

Study of Association of Nicotine Dependence and Depression among Medical Outpatients

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ABSTRACT

Background: Nicotine dependence and depression have been associated in many studies. The current study aims to determine the association of nicotine dependence and depression, the association of severity of nicotine dependence with depression and the severity of depression in nicotine dependent patients suffering from depression.

Methodology: It was an observational, cross sectional, and comparative study. 150 consecutive patients attending medical OPD diagnosed as having nicotine dependence by Diagnostic Statistical Manual (DSM)-5 were screened by Fagerstrom test, Modified Fagerstrom scale and diagnostic criteria of Major Depressive Disorder using DSM-5. Hamilton Depression (HAM-D) rating scale was applied to patients suffering from depression to know the severity. Statistical analysis was done using z test, Chi square test, Fischer's exact test and Odds' ratio.

Results: Patients with nicotine dependence were found to have statistically significant higher rate of depression than persons without nicotine dependence. (17.8 % vs 8.6%). It was found more in married patients (52%) and in patients from lower socio-economic class (75%). 72.7% of patients used smokeless forms.

Conclusion: Though highly prevalent, tobacco use disorder is often ignored due to absence of behavioral symptoms. Not only there is increase prevalence of depression in nicotine dependent patients, having depression can lead to increased chances of nicotine dependence. Hence addressing nicotine use is essential for better prognosis of both disorders.

Key words: Nicotine dependence, tobacco use disorder, depression.

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INTRODUCTION

Tobacco use disorder is among the most prevalent, and deadly of all substance dependence disorders [1]. It kills nearly 6 million people worldwide-one death every six seconds in each year [2]. In India, tobacco consumption is responsible for half of the cancers in men and a quarter of all cancers in women [3]. Not only it harms physical health, it also gravely affects the mental health. Tobacco use causes dependence of nicotine, the prevalence of which is much higher in the developing countries like India due to poor literacy and decreased awareness [2]. In India, tobacco consumption is mainly through smoked and smokeless forms. Tobacco is smoked mainly in the form of beedis and cigarettes. Smokeless forms of tobacco consumption mainly include chewing tobacco and inhalational stuff. Chewing tobacco is mainly in the form of gutka and zarda [4]. Tobacco generally does not cause any behavioral problem and that is the reason why it is ignored. Therefore, few tobacco-dependent persons seek or are referred for de addiction. Also tobacco is legal and most patients who have quit tobacco use have done so without treatment and hence there is a common, but wrong view that unlike other drugs, smokers don't need treatment [1].

The overall prevalence is 18.4% for tobacco smoking and 21% for tobacco chewing. Compared to men, Indian women are much less likely to smoke tobacco (3.4% vs. 33.3%), chew tobacco (13% vs. 29%), and use tobacco in both forms (15.5% vs. 50.2%) [4]. According to WHO, per capita consumption data suggest that beedi smoking has been steadily rising during the past several decades in India [6]. Tobacco consumption is significantly higher in poor, less educated, scheduled castes, tribal population [3].

Nicotine affects the central nervous system by acting as an agonist at the nicotinic subtype of acetylcholine receptor. About 25% of nicotine inhaled during smoking reaches the bloodstream, through which nicotine reaches the brain within 15 seconds. It produces positive reinforcing and addictive properties by activating the dopaminergic pathway projecting from the ventral tegmental area to the cerebral cortex and the limbic system. Persistent use of tobacco called nicotine dependence represents one of the most preventable causes of psychiatry morbidity and mortality. The clinical expression of this dependence occurs when the smoker quits smoking and presents with withdrawal symptoms like an intense craving for tobacco, tension, irritability, difficulty concentrating, drowsiness and paradoxical insomnia, bradycardia and hypotension, increased appetite and weight gain, decreased motor performance, and increased muscle tension [1].

Approximately 50% of all psychiatry outpatients, 70% of outpatients with bipolar 1 disorder, almost 90% of patients with schizophrenia and 70% of patients with substance use disorder smoke [1].

