

# Prevalence of Tobacco Use and Oral Mucosal Lesions among Nicobarese Tribal Population in Andaman and Nicobar Islands

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## ABSTRACT

**Aim:** To determine the prevalence of tobacco use and oral mucosal lesions among Nicobarese tribal populations in Andaman and Nicobar Islands, India.

**Materials and methods:** Cross-sectional survey and oral examination were done in 400 Nicobari populations in Car Nicobar using the World Health Organization (WHO) format of Oral Health Questionnaire and Assessment forms. The data were then entered and statistical analysis was done using SPSS Inc., Chicago, Illinois, USA, Version 20.0.

**Results:** There is high prevalence of tobacco consumption (88.25%), especially the smokeless form of tobacco. Oral mucosal lesions were present in 25.75% of the total population, and keratosis was the most prevalent among oral mucosal lesions which was 56.3%.

**Conclusion:** There is a statistical significance in the presence of oral mucosal lesions who consumes smokeless form of tobacco every day. There is no significance observed between male and female Nicobari tribes.

**Clinical significance:** This high consumption of smokeless form of tobacco puts both genders in Nicobari tribal population equally at risk of developing precancerous and cancerous lesions. Early intervention and oral health education should be done frequently to prevent the development of oral cancer at early stages in tribal population.

**Keywords:** Nicobari population, Oral mucosal lesion, Tobacco user, Tribal.

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## INTRODUCTION

The Andaman and Nicobar Islands is an Indian archipelago situated in the Southeastern part of India of the Indian Ocean in the Bay of Bengal. Apart from being a famous tourist destination, it is home for six native tribes of India.<sup>1</sup> They are the Great Andamanese, Onge, Jarawa, Sentinels, Shompen, and Nicobarese. Among these tribes, Nicobarese and Shompen are restricted to Nicobar group of Islands (Southern part), while the rest are restricted to Andaman group of Islands (Northern part). The Nicobari tribe accounts for over 95% of the tribal population in the Island. The geographic locations of the Islands are strategically positioned to receive heavy rainfall that favors the dense tropical forest which in turn favors the growth of areca nuts and betel nuts in the Islands. In spite of various tobacco prevention and control policies over the years, it is apparent that the prevalence of tobacco use in India remains moderately intact. Moreover, it has been accounted for a relatively high use of tobacco in provincial than in the urban parts of India. The prevalence of tobacco use in a tribal area is generally highly contrasted with urban and rural partners.<sup>2</sup> Likewise, Andaman and Nicobar Islands are no exception to the statement.

Addiction to tobacco has been found to be significantly high among the tribal population of India. In Andaman and Nicobar Islands, tobacco chewing is the most common habit of tobacco use and there are different patterns of tobacco chewing found such as use of *Zarda Pan*, *Kagaz Pan*, *Sookha*, *Khaini*, and *Gutkha*.<sup>3</sup> The Nicobarese are found to be fond of smoking tobacco wrapped in the pandanus leaf, cigarette, and *bidi*. They also follow chewing tobacco with lime and a combination of tobacco and betel leaf which is known as "Nyoop" (betel quid).

Tobacco use is one of the major risk factors for the development of oral mucosal lesions including oral precancer and cancerous lesions. The oral mucosa serves as a protective barrier against

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trauma, pathogens, and carcinogenic agents. As a known fact, risk factor for the development of oral mucosal changes increases with tobacco use. Oral cancers are found most prevalent (19.27% of all cancer cases) among the population of Andaman and Nicobar Islands.<sup>3</sup>

India is home to various tribal communities with widely varying cultures and socioeconomic conditions in different geographic locations. Therefore, a study done in one region of the country cannot be generalized for all tribal communities. While there are a few studies on tribal populations from south and western parts of India, there is a significant literature gap from this union territory. Previous data on oral cancer in the Islands were retrospective study and tobacco use data were based on self-reported rates of tobacco use. They were devoid of oral examination. Hence the present study

was carried out in Car Nicobar to estimate the prevalence of tobacco practice and oral mucosal lesions in Nicobarese tribal population in the union territory of Andaman and Nicobar Islands in India.

## MATERIALS AND METHODS

The cross-sectional study design was used to perform the field survey among the Nicobari tribal population. The study was planned to be conducted in Car Nicobar District of the Nicobar Islands. Since Nicobar Islands come under restricted area permit, prior ethical committee clearance, Tribal Council Consent, and Administration approval were obtained. After the approval from the concerned authorities, the survey was carried out by standard operating procedure. Inclusion criteria were that the randomly selected participants of both genders who belong to the Nicobari tribe and above 12 years with consent. Exclusion criteria were other tribal groups Shompen and those who were not willing to give consent.

