

Prevalence of Nicotine in Schizophrenia

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Abstract: *Nicotine addiction is an important health problem increasing medical morbidity and mortality, Total number of deaths due to tobacco in a single year outweigh total numbers of death due to AIDS, Accidents, Alzheimers, Cancer, Diabetes, Hepatitis, Leukemia, meningitis, Murders and Suicides al together. Smoking prevalence among adolescents has risen significantly since 1990*

Keywords: Nicotine addiction, morbidity, Smoking.

1. Introduction

Nicotine addiction is an important health problem increasing medical morbidity and mortality. Smoking remains the single greatest preventable cause of death in our society. There is no doubt that smoking cause considerable morbidity and mortality in general population.

Total number of deaths due to tobacco in a single year outweigh total numbers of death due to AIDS, Accidents, Alzheimers, Cancer, Diabetes, Hepatitis, Leukemia, meningitis, Murders and Suicides al together.

Smoking prevalence among adolescents has risen significantly since 1990. In terms of the diagnosis of nicotine dependence per se, about 20% of the population develops nicotine dependence at some point, making it most prevalent psychiatric disorder. According to DSM-IV TR approximately 85% of current daily smokers are nicotine dependent. Nicotine withdrawal occurs in 50% of smokers who try to quit.

WHO estimates say that there are 1 billion smokers world wide and they smoke 6 trillion cigarettes in a year. Tobacco kills more than 3 million person a year. The ill effects of smoking are reflected that 60% of direct health costs go to treat tobacco related illnesses.

Several studies have indicated a strong relationship between nicotine dependence and schizophrenia. Brain abnormalities those are likely to be involved in pathophysiology of schizophrenia are very complex. Several studies undertaken to understand clinical manifestations and neurobiology have resulted in greater appreciation of complexity.

No single model explains various manifestations of schizophrenia. Useful models must account for common clinical and behavioural manifestations associated with disorder. Tobacco smoking is one such behaviour which can be used for explaining pathophysiology of schizophrenia. Smoking schizophrenia may be manifestation of shared underlying neurobiology.

There are several reasons for understanding relationship between smoking and schizophrenia. Smoking appears to cause general and specific health risks for persons with schizophrenia.

There is evidence that persons with schizophrenia have higher mortality rate from natural causes than controlled population. This increased prevalence of smoking among persons with schizophrenia is potential factor in explaining mortality. Unfortunately no epidemiological data exist that specifically describe smoking related morbidity and mortality among smokers who have schizophrenia.

2. Why Schizophrenic Smoke More?

Upto 90% of schizophrenic patients may be dependent on nicotine. There are several reasons.

➤ Their illness makes them more vulnerable to the effect of nicotine. They are more likely to get addicted and less likely to quit smoking.

➤ Nicotine decreases blood concentrations of some antipsychotics thereby reducing side effects of drugs mainly typical antipsychotics

➤ Increased smoking is due to brain abnormalities in nicotine receptors. A specific polymorphism in a nicotine receptor has been linked to genetic risk of schizophrenia.

➤ Nicotine administration appears to improve some cognitive impairment and parkinsonism and in schizophrenia because of nicotine dependent activation of dopamine neurons.

➤ Recent studies have shown that nicotine may decrease positive symptoms such as hallucinations by its effect of nicotine receptors in brain that reduce perception of outside stimuli specially noise. Thus smoking is a form of self medication.

The relationship between clinical features of illness and smoking has not been studied adequately. Models of explaining high rate of smoking among psychiatric focus on

psychopathology of illness, influence of drugs used and psychology of patients.

3. Aims And Objectives

The objectives were to study.

- 1.Prevalence of smoking in schizophrenia patients.
- 2.Relationship of smoking and severity of illness.

4. Materials and Methods

The study was prospective, conducted in G. G. Hospital, Affiliated with M. P. Shah Medical college – Jamnagar. It is the largest government run hospital in Saurashtra region.

SETTING :

The study was carried out in out patient department of psychiatry ward, G. G. Hospital, Jamnagar.