The relationship between depression and smoking has been examined in studies according to the presence of depressive symptoms. Presence of history of depression in a smoker is important as depressive symptoms can occur during quit attempts. That is why chances of relapse are high if person has depressive features. Data indicate that patients with depressive disorders or anxiety disorders are less successful in their attempts to quit smoking than other persons. All smokers are at greater risk for progressing from non-dependence to dependence when there has been a history of a major depression or if there is a current untreated major depression. Smokers who are depressed may continue to smoke in contrast to quitting for health reasons because of the rewarding effects of nicotine. There is bidirectional relation, nicotine dependence and depression can influence each other. Smoking and tobacco consumption could be "self-medication" to cure depressive features like sad or negative mood [7].

Though widely prevalent, tobacco use as disorder in psychiatric patients has been studied less in India. Treating associated conditions would lead to better prognosis of both the disorders. Hence we have conducted this study to throw some more light on this topic.

Aims and objectives

- To determine the association of nicotine dependence and depression.
- To determine the association of severity of nicotine dependence with depression.
- To determine the severity of depression in nicotine dependent patients suffering from depression.

METHODOLOGY

This is an observational, cross sectional and comparative study. It was conducted at one of the largest tertiary care hospitals within duration of six months.

Inclusion criteria: Patients aged between 15 to 50 years attending medical OPD

Exclusion criteria:

- Unwillingness to participate in the study.
- Confused and critically ill patients
- Psychiatric co morbidities (other than depression)
- Co morbid Abuse or dependence of other substance.
- Patients who were taking tobacco in both forms, i.e. smoking and chewing.

Ethical permission has been taken from the institutional ethics committee. After taking informed consent, 150 consecutive patients attending medical OPD diagnosed as having nicotine dependence by Diagnostic Statistical Manual(DSM)-5 [8] were screened by Fagerstrom test, Modified Fagerstrom scale and diagnostic criteria of Depression using DSM-5. Patients diagnosed as having Major depressive disorder were screened by Hamilton Depression (HAM-D) rating scale to know the severity.

DSM-5 diagnostic criterion was used to diagnose Major depressive disorder in 150 consecutive patients who did not have nicotine dependence. HAM-D was used to know the severity.

Socio demographic data was collected by a semi structured interview which comprised information about demographic characteristics and risk factors like family history of substance use.

Instruments:

- **Fagerstrom test for Nicotine Dependence (FTND):** It is an instrument for assessing the intensity of physical addiction to nicotine. It is a self-administered questionnaire. The test was designed to provide an ordinal measure of nicotine dependence related to cigarette smoking. It contains six items that evaluate the quantity of cigarette consumption, the compulsion to use, and dependence. In scoring, yes/no items are scored from 0 to 1 and multiple-choice items are scored from 0 to 3. The items are summed to yield a total score of 0-10. The higher the total Fagerström score, the more intense is the patient's physical dependence of nicotine. A score of 1-2 is considered low, 3-4 is considered low to moderate, 5-7 is considered moderate, and 8+ is considered high. The test retest reliability is high with correlation coefficient of 0.75. Cronbach's alpha ranges from 0.55 to 0.74 showing good internal reliability. It has a sensitivity of 0.75 and specificity of 0.80 [9-10].
- **Fagerström Test for Nicotine Dependence-Smokeless Tobacco (FTND-ST):** It is modified version of Fagerstrom test for nicotine dependence to measure severity of nicotine dependence for smokeless pattern of tobacco intake. The modification was done by Ebbert and others in 2006. Internal consistency reliability assessed using the coefficient alpha is 0.47. The scoring method is same like Fagerstrom test for nicotine dependence [11].
- **Hamilton Depression Rating Scale (HAM-D SCALE):** This scale has been used widely to measure severity of depression. Max Hamilton originally published the scale in 1960 and revised it in 1966, 1967, 1969, and 1980. It includes 17 items. Scoring is in the form of likert scale ranging from 0 to 2 or 4. A score of 8-13 is considered mild depression, 14-18 is considered moderate depression, 19-22 is considered severe depression, and ≥ 23 considered severe depression. It has good reliability and validity. It has Cronbach's alpha coefficient of ≥ 0.7 suggesting good internal reliability [12-13].

