

## Original Article

### Assessment of psychological dependence among tobacco users: A survey held among the rural population of India to call for attention of tobacco cessation centers

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#### ABSTRACT

**Background:** In India most of the tobacco cessation centers are concentrating only on urban population, whereas, literature reveals that it is rural population, which shows high frequency of consumption of tobacco. It is well known that high frequency of tobacco consumption is associated with psychological dependence. This study aimed at identifying, which form of tobacco consumption (smoking or smokeless) is associated with psychological dependence and is associated with which particular age group in rural population.

**Materials and Methods:** It was a questionnaire based survey where 200 subjects were enrolled. Revised version of standard Fagerstrom Test for Nicotine dependence (FTND) was given to each subject to answer. The collected data was statistically analyzed by using Karl Pearson Correlation (*r*) test and Student's *t*-test.

**Results:** Study showed that subjects above 40 years of age are psychologically highly dependent on tobacco smoking as compared to tobacco chewing. Tobacco chewing is more prevalent among the younger population (20-30 years of age) and type of habit does not have any influence over psychological dependence below 40 years of age. A positive correlation was observed between duration of habit and psychological dependence in all age groups irrespective of type of the habit of tobacco consumption.

**Conclusion:** This study attempts at creating a new avenue for the tobacco cessation centers where they can target their efforts towards rural population particularly people above 40 years of age with a tobacco smoking habit so that they can actually reduce the burden of a number of people at risk for developing tobacco associated oral cancer.

**Key Words:** Fagerstrom Test for nicotine dependence, psychological dependence, tobacco, tobacco cessation centers

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## INTRODUCTION

“If you can measure the problem than half of the problem is solved.” This famous phrase is undoubtedly true especially in case of psychological problems. The

psychological dependence is seen in cases of use of illegal drugs, alcohol and tobacco.

The use of tobacco in India has witnessed varied patterns, which include smoking, chewing, applying, sucking and gargling, and so on. Each of these patterns of consumption is governed by the geographic area, economic status, sociocultural, and religious influences.<sup>[1]</sup> The major forms are smoking and smokeless form. Smoking form includes bidi, cigarette, hookah, etc. Forms of tobacco chewing include, pan (piper betel leaf filled with sliced areca nut, lime, catechu, and other spices chewed

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with or without tobacco), pan-masala or gutakha (a chewable tobacco containing areca nut), and mishri (a powdered tobacco rubbed on the gums as toothpaste).<sup>[2]</sup>

Despite the growing societal and legal restrictions on tobacco consumption, people are consuming tobacco in various forms. Alcohol is known to be a potentially dangerous drug, and society still accepts it as such. On the other hand, society is just beginning to acknowledge that tobacco is also dangerous.<sup>[3]</sup> Interestingly, Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition, Text Revision (DSM-IV-TR) has included nicotine related disorders in its list of mental disorders since 2000.<sup>[4]</sup>

According to Chadda and Sengupta, the harmful effects of tobacco had been recognized historically in 16<sup>th</sup> century by King James I of England, Shah Abbas of Persia and the Mughal Emperor Jahangir of India, who tried to ban the consumption of tobacco among public.<sup>[5]</sup> Chattopadhyaya has mentioned in his study that the famous Indian Sikh Guru Gobind Singh also prohibited smoking for the members of the Sikh community. He said, "Wine is bad, Indian hemp (bhanga) destroys one generation, but tobacco destroys all generations."<sup>[6,7]</sup> Tobacco use has been considered a religious taboo by the Sikhs since then.

