

# Correlates of the Use of Different Tobacco Cessation Methods by Smokers and Smokeless Tobacco Users According to Their Socio-Demographic Characteristics: Global Adult Tobacco Survey (GATS) India 2009-10

Rohini Ruhil

Scholar, Centre for Social Medicine and Community Health, Jawaharlal Nehru University (JNU), New Delhi - 110067, India

## ABSTRACT

**Background:** Tobacco control has two aspects. One involves preventing non-tobacco users from using tobacco and the second involves tobacco cessation (quitting) by existing tobacco users. There are various methods of tobacco cessation. Pharmacotherapy [e.g., nicotine replacement therapy (NRT) and medications such as bupropion] and behavioral counselling are some of the internationally approved methods of tobacco cessation. **Objective:** This paper intends to study how age, gender, residence (rural/urban), education, and occupation influence the use of various tobacco cessation methods by smokers and smokeless tobacco users. **Materials and Methods:** The study was a cross-sectional secondary data analysis of the Global Adult Tobacco Survey (GATS) India 2009-2010. There were 3725 smokers and 6354 smokeless tobacco users included in the study who made attempts to quit in the 12 months prior to the survey by use of different cessation methods (NRT, drugs such as bupropion, counselling, and other methods). **Results:** A significant association was demonstrated between increasing educational attainment and use of cessation methods for all the methods among smokers. Being employed (Govt. or non-Govt.) was positively associated with the use of NRT as a cessation method by smokers. Students and homemakers had higher odds of using pharmacotherapy methods among smokers. A significant association was demonstrated for the gender and age of tobacco users with the use of counselling as a cessation method among smokeless tobacco users. **Conclusion:** The findings of this study have important implications for tobacco cessation service providers in view of supporting their decision of choosing a particular tobacco cessation method for tobacco users according to certain kinds of sociodemographic characteristics.

**Keywords:** Global Adult Tobacco Survey (GATS) India, sociodemographic characteristics, tobacco cessation, tobacco cessation methods

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> www.ijcm.org.in
	<b>DOI:</b> 10.4103/0970-0218.183598

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Ruhil R. Correlates of the use of different tobacco cessation methods by smokers and smokeless tobacco users according to their socio-demographic characteristics: Global adult tobacco survey (GATS) India 2009-10. Indian J Community Med 2016;41:190-7.

**Address for correspondence:**

Dr. Rohini Ruhil, Yes Health Care Clinic, Chaudhary Market, Railway Road, Defence Colony, Muradnagar, District - Ghaziabad, Ghaziabad - 201 206, Uttar Pradesh, India. E-mail: drrohiniruhil@gmail.com

**Received:** 09-04-15, **Accepted:** 16-11-2015

## Introduction

Tobacco is very well known all over the world as a harmful product causing much morbidity and mortality.<sup>(1)</sup> In spite of its known harmful effects, a large number of people use tobacco products and continue using them due to the addictive nature of tobacco.<sup>(2)</sup> Thus, people need help to quit tobacco use (i.e., for tobacco cessation), which may be provided by professionals, family, and friends. Various tobacco cessation methods include behavioral counselling, pharmacotherapy, and some traditional methods.<sup>(3)</sup> The various treatment methods differ from each other in several aspects, such as cost-effectiveness, cultural context, and the patient's current needs.<sup>(4)</sup> In one situation, counselling may be the treatment of choice, while in another, pharmacotherapy may be given along with behavioral counselling. Behavioral counselling in the form of brief advice by a health-care practitioner is very cost-effective and should be part of routine health-care practice.<sup>(5)</sup> Pharmacotherapy is also an effective treatment option for tobacco cessation. Pharmacotherapy includes nicotine replacement therapy (NRT), which comes in the form of patches, gums, sublingual tablets, lozenges, inhalers, and nasal sprays.<sup>(6)</sup> Out of all these forms of NRT, only nicotine gums were formerly available in India.<sup>(3)</sup> Now, nicotine patches have also been introduced by Rusan Healthcare. Non-nicotine replacement therapy include prescribed drugs such as bupropion and varenicline.<sup>(7)</sup> Pharmacotherapy is more expensive than behavioral counselling but the evidence shows that it increases the cessation rate by 2-3 times.<sup>(8)</sup> There is strong evidence that NRT increases cessation rates by 50-70% regardless of tobacco cessation setting and independent of any additional support provided to the individual.<sup>(9)</sup>

According to the Global Adult Tobacco Survey (GATS) India, about 38% smokers and 35% smokeless tobacco users made an attempt to quit within 1 year prior to the survey.<sup>(10)</sup> Different methods used for quitting tobacco use were NRT, medications such as bupropion, and counselling/advice, and other methods such as traditional medicines, quit line. According to GATS India, 9% of smokers who made a cessation attempt used counselling and 4% used pharmacotherapy for quitting tobacco use.<sup>(10)</sup> Among smokeless tobacco users who made a quit attempt, 8% used counselling for cessation.<sup>(10)</sup> The use of different cessation methods was also studied according to various sociodemographic characteristics, including gender, age, residence (urban/rural), education level, and occupation. This paper is based on secondary data analysis of variation in the use of different tobacco cessation methods according to sociodemographic characteristics using data from GATS India 2009-2010.

