

# Prevalence and dependency of tobacco use among tribal gypsies in Thoothukudi district - A cross sectional study

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## ABSTRACT

**Introduction:** The Narikuravars or “gypsy” are a semi vagrant groups distributed across borders, but primarily live in Tamil Nadu, India. They are notorious to face discrimination that interprets into low education level, low socio-economic status and lack of pertinent access to health care. The focus of the present study is to determine the prevalence and dependency with tobacco use among tribal gypsies in Thoothukudi district. **Materials and Methods:** The study design of the present study was a cross sectional which was done in Thoothukudi district in the month of December, 2019. Oral health status of the study population was analysed by WHO assessment form (adults), 2013. Tobacco dependence was analysed by Fagerstrom Nicotine dependency scale. The inclusion criteria were to include every gypsy person who is a citizen of Thoothukudi district and of all ages. The study included all the narikuravars (164) whose origin is Thoothukudi district. SPSS version 20.0 was used for statistical analysis. Descriptive statistics and Chi square tests were done to establish the distribution and association of the variables, respectively. **Results:** The total study participants of this cross-sectional study were 164, among them 128 were adults and 36 were children. Results revealed that among the adult population 64.55% were using tobacco, among them 29.1% were using smoking tobacco, 63.4% were using smokeless tobacco and 7.5% were using both. Medium nicotine dependency was more prevalent in both smoking and smokeless tobacco users (82.75% and 53.57%). The association between prevalence of tobacco use and gingival bleeding was statistically significant. Gingival bleeding was present in 88.9% of tobacco users and 11% of non-users (p value- 0.01). Significant association was found between gender and tobacco usage (p value- 0.042), dental erosion and tobacco usage (p value- 0.007). There exists significant association established between gender and nicotine dependency. (p value - 0.000). **Conclusion:** More than 60% of the adult study participants were using some form of tobacco. Medium tobacco dependency was prevalent among tobacco users. The tribal people have no access to all the services as their counterparts and it's our duty to educate them and create an insight about the ill effects of tobacco usage.

**Keywords:** Cigarette, Gypsy, Fagerstrom scale, nicotine dependency, tobacco usage

## Introduction

Tobacco Control Policy India Project Report revealed about 275 million tobacco users in India.<sup>[1]</sup> It was reported that smoking

prevalence in India is about 13.3%.<sup>[2]</sup> Bidi is the most popular form of smoking tobacco used in India, especially in rural areas, and the cigarette is the secondmost prominent form of smoking tobacco, mainly used in urban areas.<sup>[3,4]</sup> Extensive use of smoking as well as smokeless tobacco products is an example of modern epidemic and is termed as “the brown plague.”<sup>[5]</sup>

The use of tobacco causes short lived gratifying effect in brain principally by changing the mesolimbic pathway.<sup>[6,7]</sup> Nicotine is the

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chief component in tobacco, which causes both psychological and physical addiction. Level of nicotine addiction of an individual determined by salivary, urine and serum analysis revealed that cotinine is a metabolite of nicotine.<sup>[8,9]</sup>

Nicotine dependence is an indication of the compulsive use of nicotine-containing tobacco; physiologic tolerance which means yearning to use increased amounts of nicotine to attain desired effects; nicotine withdrawal upon discontinuation showing symptoms like anxiety, craving, impatience, increased hunger, anger, desperation and continued use in spite of many problems due to its usage.<sup>[10]</sup> The presence of nicotine causes tobacco dependence, which in turn leads to destructive health problems, primarily including cardiovascular problems, cancers, respiratory disease and reproductive diseases, and increased susceptibility to various infections. Nearly every organ of the body is harmed by the usage of tobacco.<sup>[11,12]</sup>

Fagerstrom Test for Nicotine Dependence (FTND) is widely used to determine the nicotine dependence among the smokers on different population groups globally.<sup>[8]</sup> Although studies were conducted to determine the nicotine dependency using FTND among Indian population, previous studies focussed on polydrug users and psychiatric patients.<sup>[13,14]</sup>

Individual's motivation to quit the habit and his level of dependence on smoking plays a vital role and determines the person's success in quitting the habit. For the smoking cessation programs to be effective, the motivation of the smokers is indispensable. Assessment of nicotine dependence among the smokers is imperative, as it influences the choice of intervention. If it is necessary for everyone to receive the same treatment, they all need to be having awareness about the harmful effects of tobacco.<sup>[15]</sup>

