


Tobacco Use Among the Youth in India: Evidence From Global Adult Tobacco Survey-2 (2016-2017)

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ABSTRACT

BACKGROUND: Worldwide, tobacco use is a serious public health concern affecting the youth. A vast majority of tobacco users start using tobacco well before the age of 18 years which has enormous psychosocial and health effects.

OBJECTIVES: To estimate the prevalence of individual forms of tobacco usage among youth aged 15 to 24 years and to assess the association of sociodemographic factors with tobacco use.

METHODS: The source of data was a cross-sectional GATS-2 survey in India (analysed using SPSSv17.0) which used a multistage, geographically stratified cluster sampling method. Bivariate analysis was done for evaluation of the possible association of tobacco use with sociodemographic factors. Multivariable logistic regression analysis was conducted to determine the relative strength of association between those factors and tobacco use.

RESULTS: There were 13329 respondents (44.9% males and 55.1% females) aged 15 to 24 years. Overall, 11.9% of respondents were using tobacco. The prevalence of smoke and smokeless tobacco usage was 5% and 10.9%, respectively, whereas 2% of respondents reported dual usage. The odds of using any form of tobacco were significantly higher among respondents aged 20 to 24 years (odds ratio [OR]: 2 [1.76-2.77]) who were primarily residing in rural areas (adjusted odds ratio [aOR]: 1.36 [1.2-1.54]) and were unmarried (aOR: 1.56 [1.37-1.88]). The odds of using any form of tobacco were significantly lower among females (aOR: 0.21 [0.19-0.24]), literate individuals (aOR: 0.33 [0.29-0.37]), and those who were unemployed/students/homemakers (aOR: 0.44 [0.39-0.50]).

CONCLUSIONS: The overall tobacco usage of 11.9% among young people in the age group of 15 to 24 years is a matter of concern. The study identified several sociodemographic factors significantly associated with tobacco use, implying the need for designing interventions considering social vulnerabilities of youth.

KEYWORDS: Adolescent health, smokeless tobacco, smoking, socioeconomic factors

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Introduction

Tobacco use among youth is increasing in epidemic proportions across the world. It is estimated that the vast majority of tobacco users start using tobacco products well before the age of 18 years.^{1,2} Globally, 1 in every 10 girls and 1 in every 5 boys, aged 13 to 15 years, use tobacco.³ It is further projected that current trends of tobacco use would result in the deaths of 250 million children and young people over time, most of them in developing countries.⁴ Tobacco use during adolescence and early adulthood has profound public health implications. Adolescent onset tobacco use leads to 'accelerated dependency' within a short period from first exposure.⁵ In addition, it has been consistently linked to heart disease, cancers, and premature mortality.^{1,6} Tobacco use among youth has also been well recognized as one of the behaviours that defy social norms.⁵

The tobacco use situation in India is complex owing to the availability of various forms of tobacco.⁷ Also, adolescence and

early adulthood, ie, 15 to 24 years, are considered to be the most susceptible phase of life for initiation of tobacco use in India.⁸ Based on available evidence, it is estimated that 5% to 25% of Indian adolescents currently use or have ever used tobacco.⁶ Even though smokeless tobacco is used less commonly, high rates of its use have been reported in India among adolescents aged 13 to 15 years (15% of boys and 5% of girls).³

Due to the enormous psychosocial and health effects of tobacco on youth, it is pertinent to understand its burden along with sociodemographic factors for formulating effective tobacco control measures targeting them.⁹ Global Adult Tobacco Survey (GATS) is a systematically designed robust tool for monitoring the trends in the prevalence of tobacco use. It is a household survey of persons aged 15 years and above.¹⁰ The first round of GATS was conducted in 2009 to 2010 and the second round in 2016 to 2017. Several studies have been undertaken to assess the patterns and predictors of tobacco use



in other countries. In India, there has been limited research in this regard.^{11,12} GATS-2 data is an opportunity to see the prevalence and trends of tobacco use among youth, a decade after GATS-1 and implementation of the Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply, and Distribution) Act (COTPA). This study analyses the GATS-2 survey data to estimate the prevalence of tobacco use among youth aged between 15 and 24 years in the country and understand the association of sociodemographic factors with it.

