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Tobacco Use among Adolescent Students of Grade 8, 9 and 10 from Secondary Schools, Kota, Rajasthan

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Abstract
Background: *This is the first representative study in Rajasthan to ascertain the factors that influence adolescents' decisions to initiate tobacco use in addition to information on their use of different types of tobacco products. Thus, an aim of this study was estimate the level of tobacco use among school-going adolescents.*
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.*
Result: *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. Pan masala and gutkha were the most commonly used smokeless tobacco products. About half (51.4%) boys and one-third (30.3%) girls ever used pan masala or gutkha. The average age of initiating tobacco use was 12.64 years.*
Conclusion: • *Health education programs should be provided to adolescent students to raise the level of awareness of the hazards of tobacco use and to change their perceptions. More anti-tobacco messages in the print, radio and/or television and psycho-social support to help students to develop a positive self-image to counter-act the pro-tobacco message are necessary.*
Keywords: *Tobacco, adolescent, smoker, students.*

Introduction

Tobacco use is the chief preventable cause of death and illness in the world. Most people begin using tobacco before the age of 18. Recent trends indicate that the smoking prevalence rate among adolescents is rising and age of initiation is becoming younger.[1] If these patterns continue, tobacco use will result in the deaths of 250 million children and young people alive today, a third of whom live in developing countries.[2]

Smokers who have taken up the habit in adolescence and continue to smoke regularly have a 50% chance of dying from tobacco-related disease. Half of those persons will die in middle age, thereby losing nearly 22 years of normal life expectancy. With prolonged smoking, smokers have a death rate about three times higher than non-smokers at all ages, starting from young adulthood.[3] Presently, about four million people worldwide die yearly from tobacco-related diseases, i.e., one death every eight seconds. If current trends continue, there will be one death every three seconds by 2030.[4]

Tobacco use and other high-risk behaviors are emerging as significant problems in our society. The unhealthy behaviors acquired during adolescence are continued throughout the life cycle, resulting in adverse effects on the individual, family and society. Therefore, adolescents and school–aged children should be a primary focus for intervention strategies for promoting healthy behaviours.[5]

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.[6]

Most tobacco use starts during childhood and adolescence. Teenagers are therefore an appropriate focus group when considering the initiation of tobacco use. During the teen years, adolescents are attempting to disentangle from the influence of and identification with parents, establish stronger links with their peers and establish a sharper and more independent self-identity.[5] Some studies have suggested that peer pressure and the smoking habits of parents and older siblings are major factors that influence the initiation of youth smoking.[7]

According to the GYTS-2006 in the Central region of India, 11.6% (15.3% boys and 6.4% girls) of adolescent students currently use any tobacco product and 8.7% (12.0% boys and 3.8% girls) had ever smoked cigarettes. About forty percent of students are exposed to second hand smoke in their home and almost half in public places.[6,8]

Although several research studies on tobacco use have been undertaken in different parts of India, most of them have focused only on cigarette smoking. This is the first representative study in Rajasthan to ascertain the factors that influence adolescents' decisions to initiate tobacco use in addition to information on their use of different types of tobacco products. Thus, an aim of this study was estimate the level of tobacco use among school-going adolescents.

Methods

This was a school-based cross-sectional descriptive study conducted in department of preventive & Social Medicine from October 2015 to September 2016 at Govt medical college Kota, Rajasthan.

Study population: The study population was the adolescent students of grade 8, 9 and 10 from secondary schools within kota city of Rajasthan.

Sampling: Multistage sampling was applied for the study. Schools with at least 100 secondary students (in grades 8, 9 and 10) were eligible for the study. Eligible schools were stratified into government and non-government categories. More than 50% of schools were selected on the basis of Probability Proportional to Enrolment size (PPE), i.e. the schools with high number of students are more likely to be selected than schools with low number of students.

The required number of sample size was 1579, based on the assumed prevalence rate of 17% and 10% allowable error. Thus, to obtain 1579 completed questionnaires, 1974 high school students (assuming 80% response rate) from 18 secondary schools were targeted for sample selection.

All selected schools agreed to participate in the study (school response rate=100%). As the required sample size was 1974 from 18 schools, the average number of samples to be selected from each school was 110. If the number of students in a class (combining all sections) was more than one hundred, any one class was randomly selected in the presence of the school authorities.

As the number of students in those selected schools was not uniform (ranges from 100-718), class was chosen until a sample size of 100 was reached from each school. All students of elected classes were eligible for participation in the study.

A total of 2116 questionnaires were distributed to students and 2048 of them were filled in and submitted to the investigator (student response rate=96.8%). Of them, 16 questionnaires either did not have basic information (e.g. tobacco use) or were not readable, thus excluded from the study.

Finally 2032 questionnaires (1228 from government schools and 804 from non-government schools) were included in the analysis. The final sample was higher than the expected size due to the high response rate and higher number of students available in the classroom than that obtained from the database of District Education Office, Kota.

Data collection method: Data was collected by using an anonymous self-administered questionnaire. Informed verbal consent from the school authority was obtained after explaining the purpose of the study. The anonymous self-administered questionnaire was distributed to the students of selected classes after explaining the purpose of the study and the instructions to fill in the questionnaire. Considering the sensitivity of the issue, the school authority was requested not to be present in the class during the filling in of the questionnaire. One-class period (approx. 45 min) was provided to fill in the questionnaire. Students were assured that the information they provided would remain confidential and thus were encouraged to be truthful in their responses. They were informed that their participation was completely voluntary and they could quit at any time.

Instrumentation: An anonymous self-administered questionnaire in hindi/english language was used to collect the information. The questionnaire was pre-tested in maa bharati Senior Secondary School, talwandi, and kota so as to confirm its validity and reliability and to avoid ambiguity.

