



Original Research Article

Tobacco use and oral mucosal changes in Baiga tribals of Madhya Pradesh

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ABSTRACT

Background: Tobacco use leads to oral mucosal changes and submucous fibrosis. Use of tobacco products is common amongst primitive tribes for various purposes leading to high prevalence of oral lesions.

Objectives: To estimate the prevalence of oral mucosal changes amongst tobacco users, to identify the factors contributing to increased tobacco use and suggest strategies for prevention.

Materials and Methods: A cross-sectional study was conducted amongst primitive Baiga tribe at Mandla block in Mandla district of Madhya Pradesh. Multistage random sampling method used to select the study villages with predominantly Baiga families. Prevalence of mucosal changes estimated by pilot study 41% was used to calculate sample size of 540. Data was elicited by interview and clinical examination after consent. Diagnosis was according to various stages of Pindborg classification for oral mucosal fibrosis. Data is analysed in MExcel and prevalence values presented as percentages. Chi sq test and odds ratio calculated to express association and risk estimate.

Results: All the 540 study subjects were of low socio economic status. A total of 256 (47.4%) developed oral mucosal changes as per the Pindborg classification for oral submucosal fibrosis. Amongst the 296 tobacco users 77% developed oral mucosal changes compared to 11.5% for non-users. (Odds ratio= 25.8. CI 16.03 to 41.71). Majority 59% had stage 1 changes in oral mucosa presenting as mucosal ulcers, erythema, melanotic pigmentation and petechiae ranging between 27 to 18%, while 35% presented in stage 2 with fibrous bands in 19.3%. Leukoplakia observed in 5.8% The age group with maximum cases was 21-40 years but 53.6% amongst 10 to 19 years, had oral lesions. Extensive use of tobacco products (Nas&Gudhaku) as dental cleanser and other purposes caused addictions from young age. Lack of awareness, social norm and easy availability aggravated the condition.

Conclusion: The current study highlights the problem of oral mucosal changes and OSMF amongst those in the primitive Baiga tribals due to social norm, cheap colourful packets easily available in the local market, and finally addiction. The high prevalence and continued use noted in our study reflect the absence of any preventive and promotive measures by the health personnel for the tribe. The Tobacco Control Act need to be reinforced there and targeted intervention for the welfare of the tribe be introduced to manage the menace.

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1. Introduction

Tobacco use orally enhances the occurrence of lesions¹⁻³ in the buccal cavity. Consumption usually exists as a custom among certain ethnic groups and tribes of South East Asia.⁴ Tobacco in olden times was used in smokeless form

to relieve toothache, to treat skin wounds, insect bites, as an anti-fatigue agent and for tooth-whitening amongst many communities. These practices work as a predisposing factor for addiction and results in changes in the oral mucosa which may be a precursor to oralsubmucous fibrosis and cancer.⁵ Studies have reported tobacco leaves have more than 28 carcinogens.⁶ Smokeless tobacco products are significantly responsible for cancer of the oral cavity,

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oesophagus, and pharynx.⁷ There are almost 267 million tobacco users in India. Among adults (age 15+), 28.6% of the population currently uses tobacco products (men 42.4%; women 14.2%). Among youth (ages 13-15), 14.6% currently use some form of tobacco. Each year tobacco use kills about one million Indians: Smoking and exposure to secondhand smoke kill about 926,000 people each year. Smokeless tobacco use kills an additional 200,000 people in India each year, accounting for 74% of the global burden of smokeless tobacco. By 2030, 80% of tobacco related deaths will be in low- and middle-income countries.⁸ By 2020 it is predicted that tobacco will account for 13% of all deaths in India.

