International Journal of Community Medicine and Public Health
Meena R et al. Int J Community Med Public Health. 2017 May;4(5):1661-1667
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20171780

Original Research Article

Study of tobacco use and related factors among adolescent students of secondary school in south-eastern region of Rajasthan, India

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Received: 07 March 2017
Accepted: 31 March 2017

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ABSTRACT

Background: this study aims to estimate the level of tobacco use among school-going adolescents and also identify the factors that influence youth to use tobacco. Identification of the factors responsible for initiating tobacco use among adolescents will be useful for identifying the most effective interventions to prevent youths from taking up the tobacco habit.
Methods: This was a cross-sectional study which was conducted in adolescent students of grade 8, 9 and 10 from secondary schools within Kota city of Rajasthan. 2032 questionnaires (1228 from government schools and 804 from non-government schools) were included in the analysis.
Results: About seven in ten (71.0%) adolescent students were living in the family where at least one member uses tobacco. Nearly one-third (31.0%) of the adolescent students were having good knowledge and less than half (42.7%) were having some knowledge about the hazards of tobacco use. About one third (32.3%) of adolescent students were exposed to pro-tobacco advertisements.
Conclusions: Immediate action to reduce adolescents' exposure to environmental tobacco smoke is necessary. Prohibiting tobacco use at school and monitoring the high-risk behaviors of adolescents in school is necessary. Strictly Announcing schools and other public places as "tobacco-free places" will help to minimize the exposure to tobacco smoke. It also helps to change social norms and ultimately to minimize the use of tobacco.

Keywords: Tobacco, Adolescent, Smoker, Students, Knowledge

INTRODUCTION

Tobacco use is a major worldwide public health problem. It is now by far the largest preventable cause of death in the world. Although there is a health warning on every packet of cigarettes in India indicating that smoking is injurious to health, these warnings are illegibly printed. On the other hand, attractive and catchy tobacco advertisements are very common. Thus, the use of tobacco products including cigarettes is increasing in the country.[1]

Tobacco and alcohol are the most widely used addictive substances in the world and both have serious public health consequences. Use of tobacco is extremely common throughout the world and most of its use is in the form of cigarettes. The World Bank estimates that in high-income countries, smoking-related health care accounts for 6-15.1% of all annual health care costs.[2] The high smoking-related health care costs are particularly worrisome for low-income countries that can least afford the health care burden, where the tobacco epidemic is expected to account for 70% of all tobacco-related deaths in the next 20 to 30 years.[2]

The overwhelming majority of smokers begin using tobacco before they reach adulthood. Among those young people who smoke, nearly one quarter smoke their first cigarette before they reached the age of ten.[3] Several factors increase the risk of youth smoking. These include tobacco advertisement and promotion, easy access to tobacco products, and low prices.[3]

Teenagers begin to smoke without realizing the addictive nature of nicotine. The continuum of smoking behaviors among young people evolves in stages from preparation to experimentation, to regular smoking and finally to nicotine addiction. In many instances, adolescents progress from their first experimental cigarette to strong nicotine dependence in a year or less. Once a teenager realizes the extent of his/her addiction, usually it is too late to quit due to physical and psychological dependence.[2]

High-risk behaviors are not only more prevalent, but also result in more serious complications to adolescents than adults. In this context, protecting every adolescent from initiating tobacco use is the best intervention for the promotion of the health status of our nation. Thus, this study aims to estimate the level of tobacco use among school-going adolescents and also identify the factors that influence youth to use tobacco. Identification of the factors responsible for initiating tobacco use among adolescents will be useful for identifying the most effective interventions to prevent youths from taking up the tobacco habit.[4]

METHODS

The study was a cross-sectional descriptive survey among school adolescents of grades 8, 9 and 10 of Kota city of Rajasthan. Study was conducted under department of community medicine, Govt medical college, Kota, Rajasthan. Multi stage random sampling (probability proportional to Enrolment size method for schools and random method for class within selected schools) was applied. Data collection was carried out during January to December 2016 by using anonymous self-administered questionnaire. The sample size of the study was 2032 (School response rate=100%, students response rate=96.8%). Informed verbal consent was obtained from the school authority and students. Proportion with confidence interval was calculated and logistics regression analysis was performed for data analysis.