The survey and examination were done by a single investigator with the help of a translator. The participant's interview was taken in a local language and care was taken to maintain their confidentiality. The oral health status was measured using World Health Organization (WHO) format and data related to the practice of tobacco were collected. Each participant was explained about the study in their native language and informed consent was taken. In case of participants below 18 years of age, consent was taken from parents. Those who were literate were given the questionnaire to fill up on their own. For illiterate participants, the questions were read out and response was marked. For this, the help of an interpreter was taken.

During questionnaire interview (WHO oral health questionnaire total 16 questions) and clinical examination (WHO oral health assessment form), the type of tobacco use, frequency, and oral mucosal lesions were recorded for all the participants. The participants were categorized into four groups according to their tobacco habits such as group A—smokeless form, group B—smoke form, group C—combination of both smoke and smokeless form, and group D—nontobacco habit. Participants with the presence of oral precancerous lesions and conditions were further informed to visit for periodical checkups and treatment for the same. The type of tobacco use, frequency, and oral mucosal lesions were recorded for all the participants as per the WHO format. All the data were entered, and Fisher's exact and Chi-square tests were analyzed using SPSS software version 20 for statistical analysis.

## RESULTS

In the present study, there were 400 Nicobari tribal participants. The mean age is  $41.83 \pm 17.5$  years. Out of total study participants, male participants were 38% ( $n = 152$ ) whereas female participants were 62% ( $n = 248$ ) (Table 1). Out of the total participants, 83.5% ( $n = 334$ ) were seen with the habit of smokeless form of tobacco, 3.3% ( $n = 13$ ) were seen with the habit of smoking tobacco, 1.5% ( $n = 6$ ) with the habit of both smoke and smokeless form tobacco,

**Table 1:** Percentage of tobacco and nontobacco users among gender

	Male	Female	Total
No. of participants	152 (38%)	248 (62%)	400 (100%)
Tobacco users	131 (32.75%)	222 (55.5%)	353 (88.25%)
Smokeless form	120	214	334 (83.5%)
Smoke form	7	6	13 (3.3%)
Combination	4		6 (1.5%)
Nontobacco users	21 (5.25%)	26 (6.5%)	47 (11.75%)

and 11.8% ( $n = 47$ ) were having no tobacco habits. There is high prevalence (88.25%) of tobacco habits among the tribal population and especially in smokeless form of tobacco.

Table 2 shows that the presence of oral lesions among smokeless form of tobacco consumers was 27.84% ( $n = 93$ ) whereas oral lesions among tobacco consumers in smoke form were 15.38% ( $n = 2$ ). It has been observed that participants who were consuming both smokeless and smoke form of tobacco have shown 100% ( $n = 6$ ) presence of oral lesions. With the absence of tobacco habits, two participants were found to have cleft lip/palate and aphthous ulcer. They contribute 4.25% of the total oral mucosal lesions. There is statistical significance of 0.0001 (Fisher's exact test  $p$  value).

In comparison with the presence of oral lesions among genders (Table 3), 28.2% among female participants had oral lesions and 21.7% among male participants had oral lesions. There is no statistical significance observed between male and female participants with respect to the presence of oral lesions.

Table 4 shows among total participants, 61.5% ( $n = 246$ ) were seen consuming tobacco every day whereas 17.3% ( $n = 69$ ) consumed several times a week, 4% ( $n = 16$ ) consumed once a week, 3.8% ( $n = 15$ ) consumed several times a month, 1.8% (7) consumed occasionally, and 11.8% ( $n = 47$ ) never consumed. It is statistically significant with 0.0001 (Fisher's exact test  $p$  value).

It is observed that 25.75% of the total study participants were found with oral mucosal lesions. On comparing different oral mucous lesions found in our study, at the highest rate i.e., 56.3% of the total mucosal lesions, keratosis is present in the participants. Ulceration was second most common oral lesion with 10.7%, oral cancer (5.82%), leukoplakia (8.73%), oral submucous fibrosis (6.8%), candidiasis (6.8%), erythroplakia (1.94%), lichen planus (0.97%), smokers palate (0.97%), and cleft lip and palate (0.97%) (Table 5).