But there are people to whom these services are not available as they still live in isolation away from the civilization and they have their own beliefs and myths<sup>[16]</sup> and have inadequacy of modern transport and which make them depend only upon the local natural resources. These people are known as tribal.<sup>[17]</sup> The faiths and frame of mind towards health practices are affected by the culture.<sup>[18]</sup> In India, there are many communities which are backward in terms of social, economic, political and educational considerations. Tribal community is one among them constituting 8.14% of the general public of India, with 845.1 lakh population (2001 census) they cover about 15% of the country's area.<sup>[19]</sup>

The Narikuravars are a partial nomadic group who spreads across borders, but primarily live in Tamil Nadu, India and they are notorious to face discrimination that interprets into low education level, low socio-economic status and lack of pertinent access to health care.<sup>[20]</sup> Owing to factors such as discrimination, poor literacy, barriers in accessing health care, prevailing tribal traditions and high self-medication practices among tribal people, it becomes complex to resolve inequalities that exist within these pockets of

isolated communities by health education or by programmatic interventions instituted by the government.<sup>[21,22]</sup>

From the history, we all know, tobacco use and alcohol consumption has been prevailing in the tribal communities for so long that it is a regular practice in their culture. Such practices habitually commence at a very young age and sustained life long, additionally to being imparted from generation to generation. The tribal people being so rooted to their culture are unaware of the outside world and the harmful effects of these practices.<sup>[23]</sup>

Several researches were done among the tribal population in India and the studies showed that the oral health status and oral hygiene practices were very poor among the tribal population from different states of India.<sup>[19,24-27]</sup>

To the author's knowledge, tobacco dependence among the Narikuravas community in Thoothukudi district has not been assessed and the focus of the present study is to determine the prevalence and dependency with tobacco use among tribal gypsies in Thoothukudi district.

## Materials and Methods

### Study design

A cross sectional study.

### Study setting

The study was done in three taluks in Thoothukudi district, where gypsy population were present. The taluks were Thiruchendur, Eral and Srivaikundam.

### Ethical approval and official permission

Ethical approval was obtained on 19/4/2019 by the institutional ethical committee (SRB/SDC-PHD- 1802/19/04). Permission was taken from the respective taluk officers to screen the gypsy in their taluks. The gypsies were informed about the purpose of the study and informed consent was obtained from them. The taluk officers arranged for a meeting for the present research and gypsies whomever willing were asked to attend the meeting and the meeting was scheduled in evening so that everyone could attend.

### Study population

The inclusion criteria were to include every gypsy person who is a citizen of Thoothukudi district and of all ages. Study included the participants whomever willing and consented to participate in the study. People who were bed ridden and not from Thoothukudi district (we found some of them were from Thiruchendur taluk) were excluded. A total of 164 study participants from three taluks were screened. There were 128 adults and 36 children who are below 18 years of age. There were 79 tobacco users in which 29 smoking tobacco users and 56 smokeless tobacco users for whom nicotine dependency was measured.

### Study duration

The present study was done in December 2019.

### Clinical examination

Clinical examination was done by one of the authors and oral health of the population was assessed by WHO assessment proforma, 2013. Interviewer administered questionnaire was used to assess the tobacco habits among the study population and tobacco dependence was analysed by Fagestrom Nicotine dependency scale.

### Statistical analysis

The data was analysed in SPSS software version 20.0. Frequency tables and Chi square tests were used to estimate the distribution and association of the variables, respectively.

## Results

The total sample size of this cross-sectional study was 164 in which 128 adults and 36 children who were below 18 years of age were present. The age distribution of the total population was found to be as follows: 21.95% were 1-18 years old, 48.78% were 19-35 years old, 20.12% were 36-50 years and 9.14% were 51-80 years old. [Table 1]. In the total population, results showed that 50.6% were males and 49.4% were females [Table 2].

Among the tobacco users, 67.1% were in the age group of 19-35 years, 22.8% of them were 36-50 years old and 10.1% were in 51-80 years old [Figure 1] Gender distribution of tobacco users revealed that 46.8% of them were males and 53.2% were females [Figure 2] and hence tobacco usage was more among female study participants than males.

About 64.55% of the adult population were using some forms of tobacco. Distribution of the study population based on the types of tobacco usage revealed that among tobacco users, 29.1% were using smoking tobacco, 63.4% were using smokeless tobacco and 7.5% were using both. Results showed that smokeless tobacco

was the most commonly used tobacco product among the study participants.