PATIENT SELECTION :

The study was carried out on two groups of population.

1. Experimental group.
2. Control group

Experimental group consisted of patients with the diagnosis of Schizophrenia.

Control group – patients with diagnosis of mood disorder (major depression or bipolar I disorder).

The diagnosis was made by clinical interview using DSM IV TR Criteria (American Psychiatric Association 2000).

SAMPLE SIZE :

Experimental group 50 patients
Control group 50 patients

INCLUSION CRITERIA :

Only male patients were taken into study.
Patients in age 18-55.
Patients having tobacco consumption exclusively in form of smoking.

EXCLUSION CRITERIA :

Female patients.
Patients having diagnosis other than schizophrenia or mood disorders.
Patients having tobacco consumption in form other than smoking.
Smoker were defined as those who were either smoking bidi or cigarette since last 1 year.

MATCHING :

Subjects in experimental group and control group were matched for status, family and domicile were recorded.

Subjects in experimental group and control group were interviewed regarding

- 1.Smoking behaviour
- 2.Severity of illness

5. Assessment tools

Smoking behaviour

Subjects were interviewed regarding daily consumption of bidis / cigarette, duration of smoking, current smoking status.

Modified CAGE questionnaire for smoking Behaviour (Lairson DR et al. 1975) and Fagerstrom Test for Nicotine Dependence (Heatherton TF et al. 1991) were administered. These tests assess the severity of dependence of nicotine.

The CAGE questionnaire of smoking (modified from CAGE questionnaire of alcoholism) the “four Cs” test help to make diagnosis of nicotine dependence. The CAGE questionnaire is a simple accurate tool for screening of patients with addictive disorders.

Results of CAGE questionnaire for smoking, are considered positive if two of the four questions are answered affirmatively.

The Fagerstrom test for Nicotine Dependence is a standard instrument for assessing the intensity of physical addiction. It is a 6 item scale. The higher the score, more intense is patients physical dependence on nicotine. Higher scores indicate that treatment of withdrawal symptoms usually without nicotine replacement therapy will be an important factor in plan of care.

6. Severity of illness

(1) PANSS Scale (Kay SR et. al. 1987)

PANSS is most widely used and reliable tool for assessment of positive and negative symptoms and general psychopathological status of schizophrenia patients. The PANSS consists of a semistructured clinical interview and any available supporting clinical information, such as family members or hospital staff report. There are 30 items which rate along a seven point continuum (1 = absent, 7 extreme). The assessment provides separate scores in clinical domains including positive syndrome, negative syndrome, depression, composite index and general psychopathology. Ratings are based on information relating to past week.

It has high internal reliability and validity.

(2) Clinical Global impression (CGI)

The CGI is widely used brief assessment tool in psychiatry. There is a 3 item scale which measures overall illness severity. The CGI is rated by the physician or trained rater. Raters are asked to evaluate the severity of patients illness based on the rater's total experience with specific patient population to which patient belongs. Severity of illness is rated on seven point (1 = normal, 7 = most severe). It has good reliability scores.

(3) Global assessment of functioning (GAF)

(American Psychiatric Association 2000) It is a 100 point single item scale with values ranging from 1 to 100 representing the hypothetically sickest person to the healthiest. The scale is divided into 10 equal 10 point intervals with 81-90,

91-100 intervals for individuals who exhibit superior functioning. The information required to rate comes from the clinical evaluation obtained from other sources (Family, records).

7. Analysis

The data was analysed using **SPSS version XII (SPCC Institute)**.

Chi square test, Fisher's Test and t-test were used for statistical comparison between schizophrenia and control group and smokers and non smokers as regards.

