

Clinico-epidemiological profile of tobacco users attending a tobacco cessation clinic in a teaching hospital in Bangalore city

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ABSTRACT

Background: Tobacco-attributable mortality in India is estimated to be at least 10%. Tobacco cessation is more likely to avert millions of deaths before 2050 than prevention of tobacco use initiation. **Objective:** To describe the clinico-epidemiological profile of attendees of a tobacco cessation clinic in a teaching hospital in Bangalore city. **Materials and Methods:** A descriptive study of 189 attendees seen over 2 years in the Tobacco Cessation Clinic of a tertiary-care teaching hospital in Bangalore, with information on socio demographic characteristics, tobacco-use details, nicotine dependence, family/medical history, past quit attempts, baseline stage-of-change, and treatment initiated. **Results:** Only 5% were 'walk-in' patients; 98% of attendees were smokers; 97% were males. The mean (\pm SD) age of attendees was 48.0 (\pm 14.0) years. Most participants were married (88%), and predominantly urban (69%). About 62% had completed at least 8 years of schooling. Two-thirds of smokers reported high levels of nicotine dependence (Fagerström score $>$ 5/10). About 43% of patients had attempted quitting earlier. Four-fifths (79%) of tobacco-users reported a family member using tobacco. Commonly documented comorbidities included: Chronic respiratory disease (44%), hypertension (23%), diabetes (12%), tuberculosis (9%), myocardial infarction (2%), stroke (1%), sexual dysfunction (1%) and cancer (0.5%). About 52% reported concomitant alcohol use. At baseline, patients' motivational stage was: Precontemplation (14%), contemplation (48%), preparation/action (37%) and maintenance (1%). Treatment modalities started were: Counseling alone (41%), nicotine replacement therapy alone (NRT) (34%), medication alone (13%), and NRT+medication (12%). **Conclusions:** This is the first study of the baseline profile of patients attending a tobacco cessation clinic located within a chest medicine department in India. Important determinants of outcome have been captured for follow-up and prospective documentation of outcomes.

KEY WORDS: Cessation, clinic, smoking, smokeless tobacco, tobacco

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INTRODUCTION

No condition is known to be as widely prevalent, harmful and neglected as tobacco addiction.^[1] One-half of all smokers will die prematurely as a result of their tobacco use.^[2] About 100 million deaths resulted from tobacco use

in the 20th century; during the 21st century, it is estimated to kill one billion more.^[3] While in the 20th century these deaths were mostly seen in industrialized countries, in the 21st century, most deaths are likely to be seen in developing countries.^[4] Further, while in developed countries the quit-ratios for smoking are about 30%, it is only 15% in Thailand, 9% in China and $<$ 5% in India.^[5]

Tobacco addiction is a chronic remitting and relapsing addictive disorder requiring specific treatment. Numerous tobacco cessation treatments are available for this condition.^[6,7] In India, annually about 1 in 10 deaths are related to smoking with cardiovascular diseases, respiratory diseases, cancers and tuberculosis contributing to most of these deaths.^[8] Thus, tobacco cessation together

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with tobacco taxation and other nonprice interventions can result in significant reduction in tobacco deaths in the coming three to four decades. Since the last few years, several tobacco cessation clinics in diverse settings are functioning in India to help people to quit tobacco use. These clinics typically offer tobacco cessation services developed for cigarette smokers in developed countries^[6] without fully taking into account the unique epidemiology of tobacco use in India. Nearly 55% of tobacco consumption in India is by beedi smoking, 20% by cigarette smoking and the rest as smokeless tobacco with or without arecanut, betel leaf and lime.^[9] While 33% of males and 18% of females report smokeless tobacco use, 24% of males and 3% of females report smoking.^[10] The average age of initiation of tobacco use is later than in industrialized countries^[11] with peak usage rates in those in their 40s and 50s compared to younger adults in industrialized countries.^[12] Indians smoke less than Caucasians per day^[8,13] owing to differences in nicotine metabolism.^[14] Further, quitting tobacco use is uncommon in India.^[5] Hence, research is needed to optimize treatment strategies^[15] especially in the under-studied group of Asian Indians^[14] based on local epidemiology of tobacco use. A key step toward this objective is to better understand the characteristics of tobacco users in India. In this communication, we describe the clinicoepidemiological profile of tobacco users attending a tobacco cessation clinic in a tertiary care teaching hospital in Bangalore city.