The aim of the study is to determine how certain sociodemographic characteristics (age, gender, residence, occupation, education) influence the use of different cessation methods (NRT, medications such as bupropion, counselling) by tobacco users.

The specific objectives are the following:

- a. To determine what kind of sociodemographic characteristics in smokers influence the use of counselling as a cessation method;
- b. To determine what kinds of sociodemographic characteristics in smokers influence the use of NRT as a cessation method;
- c. To determine what kinds of sociodemographic characteristics in smokers influence the use of medications such as bupropion as a cessation method;
- d. To determine what kinds of sociodemographic characteristics in smokeless tobacco users influence the use of counselling as a cessation method;
- e. To help tobacco cessation service providers in deciding among different methods of tobacco cessation for tobacco users with certain kinds of sociodemographic characteristics; and
- f. To give recommendations for tobacco cessation programs such that they could focus on certain sociodemographic characteristics in order to maximize the use of tobacco cessation methods by tobacco users.

## Materials and Methods

### Study design

The study design was cross-sectional secondary data analysis of GATS India, 2009-2010.<sup>(10)</sup> GATS is one of the major elements of the Global Tobacco Surveillance System (GTSS).<sup>(11)</sup> It helps countries in tracking tobacco control indicators and formulating effective tobacco control interventions.

### Setting

The primary data of GATS India were collected from June 2009 to January 2010 in a household survey by the International Institute for Population Sciences (IIPS), Mumbai, MH, India with technical support from Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA and the World Health Organization (WHO). GATS India covered all the 29 states (including Delhi) and two Union Territories (UTs) Chandigarh and Puducherry, covering about 99.92% of the total population of India.

### Participants

The original GATS India 2009-10 included participants aged 15 years and above, on a voluntary basis, after giving informed consent. Participants were included on the basis of three-stage sampling independently in each state/UT and within each state/UT, independently in urban and rural areas. In the present study of secondary

data analysis, the participants were all current and former tobacco users (smokers and smokeless tobacco users) aged 15 and above who had abstained for less than 12 months directly prior to the survey.

### Variables

The exposure variables used for assessing association were residence (rural or urban), gender, age group, education level (no formal schooling, less than primary, primary but less than secondary, secondary and above), occupation (Government and non-Government employee, self-employed, student, homemaker, retired, and unemployed). Outcome variables were:

- All current and former smokers aged 15 and above who made a quit attempt in the 12 months prior to the survey by the use of counselling,
- All current and former smokers aged 15 and above who made a quit attempt in the 12 months prior to the survey by the use of NRT.
- All current and former smokers aged 15 and above who made a quit attempt in the 12 months prior to the survey by the use of medications such as bupropion;
- All current and former smokeless tobacco users aged 15 and above who made a quit attempt in

the 12 months prior to the survey by the use of counselling.

### Data sources/measurement

The original data set of GATS India 2009-2010 was used, which is available for public use from the CDC website.<sup>(12)</sup>

