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ORIGINAL ARTICLE

Prevalence of Tobacco Use among Adults in Rural Areas of Kanyakumari District, Tamil Nadu - A community-based study

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ABSTRACT

Background: Tobacco refers to any product prepared from the tobacco plant and is an addictive substance containing the stimulant alkaloid nicotine as well as harmala alkaloids, which can lead to tolerance and dependence. All smoking and smokeless forms of tobacco contain nicotine, which causes addiction and health problems. **Objectives:** This study aimed to assess the prevalence and factors associated with tobacco use among adults aged 18 years and above in the rural area of Kanyakumari district, Tamil Nadu. **Methodology:** A community-based cross-sectional study was conducted among adults aged ≥18 years in Thiruvattar block, Kanyakumari district, from February 2019 to July 2020, using a semi-structured questionnaire. Data were entered into MS Excel 2010 and analyzed using SPSS Trial Version 20.0. **Results:** The prevalence of tobacco use was 22.4% for current users, 2.8% for past users, and the prevalence of never users was 74.8%. The mean age of initiation was 18.03 ± 2.92 years. Awareness regarding tobacco and its adverse health effects was 70.8%. Significant associations were found between tobacco use and gender, age group, education, occupation and socioeconomic status (SES), with p-values < 0.05. **Conclusion:** Despite high awareness of health hazards, tobacco use was more prevalent among young adults, married males, individuals from nuclear families and skilled/semi-skilled workers. Focus group discussions, anti-tobacco measures and early-life awareness programs should be prioritized for primary prevention among rural populations.

Keywords: smoking prevalence, rural health, epidemiology, smokeless tobacco, public health.

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1. INTRODUCTION

Tobacco is the common term for any product that is prepared from the tobacco plant (cured leaves). It is an addictive substance that contains the stimulant alkaloid nicotine as well as harmala alkaloids, which can c tolerance and dependence. All smoking and smokeless forms of tobacco contain nicotine that causes addiction and health problems [1,2].

Globally, cigarette smoking is the second major cause of preventable deaths, the fourth most common risk factor for disease and the leading cause of preventable deaths in industrialized countries [3,4]. According to the WHO, there are nearly 6 million deaths every year due to tobacco usage, which is projected to rise to 8 million deaths annually by the year 2030, especially in developing countries [5, 6]. It also accounts for approximately 4.1% of Disability Adjusted Life Years (DALYs) lost each year [2,7].

In India, tobacco usage drives approximately 150 million people into poverty [8,9]. Tobacco is harmful for both the heart and the body, as it mainly causes death through heart disease and cancer, due to inhalation of poisonous chemicals such as cyanide, carbon monoxide, and carcinogens. Such inhalation leads to cardiovascular diseases, including myocardial infarction (heart attack), angina (chest pain), sudden cardiac death, as well as chronic obstructive pulmonary disease, exacerbation of asthma, osteoporosis and the development of cancer at multiple sites, namely the lungs, mouth, esophagus, pharynx, larynx, stomach, urinary bladder, gallbladder, penis and potentially other sites. Usage of tobacco in women causes infertility, earlier menopause and increased risk of cervical cancer and breast cancer [10]. During pregnancy, it increases the risk of ectopic pregnancy, placenta previa, abruptio placenta, spontaneous abortion, stillbirth and low-birth-weight in infants [11,12]. Inhaling secondhand smoke can cause lung cancer and heart disease. The percentages of exposure among adults were estimated at 38.7%, 30.2% and 7.4%, at home, in indoor workplaces and in restaurants, respectively [13,14].

The prevention of tobacco usage among young adults appears as the greatest opportunity for preventing noncommunicable diseases (NCD) [15]. Recognizing this, India has implemented many policy interventions, including bans on advertising and promoting tobacco, bans on smoking in public spaces and increased taxation on tobacco-related products. These measures have shown measurable success in reducing consumption.

According to the National Family Health Survey (NFHS-3) in 2005–06, the prevalence of adult smokeless tobacco use was found to be 36.9% and 9% in men and women, respectively [16]. According to the Global Adult Tobacco Survey (GATS-1) in 2009-2010, the prevalence of adult tobacco usage was reported as 24.3% for smoking and 32.9% for smokeless tobacco in men, whereas in the case of women it was 2.9% for smoking and 18.4% for smokeless tobacco [17]. According to the National Family Health Survey (NFHS-4) 2015, a survey of India Government conducted in 13 states showed the tobacco usage among men has fallen from 50% to 47% [18].