MATERIALS AND METHODS

The Tobacco Cessation Clinic at our tertiary care, teaching hospital in Bangalore, is located within the Chest Medicine department and is a collaborative effort between the departments of Chest Medicine and Psychiatry. It is staffed by a psychiatrist, a physician and a psychologist with expertise in the treatment of addiction disorders and offers twice weekly out-patient services to patients needing help with quitting tobacco. Patients could seek help directly or were referred to the clinic by other clinicians in the hospital. All 189 consecutive tobacco users attending the clinic over a 24-month period (August 2007 to July 2009) were included in this descriptive study.

A structured questionnaire was administered to all attendees to obtain information on sociodemographic characteristics such as age, gender, educational attainment, place of residence, occupation and marital status. Details of tobacco use such as age at initiation, duration of tobacco use, past quit attempts and current usage per day were obtained for both smokers and chewers (smokeless tobacco users). Monthly expenses toward tobacco were also collected. Nicotine dependence was assessed by a revised version of the Fagerström Test for Nicotine Dependence (FTND) among smokers^[16] and among smokeless tobacco users (FTND-ST);^[17] the maximum scores were 10 and 16 for the two scales, respectively.

Addition information was collected on self-use of other addictive substances (e.g., alcohol) and family history of tobacco use. Details concerning medical comorbidities were also documented. All patients underwent a detailed clinical interview following which they were categorized into one of the 'stages of readiness to change' according to the trans theoretical model developed by Prochaska and DiClemente.^[18] These five stages are: (1) Precontemplation stage: With no intention to quit tobacco; (2) Contemplation stage: Awareness that smoking is a problem but with ambivalence about the perspective of changing and hence no quit date planned; (3) Preparation stage: 6-month intention to quit; (4) Action stage: Has quit in the last 1-month or 1-month intention to quit, and (5) Maintenance stage: Has quit for more than 1 month.

Subsequently, the patients in early stages of readiness to change (Stage 1-3) underwent motivational interviewing (MI), an approach based on cognitive behavior therapy, focusing on the tobacco user and designed to help resolve the ambivalence related to tobacco use and change the behavioral stage.^[19] Based on motivational stage and presence of comorbidities, treatment modalities offered included behavioral counseling for all patients and pharmacologic therapy for a subset of patients. Nicotine replacement therapy (NRT), bupropion sustained release (SR) and varenicline were considered first-line therapies, whereas nortriptyline and clonidine were considered second-line treatments.^[20] Data was analysed using SPSS-PC (version 13.0). Descriptive statistics (proportions or means) along with inferential testing using *t*-tests (or *F*-tests) and χ^2 tests were used for the outcomes of interest; significance was set at a 'P value' of 0.05.

RESULTS

The epidemiological characteristics of patients attending the clinic is shown in Table 1. About 95% of patients were referral patients from other departments of the hospital; only 5% were 'walk-in' patients attempting to quit tobacco use. Most patients were smokers (98%) and males (97%). Distribution by type of tobacco use was into one of five categories: Beedis only (22%), cigarettes only (49%), beedis and cigarettes (18%), chewing only (2%) and smoking and chewing (9%). Most patients were married (88%) and predominantly urban (69%). Distribution by years of schooling was: No schooling (14%), 1-8 years (29%), 9-10 years (21%), 11-12 years (10%) and more than 12 years (26%). The mean (\pm SD) age of attendees was 48.0 (\pm 14.0) years. Those from urban areas (46.3 \pm 13.8 years) were significantly younger than those from rural areas (53.3 \pm 14.4 years) ($t=10.9$; $df=185$; $P=0.002$) and exclusive cigarette smokers (44.9 \pm 13.9 years) were younger than exclusive beedi smokers (56.4 \pm 11.3 years) ($t=4.9$; $df=130$; $P<0.001$); there was however no statistically significant difference in age by previous quit attempt ($t=0.12$; $df=143$; $P=0.78$) or family history of tobacco use ($t=0.24$; $df=185$; $P=0.54$).

