

# Prevalence of Physical Nicotine Dependence and its Determinants among Tobacco users in the Rural Field Practice Area of a Tertiary Care Hospital in Tamil Nadu, India

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## Abstract

**Background:** Tobacco is the major cause of preventable death globally, which kills one person prematurely every six seconds. In India, around 46.9% of men and women aged 15 years and above use any kind of tobacco, according to NFHS-5. Tobacco use for longer duration with increased frequency is often addictive. Nicotine in tobacco is often associated with dependence, which is recognized as a public health menace and the single most significant factor for premature death. Hence, assessment of nicotine dependence among tobacco users is essential to implement tobacco control measures effectively. To estimate the prevalence of nicotine dependence among tobacco users and to study the factors associated with nicotine dependence among those tobacco users in a rural area of Kancheepuram district, Tamil Nadu. **Material and Methods:** A community-based descriptive cross-sectional study was conducted among 375 tobacco users aged 18 years and above residing permanently in the rural field practice area of the Rural Health and Training Centre (RHTC) attached to a Tertiary Care Hospital in Tamil Nadu. The study has been conducted for 6 months. A systematic random sampling technique was used to recruit the study participants. Data was collected by conducting personal interviews using a pre-tested semi-structured questionnaire. The data obtained was subjected to statistical analysis using SPSS version 23. **Result:** About 48.7% of the study participants had high dependence, 25% had moderate dependence, and 26.3% had low physical dependence on nicotine. The duration of tobacco use ( $P < 0.0000$ ) and age of initiation of tobacco use (mean age was  $28 \pm 7.1$  years) ( $P < 0.0001$ ) was found as a significant risk indicator for nicotine dependence. **Conclusion:** The high nicotine dependence (48.7%) among the study participants is quite alarming and warrants more visible and aggressive anti-tobacco campaigns and targeted preventive strategies.

**Keywords:** Nicotine dependence, smoking, tobacco users

## INTRODUCTION

Tobacco is the most widely consumed psychoactive substance throughout the globe. Smoke released from cigarettes contains various chemicals and harmful toxins. Nicotine present in tobacco is a neuro-adaptive substance that causes dependence with an increased rate of consumption.<sup>[1]</sup> According to the WHO global report, one-fourth (24.9%) of the general public including both sexes are current tobacco users of which, 40.3% are men and 9.5% are women.<sup>[2]</sup> The Global Adult Tobacco Survey 2 (GATS 2) 2016-17 estimated that in India, 28.6% of the adult population are tobacco users, of which 42.4% are male and 14.2% are female.<sup>[3]</sup> The National Family Health Survey (NFHS-5) 2019-21 of India reports that 38% of men

and 9% of women consume tobacco in any form (smoking or smokeless), and around 20.1% of men and 4.9% of women consume tobacco in any form in Tamil Nadu.<sup>[4]</sup> Tobacco use is a major public health problem accounting for premature death around the globe. It is estimated that tobacco kills around 8 million people every year globally, of which 7 million deaths

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are attributed directly to tobacco use, while 1 million deaths occur as a result of exposure to second-hand smoke.<sup>[5]</sup> Tobacco is considered to be a preventable risk factor for cardiovascular disease. Globally, more than 1 in every 10 cardiovascular deaths is attributable to tobacco use, accounting for 1.7 million deaths per year.<sup>[6]</sup> Smoke released from cigarettes contains various chemicals and harmful toxins, of which nicotine has a high tendency for dependence.<sup>[7]</sup> Though there are huge challenges that lay ahead in controlling the tobacco epidemic, feeble preliminary measures to bring out a fundamental behavioral change in tobacco users have shown to be most effective. As nicotine dependence is the most significant determinant of continued tobacco use, studying its prevalence might provide more insight into the ways to reduce tobacco burden on social and economic milieu of our country.<sup>[8]</sup> Various researchers have studied the prevalence and determinants of tobacco use and nicotine dependence. However, very few studies in India have aimed to assess both physical and psychological dependence in rural areas. So, this study is focused on estimating the prevalence and prominent determinants of nicotine dependence among tobacco users in a rural area of the Kancheepuram district.

