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"A Study of Prevalence and Clinical Correlates of Nicotine Dependence Among Patients With Bipolar Disorder"

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Abstract
Background: *The lifetime prevalence of substance use disorders is at least 40% in bipolar I patients. 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*
Aims and Objectives: *To study the prevalence and clinical correlates of nicotine dependence among patients with Bipolar Disorder. The objectives of this study are to study the prevalence of Nicotine dependence among Bipolar Disorders, socio-demographic variables of the Bipolar patients with Nicotine dependence and to determine the clinical correlates of Bipolar patients with Nicotine dependence.*
Materials and Methods*: A cross sectional study was conducted at Psychiatric Department, at Maharajah's Institute of Medical Sciences, Vizayanagaram, for a period of 2 years on a sample of 92 patients who were diagnosed as having Bipolar Affective Disorder. The tools used were self structured socio-demographic schedule and Fagerstrom Test for Nicotine Dependence which is a widely used measure of severity of Nicotine Dependence.*
Results: *The total sample size was 92 bipolar patients. The mean age of the sample was 33.62±10.573, out of 92 patients, 28 (30.4%) were from 18 to 27 age group; 31 (33.7%) from 28 to 37 age group, and 15 (16.3%) were from 38 to 47 age group. 15 (16.3%) from 48 to 57 age group and 3 (3.3%) from 58 to 67 years age group. In our study 39 (42.4%) were compliant and 53 (57.6%) non compliant. Among the 56 dependents 18(32.1%) patients were compliant, 38(67.9%) were*
non compliant.
Conclusion: *that the prevalence of Nicotine dependence was high among the BPAD patients and significantly varied with age, marital status, family history of Alcohol abuse, Total number of episodes and Drug compliance.*
Keywords*: Nicotine Dependence, Bipolar Disorders*

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I. Introduction

Tobacco is the product of New World. The Europeans who first landed in Americas brought the custom of smoking tobacco to the world. In India, the Portuguese traders introduced tobacco during 1600. Tobacco's easy assimilation into the cultural rituals of many societies was facilitated by the medicinal (and perhaps intoxicating) properties attributed to it. Tobacco is a major global contributor to deaths from chronic diseases. There are about 1.3 billion smokers in the world and approximately 80% of them live in the developing countries. Globally, there are 5 million deaths per year from tobacco use which are expected to rise to 10 million by the year 2025. It is also alarming to note that approximately 7 million of these will be from developing countries. Nicotine-dependent and psychiatrically ill individuals consume about 70% of all cigarettes smoked in the United States. The results of this study highlight the importance of focusing smoking cessation efforts on individuals who are nicotine dependent, who have bipolar disorders, and individuals who have co-morbid nicotine dependence and other bipolar disorders.

A recent national survey also found elevated smoking rates among adults with bipolar disorders compared with those without such disorders. These studies did not address the issue of nicotine dependence. Dependence on psychoactive substances indicates a condition in which repeated self-administration results in compulsive substance-taking behaviour that is very often chronic and continues despite serious consequences. Thus, determining the prevalence and co-morbidity of nicotine dependence in the general population and the contribution of these conditions to the total public health burden caused by cigarette smoking is
of the highest public health importance. Reports of tobacco use in different population groups shows its prevalence at 15% to 50% among men. People with a mental illness are twice as likely as non-psychiatric controls to smoke. Similarly, estimates of smoking prevalence rates among individuals receiving psychiatric

care varies from 50% to 80%, 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.

Most individuals with lifetime Nicotine Dependence and Bipolar Disorder were Bipolar Disorder -prior (72.6%). Bipolar Disorder -prior individuals had an earlier onset of Bipolar Disorder and a higher number of manic episodes. By contrast, Nicotine Dependence -prior individuals had an earlier onset of both daily smoking and Nicotine Dependence, and an increased prevalence of alcohol use disorder. Prior epidemiological research has consistently shown that substance use disorders (SUDs) are extremely common in bipolar I and II disorders. The lifetime prevalence of substance use disorders is at least 40% in bipolar I patients. 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. In India, the studies specifically examining the relationship between smoking and the bipolar disorder are scarce.t has been hypothesized that the prevalence of Nicotine dependence among Bipolar disorder patients is high and vary with significant correlates like family history, duration of illness, no. of episodes etc.,

II. Aims And Objectives

AIM:

To study the prevalence and clinical correlates of nicotine dependence among patients with Bipolar Disorder.

OBJECTIVES:

1. To study the prevalence of Nicotine dependence among Bipolar Disorders.
2. To study the socio-demographic variables of the Bipolar patients with Nicotine dependence.
3. To determine the clinical correlates of Bipolar patients with Nicotine dependence.

III. Methodology

This chapter will specify and justify the participants, instruments, procedure and data analysis that are used in this study.

