

Tobacco use and nicotine dependence among patients with diabetes and hypertension in Ballabgarh, India

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Abstract

Tobacco use is one of the most important modifiable risk factors for cardiovascular mortality and has a synergistic effect with diabetes and hypertension. This study was conducted to estimate the prevalence of tobacco use and nicotine dependence among adult diabetic and/or hypertensive patients. We conducted a cross-sectional study among 419 consecutively enrolled patients from the non-communicable diseases (NCDs) outpatient clinic of a secondary level hospital in Ballabgarh, India between July 2018 and January 2019. We administered a pre-tested questionnaire to

assess tobacco use and Fagerstrom Test for Nicotine Dependence (FTND) to assess nicotine dependence. Current tobacco users were defined as those who smoked in the past seven days. Nicotine dependence was classified as low, moderate or high for the FTND score of 0-3, 4-6, and 7-10, respectively. Seventy-nine patients had diabetes, 226 had hypertension, and 114 had both. The prevalence of tobacco use was 20.8% (95% CI: 17.1 - 24.9); prevalence of smoking was 15% (95% CI: 11.9 - 18.8) and smokeless tobacco use was 7.2% (95% CI: 5 - 10.1). Moderate to high nicotine dependence was found among 59.7% of tobacco users; 75.9% tobacco users attempted to quit tobacco in the past one month. One-fifth of attendees of a NCD clinic in a secondary level hospital used tobacco, most of whom had moderate-to-high nicotine dependence. High level of nicotine dependence and inability to quit despite making an attempt for it necessitates the inclusion of tobacco cessation services in the management of patients with non-communicable diseases.

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Introduction

Cardiovascular diseases (CVDs) are the leading causes of premature mortality in the world. In 2017, CVDs caused 330 million years of life lost, and 35.6 million years lived with disability, and burden was higher in the low-and middle-income countries (LMICs) [1,2]. In 2010-13, CVDs caused 23.3% of all deaths in India [3]. Tobacco use is one major risk factors for CVDs, along with diabetes and hypertension [4]. Presence of multiple risk factors have a synergistic effect on morbidity and mortality [5,6]. A cohort study found that the hazard ratio for CVD mortality increased to 2.3 (95% CI: 2.1-2.5) for those who smoked over 20 pack years with hypertension compared to those who never smoked [7]. In a nationally representative case-control study in India found that smoking was associated with an increased risk of mortality from any medical cause among women (risk ratio - 2.0; 99% CI: -1.8 to 2.3) and men (risk ratio -1.7, 99% CI- 1.6 to 1.8). The common cause of death among smokers were tuberculosis and vascular or neoplastic diseases [8]. The World Health Organization (WHO)'s Global Action Plan 2013-2020 and the India's National Action Plan and Monitoring Framework for Prevention and Control of NCDs have set a target to reduce the premature mortality from NCD by 25% and to reduce the prevalence of tobacco use by 30% by the year 2025 [9,10].

The prevalence of tobacco use is estimated to be 20.2% globally and 23.6% in India among the general population [11,12]. There has been a declining trend in the prevalence of tobacco use in the world and India [12,13]. However, this decline is not fast enough to achieve the target of reducing tobacco use by 30% by 2025. There is handful of data on the patterns and prevalence of

tobacco use focused among NCD patients at the national and international level [1,12]. A meta-analysis in Africa estimated the prevalence of active smoking among patients with diabetes and/or hypertension to be 12.9% [14]. Studies in India have reported the prevalence of tobacco use among diabetes and/or hypertension patients to be ranging from 11% to 26.6% [15-18].

In India, various strategies have been used to reduce tobacco use [19,20]. But the prevalence of tobacco use in India remains high [11,13]. The reason could be high nicotine dependence, which poses a significant challenge in tobacco cessation [21]. Data on nicotine dependence among smokers with diabetes and hypertension is sparse [15,16]. The information on tobacco use and nicotine dependence will help in planning and implementation of the tobacco cessation or control strategy effectively among tobacco users with hypertension and diabetes. Therefore, we conducted this study to estimate the prevalence of tobacco use and nicotine dependence among diabetic and hypertension patients in Ballabgarh, Haryana.

