

Prevalence of Tobacco Use and Oral Pre-malignant Disorders Risk among a Semi-Nomadic Community in an Indian State

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ABSTRACT

Objective: The present study aims in assessing the association between tobacco related habits and precancer risk among Narikurava population in Pondicherry

Methods: A total of 729 Narikurava subjects, both male & female, above 18 years of age were included in the study after informed consent. Information regarding tobacco related habits was collected and examination for oral potentially malignant disorders and oral cancer was performed. Data collection was done by a trained dental surgeon using a standardized interviewer-based questionnaire. The data recorded from 729 subjects were entered and analyzed by EpiData software (version 3.1). People with habits were further stratified into those with single and multiple habits. Further stratification was done based on duration of the habit (< 5 years, 5-10 years and > 10 years) and frequency of habit (< 5 times a day, 5-10 times a day & > 10 times a day).

Result: Overall prevalence of adverse habits was observed to be an alarming 78.24%. Among those with habits, 88.50% smoked tobacco, 71.40% chewed tobacco and 75.90% chewed betel nut. Odds ratio for smokeless tobacco was 6.48 and smoking tobacco was 3.79. The odds ratio for pre cancer risk for those with single and multiple habits was 2.24 and 4.8 respectively.

Conclusion: This survey indicates that the population has higher prevalence of tobacco related habits. Irrespective of forms of tobacco, chronicity and increase in number of habits have been found to be associated with increased risk of pre-cancer.

Keywords: Oral Cancer, Cancer prevention, Pre cancer risk, Tribal population, Narikurava tribe.

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INTRODUCTION

Cancer is considered as one of the modern day epidemics that accounts for mortality in developing countries. Oral cancer ranks third among top three types of cancer and oral cancer indices and mortality show major differences worldwide. Highest rates of incidence and prevalence are noted in India and neighbouring countries. The major cause or risk for oral cancer is attributed to tobacco and related products, especially in smokeless form. An estimated 275 million tobacco users is reported in India

according to Tobacco Control Policy India Project Report.¹ This extensive use of smoking and smokeless tobacco has led to emergence of modern epidemic, “the brown plague”.²

Addiction to tobacco and related products is primarily due to nicotine. The presence of nicotine causes tobacco dependence, which in turn leads to destructive health problem.³ Worldwide, numerous studies have found significant and consistent association between tobacco related habits and socioeconomic status. National Sample

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Survey (NSS) of 2001 – 2012, India, reported that prevalence of any tobacco use remained consistent in the poorest households and declined among the richest.⁴

In India, even today some ethnic groups of low socioeconomic status live in isolation, either geographically or socially with their traditional values and beliefs. They are the autochthonous people of the land and the Narikuravar tribal community is indigenous to Tamil Nadu state. This tribal face consequential issues like poverty, illiteracy, communication problems, poor health care, and social discrimination which leads to poor general and dental health seeking behaviour.⁵ There was also wide long-term use of smokeless tobacco in this population among both the genders.

Considering these, oral cancer or at the least oral pre cancer is expected to be high in this population. Few studies have shown the relationship between oral cancer risks and tobacco chewing.^{6,7} Till date no such data is available in this population. In lieu with the above, the present cross sectional study aims in assessing the association between tobacco related habits and precancer risk in this population.

MATERIALS AND METHODS:

This cross sectional exploration study is a part of a larger project aiming to design a model for oral cancer prevention among Narikurava population. The project is funded by Indian Council of Medical Research (ICMR), Gov. of India. The present study was conducted among a group of Narikurava population from Narikurava settlements in Lawspet, Madagadipet and Villianur region of Pondicherry. This study is approved by Institutional ethical committee (IGIDSIEC2019NRP05FASMOPM).

The study was conducted from February 2020 to November 2022. Since the survey was conducted in closed settlements or colonies, universal sampling method was used and a total of 1022 was identified and a final 729 completed the survey. Individual who were over 12 years of age with history of oral habits and willingness to participate in the study were included. All the participants were explained about the study objectives and written informed consent was taken. The study was conducted by 4 trained investigators with help of a trained assistant.

Information regarding tobacco related habits was collected and examination for oral potentially malignant disorders and oral cancer was performed. Data collection was done by a trained dental surgeon using a standardized interviewer-based questionnaire. Oral examination was done by oral pathologist (PI). The data recorded from 729 subjects were entered and analyzed by EpiData software (version 3.1). People with habits were further stratified into those with single and multiple habits. Further stratification was done based on duration of the habit (< 5 years, 5-10 years and > 10 years) and frequency of habit (< 5 times a day, 5-10 times a day & > 10 times a day).

Statistical analysis was done using SPSS version 28. Pearson's Chi-Square test and adjusted odds ratio (ORs)

with 95% confidence interval (CI) were calculated to estimate the suspected risk factors for PMD. P-value of ≤ 0.05 was considered to be statistically significant.