RESULTS

The majority (51.7%) of the respondents were of the age group 13-15 years. Nearly equal proportion of boys (51.5%) and girls (48.5%) participated in the study. About three fifths (60.5%) of the respondents were from government schools and two fifths (39.5%) were from non-government schools. Most of them were Brahmin (31.1%), followed by banayia (27.3%), reserved class (16.3) and Nagar (10.5%) (Table 1).

Table 1: General characteristics of study population.

Characteristics		Frequency	Percent
Age	10-12 yrs	9	0.5
	13-15 yrs	1033	51.7
	16-20 yrs	958	47.9
Sex	Boys	1033	51.5
	Girls	972	48.5
Grade	Eight	573	28.3
	Nine	886	43.7
	Ten	567	28.0
School	Government	1228	60.5
	Non-Government	803	39.5
Ethnicity	Brahmin	608	31.1
	Schedule tribe	319	16.3
	Banayia	533	27.3
	Nagar	206	10.5
	Dhakad	126	6.4
	Scheduled caste	81	4.1
	Others	81	4.1

Note: Number of respondents varies for different variables due to different response rate.

A substantial proportion (71.0%) of adolescent students reported that at least one family member used tobacco. Use of tobacco by family members was almost the same among boys (72.4%) and girls (70.0%) and among students of government schools (72.2%) and non-government schools (69.5%).

When asked about the tobacco use habit of their friends, nearly half of adolescent students (43.9%) reported that at least one of their four best friends used tobacco. More boys (63.7%) than girls (23.0%) reported the use of tobacco by friends. Similarly, more students of non-government schools (55.5%) reported the use of tobacco by friends than students of government schools (36.3%) (Table 2).

More boys were using tobacco among those with good knowledge (68.1%) than those with some knowledge (60.3%) or poor knowledge (53.3%). On the other hand, more girls were using tobacco among those with poor knowledge (35.0%) than those with some knowledge (31.7%) or good knowledge (30.5%).Among government school students; the use of tobacco was higher among those with good knowledge (39.2%) than those with some knowledge (36.5%) or poor knowledge (35.7%). Similarly, among students from non-government schools, the use of tobacco was higher among those with poor knowledge (64.5%) than those with some knowledge (60.0%) or poor knowledge (60.8%) (Table 3).

The proportion of tobacco users among those who agreed with the statement that tobacco users have more friends was higher (48.6%) than those who disagreed (47.5%) or were undecided (45.7%), but the difference was not significant (Table 4).

Table 2: Proportion of adolescent students by the tobacco use habit of family members and friends.

Category		Tobacco use habits of family members		Tobacco use habits of friends	
Category		At least one family member uses tobacco *	No family member uses tobacco *	At least one of four best friend uses tobacco **	No best friend uses tobacco **
Sex	Boys	72.4 (± 2.8)	27.6 (± 2.8)	63.7 (± 3.0)	36.3 (± 3.0)
	Girls	70.0 (± 2.9)	30.0 (± 2.9)	23.0 (± 2.7)	76.7 (± 2.7)
School	Government	72.2 (± 2.6)	27.8 (± 2.6)	36.3 (± 2.8)	63.7 (± 2.8)
	Non-Government	69.5 (± 3.2)	30.5 (± 3.2)	55.5 (± 3.5)	44.5 (± 3.5)
Total		71.0 (± 2.0)	29.0 (± 2.0)	43.9 (± 2.2)	56.1 (± 2.2)

Note: Values in the parenthesis indicate 95% Confidence Interval.
* Calculated among 2032 cases who provided response regarding tobacco use habit of family members.
** Calculated among 2007 cases who provided response regarding tobacco use habit of friends.

Table 3: Proportion of adolescent students using tobacco by their level of knowledge about hazards of tobacco (n=1857).