Materials and Methods

Data source

The source of data was cross-sectional GATS-2, India. The first round of the survey was held in 2009 to 2010. GATS is a standardized survey intended to measure tobacco prevalence, exposure to secondhand smoke and quit attempts across the nations and to assess the impact of tobacco control measures. The data for GATS-2 were collected from August 2016 to February 2017 by Tata Institute of Social Sciences, Mumbai, with technical support from the Centers for Disease Control and Prevention (CDC), Atlanta; the World Health Organization; Johns Hopkins Bloomberg School of Public Health and Research Triangle Initiative International.¹³

GATS-2 India was conducted in all 30 states and 2 Union Territories (Chandigarh and Puducherry) of the country, covering about 99.9% of the total population.¹³ A multistage, geographically stratified cluster sampling method was used to draw a representative sample. One individual was randomly chosen from each selected household to participate in the survey. An electronic handheld device was used for data collection. A detailed methodology of the survey has been published elsewhere.¹³

Study population

The study population selected for this study is a subset of the survey comprising individuals aged 15 to 24 years and residing in their usual residence before the survey date. The institutionalized population living in places such as hospitals, hotels, prisons, and military barracks was not included in the survey.¹³

Variables related to tobacco use

For assessing the 'current tobacco users', responses to the following questionnaire items were used: (1) 'Do you currently smoke tobacco daily, less than daily or not at all?' (2) 'Do you currently use smokeless tobacco daily, less than daily or not at all?' The 'age of initiation' variable was assessed from the following questions: (1) 'How old were you when you first started smoking tobacco daily?' (2) 'How old were you when you first started using smokeless tobacco daily?'. The following questions assessed the quantity of each form of tobacco used: (1)

'On average, how many manufactured cigarettes do you currently smoke each week?' (2) 'On average, how many rolled tobacco in paper or leaf do you currently smoke each week?' (3) 'On average, how many bidis do you currently smoke each week?' (4) 'On average, how many cigars, cheroots, or cigarillos do you currently smoke each week?' (5) 'On average, how many hukkah sessions do you currently participate in each week?' The following items assessed the quantity of each form of smokeless tobacco used: (1) 'On average, how many times do you use betel quid with tobacco each week?' (2) 'On average, how many times do you use khaini or tobacco lime mixture each week?' (3) 'On average, how many times do you use gutka, areca nut-tobacco lime mixture, or mawa each week?' (4) 'On average, how many times do you use oral tobacco (as mishri, qul, gudakhu) each week?' (5) 'On average, how many times do you use pan masala together with tobacco each week?' To assess the knowledge and use of electronic cigarettes by the study respondents, the following questions were analysed: (1) 'Before today, have you ever heard of or seen an electronic cigarette?' (2) 'Do you currently use electronic cigarettes on a daily basis, less than daily, or not at all?'

Other variables

Sociodemographic characteristics included age, sex, education status, occupation status, region, marital status, and residence (urban/rural).

Data analysis

The GATS-2 data set was analysed using Statistical Package of Social Sciences (SPSS) software version 17. Descriptive statistics were used to characterize the study population and their tobacco use status. Dependent variables in this study were based on tobacco use and were categorized into 'current tobacco users both daily and non-daily (smoking or smokeless or both)' and 'non-tobacco users'. Electronic cigarette use was considered as 'any form' for analysis. The independent variables included sociodemographic factors and age of initiation of daily tobacco use. Chi-square test was done to study the association between the independent variables and the dependent variable (any tobacco use). Unadjusted odds ratios (ORs) with 95% confidence intervals were reported to quantify the strength of association. *P* value of <.05 was considered as statistically significant. Independent association of factors with *P* value of <.20 on bivariate analysis was assessed using a logistic regression model and adjusted odds ratios (aORs) with 95% confidence interval have been presented.

Ethical considerations

GATS-2 India data set is available in the public domain from CDC for researchers. Therefore, ethics review was not deemed to be necessary.