STATISTICAL ANALYSIS

The results were analysed using Statistical package for Social Science (SPSS) version 20. Chi square test, Fischer's exact test, z test, and Odd's ratio was used for analysis. P value < 0.05 was considered statistically significant.

RESULTS

Total 300 patients were recruited in the study, 150 patients having nicotine dependence and 150 without nicotine dependence.

Table 1 shows the socio demographic distribution pattern of patients having nicotine dependence. 80% of the nicotine dependent patients were males and majority of the patients used smokeless form of tobacco.

Table 1: Socio-Demographic characteristics of patients with Nicotine Dependence

	Variable		Nicotine dependence		Total (n=150)
			Smoking (%) (total=41)	Smokeless (%) (total=109)	
1	Sex	Male Female	37 (30.8) 04 (13.3)	83 (69.2) 26 (86.7)	120 30
2	Locality	Rural	05 (23.8)	16 (76.2)	21

		Urban	36(27.9)	93 (72.1)	129
3	Family type	Nuclear Joint	33 (28.9) 08 (22.2)	81 (71.1) 28 (77.8)	114 36
4	Marital	Single Married	00 41 (28.5)	06 (100) 103 (71.5)	06 144
5	Family h/o substance	No Yes	17 (26.6%) 24 (27.9%)	47 (73.4%) 62 (72.1%)	64 86
6	Socio-economic status (kuppusswamy scale)	Upper middle Lower middle Upper lower	13 (39.4) 18 (21.9) 10 (28.6)	20 (60.6) 64 (78.1) 25 (71.4)	33 82 35

Out of 150 nicotine dependent patients, 41 patients (27.3%) used smoking forms of tobacco while 109 patients (72.7%) used smokeless form. Majority of these patients (92%) used smokeless form of tobacco.

Table 2. Comparison of socio demographic variables between nicotine dependent and non dependent group. The results are statistically significant for marital status and socio economic class.

	Variable		Present (%) (total=150)	Absent (%) (total=150)	Chi Square/Fischer test
1	Sex	Male Female	120 (53) 30 (45.15)	115 (47) 35 (54.85)	$X^2=0.491$ df=1 P=0.483
2	Locality	Rural Urban	21 (60) 129 (48.68)	14 (40) 136 (51.32)	$X^2=1.585$ df=1 p=0.208
3	Family type	Nuclear Joint	114 (50.22) 36 (49.31)	113 (49.78) 37 (50.69)	$X^2=0.018$ df=1 p=0.893
4	Marital	Single Married	6 (24) 144 (52.36)	19 (76) 131 (47.64)	$X^2=7.375$ df=1 p=0.007
5	Family h/o substance	No Yes	64 (46.04) 86 (53.42)	75 (53.96) 75 (46.58)	$X^2=1.622$ df=1 p=0.203

6	Socio-economic status (Kuppuswamy scale)	Upper	0 (0)	2 (100)	Fischer's exact test=33.793 p=0.000
		Upper middle	33 (30.27)	76 (69.73)	
		Lower middle	82 (57.75)	60 (42.25)	
		Upper lower	35 (74.47)	12(25.53)	

df=degrees of freedom

Table 3 shows the association of Nicotine Dependence with Depression. Persons with nicotine dependence had statistically significant higher prevalence of depression than persons with no nicotine dependence. Prevalence of depression was 17.3% in persons with nicotine dependence while it was 8.6% in patients without nicotine dependence.