An overwhelming majority of attendees were daily users of tobacco. There was an increasing gradient in mean age at initiation for (any) beedi use, (any) cigarette use and (any) chewing. The mean age at initiation was 18.8 (±5.5), 20.8 (±8.5) and 25.8 (±11.3) years for beedi smokers, cigarette smokers and chewers, respectively. Mean duration of tobacco use was 23.0 (±15.4), 14.6 (±12.2) and 8.9 (±12.4) years for beedi smokers, cigarette smokers and chewers, respectively.

About four-fifths of tobacco-users reported a family member using tobacco; there was no difference by type of tobacco use ($\chi^2=1.4$; $df=4$; $P=0.84$). Average monthly expenses were lowest for exclusive beedi smokers (Rs. 314.00) and highest for exclusive cigarette smokers (Rs. 1248.00); chewers and mixed users had expenses that were distributed between these values; overall differences were statistically significant (F -statistic=7.8; $P<0.001$).

Table 1: Epidemiological characteristics of attendees of the tobacco cessation clinic

Characteristic	No. (%)	Mean (±SD)
Sociodemographic characteristics (n=189)		
Patient source		
Inter-departmental referral	180 (95)	
Self-referral	9 (5)	
Type of tobacco user		
Beedis only	42 (22)	
Cigarettes only	93 (49)	
Beedis and cigarettes	33 (18)	
Chewing only	4 (2)	
Smoking and chewing	17 (9)	
Sex		
Male	184 (97)	
Female	5 (3)	
Residence		
Urban	131 (69)	
Rural	58 (31)	
Marital status		
Single	18 (9.5)	
Married	166 (87.5)	
Separated/divorced/widowed	5 (3)	
Education		
<8 years	73 (38)	
≥8 years	116 (62)	
Tobacco use		
Proportion of daily users*		
Among beedi smokers (n=81)	77 (95)	
Among cigarette smokers (n=143)	141 (99)	
Among chewers (n=21)	20 (95)	
Mean age at initiation*		
Any beedi use (n=81)	-	18.8 (±5.5)
Any cigarette use (n=143)	-	20.8 (±8.5)
Any smokeless tobacco use (n=21)	-	25.8 (±11.3)
Family history		
Tobacco use	150 (79)	
Expenses		
Beedis only (n=42)		314 (±447)
Chewing only (n=4)		408 (±430)
Smoking and Chewing (n=17)		938 (±786)
Beedis and cigarettes (n=33)		1065 (±1152)
Cigarettes only (n=93)		1248 (±886)
Past attempts to quit (n=146)†	63 (43)	

*: Total is > 189 because these are not mutually exclusive categories,

†: Missing values for 43

About 43% of patients had attempted quitting earlier, with no difference by type of tobacco user [$\chi^2=8.3$; $df=4$; $P=0.08$].

The clinical features seen in these patients are shown in Table 2. About 52% reported concomitant alcohol use and only 2% reported poly-drug use. Commonly documented medical co-morbidities included: Chronic respiratory disease (44%), hypertension (23%), diabetes (12%), tuberculosis (9%), myocardial infarction (2%), stroke (1%), sexual dysfunction (1%) and cancer (0.5%). Overall tobacco consumption in terms of number of beedis and cigarettes smoked per day was 20 ± 10 and 15 ± 11, respectively; tobacco was reported to be chewed about 12 ± 24 times per day.