As of national health surveys, despite these advancements, higher tobacco use prevalence in rural populations remains a significant concern [19]. However, there is a scarcity of recent and community-based studies focusing on adult rural populations in specific districts. Therefore, the present study was undertaken to assess the prevalence and determinants of tobacco use among adults aged 18 years and above in rural areas of Kanyakumari district, Tamil Nadu.

2. PATIENTS, MATERIALS AND METHODS

The study is a community-based cross-sectional study where the prevalence of tobacco use among adult groups aged over 18 years in both genders, as well as the factors associated with tobacco use were studied in the Thiruvattar block area of Kanyakumari District. The study was realized from February 2019 to July 2021. As per the Global Adult Tobacco Survey (GATS) 2 (2016-2017) [14], in India, the prevalence of tobacco use was 28.6%. Based on this prevalence, the sample size was calculated using the following formula:

Sample size (n) $=Z_\alpha^2 pq/d^2$, where: $Z_\alpha^2 = 3.8416$, p = 28.6 (the prevalence of tobacco use in India according to GATS 2 is 28.6%.), q = 100, p = 100 - 28.6 = 71.4, d = relative error (20% of p) = 20% of 28.6 = 5.72.

By substituting the values in the above equation, $n = (1.96)^2*28.6*71.4/(5.72)^2 = 239.76$ and is approximated to 250 sample size. Multi-stage random sampling was used. In the first stage**,** Kanyakumari District is divided into nine blocks**.** Based on the lot method, the Thiruvattar block (10 village panchayats and 6 town panchayats) area was selected. In the second stage, only the 5 village panchayats (Arivikkarai, Cherukode, Kumarankudy, Yettacode and Pechiparai) were selected by lottery method, and in the last stage, all the streets were listed out and allotted the numbers accordingly. Using this, five streets were selected randomly using a lot method, and 10 adults were included in the study from each street. The data collected from March 2019 to November 2019.

Both adult genders aged 18 years and above and residing in the study area for the last 6 months were included. Those who were not willing to participate and unable to respond due to hearing problems and those who were absent on three consecutive visits were excluded from the study. The study was initiated after obtaining the ethical clearance from the Institutional Research Committee and Institutional Human Ethics Committee. Face-to-face interviews were done among the participants. Study parameters were analyzed using IBM Statistical Package for Social Science Trial version 20.0.

3. RESULTS

A cross-sectional study conducted among 250 adult males and females in the Thiruvattar block revealed the demographic profiles of the participants as in Table 1. The study included 159 males (63.6%) with a mean age of 41.43 ± 12.32 years and 91 females (36.4%) with a mean age of 35.47 ± 11.43 years.

Table 1. Demographic profiles of the participants.

Sno	Characteristics	Number(n)	Percentages (%)
	SEX DISTRIBUTION		
	Males	159	63.6%
	Females	91	36.4%
2.	AGE GROUP DISTRIBUTION		
	18-30 years	77	30.8%
	31-40 years	57	22.8%
	41-50 years	66	26.4%
	51-60 years	39	15.6%
	Above 60 years	11	4.4%
3.	Religious DISTRIBUTION		
	Hindu	112	44.8%
	Muslim	5	2%
	Christian	133	53.2%
4.	Marital status DISTRIBUTION		
	Married	184	73.6%
	Unmarried	55	22%
	Widowed/divorced	11	4.4%
5.	Family type DISTRIBUTION		
	Nuclear family	212	84.8%
	Three generation family	35	14%
	Joint family	3	1.2%
6.	Educational status DISTRIBUTION		
	Illiterate	12	4.8%
	Primary schooling	35	14%
	Middle schooling	54	21.6%
	High schooling	51	20.4%
	Inter diploma	40	16%
	Graduate and professional	58	23.2%
7.	Socio economic status distribution (MODIFIED BG PRASAD'S SCALE)		
	Class-I	8	3.2%
	Class –II	10	4%
	Class-III	97	38.8%
	Class-IV	135	54%

Prevalence of tobacco usage:

As described in Table 2, the study found that 22.4% were current tobacco users; among them, 28.57% used smokeless forms. The mean age of initiation was 18.03 ± 2.922 years, and the average duration of usage was 25.20 ± 11.605 years. Stress played a significant role in initiating tobacco habits, with 25.4% citing stress with pressure and 20.62% stress with enjoyment. Among current users, 87.5% consumed tobacco in public places, while 57.14% had quit after learning about the associated health risks. Secondhand smoke exposure was reported in homes (23.2%), workplaces (15.2%) and public areas (67.6%). Notably, 73.2% of the participants supported banning tobacco in public places, and 70.8% were aware of its harmful effects, mainly through cinema (65.4%) and mobile sources (58.6%). Despite 87.2% of participants recognizing tobacco as addictive, 42.2% felt it was too difficult to quit, even with high awareness. Additionally, 38.4% of participants believed tobacco use helped them make friends, 12.4% thought it enhanced attractiveness, 82% felt it induced relaxation and 33.6% perceived smoking as beneficial for bowel movements.

Assessment of factors associated with tobacco use

Factors that are associated with tobacco use are described in tables 3 and 4. Current tobacco use by gender was found to be statistically significant using Fisher's exact test with a value of 41.302, df-1 and p value <0.001 (table 3). Tobacco use by type (somking, smokless, both) was significant as well: Fisher's value 33.671, df-3 and p-value < 0.001 (table 4). Tobacco use was found to be higher among the age group > 41 years, and it was statistically significant with a p-value of 0.033, df- 1 and chi square value of 4.555. Among the study

Table 2. Prevalence on tobacco usage.

TOBACCO USAGE	FREQUENCY(N)	PERCENTAGE (%)
Never user	187	74.8%
Current user	56	22.4%
Past user	7	2.8%
	STATUS OF USERS	
MODE OF TOBACCO FORMS	CURRENT USER	PAST USER
Smokers	19(33.93%)	7(100%)
Smokeless	16(28.57%)	0
Both users	21(37.5%)	0
STATUS OF USERS	Types of tobacco	N(%)
Smokers(40)	Cigarette	23(57.5%)
	Beedi	17(42.5%)
Smokeless(37)	Chewers	23(62.16%)
	Snuff users	14(37.84%)
REASON FOR INITIATION	FREQUENCY (N)	PERCENTAGE (%)
Enjoyment	9	14.29%
Peer pressure	8	12.7%
Peer pressure + Enjoyment	12	19.05%
Religious / Festive occasions	5	7.94%
Stress + Enjoyment	13	20.62
Stress + Peer pressure	16	25.4%
	CURRENT USERS FREQUENCY (%)	PAST USERS
PLACES OF USAGE		FREQUENCY (%)
Home	30(53.57%)	5(71.43%)
Work places	28(50%)	2(28.57%)
Public places	49(87.5%)	7(100)
REASON FOR QUITTING	FREQUENCY(N)	PERCENTAGE (%)
Economic burden	2	28.57%
Known ill effects	1	14.29%
Development of diseases	4	57.14%
AWARENESS OBTAINED FROM	FREQUENCY (N)	PERCENTAGE (%)
News paper	66	26.4%
TV	118	47.2%
Mobile	147	58.8%
Radio	30	12%
Public vehicle	26	10.4%
Public wall	46	18.4%
Cinema	163	65.2%
Posters	55	22%

subjects, tobacco users in smoke form and smokeless form were found to be high in the age group >41 years, and that was statistically significant using the Chi-square test with p-value 0.014, df- 3, Chi square value 10.56. Usage of both smoking and smokeless forms of tobacco was found to be high among literates, and that was statistically significant with a p-value of 0.037, df- 1 and Fisher's exact value of 8.771. Based on the occupation, tobacco use was found to be more common among semi-skilled to unemployed persons, and that was statistically highly significant using Chi square test with a p-value of 0.002, df- 1, and a Chi-square value of 9.698. Smoking-type tobacco usage was found to be higher among semi-skilled, unskilled and unemployed persons and was statistically highly significant using Chi square test with p-value 0.008, df- 3, and Chi-square value of 11.938. There was a highly statistically significant association found between tobacco use and socioeconomic status with a p-value of 0.000, df-1, Chi square value of 17.540. There was a high statistically significant association found between the type of tobacco use and the socioeconomic status with a p-value of 0.000, df-3, and Fisher's exact value of 18.890. Variables that were found to be significantly associated with current tobacco usage in the chi-square test were gender, age group, occupation and socioeconomic status.