## SUBJECT AND METHODS

This community-based cross-sectional study was conducted in Serappanachery, Padappai, a field practice area of the Rural Health and Training Centre (RHTC) attached to a Tertiary Care Hospital in Tamil Nadu, India. The study was carried out from July 2019 to January 2020 for a period of 6 months. A total of 375 participants were enrolled in the study using the systematic random sampling technique. Adults aged 18 years and above who have been using tobacco in any form for at least the past 1 year and those willing to participate in the study were included in the study. Participants who have quit tobacco, those in the process of detoxification like those using nicotine gums and patches, pregnant, lactating mothers, and psychiatric patients were excluded from the study. Sample size was calculated from a previous study by Sugavanesh J *et al.*<sup>[8]</sup> at Bangalore in 2018 found the prevalence of nicotine dependence to be 26%. Accounting 20% for non-response, the sample size was calculated as 355 (but finally, 375 participants were included in this study). Sampling Interval (N/n) is calculated as follows: [N = Total number of households in the study area = 4489, n = sample size = 375. N/n = 4489/375 = 12]. Thus, every 12<sup>th</sup> house was selected to identify tobacco users above 18 years of age. If there were no tobacco users in that house, the next house with the appropriate study subject was chosen. However when multiple tobacco users were found in the same family, all the users who satisfy the inclusion criteria were included.

Before the start of the study, ethical clearance was obtained from Institutional Ethics Committee with reference number 002/SBMC/IHEC/2018/1181 dated on 12.12.2018. After obtaining informed consent, all the participants were asked relevant questions to note demographic information, risk factors based on prestructured questionnaires. Physical

nicotine dependence was assessed using FTND scale. FTND is a short scale comprising of 6 items which quantifies the nicotine dependence. Scores obtained were used to assess the severity of dependence 1-3: Minimal dependence, 5-7: Moderate dependence, 8-10: High dependence.<sup>[9]</sup> Data were collected throughout the study period to meet the sample size for the study. The data collected among the study participants was entered in Microsoft Excel and analysed using SPSS 23.0 software version. The descriptive tables were expressed as frequency and percentages. Chi square test was used to identify the association between selected variables and  $p < 0.05$  was considered to be statistically significant. The association of socio- demographic characters and risk factors with nicotine dependence was assessed.

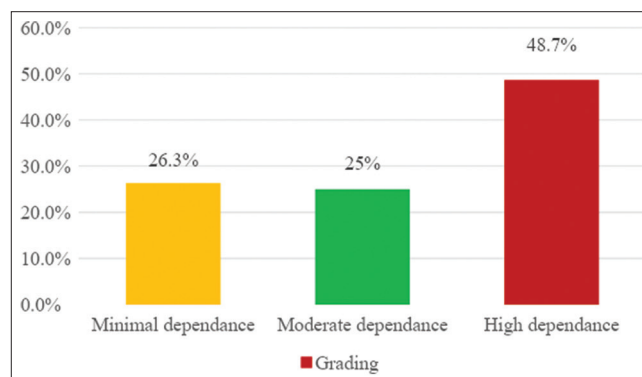
## RESULTS

The study showed that, among the study participants, 42.2% were 18-40 years of age, and 68.2% of the study participants were females. As far as marital status is concerned, 82.4% of the study participants were married [Table 1]. According to the modified BG Prasad socioeconomic classification, 38.6% belonged to the lower middle, followed by 23% in the upper lower socioeconomic category.<sup>[10]</sup>

However, 59.7% of the study samples were smokers, and 40.3% were smokeless tobacco users. The mean age of initiation of tobacco use was  $28 \pm 7.1$  years and 39.8% started using tobacco between 20 and 30 years of age. Nearly 34% were using tobacco for 11-15 years, and the frequency of tobacco use was five to ten times a day for 42.7% of them. About 36.3% consume tobacco in wine shops, and 22.5% consume tobacco at home. Around 84.9% of tobacco users consume a non-vegetarian diet, and about 38.4% of tobacco users consume alcoholic beverages [Table 2].

Figure 1 shows that 48.7% of the study participants had high dependence, 25% had moderate dependence, and 26.3% had low physical dependence to nicotine.