With respect to gender, the prevalence of tobacco usage was as follows: 53.62% males and 71.18% of females were using some form of tobacco. This shows that females have more prevalence of using tobacco than males [Table 3].

The tobacco use dependence was listed in Figure 3. About 6.89% of the smokers had high level of nicotine dependency, 82.75% had medium level dependency and 10.34% of them had low nicotine dependency. Nicotine dependency among smokeless tobacco users revealed that about 32.14%, 53.57% and 14.28% of smokeless tobacco users had high, medium and low nicotine dependency, respectively.

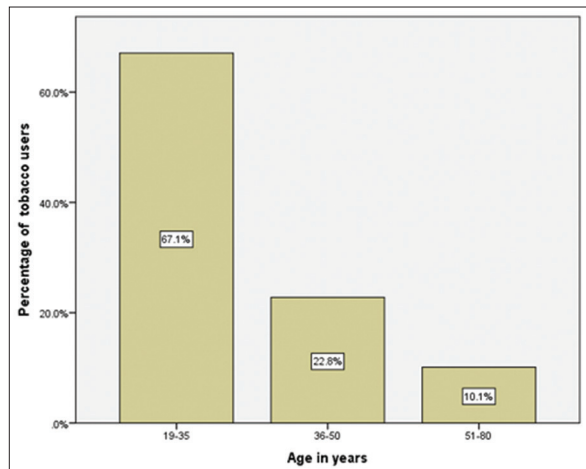
In the total study population, with respect to DMFT status, caries prevalence was more among tobacco users (60.49%) than tobacco nonusers (39.51%). But this association was not statistically significant (p value of 0.297).

**Table 1: Distribution of the study population according to age**

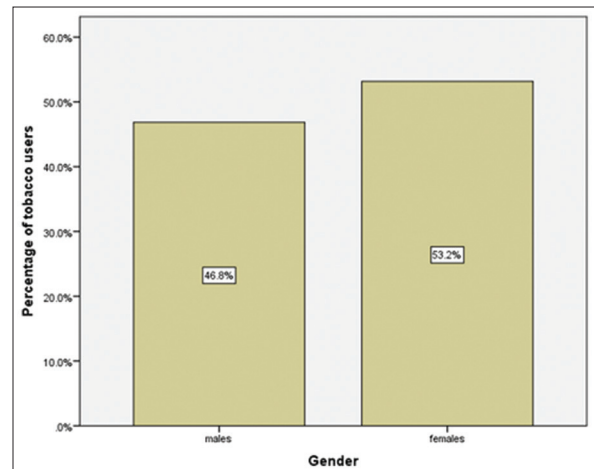
Age groups (in years)	Frequency	Percent
1-18	36	21.95
19-35	80	48.78
36-50	33	20.12
51-80	15	9.14
Total	164	100

**Table 2: Distribution of the study population according to gender**

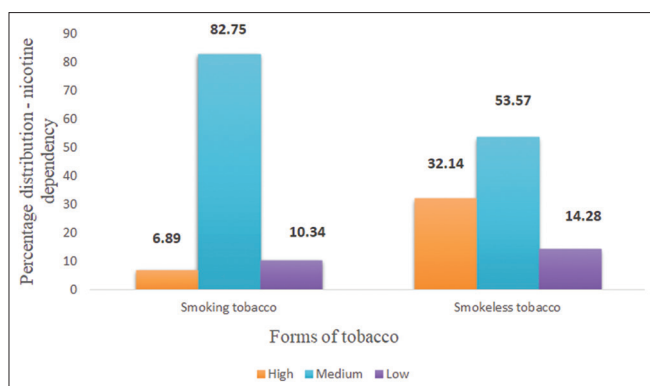
Gender	Frequency	Percent
Males	83	50.60
Females	81	49.40
Total	164	100



**Figure 1: Age wise distribution of tobacco users**



**Figure 2: Gender wise distribution of tobacco users**



**Figure 3:** Percentage distribution of nicotine dependency among tobacco users

Among the total study population, there was a statistically significant association between prevalence of tobacco use and gingival bleeding in which among participants who had gingival bleeding, 88.9% were tobacco users and 11% were non-tobacco users. This shows the risk of gingival bleeding can increase with respect to tobacco use. [Table 4].

In the total study population, with respect to periodontal status, pockets were more among tobacco users (62.5%) than non-tobacco users (37.5%). However, this association was not statistically significant (p value of 1.00).