However, despite historical attempts to ban tobacco, its use has continued to grow in popularity as a non-productive time-pass. Shadel *et al.* mentioned that tobacco smoking or chewing and associated nicotine dependence is a complex syndrome involving physiological, psychological and behavioral processes.<sup>[8]</sup>

Ashley *et al.* have stated, "although nicotine is blamed for chemical causing high level of dependence, but certain byproducts and additives in tobacco are also responsible for dependence."<sup>[9]</sup> A survey was conducted by Subramanian *et al.* to study pattern of distribution of tobacco consumption in India. It clearly stated that tobacco consumption is highest at village level. The reasons could be a lack of education, awareness, and psychological dependence.<sup>[10]</sup>

Almost 35 million tobacco users attempt to quit every year, but only about 6% are successful for more than just a month. This is because attempts are not directed to change the psychology of tobacco users. Many quitting programmes need to measure how much an individual is psychologically dependent on tobacco.<sup>[3]</sup>

Keeping in mind the above reasons and need, our study was directed to measure the psychological dependence, which is the root cause of high tobacco consumption among the rural population. It aimed at identifying which form of tobacco consumption (smoking or smokeless) is causing psychological dependence and which particular age group in rural population is psychologically more dependent on tobacco. The motive was to draw the attention of the tobacco cessation centers so that they can target at specific age group in rural population, with a particular tobacco consumption habit. This study will help and simplify the job of tobacco cessation centers by high-lighting the risk group in relation to high psychological dependence for tobacco consumption.

## MATERIALS AND METHODS

It is a questionnaire based prospective cross-sectional survey. Subjects with the habit of tobacco smoking or tobacco chewing were selected from a rural area and catchment area of Dental College, with a population of nearly 2000 people. The study was approved by ethical review board of Pravara Institute of Medical Sciences (PIMS) Deemed University. The procedures followed were in accordance with the ethical standards of the responsible committee of PIMS University on human experimentation.

**Inclusion and exclusion criteria:** Subjects with the psychologically sound mind and willing to participate in this study after explanation about study were only included in the study. The age range for the study was 20 years and above. A written consent was taken from each subject.

The survey was conducted during the regular dental health checkup camp, which was organized for villagers. During this health checkup camp, the tobacco consumption habit was assessed by direct questioning and by clinical examination. For clinical assessment presence of stains of tobacco chewing and tobacco smoking over teeth, and oral mucosa was considered positive for the presence of tobacco consumption habit. Initially nearly about 600 subjects were screened for the presence of tobacco consumption habit. The assessment of habit of tobacco consumption continued for enrolled subjects during dental health check up until 25 subjects with each 20-30 years, 31-40 years, 41-50 years, and 51 and above years of age for tobacco chewing and tobacco smoking separately were included in the

survey. Hence, overall all these 200 subjects were divided into following groups as:

Group I-100 subjects with tobacco smoking habit

Group II-100 subjects with the use of smokeless tobacco

Both groups were further subdivided into following subgroups based on age:

Group A-with age ranging between 20 years to 30 years

Group B-with age ranging between 31 years to 40 years

Group C-with age ranging between 41 years to 50 years

Group D - with age including 51 years and above

A standard questionnaire format of Fagerstrom Test for Nicotine Dependence (FTND Revised Version) for smoking [Table 1] given by Heatherton *et al.* and smokeless form of tobacco [Table 2] given by Ebbert *et al.* (2006) was given to each subject.<sup>[11,12]</sup> These questionnaires were converted in local language for better understanding and effective answering. These questionnaires comprised of six questions pertaining to dependency of tobacco. Each question carries some point/score based on the answer. The subjects were asked to answer the questions as per their experience of tobacco consumption and calculate the total point score.

### Interpretation of scoring

7-10: Person is highly dependent on nicotine and may benefit from a smoking cessation program based on treatment for nicotine addiction.

4-6: Person has low to moderate dependence on nicotine; however, this does not rule out a smoking cessation program based on treatment for nicotine addiction.

Below 4: Person has low to moderate addiction, but is not likely to need nicotine replacement therapy.

The calculated scores for all subjects were then statistically analyzed by using the Karl Pearson Correlation (*r*) test and Student's *t*-test for the distribution of psychological dependence among the rural population. The data was analyzed by using the Statistical Software SYSTAT by Cranes Software Private Limited, Bangalore, India (www.systat.org).