Table 3 shows the response of the study participant to Fagerstrom test for physical dependence to nicotine (FTND scale). Around 28.9% of them use tobacco within half an hour



**Figure 1:** Prevalence of physical dependence among the study participants

**Table 1: Sociodemographic characteristics of the study population (n=375)**

Variable	Frequency	Percentage (%)
Age		
18-40 years	157	42.2
41-60 years	135	35
> 60 years	83	22.8
Sex		
Male	255	68.2
Female	120	31.8
Religion		
Hindu	278	74
Muslim	43	11.5
Christian	45	12.1
Others	9	2.4
Marital status		
Unmarried	41	11.6
Married	312	82.4
Widower	11	3
Divorcee	11	3
Type of family		
Nuclear family	237	63.3
Joint family	105	28
Three generation family	33	8.7
Education		
Professional	28	7.4
Degree/Postgraduate	32	8.4
Post-High School/Diploma	62	16.6
High School	94	25
Middle school	48	12.9
Primary school	66	17.6
Illiterate	45	12.1
Occupation		
Professional	11	3
Semi-professional	33	8.7
Farmers/Clerks/Shop Owners	55	14.7
Skilled	68	18
Semiskilled	99	26.5
Unskilled	53	14.1
Unemployed	56	15
Socioeconomic status		
Upper	43	11.5
Upper Middle	57	15.3
Lower Middle	145	38.6
Upper Lower	86	23
Lower	44	11.6

after waking up in the morning and 35.7% use them within half an hour to 1 hour after waking up. About 46.1% find it difficult to refrain themselves from tobacco use in places where they were forbidden. About 25% were using tobacco even if they were bedridden due to any illness.

A statistically significant association [Table 4] was observed between high physical nicotine dependence and age of initiation of tobacco ( $P$ - value = 0.0003 and OR = 3.80),

**Table 2: Factors related to tobacco use among the study population (n=375)**

Variable	Frequency	Percentage (%)
Type of tobacco used		
Smoking	225	59.7
Smokeless	150	40.3
Age at initiation of tobacco use		
<20 years	64	17
20-30 years	149	39.8
31-40 years	102	27.3
>40 years	60	15.9
Duration of tobacco use		
<5 years	68	18
5-10 years	81	21.5
11-15 years	127	34
>15 years	99	26.5
Frequency of use of tobacco per day		
<5 times	105	28.1
5-10 times	160	42.7
11-15 times	83	22
>15 times	27	7.2
Place of tobacco consumption		
Teashop	61	16.2
Wineshop	136	36.3
Roadside	62	16.6
Workplace	26	7
Inside the vehicle	5	1.4
Home	85	22.5

duration of use ( $P$ - value = 0.0003 and OR = 0.34), and the type of tobacco used ( $P$ - value = 0.0003 and OR = 15.56).

## DISCUSSION

The present study was conducted to find out the prevalence and determinants of nicotine dependence among the tobacco users in rural field practice area of the Rural Health and Training Centre (RHTC) attached to a Tertiary Care Hospital in Tamil Nadu, India. In the present study, majority of the study participants belonged to 18-40 years of age and the mean age of them was  $41 \pm 8.3$  years. Similarly, in a study done by Rushender et al in Tamilnadu found that majority of the participants belonged to 30–49 years.<sup>[11]</sup> This is attributed to the fact that smoking has social acceptance and begins as a habit at a much younger age. In the present study 82.4% of the study samples were married, 11.6% were un-married and the remaining 6% were either widowed or divorced. whereas 63% were married and 37% were unmarried in a study done by Saha *et al.*<sup>[12]</sup> About 25% of the study samples had their education up to high school and only 12.1% of them were illiterates in the present study. Similarly, in a study done by Prabha et al in Bangalore 28% of the samples had their education up to high school.<sup>[13]</sup> Higher prevalence of tobacco use among illiterates shows that education plays important role in determining the lifestyle of the study participants. In this

study about 26.8% were involved in semiskilled work, 18% were into skilled work, 14.1% were into unskilled work and

**Table 3: Responses to Physical dependence scale from the participants (n=375)**

FTND Questions	Frequency (n=375)	Percentage
How soon after you wake up do you use tobacco		
<5 minutes (Score 0)	64	17
5-30 minutes (Score 1)	108	28.9
31-60 minutes (Score 2)	134	35.7
After (Score 3)	69	18.4
Do you find it difficult to refrain from using tobacco where it is forbidden		
Yes (Score 1)	173	46.1
No (Score 0)	202	53.9
Which tobacco use you would hate the most to give up		
First one in the morning (Score 1)	88	23.6
Any other (Score 2)	287	76.4
How many times do you use tobacco per day		
≤10 (Score 0)	266	70.8
11-20 (Score 1)	58	15.4
21-30 (Score 2)	48	12.8
>30 (Score 3)	3	1
Do you use tobacco more during the first hour after waking than during the rest of the day		
Yes (Score 1)	91	24.2
No (Score 0)	284	75.8
Do you want to use tobacco even when you are ill enough to be in bed most of the day		
Yes (Score 1)	94	25
No (Score 0)	281	75
It the overall score is		
• 0-3: Low dependence		
• 4-7: Moderate dependence		
• 8-10: High dependence		