Table 2: Clinical characteristics of attendees of the tobacco cessation clinic

Characteristic	No. (%)	Mean (±SD)
Clinical history		
Alcohol use comorbidities	98 (52)	
Asthma/COPD	82 (44)	
Hypertension	44 (23)	
Diabetes	23 (12)	
Tuberculosis	17 (9)	
Myocardial infarction	4 (2)	
Stroke	2 (1)	
Sexual dysfunction	2 (1)	
Cancer	1 (0.5)	
Pretreatment clinical factors		
Current mean daily tobacco use		
Exclusive beedi smokers (n=42)		
Beedis per day		24.5 (±9.7)
Exclusive cigarette smokers (n=93)		
Cigarettes per day		16.6 (±11.7)
Beedi and cigarette smokers (n=33)		
Beedis per day		17.1 (±10.0)
Cigarettes per day		14.1 (±12.3)
Exclusive chewers (n=4)		
Chews per day		28.3 (±47.8)
Mixed users (n=17)		
Chews per day		6.5 (±8.8)
Beedis per day		16.7 (±8.1)
Cigarettes per day		13.4 (±7.9)
Nicotine dependence score*		
Exclusive beedi smokers (n=36)§		
Very low (0-2 points)	5 (14)	
Low (3-4 points)	2 (6)	
Moderate (5 points)	1 (2)	
High (6-7 points)	11 (31)	
Very high (8-10 points)	17 (47)	
Exclusive cigarette smokers (n=85)§		
Very low (0-2 points)	13 (15)	5.5 (±2.4)
Low (3-4 points)	14 (17)	
Moderate (5 points)	6 (7)	
High (6-7 points)	36 (42)	
Very high (8-10 points)	16 (19)	
Motivational stage†		
Precontemplation phase	27 (14)	
Contemplation phase	90 (48)	
Preparatory/Action phase	69 (37)	
Maintenance	3 (1)	

*FTND score out of 10 for smokers and FTND-ST score out of 16 for chewers. §missing values=Six among exclusive beedi smokers and 8 among exclusive cigarette smokers. †Motivational stage according to Prochaska's transtheoretical model

About two-thirds of smokers reported high levels of nicotine dependence (FTND score $\geq 6/10$). Overall mean (\pm SD) dependence score was 5.8 (± 2.5). Scores among exclusive cigarette and exclusive beedi smokers were 5.5 (± 2.4) and 6.5 (± 2.5), respectively; this difference was statistically significant ($t=4.3, P=0.04$). Among those who smoked both beedis and cigarettes it was 6.3 (± 2.6). Mean (\pm SD) FTND-ST score among exclusive chewers was 10.8 (± 3.3). Among mixed users, scores were comparatively lower at 5.9 (± 1.7) for FTND and 5.8 (± 2.7) for FTND-ST.

At baseline, patients' motivational stage was: Precontemplation (14%), contemplation (48%), preparation/action (37%) and maintenance (1%). Treatment modalities started were: Counseling alone (41%), nicotine replacement therapy alone (NRT) (34%), medication alone (13%), and NRT + medication (12%); counseling was however offered to all patients. Follow-up with face-to-face or telephonic interviews is currently underway to determine cessation outcomes.

Figure 1 shows the relationship of both nicotine dependence and monthly tobacco expenses by motivational stage in different types of tobacco users. Nicotine dependence scores exhibited an inverse gradient by motivational stage among all three types of tobacco users. Monthly expenses were, however, lower for precontemplators and contemplators compared to those in preparation/action stage among beedi and cigarette smokers; no such association was seen among chewers.

DISCUSSION

This is the first detailed study of the clinicoepidemiological profile of patients attending a tobacco cessation clinic located within a chest medicine department in India.