Among the total population, statistically significant association was present between prevalence of tobacco use and dental erosion in which among participants who did not have dental erosion, 63.63% were tobacco users and 36.36% were non-tobacco users; among participants who had enamel erosion, 87.5% were tobacco users and 12.8% were non-tobacco users and among those who had dentinal erosion, 20% were tobacco users, and 80% were non-tobacco users had dentinal erosion. This shows that the tobacco usage can be a risk factor for the onset of dental erosion [Table 5].

A statistically significant association was present between gender and nicotine dependency among smokers. Nicotine dependency among males showed that, 8% had high dependency, 88% had medium and 0.04% had low dependency. Among females, 50% had medium and 50% had low nicotine dependency. This shows that the males were more nicotine dependent than females among smokers. [Table 6]

A statistically significant association was present between gender and nicotine dependency among smokeless tobacco users. Nicotine dependency among males showed that, 43.75% had high dependency and 56.25% had medium dependency. Among females, 27.5% had high dependency, 52.5% had medium and 20% had low nicotine dependency. This shows that the males are more nicotine dependent than females among smokeless tobacco users [Table 7]

## Discussion

Tobacco menace is a major public health issue and is one of the unexceptional causes of preventable everywhere in the world.

**Table 3: Association between gender and prevalence of tobacco use**

Gender	Tobacco usage				Total		P
	Yes		No		n	%	
	n	%	n	%			
Males	37	53.62	32	46.37	69	100	0.042
Females	42	71.18	17	28.81	59	100	
Chi square value							4.152 <sup>a</sup>

**Table 4: Association between gingival bleeding and prevalence of tobacco use**

Gingival bleeding	Tobacco usage				Total		P
	Yes		No		n	%	
	n	%	n	%			
Present	24	88.89	3	11.11	27	100	0.01
Absent	55	54.45	46	45.54	101	100	
Chi square value							10.691 <sup>a</sup>

**Table 5: Association between dental erosion and prevalence of tobacco use**

Dental erosion	Tobacco usage				Total		P
	Yes		No		n	%	
	n	%	n	%			
No sign of erosion	70	63.63	40	36.36	110	100	0.007
Enamel erosion	7	87.5	1	12.5	8	100	
Dentinal erosion	2	20	8	80	10	100	
Chi square value							9.788 <sup>a</sup>

**Table 6: Association between gender and tobacco dependency among smokers**

Gender	Level of dependence						Total		P
	High		Medium		Low		n	%	
	n	%	n	%	n	%			
Males	2	8	22	88	1	0.04	25	100	0.000
Females	0	0	2	50	2	50	4	100	
Chi square value							32.333 <sup>a</sup>		

Tobacco use leads to nearly 7.2 million pre-mature deaths each year globally, and according to the Global Adult Tobacco Survey 2 (GATS 2), India 28.6% of adults aged 15 years or above consume tobacco in any of the form.<sup>[28,29]</sup>

Tobacco chewing is present in most of the evolving countries, exceptionally those in South East Asia. Tobacco chewing and smoking have been recognized as major risk factors for oral cavity pre-cancerous lesions and cancer in India.<sup>[30]</sup> Bidis are a slender, hand rotated, un processed inexpensive provincially produced product, are habitually used more than other forms of smoking tobacco in rural areas and among groups of lower occupation.<sup>[31,32]</sup> Tobacco use has been identified to be more among the lower socio-economic groups, particularly in tribal population (52.1%)<sup>[33]</sup> and among adolescent males (65.3%).<sup>[34]</sup>

**Table 7: Association between gender and tobacco dependency among smokeless tobacco users**

Gender	Level of dependence						Total	P	
	High		Medium		Low				
	n	%	n	%	n	%			
Males	7	43.75	9	56.25	0	0	16	100	0.000
Females	11	27.5	21	52.5	8	20	40	100	
Chi square value	29.185 <sup>a</sup>								

In India, the first round of GATS was conducted in 2009–2010 and the second round has been recently conducted in 2016–2017. According to this survey, the highest prevalence of tobacco use (41.4%) is noted among people aged 65 years and above. It was found that smoking (12.3%) and smokeless tobacco use (23.4%) is higher among men than in women. In Tamil Nadu, a Tamil Nadu Tobacco Survey (TNTS 2015-2016) estimated the prevalence of tobacco use to be 5.2% out of which 4.3% of users were males. Among the 32 districts in Tamil Nadu, the highest prevalence was recorded in Pudukottai (19.9%) district and the lowest in Tanjavur district (1.2%).<sup>[35]</sup> Even though this percentage reflects an overall decrease in the prevalence rates of tobacco consumption in the country, it does not reveal the differences in the prevalence rates that may exist in marginalised communities such as the Narikuravars.

