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Original Article

Pan masala habits and risk of oral precancer: A cross-sectional survey in 0.45 million people of North India

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ABSTRACT

Objectives: This cross-sectional community based study was conducted to estimate the prevalence of consumption habits for non tobacco *pan masala* (ASU) and the risk of developing oral precancer in North India.
Methods: This study was conducted in the old town of Lucknow city in the state of Uttar Pradesh in India. Subjects residing for more than 6 months and aged 15 years or above, were enrolled in the study after their informed consent. A two page survey tool was used to collect the data. A three times more matched sample of non users was randomly obtained from this data to analyze and compare the final results.
Results: 0.45 million subjects were surveyed. Majority of tobacco users were in the age group of 20–35 years among males and 35–39 years among females. Consumption of non tobacco *pan masala* among males as well as females was most common in 15–19 years of age group. Prevalence of oral precancer (leukoplakia, submucous fibrosis, erythroplakia, lichen planus, smokers palate and verrucous hyperplasia) was 3.17% in non tobacco *pan masala* users and 12.22% in tobacco users. The odds of developing oral precancer in non tobacco *pan masala* users was 20.71 (18.79–22.82) and in tobacco users was 88.07 (84.02–92.31) at 95% confidence interval against non users of both.
Conclusion: The odds of developing oral precancer even with consumption of *pan masala* is high, even when it is consumed without tobacco. It is hence recommended to discourage this habit.

1. Introduction

The word 'substance' is referred as non-essential food ingredient that is generally addictive. Amongst the three cardinal substances abused by the mankind, tobacco is the biggest killer.[1] Worldwide smoking practices are in vogue, but chewing tobacco with *pan* or *pan masala* is typical to the Indian sub-continent.[2] Undoubtedly, there is sufficient evidence to implicate tobacco to oral cancer and precancer, but it is unknown if non tobacco *pan masala* is equally harmful.[3] Today, a clandestine sale of non tobacco *pan masala* has eroded the society. It is detrimental to the national health, and may also have a direct causal relationship to oral precancer followed by oral cancer.[4]

This study was carried out as a community based cross-sectional study design with the aim to estimate the prevalence of oral precancer in North India and to calculate the risk imposed with use of non tobacco *pan masala*.

2. Methods

This taskforce project, aimed to study the direct risk imposition (odds ratio) in users of *pan masala* or areca nut substance (ASU), tobacco in any form (TU) and non users with no chewing habits (NU). A sample size of approximately 0.45 million population was planned for this survey in the densely populated area of Lucknow. All permanent residents (residing for more than 6 months in the

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study area) aged 15 years and above were eligible for recruitment in the study after their informed consent. Mentally challenged people and those who could not be enrolled even after 3 visits, were excluded. Institutional ethical clearance was obtained. In order to achieve the 0.4 million sample size, all households in the Cis Gomti region of Lucknow were visited by trained social workers and dental surgeons. Research quality was maintained with control of sampling and measurement bias. Strict quality control measures were followed. A pilot survey during the course of this study showed that 4% of the total adult population above the age of 15 years consumed AS.

A two page survey tool, written in English, was used to collect data through interview and oral examination. It had 5 sections; I: included demographic details, II: non-tobacco *pan masala* and tobacco (*gutkha*, smoking), III: dose and duration details, IV: oral health examination, V: clinical diagnosis of the oral mucosal lesion, if present. Kuppuswamy's SES Scale,[5] based on education, occupation and monthly family income, was used to distribute the surveyed population into 5 grades, where upper grade (I) with a score range of 26–29, upper middle (II) to 16–25, lower middle (III) to 11–15, lower upper (IV) to 5–10 and lower (V) to less than 5.

The data collected was tabulated and standard statistical tools were applied for detailed analysis using SPSS-17 software and reports were generated. To improve representativeness of the samples for distribution and characteristics of the study, population was suitably weighted for age and sex adjustments. All quantitative variables were expressed as mean ± deviation. Prevalence rates were estimated along with 95% confidence interval for qualitative variables.

A total of 453,823 subjects were interviewed and orally examined. The data was checked for internal consistency through previously framed questions; and incomplete or missing data was removed to obtain a total of 402,669 survey data for evaluation.