Oral mucosal changes followed by oral sub mucous fibrosis (OSMF) are a chronic, progressive, debilitating disease, which was first reported in 1950.⁵ In this disease the oral mucosa loses its elasticity and fibrous bands develop. In Madhya Pradesh at Mandla district, Naswar/tapkeer (snuff) commonly called as “Nas&Gudhakhu”(similar to creamy snuff) is used amongst the rural and tribal communities including the primitive tribe of Baiga.⁹

The present study was conducted amongst the Baiga tribal population to estimate the prevalence of oral mucosal changes particularly submucosal fibrosis, amongst tobacco users, to identify factors contributing to tobacco use, and to recommend strategies for prevention.

2. Materials and Methods

The present cross-sectional study was conducted in Mandla District of Madhya Pradesh in central India with 84.7% rural population and 57.2% tribal population. Study population was primitive tribal population of Baiga tribe located in Mandla block of Mandla district randomly selected through multistage sampling technique. Villages of Baiga tolas with population more than 1000 were enlisted and 2 villages were selected through random sampling from the list of villages under PHC Hridayanagar from Mandla block. As no prevalence figure with oral mucosal changes for sub mucous fibrosis for primitive tribes was available in recent literature, a pilot study was conducted on 50 subjects in a Baiga tola. A prevalence of 41% of mucosal changes amongst tobacco users was obtained and the study sample size was calculated based on this prevalence with 95% Confidence Interval and with relative precision of 10%, the sample size was rounded to 540. Based on the population pattern obtained the age group for study was taken from 10 years age. Data was elicited by a piloted, structured and coded performa for interview in local language and a physician examined the oral cavity hygienically in the field with mirror and a disposable wooden spatula, for identifying the oral mucosal changes. Prior to interview and oral examination an Informed consent was obtained from all individuals after explaining the purpose of the

study. Parental consent and support was taken for eliciting information from subjects under 18 years of age and for examination.

Subjects who fitted the inclusion criteria were examined through house to house visit and all households were covered in the two villages till the sample size was completed.

Data collected was analyzed by using microsoft excel. Descriptive statistics about the subjects regarding demographic, socio-economic status, tobacco use and reasons for tobacco use was noted. Chi- square test was performed for association and statistical significance fixed at ($p < 0.05$). To estimate the risk of oral mucosal changes between tobacco users and non users, Odds Ratio (OR) was calculated.

2.1. Inclusion criteria

Members of Baiga household tribe residing in randomly selected two villages 2) Age 10 years and above 3). Members consenting field based interview and oral examination. Physician's help was taken for examination and diagnosis.

2.2. Oral examination

Pindborg classification^{10,11} was used as diagnostic criteria for oral mucosal changes with focus on submucous fibrosis.(Table 1)

Table 1: Pindborg classification of Oral Sub Mucosal Fibrosis (OSMF)

	Stomatitis includes erythematous mucosal Vesicles
Stage I	Mucosal ulcers Melanotic mucosal pigmentation Mucosal petechiae
Stage II	Fibrosis occurs in healing vesicles and ulcers. Early lesions show blanching of the oral mucosa Older lesions include vertical and circular palpable fibrous bands in the buccal mucosa and around the mouth opening or lips Mottled marble like appearance of the mucosa, blanched and leathery floor of mouth, fibrotic and de-pigmented gingiva Reduction in mouth opening, stiff and small tongue, rubbery soft palate with decreased mobility, blanched and atrophic tonsils, shrunken bud like uvula and sunken cheeks
Stage III	Not commensurate with age or nutritional status Sequelae of OSMF are as follows: Leukoplakia Speech and hearing deficit may occur because of involvement of tongue and the eustachian tube.

3. Result

All the 540 subjects under study were from families with low socio-economic status. Majority 457 (84.6%) families were laborers by occupation and 525 (97.2%) lived in kaccha houses with “ekbatti” (one bulb) connection provided by government. More than 93% did not have toilet facility and water point at home. The families belonged to social class V according to BG Prasad social classification.¹²

In the study population there were 282 (52.3%) female and 258 (47.7%) male subjects. The participants were maximum in the age group 10 to 19 years (151) followed by the age group 30 to 39 years with 100 subjects. More number of females 66.3% used smokeless tobacco (i.e. Nas, Gudakhu, dry tobacco leaves) as compared to 57.7% males, the difference being significant ($\chi^2 = 4.2$, $P < 0.05$).