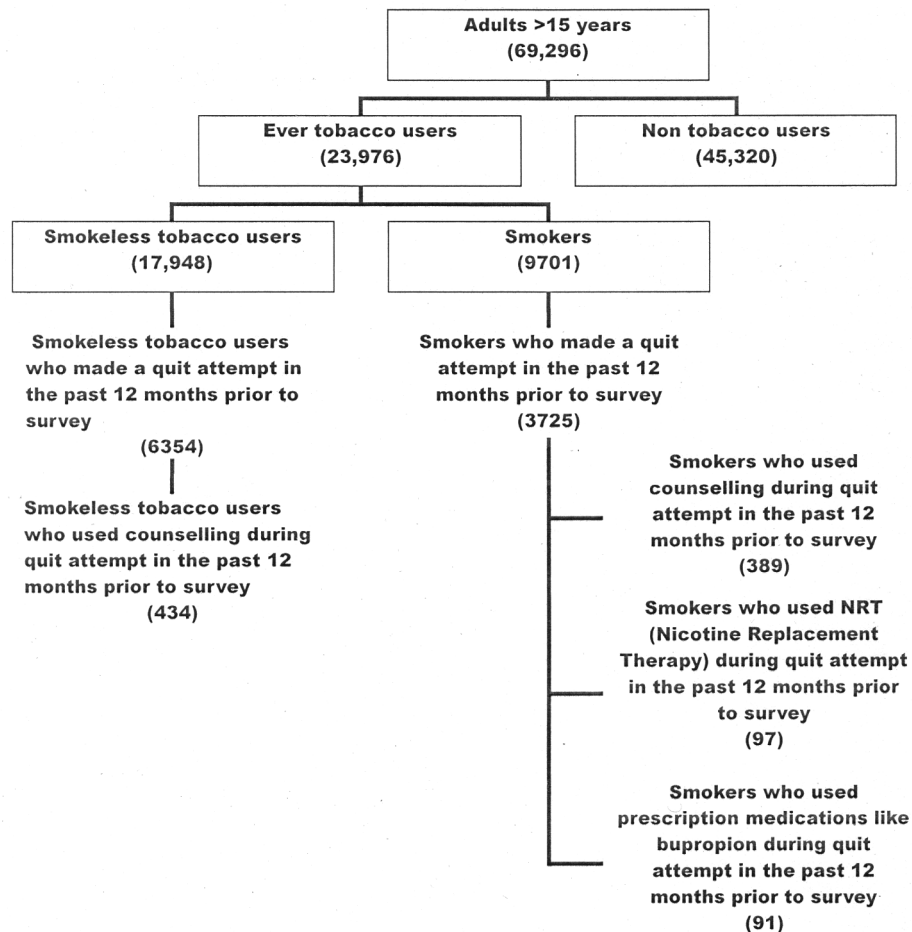
### Data analysis

The analysis of the extracted data was conducted using SPSS version 16 developed by IBM. First, a descriptive analysis of all the variables included in the study was done. Next, an initial univariate logistic regression analysis was done by searching for associations of exposure variables with the outcome variables. Then multivariate logistic regression analysis was performed, adjusting for all the confounders. Significance levels for both univariate and multivariate logistic regression analysis were set at 0.05.

## Results

### Study participants at each stage of study

Figure 1 represents a flow diagram of study participants at each stage of study from the GATS India survey data 2009-2010. Of the 3725 smokers aged >15 years who made



**Figure 1:** Flow diagram to show study participants at each stage of study

a quit attempt in the 12 months prior to survey, 97 used NRT, 91 used medications such as bupropion, and 389 used counselling during quit attempt as a cessation method. Of the 6354 smokeless tobacco users aged >15 years who made a quit attempt in the 12 months prior to survey, 434 used counselling as a cessation method during quit attempt.

### Counselling as a cessation method among smokers

Table 1 presents the sociodemographic characteristics (residence, gender, age, education, and occupation) of smokers who used counselling as a cessation method during the 12 months prior to the survey. Multivariate analysis showed that smokers with lower education level had fewer odds of using counselling as a cessation method as compared to smokers with higher education level. Smokers with no formal schooling had 0.65 times fewer odds [confidence interval (CI) 0.47-0.90,  $P = 0.01$ ] of using counselling as a cessation method as compared to smokers with education level secondary and above. Smokers with less than primary education level had 0.66 times fewer odds (CI 0.46-0.95,  $P = 0.03$ ) of using counselling as a cessation method as compared to smokers with education level secondary and above. Other sociodemographic characteristics including residence (rural, urban), gender, age, and occupation were not found to have significantly affected the use of counselling as a cessation method among smokers.

### Nicotine Replacement Therapy (NRT) as a cessation method among smokers

Table 2 presents the sociodemographic characteristics (residence, gender, age, education, and occupation) of smokers who used NRT as a cessation method during the 12 months prior to the survey. Both univariate as well as multivariate analysis showed that smokers with lower education level had fewer odds of using NRT as a cessation method as compared to smokers with higher education level. Smokers with no formal schooling had 0.19 times fewer odds (CI 0.09-0.40,  $P < 0.0001$ ) of using NRT as a cessation method as compared to smokers with education level secondary and above. Smokers with education level less than primary had 0.40 times fewer odds (CI 0.20-0.80,  $P = 0.009$ ) of using NRT as a cessation method as compared to smokers with education level secondary and above. Smokers with education level primary but less than secondary had 0.60 times fewer odds (CI 0.36-0.97,  $P = 0.036$ ) of using NRT as a cessation method as compared to smokers with education level secondary and above. Thus, the lower the education level of smokers, the lower were the odds of using NRT as a cessation method.

