RESEARCH ARTICLE

Predictors of Tobacco Use among Youth in India: GATS 2009-2010 Survey

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Abstract

<u>Background</u>: Early initiation of smoking and chewing of diverse forms of tobacco among youth in India is a significant driver for tobacco epidemic in India. Several socio-demographic factors are predictors of tobacco use in populations, especially among youth. Interventions which address these socio-demographic factors can help policy makers to curb new initiations and avert morbidity and mortality due to tobacco use. <u>Objective</u>: To study the various sociodemographic variables associated with tobacco use among youth in India. **Materials and** <u>Methods</u>: Secondary analysis of data from the Global Adult Tobacco Survey-India 2009-10 for the age group of 15-24 years was performed and predictors of smoking and smokeless tobacco were analyzed using data on occupation, education, and other sociodemographic factors. <u>Results</u>: In India there are a total of 51.3 million (22.1%) youth (15-24 years) tobacco users. Of these 35.1 million consumes chewable tobacco (15.1%), 16.2 million smoke (7%) and 1.6 million are dual users (3.1%). Males, urban, less educated, un-employed and those belonging to middle class preferred smoking over chewing; whereas, females, rural, students and those belonging to low socio-economic class are predictors of smokeless tobacco use. The major determinants of dual users are male sex, poor socio-economic strata and student class. The overall tobacco use was higher among males, rural populations, lower socioeconomic strata and un-employed class. <u>Conclusions</u>: India's youth is more susceptible to the tobacco addiction, especially of smokeless tobacco. Youth from rural India especially students, girls and those from poor socio-economic strata prefer to use smokeless tobacco products whereas urban, male and those less educated prefer smoking tobacco products. More population-based and region-focused research is needed to understand initiation patterns into tobacco use among youth so as to inform policymakers to devise new policy measures to curb the growing epidemic.

Keywords: Predictors - socioeconomic factors - youth - GATS - India

Introduction

Tobacco use is a major cause of preventable cause of death and disease worldwide has been known for decades (WHO, 2008). Despite various measures taken by the Indian government, the efforts to discourage tobacco use have been mixed. Globally it has been well understood that early youth initiation drives the tobacco epidemic (CDC report of the surgeon general. preventing tobacco use among youth and young adults, 2012). According to the Global Adult Tobacco Survey 2009-2010, youth initiation of tobacco products is varied across the country, ranging from 20.4 years in Himachal Pradesh to 14.9 years in Chhattisgarh (smoked) and 20.9 years in Himachal Pradesh to 16.2 years in Chhattisgarh (smokeless), with mean age of initiation at 17.8 years (Global Adult Tobacco Survey 2009-2010). The Global Youth Tobacco Survey presents an even more grim picture where 14.6% school going students aged 13-15 years currently use a tobacco product and another 15.5% of never smokers are likely to initiate smoking next year (Global Youth Tobacco Survey, 2006). Recent research provides several reasons for early initiation of tobacco use among youth, and perhaps the most important factor is that tobacco products remain highly affordable and accessible in India (John, 2010). Although there have been significant advances in tobacco control, the overall national implementation of tobacco control legislation across India have been mixed and sub-optimal. Rules that govern smokefree public places has perhaps made the greatest advancement in different jurisdictions in India, yet its compliance been variable (Tripathy et al., 2013; Goel et al., 2014; Kumar et al., 2014). Point of sale advertising is aggressively used by the tobacco industry to promote their products, which induces youth to initiate tobacco consumption at an early age (Goel et al., 2014).

The reasons for the youth to take up tobacco as a habit are multifactorial. Their adventurous nature and

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curiosity, coupled with various socio demographic factors are probably the most important reason for the younger generation to make these wrong choices (CDC Report of the Surgeon General. Preventing Tobacco Use Among Youth and Young Adults, 2012). The aggressive efforts of the tobacco companies to recruit fresh consumers specifically target the younger population (Glynn et al., 2003). The earlier the initiation of tobacco use the harder is the addiction to nicotine and thus difficult to leave this ill habit. Globally about 82000 to 99000 young people start smoking daily (Prokhov et al., 2006).

The patterns and predictors of tobacco use in any form have been studied in countries with different settings and cultural background like Pakistan, Nepal, Thailand, Malaysia and Vietnam. (Hammond et al., 2008; Phong et al., 2008; Binu et al., 2010; Dhanani et al., 2010). Most of them have focussed their research on smoking patterns. Smokeless form and dual form of use have been less studied. Also there is limited research on the use of tobacco among youth in the age group of 15 to 24 years in India (Lal et al., 2012). With more than 5500 new adolescent tobacco users being added everyday in India, about 2 million young people get addicted each year (Chadda et al., 2002). This paper highlights the role of various socio-economic factors responsible for the use of tobacco among the youth.