15% were unemployed. In a study done by Janakiram *et al.* 55.3% were employed and 44.7% were unemployed and about 45% were employed.<sup>[14]</sup> Study done by Picco *et al.* showed that 71% were employed and 29% were unemployed.<sup>[15]</sup> As employed population is more prone for occupational stress, tobacco use is more among them. In the present study more than half of the study population (59.7%) were smokers and 40.3% were smokeless tobacco users. Study done by Janakiram *et al.* in Kerala found that 8% were smokers 82% use smokeless tobacco and the remaining 10% were dual users.<sup>[14]</sup> In a study done by Islam *et al.* in a slum of West Bengal found that only 21.9% were smokers and 44.5% were smokeless tobacco users.<sup>[16]</sup>

In the current study, the mean age of the study participants who initiated the use of tobacco was  $28 \pm 7.1$  years. Around 39.8% started using tobacco between 20 and 30 years of age, and nearly 34% were using tobacco for a duration of 11-15 years. In a study conducted by Jonas *et al.*, the mean age to start using tobacco was  $22.4 \pm 9.2$ <sup>[17]</sup> whereas 57.4% of the study samples started using tobacco at 11-15 years of age, and 70.2% were using tobacco for more than 20 years in a study by Islam *et al.*<sup>[16]</sup> Similarly the median age to start tobacco usage was 16 years, and the median duration of smoking was 10 years in a study conducted by Aryal *et al.*<sup>[18]</sup> Tobacco use at an earlier age makes an individual prone to use for a longer duration when compared to others, as the person starts developing addiction gradually over a period of time.

In this study, 42.7% of the study participants were using tobacco five to ten times a day, and the place of consumption of tobacco was a wine shop for 36.3% and home for 22.5%. Similar findings were seen in a study conducted by MS Khan *et al.* in Karachi, where 40.4% of the samples use more than five cigarettes per day and 18.9% of the participants smoked while at workplace and 19.4% of the participants reported smoking at home.<sup>[19]</sup> In a study done by Manimunda *et al.* age (50 plus), married individuals, low socioeconomic status, consumption of alcoholic beverages and the presence

**Table 4: Association between pattern of tobacco use and physical dependence (n=375)**

Variable	Total Frequency	High physical dependence to nicotine [Score >5]			
		Yes n[%]	No n[%]	P	Odds ratio [95% CI]
Type of tobacco use					
Smoking	225	179	46	<0.0000**	15
Smokeless	150	30	120		0.56 (9.30-26.04)
Age of initiation of tobacco use (Years)					
<25	154	128	26	<0.0001**	3.80 (2.36-6.12)
≥25	221	181	140		
Duration of tobacco use (Years)					
≥10	226	149	77	<0.0000**	2.87 (1.87-4.40)
<10	149	60	89		
Frequency of tobacco use (No of times/day)					
≥10	110	67	43	0.235	1.35 (0.85-2.12)
<10	265	142	123		

\*\*P<0.01 is highly significant



of morbidities were associated with high physical nicotine dependence.<sup>[20]</sup>

In a study done by Roberts *et al* in Republic of Georgia 44.4% had high nicotine dependence, 33.7% had moderate dependence and 24.9% had low dependence to nicotine.<sup>[21]</sup> High rates of physical dependence was seen in the present study as majority of study population were males with longer duration of tobacco use. Similarly 55.2% had higher nicotine dependence, 33.5% had moderate dependence and 11.3% had low dependence to nicotine in a study done by Heydari *et al.* in Iran.<sup>[22]</sup>

## CONCLUSION

There is high nicotine dependence (48.7%) among the study participants. From the results of the present study, it is concluded that nicotine dependence is a silent yet uncontrolled epidemic among tobacco users. On the other side, the awareness about nicotine dependence is alarmingly low among the study participants. Sensitization of the study participants, preferably from a younger age through school and community-based awareness programs about the harmful effects of tobacco and nicotine dependence, promoting the implementation of a healthy lifestyle, and efforts to disseminate information regarding deaddiction support should be considered as an integral part of these programs.

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## Conflicts of interest

There are no conflicts of interest.

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