Table 2 also shows that occupation was another factor that influenced the use of NRT as a cessation method by smokers. Smokers who were Government and non-Government employees had 2.81 times higher

**Table 1: Sociodemographic characteristics and use of counselling as a cessation method among smokers who tried to stop smoking tobacco during the 12 months prior to survey: Global Adult Tobacco Survey (GATS) India 2009-2010**

Sociodemographic characteristics <i>N</i> = 3490	Smokers who used counselling as a cessation method during the 12 months prior to survey		Univariate logistic regression analysis		Multivariate logistic regression analysis	
	Yes <i>N</i> = 389 (%)	No <i>N</i> = 3101 (%)	OR (95% CI)	<i>P</i> value	OR (95% CI)	<i>P</i> value
Residence						
Urban	130 (33.4)	1009 (32.5)	1.04 (0.83-1.30)	0.73	1.03 (0.82-1.30)	0.79
Rural	259 (66.6)	2092 (67.5)	1 (Reference)		1 (Reference)	
Gender						
Male	343 (88.2)	2738 (88.3)	0.99 (0.72-1.37)	0.95	0.92 (0.62-1.35)	0.66
Female	46 (11.8)	363 (11.7)	1 (Reference)		1 (Reference)	
Age						
15-24	34 (8.7)	269 (8.7)	0.95 (0.58-1.55)	0.83	0.95 (0.55-1.63)	0.84
25-44	176 (45.2)	1549 (50)	0.85 (0.58-1.24)	0.40	0.86 (0.57-1.30)	0.49
45-64	142 (36.5)	1006 (32.4)	1.06 (0.72-1.55)	0.78	1.09 (0.73-1.64)	0.67
65+	37 (9.5)	277 (8.9)	1 (Reference)		1 (Reference)	
Education						
No formal schooling	97 (25.1)	896 (28.9)	0.77 (0.57-1.02)	0.07	0.65 (0.47-0.90)	0.01
Less than primary	53 (13.7)	500 (16.1)	0.75 (0.53-1.06)	0.10	0.66 (0.46-0.95)	0.03
Primary but less than secondary	125 (32.3)	912 (29.4)	0.97 (0.74-1.27)	0.82	0.90 (0.68-1.19)	0.46
Secondary and above	112 (28.9)	791 (25.5)	1 (Reference)		1 (Reference)	
Occupation						
Govt. and non-Govt. employee	119 (30.6)	1088 (35.2)	0.80 (0.58-1.10)	0.18	0.77 (0.54-1.11)	0.16
Self-employed	15 (3.9)	73 (2.4)	1.51 (0.82-2.78)	0.19	1.62 (0.85-3.08)	0.14
Student	182 (46.8)	1390 (44.9)	0.96 (0.71-1.30)	0.79	0.98 (0.69-1.37)	0.89
Homemaker	8 (2.1)	67 (2.2)	0.87 (0.40-1.90)	0.74	0.75 (0.32-1.77)	0.51
Retired and unemployed	65 (16.7)	476 (15.4)	1 (Reference)		1 (Reference)	

odds (CI 1.09-7.25,  $P = 0.03$ ) of using NRT as a cessation method as compared to retired and unemployed smokers. Smokers who were students had 3.35 times higher odds (CI 1.33-8.44,  $P = 0.01$ ) of using NRT as a cessation method as compared to retired and unemployed smokers. Smokers who were homemakers had 3.87 times higher odds (CI 1.04-14.42,  $P = 0.04$ ) of using NRT as a cessation method as compared to retired and unemployed smokers. Other sociodemographic characteristics including residence (rural, urban) and age were not found to be significantly associated with the use of NRT as a cessation method by smokers.

### Medications (bupropion) as a cessation method among smokers

Table 3 presents the sociodemographic characteristics (residence, gender, age, education, and occupation) of smokers who used medications (specifically, bupropion) as a cessation method during the 12 months prior to the survey. Multivariate analysis showed that smokers with no formal schooling had 0.39 times fewer odds (CI 0.21-0.74,  $P = 0.004$ ) of using a medication (bupropion) as a cessation method as compared to smokers with education level secondary and above. Smokers with primary but less than secondary schooling had 0.44 times fewer odds (CI 0.25-0.78,  $P = 0.005$ ) of using medication (bupropion) as a cessation method as

compared to smokers with education level secondary and above. Table 3 also shows a significant association between the occupation of smokers and the use of medication (bupropion) as a cessation method. Smokers who were students had 2.38 times higher odds (CI 1.10-5.17,  $P = 0.03$ ) of using a medication (bupropion) as a cessation method as compared to retired and unemployed smokers. Smokers who were homemakers had 4.61 times higher odds (CI 1.07-19.92,  $P = 0.04$ ) of using a medication (bupropion) as a cessation method as compared to retired and unemployed smokers. Other sociodemographic characteristics including residence (rural, urban) and age were not found to be significantly associated with the use of a medication (bupropion) as a cessation method by smokers.