## DISCUSSION

Oral mucous membrane is most susceptible to many diseases but astoundingly, very scarce information is available regarding abnormalities of oral mucosa, particularly among the tribal population of India where the use of any form of tobacco products is the most prevalent and major cause of havoc. Car Nicobar Island in the Southern district of Andaman and Nicobar Islands is mostly inhabited by Nicobari aboriginal tribes. Their overall literacy rate is around 71% and even after 2004 tsunami devastated their life, they still maintain their traditional cultural and social rituals in their daily life. The consumption of smoking and smokeless tobacco varied dramatically in the tribal population in India. Numerous studies have been conducted on the health status of different primitive tribal communities in India but very few studies have been reported on the tribal populace, especially that of Nicobari tribe with regard to oral health. The cross-sectional study was designed to analyze the type of tobacco use, frequency, and oral mucosal lesions in Car Nicobar in participants above 12 years age-group. This is the first cross-sectional study conducted exclusively involving Nicobari tribe in the union territory of Andaman and Nicobar Islands.

Large consumption of tobacco and areca nut along with gene-environment interactions increases the risk of oral precancerous and cancerous lesions.<sup>4</sup> Oral cancer is one of the few cancers whose survival rate has not improved over the years while during the past few decades, a 60% increase in oral precancerous and cancerous lesions in adults under the age of 40 years has been documented.<sup>5,6</sup>

**Table 2:** Presence of lesion among tobacco habit population

Tobacco habit	No. of participants	Percent	Lesion status		Percentage of lesion occurrence with habit
			Present	Absent	
Group A—smokeless form	334	83.5%	93	241	27.84%
Group B—smoke form	13	3.25%	2	11	15.38%
Group C—combination of smoke and smokeless form of tobacco	6	1.5%	6	0	100%
Group D—no tobacco habit	47	11.75%	2	45	4.25%
Total	400	100%	103	297	

Fisher's exact test  $p$  value = 0.0001 statistically significant

**Table 3:** Description of oral lesions among male and female

Sex	Total	Percent	Lesion		Percentage (presence of lesion)
			Absent	Present	
Female	248	62%	178	70	28.2%
Male	152	38%	119	33	21.7%
Total	400	100%	297	103	

Chi-square  $p$  value = 0.148

**Table 4:** Frequency of tobacco habit

Duration	Frequency	Percent	Lesion code	
			No	Yes
1—never	47	11.8%	45	2
2—seldom	7	1.8%	7	0
3—several times a month	15	3.8%	13	2
4—once a week	16	4.0%	14	2
5—several times a week	69	17.3%	63	6
6—every day	246	61.5%	155	91
Total	400	100%	297	103

Fisher's exact test  $p$  value = 0.0001

**Table 5:** Distribution of oral lesion among different tobacco habits

Oral lesions	Overall	Percentage
Oral cancer	6	5.82%
Leukoplakia	9	8.73%
Lichen planus	1	0.97%
Ulceration	11	10.7%
Erythroplakia	2	1.94%
Candidiasis	7	6.8%
Oral submucous fibrosis	7	6.8%
Keratosis	58	56.3%
Cleft lip and palate	1	0.97%
Smokers palate	1	0.97%
Total	103	100%

The present study highlights relatively high prevalence of tobacco consumption habits in the Nicobarese tribal population. Overall 88.3% of participants were tobacco users whereas 11.7% were nontobacco users. This percentage is relatively higher in the present study compared to the study done by Manimunda et al.<sup>1</sup> in which the tobacco consumption in Nicobari was 83.9%. Similarly,

Vijayakumar et al.<sup>7</sup> found 80% in Sugali tribes in Telangana region, Chellappa et al.<sup>8</sup> found 64.55% adults among tribal gypsies in Thoothukudi district, Anjali et al.<sup>9</sup> showed 43.8% had tobacco habits in Nilambur forest, Kerala. Verma et al.<sup>10</sup> found a 43.38% prevalence of tobacco consumption in tribal districts of Madhya Pradesh whereas Kumar et al.<sup>11</sup> found 45% in Jharkhand.

Tribal populations in India, similar to other underprivileged groups, have their rational number of distress, and many times they are hidden and unnoticed from the "mainstream" India. Diseased state and malnourishment are more common among indigenous population in comparison with the average Indian population. Currently, 28.6% of the population uses tobacco products in India.<sup>12</sup> The difference could be seen because the factors that impact the tobacco consumption were present in the local environment predominantly and also pretentious by beliefs and behaviors toward tobacco habits.