Materials and Methods

Study design

We used the disaggregated data from the Global Adult Tobacco Survey that is available in public domain (gatsindia@iips.net.) (Global Adult Tobacco Survey, India 2009-10). The Global Adult Tobacco Survey- India released in 2010 is a nationally representative survey which covered 69926 household and collated information on key tobacco control indicators and assists countries in the formulation, tracking and implementation of effective tobacco control interventions. (IIPS, 2010)

Data variables and analysis

We used this data to find an association between use of tobacco among youth (15-24 years) which was the major dependent variable and gender, education, occupation, wealth index and place of residence (independent variables).The main objective was to study the risk factors(predictors) for tobacco use among youth in India. The questions taken in to consideration were: Do you currently smoke? (B01): All daily or non daily smokers were considered as users. Do you currently use smokeless tobacco? (C01): Here too daily and less than daily users were considered tobacco consumers. The wealth index was derived from the variables that captured possession of assets by households. To assign a wealth status to each household, we used standard assets based approach. GATS-India dataset contains information for number of items possessed by a household against a list of items. This list includes items like washing machine, refrigerator, vehicle etc. We performed 'Principal Component Analysis' (PCA) to generate a wealth index score for each household on the basis of their possession of assets. First component or principal component explaining maximum variability in the data was considered to assign a score to household. As the wealth score generated using PCA was normalised score, we divided the number of households into five quintiles representing their wealth status i.e. from poorest (with minimum score) to richest (with highest score).The score for the poorest and the poor was combined under the heading of 'poor', and the rich and the richest were combined as 'rich'.

Epi Info 7 was used to carry out the statistical analysis in the study. Proportion of youth consuming all forms of tobacco was calculated. Chi square test was used to test the association between predictors and tobacco use. P value

Table 1. Socio-demographic profile of youth tobacco users from GATS, India 2009-10.

Variables *	Total youth N (%)	Smokers N (%)	Smokeless tobacco users N (%)	Dual Users N(%)
GENDER				
Male	6209(46.11)	879(14.2)	1313(21.2)	382(6.2)
Female	7254(53.8)	61(0.80)	716(9.9)	29(0.40)
RESIDENCE				
Rural	8182(60.8)	605(7.4)	1437(17.6)	282(3.5)
Urban	5281(39.2)	335(6.3)	592(11.2)	129(2.4)
EDUCATION				
No formal education	1374(10.2)	110(8.0)	328(23.9)	57(4.2)
Primary incomplete	1137(8.4)	135(11.9)	294(25.9)	67(5.9)
Primary but secondary incomplete	1604(11.9)	363(22.6)	854(53.2)	168(10.5)
Secondary and higher secondary	3235(24.02)	273(8.4)	477(14.7)	104(3.2)
Graduation and above	2587(19.2)	56(2.2)	70(2.7)	13(0.5)
OCCUPATION				
Govt.employee/non govt	1913(14.2)	221(11.6)	475(24.8)	112(5.9)
Self Employed	2229(16.5)	367(16.5)	620(27.8)	147(6.6)
Student	5359(39.8)	228(4.3)	422(7.9)	83(1.6)
Home maker	3488(25.9)	53(1.5)	386(11.1)	24(0.7)
Unemployed	467(3.5)	70(15.0)	123(26.3)	44(9.4)
WEALTH INDEX				
Poor class	2541(18.9)	278(10.9)	704(27.7)	132(5.2)
Middle class	5683(42.2)	192(3.4)	530(9.3)	184(3.2)
Rich class	5169(38.4)	463(9.0)	794(15.4)	94(1.8)

*The total may not add upto 13463 (youth population) as there are some missing values in data set for certain variables

Table 2. Association of Predictors with U se of Smoke, Smokeless and Dual Forms of Tobacco among the Youth GATS, India 2009-2010

