



## PATTERN AND LEVEL OF NICOTINE-DEPENDENCE OF SCHIZOPHRENIA AND BIPOLAR AFFECTIVE DISORDER PATIENTS AND ITS COMPARISON WITH NICOTINE USERS WITHOUT MENTAL ILLNESS

**Dr. Priyanka Sharma**

Assistant Professor, Department of Psychiatry, Gajra Raja Medical College & J.A.Hospital, Gwalior (M.P.) 474001

**Dr. Shantanu Bharti\***

Associate Professor, Department of Psychiatry, Era's Lucknow Medical College & Hospital, Sarfarazganj, Hardoi Road, Lucknow, (U.P.) 226003 \*Corresponding Author

### ABSTRACT

**Background:** Use of nicotine products is quite prevalent in patients of mental disorders as well as in general public to combat with the stress and anxiety. It is of interest to study the pattern of nicotine dependence in various psychiatric illnesses and to compare it with general population. **Method:** This study included 150 respondents, 50 each from Schizophrenia (SCH), BPAD (Mania) and general population without any psychiatric illness (Controls) respectively having history of nicotine use for >1 year. Patients were diagnosed according to ICD-10 diagnostic criteria. Severity of illness was assessed by appropriate rating scales. Severity of nicotine dependence was assessed by Fagerstrom Test for Nicotine Dependence (FTND & FTND- ST). Statistical analysis of data was done using Statistical Package for Social Sciences (SPSS) version 21.0. Chi-square test and ANOVA were performed. **Results:** Mean age of SCH, BPAD and Controls was 39.26±7.48, 36.82±9.01 and 39.60±7.77 years respectively. Male to female ratio of SCH, BPAD and Controls were 5.25, 6.14 and 2.57 respectively. Prevalence of smoking was 88%, 88% and 74% respectively in the three groups. Statistically, no significant difference among groups was observed with respect to smoking and smokeless tobacco use. Though duration of smoking was significantly higher in controls as compared to that in SCH and BPAD groups yet daily frequency of smoking and smokeless tobacco consumption was significantly higher in cases with SCH and BPAD as compared to that in controls. Mean FTND & FTND-ST scores in SCH, BPAD and Controls were 7.06±5.71 & 6.50±3.26, 10.09±9.50 & 5.94±2.44 and 7.16±6.80 & 2.76±2.21 respectively. **Conclusion:** Nicotine dependence was significantly higher in cases with BPAD and SCH as compared to normal population. Schizophrenia patients tended to have higher dependence on smokeless form of nicotine use as compared to controls.

**KEYWORDS :** Nicotine dependence, smoke-form, smokeless tobacco, Schizophrenia, Bipolar affective disorder (BPAD).

### INTRODUCTION

Addiction to nicotine is one of the most important causes of morbidity and mortality that can be averted. Smoking is not any more just a bad habit, but a substance addiction problem. The pharmacological aspects of nicotine show that this substance has a broad distribution in the different body compartments, due mainly to its lipophilic characteristic. It not only affects the physical health but also had an influential impact on the psychological and mental health of individuals. Evidence has shown a high rate of nicotine dependence among patients with different behavioural and mental disorders. The underlying physiological relationship between nicotine dependence and mental health can be explained by the impact of nicotine use on CNS. There are nicotinic receptors as members of cholinergic receptors' family. They are located in neuromuscular junction and in the central nervous system (CNS). Although they are similar, pentameric structures with an ionic channel to sodium, there are some differences in the protein chains characteristics. Animal studies have shown that repeated administration of nicotine results in the sensitization phenomenon, which produces increase in the behavioral locomotor activity response [1]. It has been found that most psychostimulants-induced behavioral sensitization through a nicotine receptor activation. Nicotine receptors in CNS are located mainly in presynaptic membrane and in that way they regulated the release of several neurotransmitters, among them acetylcholine, dopamine, serotonin, and norepinephrine. In some activities like sleep-wake cycle, nicotine receptors have a functional significance. Nicotine receptor stimulation promotes wake time, reduces both, total sleep time and rapid eye movement sleep (REMS) [2]. Nicotine has been shown to have the characteristic dependence and withdrawal syndrome and patients with psychiatric illnesses comprise one of the most vulnerable groups. Among them schizophrenia, major depression, anxiety disorders and attention deficit disorder, represent the best example in this area [3]. In present study an attempt has been made to understand the prevalence and pattern of nicotine dependence among patients of schizophrenia, BPAD with mania in comparison to general population of both smoke- and smokeless-form of nicotine users.

