Research Paper

A comparative study of reliability of self report of tobacco use among patients with bipolar and somatoform disorders

Yatan Pal Singh Balhara, Raka Jain[1], Shyam Sundar A.[1], Rajesh Sagar[1]

Department of Psychiatry and De-addiction, Lady Hardinge Medical College and Smt. Sucheta Kriplani Hospital, [1]Department of Psychiatry, All India Institute of Medical Sciences, New Delhi, India

ABSTRACT

Objective: To compare the use and reliability of self-reported tobacco use (both smoked and smokeless) among patients with bipolar disorder and somatoform disorders. **Materials and Methods:** The study was conducted at psychiatry out-patient department of a tertiary care hospital. A total of 50 consecutive patients were recruited. The subjects were asked about the use of tobacco products (smoked as well as smokeless) over the past one week. Those reporting affirmatively in response to the question were assessed using Fagerstrom Test for Nicotine Dependence (FTND) scales. Quantitative urinary cotinine levels were assessed using Enzyme-linked immunosorbent assay (ELISA). **Results:** Calculation of Cohen's kappa using cross tabulation revealed discordance between the self-reported use of smoked as well as smokeless tobacco products in both the groups. Analysis using the lower cut off of 50 ng/ ml also revealed discordance between the self-reported tobacco use (smoked as well as smokeless) for both the groups. **Conclusions:** The reliability of self-report is questionable among both these groups for smoking as well as smokeless tobacco products.

Key words: Cotinine levels, psychiatric illness, urinalysis

INTRODUCTION

Tobacco use is a leading preventable cause of mortality globally. The number of deaths annually attributable to tobacco is expected to increase from 3 million in 1993 to 8.4 million in 2020.[1] Medical cost related to tobacco use has shown to range from 4% in developing countries to 15% in developed countries.[2,3] Smokeless tobacco use remains understudied and under-researched. This fact is concerning as in certain regions of world cigarette smoking constitutes a smaller fraction of total tobacco use with up to 86% tobacco users being non-cigarette users.[4]Smoking rates have been found to be high among the patients with psychiatric illness. Nicotine dependence is the most prevalent substance abuse disorder among individuals with mental illness.[5] Epidemiological studies have found smoking rates among psychiatric patients to be twice that of general population.[6]

Access this article online	
Quick Response Code:	Website: www.jpharmacol.com
	DOI: 10.4103/0976-500X.83282

Tobacco use impairs the duration and quality of life for patients with mental illness. It can also reduce the therapeutic blood levels of some psychiatric medications.[7,8] Additionally it has been found to be predictive of future suicidal behaviour among these patients.[9,10] Tobacco use increases risk for the later development of certain anxiety disorders. Moreover, smokers with anxiety disorders have more severe withdrawal symptoms during smoking cessation than smokers without anxiety disorders.[11] It has been recommended to establish

Address for correspondence:
Yatan Pal Singh Balhara, Department of Psychiatry and De-addiction, Lady Hardinge Medical College and Smt. Sucheta Kriplani Hospital, New Delhi, India. E-mail: ypsbalhara@gmail.com

specialised services to help patients with psychiatric illness who have associated substance dependence.[12] By virtue of its impact on lives saved, quality of life, and cost efficacy, treating smoking is considered one of the most important clinical activity.[13] Evaluation of tobacco use among psychiatric patients remains neglected.[14,15] Additionally, most of the literature on tobacco and psychiatric disorders is limited to smoking forms of tobacco. Also certain disorders such as somatoform disorders are under-represented/ unrepresented in these studies.[16-21]

In spite of its wide use, validity of self-reported tobacco use has been questioned in recent times.[22] It is recommended to use some bioassay to validate the use of tobacco products. However, the literature on reliability of self-reported tobacco use among psychiatric disorder patients is limited. We could come across only one such study carried out among schizophrenia patients.[23] The current study aims at comparison of the use and reliability of self-reported tobacco use (both smoked as well as smokeless) among patients with bipolar disorder and somatoform disorders. This is the first study of this nature to the best of our knowledge.

