

ORIGINAL RESEARCH

Palatal changes of reverse smokers in a population

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ABSTRACT

Introduction: Reverse smoking has been identified as a unique way of tobacco usage where the smoker usually places the lit end of the chutta into his or her mouth so that they directly inhales from the lit end. On an average, each adult might smoke 3–4 chuttas per day and each chutta relatively lasts for about 15–30 min.

Materials and Methodology: Oral screening camp was conducted and almost over 1500 individuals were screened and a total of 65 individuals were reported to indulge in reverse smoking. Of these, 49 were females and 16 were males who had given meticulous history of reporting no other tobacco and alcohol habits and there were no systemic disturbances. Proper history pertaining to the habit, systemic illness, pigmentation related to any medications, family history and reason for indulging in reverse smoking were collected from all the 65 individuals. Palatal mucosal observations were made by four examiners and the mean and percentage prevalence of lesions among 65 subjects were computed. Fisher's exact test was used to assess the association between the agreements of four examiners, a P value was calculated by two-tailed t-test. Logistic regression analysis model was used for co-efficient of prediction in presence or absence of a lesion.

Results: The mean and percentage prevalence of the each lesion recorded and agreed by four examiners among 65 subjects shows presence of 88.7% of hyper-pigmented areas, 63.4% of depigmented areas, 51.6% of excrescences, 33.0% of potentially malignant lesions and 10.5% of frank ulcerations. Fisher's exact test was used to test the association between the agreements of four examiners, a P value was established at 0.7203. In the logistic regression analysis model the coefficient of the variable was set at 1, the confidence interval was found to be 95% and $P < 0.005$ was established.

Conclusion: In order to make healthy choices, a stern focus on the health promotion is mandatory that majorly include those that emphasize on the need of educating the individuals about the risks associated. Moreover in view of considering the high-risk groups in order to influence the personal routines and behaviours, it is aimed at emphasizing the measures through information campaigns.

Keywords: palatal changes, tobacco, smokers palate, reverse smokers, chutta

INTRODUCTION

Indian subcontinent is the world's second largest tobacco consumer and manufacturer and there are various tobacco products that were easily available at affordable costs. Tobacco

smoking and consumption is observed to be having a wide spread variation across the Indian subcontinent which has reported to be the most leading aetiologies of death and diseases among Indian population. It has been accounted that about 1.37 million individuals dying each year. When considering the tobacco smoking, it has extended variations in the way of using the smoking device.^{1,2} Considering the records of global adult tobacco survey India, 2017-18, almost about 629 million adults reported to be more than 15 years or older across India were reportedly using tobacco and its related products.³

The term “reverse smoking” could be defined as a smoking with the lightened end that is intended to be kept inside the mouth.⁴ which a peculiar habit that is more commonly prevalent among the adult fishermen residing in the coastal regions of Indian subcontinent. The smoking device that was used is relatively a homemade cigar made by crudely rolling few semi dried tobacco twigs called as “chutta.” The word chutta is basically derived from the Tamil word “churutu” which means “to roll or to fold”. Each chutta when it is weighed is reportedly at about 5–7.5 g. On an average, each adult might smoke 3–4 chuttas per day and each chutta relatively lasts for about 15–30 min. Few individuals smoke complete chutta at once or one chutta at 2–3 intervals; each interval lasts about 5–10 min. The unique characteristic feature of this habit is that the individual who intended to lit extreme of the chutta is kept inside the mouth and then closed with their lips sealed the mouth which allows slow inhalation of smoke from chutta and the smoke is allowed to let out from the unlit end. The lips kept the cigarette wet which increases of the consumption time from 2 – 19 minutes. The highest temperature that was recorded can reach a maximum of about 760°C and the intraoral temperature can reach about 120°C. This habit of reverse smoking is surprisingly more common in females than males and this kind of prevalence has been attributed to many reasons like, Females wanted to keep their smoking habit in a secret way from their husbands, Due to the strong winds and splashing waters across the coastal areas, there are chances of that lit end of chutta might extinguished if used in a conventional way, Fisherwoman while weaving the fishing nets they intended to avoid the damage caused by the fallen ashes from chutta.^{5,6,7}

The observable clinical manifestations of the oral mucosa in patients observed with the habit of reverse smoking greatly vary from those from the conventional smoking. Tongue and palate are the most commonly affected area. The various changes that were reported include minor changes like leukoedema, melanosis and smokers palate to more potentially complicating malignant illnesses like leukoplakia or erythroplakia which could invariably lead to oral cancer. This study was conducted to study the palatal changes that were associated with population practising reverse smoking.

MATERIALS AND METHODOLOGY

Oral screening camp was conducted and almost over 1500 individuals were screened and a total of 65 individuals were reported to indulge in reverse smoking. Of these, 49 were females and 16 were males who had given meticulous history of reporting no other tobacco and alcohol habits and there were no systemic disturbances. Proper history pertaining to the habit, systemic illness, pigmentation related to any medications, family history and reason for indulging in reverse smoking were collected from all the 65 individuals. Proper Photographs were recorded showing various palatal changes were taken using digital camera. Palatal mucosal observations were made by four examiners and the mean and percentage prevalence of lesions among 65 subjects were computed. Fisher’s exact test was used to assess the association between the agreements of four examiners, a P value was calculated by two-tailed t-test. Logistic regression analysis model was used for co-efficient of prediction in presence or absence of a lesion.

RESULTS

Table 1 displays the presence of individual lesions on palatal mucosa among 65 reverse smokers recorded by four examiners. The mean and percentage prevalence of the each lesion recorded and agreed by four examiners among 65 subjects shows presence of 88.7% of hyper-pigmented areas, 63.4% of depigmented areas, 51.6% of excrescences, 33.0% of potentially malignant lesions and 10.5% of frank ulcerations. Fisher's exact test was used to test the association between the agreements of four examiners, a P value was established at 0.7203. In the logistic regression analysis model the coefficient of the variable was set at 1, the confidence interval was found to be 95% and $P < 0.005$ was established.