Materials and Methods

This cross-sectional study was conducted at a secondary level hospital in Ballabgarh block of district Faridabad in Haryana, India. It was a fifty bedded hospital, which served to more than 350,000 outpatients every year and had a specialised NCD clinic. We enrolled 419 consecutive attendees of the NCD clinic, aged ≥ 18 yrs. Data were collected using a structured pre-tested questionnaire in the local language (Hindi) regarding the socio-demographic details and tobacco use between July 2018 till January 2019. Current tobacco use was defined as either tobacco smoking or the use of smokeless tobacco in the last seven days. Patients who reported current tobacco use were further assessed regarding

the product type, frequency, age at initiation of tobacco use, duration of use, and attempt to quit in the last one month. Patients using tobacco in both the forms (smoked and smokeless tobacco) were classified into smokers and smokeless tobacco users based on the predominant use (based on the quantity and the consumption years). We also assessed the current tobacco users for nicotine dependence using revised Fagerstrom Test for Nicotine Dependence (FTND) for smokers [22] and smokeless tobacco users [23]. FTND consists of various items, and their sum produces a score ranging from 0-10.

Data were entered in Microsoft Excel and was analysed using Stata13. Descriptive analysis was done for the prevalence and pattern of tobacco use. Prevalence of tobacco use was reported as the proportion with the 95% confidence interval. Nicotine dependence was reported in the category of low, moderate and high. A score of 0-3 was considered as low dependence, 4-6 as moderate dependence and 7-10 as high dependence [24]. We used bivariable and multivariable logistic regression to assess the determinants of tobacco use and, moderate to high nicotine dependence (FTND score ≥ 4). All factors which were potentially significant ($p < 0.2$) in the bivariable analysis were considered for the multivariable logistic regression model. During the multivariable and bivariable analysis, the most predominant form of tobacco was selected for patients who were using tobacco in both forms (smoke and smokeless).

Results

A total of 419 patients were included in the study; in which 79 patients had diabetes (18.9%), 226 had hypertension (53.9%) and 114 had both (27.2%). Majority of the patients were female (57.5%), and were in the age group 61-70 years (34.6%) (Table 1).

Table 1. Socio-demographic profile of the patients with diabetes and hypertension in Ballabgarh, India.

Variable	Frequency (%)
Sex	
Male	178 (42.5)
Female	241 (57.5)
Age group (in years)	
18 - 50	121 (28.9)
51-60	122 (29.1)
≥ 61	176 (42)
Marital Status	
Currently married	325 (77.6)
Currently unmarried/widowed/divorced	94 (22.4)
Earning status	
Not earning	329 (78.5)
Earning	90 (21.5)
Education status	
No education	123 (29.4)
Less than primary	81 (19.3)
Primary education	76 (18.1)
Secondary and above	139 (33.2)
Monthly family income in INR (n=417)*	
0-8000	90 (21.6)
8001-16000	189 (45.3)
≥ 16001	138 (33.1)

*Two participants refused to provide information on monthly family income.

The prevalence of tobacco use was 20.8% (n=87, 95% CI: 17.1 - 24.9); prevalence of smoking was 15% (n=63, 95% CI: 11.9 - 18.8) and smokeless tobacco use was 7.2% (n=30, 95% CI: 5 - 10.1). Six patients reported using tobacco in both the forms. The prevalence of tobacco use among males and females was 35.4% (95% CI: 28.7 - 42.8) and 10% (95% CI: 6.7 - 14.5) respectively. The prevalence of tobacco use among diabetic and hypertensive patients was 21.2% (n=41, 95% CI: 16 - 27.6) and 20.6% (n= 70, 95% CI: 16.6 - 25.2) , respectively.

There were 60 predominant smokers and 27 predominant smokeless tobacco users. Among the patients who predominantly smoked tobacco (n=60); 50 used bidi, two used cigarettes, six used hookahs, and two used both (hookahs and bidi). The mean age of starting smoking was 30.7 years (SD-14) and mean duration (years of smoking) was 26.3 years (SD-14.3). Among the current predominant smokers, 76.7% (n=46/60) of the patients reported that they attempted to quit smoking in the last one month. Among the patients who predominantly reported using smokeless tobacco (n=27); four used it with betel leaf, 22 used it as gutka/khaini, one used tobacco in snuff form. The mean age of starting smokeless tobacco use was 34.5 years (SD-12.7) and mean duration (years of using smokeless tobacco) was 21.7 years (SD-15.5). Among the current predominant smokeless tobacco users, 74.1 % (n=20/27) of

the patients reported that they attempted to quit smokeless tobacco in the last one month.