Design and Sample:

A cross sectional study was conducted at Psychiatric Department , at Maharajah's Institute of Medical Sciences, Vizayanagaram, for a period of 2 years (October 2013 – September 2015) on a sample of 92 patients who were diagnosed as having Bipolar Affective Disorder after obtaining permission from the Institutional Ethics Committee of Maharajah's Institute of Medical Sciences. The tools used were self structured socio-demographic schedule and Fagerstrom Test for Nicotine Dependence which is a widely used measure of severity of Nicotine Dependence. It consists of 6 items with a total score of 10. ICD-10 criteria were used to confirm the diagnosis of Bipolar Disorder. The data collected was analysed and statistical package for social sciences 16^{th} versions by using frequencies, standard deviation, bar charts, pie diagrams and chi-square test to study the prevalence and clinical correlates of Nicotine dependence among Bipolar patients and its relation to socio-demographic variables and clinical variables.

Sampling Criteria:

A. **Inclusion Criteria**:

1. Subjects between 18 – 65 years of age.
2. Patients who fulfilled ICD – 10 clinical description and diagnostic guidelines criteria of Bipolar Disorder.
3. Patients who have given written informed consent.

B. **Exclusion Criteria**:

1. Presence of Co-morbid psychiatric illness
2. Presence of any substance abuse other than nicotine dependence.

IV. Results

This study describes the analysis and findings of data.

Distribution of subjects according to characteristics of sample

Table 1 – Age group

Age in Years	Frequency	Percentage
18 – 27	28	30.4
28 – 37	31	33.7

38 – 47	15	16.3
48 – 57	15	16.3
58 – 67	3	3.3

The total sample size was 92 bipolar patients. The mean age of the sample was 33.62±10.573, out of 92 patients, 28 (30.4%) were from 18 to 27 age group; 31 (33.7%) from 28 to 37 age group, and 15 (16.3%) were from 38 to 47 age group. 15 (16.3%) from 48 to 57 age group and 3 (3.3%) from 58 to 67 years age group. Among all age groups 28-37 age group was having high prevalence of nicotine dependence. In a total of 92 Bipolar patients, 56 were found to have Nicotine Dependence and 36 had non Nicotine dependence.

Table 2 – Sex Variable

Sex	**Frequency**	**Percentage**
Male	45	48.9
Female	47	51.1

In the total 92 patients, 45 (48.9%) were male patients and 47 (51.1%) Female patients.

Table 3 – Religion

Religion	**Frequency**	**Percentage**
Hindu	88	95.6
Muslim	2	2.2
Christians	2	2.2

In the total 92 patients,88 (95.7%) were Hindus while 2 (2.2%) were Christians and 2 (2.2%) were Muslims.

Table 4 - Occupation

Occupation	**Frequency**	**Percentage**
Unemployed	22	23.8
Student / Housewife	26	28.3
Semi Skilled	25	27.2
Skilled	16	17.4
Clerk, Farm Owner	0	0.0
Semi Professional	3	3.3
Professional	0	0

In the total 92 patients, 22 (23.9%) were unemployed, 26 (28.3%) were Students or Housewives, 25 (27.2%) were Semiskilled labourers, 16 (17.4%) were skilled labourers and 3 (3.3%) were Semi professionals.

Table 5 - Education

Education	Frequency	Percentage
Illiterate	9	9.8
Primary School	21	22.8
Middle School	34	37.0
High School	17	18.5
Diploma	5	5.4
Graduate	2	2.2
Professional Degree	4	4.3

In the total 92 patients, 9 (9.8%) were Illiterates, 21 (22.8%) have studied up to Primary school; 34 (37.0%) have studied Middle School, 17 (18.5%) have gone to High school, 5 (5.4%) have done Diploma, 2 (2.2%) were Graduates and 4 (4.3%) were Postgraduates.

Table 6 – Marital Status

Marital Status	Frequency	Percentage
Unmarried	42	45.7
Married	43	46.7
Widowed	0	0.0
Divorced / Separated	7	7.6

In the total 92 patients, 42 (45.7%) of the sample were unmarried,43 (46.7%)
Were married and 7 (7.6%) were either divorced or separated.

Table 7 - Residence

Residence	Frequency	Percentage
Rural	75	81.5
Semi-Urban	11	12.0
Urban	6	6.5

In the total 92 patients, 75(81.5%) patients were from rural background,
11(12.0%) were from semi urban and 6 (6.5%) from urban back grounds.

Table 8 – Socioeconomic Status

Socioeconomic Status	Frequency	Percentage
Upper	0	0.0
Upper Middle	17	18.5
Upper Lower	59	64.1

Lower Middle	16	17.4
Lower	0	0.0

The socioeconomic status was calculated using KuppuSwamy's scale. In the total 92 patients, 17 (18.5%) were Upper middle class, 16 (17.4%) were Lower Middle class and 59 (64.1%) were upper lower.