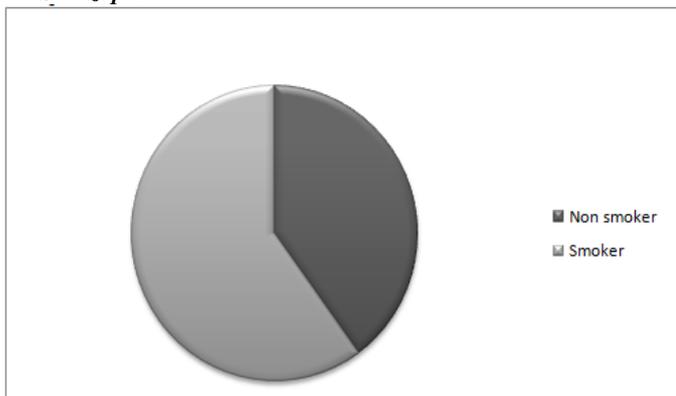
1. Demographic characteristics.
2. Smoking behaviour
3. Severity of illness

8. Results and Discussion

During the study period 100 patients with diagnosis of schizophrenia were studied with prevalence of nicotine. The results are as under.

PREVALENCE OF SMOKING

Schizophrenia



Control Group

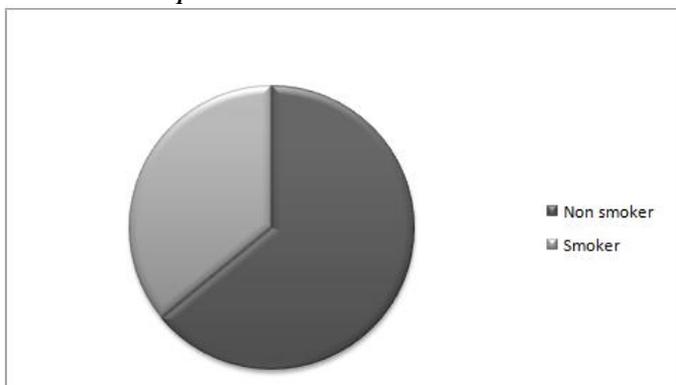


Table – 1
Demographic Characteristics

	Schizophrenia (N-50) N(%)	Mood D. (N-50) N(%)
Age¹		
Range	19-55	25-55
Mean	36.94	38.56
SD	10.31	09.95
Education²		
Uneducated	05 (10)	06 (12)
Educated	45 (90)	44 (88)
Marital status³		
Married	31 (62)	40 (80)
Unmarried	12 (24)	08 (16)
Divorced	07 (14)	02 (04)
Income⁴		
Nil	27 (54)	10 (20)
< 1000	02 (04)	05 (10)
1000 – 2000	08 (16)	15 (30)
2000 – 5000	08 (16)	12 (24)
> 5000	05 (10)	08 (16)
Occupation⁵		
Unemployed	25 (50)	18 (36)
Employed	25 (50)	32 (64)
Family type⁶		
Joint	37 (74)	36 (72)
Nuclear	13 (26)	14 (28)
Domicile⁷		
Urban	41 (82)	38 (76)
Rural	09 (18)	12 (24)

Age	t = 5.35	NS
Education	$\chi^2 = 0.369$	NS
Marital Status	$\chi^2 = 2.73$	NS
Income	$\chi^2 = 4.03$	S
Occupation	$\chi^2 = 0.0698$	NS
Family	$\chi^2 = 0.0389$	NS
Domicile	$\chi^2 = 8.38$	S

Age :

Mean age of schizophrenia group was 36.94 and 38.56 in control group. This was not statistically significant.

Education :

There was no statistically significant difference as regards educational status between schizophrenia group and control group.

Marital Status :

40/50 in control group were married as compared to 31/50 in schizophrenia group 1950 in schizophrenia group were either unmarried or divorced as against 10/50 in control group. This was not statistically significant.

Income :

More members of subjects in schizophrenia group were nil income (27/50) as compared to control group (10/50). This was statistically significant.

Occupation :

In schizophrenia group 25/50 were unemployed as compared to 18/50 in control group. This was not statistically significant.

Family type :

There was no statistically significant difference as regards family type in schizophrenia group and control group.