### Counselling as a cessation method among smokeless tobacco users

Table 4 presents the sociodemographic characteristics (residence, gender, age, education, and occupation) of smokeless tobacco users who used counselling as a cessation method during the 12 months prior to the survey. Table 4 shows that male smokeless tobacco users had 0.74 times fewer odds (CI 0.57-0.94,  $P = 0.02$ ) of using counselling as a cessation method as compared to female smokeless tobacco users. In addition, younger smokeless tobacco users had fewer odds of using counselling as

**Table 2: Sociodemographic characteristics and use of Nicotine Replacement Therapy (NRT) as a cessation method among smokers who tried to stop smoking tobacco during the 12 months prior to survey: Global Adult Tobacco Survey India (GATS) 2009-2010**

Sociodemographic characteristics <i>N</i> = 3491	Smokers who used NRT as a cessation method during the past 12 months prior to survey		Univariate logistic regression analysis		Multivariate logistic regression analysis	
	Yes <i>N</i> = 97 (%)	No <i>N</i> = 3394 (%)	OR (95% CI)	<i>P</i> value	OR (95% CI)	<i>P</i> value
Residence						
Urban	36 (37.1)	1103 (32.5)	1.23 (0.81-1.86)	0.34	0.97 (0.63-1.50)	0.90
Rural	61 (62.9)	2291 (67.5)	1 (Reference)		1 (Reference)	
Gender						
Male	86 (88.7)	2996 (88.3)	1.04 (0.55-1.96)	0.91	0.35 (0.17-0.73)	0.005
Female	11 (11.3)	398 (11.7)	1 (Reference)		1 (Reference)	
Age						
15-24	15 (15.5)	288 (8.5)	3.21 (1.15-8.94)	0.02	1.54 (0.50-4.71)	0.45
25-44	52 (53.6)	1675 (49.4)	1.91 (0.76-4.83)	0.16	1.01 (0.38-2.67)	0.99
45-64	25 (25.8)	1123 (33.1)	1.37 (0.52-3.61)	0.52	0.92 (0.34-2.50)	0.86
65+	5 (5.2)	308 (9.1)	1 (Reference)		1 (Reference)	
Education						
No formal schooling	10 (10.3)	982 (29)	0.20 (0.10-0.40)	<0.0001	0.19 (0.09-0.40)	<0.0001
Less than primary	11 (11.3)	543 (16)	0.40 (0.20-0.77)	0.005	0.40 (0.20-0.80)	0.009
Primary but less than secondary	32 (33)	1006 (29.7)	0.62 (0.39-0.99)	0.04	0.60 (0.36-0.97)	0.036
Secondary and above	44 (45.4)	859 (25.3)	1 (Reference)		1 (Reference)	
Occupation						
Govt. and non-Govt. employee	36 (37.1)	1171 (34.6)	2.74 (1.15-6.53)	0.02	2.81 (1.09-7.25)	0.03
Self-employed	1 (1)	87 (2.6)	1.02 (0.12-8.6)	0.98	1.87 (0.21-16.50)	0.57
Student	48 (49.5)	1526 (45.1)	2.8 (1.19-6.58)	0.01	3.35 (1.33-8.44)	0.01
Homemaker	6 (6.2)	69 (2)	7.74 (2.43-24.66)	<0.0001	3.87 (1.04-14.42)	0.04
Retired and unemployed			1 (Reference)		1 (Reference)	

**Table 3: Sociodemographic characteristics and use of medications (bupropion) as a cessation method among smokers who tried to stop smoking tobacco during the 12 months prior to survey: Global Adult Tobacco Survey (GATS) India 2009-2010**