Results

There were 13 329 respondents (5987 males [44.9%] and 7342 females [55.1%]) aged between 15 and 24 years. The prevalence of current smoking and smokeless tobacco use was 5% ($n=661$) and 10.9% ($n=1453$), respectively. Two percent of respondents ($n=263$) were using both smoking and smokeless forms of tobacco. Overall, 11.9% ($n=1588$) respondents were using any form of tobacco. Only 4 participants (0.7%) out of 593 respondents (who have ever heard or seen an electronic cigarette) reported using electronic cigarettes on less than daily basis (Table 1).

The mean age for initiating smoking daily was 17.2 ± 8.7 years (median: 17 years; interquartile range [IQR]: 15-18 years). The mean age for initiating daily consumption of smokeless tobacco was 20.2 ± 18.4 years (median: 17 years; IQR: 15-19.5 years). There was a very poor response to questions of smoking and smokeless forms. Among those who responded ($n=60$), cigarette was the most common form of tobacco used ($n=31$) followed by bidis ($n=15$). They reported smoking on an average of 2 cigarettes and 5 bidis per week. The most common smokeless form of tobacco used by study participants, who responded to the question ($n=114$), was betel quid with tobacco ($n=51$) followed by gutka, areca nut, and tobacco lime mixture ($n=28$). While gutka was reported to be used by respondents 3 times per week on an average, they were using betel quid with tobacco only 1 time in a week.

Among the study respondents, people in the age group of 20 to 24 years were 2 times more likely to use smoking (OR: 2.2 [1.9-2.6]), smokeless (OR: 2.1 [1.8-2.3]), or both forms of tobacco (OR: 2.4 [1.8-3.1]) when compared with the age group of 15 to 19 years ($P < .01$). The odds of using any form of tobacco were significantly higher among males (OR: 3.9 [3.5-4.4]) when compared with females. Rural respondents were 1.3 times more likely to smoke, 1.8 times more likely to use smokeless tobacco, and 1.6 times more likely to use both forms of tobacco in comparison with urban participants. Region-wise comparison of any form of tobacco use showed participants from the north-east region to be using 7 times more when compared with the north region (OR: 7.2 [5.9-8.7]). This was followed by respondents from Central (OR: 3.4 [2.8-4.1]) and East region (OR: 3.1 [2.5-3.8]) ($P < .01$). The odds of using any form of tobacco or a combination decreased with the educational status of the participants. Similarly, the odds of tobacco use were less than one if the respondent was a student (OR: 0.16 [0.1-0.2]) or a homemaker (OR: 0.23 [0.2-0.3]) or an unemployed person (OR: 0.7 [0.6-0.9]). In comparison with married respondents, single/separated/widowed/divorced were 1.6 times (1.4-1.7) more likely to use any form of tobacco ($P < .01$) (Table 1).

The multivariable analysis of various sociodemographic factors showed higher aged (20-24 years) (aOR: 2 [1.76-2.27]) rural resident (aOR: 1.36 [1.2-1.54]) and unmarried/single/separated/widowed/divorced (aOR: 1.56 [1.37-1.78])

to be significantly associated with the use of any form of tobacco. Female sex (aOR: 0.21 [0.19-0.24]), literate status (aOR: 0.33 [0.29-0.37]), and unemployed/student/homemaker status (aOR: 0.44 [0.39-0.50]) were considered to be protective factors with respect to tobacco use. No significant relation of region was found with any forms of tobacco use. Overall, the modelling of sociodemographic factors contributed to 27% variation in tobacco use ($R^2 = .271$; $P < .001$) (Table 2).

Discussion

There is ample evidence globally to suggest that early age of initiation of tobacco use drives the tobacco epidemic.¹ Furthermore, tobacco use among youth is associated with multi-factorial etiology. While this has been widely studied in the Western world, it has received little attention in developing countries including India.⁵ Therefore, the current analysis explored association among sociodemographic factors and tobacco use in youth in the country.