Predictors	Smoker		Smokeless Tobacco users		Dual users	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
AGE						
15-24	0.32(0.29-0.34) 0.00*	0.32(0.29-0.34) 0.00*	0.49(0.47-0.52) 0.00*	0.49(0.47-0.52) 0.00*	0.45(0.40-0.49) 0.00*	0.45(0.40-0.49) 0.00*
25 and above	Reference		Reference		Reference	
GENDER						
Male	19.45(0.29-0.34) 0.00*	24.99(17.62-35.43) 0.00*	2.45(2.22-2.70) 0.00*	0.41(0.36-0.47) 0.00*	16.33(11.18-23.86) 0.00*	0.05(0.03-0.08) 0.00*
Female	Reference		Reference		Reference	
RESIDENCE						
Urban	0.85(0.74-0.98) 0.012*	1.06(0.91-1.23) 0.487*	0.59(0.53-0.66) 0.00*	0.70(0.63-0.79) 0.00*	0.70(0.57-0.87) 0.001*	0.81(0.65-1.01) 0.055*
Rural	Reference		Reference		Reference	
EDUCATION						
Graduation and above	0.52(0.38-0.73) 0.00*	0.45(0.31-0.64) 0.00*	0.18(0.14-0.24) 0.00*	4.36(3.28-5.81) 0.00*	0.24(0.13-0.43) 0.00*	4.59(2.44-8.66) 0.00*
Secondary and higher secondary	0.69(0.55-0.87) 0.002*	0.57(0.43-0.74) 0.00*	0.35(0.30-0.41) 0.00*	2.35(1.97-2.80) 0.00*	0.51(0.37-0.71) 0.00*	.24(1.55-3.22) 0.00*
Primary but secondary incomplete	0.93(0.75-1.16) 0.53*	0.63(0.49-0.81) 0.001*	0.68(0.59-0.79) 0.00*	1.51(1.29-1.77) 0.00*	0.83(0.61-1.13) 0.24*	1.67(1.21-2.32) 0.002*
Primary incomplete	1.55(1.19-2.02) 0.001*	0.94(0.69-1.26) 0.659* 0.25*	1.11(0.93-1.33) 0.30*	1.11(0.92-1.34) 0.045*	1.45(1.01-2.08) 0.569*	1.12(0.76-1.63)
No formal schooling	Reference		Reference		Reference	
OCCUPATION						
Govt./Non govt employee	0.75(0.56-1.00) 0.05*	0.75(0.55-1.02) 0.064*	0.94(0.74-1.18) 0.58*	1.01(0.79-1.28) 0.97*	0.61(0.42-0.87) 0.006*	1.64(1.13-2.40) 0.006*
Self employed	1.12(0.85-1.48) 0.43*	0.99(0.75-1.34) 0.995*	1.08(0.86-1.35) 0.52*	1.02(0.81-1.29) 0.86*	0.68(0.48-0.97) 0.03*	1.74(1.20-2.51) 0.003*
Student	0.25(0.19-0.34) 0.00*	0.36(0.27-0.49) 0.00*	0.24(0.19-0.30) 0.00*	2.77(2.18-3.52) 0.00*	0.15(0.10-0.22) 0.00*	4.13(2.70-6.01) 0.00*
Homemaker	0.09(0.06-0.13) 0.00*	0.91(0.57-1.44) 0.68*	0.35(0.28-0.44) 0.00*	1.65(1.28-2.14) 0.00*	0.07(0.04-0.11) 0.00*	1.84(0.93-3.26) 0.084*
Unemployed	Reference		Reference		Reference	
WEALTH INDEX						
Poor class	0.52(0.45-0.61) 0.00*	0.54(0.44-0.66) 0.00*	1.28(1.15-1.43) 0.00*	2.01(1.76-2.29) 0.00*	1.55(1.24-1.95) 0.00*	1.73(1.30-2.28) 0.00*
Rich class	0.83(0.69-0.99) 0.038*	1.18(0.98-1.43) 0.084*	0.69(0.61-0.78) 0.00*	1.46(1.28-1.67) 0.00*	0.96(0.75-1.24) 0.757*	1.02(0.78-1.33) 0.897*
Middle class	Reference		Reference		Reference	

<0.05 was considered significant. Logistic regression analysis was used to calculate the relationship between tobacco use among youth and various independent variables. Adjusted odds ratios with 95% confidence intervals was calculated.

Ethics

The study was exempted from ethics review by the chairperson of the Ethics Advisory Group of International Union against Tuberculosis and Lung Disease, as it was a secondary analysis of existing dataset without involvement of any direct interaction with human participants.