Domicile :

In schizophrenia group 41/50 were from urban domicile as compared to 38/50 in control group. 9/50 in schizophrenia

	Schizophrenia		Mood D.	
	Smokers (N=20) N(%)	Non-Smokers (N=30) N(%)	Smokers (N=18) N(%)	Non-Smokers (N=32) N(%)
Age¹				
Range	23-55	19-55	22-55	22-55
Mean	36.8	34.72	30.2	35.8
SD	9.36	12.2	12.09	10.8
Education²				
Uneducated	3 (15)	2 (6.6)	2 (11.1)	4 (12.5)
Educated	17 (85)	28 (93.4)	16 (88.9)	28 (87.5)
Marital status³				
Married	17 (70)	17 (56.6)	14 (77.8)	26 (81.2)
Unmarried	3 (15)	9 (30)	2 (11.1)	6 (18.2)
Divorced	3 (15)	4 (13.3)	2 (11.1)	0 (0)
Income⁴				
Nil	8 (40)	19 (63.3)	4 (22.2)	6 (18.7)
< 1000	1 (5)	1 (2.2)	1 (5.5)	4 (12.5)
1000 – 2000	2 (10)	6 (20)	6 (33.3)	9 (28.1)
2000 – 5000	7 (35)	1 (3.3)	4 (22.2)	8 (25)
> 5000	2 (10)	3 (10)	3 (16.8)	5 (15.6)
Occupation⁵				
Unemployed	8 (40)	17 (56.6)	4 (22.2)	6 (18.7)
Employed	12 (60)	13 (43.2)	14 (77.8)	26 (81.2)
Family type⁶				
Joint	12 (60)	25 (83.3)	12 (66.6)	24 (75)
Nuclear	8 (40)	5 (16.6)	6 (33.3)	8 (25)
Domicile⁷				
Urban	15 (75)	26 (86.6)	10 (55.5)	28 (87.5)
Rural	5 (25)	4 (13.3)	8 (44.5)	4 (12.5)

Table – 2**Smoking and demographic characteristics**

	Schizophrenia		Mood D.	
	Smoke rs (N=20) N(%)	Non-Smokers (N=30) N(%)	Smokers (N=18) N(%)	Non-Smokers (N=32) N(%)
Age¹				
Range	23-55	19-55	22-55	22-55
Mean	36.8	34.72	30.2	35.8
SD	9.36	12.2	12.09	10.8
Education²				
Uneducated	3 (15)	2 (6.6)	2 (11.1)	4 (12.5)
Educated	17 (85)	28 (93.4)	16 (88.9)	28 (87.5)
Marital status³				
Married	17 (70)	17 (56.6)	14 (77.8)	26 (81.2)
Unmarried	3 (15)	9 (30)	2 (11.1)	6 (18.2)
Divorced	3 (15)	4 (13.3)	2 (11.1)	0 (0)
Income⁴				
Nil	8 (40)	19 (63.3)	4 (22.2)	6 (18.7)
< 1000	1 (5)	1 (2.2)	1 (5.5)	4 (12.5)
1000 – 2000	2 (10)	6 (20)	6 (33.3)	9 (28.1)
2000 – 5000	7 (35)	1 (3.3)	4 (22.2)	8 (25)
> 5000	2 (10)	3 (10)	3 (16.8)	5 (15.6)
Occupation⁵				
Unemployed	8 (40)	17 (56.6)	4 (22.2)	6 (18.7)
Employed	12 (60)	13 (43.2)	14 (77.8)	26 (81.2)
Family type⁶				
Joint	12 (60)	25 (83.3)	12 (66.6)	24 (75)
Nuclear	8 (40)	5 (16.6)	6 (33.3)	8 (25)
Domicile⁷				
Urban	15 (75)	26 (86.6)	10 (55.5)	28 (87.5)
Rural	5 (25)	4 (13.3)	8 (44.5)	4 (12.5)

	Age	t = 1.34	NS	t = 1.98	NS
	Education	$\chi^2 = 1.78$	NS	$\chi^2 = 1.68$	NS
	Marital Status	$\chi^2 = 10.82$	NS	$\chi^2 = 8.96$	NS
	Income	$\chi^2 = 6.32$	S	$\chi^2 = 4.32$	S
	Occupation	$\chi^2 = 2.62$	NS	$\chi^2 = 2.38$	NS
	Family	$\chi^2 = 12.45$	NS	$\chi^2 = 14.2$	NS
	Domicile	$\chi^2 = 18.45$	S		

Marital Status :

More non smokers were married in both group. With low rate of unmarried and divorce. This was statistically significant.