3. Results

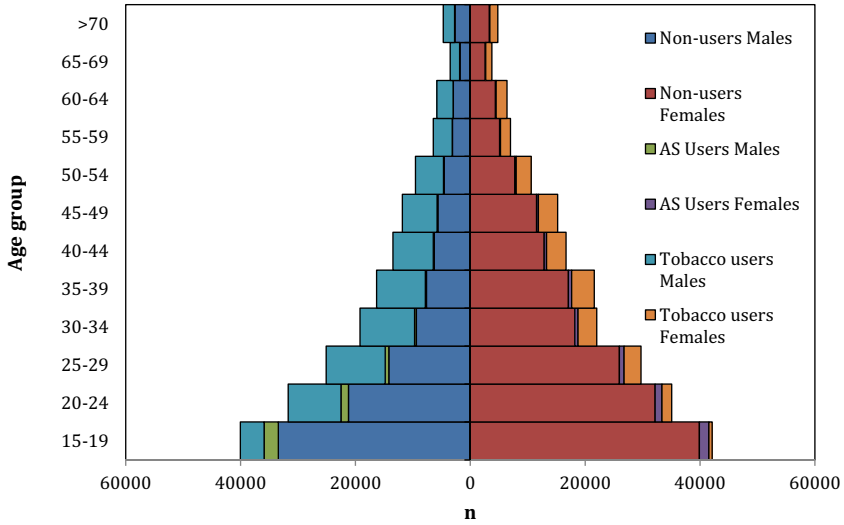
73% of the population surveyed were non users. Non-tobacco *pan masala* was consumed by approx. 3% population. In contrast, 24% of the population consumed tobacco products. Among the total males in the population, 60% were non users, 3% non tobacco *pan masala* users and 37% tobacco users. Similarly, 84% of all the females in the population were non users, 3% consumed non tobacco *pan masala* and 13% consumed tobacco.

Consumption of non tobacco *pan masala* among males as well as females was most common in the 15–19 years of age group. Majority of tobacco users were in the age group of 20–35 years among males and 35–39 years among females (Fig. 1). Among the unmarried population, 4.45% were non tobacco *pan masala* users and 11.9% were tobacco users, whereas amongst the married subjects, 2% were non tobacco *pan masala* users and 30.6% were tobacco users (Fig. 2a). There was a definite trend of tobacco use with education level. The illiterate subjects consumed tobacco more than the literate ones (Fig. 2b). Tobacco as well as non tobacco consumption was more amongst the Muslims (Fig. 2c). While non tobacco *pan masala* was consumed more by the unemployed group, tobacco was much more practiced amongst the labourers (Fig. 2d).

A total of 12,711 cases of oral precancer (leukoplakia, erythroplakia, oral submucous fibrosis (SMF), verrucous hyperplasia, lichen planus and smokers palate) were clinically diagnosed in the population. Prevalence of oral precancer was 3.17% in non tobacco *pan masala* users, 12.22% in tobacco users and only 0.16% in non users (Table 1). Presentation of oral precancer in the population was 19 times more in non tobacco *pan masala* users, and 73 times more in tobacco users when compared with the non users.

Oral submucous fibrosis was the commonest oral precancer in the population, observed in 1.3% population (5211 cases in 402,669 subjects). 277 cases of SMF were observed in 11,635 non tobacco *pan masala* users (2.4%), 4683 in 97,165 tobacco users (4.8%), and 251 in 293,869 non users (0.1%). The second commonest oral precancer was leukoplakia, observed in 0.7% population (2980 cases in 402,669 subjects). 69 cases of leukoplakia were observed in 11,635 non tobacco *pan masala* chewers (0.6%), 2811 in 97,165 tobacco users (2.9%), and 100 in 293,869 non users (0.03%). Erythroplakia, verrucous hyperplasia, lichen planus and smokers palate were rarely seen in non tobacco *pan masala* users. Erythroplakia was observed in 0.004% in the population with only 15 cases diagnosed, of which only 1 among 11,635 non tobacco *pan masala* users.

The age, sex and SES study revealed that prevalence of oral precancer in non tobacco *pan masala* users increased up to 30 years of age and then declined, in contrast to in tobacco users. Precancer was more in males among non tobacco *pan masala* users, but more in females amongst tobacco users. Among non tobacco *pan masala* users, precancer was less in SES extreme grades, while among



* AS: non tobacco *Pan masala* user, TU: tobacco user, NU: non user

Fig. 1. Age-sex pyramid of the different types of users in the population. * AS: non tobacco *pan masala* user, TU: tobacco user, NU: non user.