Table 3: Association of Nicotine Dependence and Depression

	Depression (%)	No depression (%)	Total	z test	Odds' ratio (95%CI)
Nicotine dependence	26 (17.3)	124 (82.7)	150	z score=2.28 p=0.08	2.21
No dependence	13 (8.7)	137 (91.3)	150		
Total	39	261	300		

CI= confidence Interval

Table 4 shows association of severity of Nicotine Dependence with Depression. Out of 26 nicotine dependent patients who had depression, 04 patients (15%) had low to moderate nicotine dependence, 18 patients (69%) have moderate nicotine dependence, 04 patients (15%) have high nicotine dependence. There was no statistical significant association found between severity of dependence and depression.

Table 4: Association of severity of Nicotine Dependence and Depression

Nicotine dependence	Depression (%)	No depression (%)	Total	Chi square test
Low-mod	04 (15.4%)	22 (84.6)	26	X ² =0.25 df=2 p=0.88
Moderate	18(17.14)	87 (82.86)	105	
Severe dependence	04 (21.05%)	15 (78.95%)	19	
Total	26	124	150	

DISCUSSION

Out of 150 participants having nicotine dependence, majority of the subjects were males (80%). Both males and females patients used more of smokeless pattern. More than two thirds patients of nicotine dependence consumed smokeless form of tobacco. Even patients suffering from depression used more of smokeless forms. Smokeless pattern of tobacco intake in the form of gutka and pan masala chewing was more prevalent

than smoking pattern in the form of beedis and cigarettes. Researchers also had similar findings [2,7]. This could be because these forms are cheaper as compared to the smoking forms. The mean age of the patients having nicotine dependence was 35.93 years.

On comparing both the nicotine dependent group and the non nicotine user groups, it was found that nicotine dependence was found more in married patients ($p < 0.05$). Similar findings were stated by other researchers. This could probably be due to more stress associated with married life [2,14]. In contrast, Schmidt et al had different findings that higher levels of nicotine dependence were found in unmarried persons [15]. Also, nicotine dependence was seen more in patients coming from lower socio economic class ($p < 0.05$). Around 75% of the patients having nicotine dependence belonged to lower socio economic class. This could be associated with lower education in lower socio economic class as educated people could be more concerned about the injurious effect of tobacco to health due to better awareness [2,16].

Depression was found in 17.3% patients with nicotine dependence and in 8.6% in persons without nicotine dependence. Naomi Breslau at al states prevalence of major depressive disorder was 13.6% in persons with nicotine dependence as compared to 5.2% in persons without nicotine dependence (OR=2.89;95% CI) [17]. Wiesbeck and others stated that the highest rate of depression was found in current smokers than non-smokers (23.7% vs 6.2%) [18]. Another study states that in women, chance of depression was more in smoker than non-smokers (OR-2.1, 95% CI, $P=0.002$) and also in male chance of depression was more in smokers than non-smokers (OR-5.9, 95% CI, $P=0.0008$) [19]. Some other studies also have similar findings [20,27]. Not only there is an increased prevalence of depression in patients having nicotine dependence, but also depression can lead to increase incidence of nicotine use. People consume it to temporarily enhance mood and hence patients suffering from depression get easily addicted to nicotine. The emergence of global economy, the widespread marketing of tobacco products and the vulnerability of mentally ill patients make it likely that person living with mental disorder in developing countries may use tobacco products at a disproportionate rate [3].

Although few studies suggest that those with high nicotine dependence is associated with severe depression, this study doesn't have any significant correlation [20,23, 28]. Mild severity of depression was seen more as compared to moderate type in nicotine dependent patients having depression. (69% vs 31%). Majority of the nicotine dependent depressed patients (92%) were using chewing form of tobacco.

CONCLUSION

Though tobacco use disorder is among the most prevalent, it is the most ignored. This study concludes that there is significantly higher prevalence of depression in nicotine dependent patients as compared to persons who do not have nicotine dependence. Consumption of smokeless pattern of tobacco is seen more than smoking pattern of tobacco. Hence addressing the use of nicotine use is important as not only it will lead to lesser physical ailments but also better prognosis in mental health conditions. It is a single centre study so the results can't be generalized. In future larger studies can be conducted for a larger sample size and multiple sites may be chosen to support these findings.

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