MATERIALS AND METHODS

The study was conducted at psychiatry out-patient department of a tertiary care hospital. A total of 50 consecutive patients meeting the study criteria were included. We recruited male subjects aged 18 or more. Subjects meeting Diagnostic and Statistical Manual of Mental Disorders IV Text Revision (DSM IV TR) criteria for bipolar disorders and somatoform disorders were approached for participation and those providing consent were included in the study. In order to ensure subject participation in providing the relevant information, we selected the follow up clinic for the recruitment purpose. Those refusing to provide consent or those who were unable to cooperate for participation in the study due to a physical illness, were excluded from the study.

The socio demographic profile of the study subjects was recorded using the study proforma. Subsequently the subjects were asked about the use of tobacco products (smoked as well as smokeless) over the past one week period. They were asked to respond to answer the question "have you used xxx over the past 1 week?" The tobacco products asked in the questionnaire included smoking forms (cigarettes, bidi) as well as smokeless forms (gutkha, khaini, tobacco powder). Those reporting affirmatively in response to the question on use of tobacco products were assessed using Fagerstrom Test for Nicotine Dependence (FTND) (smoking as well as smokeless). FTND- smoking is a widely used six-item questionnaire used to screen for severity of dependence on smoked tobacco.[24] FTND- smokeless (FTND-ST) is a nine-item instrument used to evaluate the level of nicotine dependence for smokeless tobacco.[25]

Estimation of urinary cotinine levels

Immediately after routine clinical examination, 50 ml of urine sample was collected from each subject under close supervision and were submitted for laboratory analysis. Quantitative urinary cotinine was done by using Enzyme-linked immunosorbent assay (ELISA) kits of Calbiotech.Inc, USA which uses solid phase competitive ELISA. Assay was carried out as directed by the manufacturers.[26] The detection limit of cotinine assay was 2 ng/ml.

The data was computed and analysed using Statistical Package for the Social Sciences (SPSS) version 17. Independent sample *t* test was carried out to find the in between group differences for the bipolar disorders and somatoform disorder groups. The concordance for self report and urinary cotinine levels was calculated using the Cohen's kappa for both the study groups. Pearson's correlation coefficient was calculated to assess the correlation between the scores on FTND (smoking and smokeless) and urinary cotinine levels. Keeping in mind the wide range of cut off value used for urinary cotinine levels across studies, we carried out analysis using two cut offs; 50 ng/ml (the lower limit of the recommended cut off across studies) and 550 ng/ml (the upper limit of recommended cut-off across studies). Conditions of anonymity and confidentiality as recommended in ethical approval were strictly adhered to during the study. Additionally, a valid informed consent was obtained from all the study subjects and care givers as required by the ethical committee.

RESULTS

A total of 50 consecutive male subjects meeting the study criteria were included. The mean age of the subjects in bipolar group and somatoform groups was 35. 5 (Standard deviation, SD = 12.7) years and 29.4 (SD = 8.2) years, respectively. The two groups were comparable on different socio-demographic variables [Table 1]. Self-reported use of tobacco products (both smoked as well as smokeless) was also comparable between the two groups. The two groups did not differ on mean FTND scores (both smoking and smokeless) and urine cotinine levels [Table 2]. Self-reported use of tobacco products over the past one week was 10% (smoking forms) and 8% (smokeless forms) by the subjects in the bipolar group. The rates were 10% (smoking forms) and 12% (smokeless forms) for the somatoform group.

Using a cut-off value of urine cotinine > 550 ng/ml, 48% of the subjects in bipolar group were found to have biochemical evidence of use of smokeless tobacco products over the past one week and 52% were found to have smoked over the past one week. Among the somatoform group, 48% were found to have biochemical evidence of smoking and use of smokeless tobacco products. Calculation of Cohen's kappa using cross