Income :

In non smoker groups subjects were earning well than smokers. This was statistically significant.

Family type :

More non smokers were belonging to joint family. This was statistically significant.

Domicile :

More non smokers belonging to urban domicile. This was statistically significant.

There was no statistically significant difference as regards to age education and occupation.

Table – 3
Disease Variables and Smoking

	Schizophrenia	
	Smokers (N=20)	Non smokers (N=30)
Duration of illness (in months)		
Range	12-300	6-324
Mean	36	36
PANSS		
Mean Positive Score ¹	12.2	14.5
SD	4.8	4.7
Mean Negative Score ²	14.8	17.1
SD	8.4	7.63
Mean General Psychopathology Score ³	27.6	29.3
SD	7.8	6.1
Mean Composite Score ⁴	60.8	67.8
SD	21.8	19.4
CGI⁵		
Borderline illness	1 (5)	2 (6.6)
Mild illness	10 (50)	5 (16.6)
Moderate illness	4 (20)	16 (53.3)
Marked illness	5 (25)	7 (23.3)
GAF⁶		
50 – 21	7 (35)	20 (66.6)
90 – 51	13 (65)	10 (33.3)

¹P = 0.23

²P = 0.29

³P = 0.45

⁴P = 0.25

⁵P = 0.019

⁶P = 0.04

Median duration of illness was 36 months in smokers as well as in non smokers.

As regards PANSS scores all the mean sub scale scores and the mean composite score were higher in non smokers but it was not statistically significant.

In CGI assessment 12/20 smokers had borderline or mild illness as compared to 7/30 non smokers. 23/30 non smokers had moderate to marked illness as against 9/20 smokers. This was statistically significant.

In Global Assess of Functioning (GAF) 7/20 smokers were having scores less than 50 and 13/20 having more than 50. Among non smokers 20/30 having less than 50 and 10/30 having more than 50. This was statistically significant.

Table – 4
Smoking characteristics in schizophrenia and mood disorders

	Smokers	
	Schizophrenia (N=20)	Mood disorder (N=18)
Smokers¹	20 (40)	18 (36)
Duration of smoking² (in years)	1-40	1-30
Mean	18.4	13.05
SD	11.1	8.62
Daily Consumption³ (bidis/day)		
Before onset	12.7	11.2
After onset	19.8	14.6
Age of onset⁴		
Range	10-46	14-47
Mean	20.6	24.5
SD	11.00	9.22
Money Spent (Rs/Day)⁵		
Mean	7.95	5.75
CAGE		
> 2 yrs responses	6 (30)	3 (16.7)
Fagerstrom Test for⁶ Nicotine Dependence		
High dependence	11 (55)	7 (38.8)
Moderate dependence	5 (25)	6 (33.3)
Mild dependence	4 (20)	5 (27.7)

¹P = 0.33

²P = 0.148

³P = 0.032

⁴P = 0.49

⁵P = 0.01

⁶P = 0.36

Prevalence of smoking :

40% patients in schizophrenia group smoked as against 36% in mood disorder group. This difference was not statistically significant.

Mean duration of smoking :

In Control group was less than in schizophrenia subjects (13.05 years Vs. 18.4 years) but this was not statistically significant.

Mean daily consumption of bidis/day has increased from 12.7 to 19.8 after onset of illness in smokers from schizophrenia group. This increase in consumption was statistically significant. Daily consumption after onset of illness was 19.7 bidis / day in schizophrenia group as compared to 14.6 bidis / day in mood disorders group. This was statistically significant.