Category		Proportion of adolescent students using tobacco among those having		
		Good knowledge	Some knowledge	Poor knowledge
Sex	Boys	68.1 (± 5.9)	60.3 (± 4.8)	53.3 (± 6.5)
	Girls	30.5 (± 5.3)	31.7 (± 5.0)	35.0 (± 6.2)
School	Government	39.2 (± 5.4)	36.5 (± 4.6)	35.7 (± 5.2)
	Non-Government	60.8 (± 6.4)	60.0 (± 5.2)	64.5 (± 8.3)
Total		48.1 (± 4.2)	47.0 (± 3.3)	43.9 (± 4.5)

Note: Values in the parenthesis indicate 95% Confidence Interval.

Table 4: Proportion of adolescent students using tobacco by level of agreement with the statement that "tobacco users have more friends" (n=2013).

Category		Proportion of adolescents students using tobacco by level of agreement on the statement that "tobacco users have more friend"		
		Agree	Can't Say	Disagree
Sex	Boys	63.5 (± 4.2)	58.9 (± 5.4)	55.4 (± 7.6)
	Girls	30.0 (± 4.5)	33.9 (± 4.9)	38.8 (± 7.8)
School	Government	38.0 (± 4.1)	38.1 (± 4.7)	39.6 (± 7.0)
	Non Government	65.1 (± 5.0)	57.1 (± 5.9)	59.1 (± 8.5)
Total		48.6 (± 3.2)	45.7 (± 3.7)	47.5 (± 5.5)

Note: Values in the parenthesis indicate 95% Confidence Interval.

Table 5: Proportion of adolescent students using tobacco by their exposure to pro-tobacco advertisements (n=1966).

Category		Exposure to tobacco promotional advertisement in media or event			
		Exposed group		Non exposed group	
		Ever users	Never users	Ever users	Never users
Sex	Boys	65.3 (± 5.0)	34.7 (± 5.0)	58.3 (± 3.9)	41.7 (± 3.9)
	Girls	34.0 (± 6.0)	66.0 (± 6.0)	32.4 (± 3.6)	67.6 (± 3.6)
School	Government	40.2 (± 5.1)	59.8 (± 5.1)	37.0 (± 3.4)	63.0 (± 3.4)
	Non Government	69.1 (± 5.8)	30.9 (± 5.8)	57.3 (± 4.4)	42.7 (± 4.4)
Total		52.0 (± 4.0)	48.0 (± 4.0)	45.0 (± 2.7)	55.0 (± 2.7)

Among those students who were exposed to advertisement, more were ever-users (52%) than never-users (48%). Also, more never-users (55%) were not exposed to advertisement than ever-users (45%) (Table 5).

Presently, smoking in public places, government offices and other institutions are restricted in India. Very few (3.0%) adolescent students were regularly exposed to environmental tobacco smoke in public places. About four out of five (80.3%) students reported that they were occasionally exposed to environmental tobacco smoke in

public places. More tobacco users were exposed (3.9% regularly and 83.4% occasionally) to environmental tobacco smoke in public places than non-users (2.3% regularly and 77.5% occasionally) (Table 6).

Table 6: Proportion of adolescent students by their exposure to environmental tobacco smoke in public places (n=1845).

Category		Exposed to smoke from others in public places		
		Regular	Occasional	Never
Sex	Boys	3.5 (± 1.2)	79.7 (± 2.6)	16.8 (± 2.4)
	Girls	2.5 (± 1.1)	81.3 (± 2.2)	16.2 (± 2.5)
School	Government	2.0 (± 0.9)	78.0 (± 2.5)	20.0 (± 2.4)
	Non Government	4.5 (± 1.6)	83.7 (± 2.7)	11.8 (± 2.4)
Tobacco use	Ever Users	3.9 (± 1.4)	83.4 (± 2.6)	12.7 (± 2.3)
	Never Users	2.3 (± 1.0)	77.5 (± 2.7)	20.2 (± 2.6)
Total		3.0 (± 0.9)	80.3 (± 1.9)	16.6 (± 1.7)

Note: Values in the parenthesis indicate 95% Confidence Interval.

Table 7: Predictors of ever tobacco use by knowledge about hazards and perceptions towards tobacco use (logistic regression analysis).