Table 1: Socio-demographic and tobacco product use profile of study subjects

		Bipolar group	Somatisation group
Gender	Males	25 (50)	25 (50)
Marital status	Married	19 (38)	16 (32)
	Single	6 (12)	9 (18)
Residence	Urban	12 (24)	18 (36)
	Rural	13 (26)	7 (14)
Self-reported smoking	Yes	5 (10)	5 (10)
	No	20 (40)	20 (40)
Self-reported use of smokeless forms	Yes	4 (8)	6 (12)
	No	21 (42)	19 (38)
FTND smoking (Mean±SD)		3.25 ± 1.5	2.75 ± 1.26
FTND smokeless (Mean±SD)		3.0 ± 0 .82	2.86 ± 0 .90
Level of urine cotinine (ng/ml)		1122.19	936.48

FTND- Fagerstrom Test for Nicotine Dependence; *n*=50, values in paranthesis represents percentage

Table 2: Concordance between self-report of tobacco product use and urine cotinine levels

	Bipolar Disorder group (50%)								Somatisation disorder group (50%)							
	Smoking				Smokeless				Smoking				Smokeless			
	Urine cotinine>550 ng/ml				Urine cotinine>550 ng/ml				Urine cotinine>550 ng/ml				Urine cotinine>550 ng/ml			
		Yes	No	Total		Yes	No	Total		Yes	No	Total		Yes	No	Total
Tobacco use self-report	Yes	2 (8)	3 (12)	5 (20)	Yes	3 (12)	1 (4)	4 (16)	Yes	3 (12)	2 (8)	5 (20)	Yes	3 (12)	3 (12)	6 (24)
	No	13 (52)	7 (28)	20 (80)	No	12 (48)	9 (36)	21 (84)	No	12 (48)	8 (32)	20 (80)	No	12 (48)	7 (28)	19 (76)
	Total	15 (60)	10 (40)	25 (100)	Total	15 (60)	10 (40)	25 (100)	Total	15 (60)	10 (40)	25 (100)	Total	15 (60)	10 (40)	25 (100)
	Cohen's kappa =-0.143 (*P*=0 .307)				Cohen's kappa = 0.085 (*P*=0 .504)				Cohen's kappa= 0 .000 (*P*= 1.00)				Cohen's kappa= -0.087 (*P*=0 .566)			

n=50, values in paranthesis represents percentage

tabulation revealed discordance between the self-reported use of smoked as well as smokeless tobacco products in both the groups. The findings have been summarised in Table 2. Analysis using the lower cut off of 50 ng/ ml also revealed discordance between the self-reported tobacco use (smoked as well as smokeless) for both the groups [Table 2].

Further in order to assess the reliability of the severity of tobacco dependence among those who reported use of these products, we calculated the Pearson's correlation coefficient for FTND scores (smoked as well as smokeless) and the urinary cotinine levels. No significant correlations were observed between these two variables for both groups of subjects. In fact, FTND (smoking) scores had a statistically significant negative correlation with the urine cotinine level for the bipolar group (Pearson's coefficient= -0.999, *P*=0.001).

DISCUSSION

We aimed at comparison of the use and reliability of self-reported tobacco use (both smoked as well as smokeless) among patients with bipolar disorder and somatoform disorders. Concerns have been raised over the validity of the self-reported tobacco use in medical settings. Use of self-reported measures of tobacco use has shown to result in under reporting.[27,28] There is limited literature on the validity of self-report of tobacco use among patients with psychiatric illness. A recent systematic review of the relationship between self-reported and cotinine-assessed smoking status failed to find any relevant study involving patients with psychiatric disorders.[29] Additionally, a Pubmed MeSH search using the terms 'somatoform disorder' AND 'tobacco' failed to provide any relevant results.

We chose subjects with bipolar disorders as a comparison group since high rate of tobacco use among these patients has been a consistent finding across studies.[30-34] Adverse impact of smoking on the long term course of bipolar disorders has been demonstrated in prospective cohort studies.[35] Urinary cotinine estimation has been found to be a sensitive and specific biomarker for tobacco use.[36] Its use is recommended for validation of self-report of tobacco use in medical settings for smoking[22,37] as well as smokeless tobacco use.[38] Cut off value for cotinine levels to detect tobacco use has varied from 50 to 550 ng/ml across studies.[29] To address the issue we analysed the data using the two extremes of this wide range. However, no concordance was observed between the self-report and urinary cotinine levels using either of these cut offs.