The mean FTND score among predominant smokers and predominant smokeless tobacco users was 3.6 (SD- 2) and 4.2 (SD-1.9), respectively. The proportion of the high level of nicotine dependence among smokeless tobacco users (14.8%) was more than the smokers (8.3%). Most of the tobacco users had moderate nicotine dependence. Moderate to high nicotine dependence was found in 59.7% (n=52) of tobacco users (55% of predominant smokers and 70.4% of predominant smokeless tobacco users) (Table 2). In the bivariable regression for determinants of tobacco use; sex, education, marital status and occupation were found potentially significant. In the multivariable regression, sex was significantly associated with tobacco use; males were 5.9 times (95% CI: 3-11.6) more likely to be a tobacco user compared to females (Table 3). In bivariable regression for determinants of moderate-high nicotine dependence (FTND score ≥ 4); tobacco type, quantity per day and age were found to be potentially significant. In the multivariable regression, age was significantly associated with moderate-high nicotine dependence; patients aged 18-59yrs had 2.6 times higher odds (95% CI: 1.02 - 6.5) of being a moderate-high nicotine dependence compared to patients aged ≥ 60 yrs (Table 4).

Table 2. Level of nicotine dependence for current predominant smokers (n=60) and current predominant smokeless tobacco users (n=27) among patients with diabetes and hypertension in Ballabgarh, India.

Level of nicotine dependence	Current predominant smokers, n (%)	Current predominant smokeless tobacco user, n (%)
Low (0-3)	27 (45.0)	8 (29.6)
Moderate (4-6)	28 (46.7)	15 (55.6)
High (7-10)	5 (8.3)	4 (14.8)

Table 3. Determinants of tobacco use among patients with diabetes and hypertension in Ballabgarh, India.

Variables (n=419)	Tobacco users (%)	Bivariable analysis		Multivariable analysis	
		cOR (95% CI)	p-value	aOR (95% CI)	p-value
Sex					
Female (n=241)	24 (10.0%)	1		1	
Male (n=178)	63 (35.4%)	4.9 (2.9-8.3)	<0.001	5.9 (3-11.6)	<0.001
Age group (in years)					
18-50 (n=121)	25 (20.7%)	1		Not included	
51-60 (n=122)	24 (19.7%)	0.9 (0.5-1.8)	0.848		
≥ 61 (n=176)	38 (21.6%)	1.1 (0.6-1.9)	0.847		
Education status					
No education (n=123)	19 (15.4%)	1		1	
Less than primary (n=81)	14 (17.3%)	1.21 (0.5-2.4)	0.728	0.6 (0.3-1.5)	0.28
Primary education (n=76)	18 (23.7%)	1.7 (0.8-3.5)	0.149	0.7 (0.3-1.7)	0.5
Secondary and above (n=139)	36 (25.6%)	1.9 (1.03-3.6)	0.040	0.6 (0.3-1.2)	0.15
Marital status					
Currently married (n=325)	75 (23.1%)	2.1 (1.1 - 3.9)	0.033	1.6 (0.8-3.2)	0.202
Currently not married (n=94)	12 (12.8%)	1		1	
Family income (n=417)					
0-8000 (n=90)	20 (22.2%)	1		Not included	
8001-16000 (n=189)	35 (18.5%)	0.8 (0.4-1.5)	0.468		
≥ 16001 (n=138)	31 (22.5%)	1.01 (0.5-1.9)	0.966		
Earning status					
Not earning (n=329)	58 (17.6%)	1		1	
Earning (n=90)	29 (32.2%)	2.2 (1.3-3.8)	0.003	0.97 (0.5-1.8)	0.942

Discussion

We found the prevalence of current tobacco use among diabetic and hypertensive patients to be 20.8%. The prevalence of smoking tobacco was higher than the smokeless tobacco use, and male sex was strongly associated with tobacco use. We also found that majority of the tobacco users had moderate to high level of nicotine dependence, and more than one-third of the patients had attempted to quit tobacco use in the past one month.

The observed prevalence of tobacco use was higher among hypertensive patients compared to the studies done in Gujarat (11%) [15] and rural Delhi (13.7%) [17]. The prevalence of tobacco use among diabetic patients was however similar to a study done in Kerala (22.5%) [16]. The prevalence was less compared to the finding of a study done among middle-class urban participants in India (26.6%) [18]. All the disparities could be explained due to differences in the study setting and the definitions used for current tobacco users. We found that males sex had higher odds of tobacco use. This finding was in line with a study which analysed the GATS-2 survey data for determinants of tobacco use in India [25]. This can be explained by the social norms in India, where use of tobacco by women is considered a taboo [26,27].