The indigenous population everywhere in the world experiences a greater burden of diseases<sup>[36]</sup> and also their tobacco abuse is usually twice as large as than that of their non-Indigenous population.<sup>[37]</sup> This leads to inequality in burden of substance-related mortality and morbidity. India is the land of differences comprising people from various languages, different races and ethnicity; about 25% of the indigenous population resides in India and hence it is one among the place with large tribal populations in the world.<sup>[38]</sup> Tribal population constitutes about 8.2% of the complete population in India.<sup>[39]</sup> Tribal population in India similar to other under privileged groups, have their reasonable number of distress and often they are hidden and unnoticed from the “mainstream” India. Death rate, diseased state and malnourishment are more common among indigenous population when compared with the average Indian population.<sup>[40]</sup>

Recent research has also revealed that tribal people of Wayanad district from Kerala are heavily dependent on both forms of tobacco. Tobacco related precancerous lesions were more prevalent among the Paniya tribe of Wayanad.<sup>[41]</sup> Their unawareness about the ill effects of tobacco is highly frightening and so special attention is required for improving the knowledge, awareness and welfare of the indigenous population. Though there was an increase in awareness programs and education programs in the community regarding the ill effects of tobacco on overall health, there exists a lacuna in complete coverage of anti-tobacco awareness programs among the tribal population.<sup>[42]</sup>

In the present study, among the study participants, 50.6% were males and 49.4% were females. In a similar study done

in Jharkhand by Gunjan Kumar *et al.*, 60.8% males and 39.2% females participated.<sup>[26]</sup> But in a similar study conducted in Nellore the males constitute 37.34%, and the females constitute 62.66%.<sup>[43]</sup>

In the present study, 61.71% adults were using tobacco. Similar finding was found in a study by Vijayakumar B *et al.* in which 80% had tobacco habits.<sup>[19]</sup> In a study by S. Anjali *et al.* 43.8% of tribal group showed prevalence of tobacco usage.<sup>[44]</sup> In a study done by S. Shridevi in the same narikurava community in the next district, it was reported that tobacco use and alcoholism was a part of their community culture. It is one of the major factors to socialize with the community members. It has serious impact in the professional and personal lives of the “Narikuravar” community women.<sup>[23]</sup>

In the present study, medium nicotine dependency was more both in both smoking and smokeless tobacco users (82.75% and 53.57%). In a study by Anjali S *et al.*, similarly medium level of dependency was high among similar tribe kattunaikkan (63.8%)<sup>[44]</sup> but in a contrastive study, tribal in Kerala are heavily dependent on smoking as well as smokeless forms of tobacco.<sup>[41]</sup>

The existing disparity of disease prevalence and associated risk factors among populations residing in different regions of the globe could be explained in a better way through region-specific studies, and among disadvantages groups.<sup>[45]</sup> In that way, we have established the prevalence and high usage of various forms of tobacco among the tribal population. The World Health Organization on its website affirms that the heavy use of tobacco is one of the main contributing factors towards the growing incidence of oral cancer.<sup>[46]</sup>

Early detection, diagnosis and treatment is absolutely important for these habits and lesions to increase the awareness of the population. Primary health centre physicians and dentists are the first contact of these tribes to the medicine. Easy accessibility of the oral cavity to exam makes it an ideal target for improved screening practices. Due to the modest investments of time and cost required by screening exams, primary care physicians assume a frontline role in the battle against tobacco and oral cancer.<sup>[47]</sup>

Regarding the health sector, more investment in training of health professionals from primary care to biopsies, in addition to intersectoral and multidisciplinary actions are necessary.<sup>[48]</sup> Further training is required at both undergraduate and postgraduate levels to increase awareness of oral cancer and its associated risk factors, and to strengthen primary care practitioners’ abilities to diagnose potentially cancerous intra-oral lesions.<sup>[49]</sup> The prominent usage of smoking and smokeless form of tobacco use among tribal people shows that we must make efforts to commence anti-tobacco awareness programs.