The groups in the current study were comparable on different socio-demographic parameters. No significant differences were observed for the FTND (smoking and smokeless) scores.

The findings point to a comparable profile with respect to tobacco use (both smoking and smokeless forms) for the bipolar disorder and somatoform disorder patients as reflected by comparable urinary cotinine levels. Additionally finding of discordance between the self-report and urinary cotinine levels for both smoking and smokeless forms of tobacco use, highlights the need for use of a confirmatory bio-assay for patients with bipolar disorders and somatoform disorders. Such an approach would help improve the detection rates for tobacco use among these individuals. Tobacco use problem is likely to be overshadowed and missed in these individuals because of the management plan being focused on the psychiatric disorder.

Patients with mental illness might not reveal their actual tobacco use status due to multiple reasons. Altered mental state during florid phases of illness and cognitive deficits associated with the psychiatric conditions are common illness related factors. Other factor such as fear of social and medical disapproval can also prevent them from self-revelation of the tobacco use status. Inadequate knowledge of the potential harms of tobacco use might also make them non-forthcoming with this important information. Additionally, the prominent distress and dysfunction due to the primary psychiatric condition might pin hole the focus of the care givers as well.

This is the first study of this nature to the best of our knowledge. We compared a consecutive sample of out-patients patients of somatoform disorders with those of bipolar disorder. Literature on tobacco use among somatoform disorder patients is non-existent. Moreover, there are no comparative studies on reliability of self-report on tobacco use among psychiatric patients including bipolar disorders and somatoform disorders. One prior study assessed the validity of the self-reported tobacco use among patients with schizophrenia.[23] The stratified data on the duration of schizophrenia indicated that the positive relationship between self-reported smoking and the carbon monoxide (CO) concentration became less obvious with the increase in duration of schizophrenia. The authors concluded that psychiatrists should use objective methods of measurement to assess the smoking status of chronic schizophrenia patients. The findings of the current study provide important insights that could be of help while planning the management services for patients seeking treatment for bipolar disorders and somatoform disorders.

One needs to keep in mind the possible limitations of the urinary cotinine estimation. The misclassification rates in studies employing urine cotinine as a measure of tobacco use have ranged from 0.9% to 9.8%.[22] In order to minimise any such classification, we have used a higher cut off value of 550 ng/ml for detecting tobacco use in the current study as recommended by Zielińska-Danch *et al*.[39] Additionally we carried out analysis using a cut-off of 50 ng/ ml as well (the lower limit of range used across studies).

There is a need to replicate the findings using bigger sample size and from different treatment settings and centres. Due to logistic reasons, we included a relatively smaller sample size. Additionally, we could not include female students in our study. It would be interesting to conduct future studies with a larger sample size including female subjects. Also, addition of a comparison arm of healthy individuals would also add to the validity of the findings. Additionally, the current study did not aim at exploring the possible causes for this discrepancy between the self-report and urinalysis findings. It is recommended to study these factors in future studies.

CONCLUSIONS

Self-reported use of tobacco products (smoking as well as smokeless) is comparable among patients with bipolar disorder and somatoform disorders. Additionally, the reliability of this self-report is questionable among both these groups for smoking as well as smokeless tobacco products. There is a case for validation of self-reported tobacco use by urinary cotinine assessment among these patient groups. This will help better identification of tobacco users and modify management plan accordingly. There is a need for objective measures for detection of tobacco use among psychiatric patients.[23] The need to establish specialised clinics for psychiatric patients with substance abuse problem has also been emphasised previously.[12] However it might not be practical to assess each and every patient for tobacco use with the help of a bioassay in a developing country setting like ours. This calls for a need for adequate training of the mental health professionals on these issues. A more comprehensive evaluation including information from the care givers on tobacco use status of the patients can help corroborate the report by the patients. Moreover the bioassay tools such as urinalysis should be available as they can be used if the clinician suspects tobacco use as indicated by some physical signs like nicotine staining etc. It would help improve the detection rate of tobacco use problem among psychiatric patients.