A total of 256 (47.4%) out of 540 developed mucosal changes. Oral lesions were common in 77% of tobacco users (228 out of 296) compared to 11.47% of non users (28 out of 244). The odds of having oral mucosal changes amongst tobacco users was 25.8 times (CI 16.03 to 41.7) compared to the non tobacco users. The difference is significant $p < 0.05$ Amongst the age groups 20-40 years (67.6%) were most affected followed by the older age groups where on an average 62.5% had lesions. The age group of 10-19 years, 81 (53.6%) out of 151 had developed the mucosal changes.

Clinically maximum number of cases were diagnosed in Stage I (59%) however the persons in stage 2 (35.2%) and stage 3 (5.8%) with more severe disease, were not taking any treatment.

Occurrence of fibrous bands was observed in 19.53% subjects and 7 persons (2.73%) had restrictive mouth opening. Leukoplakia was detected in 15 persons (5.8%) (Table 3)

Table 2: Distribution of oral mucosal changes as per Pindborg classification

Stages	Oral sub mucous fibrosis cases	Percent
Stage I	151	59%
Stage II	90	35.2%
Stage III	15	5.8%
Total	256	100%

Information on type of tobacco use and reasons for use revealed that the commonest types of smokeless tobacco used by majority tribals were Nas (Dental snuff) and Gudakhu (tobacco and jaggery made into a paste) or dry tobacco leaves, which were easily available in the local market. Gudhakhu tastes sweet and comes in colourful attractive packets with prices ranging from Rs. 2 to Rs 5. The children are initiated into using NAS as dental cleaner as early as 4 years. Nearly 36.5% informed that by using Nas as dental cleanser they experienced a feeling

Table 3: Distribution of oral mucosal changes among tobacco users

Types of Oral mucosal changes	Frequency	Percentage
Mucosal ulcers	57	22.26%
Erythematous mucosa	57	22.26%
Melanotic mucosal pigmentation	71	27.73%
Mucosal petechiae	47	18.35%
Fibrous bands	50	19.53%
Blanching	45	17.57%
Leathery mucosa	42	16.40%
Leukoplakia	15	5.80%
Restricted mouth opening	7	2.73%
Rubbery soft palate	10	3.90%
Base Total	256	

Multiple response

of well being, relief from pain & tiredness and it also suppressed hunger. Adolescent girls also used Gudhakhu to decrease pain during menstrual period. Common reasons for using tobacco in these forms were social acceptability, resulting in addiction. Moreover, ignorance about dangers of long use, coupled with easy availability of colourfully packed Gudhakhu, allured especially the youngsters to buy and practice such high risk behaviours. No effort had been made regarding information and education amongst these tribal communities, about the dangers of using these tobacco products.

4. Discussion

The study has indicated that use of tobacco as a tooth cleanser/ toothpaste and for other purposes is common in the Baiga tribal population, where 54.8% of the population is using various forms of tobacco in many ways, which is same as 53.8% reported by Khanna¹³ amongst Baiga tribals in 2012 in the 21 to 40 age group but higher than 42.4% given in India Global Adults Tobacco Survey (GATS)II (2016–17)¹⁴ and 43.38%,¹⁵ in a study done in Mandla district but another block. The male female difference in tobacco consumption is large amongst non tribals as given by NFHS -4, 59.5% in males and 10.4% in females also in GATS-II,¹⁴ compared to ours where women are using tobacco 66% in smokeless form higher than in men 57.5%, also reported as long back as 2004⁷ and amongst Gonds tribe¹⁶ but closure to the figures reported in the other study in Mandla district 47.4% and 39.5% in males and females respectively. Such differing values may be attributed to culture and social customs on the choice of tobacco product prevalent in each group of study subjects. Most common

form of tobacco used by Baigas are Nas, Gudakhu and dry tobacco leaves while in the other study done in Mandla district¹⁵ the use of such products was very less only 2.9%. This again reflects the importance of studying the local area practices for taking appropriate corrective measures.