This secondary analysis of nationally representative GATS-2 data showed that 1 out of every 8 young persons in the age group of 15 to 24 years was using any form of tobacco. The prevalence of current smoking and smokeless tobacco use was 5% and 10.9%, respectively, and 2% of the respondents were using both forms of tobacco. This is much lower than the figures reported by a similar analysis of the GATS-1 data (2009-2010), wherein 22.1% of young persons used any form of tobacco products.¹⁴ This finding is encouraging and highlights the tobacco control initiatives undertaken in the nation in the last decade to curb the menace, particularly among the younger generation.¹⁵

The mean age of initiating smoking daily among the study group was 17 years. For smokeless tobacco, it was 20 years. The overall mean age of initiation of tobacco use was 17.8 years in GATS-1 (2009-2010) for all age groups, whereas it was 19.3 years according to the GATS-2.¹⁶ This has several implications. The finding reiterates the need to design age-specific interventions for controlling the tobacco epidemic. Also, increasing the age of sale or purchase of any form of tobacco products at Point of Sale from the existing 18 years to 21 years is an important strategy for delaying the initiation of tobacco use at an early age.¹⁴

Tobacco is used in a variety of forms in India. In the current scenario, cigarette was commonly used by youth followed by bidis. This is in contrast to the most commonly used products reported nationally which are khaini (smokeless form) and bidis (smoking form).¹⁰ However, the finding needs to be interpreted with caution as very few participants reported to the question on forms of tobacco used by them. The knowledge about electronic cigarettes among youth in GATS-2 survey was limited as only 4.4% of them reported having heard of or seen them. Also, out of those who had heard of or seen electronic cigarettes, only 4 reported using them on a less than

Table 1. Bivariate associations of sociodemographic factors with tobacco use status (N= 13 329).

VARIABLES	ANY FORM OF TOBACCO USERS NO. (%)	SMOKING TOBACCO USERS NO. (%)	SMOKELESS TOBACCO USERS NO. (%)	BOTH (SMOKING AND SMOKELESS USERS) NO. (%)
Total	1588 (11.9)	661 (5)	1453 (10.9)	263 (2)
Age, y				
15-19 ^a	499 (31.4)	193 (29.2)	460 (31.7)	77 (29.3)
20-24	1089 (68.6)	468 (70.8)	993 (68.3)	186 (70.7)
OR (95% CI)	2.1 (1.9-2.4)*	2.2 (1.9-2.6)*	2.1 (1.8-2.3)*	2.4 (1.8-3.1)*
Gender				
Male	1146 (72.2)	611 (92.4)	1009 (69.4)	237 (90.1)
Female ^a	442 (27.8)	50 (7.6)	444 (30.6)	26 (9.9)
OR (95% CI)	3.9 (3.5-4.4)*	16.6(12.4-22.2)*	3.2 (2.8-3.5)*	13.6 (9.1-20.4)*
Residence				
Urban ^a	392 (24.7)	189 (28.6)	337 (23.2)	67 (25.5)
Rural	1196 (75.3)	472 (71.4)	1116 (76.8)	196 (74.5)
OR (95% CI)	1.7 (1.5-1.9)*	1.3 (1.1-1.6)*	1.8 (1.6-2.1)*	1.6 (1.2-2.2)*
Region				
North ^a	150 (9.4)	114 (17.2)	3057 (25.7)	27 (10.3)
Central	336 (21.2)	73 (11)	1989 (16.7)	46 (17.5)
OR (95% CI)	3.4 (2.8-4.1)*	0.9 (0.6-1.2)	6.1 (4.5-7.7)*	2.7 (1.6-4.4)*
East	245 (15.4)	74 (11.2)	1608 (13.5)	33 (12.5)
OR (95% CI)	3.1 (2.5-3.8)*	1.1 (0.8-1.5)	5.0 (3.9-6.4)*	2.4 (1.4-4.0)*
North East	675 (42.5)	352 (53.3)	2074 (17.5)	138 (52.5)
OR (95% CI)	7.2 (5.9-8.7)*	4.0 (3.2-5.0)*	9.9 (7.9-12.5)*	8.5 (5.6-12.9)*
West	117 (7.4)	14 (2.1)	1152 (9.7)	7 (2.6)
OR (95% CI)	2.0 (1.6-2.6)*	0.3 (0.2-0.5)*	3.5 (2.6-4.6)*	0.7 (0.3-1.62)
South	65 (4.1)	34 (5.1)	1996 (16.8)	12 (4.6)
OR (95% CI)	0.7 (0.5-0.9)*	0.4 (0.3-0.7)*	0.9 (0.7-1.3)	0.69 (0.35-1.38)
Education				
No formal schooling ^a	188 (11.8)	60 (9.1)	190 (13.1)	31 (11.8)
Less and up to primary school	454 (28.6)	183 (27.7)	451 (31.1)	90 (34.2)
OR (95% CI)	1.3 (1.0-1.5)*	1.5 (1.4-2.1)*	1.2 (1.0-1.5)*	1.5 (0.9-2.3)
Less and up to secondary school	695 (43.8)	293 (44.3)	618 (42.5)	108 (41.1)
OR (95% CI)	2.3 (2.0-2.6)*	0.8 (0.6-1.1)	0.5 (0.4-0.6)*	0.5 (0.3-0.8)*
Up to higher secondary school	188 (11.8)	93 (14.1)	147 (10.1)	26 (9.9)
OR (95% CI)	0.5 (0.4-0.6)*	0.5 (0.4-0.7)*	0.2 (0.1-0.3)*	0.2 (0.1-0.4)*
College/graduate level and above	63 (4.0)	31 (4.7)	46 (3.2)	7 (2.7)
OR (95% CI)	0.3 (0.2-0.4)*	0.3 (0.2-0.5)*	0.1 (0.09-0.2)*	0.1 (0.05-0.2)*