Variables	Effects of variable on being ever user of tobacco product			
	ß	SE	Estimated Odds Ratio (95% confidence interval)	p
Knowledge about the hazards of tobacco use				
Good Knowledge			1	
Some knowledge	0.12	0.12	1.13 (0.90 – 1.42)	0.29
Poor knowledge*	0.17	0.12	1.18 (0.93 – 1.51)	0.18
Perception that tobacco users have more friend				
Disagree *			1	
Can't say	0.08	0.13	0.93 (0.72 – 1.20)	0.56
Agree	0.04	0.13	1.04 (0.82 – 1.34)	0.73

Table 8: Predictors of ever tobacco use by tobacco use habit of family members and friends (Logistic regression analysis).

Variables	Effects of variable on being ever user of tobacco product			
	ß	SE	Estimated Odds Ratio (95% confidence interval)	p
Tobacco use habit of family members				
Not any family member use tobacco *			1	
At least one family member use tobacco	0.58	0.10	1.79 (1.47 – 2.18)	<0.01
Tobacco use habit of friends				
None of four best friend use tobacco *			1	
At least one of four best friend use tobacco	1.78	0.10	5.93 (4.88 – 7.20)	<0.01
Tobacco use habit of family members and friends (Combined)				
Both friends/family members do not use tobacco *			1	
At least one among friends or family members use tobacco	0.67	0.14	1.95 (1.49 – 2.56)	<0.01
Both friends/family members use tobacco	2.19	0.15	8.93 (6.66 – 11.99)	<0.01

Knowledge and perceptions are important influencing factors for initiating tobacco use. Thus, use of tobacco was examined with the student's level of knowledge about the hazards of tobacco use and their perceptions towards tobacco use. Student's level of knowledge regarding the harmful effects of tobacco use was not significantly associated with their use of tobacco. Similarly, no significant relationship was observed between the tobacco use of adolescent students and their perception towards tobacco users (Table 7).

Tobacco use by family members and friends may strongly influence adolescents to use tobacco. Thus, student's tobacco use was examined in association with

the tobacco use behavior of family members and best friends. Adolescent students were more likely to use tobacco if at least one family member (parents, siblings and other members residing permanently) used tobacco (OR=1.79, p<0.01) than those who had no family members using tobacco.

Adolescent students who had at least one best friend who used tobacco were more likely to use tobacco (OR=5.93, p <0.01) than those who had no best friends using tobacco. When both friends and family members of an adolescent student were using tobacco, the possibility of being a tobacco user was higher (OR=8.93, p<0.01) than those with no family members or friends using tobacco (Table 8).

Exposure to tobacco promotional advertisements and exposure to environmental tobacco smoke at home and in public places are environmental factors that could influence adolescent students to initiate tobacco use. Exposure to tobacco promotional advertisement in the media or at social events was significantly associated with the tobacco use behavior of adolescent students (OR=1.32, p<0.01). Students regularly exposed to environmental tobacco smoke at home were more likely to become tobacco users (OR=1.46, p=0.05) than those who were never exposed. Students who were regularly exposed to environmental tobacco smoke in public places were also more likely to become tobacco users (OR=2.69, p <0.01) than those who were never exposed (Table 9).

Table 9: Predictors of ever tobacco use by pro-tobacco advertisements and environmental tobacco smoke (logistic regression analysis).

Variables	Effects of variable on being ever user of tobacco product			
	ß	SE	Estimated Odds Ratio (95% confidence interval)	p
Exposure to pro tobacco advertisement				
No *			1	
Yes	0.28	0.10	1.32 (1.10 – 1.60)	<0.01
Exposure to environmental tobacco smoke at public place				
Never *			1	
Occasionally	0.53	0.30	1.71 (1.32 – 2.20)	<0.01
Regularly	0.99	0.13	2.69 (1.50 – 4.83)	<0.01

DISCUSSION

Tobacco use habit of family members and friends

A substantial proportion (71.0%) of the adolescent students reported that at least one of their family members (parents, siblings and other members residing permanently) use any tobacco products. This result (71%) is much higher than the GYTS where 37.8% lived in homes where others smoke. The people of urban areas are more likely to use tobacco. Thus, the result is higher than the result of GYTS that had also covered the rural area. The results of this study revealed that adolescent students from families with at least one member using tobacco were 1.79 times more likely to use tobacco compared to those with no members using tobacco. Tobacco use of family members is likely to influence adolescents. When adolescents are exposed to the tobacco use habit of family members, they are more likely to perceive tobacco use as a positive and acceptable behavior. Thus, this helps to develop favorable personal beliefs and subjective norms about tobacco use, and ultimately leading youth to take up the habit.