### MATERIAL AND METHOD

The present study was carried out at Department of Psychiatry, Era's Lucknow Medical College, Lucknow. A total of 50 patients of Schizophrenia (SCH), 50 patients of Bipolar Affective Disorder with Mania (BPAD) aged above 18 years having history of nicotine use (smoke-form or smokeless form) for a minimum of one year or more,

diagnosed as per ICD-10 criteria were enrolled in the study from amongst those attending the Adult Psychiatric Outpatient Department of our facility. A total of 50 individuals without any mental illness, attending the tobacco cessation clinic of our facility were enrolled as controls. Elderly >60 years of age, those with mental retardation, those having other psychiatric comorbidity, users of alcohol and other drugs, unable to communicate and non-cooperative/non-consenting individuals were excluded from the study. After obtaining an informed consent, age and gender of the participants were noted. Type of nicotine use (smoke-form / smokeless form) was noted along with duration and frequency of use. For smoke form, the frequency was noted in terms of average number of sticks consumed per day whereas for smokeless form, the frequency was noted in terms of number of pouches (ready made preparations)/betel quids with tobacco taken per day. The average number was based on an exploration into pattern and frequency of nicotine use during the last six months based on guided recall.

Nicotine dependence of the participants was measured using the Hindi translation of Fagerstrom Test for Nicotine Dependence (FTND) [4] for smoke-form of Nicotine use. For smokeless-form of nicotine use, Fagerstrom Test for Nicotine Dependence modified for ST users (FTND-ST) as proposed by Ebbert *et al.* [5] were used.

**Data Analysis:** Data so obtained was fed into computer using MS-Excel 2013 software. Data was analyzed using Statistical Package for Social Sciences, version 21.0. Chi-square test, Independent samples 't'-test and ANOVA were performed. Associations were considered significant on a 'p' value less than 0.05.

### RESULTS

Majority of participants were males (n=121/150; 80.7%). The male to female ratio of study population was 4.17. Though proportion of males was higher in BPAD (43/50; 86%) and SCH (42/50; 84%) groups as compared to controls (36/50; 72%) yet this difference was not significant statistically (p=0.159). Age of participants ranged from 20 to 58 years. Mean age of SCH, BPAD and Controls was 39.26±7.48, 36.82±9.01 and 39.60±7.77 years respectively (p=0.178). Mean duration since diagnosis was 7.44±9.01 and 7.30±7.48 years respectively in BPAD and SCH groups. Statistically, there was no significant difference between two patient groups with respect to duration of illness (p=0.933) (Table 1).

Maximum number of BPAD patients had last episodes >6 months back

(n=21; 42%) followed by 2-3 months (n=19; 38%). A total of 5 (10%) patients each had last episodes 4-6 months and ≤1 month back (Fig. 1).

Proportion of smokers was 88%, 88% and 74% respectively in SCH, BPAD and controls whereas proportion of smokeless tobacco users was 70%, 54% and 58% respectively in SCH, BPAD and control groups. Thus for all the three groups, smoke-form of tobacco was more common than smokeless form. Statistically, there was no significant difference among the groups with respect to proportion of smokers and smokeless tobacco users ( $p=0.094$  and  $p=0.234$ ). Mean duration of smoking was significantly higher in controls (14.78±10.42 years) as compared to that in SCH (10.82±6.01 years) and BPAD (10.82±6.01 years) groups respectively ( $p=0.022$ ). However, among smokeless form of tobacco users, though mean duration of use was higher in SCH (5.64±5.72 years) and controls (5.34±7.72 years) as compared to that in BPAD (3.72±3.98 years) group yet the difference among groups was not significant statistically ( $p=0.231$ ). As far as average number of sticks consumed per day was concerned, it was maximum in BPAD (18.28±8.62) followed by SCH (13.58±6.99) and minimum in controls (7.65±6.46). Statistically, this difference among groups was significant ( $p<0.001$ ). However, for smokeless-form of tobacco use, mean number of pouches/day was maximum in SCH (3.02±2.65) followed by BPAD (1.86±1.77) and minimum in controls (1.64±1.66) respectively, thereby showing a statistically significant difference among groups ( $p<0.001$ ). Mean FTND and FTND-ST scores were in SCH, BPAD and Controls were 7.06±5.71 & 6.50±3.26, 10.09±9.50 & 5.94±2.44 and 7.16±6.80 & 2.76±2.21 respectively, thus showing a significant intergroup difference for both the scores ( $p<0.05$ ) (Table 2).

