

# A Study of Prevalence and Clinical Correlates of Nicotine Dependence among Patients with Bipolar Disorder

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## ABSTRACT

**Introduction:** In India, the studies specifically examining the relationship between smoking and bipolar disorder are scarce. Even in the studies reported, only smoking tobacco has been included. In India where the predominant form of tobacco abuse by women being smokeless tobacco, this approach would exclude most female sample. So, we propose to examine the pattern of both smoking and smokeless tobacco among the bipolar patients and to correlate the same to the socio-demographic data and comorbid other substance abuse.

**Material and methods:** We examined the prevalence of smoking in of 92 patients who met the Clinical Diagnosis and Description Guidelines, Tenth Edition criteria for bipolar I disorder and evaluated the relationship between smoking and demographic and clinical data and the difference in smoking and smokeless tobacco use.

**Results:** Fifty-five of the bipolar patients (59.7%) smoked, a rate that is higher than among the general population in India (48%). The form of tobacco use was significantly correlated to sex. Significant relationships were revealed between nicotine use and family history of substance abuse and between smoking and history of alcohol use. The severity of dependence of smoking tobacco could correlate to the severity of dependence of Alcohol but not smokeless tobacco. The severity of current episode of mania predicts the severity of smokeless tobacco use.

**Conclusion:** Bipolar patients smoke more than the general population. Bipolar patients that are moderate or heavy smokers are more likely than non-smokers to consume alcohol. However, no association was found between clinical variables of bipolar patients and smoking.

**Keywords:** Bipolar Disorder, Smoking, Nicotine Dependence

## INTRODUCTION

Global Adult Tobacco Survey India revealed that more than one-third (35%) of adults in India use tobacco in some form or the other. Among them 21 percent adults use only smokeless tobacco, 9 percent only smoke and 5 percent smoke as well as use smokeless tobacco. The prevalence of overall tobacco use among males is 48 percent and that among females is 20 percent. Prevalence of smoking among males is 24 percent whereas the prevalence among females is 3 percent. In most of the states/UTs, the prevalence of both smoking and smokeless tobacco use among males is higher than among females with exceptions in Puducherry, Tamil Nadu, Meghalaya, Tripura and Mizoram, where prevalence of smokeless tobacco is higher among females than males.<sup>1</sup> People with a mental illness are twice as likely as non-psychiatric controls to smoke.<sup>2</sup> Similarly, estimates of

smoking prevalence rates among individuals receiving psychiatric care varies between 50% to 80% psychiatric patients, compared to 24% of the general population. Such findings suggest that the mentally ill bear a disproportionate share of the public health burden associated with smoking-related diseases, and stresses the importance of clarifying the relationship between psychiatric illnesses and smoking.<sup>3</sup>

Tobacco use impairs the duration and quality of life for patients with mental illness. It can also reduce the therapeutic blood levels of psychiatric medications. Additionally it has been found to be predictive of future suicidal behaviour among these patients. By virtue of its impact on lives saved, quality of life, and cost efficacy, "treatment of smoking" is considered one of the most important clinical activity.<sup>4</sup>

Although high smoking rates have been reported among bipolar patients, only a few studies examined the prevalence of smoking in bipolar disorder, and their findings are inconsistent.<sup>5,6</sup> In India, the studies specifically examining the relationship between smoking and bipolar disorder are scarce. Even in the studies reported, only smoking tobacco has been included. In India where the predominant form of tobacco abuse by women being smokeless tobacco, this approach would exclude most female sample. So, we proposed to examine the pattern of both smoking and smokeless tobacco among the bipolar patients and to correlate the same to the sociodemographic data and comorbid other substance abuse.

## MATERIAL AND METHODS

The study was conducted in the psychiatry department of Thanjavur Medical College Hospital, Thanjavur. The study design employed was Cross Sectional study.

Consecutive patients attending outpatient section of Psychiatry department fulfilling the selection criterion were included in the study. Inclusion Criteria were age between 18 – 65 years, fulfilling ICD – 10 Clinical Descriptions and Diagnostic guidelines criteria of Bipolar Disorder, current episode Mania with or without Psychosis, Patients and patient attenders giving consent. Patient having other co

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**How to cite this article:** Avudaiappan Sankaran. A study of prevalence and clinical correlates of nicotine dependence among patients with bipolar disorder. International Journal of Contemporary Medical Research 2019;6(6):F21-F25.