Table - 1: Presence of individual lesions on palatal mucosa recorded by four observers (n=65)

Observer	Hyperpigmentation	Depigmentation	Excrescences	Leukoplakia Erythroplakia	Ulcerations
1	58	44	38	12	9
2	46	25	25	13	12
3	54	44	30	29	4
4	56	42	36	19	3
Total	214	155	129	73	28
Mean	53.5	38.7	32.2	18.2	7
Percentage	88.7	63.4	51.6	33.0	10.5

DISCUSSION

The changes that were associated with the palatal mucosa in reverse smokers were of varying degrees usually ranging from certain adaptive changes to potentially malignant lesions and eventually ulcerations. The adaptive changes that were observed were usually hyperpigmentation and excrescence. Depigmented areas are observed to be the transition regions between the adaptive and potentially malignant lesions. Potentially malignant lesions were noted to be leukoplakia and erythroplakia. Hyperpigmentation denotes a well-defined diffuse or focal greyish black pigmentation of the palatal mucosa due to increased melanin production initiated by melanocytes. The intensity was varying in all the 88.7% of cases. This pigmentation was usually bounded to the hard palate and had regular margins and was produced due to increased melanin deposition as a protective inhibitory reaction to heat and its antioxidant properties against toxic products that were produced during combustion of tobacco within the oral cavity.^{8,9} The possibility of drug-induced pigmentation was basically neglected by recording proper history of medication like quinacrine, amodiaquine, premarin etc.¹⁰ Various physiologic racial pigmentation is generalized but in these cases observed in the study, it has been showed that pigmentation usually associated on the palatal mucosa. In the hard palate, various physiologic racial pigmentation basically presents as a dark brown macules with ill-defined borders and is usually asymptomatic with no gender predilection.¹¹ Cytologic research revealed that reverse smokers had a greater percentage of parakeratinisation, hyper-parakeratinisation and dyskeratosis when compared with traditional chutta smokers and non-smokers. Therefore, these observations could indicate high-risk lesions in the hard palate of reverse smokers.

A study conducted by Natali et al. in the year 1991 observed that oral mucosa changes usually produced from heavy drinking and smoking comprised of splotchy areas of depigmentation surrounded by hyperpigmentation.

They concluded that these changes in the oral pigment could possibly serve as to identify patients who are heavy smokers and drinkers and may be a useful diagnostic sign.¹² Daftary in 1989 reported that 17% of reverse smokers were reported with clinically depigmented areas.¹³

Another study by Ramulu et al. in 1971 stated that when the glandular area of the hard palatal mucosa clinically showed papular elevations upto 2–3 mm in height with central umbilications presented with or without pigmentation of the surrounding mucosa which is considered as stomatitis nicotina.¹⁴ Moreover, they revealed that there might be many of these painless papular lesions in the glandular part of the hard palatal mucosa which are not usually present in the soft palate or in the anterior half or anterior one-third of the hard palate and will not extend up to the alveolar margin. A study by Thoma et al elaborated that the nicotine stomatitis as a lesion usually occurs in pipe smokers in regions that are not covered by dentures.¹⁵ Whereas Mehta et al in the year 1977 quoted that the excrescences were transient in nature and tend to regress with the discontinuation of the habit. They also concluded that this is the initial and most immediate response associated with reverse smoking habit. The hypertrophied ductal openings of minor salivary glands serves as a portal of entry for the toxins of tobacco smoke and the pseudostratified columnar epithelial linings of ducts which is found to undergo squamous metaplasia in response to chronic irritation usually produced by heat and chemicals that are released during reverse smoking and this metaplastic squamous epithelium has got high malignant potential and might be responsible for malignancy in this component.¹⁶

In certain individuals, red lesions were also evident that are possibly associated with leukoplakia comprising of about 33% in our study population. A study by Gavarasana and Susarla in 1989 reported the frequency of preleukoplakia to be 2.26 times higher and leukoplakia was 13.84 times higher in reverse smokers when compared to the conventional chutta smokers.¹⁷ Van Der EB et al in the year 1993 observed that 9.8% prevalence rates of leukoplakia palati and concluded a strong association of leukoplakia with reverse smoking than conventional chutta smoking.¹⁸

From this study, it has been reported that 10.5% of 60 reverse smokers showed frank ulcerations which refers to red area with crater or excavation. Carcinoma that were associated with reverse smoking and especially in women of Vishakapatnam district was reported first by Kini and Rao in 1937 and supported by Khanolkar and Suryabai in 1945.¹⁴ Reddy et al in 1974 observed that a reverse smoking female runs a relative risk of developing carcinoma of the hard palate 47 times more than that of a non-smoking female.¹⁹ According to Reddy et al in the year 1976 carcinoma of palate in reverse smokers usually occurs in the middle of the posterior half of the hard palate and not in the soft palate or in the anterior half of the hard palate. They also concluded that the localization of carcinoma in reverse smokers corresponds to the glandular area of the hard palate.¹⁹ Study by Quigley et al in 1965 the reason for this malignant transformation might be due to excessive heat generated during reverse smoking rising the palatal temperature to up to 120°C and also because of the higher content of nicotine, total particulate matter and incomplete combustion of the chutta tobacco.⁷

CONCLUSION

In order to make healthy choices, a stern focus on the health promotion is mandatory that majorly include those that emphasize on the need of educating the individuals about the risks associated. Moreover in view of considering the high-risk groups in order to influence the personal routines and behaviours, it is aimed at emphasizing the measures through information campaigns.

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