Prevalence of Nicotine dependence Vs. Socio Demographic Variables

Table 9 – Age and Nicotine Dependence

Age	**Dependent**		**Non Dependent**		**X^2**	**P**	**Inference**
	n	**%**	**n**	**%**			
18-27	12	21.4	16	44.4	14.979	0.005	S
28-37	19	33.9	12	33.3			
38-47	12	21.4	3	8.4			
48-57	13	23.3	2	5.5			
58-67	0	0	3	8.4			
Total	56	100	36	100%			

Chi-Square = 14.979; P-Value=0.005
Age: - In a total of 92 patients 56 patients had Nicotine Dependence and
36 were not Nicotine dependent. There was a statistically significant relationship between age of patients and in Nicotine dependence Bipolar Disorder, Nicotine dependence was more among the age group 28 - 37 years.

Table 10- Gender and Nicotine Dependence

Gender	**Dependent**		**Non Dependent**		**X^2**	**P**	**Inference**
	n	**%**	**n**	**%**			
Male	33	58.9	12	33.4	5.745	0.017	NS
Female	23	41.1	24	66.6			
Total	**56**	**100%**	**36**	**100%**			

Chi-Square - 5.745; P-Value -<0.017.
Gender: In a total of 92 patients, 56 patients had nicotine dependence, out of which 33 were males and 23 were females. 36 patients were not having nicotine dependence. Gender was statistically not significant in prevalence of nicotine dependence in bipolar disorder.

Table 11- Religion and Nicotine Dependence

	Dependent		Non Dependent		x^2	P	Inference
	n	%	n	%			
Hindu	54	96.4	34	94.4			
Muslim	1	1.8	1	2.8	207	.901	NS
Christians	1	1.8	1	2.8			
Total	**56**	**100**	**36**	**100%**			

Chi-Square-.207, P-Value-.901

Religion: In the total of 92 patients, 54 (96.4%) were Hindus, while 1 (1.78%) were Christians and 1 (1.78%) were Muslims. In a total of 92 patients, 54 Hindus, 1 Muslim and 1 Christian were found to have Nicotine Dependence, 36 patients were not having nicotine dependence. Religion was statistically not significant in prevalence of nicotine dependence in bipolar disorder.

Table 12- Residence and Nicotine Dependence

Residence	Dependent		Non Dependent		X^2	P	Inference
	n	%	n	%			
Rural	44	78.5	31	86.2			
Semi-Urban	8	14.3	3	8.3	0.642	0.887	NS
Urban	4	7.2	2	5.5			
Total	**56**	**100%**	**36**	**100%**			

Chi-Square-0.642, P-Value-0.887

Residence: In the total of 92 patients, 44 (78.5%) were Rural, 8 (14.2%) were Semi Urban and 4 (7.14%) were Urban were found to have Nicotine Dependence, 36 patients were not having nicotine dependence. Area of residence had no statistical significance in prevalence of nicotine dependence in bipolar disorder.

Table 13 – Occupation and Nicotine Dependence

Occupation	Dependent		Non Dependent		X^2	P	Infere Nce
	n	%	n	%			
UN EMPLOYED	14	25.2	8	22.2			
STUDENT	10	17.8	16	44.4			
SEMISKILLED	16	28.5	9	25.0	10.373	0.035	NS
SKILLED	13	23.2	3	8.4			
SEMIPROFESSION	3	5.3	0	0			

Total	**56**	**100%**	**36**	**100**			

Chi-Square-0.642, P-Value-0.887

Occupation: In the total of 92 patients, 14 (25%) were Unemployed, 10 (17.8%) were Students, 16 (28.5%) were Semiskilled, 13(23.2%) were Skilled and 3(5.3%) Semi-professional were found to have Nicotine Dependence, 36 patients were not having nicotine dependence. Occupation was statistically not significant in prevalence of nicotine dependence in bipolar disorder.

Table 14 – Education and Nicotine Dependence

Education	**Dependent**		**Non Dependent**		**X^2**	**P**	**Infere Nce**
	N	**%**	**n**	**%**			
ILLETERATE	5	8.9	4	11.1			
PRIMARY SCHOOL	12	21.4	9	25.0			
MIDDLE SCHOOL	23	41.2	11	30.5			
HIGH SCHOOL	10	17.8	7	19.5	4.363	0.628	NS
DIPLOMA	3	5.4	2	5.6			
GRADUATE	2	3.6	0	0			
PROFESSIONAL	1	1.7	3	8.3			
Total	**56**	**100%**	**36**	**100%**			

Chi-Square-4.363, P-Value-0.628

Education: In the total of 92 patients, 5 (8.9%) were illiterate, 12 (21.4%) were Primary School, 23 (41%) were Middle School, 10(17.8%) were High School, 3(5.3%) were Diploma, 2(3.5%) were Graduate and 1(1.7%) Professional were found to have Nicotine Dependence, 36 patients were not having nicotine dependence. Education was statistically not significant in prevalence of nicotine dependence in bipolar disorder.