**DOI:** <http://dx.doi.org/10.21276/ijcmr.2019.6.6.52>

morbid mental illness, Mental retardation and Neurological conditions were excluded.

A specifically designed proforma was used to collect the data regarding the sociodemographic characteristics, Illness history, Substance use history from the patients. Severity of mania was rated by using Young Mania Rating Scale. (YMRS)

Fagerstrom Test for Nicotine dependence (FTND) was used to rate the Smoking Tobacco use, While Fagerstrom Test for Nicotine Dependence for smokeless tobacco. (FTND ST) was used to measure severity of Nicotine dependence among Smokeless Tobacco users. It is a 6 item scale with a total score of 10. The correlation between the FTND-ST total score and the serum cotinine concentrations was 0.53 ( $p < 0.001$ ).<sup>7</sup>

Alcohol Use Disorders Identification Test (AUDIT) was used to detect alcohol problems experienced within the last year. The test contains 10 multiple choice questions on quantity and frequency of alcohol consumption, drinking behavior and alcohol-related problems or reactions. The answers are scored on a point system; a score of more than eight indicates an alcohol problem.<sup>8</sup>

Patients attending the outpatient section of Department of Psychiatry were selected for study. After getting informed consent from the patients and their first degree relatives, socio demographic data about the patient were collected in a specially designed proforma. Data were obtained from a review of the medical chart and a clinical interview. The charts were used to provide data regarding duration of illness, current episode duration, Inter episode compliance of drugs, and number of hospitalizations. Before beginning the interview, rapport was established with the patients to gain their trust. The data about the use of smoking and smokeless

tobacco was collected by self-report. Young mania rating scale was administered. Fagerstrom Test for Nicotine Dependence and its modification for smokeless tobacco were administered to patients who gave a history of Tobacco use. AUDIT was administered to those patients who gave a history of use of Alcohol. The assessment was carried out by a single investigator. Time taken to complete interview together with administration of scales ranged between 30 to 45 minutes.

### STATISTICAL ANALYSIS

Statistical analysis was done using SPSS v17. The Sociodemographic variables were measured by Descriptive statistical methods. Pearson Chi-Square test and Fisher's Exact Test were implemented to correlate tobacco use and the sociodemographic and clinical variables. P value and Odds rate were calculated to find the significance of correlation.

### RESULTS

The sample consists of 92 bipolar patients. Their Sociodemographic characteristics are displayed in Table 1. The study group consists of 45 male patients and 47 female patients. The mean age of the sample was  $33.62 \pm 10.573$ . The family history of Bipolar Disorder was present in 22(23.9%) of the patients.

The mean age of the sample population at the time of first diagnosis was  $24.92 \pm 8.798$  years. Of the sample of 92 patients, the mean duration of Illness was  $8.70 \pm 8.54$  years. 14.1% ( $n=13$ ) were Patients who presented with first episode of Mania.

25% ( $n=23$ ) had alcohol abuse. None of the sample had any other substance abuse. The Severity of alcohol use was measured using AUDIT. Of the 23 patients, 3 did not

Variables	Tobacco Use		X <sup>2</sup>	P
	Present	Absent		
Age				
18 – 27	12	16	14.979	.005*
28 – 37	19	12		
38 – 47	12	3		
48 – 57	13	2		
58 – 67	0	3		
Total	56 (60.9%)	36 (39.1%)		
Sex				
Male	33	12	5.745	.020
Female	23	24		
Religion				
Hindu	54	34	207	.901
Muslim	1	1		
Christians	1	1		
Occupation				
Unemployed	14	8	10.373	.035
Student/ Housewife	10	16		
Semi Skilled	16	9		
Skilled	13	3		
Clerk, Farm Owner	0	0		
Semi Professional	3	0		
Professional	0	0		

Education				
Illiterate	5	4	4.363	.628
Primary School	12	9		
Middle School	23	11		
High School	10	7		
Diploma	3	2		
Graduate	2	0		
Professional Degree	1	3		
Marital Status				
Unmarried	21	21	6.909	.032
Married	28	15		
Widowed	0	0		
Divorced/Seperated	7	0		
Residence				
Rural	44	31	.887	.642
Semi – Urban	8	3		
Urban	4	2		
Socioeconomic scale				
Upper	0	0	1.689	.430
Upper Middle	8	9		
Lower Middle	10	6		
Upper Lower	38	21		
Lower	0	0		
Family History of BPD				
Absent	45	25	1.434	.317
Present	11	11		
Family History of Suicide				
Absent	40	32	3.927	.069
Present	16	4		
Family History of Other Mental Illness				
Absent	48	35	3.288	.084
Present	8	1		
Family history of Substance Abuse				
Absent	34	36	18.588	.000*
Present	22	0		
Alcohol abuse				
Present	20	3	8.762	0.003*
Absent	36	33		