Table 3. Tobacco Use According to Gender, Age Group, Occupation and Socioeconomic Status.

Gender/Tobacco use	Tobacco users	Tobacco Non users	df	P value	Fisher's exact value
MALE	56	103			
FEMALE	0	91	1	0.000*	41.137
	Age group/Tobacco use				
<40 years	23	111	1	0.033*	4.555
>41 years	33	83			
	Occupation/Tobacco use				
Professional to skilled workers	25	131	1	0.002*	9.698
Semi-skilled to unemployed	31	63			
	Socio-economic status /Tobacco use				
Upper to Middle class	12	103	1	0.000*	17.540
Lower middle to Lower class	44	91			

* P < 0.05 is statistically significant.

Table 4. Type of tobacco used according to gender, age group, marital status, education.

Gender/Tobacco type	Non smokers	Smoking tobaccos	Smokeless tobaccos	Both	Df	P value	Fisher's exact value
MALE	103	19	16	21			
FEMALE	91	0	0	0	3	0.000*	33.671
Age group / Tobacco type	Smoking tobacco	Smokeless tobaccos	Both	df	P value	Chi square value	
<40 years	6	4	13	2	0.045*	6.233	
>41 years	13	12	8				
	Marital status/Tobacco type						
Unmarried	1	1	7	2	0.026*	7.325	
Married/Separated	18	15	14				
	Education /Tobacco type						
Illiterates/up to Middle school	12	3	6	2	0.015*	8.517	
High school and higher	7	13	15				

* P < 0.05 is statistically significant.

4. DISCUSSION

This study was conducted among adults in rural areas of Kanyakumari district, where the prevalence of tobacco use was found to be 22.4%. This finding was similar to studies conducted by Rani M [19] (National Survey 1998–1999, India), Imtiaz D [20] (Uttarakhand, 2013), Chockalingam K [3] (Chennai, 2009–2012) and Praveen Lal CJ [21](Kerala). However, there were significant variations when compared with several other studies. The prevalence of tobacco use ranged from 40% to 50% in studies conducted by Bala DV [22] (Gujarat, 2006), Divyang Kumar N [23] (2016), Anand A [24] (2007), Bhavya B [2] (Karnataka, 2012), Christopher J Rogers [75] (US), Jeeragyal DP [54] (Andhra, 2012–14), Jindal SK [25] (Chandigarh, 2006), Konduru RK [26] (Thiruvallur, 2008), Subramanian SV [27] (India, 1998–99), Das R [28] (Tripura) and Mukherjee K [29] (Mumbai). In contrast, studies by Sinha DN [30] (Bihar, 2000) and Aryal U [31] (Kathmandu) reported even higher prevalence rates, exceeding 70%. And in our study, females were nonsmokers; either they are reluctant to disclose their habits of tobacco use during data collection in view of stigma, or it may be the true low prevalence in our area. A few notable studies recorded very low prevalence rates, ranging from 10% to 20%, such as those conducted by Gaja Lakshmi CV [32] (South India), Owolabi EO [33] (South Africa, 2017), Waweru P [34] (South India), Gupta RK [12], Ahamed RS [35] (Aligarh, 2009), Kumar S [36] (Lucknow, 2011) and Berg CJ [37] (2011). Extremely low prevalence (<5%) was observed in studies by Singh V [38] (Jaipur), Kumar R [39] (Delhi), Devi LJ [40] (Manipur), Fotedar S [41] (Himachal Pradesh), Bridget K Ambrose [42] (US) and Namratha Kulkarni [43].

In the present study, a majority of current tobacco users (37.5%) used both smoke and smokeless forms, and smokers (33.93%) outnumbered smokeless users (28.57%). Studies by Bhavya B[2] (Karnataka, 2012), Christopher J Rogers [44] (US) and Imtiaz D[20]

(Uttarakhand) found smoking prevalence to be below 17%. A higher prevalence (>50%) of smoked tobacco compared to smokeless forms was noted in studies by Sakore DN [15] Kapoor SK [45], Basu D [46], Singhi S [47], Madan KPD [48] and Lim KH [49], attributed to easy addiction, low cost, portability and social enjoyment. Conversely, smokeless tobacco usage (> 45%) was higher in studies by Das R [28], Dixit AM [8], Makwana NR [50] and Taran SJ [51], often due to lower cost, discretion in public usage, cultural acceptance and lack of warning labels.