Table 15 – Marital Status and Nicotine Dependence

Marital Status	**Dependent**		**Non Dependent**		**2 X**	**P**	**Infere Nce**
	N	**%**	**n**	**%**			
UNMARRIED	21	37.5	21	58.4			
MARRIED	28	50.0	15	41.6	6.909	.032	S
DIVORCED	7	12.5	0	0			
Total	**56**	**100%**	**36**	**100%**			

Marital Status: In the total of 92 patients, 21 (37.5%) were Unmarried, 28 (50.0%) were Married, 7 (12.5%) were Divorced and found to have Nicotine Dependence, 36 patients were not having nicotine dependence. Marital status was statistically significant in prevalence of nicotine dependence in bipolar disorder, more among the married.

Table 16 –Socioeconomic Status and Nicotine Dependence

Socioeconomic Status	Dependent		Non Dependent		χ^2	P	Inference
	n	%	n	%			
UPPER MIDDLE	8	14.4	9	25.0	1.689	0.430	NS
UPPER LOWER	38	67.8	21	58.3			
LOWER MIDDLE	10	17.8	6	16.7			
Total	**56**	**100%**	**36**	**100%**			

Chi-Square-1.689, P-Value-0.430

Socioeconomic Status: In the total of 92 patients, 8 (14.2%) were Upper middle, 10 (17.8%) were Lower middle and 38 (67.8%) were Upper lower. Socioeconomic status was not statistically significant in the prevalence of nicotine dependence in bipolar disorder.

Table 17 – Family H/o. Alcohol Abuse and Nicotine Dependence

Family H/o. Alcohol abuse	Dependent		Non Dependent		χ^2	P	Inference
	N	%	n	%			
Yes	22	39.2	20	55.5	8.762	.003	S
No	34	60.8	16	44.5			
Total	**56**	**100%**	**36**	**100%**			

Chi-Square-8.762, P-Value-.003

Family H/o. Alcohol abuse: In a total of 92 BPAD patients, 56 were nicotine dependent, out of which 22 patients had a positive family history of alcohol abuse. It was statistically significant.**Table 18 - Family H/o. BPAD and Nicotine Dependence**

F H\o BPAD	Dependent		Non Dependent		χ^2	P	Inference
	n	%	n	%			
Yes	44	78.57	26	72.23	1.434	0.317	NS
No	12	21.43	10	27.77			
	56	**100%**	**36**	**100%**			

Chi-Square – 1.434, P-Value – 0.317

Family H/o. BPAD: In a total of 92 bipolar patients, 56 patients were found to have Nicotine dependence and out of which 44 had family history of BPAD. There were 36 patients with non nicotine dependence in BPAD, out of which 26 had family history of BPAD. These results show that family history of BPAD has no significance in prevalence of nicotine dependence in BPAD.

Table 19 – Total Duration of illness

Duration of illness	Value	Percentage
0-4	36	39.1
5-9	24	26.1
10-14	14	15.2
15-19	6	6.5
20-24	5	5.5
25-29	2	2.2
30-34	4	4.3
>35	1	1.1

Table 20 – Total Duration of illness and Nicotine Dependence

Duration of illness	Dependent		Non Dependent		X^2	P	Inference
	n	%	n	%			
0-4	19	33.9	17	47.3	1.563	0.121	NS
5-9	15	26.8	9	25.0			
10-14	10	17.9	4	11.1			
15-19	4	7.2	2	5.5			
20-24	2	3.6	3	8.4			
25-29	2	3.6	0	0.0			
30-34	3	5.3	1	2.7			
>35	1	1.7	0	0.0			
	56	**100%**	**36**	**100%**			

Chi-Square – 1.563, P-Value – 0.121

Duration illness and Nicotine Dependence: In a total of 92 patients, the mean duration of Illness was 8.70±8.54 years. 36 (39.1%) patients had Illness for less than five years. It also shows that 24 (26.1%) patients had Illness for 5-9 years; 14 (15.2%) patients had illness for 10 - 14 years; 6 (6.5%) patients had illness for 15-19 years, 5 (5.4%) patients had illness for 20 - 24 years; 2 (2.2%) patients had illness for 25 - 29 years; 4 (4.3%) patients had illness for 30 - 34 years and 1 (1.1%) one patient had illness for more than 35 years. Among 56 Nicotine dependent patients, 19 (33.9%) were within 0-4 years, 15(26.8%) patients were in between 5-9 years, 10(17.9%) patients were in between 10-14 years, 4(7.2%) patients were in between 15-19 years, 2(3.6%) patients were in between 20-24 years, 2(3.6%) patients were in between 25-29 years, 3(5.3%) patients were in between 30-34 years and 1(1.7%) patient was in between >35 years. Duration of illness was not statistically significant in prevalence of nicotine dependence in bipolar patients.