Smokeless tobacco use is documented in many countries. Oral use of smokeless tobacco is ubiquitous; India has major number of smokeless tobacco users in the world and there has been substantial increase in smokeless tobacco use in all age groups. In the present study, frequency of tobacco consumption was observed in 61.5% of participants on a daily basis. In type of tobacco use 83.5% of Nicobarese were using smokeless form of tobacco, smoke form in 3.3% and combination users of both smoke and smokeless form of tobacco were 1.5%. In a study conducted by Chellappa et al.,<sup>8</sup> 63.4% were using smokeless tobacco, 29.1% were using smoke form, and 7.5% were using both. Manimunda<sup>1</sup> found that 40.9% were using smokeless tobacco, 1.7% were using smoking form, and 6.3% using both forms of tobacco.

In the present study, there is no significant difference between male and female participants in the overall tobacco consumption habit, which suggests that both genders are equally at risk of developing precancerous and cancerous lesions. Whereas a study reported by Chellappa et al.<sup>8</sup> shows that tobacco usage was more among female participants than males and Verma et al.<sup>10</sup> observed that 66.9% of males had the habit of tobacco, which is nearly double as compared to 33.11% in females. In the present study, it was also observed that smokeless form of tobacco habit was practiced more among females and the use of combination tobacco was practiced more in the males.

The prevalence of oral mucosal lesions in the present study was found to be 25.8%. Similarly, Patil et al.<sup>13</sup> reported 26.8% prevalence of oral mucosal changes in subjects with habits, while it is lower than the 36.36% prevalence reported by Verma et al.<sup>10</sup> and 39.1% by Kamble et al.<sup>14</sup> In the present study, the most common oral mucosal lesion observed was keratosis which was 60.2%. The development of these oral lesions majorly depends on early onset

of habit, frequency, type, form of tobacco use, amount of daily use, and site where it is frequently placed.<sup>15</sup>

The second most common lesion observed in the Nicobari tribal population was ulceration, which was 10.7% followed by rest of the oral lesions. High occurrence of ulceration may be attributed to the fact that Indian population apply lime in the smokeless form of tobacco and consume spicy foods which may enhance the degradation of oral mucosa or result in acidic regurgitation leading to ulcers. Ulcerations may be result of stress, trauma from teeth, and dietary deficiency of vitamins. Accordingly, our study conducted by Abdul Shahid et al.<sup>3</sup> reported that oral cancer was the most common cancer which comprised 19.61% of all the cancer cases in Andaman and Nicobar Islands and in which 5.09% were reported from Nicobar District.

No significant difference was observed between male and female participants in the presence of lesion which is in accordance with the overall tobacco consumption habit, which suggests that both genders are equally at risk of developing precancerous and cancerous lesions.

In the present study, habit of combined smoke and smokeless form of tobacco showed 100% development of oral lesions. This could be due to adverse effects of nicotine, tar content in smoke form, and different smokeless forms, such as areca nuts, dry mixture of powdered tobacco, slaked lime, and areca nut flakes, which are chewed or sucked orally. Due to placement of smokeless form in the oral cavity, which may increase, the concentration of carcinogens and the failure to clean the carcinogens from the surface augment this effect. All the tobacco forms with higher frequency and for longer duration in contact with oral mucosa lead to the development of oral mucosal lesions. In combination with tobacco habit, the risk is increased twice, which leads to the higher development of oral precancerous lesions and conditions.

Even though 61.5% of participants were seen consuming tobacco every day, the prevalence of oral mucosal lesions in the present study is less compared to other studies. This could be due to the use of different tobacco forms, quality, and quantity. Tribals widely use locally available areca nuts, betel leaves, and tobacco as compared to the company processed products compared with other states of India.

Limitations of the present study rose when strict COVID protocols were implemented due to spread of coronaviruses. People were reluctant and in fear of participating in the study since it involve oral examination. The additional information on the questionnaire has not been revealed since we received administrative approval on tobacco habits and oral lesions alone. In future, the comprehensive study can be done in all other tribal communities in Andaman and Nicobar Island with the result and effect of the present study.