Quitting tobacco by an individual could be said to depend on self, the availability of cessation services and the presence of a supportive environment both at the micro-level (in the family, workplace, etc.) and at the macro level (in society).

Most of our patients were referred by other physicians with very few 'walk-in' or self-referrals. This could have implications for continued clinic attendance, adherence to therapy and success in quitting. Most clinic attendees were males, smokers and predominantly urban, signifying that only a subset of all tobacco users in this region had access to cessation services in a clinic setting.^[21] Elsewhere in India, clinic attendees were mostly tobacco chewers (66%).^[22] Age is also an important factor. Our patients were much older than the average of 37 years seen from across India;^[22] it was however similar to that seen in one setting in Tamil Nadu^[23] and also in Brazil.^[24-25] This has implications for success in quitting as also the potential benefits that would accrue from quitting. Past evidence shows that those who quit smoking before the onset of major complications avoid most of the excess hazards of smoking. The benefits of cessation were largest in those who quit before middle-age (25-34 years), but were still significant in those who quit later (45-54 years).^[26] The profile of comorbidities seen in our patients could be a reflection of the location of the clinic within the chest medicine department.

Whether a tobacco user succeeds in quitting depends on the balance between that individual's motivation to quit and his/her degree of nicotine dependence. Clinicians must be able to assess both of these characteristics.^[27] Pretreatment markers, such as the Fagerström Tolerance Nicotine Dependence score, number of smokes per day and number of years of tobacco use have been identified

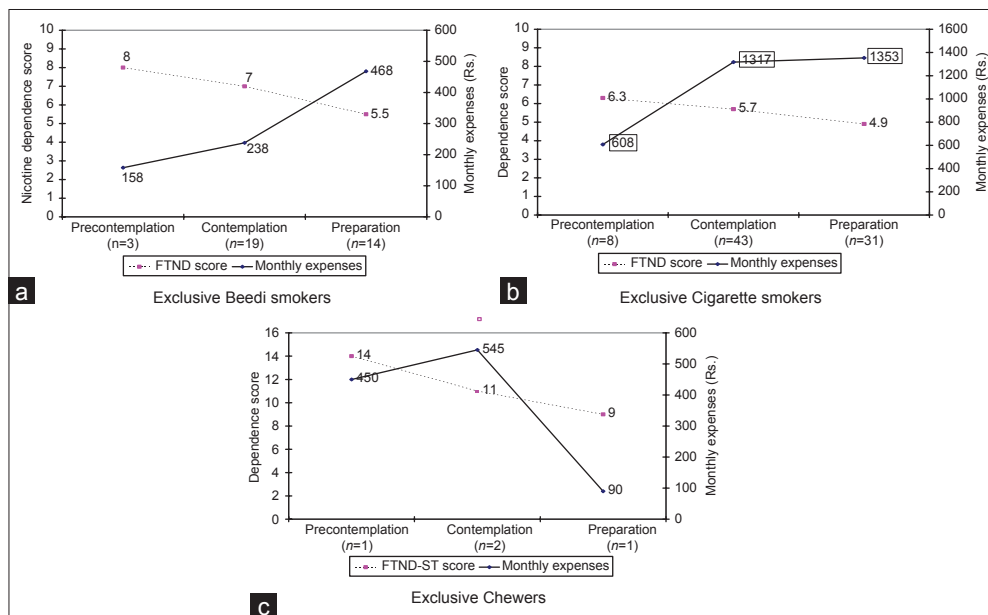


Figure 1: (a-c) Relationship of nicotine dependence scores and monthly tobacco expenses to the motivational stage in different exclusive types of tobacco users