Nearly half (43.9%) of adolescent students reported that at least one of their four best friends use tobacco. Adolescent students with best friend using tobacco were 5.93 times more likely to use tobacco compared to those with no friends using tobacco. During adolescence, the relationship with the peer group becomes stronger than family members and thus young people are influenced more by the habits of their friends. Imitating the behavior of friends is common practice among adolescents who want to be like their peers and influences them to use tobacco.[5]

An amplified effect was observed among adolescent students who were exposed to the tobacco use behavior of both family members and best friends. These students were 8.93 times more likely to use tobacco than those who did not have any family members or best friends using tobacco. The recent Turkish study also explained that youth's close friends who smoke were more likely to experiment and continue smoking and this effect of peer group is stronger among girls than boys.[6]

Although detailed studies on the influence of family members and friends were not available in Rajasthan, different international studies suggested similar results to this study. A positive correlation was observed with parental tobacco use from a study in Tunisia.[7]Several other studies showed that adolescents with a parent or older siblings or a friend who smoke cigarettes are more likely to become a smoker.[5,6,9]

Knowledge regarding the hazards of tobacco use

Although a majority (91.4%) of adolescent students claimed to have knowledge of the hazards of tobacco use. The results showed that about one fourth (26.2%) of the respondents in fact had poor knowledge, and were unable to recall even one of the main health hazards of tobacco use.

Higher proportions of girls had good knowledge about the hazards of tobacco use compared to boys. The proportion of adolescent students having poor knowledge was significantly lower among non-government school students than government school students. This difference may be due to the better educational activities and restrictions to use tobacco in non-government school than in government schools.

In contrary to the general assumption, the proportion of adolescent students using tobacco was higher among those with good knowledge of the hazards of tobacco use. But it is interesting to note here that when the results were stratified by sex, there was an opposite trend among boys and girls. Use of tobacco was positively correlated with the level of knowledge among boys but negatively correlated among girls. Similarly, a positive relation was observed in tobacco use and the level of knowledge among adolescent students of non-government schools, but the reverse was found in the case of government school students. In Rajasthan, girls are more confined within the close supervision of family members than boys. Thus girls have more restriction and close supervision against high-risk behaviors. As adolescent students initiate the use of tobacco, adolescents learn something about its hazards from their peers too. But the results of this study indicated that knowledge of the hazards of tobacco use did not influence student's decisions about initiating tobacco use. Although the students have some knowledge about the health hazards, they may have wrong perceptions about tobacco use. A substantial proportion of students thought that tobacco users are more attractive and have more friends. In this situation, they may overlook the health hazards in favor of their perceived benefits of tobacco use.

Therefore, it may concluded from this study that knowledge of the health hazards is not sufficient to protect individuals from initiating tobacco use, although education is a necessary component of a comprehensive tobacco control program.

Perceptions regarding tobacco use

Nearly half (47.1%) of the respondents thought that adolescents who use tobacco have more friends. These perceptions may have developed among adolescent students from the information received from their peers. Probably adolescents were not getting valid or complete information about the hazards and benefits of tobacco. The source of information is mostly informal and un-systematic, which resulted in the development of some wrong impressions regarding tobacco use. The glamour and slogans used in tobacco advertisements also result in the development of favorable perceptions of tobacco use as desired by tobacco companies.

Among adolescent students who agreed with the statement that "tobacco users have more friends", nearly half (48.6%) were tobacco users as compared to those who disagree (47.5%) or were undecided (45.7%). Logistic regression analysis showed that student's perceptions regarding tobacco use alone were not significantly associated with their tobacco use behavior.