(Continued)

Table 1. (Continued)

VARIABLES	ANY FORM OF TOBACCO USERS NO. (%)	SMOKING TOBACCO USERS NO. (%)	SMOKELESS TOBACCO USERS NO. (%)	BOTH (SMOKING AND SMOKELESS USERS) NO. (%)
Occupation				
Employed ^a	917 (57.7)	441 (66.7)	850 (58.5)	187 (71.1)
Student	302 (19)	135 (20.4)	243 (16.7)	38 (14.4)
OR (95% CI)	0.16(0.1-0.2)*	0.2 (0.1-0.22)*	0.15 (0.1-0.2)*	0.1 (0.07-0.14)*
Homemaker	259 (16.4)	39 (5.9)	250 (17.2)	15 (5.7)
OR (95% CI)	0.23(0.2-0.3)*	0.08 (0.06-0.1)*	0.26 (0.2-0.3)*	0.06 (0.04-0.1)*
Unemployed	110 (6.9)	46 (7.0)	110 (7.6)	23 (8.8)
OR (95% CI)	0.7 (0.6-0.9)*	0.6 (0.5-0.9)*	0.8 (0.6-0.98)*	0.7 (0.5-1.1)
Marital status				
Married ^a	652 (41.1)	227 (34.3)	655 (45.1)	115 (43.7)
Others	936 (58.9)	434 (65.7)	798 (54.9)	148 (56.3)
OR (95% CI)	1.6 (1.4-1.7)*	1.1 (0.9-1.3)	1.9 (1.7-2.1)*	1.7 (1.4-2.2)*

Abbreviations: CI, confidence intervals; OR, odds ratio.

^aReference category.

* $P < .01$.

Table 2. Adjusted ORs (95% CIs) from multivariable logistic regression analysis of the relationship between sociodemographic factors and any form of tobacco use (N = 13 329).