as predictors of cessation. While some have found no association with quitting,^[28] others have consistently identified FTND scores to be predictive of quitting.^[29-31] Reporting of nicotine dependence by two-thirds of our patients was comparable to that seen in a sample of psychiatric patients in Bangalore earlier.^[32] Our study also showed higher dependence scores among exclusive beedi smokers as compared to exclusive cigarette smokers. It was also seen that precontemplators and contemplators had higher levels of nicotine dependence as compared to those in preparation/action stage but were able to maintain their tobacco use habit at a lower cost. Earlier studies have documented these two disparate findings separately – the inverse relationship of nicotine dependence and motivation to quit^[33] and the positive association of higher cigarette prices with greater motivation to quit^[34] have been noted among smokers in developed countries. This perverse finding within the same study is unique. It has implications for tobacco users' intention or ability to quit: being highly nicotine-dependent, those in earlier stages may be less reluctant or able to quit and simultaneously, having to spend relatively less on their tobacco habit, probably by using less-expensive or unfiltered brands, there was less of an economic reason for them to quit.

In the last decade, over a dozen tobacco cessation clinics are operational within hospitals in urban areas across India.^[21] Treatment options for nicotine dependence include pharmacological and nonpharmacological therapies. Nonpharmacological treatment includes 'brief, opportunistic counseling' or 'intensive counseling' involving personal, unambiguous and non-judgmental advice; and pharmacologic therapies include 'over-the-counter' nicotine replacement therapy (NRT) as well as prescription drugs. Pharmacological treatments double the rate of quitting and staying abstinent at 6 months when compared to placebo.^[35] Further, all these tobacco cessation interventions are among the most cost-effective health interventions.^[36]

Lastly, all of these are more effective if they operate within a supportive environment that is created by changing community norms, restricting tobacco use in public and work places, comprehensively banning advertising and promotion, disseminating information about health risks from tobacco, and increasing the cost of tobacco products.^[4,37] The National Tobacco Control Programme of the Ministry of Health and Family Welfare in India has initiated a multi-pronged action program to reduce the burden of tobacco in the country over the last few years.^[38]

This descriptive study had some limitations. Our patients were from a single tobacco cessation clinic that was located within a chest medicine clinic; they were mostly patients accessing the hospital for other medical comorbidities and tobacco cessation was not their primary concern. Hence, bearing in mind the potential for 'selection bias' in our sample of patients, caution must be exercised in interpretation and generalization to

Box 1: Key messages

- Mean age of clinic attendees was 48 years
- Most patients were male, smokers and urban
- 95% of patients were inter-departmental referrals and only 5% were 'walk-in' patients
- Clinical and epidemiological pre-treatment markers predictive of cessation have been documented
- About two-thirds of smokers reported high levels of nicotine dependence (FTND score $\geq 6/10$)
- Patients' motivational stage at baseline was: Precontemplation (14%), contemplation (48%), preparation/action (37%) and maintenance (1%). Motivational stage was directly associated with tobacco expenses but inversely related to nicotine dependence
- Treatment modalities started were: Counseling alone (41%), nicotine replacement therapy alone (NRT) (34%), medication alone (13%), and NRT+medication (12%).

tobacco users - those attending clinics in mental health or other settings and those who are 'walk-in' patients as opposed to 'referral' patients are likely to have different characteristics. Secondly, tobacco use was self-reported with no validation by use of any biomarkers. Lastly, the three study instruments used in the evaluation, FTND among smokers,^[16] (FTND-ST) among smokeless tobacco users^[17] and the 'stages of readiness to change'^[18] were not specifically tested for their psychometric properties in our patient population. Their test-retest reliability and internal consistency are however known to be moderate-to-high (0.62-0.91)^[39,40] and these instruments are routinely used in clinical practice.

Thus this study describes the attendees of a tobacco cessation clinic located within the chest medicine department of an urban tertiary-care hospital in south India [Box 1]. It profiles the clinical and epidemiological characteristics of a subset of tobacco users, mostly with medical morbidities, focusing on pretreatment markers that could potentially be predictors of cessation. Further research is needed on the diverse spectrum of tobacco users in the Indian setting, including those attending health care facilities and those in the community, as also follow-up information on their cessation outcomes in order to optimize treatment strategies.

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