## RESULTS

The statistical analysis of the study data revealed that tobacco chewing habit is more common and for a long duration in the subjects below the age of 40 years in rural population. Subjects above 50 years of age were more indulged with the tobacco smoking habit as compared to tobacco chewing habit [Table 3].

**Table 1: Questionnaire form of FTND revised version for smoking form of tobacco**

Question	Answer	Point
How soon after you wake up do you smoke your first cigarette?	Within 5 min	3
	6-30 min	2
	31-60 min	1
	After 60 min	0
Do you find it hard not to smoke in places where you should not smoke such as church, school, hospital, in bus, cinema theatre etc.	Yes	1
	No	0
Which cigarette would you hate to have to give up most?	The first one in the morning	1
	Any other	0
How many cigarette do you smoke per day	10-fewer	0
	11-20	1
	21-30	2
	More than 30	3
Do you smoke more in the first hour after waking than you do during rest of the day?	Yes	1
	No	0
Do you still smoke if you are so ill that you are in bed most the day	Yes	1
	No	0

FTND: Fagerstrom test for nicotine dependence

**Table 2: Questionnaire form of FTND revised version for smokeless form of tobacco**

Question	Answer	Point
How soon after you wake up to do you place your first dip?	Within 5 min	3
	6-30 min	2
	31-60 min	1
	After 60 min	0
How often do you intentionally swallow tobacco juice?	Always	2
	Sometimes	1
	Never	0
Which chew would you hate to give up most?	The first one in the morning	1
	Any other	0
How many cans/pouches do you chew per week	More than 3	2
	2-3	1
	1	0
Do you chew more frequently during first hour after awakening than during rest of the day?	Yes	1
	No	0
Do you chew if you are so ill that you are in bed most the day	Yes	1
	No	0

FTND: Fagerstrom test for nicotine dependence

When we compared Group I with Group II for psychological dependence for tobacco use, statistical analysis revealed that people are highly dependent on tobacco smoking after age of 40 years ( $5.24 \pm 2.31$ ; [Table 3]). Study data revealed that, form of tobacco consumption (either smoking or smokeless form) does not have any influence over psychological dependence for age groups of 20-30 years and 31-40 years.

**Table 3: Distribution of mean and SD values of the duration of habit and FTND score (points) in all groups under study**

Parameters	Group I A	Group II A	Group I B	Group II B	Group I C	Group II C	Group I D	Group II D
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Duration of habits (in months/years)	4.14 ± 3.40	6.06 ± 6.14	9.88 ± 6.02	12.70 ± 9.64	17.76 ± 6.10	17.66 ± 1.64	25.12 ± 10.17	6.36 ± 1.9
FTND score (points)	3.40 ± 1.19	3.92 ± 1.84	3.68 ± 2.03	4.0 ± 1.70	5.24 ± 2.31	3.32 ± 2.17	23.78 ± 11.55	3.80 ± 1.95

FTND: Fagerstrom test for nicotine dependence

**Table 4: Karl Pearson correlation (r) between duration of habit and FTND score in all groups**

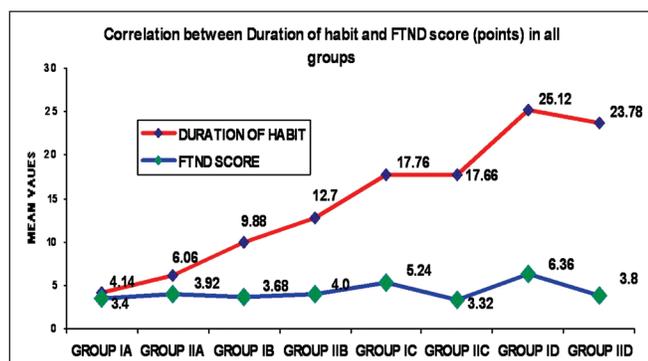
Karl Pearson's correlation coefficient between duration of habit and FTND score (r)							
Group I A	Group II A	Group I B	Group II B	Group I C	Group II C	Group I D	Group II D
0.1839	0.1603	0.2698	0.04553	0.4278	0.2049	0.09406	0.0276