Table 21 - Total Number of Episodes

Total No. of Episodes	No. of Patients	Percentage
1	13	14.1
2	32	34.8
3	18	19.6

4	4	4.3
5	11	12.0
6	7	7.6
7	2	2.2
8	4	4.3
12	1	1.1
	92	100%

Table 22 - Total Number of Episodes and Nicotine Dependence

Total Episodes	**Dependent**		**Non Dependent**		**X^2**	**P**	**Inference**
	N	**%**	**n**	**%**			
1	5	8.9	8	22.3			
2	15	26.8	17	47.3			
3	16	28.6	2	5.7			
4	1	1.7	3	8.3			
5	10	17.9	1	2.7	24.837	.001	S
6	4	7.1	3	8.3			
7	2	3.6	0	0			
8	3	5.4	1	2.7			
12	0	0.0	1	2.7			
	56	**100%**	**36**	**100%**			

Chi-Square = 24.837; P-Value=0.001

Total Number of Episodes and Nicotine Dependence: In a total of 92 bipolar patients, 56 had Nicotine dependence out of which 5(8.9%) were presented with one episode, 15(26.7%) patients had 2 episodes, 16(28.5%) patients had 3 episodes, 1(1.7%) patient had 4 episodes, 10(17.8%) patients had 5 episodes, 4(7.1%) patients had 6 episodes, 2(3.5%) patients had 7 episodes, 3(5.3%) patients had 8 episodes and 0(0.0%) patient had 12 episodes. Nicotine dependence was found to be more common among patients with 2 or 3 episodes, that may be because of younger age patients in those two groups and it was statistically significant.

Table 23 – Drug Compliance

Drug Compliance		
Compliant	39	42.4
Non Compliant	53	57.6

Table 24 – Drug Compliance and Nicotine Dependence

Drug Compliance	Dependent		Non Dependent		X^2	P	Infere Nce
	N	%	n	%			
Compliant	18	32.1	21	58.3	6.155	0.013	S
Non Compliant	38	67.9	15	41.7			
Total	**56**	**100%**	**36**	**100%**			

Chi-Square-6.155, P-Value-0.013

Drug Compliance: In a total of 92 bipolar patients, 39 (42.4%) were compliant and 53 (57.6%) non compliant. Among the 56 dependent patients 18(32.1%) patients were compliant and 38(67.9%) were non compliant. Drug compliance was statistically significant in prevalence of nicotine dependence in bipolar disorder, less the drug compliance more the Nicotine dependence.

Severity of Degree of Nicotine Dependence

Table 25 - Severity of Degree of Nicotine Dependence in Bipolar Patients

Nicotine Dependence	BPAD
Mild	33
Moderate	6
Severe	17
Total	**56**

Table 26 - Total Episodes in Bipolar Patients - Degree of Nicotine Dependence

			Total Episodes								Total
			1	2	3	4	5	6	7	8	
Nicotine Dependent	Nicotine grade	Mild Dependence	3	5	9	1	9	3	0	3	33
		Moderate Dependence	0	4	2	0	0	0	0	0	6
		Severe Dependence	2	6	5	0	1	1	2	0	17

	Total	5	15	16	1	10	4	2	3	56

Chi square=18.544, P-Value= .183

The above table shows the relation between degree of nicotine dependence with no of Episodes of Bipolar disorder. In a total of 92 bipolar patients 56 patients were found to have nicotine dependence. 33 patients had mild dependence, 6 patients had moderate dependence and 17 patients had severe dependence. 6 patients had 1 episode, 14 patients had 2 episodes, 20 patients had 3 episodes, 2 patients had 4 episodes, 5 patients had 5 episodes, 4 patients had 6 episodes, 2 patients had 7 episodes and 3 patients had 8 episodes. Total number of episodes in Bipolar Disorder patients was not significantly associated with degree of nicotine dependence.

Table 27 - Manic Episodes in Bipolar Patients

Nicotine Dependence	**Manic**
Mild	33
Moderate	6
Severe	17
Total	**56**

Table 28 - Manic Episodes in Bipolar Patients - Degree of Nicotine Dependence

Nicotine Dependent		manic episodes								Total
		1	2	3	4	5	6	7	8	
Grading	Mild dependence	4	4	13	2	4	3	0	3	33
	Moderate dependence	0	4	2	0	0	0	0	0	6
	Severe dependence	2	6	5	0	1	1	2	0	17
Total		6	14	20	2	5	4	2	3	56

Chi square=17.926, P-Value= .210

In the total of 92 bipolar patients, 56 patients had nicotine dependence, 33 patients had mild dependence, 6 patients had moderate dependence and 17 patients had severe dependence. 6 patients had 1 episode, 14 patients had 2 episodes, 20 patients had 3 episodes, 2 patients had 4 episodes, 5 patients had 5 episodes, 4 patients had 6 episodes, 2 patients had 7 episodes and 3 patients had 8 episodes. Manic episodes in bipolar patients were not significantly associated with degree of nicotine dependence.

Table 29 - Depressive Episodes in Bipolar Patients

Nicotine Dependence	**Depression**
Mild	31
Moderate	10
Severe	15
Total	**56**

Table 30 - Depressive Episodes in Bipolar Patients - Degree of Nicotine Dependence

Nicotine Dependent		depression episodes			Total
		0	1	2	
Grading	Mild Dependence	24	4	3	31
	Moderate Dependence	6	2	2	10
	Severe Dependence	15	0	0	15
Total		45	6	5	56

Chi square=5.576, P-Value= .233

In a total 92 bipolar patients, 56 patients had nicotine dependence, 11 patients had depressive episodes. 6 patients had one depressive episode, 5 patients had two depressive episodes. Depressive episodes was Bipolar patients were not significantly associated with degree of Nicotine Dependence.