## DISCUSSION

In present study, in a demographically matched population having almost similar prevalence of tobacco use, and in fact a longer duration of tobacco use in normal population, the amount of nicotine use (number of sticks consumed per day, weekly smokeless tobacco use) was higher in patients with mental illnesses as compared to normal population. Nevertheless, it was seen that there is a high tendency of nicotine use in the individuals without any mental illness. In fact, high prevalence of nicotine dependence in mentally healthy general population has also been reported in literature [6,7]

With respect to type of tobacco use, use of nicotine in smoke form was significantly higher in BPAD patients as compared to Schizophrenia and normal controls whereas smokeless form was more common in Schizophrenia as compared to BPAD patients and normal controls.

A number of studies [7-10] have shown a high prevalence and nicotine dependence in patients of different mental disorders and have shown an inverse association between certain antipsychotics (e.g. clozapine) and nicotine dependence. In most of the studies from western countries, a high dependence on smoke form has been shown which is in contrast to present study where dependence on smokeless form was also more pronounced. In present study, we observed that nicotine dependence for smoke form was more pronounced in BPAD patients as compared to schizophrenia and normal patients. In fact, for smoke form nicotine dependence rate was similar for both the normal and schizophrenia patients. However, for smokeless form, the level of dependence in both types of mental disorders was higher as compared to controls. Similar to our study, several other workers who compared the nicotine dependence between those with and without mental illnesses also found the pattern and level of dependence with a slightly higher dependence in those with mental illness as compared to those without mental illness [7,11].

The study also highlighted that smokeless form of nicotine use is emerging as a cause of nicotine dependence in our population. One of the reasons for this is the high prevalence of gutkha, pan masala and betel quid use in our region [12]. One of the significant findings in present study was that smokeless tobacco use in Schizophrenia patients and controls was significantly higher as compared to that in BPAD patients. It seems that not only the biochemical influence of nicotine but the projected macho-image of smokers also has an influence on nicotine dependence and choice of nicotine product.

The study brought about the fact that despite shorter duration of use, the frequency and amount of nicotine use in mental disorder patients was higher as compared to normal subjects, thus indicating a sense of extreme craving for nicotine among patients with mental disorders.

The present study also highlighted the fact that nicotine dependence

need to be studied both in context of smoke- and smokeless forms of nicotine use. The study showed that overall burden of nicotine dependence (sum of FTND and FTND-ST) was maximum in BPAD patients (Mean sum total = 16.03) followed by SCH (Mean sum total = 13.56) and minimum in those without mental illness (Mean sum total=9.92). The findings of study show that different determinants of nicotine use, apart from just the biochemical influences might guide the choice of nicotine products among the users depending upon their mental states. Further studies on larger sample size are recommended to differentiate the choice of nicotine-form and dependence level in different types of mental illnesses in order to justify the cravings for nicotine dependence in terms of both their biochemical and behavioural impact.

## CONCLUSION:

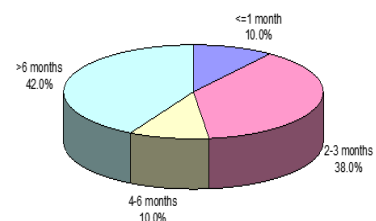
Nicotine dependence, either of smoke or smokeless form was of higher order among patients with mental disorder despite shorter duration of tobacco use.