Smokers in schizophrenia group started smoking at younger age (20.6 years) as compared to smokers in control group (24.5 years). This difference was not significant.

Money spent :

Smoking in schizophrenia group spent 7.95 Rs./day as compared to 5.7 Rs./day by smokers in control group. This was statistically significant.

16/20 smokers in schizophrenia group had moderate to high nicotine dependence on fagerstrom test fro Nicotine Dependence. 13/18 in control group had moderate to high dependence. 4/20 schizophrenia smokers had mild dependence while 5/18 in control group smokers had mild dependence.

9. Discussion

PREVALENCE OF SMOKING :

Prevalence of smoking in schizophrenia patients from our study was found to be 40% and 36% in mood disorder patients. This difference in smoking prevalence in schizophrenia and control group was not statistically significant.

This was almost similar to prevalence rates reported by other Indian studies. In study carried out by Thara et al. (2002) only 38% of schizophrenia patients were found to be current smokers. This was significantly more than in psychiatric patients studied (major affective disorders and non psychiatric disorders) but not medically ill controls and not higher than the rates for the general male population in India. Srinivasan et al. (2002) have also reported same prevalence. Western studies have shown the prevalence between 42% to 92%.

DEMOGRAPHIC CHARACTERISTICS :

As regards demographic characteristics, the difference between control group and schizophrenic group was statistically significant as regards marital status and income. This can be understood on basis of socio occupational impairment which is prominent feature of schizophrenia.

DAILY CONSUMPTION :

The dially consumption observed in schizophrenic group (19.7 / day) was similar to the reported by Herran et al. (2000) (22.4 / day) and by de Leon et al. (1995) (19 day). The daily consumption was higher than in control group before the onset of illness as well as after the illness started. The difference between the daily consumption (12.7 Vs. 11.2) was not statistically significant but the difference after onset of illness (19.8 Vs. 14.6) was statistically significant.

Chewing tobacco is form of nicotine use more prevalence in India. The data on this behaviour was not analysed for space of compatibility in comparing with other studies of smoking.

SEVERITY OF ILLNESS :

Our study did not find any positive correlation between dially consumption and severity of illness and phase of illness. All the sub scale and composite score on PANSS were greater in non smoking schizophrenic patients as compared to schizophrenia smokers and in CGI and GAF assessment more

non smokers had moderate to marked illness as compared to smokers.

Evidence suggests that smokers with schizophrenia are heavier smokers than smokers with (de Leon et al. 1995); or without (Olincy et al. 1997) other psychiatric disorders but on Fagerstrom Test for Nicotine dependence no such difference was found between schizophrenia group and control group.

Smoking in psychiatric patients has some therapeutic relevance mediated by biochemical mechanism needs to be rethought. Repeated observations of higher rates of smoking in patients with schizophrenia and other psychiatric disorders than others may not always be true.

This issue probably needs to be seen from biopsychosocial view. The relationship between smoking and psychiatric status may not be simply and biological one as several sociocultural and economic factors could influence smoking behaviour. The reasons why psychiatric patients we studied did not smoke more could be socioeconomical and cultural. Economic dependence on family member and their overall influence on life of schizophrenic patient may have played an important role in controlling smoking behaviour.

There is a need to review the neurobiological issue of smoking in schizophrenia as smoking as a leading cause of preventable mortality and morbidity. One may propose that smoking may be therapeutic to people with serious mental disorders, e.g. in schizophrenia on basis of nicotine research in psychiatry, but these proposals must be seriously considered before coming to concrete conclusion.

The benefits of quitting and hazards of smoking are clearly demonstrated. Tobacco use causes more deaths than all other substances combined.

9. Conclusion

Prevalence of nicotine may not be as high as reported in western literature. We have to re think about this from Indian perspective. Severity and stages of illness may not have any influence on smoking behaviour. Sociocultural and economic factors may be equally important as biological factors in determination of smoking behaviour.

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