In the present cross-sectional study conducted among gypsies in Thoothukudi district, more than 60% of the study population used some forms of tobacco and majority of the tobacco users exhibited medium tobacco dependency as per Fagerstrom scale.

Smokeless tobacco was the most commonly used tobacco product among the study participants. Though tobacco usage was more among females than males, high tobacco dependency was found to be more among male study participants when compared to females. Tobacco usage is significantly associated with gingival bleeding and dental erosion.

## Conclusion

The prevalence of tobacco utilization was revealed to be higher (more than 60%) among both males and females among the tribal population. Medium tobacco dependency was more prevalent among tobacco users. Majority of them used various forms of smokeless tobacco. A family history of tobacco use, peer pressure from friends and cultural beliefs were shown to be the prime constituting factors for early onset of the habit. Involving of a local community person from their locality might help since the tribes are rooted to culture. The treatment intervention can be only applied after enlightening them to the outer world and come out of their ignorance and absurd cultural habits.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

## References

- Government of India Ministry of Health and Family Welfare. The International Tobacco Control Policy Evaluation Project. TCP India Project Report. Findings from the Wave 1 Survey (2010/2011): University of Waterloo, Ontario, Canada, Navi Mumbai, India: Healix/Sekharia Institute for Public Health; 2013. Available from: [https://www.healis.org/pdf/special-report/TCP-IndiaNR-ENG-Sept17\\_2015\\_v17-web.pdf](https://www.healis.org/pdf/special-report/TCP-IndiaNR-ENG-Sept17_2015_v17-web.pdf). [Last accessed on 2020 Feb 02].
- Ng M, Freeman MK, Fleming TD, Robinson M, Dwyer-Lindgren L, Thomson B, *et al.* Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA* 2014;311:18392.
- Ministry of Health and Family Welfare, Government of India. Global Adult Tobacco Survey, GATS India 2009-2010. New Delhi: Ministry of Health and Family Welfare, Government of India; 2010. Available from: <https://ntcp.nhp.gov.in/assets/document/surveys-reports-publications/Global-Adult-Tobacco-Survey-India-2009-2010-Report.pdf>. [Last accessed on 2020 Feb 06].
- Sugavanesh P, Pushpanjali K. Nicotine dependence, its risk indicators, and exhaled carbon monoxide levels among the smokers in Bengaluru, India. *Indian J Community Med* 2018;43:220-3.
- Wallace RB, editor. *Maxcy-Rosenau Last. Public Health and Preventive Medicine*. 15<sup>th</sup> ed. New York, USA: The McGraw-Hill Companies; 2008. p. 6.
- Kaur J, Sinha SK, Srivastava RK. Integration of tobacco cessation in general medical practice: Need of the hour. *J Indian Med Assoc* 2011;109:9258.
- Islam K, Datta AK, Seth S, Roy A, Das R. A study on the prevalence and correlates of nicotine dependence among adolescents of Burdwan Town, West Bengal. *Indian J Psychiatry* 2019;61:89-93.
- Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström test for nicotine dependence: A revision of the Fagerström tolerance questionnaire. *Br J Addict* 1991;86:1119-27.
- Ebbert JO, Patten CA, Schroeder DR. The Fagerström test for nicotine dependence: smokeless tobacco (FTNDST). *Addict Behav* 2006;31:1716-21.
- WHO Report on the Global Tobacco Epidemic. World Health Organization. 2009. Available from: [http://www.who.int/tobacco/global\\_report/2009/en/index.html](http://www.who.int/tobacco/global_report/2009/en/index.html). [Last accessed on 2020 Feb 16].
- U.S. Department of Health and Human Services. The health consequences of smoking. A report of the Surgeon General. Atlanta, Georgia: Centre for Disease Control, National Centre for Disease Prevention and Health Promotion, Office of Smoking and Health; 2004.
- Parashar M, Agarwalla R, Mallik P, Dwivedi S, Patvagekar B, Pathak R. Prevalence and correlates of nicotine dependence among construction site workers: A cross-sectional study in Delhi. *Lung India* 2016;33:496-501.
- Chandra PS, Carey MP, Carey KB, Jairam KR, Girish NS, Rudresh HP, *et al.* Prevalence and correlates of tobacco use and nicotine dependence among psychiatric patients in India. *Addict Behav* 2005;30:1290-9.
- Jhanjee S, Sethi H. The Fagerström test for nicotine dependence in an Indian sample of daily smokers with poly drug use. *Nicotine Tob Res* 2010;12:1162-6.
- West R. Assessment of dependence and motivation to stop smoking. *BMJ* 2004;328:3389.
- Vivek S, Jain J, Simon PS, Battur H, Tikare S, Mahuli A. Understanding oral health beliefs and behavior among Paniyan tribals in Kerala, India. *J Int Oral Health* 2012;4:23-8.
- Naheeda, Asif MS, Padma M, Paul A. Assessment of periodontal status of Konda Reddy tribe in Bhadrachalam, Khammam district, India. *J Clin Diagn Res* 2015;9:23-5.
- Nagaraj AA, Ganta S, Yousuf A, Pareek S. Enculturation, myths and misconceptions regarding oral health care practices among rural female folk of Rajasthan. *Journal of Ethnomedicine and Ethnobiology* 2014;8:157-64.
- Vijayakumar N, C R, Reddy C, Sunkari M, Kumar S, Malar I. C 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;3:21-6.
- Zafiu M. "Health Access for Vulnerable Groups: A Study On The "Gypsy" Narikuravar Community In Tamil Nadu, India," Joseph Wharton Scholars. 2017. Available from: [https://repository.upenn.edu/joseph\\_wharton\\_scholars/36](https://repository.upenn.edu/joseph_wharton_scholars/36). [Last accessed on 2020 Mar 01].