V. Discussion

The total sample size was 92 Bipolar patients. The mean age of the sample was 33.62±10.573. Out of 92 patients, 28 (30.4%) were from 18 to 27 age group, 31 (33.7%) from 28 to 37 age group, 15 (16.3%) were from 38 to 47 age group, 15 (16.3%) from 48 to 57 age group and 3 (3.3%) from 58 to 67 years age group. Among all age groups 28-37 age group was having high prevalence of Nicotine dependence. In a total of 92 Bipolar patients, 56 were found to have Nicotine Dependence and 36 had non Nicotine dependence. In our study there was statistically significant relationship between age of patients and Nicotine dependence in Bipolar Disorder with a P-value of .005. It is probably because the number of patients abusing Nicotine and Alcohol is more in this age group 28-37 years (33.7%) and prevalence of Bipolar Disorders is more among people younger than 30 years of age. It was similar to the study done by **Monica Perez-Rios et al[1] (2006-2011)** on a sample of 2500 people, with similar allocation by age

group (18–39 years, 40–59 years, and 60 years and older) to the Spanish population. A total of 2,522 adults were interviewed in 2006 and 2,504 in 2011 on Colombo North Teaching Hospital and concluded that Overall prevalence of smokers in 2006 was 23.4% and 20.7% in 2011. Significant findings were observed in the youngest group only: the prevalence of smokers decreased from 30.7% in 2006 to 24.7% in 2011 and the prevalence of never smokers increased from 47.6% to 56.5%, respectively. It was also similar to the study conducted by **Carney CP et al[2] (2006)** with 3557 patients in Wellmark Blue Cross blue shield and found that Persons with Bipolar Disorder were young (mean age, 38.8 years) and significantly more likely to have medical comorbidity, including three or more chronic conditions (41% versus 12%, $p < .001$) compared with controls.

In our study 45 (48.9%) were male patients and 47 (51.1%) female patients. In a total of 45 male patients 33 (58.9%) were dependent and among 47 females 23 (41%) were dependent. It was not statistically

significant although, the prevalence of Nicotine dependence was higher among males compared to females with bipolar disorder. It was similar to the study done by **Monica Perez-Rios et al[1] (2006-2011)** in 2006 and 2011, studies done by **Poirier et al[3] (2002), Breslau N et al[4] (1995)** and **Anne Yee et al[5] (2009-2010).**

In our study, there were 88 (95.7%) Hindus while 2 (2.2%) were Christians and 2 (2.2%) were Muslims. Among 88 Hindus 54 were dependent (96.4%) and out of 2, 1 Muslim and 1 Christian were found to have Nicotine Dependence, which is not statistically significant. It was similar to the study done by **Prabha S. Chandra et al[6] (2005)**.

In our study, there were 22 (23.9%) unemployed, 26 (28.3%) were Students or Housewives, 25 (27.2%) were Semiskilled laborers, 16 (17.4%) were

skilled laborers and 3 (3.3%) were Semi professionals. Among 22 Unemployed 14 (25%) were dependent, among 26 students 10 (17.6%) were dependent, among 25 Semi Skilled laborers 16 (28.5%) were dependent, among 16 Skilled laborers 13 (23.2%) were dependent and among 3 Semi Professionals 3 (5.3%) were dependent. The results were not significant for occupation. It was similar to the studies done by **Prabha S. Chandra et al[6] (2005) & Anna Schmidt et al.** It differs from the study done by **Jeanette A. Waxmonsky et al[7] (2005)** where it was statistically significant for Unemployed with P =.003.

In our study, there were 9 (9.8%) illiterates, 21 (22.8%) have studied up to Primary School; 34 (37.0%) up to Middle School, 17 (18.5%) have gone to High school (11^{th} and 12^{th} standard), 5 (5.4%) have done Diploma, 2 (2.2%) were Graduates and 4 (4.3%) were Postgraduates. Among the 56 dependent patients 5 (8.9%) were illiterate, 12 (21.4%) were Primary School, 23 (41%) were Middle School, 10(17.8%) were High School, 3(5.3%) were Diploma, 2(3.5%) were Graduate and 1(1.7%) Professional was found to have Nicotine Dependence. It was not statistically significant. It was similar to the studies done by **Prabha S. Chandra et al[6] (2005), Jeanette A. Waxmonsky et al[7] (2005) & Pennanen M et al(2007).** It differs from the study done by **Anne Yee et al[5] (2009-2010)** in which education and occupation was statistically significant in prevalence of nicotine dependence.