We found that 59.7% of tobacco users had moderate to high nicotine dependence. Similar findings was reported by a study done in West Bengal (54.5%) among young adolescents [28]. We found higher nicotine dependence among smokeless tobacco users compared to smokers, which was similar to studies conducted at Puducherry [29], Bhopal [30] and Nepal [31]. Our finding of younger aged patients to be associated with nicotine dependence

was similar to a study conducted among male industrial workers [32]. We found a higher proportion of patients who had attempted to quit tobacco in the past one month compared to a national survey (42%) conducted among general population [33]. This difference could be due to the study participants, as we had enrolled patients from the NCD clinic who are regularly advised for quitting tobacco or it could be due to social desirability bias.

The high nicotine dependence and inability to quit tobacco among NCD patients suggests need for an effective integration of tobacco cessation services at the NCD clinics under the national programme. Tobacco cessation or control strategy plays a vital role in the management of diabetes and hypertension [34,35]. A treating physician needs to screen for nicotine dependence among NCD patients with tobacco use to provide an appropriate guidance. In the past ten years (2007-2017), there has been an increase of 13% in the Disability Adjusted Life Years (DALYs) contributed by tobacco use [36]. More accelerated and focused strategies need to be adopted to achieve the target of tobacco reduction by 30% by the year 2025 [9,10]. This study provided an insight over the patterns of tobacco use and dependence on nicotine among the NCD patients, and provides evidence for planning an effective intervention for tobacco cessation. We used a standard tool to assess the nicotine dependence. One of the limitations of the study was the assessment of tobacco use was self-reported by the patients, which could have led to an under-estimation of the prevalence of the tobacco due to the social desirability bias. The patients attending NCD clinic may not be representative of all NCD patients in the community. Hence it is recommended that community-based studies may be conducted to generalise these findings and to formulate an effective intervention for tobacco cessation among NCD patients.

Table 4. Factors associated with moderate to high nicotine dependence (FTND score ≥ 4) among patients with diabetes and hypertension in Ballabgarh, India.

Variables (n=87)	Patients with high nicotine dependence	Bivariable analysis cOR (95%CI)	p-value	Multivariable analysis aOR (95%CI)	p-value
Predominant tobacco type					
Smoke (n=60)	33 (55.0%)	1		1	
Smokeless (n=27)	19 (70.4%)	1.9 (0.7–5.1)	0.180	1.8 (0.7–4.7)	0.263
Age of starting tobacco use				Not included	
≤ 25 yrs (n=38)	22 (57.9%)	1			
≥ 26 yrs (n=49)	30 (61.2%)	1.1 (0.5–2.7)	0.753		
Duration of tobacco use				Not included	
≤ 20 yrs (n=43)	23 (53.5%)	1			
≥ 21 yrs (n=44)	29 (65.9%)	1.7 (0.7–3.4)	0.239		
Sex				Not included	
Female (n=24)	13 (54.2%)	1			
Male (n=63)	39 (60.0%)	1.4 (0.5–3.6)	0.511		
Age group (in years)					
18-59 (n=37)	25 (67.6%)	2.7 (1.1–6.7)	0.033	2.6 (1.02–6.5)	0.045
≥ 60 (n=50)	27 (54.0%)	1		1	
Education status				Not included	
$\leq 5^{\text{th}}$ standard (n=33)	20 (60.6%)	1			
$\geq 6^{\text{th}}$ standard (n=54)	32 (59.3%)	0.9 (0.4–2.2)	0.901		
Income status				Not included	
Not earning (n=58)	34 (58.6%)	1			
Earning (n=29)	18 (62.1%)	2.7 (0.5–2.9)	0.757		
Monthly family income (INR)				Not included	
≤ 12000 (n= 47)	28 (59.6%)	1			
≥ 12001 (n=39)	23 (58.9%)	1 (0.4–2.3)	0.955		

Conclusions

The prevalence of tobacco use among NCD patients was substantial, with more than half of the tobacco users had moderate to high nicotine dependence. More than one-third of the patients had attempted to quit tobacco use in the past one month. There is a need to focus on dealing with the nicotine dependence among tobacco users while planning tobacco cessation strategies.

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