Results

The total population interviewed in GATS India -2010 was 69,926. Of these the youth population between 15- 24 years was 13463 (19.3%). The total number of tobacco users (smokers and smokeless) among the youth were 2969 (22.1%) whereas those who did not use tobacco in any form were 10494 (77.9%). Among tobacco users, there were 411 (3.1%) dual users (both smoked and smokeless form). Use of smokeless tobacco was found to be higher (n=2029, 15.1%) as compared to smoked form (n=940, 7%). Male gender being a prominent predictor of tobacco use, with 35.3% of total males was tobacco

Table 3. Association of predictors with overall tobacco use among the youth GATS, India 2009-10

Predictors	Tobacco use	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
AGE		
15-24years	0.37(0.35-0.38)	0.37(0.35-0.38)
	0.00*	0.00*
25 and above reference		reference
GENDER		
Male	3.56(3.26-3.93)	3.51(3.10-3.98)
	0.00*	0.00*
Female reference		reference
Residence		
Urban	0.65(0.59-0.71)	0.80(0.72-0.88)
	0.00*	0.00*
Rural reference		reference
EDUCATION		
Graduation and above	0.25(0.20-0.31)	0.36(0.27-0.46)
	0.00*	0.00*
Secondary and higher secondary	0.40(0.35-0.47)	0.53(0.45-0.63)
	0.00*	0.00*
Primary but secondary incomplete	0.72(0.63-0.83)	0.72(0.61-0.84)
	0.00*	0.00*
Primary incomplete	1.22(1.03-1.45)	1.01(0.84-1.22)
	0.03*	0.90
no formal schooling reference		reference
OCCUPATION		
Gov/Non govt employee	0.96(0.76-1.20)	0.97(0.76-1.23)
	0.72	0.79
Self employed	1.30(1.04-1.62)	1.15(0.91-1.46)
	0.02*	0.24
Student	0.25(0.20-0.32)	0.38(0.30-0.49)
	0.00*	0.00*
Homemaker	0.29(0.23-0.37)	0.64(0.50-0.83)
	0.00*	0.001*
Unemployed reference		reference
WEALTH INDEX		
Poor	1.63(1.45-1.83)	1.32(1.16-1.50)
	0.00*	0.00*
Rich	0.68(0.60-0.77)	0.93(0.81-1.07)
	0.00*	0.31
Middle reference		reference

users as compared to 10.7% of females. 29.5% of youth residing in the rural areas were tobacco users as compared to 17.5% in the urban areas. Poverty and poor education were also found to be key predictors of tobacco use. The use of tobacco was more among youth who had received education between primary and secondary class (75.8%) or till primary school (37.7%) as compared to those who had completed their graduation (4.8%). Similarly, the poor section of society (38.6%) was higher on tobacco use as compared to rich class (24.3%) and middle class (12.7%).Maximum use of tobacco was seen among youth who were unemployed (41.3%), self-employed (44.2 %) or employed in government/ non-government jobs(36.4%) as compared to students (12%). The demographic details of the youth population who are users of tobacco are given in Table 1.

Smoking among youth was significantly higher in males (OR 24.99, 95% CI 17.62-35.43) showing male gender as being an important predictor of smoked tobacco consumption. The smoking habit was significantly. Smoking decreased with increasing education, highlighting lesser education as a key predictor for increased use of tobacco. There was almost 40% less smoking among youths pursuing secondary and higher secondary education (OR 0.57, 95% CI 0.43-0.74) and 55% less in those pursuing graduation and above (OR 0.45, 95% CI 0.31-0.64) as compared to youth smokers who had no formal schooling. In addition, significantly lower smoking was observed among the poor class (OR 0.54, 95% CI 0.44-0.66) as compared to the middle and the rich class.

The use of smokeless forms of tobacco was significantly less among male youth as compared to their counterparts (OR 0.41, 95% CI 0.36-0.47), which clearly indicates that female gender is a prominent predictor of smokeless tobacco use. The rural youth (OR 0.70, 95% CI 0.63-0.79) consumed 30% more smokeless tobacco than their urban counterparts. While studying the possible association with smokeless tobacco use with education a positive association was observed wherein youth pursuing graduation and higher degrees were the highest users (OR 4.36, 95% CI 3.28-5.81) as compared to those with no formal schooling. The use of smokeless tobacco was highest among students (OR 2.77, 95% CI 2.18-3.52) as compared to youth in other professions. The use of smokeless tobacco was found in all the socioeconomic classes derived from the wealth index, however maximum use was seen among the poor (OR 2.01, 95% CI 1.76-2.29) followed by the rich (OR 1.46, 95% CI 1.28-1.67).