In our study, 42 (45.7%) of the sample were unmarried, 43 (46.7%) were married and 7 (7.6%) were either divorced or separated. Among 56 dependents 21 (37.5%) were Unmarried, 28 (50.0%) were Married, 7 (12.5%) were Divorced. 36 patients were not having nicotine dependence. It was statistically significant. It was similar to the studies done by **Prabha S. Chandra et al[6] (2005), Jeanette A.**

Waxmonsky et al[7] (2005) & Pennanen M et al (2007). It differs from the study done by **Anne Hway et al[5] (2009-2010)** in which marital status was statistically significant in prevalence of nicotine dependence.

In our study, there were 75 (81.5%) patients from rural background, 11(12.0%) were from semi urban and 6 (6.5%) from urban back grounds. 44 (78.5%) Rural, 8 (14.2%) Semi Urban and 4 (7.14%) Urban were found to have Nicotine Dependence. The results were not significant for place of residence. It was similar to the studies done by **Prabha S. Chandra et al[6] (2005).**

The socioeconomic status was calculated using Kuppusamy's scale. In the total 92 patients, 17 (18.5%) were Upper middle class, 16 (17.4%) were Lower Middle class and 59 (64.1%) were upper lower. 8 (14.2%) Upper middle, 10 (17.8%) Lower middle and 38 (67.8%) Upper Lower class people were Nicotine Dependent which was not statistically significant. It was similar to the studies done by **Matthews et al (1989)** & **Pennanen M et al (2007).**

In our study, among 56 Nicotine Dependence patients, 22 patients had a positive family history of alcohol. Family h/o. alcohol abuse was statistically significant for prevalence of nicotine dependence in bipolar disorder with a P-value of .003. It is significant because the family h/o. alcohol abuse has a definitive impact on prevalence of nicotine dependence in BPAD due to genetic impact of CYP2A6, an enzyme responsible for the majority of inactivation of nicotine in human; it is also responsible for activating tobacco-related pre carcinogens such as the nitrosamines. Genetic variation in CYP2A6 gene may protect individuals from becoming nicotine-dependent. Mimicking this defect by inhibiting CYP2A6 decreases the nicotine metabolism. Cigarette smoking like any other behavior shows evidence of heterogeneity. Dopamine transporter gene SLC6A3 encodes protein that regulates the levels of dopamine in the brain and leads to addictive behaviour. The process of identifying gene markers predicts a heightened risk causing nicotine dependence. It was similar to the studies done by **Krenin et al[8] (2011), Jeanette A. Waxmonsky et al[7](2005)**, **Goldstein et al[9] (2008), Prabha S. Chandra et al[6] (2005) & Hartz et al.**

In our study 13(14.1%) were presented with one episode, 32(34.8%) patients had 2 episodes, 18(19.6%) patients had 3 episodes, 4(4.3%) patients had 4 episodes, 11(12.0%) patients had 5 episodes, 7(7.6%) patients had 6 episodes, 2(2.2%) patients had 7 episodes, 4(4.3%) patients had 8 episodes and 1(1.1%) patient had 12 episodes. Among 56 dependent patients 5(8.9%) were presented with one episode, 15(26.7%) patients had 2 episodes, 16(28.5%) patients had 3 episodes, 1(1.7%) patients had 4 episodes, 10(17.8%) patients had 5 episodes, 4(7.1%) patients had 6 episodes, 2(3.5%) patients had 7 episodes and 3(5.3%) patients had 8 episodes. Total number of episodes was statistically significant for prevalence of nicotine dependence in bipolar disorder

with a P-value of 0.001. It is significant because the total number of episodes has a definitive impact on prevalence of nicotine dependence in bipolar disorder due to psychological stress loading with more antipsychotic medications, mood stabilizers and anti depressants. In general the degree of nicotine dependence is determined by individual, genetic and psychosocial factors, occupational (e.g., work stress), personal (e.g., poor quality of life), imbalance, effort, reward and gratification crisis. It is similar to the studies done by **N Edrisinghe et al[10] (2014) & Prabha S. Chandra et al[6] (2005)**.

In our study 39 (42.4%) were compliant and 53 (57.6%) non compliant. Among the 56 dependents 18(32.1%) patients were compliant, 38(67.9%) were
non compliant. Drug compliance was statistically significant for prevalence of nicotine dependence in bipolar disorder with a P-value of 0.013. It was evident if the drug compliance is not good or irregular it had impact over the quality of life of bipolar patients that may lead to Nicotine dependence. It was similar to the studies done by **Prabha S. Chandra et al[6] (2005)** P-Value <.05.

In a total of 92 bipolar patients, 56 patients were found to have nicotine dependence out of which 33 patients had mild dependence, 6 patients had moderate dependence and 17 patients had severe dependence. The severity of degree of Nicotine Dependence had no significant relationship with number of episodes of Bipolar Disorder. It was similar to the studies done by **Prabha S. Chandra et al[6] (2005), Glassman et al[15].** It differed from the study done by **Anne Hway et al[5] (2009-2010)**, where they had significant relationship, the more the number of episodes the more was severity of degree of Nicotine Dependence.