21. Stephens C, Nettleton C, Porter J, Willis R, Clark S. Indigenous peoples' health-why are they behind everyone, everywhere? *Lancet* 2005;366:10-3.
22. Shrivastava SR, Shrivastava PS, Ramasamy J. Implementation of public health practices in tribal populations of India: Challenges and remedies. *Healthcare in Low resource settings* 2013;1:3.
23. Shridevi S, Ponni S. A study on the influence of alcohol consumption in the lives of 'Narikuravar' women in Tirunelveli District, Tamil Nadu, India. *A. Journal of Composition Theory* 2020;13:694-9.
24. Gopalankutty N, Vadakkekuttical RJ, Remadevi S, Pillai AS. Prevalence of periodontitis and its correlates among tribal population of Attapady block, Palakkad District, Kerala. *J Indian Soc Periodontol* 2020;24:264-70.
25. Sindhu R, Manipal S, Mohan R, Bharathwaj VV, Lalitha ND, Prabu D. Perceived oral health beliefs, traditional practices, and oral health status of nomads of Tamilnadu: A cross-sectional study. *J Family Med Prim Care* 2020;9:131-5.
26. Kumar G, Tripathi RM, Dileep CL, Trehan M, Malhotra S, Singh P. Assessment of oral health status and treatment needs of Santhal tribes of Dhanbad District, Jharkhand. *J Int Soc Prevent Communit Dent* 2016;6:338-43.
27. Mandal S, Ghosh C, Sarkar S, Pal J, Kar S, Bazmi BA. Assessment of oral health status of Santal (Tribal) children of West Bengal. *J Indian Soc Pedod Prev Dent* 2015;33:44-7.
28. Forouzanfar MH, Afshin A, Alexander LT, Anderson HR, Bhutta ZA, Biryukov S. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: A systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016;388:1659-724.
29. GATS - 2 (Global Adult Tobacco Survey - 2) Factsheet. India 2016-17. Ministry of Health and Family Welfare, Govt. of India; World Health Organisation; Tata Institute of Social Sciences. Available from: [https://www.who.int/tobacco/surveillance/survey/gats/GATS\\_India\\_2016-17\\_FactSheet.pdf](https://www.who.int/tobacco/surveillance/survey/gats/GATS_India_2016-17_FactSheet.pdf). [Last accessed on 2020 Mar 06].
30. Reddy KS, Gupta PC. Report on tobacco control in India. Ministry of Health and Family Welfare, Government of India, New Delhi. 2004. Available from: [https://www.who.int/fctc/reporting/Annex6\\_Report\\_on\\_Tobacco\\_Control\\_in\\_India\\_2004.pdf](https://www.who.int/fctc/reporting/Annex6_Report_on_Tobacco_Control_in_India_2004.pdf). [Last accessed on 2020 Feb 15].
31. International Institute for Population Sciences & Ministry of Health and Family Welfare, Government of India. Global adult tobacco survey, India 2009-10. IIPS; Mumbai, India. 2010. Available from: [https://www.who.int/tobacco/surveillance/en\\_tfi\\_india\\_gats\\_fact\\_sheet.pdf](https://www.who.int/tobacco/surveillance/en_tfi_india_gats_fact_sheet.pdf). [Last accessed on 2020 Feb 16].
32. Agrawal S, Karan A, Selvaraj S, Bhan N, Subramanian SV, Millet C. Socio-economic patterning of tobacco use in Indian states. *Int J Tuberc Lung Dis* 2013;17:1110-7.
33. Zahiruddin QS, Gaidhane A, Bawankule S, Nazli K, Zodpey S. Prevalence and pattern of tobacco use among tribal adolescents: Are tobacco prevention messages reaching the tribal people in India? *Ann Trop Med Public Health* 2011;4:74-80.