FTND: Fagerstrom test for nicotine dependence

**Table 5: Comparison of mean values of duration of habits and FTND score in Group IC and IIC**

Parameters	Group I C	Group II C	Student's t-test value	P value	Significance
	Mean ± SD	Mean ± SD			
Duration of habits (in months/years)	17.76 ± 6.10	17.66 ± 1.64	0.079	P>0.05	Not significant
FTND score (points)	5.24 ± 2.31	3.32 ± 2.17	3.04	P<0.01	Highly significant

FTND: Fagerstrom test for nicotine dependence



**Figure 1:** Comparison of the mean value of duration of habit and Fagerstrom Test for Nicotine Dependence score in all groups

A positive correlation [Table 4] was observed between duration of habit and FTND score in all age groups, irrespective of the type of habit of tobacco consumption. This positive correlation indicates that, as the duration of habit increases, psychological dependence also increases [Figure 1]. This correlation found to be stronger in group IC that is in the age range of 41-50 years where correlation coefficient (r) is 0.4278 [Table 5]. After applying Student t-test, this correlation in all the groups was found to be statistically significant (P < 0.001).

The comparison of FTND scores for older adults

(40-50 years; [Table 5]) and those above 50 years [Table 6] in rural population revealed that, though there was no significant difference in duration of habit between Group IC and IIC, there was highly significant difference observed in relation to psychological dependence among these individuals. By applying Student's unpaired test there was a highly significant difference observed between the proportions of duration of habit and FTND score in group ID and IID (P < 0.01). So after the age of 40 years, the rural population seemed to be highly dependent on tobacco smoking as compared to tobacco chewing.

## DISCUSSION

Every year, millions of tobacco users try to quit the habit, but only few succeed in their attempt. The reason could be in the pathophysiology of nicotine dependence. What might happen in tobacco addicts is probably that, in an effort to adjust and feel normal, the brain does actually alter its physical neuro-circuitry to meet the changed chemical onslaughts of nicotine, dopamine, adrenaline, acetaldehyde etc. The number of neuro-receptors and transporters available to receive nicotine will diminish. At the same time, extra acetylcholine receptors develop. The new sense

**Table 6: Comparison of mean values of duration of habits and FTND score in Group I D and II D**

Parameters	Group I D	Group II D	Student's <i>t</i> -test value	<i>P</i> value	Significance
	Mean ± SD	Mean ± SD			
Duration of habits (in months/years)	25.12 ± 10.17	6.36 ± 1.9	9.23	<0.01	Highly significant
FTND score (points)	23.78 ± 11.55	3.80 ± 1.95	8.54	<0.01	Highly significant

FTND: Fagerstrom test for nicotine dependence

of “normal” depends upon the presence of nicotine. Withdrawal from nicotine upsets this delicate balance. The dopamine and adrenaline levels are all wrong, and the brain signals a feeling of depression and anxiety. Return to normalcy now depends on re-intake of nicotine.<sup>[3]</sup>

Studies have been conducted by Surekha and Thorat *et al.* to see the level of consumption of tobacco among the rural population.<sup>[13,14]</sup> These studies are descriptive in nature, mainly focusing on the percentage distribution of tobacco consumption among the rural population. The present study, mainly focused on measuring the nicotine dependence among the rural population, hence that the particular age group and the type of tobacco consumption habit associated with the psychological dependence can be targeted for cessation.

Epidemiological surveys conducted earlier in relation to habit of tobacco consumption showed that, mean age of addiction for male smokers was 27.2 years and for chewers it was 22.8 years. The corresponding ages for the surveys conducted later they were 32.0 years and 25.3 years respectively.<sup>[14]</sup> Looking at these statistical values, the present study was designed to enroll even a lesser age of 20 years, for measurement of psychological dependence.