**Table-1:** Socio Demographic and Illness Variables correlated to Tobacco Use

Form of tobacco use * sex				
Form of Tobacco	Male	Female	X <sup>2</sup>	P
Beedis only	6	0	38.508	0.000*
Cigarettes only	7	0		
Chewing tobacco only	7	23*		
Beedis and cigarettes	4	0		
Beedis and chewing tobacco	4	0		
Cigarettes and chewing tobacco	1	0		
All three types	4	0		

**Table-2:** Form of Tobacco use correlated to Sex

meet dependence criteria, While 6 patients had moderate dependence and 14 patients had severe dependence.

The Lifetime prevalence of Nicotine use was 60.9% (n = 56) in the sample. The Current Prevalence of Nicotine use was 59.7% (n = 55) in the sample. Of the 56 patients who had used tobacco use, the mean age at first use of tobacco had been 18.19 ± 5.25 years. 32.6% (n=30) patients used only chewable tobacco like betel, paan etc while 14.1%

(n=13) had used only smoking tobacco like beedi, cigarettes etc. 14.1%(n=13) had used both chewing as well smoking form of tobacco. 39.1%(n=36) had no tobacco use. Of the 43 patients using chewable tobacco (30 patients using only chewable tobacco and 13 patients using both smoking and smokeless tobacco), 10 patients had no dependence, 4 had moderate dependence and 29 had Severe dependence. Of the 26 patients using smoking tobacco (13 patients using

only smoking tobacco and 13 patients using both smoking and smokeless tobacco), 3 patients had no dependence, 6 had moderate dependence and 17 had Severe dependence.

There was no statistically significant relationship between Prevalence of Nicotine use and Other Sociodemographic variables like age, religion, occupation, education, place of residence, marital status and socioeconomic status. Whereas 23 females who used tobacco were all using smokeless tobacco only, among males only 7 patients were using smokeless tobacco alone. Thus the form of tobacco use was significantly correlated to sex. ( $p < 0.001$ ). Family history of substance abuse was positively correlated to the use of Nicotine ( $p < 0.001$ ). There was a positive correlation of alcohol use and Nicotine use ( $p < 0.005$ ). The FTND total score among subjects with alcohol use ( $6.17 \pm 3.688$ ) is higher than subjects without alcohol use ( $0.75 \pm 2.464$ ), which is statistically significant ( $p < 0.001$ ).

## DISCUSSION

The study population consisted of 45 males and 47 females. To our knowledge none of the earlier studies had an almost equal distribution of male and female cases. The Lifetime prevalence of Nicotine use was 60.9% ( $n = 56$ ) in the sample. The Current Prevalence of Nicotine use was 59.7% ( $n = 55$ ) in the sample (Table. 1). The prevalence of overall tobacco use among males is 48 percent and that among females is 20 percent in general population in India.<sup>1</sup> Thus the prevalence of Nicotine use is higher among patients than general population.

Earlier studies have estimated the prevalence of nicotine use among Bipolar patients to be between 31.2%<sup>9</sup> to 70%.<sup>10</sup> Study by Vanable et al on Psychiatric outpatients found that the rates of smoking in bipolar disorder patients were 66%.<sup>3</sup> Similarly the study by Diaz et al found that Prevalence of current daily smoking for patients with bipolar disorder is 66%.<sup>11</sup> A study by Kreinin et al also found higher rates of smoking for bipolar patients (53.9%) than the control population.<sup>12</sup> Thus the prevalence rates obtained in our study confirm to the results obtained by these studies. Given the association between tobacco use and multitude of physical comorbidities, tobacco use would account for thirteen percentage of all deaths occurring in India by 2020. Thus, consequences of tobacco use are staggering, and tobacco control measures in bipolar patients warrant immediate attention.