34. Dhekale DN, Gadekar RD, Kolhe CG. Prevalence of tobacco consumption among the adolescents of the tribal areas in Maharashtra. *J Clin Diagn Res* 2011;5:1060-3.
35. Tamil Nadu Tobacco Survey (TNTS) 2015-2016. [cancerinstitutewia.in](http://cancerinstitutewia.in). Available from: [www.cancerinstitutewia.in/CIWIA/download/CI\\_Fact\\_Sheets\\_final.pdf](http://www.cancerinstitutewia.in/CIWIA/download/CI_Fact_Sheets_final.pdf). [Last accessed on 2020 Sep 16].
36. DiGiacomo M, Davidson PM, Abbott PA, Davison J, Moore L, Thompson SC. Smoking cessation in indigenous populations of Australia, New Zealand, Canada, and the United States: Elements of effective interventions. *Int J Environ Res Public Health* 2011;8:388-410.
37. Carson KV, Brinn MP, Peters M, Veale A, Esterman AJ, Smith BJ. Interventions for smoking cessation in Indigenous populations. *Cochrane Database Syst Rev* 2012;1:CD009046.
38. Danver SL. Native Peoples of the World: An Encyclopedia of Groups, Cultures and Contemporary Issues. 1<sup>st</sup> ed.. New York, USA: Routledge; 2015.
39. International Work Group for Indigenous Affairs. Indigenous people in India. Available from: <https://www.iwgia.org/en/india.html>. [Last accessed on 2020 Mar 01].
40. Mohankumar A. Health status of an indigenous population in India receiving preventive and curative health care services. 2009. Available from: <http://www.ashwini.org/documents/MortalityAndMorbidity.pdf>. [Last accessed 2020 Sep 16].
41. KC Deepa, Jose M, Prabhu V. Prevalence and type of tobacco habits and tobacco related oral lesions among Wayanad Tribes, Kerala, India. *Indian J Public Health Res Dev* 2013;4:63-8.
42. Janakiram C, Joseph J, Vasudevan S, Taha F, Deepan Kumar CV, Venkitachalam R, *et al.* Prevalence and dependency of tobacco use in an indigenous population of Kerala, India. *J Oral Hyg Health* 2016;4:198.
43. Sarah Sheela Emerald N, ChandraSekhara Reddy V, Sudhakar Rao N. Dental health myths and misconceptions among Yanadi Tribe of Gonepalli Village, Nellore District, India: A cross-sectional study. *International Journal of Humanities and Social Science* 2016;5:9-15.
44. Anjali S, Shivakumar M, Ranganath S, Santhakumari S. 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;4:42-5.
45. Quadri MFA, Tadakamadla SK, John T. Smokeless tobacco and oral cancer in the Middle East and North Africa: A systematic review and meta-analysis. *Tob Induc Dis* 2019;17:56.
46. World Health Organization. Towards a strategy for cancer control in the Eastern Mediterranean region. Cairo: World Health Organization, Regional Office for the Eastern Mediterranean; 2009. Available from: <https://apps.who.int/iris/handle/10665/116587>. [Last accessed on 2020 Mar 05].
47. Lalezarzadeh F, Folk D, Hanna JJ, Paskhover B. Oral cancer screening in high-risk individuals: The need for awareness by the primary care physician. *Einstein J Biol Med* 2012;28:39-40.
48. Noro LRA, Landim JR, de Andrade Martins MC, Lima YCP. The challenge of the approach to oral cancer in primary health care. *Ciencia & Saude. Coletiva (Portuguese) - Collective Health Science* 2017;22:1579-87.
49. Macpherson LMD, McCann MF, Gibson J, Binnie VI, Stephen KW. The role of primary healthcare professionals in oral cancer prevention and detection. *Br Dent J* 2003;195:277-81.