In our study children and youngsters started use of Nas as early as 4 years for dental cleaning and used Gudakhu as sweets enticed by attractive packets also reported by others.^{17,18} However early initiation is prevalent in tribal population as observed by us and reported in a study done amongst Kolam tribe in Maharashtra, where the minimum age of initiation was three years.¹⁹ Adolescents are consuming tobacco in various forms as reported by authors for tribal²⁰ and rural youths²¹ and common practice across globe since long.²² May be the unscrupulous tobacco sellers target the vulnerable for selling their products.

Majority (67.6%) affected were in the productive age group of 20 to 40 years. These findings are concomitant to the report by Wahi et al²³ on tobacco consumption in gutkha form, where most OSMF cases were observed in age group 21-40 years. Other studies also report the involvement of the adult productive group.²⁴⁻²⁶ The 53.6% prevalence of mucosal changes in the age group of 10 to 19 years in our study is also indicative of early and long use of tobacco. Early initiation and prolonged use due to easy availability of the tobacco products from street sellers and social acceptability, are also noted by other authors.^{21,24} In the present study, the prevalence of oral mucosal changes is 47.1 amongst the study group similar to that of Reddy et al.² and the risk of occurrence of oral mucosal changes is 25.8 times more amongst those using tobacco compared to non users. Reports are available on correlation between smokeless tobacco use and OSMF.²⁷⁻²⁹

The clinical profile of the patients observed in our study are similar to reports from various authors on submucous fibrosis.²⁸ Out of 256 patients, maximum 59% were in stage I, and (35.2%) in stage II of OSMF. Our figure for stage II is less than 58.8% reported in another study in which the patients had mainly buccal and faucial bands, however their values for stage III patients is much higher 20%²⁷ compared to 6% in our study. Bhatnagar et al.³⁰ noted low prevalence of oral mucosal lesions (16.8%), and oral submucous fibrosis (1.97%), and leucoplakia (2.8%) though majority of the tobacco users were 40 years & above. The low prevalence may be due to late initiation and different forms of tobacco use. However Rao et al. in their contemporary narrative review on Oral submucous fibrosis have stated that the prevalence may range from 0.1 to 30% varying by geographical location, sample size, and sampling methodology Rao et al.²⁹

The factors contributing to the high prevalence of OSMF in our study are mainly a primitive tribe low socio-economic status of 97% population, easy availability, socio-cultural custom of use for dental cleaning, relaxation, cheap product

for suppressing hunger and as a remedy for tooth ache in general or menstrual pain in adolescent girls,³¹ also reported in other studies.³² The practice of using tobacco in dental paste is there in the commercial products³³ and the use by tribals is not unique but needs to be addressed.

Though “tobacco kills” is written and some pictures are given, over the pouches of the tobacco products, those are not understood by the illiterate tribals and hence the message does not convey the seriousness of the disease linked with use. Besides as per GATS-II at national level only 46% adults had thought of quitting tobacco because of a warning label, so only putting warnings are not enough to stop people from using tobacco as they become addictive. The warnings on smokeless tobacco packets have low levels of noticing and effectiveness has been reported.³⁴

5. Conclusion

The current study highlights the problem of oral mucosal changes and OSMF amongst those in the primitive Baiga tribals using tobacco usually in smokeless form starting with the use as dental cleanser from young age, due to social norm, cheap colourful packets easily available in the local market and finally addiction. Poverty, ignorance addiction precipitate the risk behaviour oblivious of the lurking danger to health. The varying prevalence figures noted in literature can be attributed to type of tobacco product and density of use. The high prevalence of OSMF and continued use of tobacco as noted in our study reflect the absence of any preventive and promotive measures by the health personnel for the tribe. The Tobacco Control Act need to be reinforced there and targeted intervention done for the welfare of the tribe.

6. Source of Funding

None.

7. Conflict of Interest

None.

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