REFERENCES

1. Murray C, Lopez A. Evidence-Based Health Policy – Lessons from the Global Burden of Disease Study. Science 1996;274:742.
2. World Bank. Curbing the epidemic governments and the economics of tobacco control Washington; DC; USA: World Bank; 1999.
3. Sung HY, Wang L, Jin S, Hu TW, Jiang Y. Economic burden of smoking in China, 2000. Tob Control 2006;15 Suppl 1:i5-11.
4. Bates MN, Khalakdina A, Pai M, Chang L, Lessa F, Smith KR. Risk of tuberculosis from exposure to tobacco smoke: A systematic review and meta-analysis. Arch Intern Med 2007;167:335-42.
5. Margolese HC, Malchy L, Negrete JC, Tempier R, Gill K. Drug and alcohol use among patients with schizophrenia and related psychoses: Levels and consequences. Schizophr Res 2004;67:157-66.
6. Reducing Tobacco Use: A Report of the Surgeon General. Atlanta, US Department of Health and Human Services, 2000. Available from: http://www.cdc.gov/tobacco/sgr/sgr2000/index.htm.

7. Lichtermann D, Ekelund J, Pukkala E, Tanskanen A, Lönnqvist J. Incidence of cancer among persons with schizophrenia and their relatives. Arch Gen Psychiatry 2001;58:573-8.
8. Goff DC, Henderson DC, Amico E. Cigarette smoking in schizophrenia: Relationship to psychopathology and medication side effects. Am J Psychiatry 1992;149:1189-94.
9. Breslau N, Schultz LR, Johnson EO, Peterson EL, Davis GC. Smoking and the risk of suicidal behavior: A prospective study of a community sample. Arch Gen Psychiatry 2005;62:328-34.
10. Oquendo MA, Galfalvy H, Russo S, Ellis SP, Grunebaum MF, Burke A, *et al*. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. Am J Psychiatry 2004;161:1433-41.
11. Morissette SB, Tull MT, Gulliver SB, Kamholz BW, Zimering RT. Anxiety, anxiety disorders, tobacco use, and nicotine: A critical review of interrelationships. Psychol Bull 2007;133:245-72.
12. McCreadie RG. Scottish Comorbidity Study Group. Use of drugs, alcohol and tobacco by people with schizophrenia: Case—control study. Br J Psychiatry 2002;181:321-5.
13. Hughes JR. Taking smoking cessation treatment seriously: The American Psychiatric Association's Practice Guideline for the Treatment of Patients with Nicotine Dependence. Addiction 1998;93:469-70.
14. Montoya ID, Herbeck DM, Svikis DS, Pincus HA. Identification and treatment of patients with nicotine problems in routine clinical psychiatry practice. Am J Addict 2005;14:441-54.
15. Prochaska JJ, Fromont SC, Hall SM. How prepared are psychiatry residents for treating nicotine dependence? Acad Psychiatry 2005;29:256-61.
16. Ziedonis D, Hitsman B, Beckham JC, Zvolensky M, Adler LE, Audrain-McGovern J, *et al*. Tobacco use and cessation in psychiatric disorders: National Institute of Mental Health report. Nicotine Tob Res 2008;10:1691-715.
17. Breslau N, Klein DF. Smoking and panic attacks: An epidemiologic investigation. Arch Gen Psychiatry 1999;56:1141-7.
18. Waxmonsky JA, Thomas MR, Miklowitz DJ, Allen MH, Wisniewski SR, Zhang H, *et al*. Prevalence and correlates of tobacco use in bipolar disorder: Data from the first 2,000 participants in the Systematic Treatment Enhancement Program. Gen Hosp Psychiatry 2005;27:321-8.
19. Glassman AH, Helzer JE, Covio LS, Cottler LB, Stetner F, Tipp JE, *et al*. Smoking, smoking cessation, and major depression. JAMA 1990;264:1546-9.
20. Kelly C, McCreadie RG. Smoking habits, current symptoms, and premorbid characteristics of schizophrenic patients in Nithsdale, Scotland. Am J Psychiatry 1999;156:1751-7.