RESULTS:

Out of the 729 who completed the survey, 337 were male and 392 were female. Mean age of men was 40.04 ± 5.20 years and female was 37.20 ± 4.01 years. 38.27% are illiterate. Among the rest literate, 1.78% are graduates and 59.32% has attended primary school. 0.55% were professionals, 25.93% were craft traders, 58.02% dis elementary occupation and 15.09% were unemployed. Majority, 54.36% of the population earned < 6323 INR per month and 15.09% had no income. Detailed sociodemographic information are given in Table 1.

Overall prevalence of adverse habits was observed to be an alarming 78.24%. Among those with habits, 88.50% smoked tobacco, 71.40% chewed tobacco and 75.90% chewed betel nut. (Graph 1) We further stratified the entire population into those with no habits, those with single habit and multiple habits. 2.70% of the population had no tobacco related habit, 17.60% had single habit and 79.70% had multiple habits. (Graph 2). The average age of starting smokeless tobacco use and smoking was found to be 14.36 years and 15.17 years respectively.

Analysis of the association between type of habit and oral health outcomes revealed significant findings (Table 2). Individuals who reported smoking tobacco demonstrated a statistically significant association ($p = 0.03$), with an odds ratio (OR) of 3.79 (95% CI: 0.898–2.012). The risk was even more pronounced among smokeless tobacco users, who exhibited an OR of 6.84 (95% CI: 1.961–5.260). Participants with a single habit showed elevated risk (OR = 2.24, 95% CI: 2.273–9.854, $p = 0.001$), while those with multiple habits also demonstrated increased odds (OR = 4.18, 95% CI: 0.992–3.159).

Duration of habit was strongly associated with risk escalation. For smoking tobacco, participants with less than five years of use had an OR of 1.27 (95% CI: 0.898–2.012, $p = 0.03$). This risk increased substantially with longer duration, reaching OR = 4.32 (95% CI: 1.961–5.260) for 5–10 years and OR = 6.27 (95% CI: 2.273–9.854) for more than 10 years. A similar dose–response pattern was observed among smokeless tobacco users, with OR = 1.02 (95% CI: 0.992–3.159, $p = 0.005$) for less than five years, OR = 5.11 (95% CI: 1.264–7.010) for 5–10 years, and OR = 7.35 (95% CI: 2.489–11.241) for more than 10 years.

Frequency of use further amplified the risk. Among smoking tobacco users, those consuming fewer than five times per day had a reduced odds ratio (OR = 0.75, 95% CI: 0.323–0.995), whereas consumption of 5–10 times per day increased the risk (OR = 2.18, 95% CI: 0.958–4.471), and more than 10 times per day markedly elevated the odds (OR = 5.50, 95% CI: 2.961–7.256). Similarly, smokeless tobacco users demonstrated a progressive increase in risk with frequency, ranging from OR = 1.00 (95% CI: 0.834–2.238) for less than five times per day, to

OR = 3.24 (95% CI: 1.089–5.367) for 5–10 times per day, and OR = 9.32 (95% CI: 4.228–13.279) for more than 10 times per day.

Overall, the findings indicate a clear and consistent dose–response relationship, with both type of habit and duration/frequency of use significantly associated with increased risk. Longer duration and higher frequency of tobacco use, whether smoking or smokeless, were strongly predictive of adverse outcomes.

DISCUSSION

Oral cancer prevalence is increasing in developing countries and is one of the major causes of mortality. Though several factors have been identified to be associated with oral cancer, Tobacco, especially smokeless form is characterized as an important risk factor with substantial evidence.^{8,9} Narikuravar tribal population is indigenous to Tamilnadu and studies have reported high tobacco usage among this population.^{5,10,11} Hence, oral precancerous and cancerous lesion risk is expected to be high in this population. In lieu, this study was initiated to determine the pre cancer risk in the specific population.

In the present population, overall prevalence of adverse habits was observed to be an alarming 78.24%. Among those with habits, 88.50% smoked tobacco, 71.40% chewed tobacco and 75.90% chewed betel nut. Chellappa L et al, among Narikurava population in Thoothukudi district of Tamilnadu reported that 64.55% were using tobacco, among them 29.1% were using smoking tobacco.¹⁰ Prabhu D et al reported use of tobacco by 57.5% of Narikurava population in a part of Chennai, Tamilnadu.¹¹

In the present study we stratified population with habits into those with single and multiple habits. 17.60% of the Narikurava population of Pondicherry had single habit and 79.70% had multiple habits, whereas Chellappa et al reported a mere 7.5% of Narikurava population in Thoothukudi who were using both smoking and smokeless tobacco.¹⁰