VARIABLES	ADJUSTED ODDS RATIO (AOR)	95% CONFIDENCE INTERVAL	P VALUE
Age (20-24 y)	2.0	1.76-2.27	<.001
Gender (female)	0.21	0.19-0.24	<.001
Residence (rural)	1.36	1.2-1.54	<.001
Region	1.02	0.99-1.05	.235
Education (literate)	0.33	0.29-0.37	<.001
Occupation (unemployed/student/retired/homemaker)	0.44	0.39-0.50	<.001
Marital status (unmarried/single/separated/widowed/divorced)	1.56	1.37-1.78	<.001

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio.

daily basis. These results need to be interpreted in the light of existing global evidence suggesting dynamic and evolving patterns of e-cigarettes use among youth, based on which India has recently banned e-cigarettes in the country.¹⁷

Increasing prevalence of smoking among youth as reported in our study is consistent with findings from multiple studies done in India and other countries.^{1,18,19} Gender also emerged as an important predictor of tobacco use in our study with males being more likely to use any form of tobacco as compared with females. Tobacco use, particularly smoking, is a male-dominated phenomenon among children and adolescents in India.¹⁹ However, there have been noted exceptions

such as Goa and North-Eastern States which have reported almost equal prevalence, similar to the gender distribution seen in studies from Western countries.^{18,20-23}

The odds of using any form of tobacco were higher among rural youth. This is consistent with findings from studies done elsewhere in India.^{24,25} Social acceptability of tobacco, particularly smokeless forms since ancient times, made it widely prevalent in rural areas. But it is worthwhile to state that there exist geographic variations concerning tobacco use across the country. However, the health of people living in rural areas is impacted more by tobacco use due to socioeconomic factors, culture, policies, and lack of proper health care.²⁶

Although region-wise variation in tobacco use did not emerge as an independent predictor, respondents from north-east were more likely to use tobacco as compared with other regions in the country. This has been consistently reported in GATS-1 and District Level Household Survey (DLHS)-4.^{16,27,28} These findings further reaffirm the cultural variation and social acceptability of tobacco in the region. This calls for effective implementation of anti-tobacco legislation in the north-east region.

As evident from several studies in India, there is an inverse relationship between tobacco use and education.^{14,24,29} Literacy emerged as a protective factor against tobacco use in our study too. It is well established that education status is associated with healthy behaviours.

Interestingly, the odds of tobacco use were less than 1 if the respondent was a student or a homemaker or an unemployed person. This is in contrast to the findings of GATS-1 where maximum use of tobacco was reported among the youth who were unemployed (41.3%) or self-employed (44.2%).¹⁴ Implementation of legislation related to the sale of tobacco products in and around educational institutions and decreased access due to increased costs could be the possible reasons for the finding in our study.

It is well known that marital status is an important social-contextual factor in predicting tobacco use.^{30,31} Our study reported higher odds of tobacco use if the respondents were unmarried/single/separated/widowed/divorced. Lack of family support, stress, and a sense of independence could be responsible for this.

The study had a few limitations. The survey is cross-sectional in design and hence limits the establishment of temporal association and measurement of social patterning of tobacco use over time. Furthermore, a lack of adequate response to questions pertaining to the type of smoking and smokeless forms used by youth limits its generalizability. Similarly, recall bias cannot be ruled out as few questions involved a recall period varying from 7 days to 1 month. Also, there could be inconsistencies in self-reported age of initiation of daily tobacco use. This is a potential limitation of self-reported data and it affects reliability.^{32,33} Finally, other markers of social stratification such as socioeconomic status, parental education, and parental occupation were not studied in this article.

Despite limitations, nationally representative data of GATS-2 India provide useful insights about the prevalence of various forms of tobacco usage among youth. To conclude, the prevalence of smoking, smokeless form, and dual use were 5%, 10.9%, and 2%, respectively. The use of any form of tobacco was 11.9%. Gender, area of residence, education, occupation, and marital status were significantly associated with any form of tobacco use. Considering the multi-factorial attributes of tobacco use among youth, there is a need to design specific health-promoting and preventive interventions for them, keeping in mind their social vulnerabilities.

Author Contributions

SG, TA: Conceptualization of idea, acquisition of data and its analysis, drafted manuscript and revised it critically for its intellectual content, final approval of the published work and accountable for all aspects of work.

JK: Design of the work, data analysis, interpretation of data, review of the intellectual content of manuscript, final approval of the published work and accountable for all aspects of work.

JPT, DNS: data analysis, interpretation of data, review of the intellectual content of manuscript, final approval of the published work and accountable for all aspects of work.

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