21. Morris CD, Giese AA, Turnbull JJ, Dickinson M, Johnson-Nagel N. Predictors of Tobacco Use Among Persons With Mental Illnesses in a Statewide Population. Psychiatr Serv 2006;57:1035-8.
22. Rebagliato M. Validation of self reported smoking. J Epidemiol Community Health 2002;56:163-4.
23. Takeuchi T, Nakao M, Shinozaki Y, Yano E. Validity of self-reported smoking in schizophrenia patients. Psychiatry Clin Neurosci 2010;64:274-8.
24. 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.
25. Ebbert JO, Patten CA, Schroede DA. The Fagerström Test for Nicotine Dependence-Smokeless Tobacco (FTND-ST). Addict Behav 2006;31:1716-21.
26. Cotinine ELISA. Catalog Number: CO096D. Calbiotech, Spring Valley, CA. Available from: http://www.calbiotech.com/assets/CT086D-R2-MSDS.pdf.
27. Tyrpien K, Bodzek P, Manka G. Application of planar chromatography to the determination of cotinine in urine of active and passive smoking pregnant women. Biomed Chromatogr 2001;15:50-5.
28. Lewis SJ, Cherry NM, McL Niven RM, Barber PV, Wilde K, Povey AC. Cotinine levels and self-reported smoking status in patients attending a bronchoscopy clinic. Biomarkers 2003;8:218-28.
29. Gorber SC, Schofield-Hurwitz S, Hardt J, Levasseur G, Tremblay M. The accuracy of self-reported smoking: A systematic review of the relationship between self-reported and cotinine-assessed smoking status. Nicotine Tob Res 2009;11:12-24.
30. Lasser K, Boyd JW, Woolhandler S, Himmelstein DU, McCormick D, Bor DH. Smoking and Mental Illness: A Population-Based Prevalence Study. JAMA 2000;284:2606-10.
31. Kupfer DJ. The Increasing Medical Burden in Bipolar Disorder. JAMA 2005;293:2528-30.
32. Itkin O, Nemets B, Einat H. Smoking habits in bipolar and schizoprenic outpatients in southern Israel. J Clin Psychiatry 2001;62:269-72.
33. Gonzalez-Pinto A, Gutierrez Miguel, Ezcurra J, Aizpuru F, Mosquera F, Lopez P, *et al*. Tobacco smoking and bipolar disorder. J Clin Psychiatry 1998;59:225-8.
34. Diaz FJ, James D, Botts S, Maw L, Susce MT, De Leon J. Tobacco smoking behaviors in bipolar disorder: A comparison of the general population, schizophrenia, and major depression. Bipolar Disord 2009;11:154-65.
35. Dodd S, Brnabic AJ, Berk L, Fitzgerald PB, de Castella AR, Filia S, *et al*. A prospective study of the impact of smoking on outcomes in bipolar and schizoaffective disorder. Compr Psychiatry 2010;51:504-9.
36. Schepis TS, Duhig AM, Liss T, McFetridge A, Wu R, Cavallo DA, *et al*. Contingency management for smoking cessation: Enhancing feasibility through use of immunoassay test strips measuring cotinine. Nicotine Tob Res 2008;10:1495-501.
37. Society for Research on Nicotine and Tobacco Subcommittee on Biochemical Verification. Biochemical verification of tobacco use and cessation. Nicotine Tob Res 2002;4:149-59.
38. Behera D, Uppal R, Majumdar S. Urinary levels of nicotine and cotinine in tobacco users. Indian J Med Res 2003;118:129-33.
39. Zielińska-Danch W, Wardas W, Sobczak A, Szołtysek-Bołdys I. Estimation of urinary cotinine cut-off points distinguishing non-smokers, passive and active smokers. Biomarkers 2007;12:484-96.

How to cite this article: Balhara YP, Jain R, Sundar SA, Sagar R. A comparative study of reliability of self report of tobacco use among patients with bipolar and somatoform disorders. J Pharmacol Pharmacother 2011;2:174-8.

Source of Support: Nil, **Conflict of Interest:** None declared.