Dual users were 20% more in the rural area and majority of them were from the poor socio economic class (OR 1.73, 95% CI 1.30-2.28). Dual tobacco use was significantly more popular among students (OR 4.13, 95% CI 2.70-6.01) and graduates and above (OR 4.59, 95% CI 2.44-8) as compared to other occupation and profession respectively. The regression analysis for measuring the association of predictors with smokers, smokeless and dual use is shown in Table 2.

The regression analysis in Table 3 shows the predictors of any type of tobacco use among the youth. Any type of tobacco use was observed to be more in male youth (OR 3.51, 95% CI 3.10-3.98) as compared to female counterparts. Tobacco use was positively associated with those who were self- employed (OR 1.15, 95% CI 0.91-1.46) as compared to other professions; however the association was non- significant. Among all socioeconomic classes tobacco use was significantly higher among the poor class (OR 1.32, 95% CI 1.16-1.50)

Discussion

Death due to tobacco use is expected to increase dramatically in the coming decades. Mortality from smoking alone will double from 2030 in India given the large persistent cohort of lifelong smokers in India (Lal et al., 2012). Majority of these deaths would occur during the productive years of life due to the addiction acquired

during youth (Reddy et al., 2005). The analyses of data from GATS-2010 reveal that almost 22.1 % (51.3 million) youth smoke, chew or use both forms of tobacco products.

The current survey showed a significantly higher use of tobacco smokers belong to poor socio-economic and less educated strata, which remains one of the strongest predictors of tobacco use, as across the world. In India, tobacco consumption is highest among youth who have received formal education till the primary level. This could probably be due to lack of knowledge about the hazards of tobacco use. Several studies while assessing the relation between use of tobacco and education have reported decrease in the use of tobacco with increase in education (Rani et al., 2003). Similar to situation in India, a study among Nepali youth showed that smoked tobacco was associated more with middle and higher income groups than the low income (Binu et al., 2010). Higher use of smokeless form of tobacco was seen in the students and overall tobacco use was more among un-employed or self- employed youth. The spirit of adventure and experimentation among the students could perhaps be one of the causes for tobacco use among the students. These findings of increased tobacco use among people in lower socio-economic strata are in accordance with several other studies (Gupta et al., 1996). Expenditure on essential commodities is sometimes compromised to afford tobacco products in families of poor socio-economic strata, which not only leads to impoverishment, but also increased morbidity and mortality (Thakur et al., 2013).

Gender was also an important predictor of smoking among the Nepali youth with males ten times more likely to be smokers than females (Binu et al., 2010). This corresponds to the findings of other studies where proportion of female smokers was lower than males (Palipudi et al., 2012) and in fact some studies found that there were no female smokers at all in their sample (Singh et al., 2003; Nichter et al., 2004; Kumar et al., 2005; Sharma et al., 2006; Chandrashekhar et al., 2008; Siziya et al., 2008). This is not necessarily the same in all parts of the world as a study in young adults in Canada showed that females were more likely to be daily smokers as compared to males though the number of cigarettes they smoked was fewer (Hammond D, 2005). Alarmingly there is an increasing trend of smoking among women as compared to male counterparts in India (Goel et al., 2014, Roy P et al., 2015). The challenge for policymakers while designing youth-focused interventions is the long windows of vulnerability. The tobacco industry is clearly aware of this and exploits these to ensure that it creates a cohort of tobacco addicts every year as youth initiations translate into profits for tobacco companies. We conclude that efforts directed towards discouraging tobacco use initiation, among the young population should be an important part of all policies directed towards tobacco control. Creating awareness about the dangers of tobacco use among the younger generation would reduce the large number of new tobacco users adding on to the already existing user population. The raising of age of purchase of tobacco products at Point of Sale (POS) from existing 18 years to 21 years is also a useful strategy to curb initiation of tobacco products (Lal et al., 2012). Further, tobacco control related issues should be integrated in curricula of public health students, so as to build their capacity for influencing policy makers on this key issue (Yadav et al., 2014). Youth are extremely sensitive to price, and if taxes are raised above inflationary trends and strongly administered, tobacco products will become less affordable (World Bank, 1999). Pack warnings, ban of tobacco advertising and stronger implementation of laws which reduce access of tobacco products in youth, can additionally help reduce current initiation and future prevalence of tobacco use. Together such efforts would be more fruitful in curbing this growing menace than spending large amount of scarce resources on de-addiction and treatment of diseases due to tobacco use.

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100.0

6.3

75.0

56.3

50.0

25.0

31.3

0

Newly diagnosed without treatment