Among current smokers in this study, cigar users (57.5%) were more prevalent than beedi users (42.5%), consistent with Chockalingam K [3]. However, studies by Dixit AM [8], Gupta RK [12], Imtiaz D [20] and Jindal SK [25] found beedis more popular due to their affordability and availability. Das RS [28] study in Northern states noted widespread use of pan with tobacco, Gul, Gutka, Khaini and Hookah. The mean age of initiation for tobacco use was 18±2 years. Similar initiation ages (18–35 years) were found in studies by Gupta RK [12], Santhana Krishnan I [52] and the Global Adult Tobacco Survey-2 [14]. Other studies by Imtiaz D [20] (Uttarakhand, 2013), Nisar N [53] (Karachi, 2005) and Mishra GA [54] reported initiation before 20 years, indicating adverse effects on school and college education.

Education plays a vital role in determining tobacco use patterns. In this study, tobacco use was higher among individuals with higher education levels, possibly due to increased social interactions. However, studies by Garg A [55] (Delhi, 2007), Dixit AM [8] (Jaipur), Bhasker S [56] (Delhi), Chhabra SK [57], Prabhakar B [58], Mukherjee K [29] (Mumbai) and Rani M [19] (National Survey—India) showed an inverse relationship, with higher tobacco use among the less educated due to poor awareness of health risks. Our study also found a significant association between lower socioeconomic status and tobacco use, aligning with findings from Bhavya B [2] (Karnataka, 2012), Bala DV [22] (Gujarat, 2006), Ahamed RS [35] (Aligarh, 2009), Garg A [55] (Delhi, 2007) and Dixit AM [8] (Jaipur), highlighting how poverty and tobacco usage form a vicious cycle.

Further associations were observed between tobacco use and gender, education, occupation and socioeconomic status. Studies by Bhavya B [2], Bala DV [22], Owolabi EO [33] and Chulasiri MP [59] found similar associations, emphasizing the roles of literacy, occupation and socio-cultural factors. Christopher J. Rogers [44] (US) linked tobacco use with stress and financial burden, Imtiaz D [20] (Uttarakhand) with age groups, Chockalingam K [3] (Chennai) with geographic location, and Parashar M [60] (Delhi) with marital status, migrant status, income and family type. Tobacco consumption not only impacts users but also harms families through secondhand smoke exposure, particularly among impoverished groups. Even minimal spending on tobacco can exacerbate poverty, leading to poor nutrition, decreased healthcare-seeking behavior and malnutrition.

The present study provides important insights into tobacco habits and awareness among adults, offering valuable guidance for policymakers and public health officials. It also emphasizes a holistic approach to tobacco cessation, shifting from individual-centered strategies to broader community-wide interventions. This study is confined within a specific geographical area and only to that demographic population; hence, the findings cannot reflect the regional or the national averages.

5. CONCLUSIONS AND RECOMMENDATIONS

Despite adequate awareness of health hazards, prevalence of tobacco use was slightly higher among early adult life, married males, nuclear families, and skilled semi-skilled workers. Currently tobacco-free and tobacco incorporated pan masala are highly used among college students and younger age adults which is an innocuous habit. Hence it is suggested that anti-tobacco measures and awareness creation should be initiated early in life as primary prevention, and also among those who are unwilling to quit and unaware of its harmful effects. Common beliefs about initiation were found to be stress, peer pressure, and enjoyment; therefore, FGD (focused group discussions) can be targeted among rural populations and school candidates may result in quitting at their early stages. Each parent plays a major role in that they need to take care of the adult to inspect his regular activities and their friend's circle, which helps to bring them back to normal by explaining the good and bad aspects of tobacco and other substance abuse. On considering all the above knowledge, awareness and legislative measures, one should have their own self-control to quit tobacco use and have to take major steps in sorting out life-threatening acts and poverty. There should be strong policies to ban tobacco use at public places, near schools, temples, workplaces, hospitals and restaurants. And the government also should increase the taxes on tobacco products and increase the price of the products so that they are not easily affordable to school and college students and poor people. There should be surveillance of nicotine content in the tobacco products at both the manufacturer and consumer levels. There should not be recreational or usage of e-cigarettes in view of tobacco cessation.

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