VI. Conclusions And Summary

This is a cross sectional study conducted at Psychiatric Department OPD, in Maharajah's Institute of Medical Sciences, Vizianagaram, for a period of 2 years (October 2013 – September 2015) on a total sample of 92 patients who were diagnosed to have Bipolar Affective Disorder. Prior to this study permission was obtained from Institutional Ethics Committee of Maharajah's Institute of Medical Sciences. The tools used were self structured socio-demographic schedule and Fagerstrom test for Nicotine dependence which is a widely used measure of severity of Nicotine dependence. The data collected was analysed to assess the prevalence of Nicotine dependence among Bipolar patients and clinical correlates of Nicotine dependence among Bipolar patients and its relation to socio-demographic variables and clinical variables.

1. In our study, 28-37 (33.7%) age group was having high prevalence of nicotine dependence which was statistically significant.
2. In a total of 92 patients, 56 patients had nicotine dependence, out of which 33 were males and 23 were females, gender had no statistical significance.
3. In a total of 92 patients, 54 Hindus, 1 Muslim and 1 Christian were found to have Nicotine Dependence. Religion was statistically not significant.
4. In our study, 56 patients had nicotine dependence, 44 (78.5%) were Rural, 8 (14.2%) were Semi Urban and 4 (7.14%) were Urban were found to have Nicotine Dependence. Area of residence had no statistical significance.
5. In the total of 92 patients, 14 (25%) were Unemployed, 10 (17.8%) were Students, 16 (28.5%) were Semiskilled, 13(23.2%) were Skilled and 3(5.3%) Semiprofessional were found to have Nicotine Dependence. Occupation was statistically not significant.
6. In the total of 92 patients, 56 patients had Nicotine Dependence out of which 5 (8.9%) were illiterate, 12 (21.4%) were Primary School, 23 (41%) were Middle School, 10(17.8%) were High School, 3(5.3%) were Diploma, 2(3.5%) were Graduate and 1(1.7%) Professional. Education was statistically not significant.

7. In our study total 92 patients, 56 patients had Nicotine Dependence out of which 21 (37.5%) were Unmarried, 28 (50.0%) were Married, 7 (12.5%) were Divorced. Nicotine Dependence was found to be more common among married group and it was statistically significant.
8. In the total of 92 patients, 56 patients had Nicotine Dependence out of 8 (14.2%) were Upper middle, 10 (17.8%) were Lower middle and 38 (67.8%) were Upper lower. Socioeconomic status was not statistically significant.
9. In a total of 92 BPAD patients, 56 were nicotine dependent, out of which 22 patients had a positive family history of alcohol abuse which was statistically significant.
10. In a total of 92 Bipolar patients, 56 patients were found to have Nicotine dependence and out of which 44 had family history of BPAD. It was statistically not significant.
11. In a total of 92 Bipolar patients, among 56 Nicotine dependent patients, 19 (33.9%) were presented with 0-4 years, 15(26.8%) patients had 5-9 years, 10(17.9%) patients had 10-14 years, 4(7.2%) patients had 15-19 years, 2(3.6%) patients had 20-24 years, 2(3.6%) patients had 25-29 years,

12. 3(5.3%) patients had 30-34 years and 1(1.7%) patient had >35 years. Duration of illness was not statistically significant in prevalence of nicotine dependence in bipolar patients.
13. In a total 92 bipolar patients, 5(8.9%) were presented with one episode, 15(26.7%) patients had 2 episodes, 16(28.5%) patients had 3 episodes, 1(1.7%) patients had 4 episodes, 10(17.8%) patients had 5 episodes,
14. 4(7.1%) patients had 6 episodes, 2(3.5%) patients had 7 episodes, 3(5.3%) patients had 8 episodes and 0(0.0%) patient had 12 episodes. Nicotine Dependence was found to be more common among patients who had 3 episodes and it was statistically significant. Younger age must have contributed to the significance among these patients.
15. In a total of 92 bipolar patients, 39 (42.4%) were compliant and 53 (57.6%) non-compliant. Among the 56 dependents 18(32.1%) patients were compliant and 38(67.9%) were non-compliant and non compliance was significantly associated with Nicotine Dependence in BPAD.
16. In a total of 92 bipolar patients, 56 patients were found to have nicotine dependence out of which 33 patients had mild dependence, 6 patients had moderate dependence and 17 patients had severe dependence. The severity of degree of Nicotine Dependence had no significance.

Although high rates of Nicotine Dependence have been reported among psychiatric patients, only a few studies examined the prevalence of Nicotine Dependence in bipolar disorder, and findings were inconsistent. In India, the studies specifically examining the relationship between Nicotine Dependence and Bipolar Disorder were scarce.

Our study shows that the prevalence of Nicotine dependence was high among the BPAD patients and significantly varied with age, marital status, family history of Alcohol abuse, Total number of episodes and Drug compliance.

Limitations

a) The study was a cross sectional study and hence results cannot be generalized to the entire population.
b) The size of the sample was small, bigger sample may yield more providing results.
c) The distribution of the sample was not equal in age or sex that led to variable results compared to the previous studies.

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