Sociodemographic characteristics N = 3488	Smokers who used medications (bupropion) as a cessation method during the 12 months prior to survey		Univariate logistic regression analysis		Multivariate logistic regression analysis	
	Yes N = 91 (%)	No N = 3397 (%)	OR (95% CI)	P value	OR (95% CI)	P value
Residence						
Urban	35 (38.5)	1102 (32.4)	1.30 (0.85-2.00)	0.23	1.22 (0.78-1.90)	0.39
Rural	56 (61.5)	2295 (67.6)	1 (Reference)		1 (Reference)	
Gender						
Male	76 (83.5)	3004 (88.4)	0.66 (0.38-1.17)	0.15	0.36 (0.18-0.7)	0.003
Female	15 (16.5)	393 (11.6)	1 (Reference)		1 (Reference)	
Age						
15-24	6 (6.6)	297 (8.7)	0.88 (0.29-2.66)	0.83	0.55 (0.15-2.04)	0.37
25-44	43 (47.3)	1682 (49.5)	1.12 (0.50-2.51)	0.79	0.93 (0.39-2.23)	0.87
45-64	35 (38.5)	1112 (32.7)	1.38 (0.61-3.13)	0.44	1.31 (0.56-3.10)	0.53
65+	7 (7.7)	306 (9.0)	1 (Reference)		1 (Reference)	
Education						
No formal schooling	21 (23.1)	971 (28.6)	0.52 (0.30-0.90)	0.02	0.39 (0.21-0.74)	0.004
Less than primary	14 (15.4)	539 (15.9)	0.63 (0.33-1.17)	0.14	0.55 (0.28-1.06)	0.07
Primary but less than secondary	20 (22.0)	1017 (30.0)	0.47 (0.27-0.82)	0.007	0.44 (0.25-0.78)	0.005
Secondary and above	36 (39.6)	866 (25.5)	1 (Reference)		1 (Reference)	
Occupation						
Govt. and non-Govt. employee	36 (37.1)	1171 (34.6)	2.74 (1.15-6.53)	0.02	1.50 (0.66-3.40)	0.34
Self-employed	1 (1.0)	87 (2.6)	1.02 (0.12-8.60)	0.98	2.82 (0.72-11.05)	0.14
Student	48 (49.5)	1526 (45.1)	2.8 (1.19-6.58)	0.01	2.38 (1.10-5.17)	0.03
Homemaker	6 (6.2)	69 (2)	7.74 (2.43-24.66)	<0.0001	4.61 (1.07-19.92)	0.04
Retired and unemployed	6 (6.2)	534 (15.8)	1 (Reference)		1 (Reference)	

**Table 4: Sociodemographic characteristics and use of counselling as a cessation method among smokeless tobacco users who tried to stop using smokeless tobacco during the 12 months prior to survey: Global Adult Tobacco Survey (GATS) India 2009-2010**

Sociodemographic characteristics N = 4745	Smokeless tobacco users who used counselling as a cessation method during the 12 months prior to survey		Univariate logistic regression analysis		Multivariate logistic regression analysis	
	Yes N = 434 (%)	No N = 4311 (%)	OR (95% CI)	P value	OR (95% CI)	P value
Residence						
Urban	124 (28.6)	1401 (32.5)	0.83 (0.67-1.03)	0.09	0.83 (0.66-1.04)	0.1
Rural	310 (71.4)	2910 (67.5)	1 (Reference)		1 (Reference)	
Gender						
Male	255 (58.8)	2830 (65.6)	0.75 (0.61-0.91)	0.004	0.74 (0.57-0.94)	0.02
Female	179 (41.2)	1481 (34.4)	1 (Reference)		1 (Reference)	
Age						
15-24	39 (9.0)	615 (14.3)	0.44 (0.28-0.70)	0.0004	0.36 (0.21-0.60)	<0.0001
25-44	216 (49.8)	2407 (55.8)	0.62 (0.43-0.89)	0.009	0.58 (0.39-0.85)	0.005
45-64	139 (32)	1012 (23.5)	0.95 (0.65-1.38)	0.79	0.91 (0.61-1.34)	0.62
65+	40 (9.2)	277 (6.4)	1 (Reference)		1 (Reference)	
Education						
No formal schooling	125 (28.9)	1271 (29.5)	1.04 (0.79-1.38)	0.77	0.74 (0.54-1.02)	0.06
Less than primary	75 (17.3)	622 (14.5)	1.28 (0.93-1.76)	0.13	1.08 (0.77-1.51)	0.65
Primary but less than secondary	137 (31.6)	1391 (32.3)	1.04 (0.79-1.37)	0.76	1.00 (0.75-1.33)	0.999
Secondary and above	96 (22.2)	1018 (23.7)	1 (Reference)		1 (Reference)	
Occupation						
Govt. and non-Govt. employee	110 (25.3)	1284 (29.8)	0.72 (0.55-0.94)	0.01	0.91 (0.67-1.23)	0.53
Self-employed	10 (2.3)	86 (2.0)	0.98 (0.50-1.93)	0.95	0.90 (0.44-1.82)	0.76
Student	170 (39.2)	1703 (39.5)	0.839 (0.66-1.07)	0.15	1.00 (0.76-1.32)	0.999
Homemaker	11 (2.5)	115 (2.7)	0.80 (0.42-1.53)	0.51	1.45 (0.70-3.00)	0.32
Retired and unemployed	133 (30.6)	1118 (26)	1 (Reference)		1 (Reference)	

a cessation method as compared to older smokeless tobacco users. Smokeless tobacco users in the age group of 15-24 years had 0.36 times fewer odds (CI 0.21-0.60,  $P < 0.0001$ ) of using counselling as a cessation method as compared to smokeless tobacco users in the age group of 65+ years. Smokeless tobacco users in the age group of 25-44 years had 0.58 times fewer odds (CI 0.39-0.85,  $P = 0.005$ ) of using counselling as a cessation method as compared to smokeless tobacco users in the age group of 65+ years. Thus, the younger the age (group) of smokeless tobacco users, the fewer the odds of using counselling as a cessation method as compared to older age groups. Other sociodemographic characteristics including residence (rural, urban), education, and occupation did not significantly influence the use of counselling as a cessation method by smokeless tobacco users.