## CONCLUSION

With very little information available regarding oral health status among Nicobari tribal population in India, the prevalence of tobacco consumption, which revealed to be higher among both males and females especially smokeless form of tobacco, puts both genders are equally at risk of developing precancerous and cancerous lesions. The overall prevalence of tobacco consumption at 88.25% and oral mucosal lesions being at 25.8%, immediate oral health education and camps should be conducted frequently for the betterment of tribal population.

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Andaman and Nicobar Administration, Port Blair. Tribal Council, Car Nicobar, Andaman and Nicobar Islands. Department of Education, Car Nicobar.

## REFERENCES

1. Manimunda SP, Benegal V, Sugunan AP, et al. Tobacco use and nicotine dependency in a cross-sectional representative sample of 18,018 individuals in Andaman and Nicobar Islands, India. *BMC Public Health* 2012;12(1):515. DOI: 10.1186/1471-2458-12-515.
2. Rahul GN. Tribal tobacco survey among young adolescent of central part of India. *World J Dent* 2019;10(2):109-113. DOI: 10.5005/jp-journals-10015-1614.
3. Abdul Shahid PP, Pooja Gogia B, Nagma R. Comprehensive analysis of cancer burden in Andaman and Nicobar islands: a descriptive study. *Int J Contemp Med Res* 2017;4(2):357-360. Available from : <https://doi.org/10.21276/ijcmr>
4. Khanna S. The interaction between tobacco use and oral health among tribes in central India. *Tob Induc Dis* 2012;10(1):16. DOI: 10.1186/1617-9625-10-16.
5. Lane PM, Gillhuly J, Whitehead P, et al. Single device for the direct visualisation of oral cavity tissue fluorescence. *J Biomed Opt* 2006;11(2):024006. DOI: 10.1117/1.2193157.
6. Myers LN, Elkins T, Roberts D, et al. Squamous cell carcinoma of the tongue in young adults: increasing incidence and factors that predict treatment outcomes. *Otolaryngol Head Neck* 2000;122(1):44-51. DOI: 10.1016/S0194-5998(00)70142-2.
7. Vijayakumar N, Rohini C, Reddy C, et al. Assessment of oral health status and treatment needs among Sugali Tribes in Telangana region: a cross-sectional study. *Int J Oral Health Med Res* 2017;3(6):21-26. Available from: <https://doi.org/10.38110/ijohmr>
8. Chellappa LR, Leelavathi L, Indiran MA, et al. Prevalence and dependency of tobacco use among tribal gypsies in Thoothukudi district – a cross sectional study. *J Family Med Prim Care* 2021;10(2):738-744. DOI: 10.4103/jfmpc.jfmpc\_1344\_20.
9. Anjali S, Shivakumar M, Ranganath S, et al. Assessment and comparison of tobacco dependence level among Cholanaicken and Kattunaicken tribal groups of Nilambur Forest, Kerala: a questionnaire study. *J Indian Acad Dent Spec Res* 2017;4(2):42-45. DOI: 10.4103/jiadsr.jiadsr\_14\_17.
10. Verma P, Saklecha D, Akshar P. A study on prevalence of tobacco consumption in tribal district of Madhya Pradesh. *International Journal of Community Medicine and Public Health* 2018;5(1):76-80. DOI: 10.18203/2394-6040.ijcmph20175508.
11. Kumar G, Dileep CL, Sethi AK, et al. The Birhor tribes of Ramgarh District, Jharkhand – a ferret into their oral health status and treatment needs. *Med Pharm Rep* 2019;92(2):178-184. DOI: 10.15386/cjmed-1025.
12. Rai B, Brahmankar M. Tobacco use among Indian states: key findings from the latest demographic health survey 2019-2020. *Tob Prev Cessat* 2021;7:19. DOI: 10.18332/tpc/132466.
13. Patil PB, Bathi R, Chaudhari S. Prevalence of oral mucosal lesions in dental patients with tobacco smoking, chewing, and mixed habits: a cross-sectional study in South India. *J Fam Community Med* 2013;20(2):130-135. DOI: 10.4103/2230-8229.114777.
14. Kamble KA, Guddad SS, Nayak AG, et al. Prevalence of oral mucosal lesions in Western Maharashtra: a prospective study. *J Indian Acad Oral Med Radiol* 2017;29(4):282-287. DOI: 10.4103/jiaomr.jiaomr\_14\_17.
15. Sahitha R. Effects of smokeless tobacco, betel quid and areca nut on oral mucosa. *IOSR J Dent Med Sci* 2014;13(2):8-11. DOI: 10.9790/0853-13210811.