Pooled consortium of US studies on Smokeless Tobacco Use and the Risk of Head and Neck Cancer reported that use of snuff was strongly associated with oral cavity cancers with OR of 3.01.¹² A systematic review reported that risk estimate for the South–East Asia Region ranged 4.44–7.90 for smokeless tobacco.¹³ Another systematic review with meta-analysis of smokeless tobacco and oral cancer in south Asia reported that the pooled OR for chewing tobacco and risk of oral cancer was 4.7.¹⁴

Given the strong association between tobacco use and oral cancer, we stratified both smoking and smokeless forms based on duration and frequency. In the present study, odds ratio for smokeless tobacco was 6.48 and smoking tobacco was 3.79. The odds ratio for pre cancer risk for those with single and multiple habits was 2.24 and 4.8 respectively. In accordance with previous studies, the odds ratio increased with frequency and duration of habit in both smoking and smokeless forms.

A similar study reported that or oral cancer, smokeless tobacco use was related to years of use, with relative risks of 13.8 for 1–24 years increasing to 47.5 for 50 or more years of use.¹⁵ Zhou et al. reported a positive trend in oral cancer risk with increasing duration and frequency of smokeless tobacco use.¹⁶ On contrary, Mashberg et al. noted no trend in the odds ratios with respect to duration of smokeless tobacco use.¹⁷

The major strength of this study is the large number of cases which made it possible to estimate associations between tobacco risks of precancerous lesions. However, no attempts were made to find the causal relationship between the habits and OPMD. That was mainly due to the cross sectional study design. Present study revealed that smokeless tobacco use had increased odds ratio, both in relation to duration and frequency as compared to smoking tobacco use. Tobacco use in in general trigger inflammation that leads to atrophy and hypertrophy of the mucosa, finally resulting in PMD and oral cancer. Smokeless forms of tobacco, especially quid and pouching of the same, have increased carcinogenic potential as it is in contact with the oral mucosa for longer time period. Irrespective of forms of tobacco, chronicity and increase in number of habits have been found to be associated with increased risk of pre-cancer.

As dental health professionals, it is one of our duty to reach out to this high risk population for creating an awareness and educating this vulnerable population on ill effects of tobacco. The knowledge regarding PMD, its associated risk factors and susceptibility to develop cancer should also be imparted. This should continue into conduction of regular screening and assistance in habit cessation and quitting.

CONCLUSION:

The results of our study highlight the fact that individuals with tobacco related habits among the Narikurava population are at high risk of developing PMD. Chronic smoking and betel quid chewing are the major risk factors for development of PMD. This result highlight the fact that the population needs education regarding pre cancer risk of tobacco and related products. They also need constant tobacco cessation counselling and special help to those who are willing to quit. Since, the population is at known risk for oral cancer, constant monitoring and early intervention would be the key to prevention of morbidity and mortality related to oral cancer.

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Table 1: Socio-demographic details

	Percentage	N
SEX		
Male	46.23	337
Female	53.77	392
EDUCATION		
Illiterate	38.27	279
Literate	61.73	450
DEGREE		
Graduate	1.78	8
Intermediate degree	2.67	12
High school	12.67	57
Middle school	23.56	106
Primary school	59.32	267
OCCUPATION		

Professionals	0.55	6
Technician and associated professionals	0.41	8
Craft & Related Trade Workers	25.93	189
Elementary Occupation	58.02	423
Unemployed	15.09	103
INCOME		
6327-18,949	0.55	6
≤6323	84.36	623
No income	15.09	103

Table 2: Association of tobacco related habits with pre-cancer

	Chi square value	P value	Or	CI (95%)
TYPE OF HABIT				
Smoking tobacco	0.952	0.03	3.79	0.898 - 2.012
Smokeless tobacco	1.021		6.84	1.961 – 5.260
Single habit	1.694	0.001	2.24	2.273 – 9.854
Multiple habits	2.462		4.18	0.992 – 3.159
DURATION OF HABIT				
<i>Smoking tobacco</i>				
< 5 years	0.215	0.03	1.27	0.898 - 2.012
5 – 10 years	1.223		4.32	1.961 – 5.260
> 10 years	2.581		6.27	2.273 – 9.854
<i>Smokeless tobacco</i>				
< 5 years	0.489	0.005	1.02	0.992 – 3.159
5 – 10 years	1.272		5.11	1.264 – 7.010
> 10 years	2.875		7.35	2.489 – 11.241
FREQUENCY OF HABIT				
<i>Smoking tobacco</i>		0.02		
< 5 times a day	0.531		0.75	0.323 – 0.995
5 – 10 times a day	1.824		2.18	0.958 – 4.471
> 10 times a day	2.920		5.50	2.961 – 7.256
<i>Smokeless tobacco</i>				
< 5 times a day	0.628	0.001	1.00	0.834 – 2.238
5 – 10 times a day	1.097		3.24	1.089 – 5.367
> 10 times a day	2.358		9.32	4.228 – 13.279