial forms of smokeless tobacco. All of the 5 cases showed fibrosis of buccal mucosa with vertical bands being palpable.

Three cases of lichenoid reaction were diagnosed clinically. Lichenoid reaction to betel quid has been reported earlier and clinically resembles lichen planus.¹⁶ In the two cases of lichenoid reaction, the straita were seen on the buccal mucosa in the area of placement of quid. Two cases of oral cancer were diagnosed clinically. One was an ulceroproliferative lesion found on the floor of mouth of a 43 year old male and was associated with beedi smoking. The other case was found in the left retromolar area of a 62 year old female and was associated with betel quid with tobacco habit.

However it was noted that the subjects were unaware of the presence of most of these lesions and lacked any general information about these lesions.

The health care providers specifically the dentists are well equipped to intervene. It is of paramount importance that the presence of oral precancers has to be diagnosed at an early stage to prevent malignant transformation. Special training needs to be provided for the health care personnel in identification of these lesions and their biologic behavior.

This study highlights the importance of providing oral health care and education of the study population on the harmful effects of these habits. It also points out the need of increased co-operation between the personnel involved, the marble factory workers, the factory employers, the health care providers and the governmental authorities. This study could form a baseline data for conducting further elaborate studies on marble factory workers which include epidemiologic studies, interventional or preventive programmes.

CONCLUSION

Oral mucosal lesions associated with tobacco were found in 17.6% of the study population. The predominant lesions in females were tobacco pouch keratosis, betel chewer's mucosa along with lichenoid reaction and lichen planus. The prevalence of leukoplakia in our study was 3.60% with male prevalence of 2.2% and female prevalence of 1.4%. Most of the lesions were found on the buccal mucosa including commissures. The prevalence of lesions was found to be more in males, the majority of which were of smoker's melanosis and smoker's palate, 2.6% and 4.6% respectively. In the study we also found that smoking is more prevalent in men when compared with that of chewing and more number of leukoplakia lesions are associated with smoking habit.

Table 1-Prevalence of tobacco habit in the study population.

MALE 584				FEMALE 916		
With Habit 457			With out Habit 127	With Habit 616		With out Habit 300
Smoked	Smok eless	SmokedandS mokeless		Smokeless		
273	142	42		Betel Quid260	BetelQuid withTobacco 356	
TOTAL- 1500						

Table-2 Prevalence of the lesions according to sexof study population.

Lesions	Frequency			Percentage of prevalence among Lesions (%)			Percentage of prevalence for Study population (%)		
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Leukoplakia	33	21	54	12.45	7.92	20.37	2.2	1.4	3.60
Melanosia	35	00	35	13.20	0	13.2	2.3	00	2.3
Smokers palate	70	00	70	26.40	0	26.4	4.6	00	4.6
Melanosia + Smokers palate	68	00	68	25.60	0	25.6	4.4	0.06	4.46
Squamous cell carcinoma	01	00	01	0.3	0	0.3	0.06	0.0	0.06
Verrucous carcinoma	00	01	01	0	03	0.3	00.00	0.06	0.06
Verrucous hyperplasia	01	00	01	0.3	0	0.3	00.00	0.06	0.06
Tobacco Pouch Keratosis	02	08	10	0.7	3.0	3.7	0.13	0.53	0.6
Betel chewers mucosa	02	05	07	0.7	1.8	2.6	0.13	0.33	0.46
Leukoe dema	05	04	09	1.8	1.5	3.3	0.33	0.26	0.6
Oral sub mucous fibrosis	03	02	05	1.1	0.7	1.8	0.2	0.13	0.33
Lichenoid reaction	00	02	02	0	0.7	0.7	00	0.13	0.13
Candidiasis	01	00	01	0.3	0	0.3	0.06	00	0.06
Lichen planus	00	01	01	0	0.3	0.3	0.00	0.06	0.06
TOTAL	221	44	265			100			17.32

Table-3 Correlation between the lesions and smoking habit in males

Lesions	Smoked			Total
	Beedi	Cigarette	Both	
Leukoplakia	29	03	0	32
Melanosia	30	01	01	32
Smokers palate	65	01	04	70
Melanosia + smokers palate	61	05	02	68
Squamous cell carcinoma	01	0	0	01
Verrucous hyperplasia	01	0	0	01
Leukoedema	03	0	02	05
Candidiasis	01	0	0	01
Total	190	10	10	210

Table- 4 Correlation between the Lesions and Smokeless Habit in population

Lesions	Males	Females	Total
Leukoplakia	01	21	22
Melanosia	03	00	03
Verrucous carcinoma	00	01	01
Tobacco pouch keratosis	02	08	10
Betel chewers mucosa	02	05	07
Leukoedema	00	04	04
Oral submucous fibrosis	03	02	05
Lichenoid reaction	00	02	02
Lichen planus	00	01	01
Total	11	44	55