**Table 1: Demographic Profile and Baseline characteristics**

Variable	Controls (n=50)	BPAD (n=50)	SCH (n=50)	Statistical significance
Male:Female	36/14	43/7	42/8	$p=0.159$
Mean Age±SD (Range) in yrs	39.60±7.77 (25-52)	36.82±9.01 (20-58)	39.26±7.48 (29-52)	$p=0.178$
Duration since diagnosis±SD (years)		7.44±9.01 (1-20)	7.30±7.48 (2-16)	$p=0.933$

**Table 2: Tobacco/Smoking prevalence and pattern of dependence**

Variable	Controls (n=50)	BPAD (n=50)	SCH (n=50)	Statistical significance
Smokers	37 (74%)	44 (88%)	44 (88%)	$p=0.094$
Smokeless tobacco users	29 (58%)	27 (54%)	35 (70%)	$p=0.234$
Duration since smoking (Years)	14.78±10.42	10.82±7.50	10.82±6.01	$p=0.022$
Number of sticks Smoked per day	7.65±6.46	18.28±8.62	13.58±6.99	$p<0.001$
Duration of Tobacco use (Years)	5.34±7.72	3.72±3.98	5.64±5.72	$p=0.231$
Pouch/day	1.64±1.66	1.86±1.77	3.02±2.65	$p<0.001$
FTND	7.16±6.80	10.09±9.50	7.06±5.71	$p<0.001$
FTND-ST	2.76±2.21	5.94±2.44	6.50±3.26	$p=0.045$



**Fig. 1: Duration since last episode of BPAD**

## REFERENCES

- Zago A, Leão RM, Carneiro-de-Oliveira PE, Marin MT, Cruz FC, Planeta CS. Effects of simultaneous exposure to stress and nicotine on nicotine-induced locomotor activation in adolescent and adult rats. *Braz J Med Biol Res.* 2012;45(1):33-37.
- Brown RE, Basheer R, McKenna JT, Strecker RE, McCarley RW. Control of sleep and wakefulness. *Physiol Rev.* 2012;92(3):1087-1187.
- Salin-Pascual RJ, Alcocer-Castillejos NV, Alejo-Galarza G. Nicotine dependence and psychiatric disorders. *Rev Invest Clin.* 2003 Nov-Dec;55(6):677-93.
- Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom test for nicotine dependence: A revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict* 1991;86:1119-27.
- Ebbert JO, Patten CA, Schroeder DR. The Fagerström Test for Nicotine Dependence-Smokeless Tobacco (FTND-ST). *Addict Behav.* 2006;31(9):1716-1721.
- Divinakumar K J, Patra P, Prakash J, Daniel A. Prevalence and patterns of tobacco use and nicotine dependence among males industrial workers. *Ind Psychiatry J* 2017;26:19-23
- Oliveira RM, Santos JLF, Furegato ARF. Tobacco addiction in the psychiatric population and in the general population. *Rev Lat Am Enfermagem.* 2017;25:e2945.

8. de Oliveira RM, Siqueira Júnio AC, Santos JLF, Furegato ARF. Nicotine dependence in the mental disorders, relationship with clinical indicators, and the meaning for the user. *Rev. Latino-Am. Enfermagem* 2014; 22(4):685-92.
9. Wijesundera H, Hanwella R, de Silva VA. Antipsychotic medication and tobacco use among outpatients with schizophrenia: a cross-sectional study. *Ann Gen Psychiatry*. 2014 Mar 19;13(1):7.
10. Garcia-Portilla MP, Garcia-Alvarez L, Saiz PA, Diaz-Mesa E, Galvan G, Sarramea F, Garcia-Blanco J, Elizagarate E, Bobes J. Effectiveness of a Multi-Component Smoking Cessation Support Programme (McSCSP) for Patients with Severe Mental Disorders: Study Design. *International Journal of Environmental Research and Public Health*. 2014; 11(1):373-389.
11. Šagud M, Vuksan-Čusa B, Jakšić N, Mihaljević-Peješ A, Živković M, Vlatković S, et al. Nicotine dependence in Croatian male inpatients with schizophrenia. *BMC Psychiatry* 2018; 18: 18.
12. Sinha DN, Gupta PC, Ray CS, Singh PK. Prevalence of smokeless tobacco use among adults in WHO South-East Asia. *Indian J Cancer* 2012;49:342-6