Younger age groups of rural areas showed a higher psychological dependence for tobacco chewing as compared to tobacco smoking [Table 3]. However, these differences were not significant at a statistical level. The high frequency of tobacco chewing in young people could be attributed to some of following reasons:

- Younger age group of the rural population is not so familiar with the trend of tobacco smoking especially cigarette smoking due to cost factor
- Manually made cheaper tobacco chewing products such as mawa, gutakha, tobacco quid etc., are more preferred
- Peer pressure
- In rural population bidi smoking has become a definite trend for older ones and not much accepted

by younger population

- Younger individuals can hide their habit of tobacco consumption by preferring tobacco chewing rather than tobacco smoking.

The above observations are correlating with the study conducted by Kishore *et al.*, in rural population of district Wardha. They found that the majority of the boys were engaged in tobacco chewing (69.74%) type of tobacco consumption.<sup>[13]</sup> The exposure of the habit of tobacco use in adolescents was influenced by various factors such as peer pressure, friends, elders, boys trying to follow hero images, feeling strong and powerful when using tobacco and last but not the least, for fun.<sup>[14]</sup>

The present study has revealed that tobacco smoking habit, especially, bidi smoking is more common after the age of 40 years among the rural population. The mean duration of habit and FTND score is high [Table 3, Figure 1] for tobacco smoking as compared to tobacco chewing after the age of 40 years. The reasons for such a shift of pattern of tobacco consumption could be as follows:

- Bidi is known as the poor man's cigar and is also very well accepted as a trend among older individuals in the rural population.
- Since most of the old individuals lose their teeth, and are unable to chew hard tobacco, this physical disability could be a cause for a shift of habit pattern.

The literature search for high dependence on bidi smoking revealed that the nicotine concentration in the tobacco of bidi was significantly greater (21.2 mg/g), than the tobacco from the commercially filtered (13.5 mg/g) and unfiltered cigarettes (16.3 mg/g). Bidi contains a higher concentration of nicotine than conventional cigarettes. Therefore, it is logical to presume that bidi smokers are at a risk of becoming nicotine dependent. Based on these findings Malsona *et al.* deter a popular belief among US teens that bidis are a safe alternative to commercial cigarettes.<sup>[15]</sup>

The literature states that tobacco associated oral cancer is commonly seen in people above 40 years

of age.<sup>[14,16]</sup> Subsequently, as per the present study findings, a hypothesis can be derived that, in rural areas, people above 40 years of age with tobacco smoking habit are at a higher risk for developing oral cancer due their high psychological dependence.

## SUMMARY

### Present study highlights

- Tobacco chewing habit is more prevalent among young individuals of the rural population.
- The type of habit either tobacco chewing or tobacco smoking doesn't have any effect over psychological dependence among individuals below 40 years of age. Hence, the young individuals should be targeted for tobacco cessation therapy irrespective of type of habit of tobacco consumption.
- Individuals above 40 years of age show a high psychological dependence for tobacco smoking as compared to tobacco chewing, and these individuals are at a risk for developing oral cancer due to higher tobacco consumption.
- Hence, it is of prime importance to target such individuals for quitting tobacco consumption habit.

## CONCLUSION

Present study is a grass root level based questionnaire survey to measure the psychological dependence of the rural population for tobacco consumption habit. The first step towards tobacco cessation is to know how much an individual is psychologically dependent on tobacco. Based on the dependence level, the programme of tobacco cessation should be adequately implemented. Among the rural population tobacco smoking habit is associated with a high psychological dependence especially after the age of 40 years. The duration of habit was also found to be correlating with the psychological dependence. These findings could be a stepping stone for opening of tobacco cessation centers in rural area, which can target the rural population to put an end to the habit and hereafter reduce the incidence of oral cancer. The good news about the psychological part of addiction is that the mind can actually over-ride the brain and body. Right at the time, a tobacco user decides to quit smoking, he/she has there itself begun to gain some control over the addiction. All addicts have the opportunity to quit though most need help.

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