Of the 56 patients with Nicotine use, 33 were males and 23 were females. There was no statistically significant relationship by Sex among Patients with Bipolar Disorders having Nicotine use. Whereas 23 females who used tobacco were all using smokeless tobacco only, among males only 7 patients were using smokeless tobacco alone. Thus the form of tobacco use was significantly correlated to sex (Table 2). This is reflective of general population as smokeless tobacco use appear to be higher among females than males in Tamilnadu.<sup>1</sup>

22 patients who had nicotine use also had family history of substance abuse while none of the patients without

nicotine use had a positive family history of substance use which was statistically significant ( $p < 0.001$ ). A study by Hartz et al found that variants in nicotinic receptor genes are independently associated with bipolar disorder.<sup>13</sup> But being a small study, this finding needs replication in a larger population before a genetic basis for nicotine addiction in bipolar patients could be suggested.

But no statistically significant relationship was obtained between FTND and FTND – ST total scores and Family History of Bipolar Disorder, Family History of Suicide, Family History of substance use and Family history of other Mental Illness. Thus severity of nicotine dependence appears to be unrelated to the family history of the patient.

Alcohol was used by 20 of the 56 patients with nicotine use while only 3 of the patients without nicotine use had alcohol use. This was a statistically significant relationship. ( $p < 0.005$ ). Waxmonsky et al. in 2005 found in their cross-sectional study that bipolar patients who smoke have positively association with use of alcohol, caffeine, and illicit drugs.<sup>9</sup> Goldstein et al. in 2008 also found positive relationships between smoking status and higher rates of comorbid substance use disorder in a sample of adolescents with bipolar disorder.<sup>14</sup> Thus our study appear to confirm to the association between smoking and alcohol use demonstrated by the previous studies.

The FTND total score among subjects with alcohol use ( $6.17 \pm 3.688$ ) is higher than subjects without alcohol use ( $0.75 \pm 2.464$ ), which is statistically significant ( $p < 0.001$ ). But no statistically significant relationship was observed between FTND – ST scores and alcohol use. When FTND scores were correlated to AUDIT total scores, a positive correlation could be obtained. Thus severity of dependence of smoking tobacco could predict the dependence of Alcohol. The smokeless tobacco users being mostly females having low prevalence of alcohol dependence compared to male patients may explain this result. Most of the studies done on nicotine use in bipolar patients so far have included only measures of smoking tobacco and have demonstrated an association between alcohol use and nicotine use. But inclusion of smokeless tobacco which is the predominant form of tobacco use in females in Tamilnadu would reflect a culturally acceptable and better picture.<sup>1</sup>

The prevalence of the nicotine dependence in the sample was not associated with age at first diagnosis. When FTND and FTND – ST total scores were correlated with Age at first diagnosis, Duration of Illness, Drug Compliance between episodes and age of first use of tobacco, no statistically significant relationship could be obtained. Thus the prevalence and severity of Tobacco use appears to be unrelated to the age of illness onset in this sample. Krenin et al found significant association between age of illness onset and Tobacco use, which could not be demonstrated in this study.<sup>12</sup>

But while FTND scores did not correlate to total number of episodes, a positive correlation between FTND – ST total scores and total Number of episodes was obtained. Waxmonsky et al. in 2005 found in their cross-sectional

study that bipolar patients who smoke have more previous episodes of mania compared to non-smokers with bipolar disorder.<sup>9</sup>

When FTND total scores were correlated to Total YMRS scores no correlation could be obtained. But when FTND – ST total scores were correlated to total YMRS scores a positive correlation could be obtained. Thus higher YMRS scores predicts higher FTND – ST scores. Again this confirms to the findings by Waxmonsky et al that bipolar patients who smoke have more serious previous episodes of mania compared to non-smokers with bipolar disorder.<sup>9</sup>

## CONCLUSION

From our study, we found that the prevalence of Nicotine Dependence is higher among patients than general population. Also the prevalence of Smokeless tobacco use was higher among female patients than male patients. The Severity of Nicotine Dependence of smokeless tobacco is independently correlated to the total number of episodes while the severity of current episode of mania predicts the severity of smokeless tobacco use. Thus we conclude that smokeless tobacco use should be independently enquired and intervened in patients with Bipolar Disorder especially in a female population.

However the study findings are limited by the fact that the study was conducted in a general Hospital setup with a cross sectional study design using clinical interview, hence the results cannot be generalized to Entire population. Also the Blood Levels of nicotine could not be measured and results are based on self- report. Thus the findings need to be replicated in a larger population sample preferably with blood nicotine levels monitoring.

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**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 04-05-2019; **Accepted:** 04-06-2019; **Published:** 30-06-2019