## Discussion

The results show that the education level of smokers influences the choice of cessation method for all the cessation methods. The occupation of smokers also influences the choice of use of NRT and medications such as bupropion as cessation methods. The results further show that the gender and age of smokeless tobacco users has a bearing on the use of counselling as a cessation method. Smokers with lower education levels had fewer odds of using any of the cessation methods, as compared to smokers with higher education levels. Thus, education of the community is very important. Well-educated people could understand the importance of cessation and could additionally show better compliance with the use of NRT and medications such as bupropion. Government and non-Government employees, among smokers, had higher odds of using NRT as compared to smokers who were retired and unemployed. This may be due to the higher costs of NRT, which is thus more affordable for employed people as compared to retired and unemployed people. Smokers who were students had higher odds of using NRT as well as medications such as bupropion for smoking cessation as compared to retired and unemployed groups of smokers. This may be because of students being more educated and aware, thus showing better compliance with the use of NRT and medications such as bupropion. The homemakers among the smokers also had higher odds of using NRT as well as medications such as bupropion for smoking cessation as compared to retired and unemployed groups of smokers, while the same association was found insignificant in case of counselling as a cessation method. Thus, tobacco cessation service providers may choose to prescribe pharmacotherapy (NRT, bupropion) to the students and homemakers among smokers, in combination with counselling. Male smokeless tobacco users had fewer odds of using counselling for tobacco cessation as compared to females, which is a great challenge for

tobacco cessation service providers. Another challenge is that young smokeless tobacco users had fewer odds of using counselling as a cessation method as compared to older (65+ years) smokeless tobacco users.

The results of this study are consistent with many studies done worldwide. According to one study done in Poland, the correlates of tobacco cessation were found to be older age, high educational attainment, awareness of smoking health consequences, and employment.<sup>(13)</sup> In our study, older age as a correlate of use of counselling for cessation of smokeless tobacco emerged as significant, while the same association was found to be insignificant for smokers. Another study conducted among Romanian adults found that the correlates of long-term cessation were being economically active, age more than 40 years, being aware of harmful health consequences of tobacco, and cohabitation with nonsmokers.<sup>(14)</sup> In a study conducted in the states of Gujarat and Andhra Pradesh in India, it was found that the probability of tobacco cessation increases with increase in education, belonging to higher socioeconomic status, and belonging to a non-agricultural laborer occupational group. The same study showed that for the smokeless tobacco user group, the education level was not significantly associated with tobacco cessation.<sup>(15)</sup> According to one systematic review, behavioral counselling and varenicline drug may help in tobacco cessation of smokeless tobacco, while NRT and the drug bupropion was of little help for smokeless tobacco users.<sup>(16)</sup> In GATS India 2009-2010, data about the use of NRT and drugs such as bupropion by smokeless tobacco users are not available. According to one study in USA, young adult smokers were less likely to use pharmacotherapy as well as behavioral treatments, as compared to older smokers.<sup>(17)</sup> According to the same study in USA, young adult smokers with higher education level were more likely to use pharmacotherapy as compared to young adult smokers with lower education level, which is consistent with our study.

Thus, rarely any study is available globally that has studied different tobacco cessation methods (NRT, bupropion, counselling) as dependent variables with sociodemographic characteristics (age, gender, residence, occupation, education) as independent variables separately for smokers and smokeless tobacco users. Our study, then, helps in bridging this gap in the literature and adds to new knowledge.

The main limitation of this study is that it is based on secondary data analysis. There are other limitations also. The study is based on tobacco users' responses to questions regarding the use of NRT, bupropion, traditional medicines, counselling, etc. Tobacco users may not fully understand these different cessation methods and may not distinguish between NRT, drugs

such as bupropion, and traditional medicines, and this may be a source of potential bias. There may be recall bias and Hawthorne effect as well.

## Conclusion

We can conclude that correlates of the use of counselling by smokers were having higher education level. Correlates of the use of NRT by smokers were having higher education level, being Government or non-Government employee, being student, and being homemaker. Correlates of the use of medications (such as bupropion) by smokers were having higher education level, being student, and being homemaker. Correlates of the use of counselling by smokeless tobacco users were being female and being in an older age group. Therefore it is very important for smokers to be educated for better compliance with the use of different tobacco cessation methods. NRT may be the therapy of choice for Government and non-Government employees who use tobacco and are willing to quit. Similarly, health service providers may opt for NRT or bupropion (if required) for smokers who are students or homemakers. Young and male smokeless tobacco users need special attention in tobacco cessation therapy because they may show lower compliance as compared to their counterparts. We must not forget that choosing a particular mode of treatment for tobacco users also depends on several other factors, such as severity of addiction, tobacco users' stage of readiness to quit, and the presence of a comorbidity.