The GYTS results in India showed that 34.1% of adolescent students think that boys who smoke have more friends and 19.7% of adolescent students think that girls who smoke have more friends. All these results were higher than the median value of all GYTS countries.[2]

Exposure to pro-tobacco advertisement

Nearly one third (32.3%) of adolescent students reported that they saw tobacco promotional advertisements in the media or at social or sporting events during the last 30 days. Although the advertisement of tobacco products in national electronic media (i.e. radio and television) is already banned, national newspapers and magazines with high youth readerships are still publishing the attractive advertisements of tobacco products. In addition, youths are being targeted through large billboards on city corners and through sporting events, music concerts, street festivals and other social events and gatherings that are sponsored by the tobacco companies. As Indian and other international television channels are very popular among youths, attractive and influencing advertisements in those channels were found to encourage the adolescent students to use tobacco. Different catchy slogans in advertisement banners e.g. "safalta ka pratik" (symbol of success), "sahasi ko ek mantra chahayia" (the demand of the brave person), "my India my pride: Surya King" etc. are being used to target and attract adolescents to take-up tobacco. The clips of smoking film stars in different cinemas also influence students to use tobacco. Other promotional advertisements of tobacco companies were shop decoration, distribution of gifts etc. All these promotional advertisements show tobacco use as a pleasurable, relaxing and sociable behavior.

The results of this study showed that adolescent students exposed to tobacco promotional advertisements were 1.32 times more likely to use tobacco than those who were not exposed. Similarly, other research has shown that youth who were regularly exposed to such advertisements were more likely to use tobacco.[9]

More adolescents reported exposure to pro-tobacco advertisement in the GYTS in the Central Developmental Region of India than the present study. According to the GYTS, 44.0% of non- smokers and 51.2% of current

smokers were exposed to pro-tobacco advertisements. Although, anti-tobacco advertisement has a protective effect, it was unable to counteract the effects of pro-tobacco advertisement in the same cohort.[10]

Exposure to environmental tobacco smoke

Nearly three of five adolescent students were exposed to environmental tobacco smoke (7.4% regularly and 50.9% occasionally) in their home and four of five adolescent students were exposed (3.0% regularly and 80.3% occasionally) to environmental tobacco smoke in public places. Substantial proportions of non-users (55.6% at home and 79.8% in public places) were being exposed to environmental tobacco smoke, limiting their rights to live and grow in a smoke free environment. In the GYTS in India, about 35.8% of never smokers and 53.6% of current smokers reported that they were exposed to smoke from others in their home in last seven days and 44.7% of never smokers and 63.8% of current smokers reported that they were exposed to smoke from others in public places.[11] All these results illustrate the alarming situation of exposure to second hand smoke, which not only harms the health of adolescents, but also influences them to use tobacco.

Exposure to environmental tobacco smoke at home and in public places was significantly associated with the tobacco use behavior of adolescent students. Adolescent students who live in the homes where other members regularly use tobacco were 1.46 times more likely to use tobacco than those not exposed to environmental tobacco smoke at home. Adolescents who are exposed to second hand smoke outside their home were 2.69 times more likely to use tobacco than those who were not exposed.

There is a possibility of an incremental increase in the prevalence of tobacco use as a positive relation was observed between the tobacco use of adolescent students and their exposure to environmental tobacco smoke. A large proportion of adolescent students, especially never users of tobacco, are being exposed to environmental tobacco smoke favoring them to become tobacco users in the future.

CONCLUSION

Immediate action to reduce adolescents' exposure to environmental tobacco smoke is necessary. Prohibiting tobacco use at school and monitoring the high-risk behaviors of adolescents in school is necessary. Strictly Announcing schools and other public places as “tobacco-free places” will help to minimize the exposure to tobacco smoke. It also helps to change social norms and ultimately to minimize the use of tobacco.

ACKNOWLEDGEMENTS

Authors are thankful to students & staff of the school for their cooperation in the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Meena R, Meena S, Mittal D, Meena N. Study of tobacco use and related factors among adolescent students of secondary school in south-eastern region of Rajasthan, India. Int J Community Med Public Health 2017;4:1661-7.