## Acknowledgments

I would like to acknowledge my family, especially my husband Dr. Naveen Kumar, for acting as a pillar of support throughout my study.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

1. World Health Organisation (WHO). WHO Report on the Global Tobacco Epidemic, 2008 — The EMPOWER Package. Geneva: World Health Organisation; 2008. p. 14-7.
2. US department of Health and Human services: The health consequences of smoking: Nicotine addiction: A report of the Surgeon General. Rockville, MD, US department of Health and Human services Publication; 1988. p. 381.
3. Directorate General of Health Services. Tobacco Dependence Treatment Guidelines. New Delhi: Ministry of Health and Family Welfare, 2011. Available from: <http://www.searo.who.int/india/tobacco/en/>. [Last accessed on 2014 Nov 23].
4. Solberg LI, Maciosek MV, Edwards NM, Khanchandani HS, Goodman MJ. Repeated tobacco-use screening and intervention in clinical practice: Health impact and cost effectiveness. *Am J Prev Med* 2006;31:62-71.
5. Feenstra TL, Hamberg-Van Reenen HH, Hoogenveen RT, Rutten-Van Molken MP. Cost-effectiveness of face to face smoking cessation interventions: A dynamic modelling study. *Value Health* 2005;8:178-90.
6. Thompson GH, Hunter DA. Nicotine replacement therapy. *Ann Pharmacother* 1998;32:1067-75.
7. Kotz D, Brown J, West R. Prospective cohort study of the effectiveness of smoking cessation treatments used in the "real world". *Mayo Clin Proc* 2014;89:1360-7.
8. London: Royal college of physicians of London. Tobacco advisory group of the Royal College of Physicians. Nicotine addiction in Britain; A report of the tobacco advisory group of the Royal College of Physicians. Available from: <http://www.rcplondon.ac.uk/pubs/books/nicotine>. [Last accessed on 2014 Nov 24].
9. Stead LF, Perera R, Bullen C, Mant D, Hartmann-Boyce J, Cahill K, Lancaster T. Nicotine replacement therapy for smoking cessation. *Cochrane Database Syst Rev* 2012;11:CD000146.
10. International Institute for Population Sciences (IIPS), Mumbai and Ministry of Health and Family Welfare (MoHFW). Government of India: Global Adult Tobacco Survey (GATS) — India, 2009-10. New Delhi: MoHFW, Govt. of India; 2010. ISBN 978-81-920192-0-8. Available from: <http://mohfw.nic.in/WriteReadData/l892s/1455618937GATS%20India.pdf>. [Last accessed on 2015 Jan 5].
11. The GTSS Collaborative Group. The Global Tobacco Surveillance System. *Tobacco Control* 2006;15:111-13. Available from: [www.cdc.gov/tobacco/global/gtss/index.htm](http://www.cdc.gov/tobacco/global/gtss/index.htm). [Last accessed on 2015 Jan 5].
12. United States Centers for Disease Control and prevention. Global Adult Tobacco Survey (GATS) Data. Available from: <http://apps.nccd.cdc.gov/gtssdata/Ancillary/DataReports.aspx?CAID=2>. [Last accessed on 2015 Jan 5].
13. Kaleta D, Korytkowski P, Makowiec-Dąbrowska T, Usidame B, Bąk-Romaniszyn L, Fronczak A. Predictors of long-term smoking cessation: Results from the global adult tobacco survey in Poland (2009-2010). *BMC Public Health* 2012;12:1020.
14. Kaleta D, Usidame B, Dziankowska-Zaborszczyk E, Makowiec-Dąbrowska T. Correlates of cessation success among Romanian adults. *Biomed Res Int* 2014;2014:675496.
15. Sarkar BK, Arora M, Gupta VK, Reddy KS. Determinants of tobacco cessation behavior among smokers and smokeless tobacco users in the states of Gujarat and Andhra Pradesh, India. *Asian Pac J Cancer Prev* 2013;14:1931-5.
16. Ebbert J, Montori VM, Erwin PJ, Stead LF. Interventions for smokeless tobacco use cessation. *Cochrane Database Syst Rev* 2011;CD004306.
17. Curry S, Sporer A, Pugach O, Campbell R, Emery S. Use of tobacco cessation treatments among young adult smokers: 2005 National Health Interview Survey. *Am J Public Health* 2007;97:1464-9.