Following the pre-test, some modifications in the order of the questions and terminology were made in the final questionnaire.

Ethical Consideration: All the information collected for the study was utilized only for the purpose of research and was not disclosed to anyone outside the research team. Verbal consent was taken from all participating schools and students. The participation was completely voluntary. Their right to refuse to participate in the study (if they wished so) was respected.

Data management and analysis:

Coding was done to simplify the process of data entry. All the data was entered in the database created in EPI Info Version 6.04d and analyzed by importing the data file to EPI Info 2002 and MEDCALC 14.0 version for windows.

The response rate for different questions was different; so the proportion was calculated based on the response taking each as an independent event. Thus, the number may not match each other in some cases. Random check of 50 forms was performed to ensure correct data entry. The EPI Info 2002 software was used to calculate the confidence interval of proportion and MEDCALC 14.0 version for Windows for logistic regression 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)

Of the total respondents, nearly half (47.1%) of adolescent students ever used any tobacco product (Table 3). Pan masala and gutkha were the most commonly used smokeless tobacco products. About half (51.4%) boys and one-third (30.3%) girls ever used pan masala or gutkha. The use of tobacco was significantly higher among boys (60.6%) compared to girls (32.8%) and more common among students of non-government schools (61.1%) than those from government schools (38.0%). Almost all forms of tobacco were common among adolescent students of the Dhakad/Nagar ethnic group followed by adolescent students of the reserved and Brahmin/ Banayia ethnic groups.(table 2)

Twelve cases not reporting the frequency of use were excluded in analysis of the total respondents, nearly one in seven (13.2%) were current (either regular or occasional) users of any tobacco products, one in four (22.7%) were experimental users (i.e. used any tobacco products not more than 10 times) and one in ten (10.6%) were past users of any tobacco product (Table 4). More boys (17.4%) were using tobacco products than girls (8.6%) and more students of non-government schools (18.2%) were using tobacco than students from government schools (10.0%). More adolescent students from the Dhakad/Nagar ethnic group were current users (16.9%) and past users (23.4%) of tobacco products than those from other ethnic groups. Higher proportions of adolescent students from Nagar ethnic group (25.4%) were experimental users followed by those from Brahmin/banayia (23.3%), dhakad/nagar (22.2%) and other (20.8%). (Table 3)

The average age of initiating tobacco use was 12.64 years. Initiation of tobacco use was earlier by a few months among girls (12.40 yrs) than boys (12.76 yrs). Similarly, adolescent students of non-government schools initiated tobacco earlier (12.48 yrs) than adolescent students of government schools (12.82 yrs). (Table 4)

Tobacco use was significantly associated with the sex of adolescent students. Boys were more likely to use tobacco compared to girls (OR=3.15, $p<0.01$). Similarly, adolescent students from non-government schools were more likely to use tobacco than adolescent students from government schools (OR=2.58, $p<0.01$). A significant difference was observed between adolescent students from the Dhakad/nagar ethnic group compared to the Brahmin/Banayia ethnic group (OR=1.48, $p<0.01$). (Table 5)

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

Table 2: Prevalence of ever tobacco use by type of tobacco product (n=2032)

Category		Type of tobacco			
Category		Any tobacco product	Cigarette Bidi	Surti Khaini	Pan masala Gutkha
Sex	Boys	60.6 (± 3.1)	22.9 (± 2.2)	5.0 (±1.4)	51.4 (± 3.1)
	Girls	32.8 (± 3.0)	5.9 (± 1.6)	0.9 (± 0.7)	30.3 (± 3.0)
School	Government	38.0 (± 2.8)	11.7 (±1.9)	2.4 (± 0.9)	31.3 (± 2.7)
	Non Government	61.1 (± 3.4)	19.3 (±2.8)	4.0 (± 1.4)	56.3 (± 3.5)
Ethnicity	Brahmin/Banayia	43.4 (± 3.2)	10.5 (± 2.1)	2.6 (± 1.1)	38.6 (± 3.2)
	Dhakad/Nagar	53.2 (± 3.7)	19.4 (± 2.9)	3.5 (± 1.4)	45.6 (± 3.7)
	reserved (SC/ST/OBC)	46.0 (± 9.0)	12.7 (± 6.2)	2.4 (± 3.2)	40.5 (± 8.9)
	Others (Muslims)	43.8 (± 6.5)	17.9 (± 5.1)	3.3 (± 2.6)	37.9 (± 6.3)
Total		47.1 (± 2.2)	14.7 (±1.6)	3.0 (± 0.8)	41.2 (± 2.2)

Note: Values in the parenthesis indicate 95% Confidence Interval

Table 3: Proportion of adolescent students using tobacco by frequency of use (n=2020)

Category		Frequency of tobacco use			
Category		Current user	Past user	Experimental user	Never user
Sex	Boys	17.4 (± 2.4)	14.8 (± 2.3)	27.9 (± 2.8)	39.9 (± 3.1)
	Girls	8.6 (± 1.8)	6.1 (± 1.6)	17.4 (± 2.5)	67.9 (± 3.0)
School	Government	10.0 (± 1.8)	7.9 (± 1.6)	19.5 (± 2.3)	62.6 (± 2.8)
	Non Govt.	18.2 (± 2.8)	14.7 (± 2.5)	27.6 (± 3.2)	39.5 (± 3.5)
Ethnicity	Brahmin/Banayia	10.7 (± 2.1)	8.7 (± 1.9)	23.3 (± 2.8)	57.3 (±3.3)
	Dhakad/Nagar	16.9 (± 2.8)	23.4 (± 2.5)	22.2 (± 3.1)	47.5 (± 3.7)
	reserved (SC/ST/OBC)	11.9 (± 6.1)	8.7 (± 5.4)	25.4 (± 7.9)	54.0 (± 9.0)
	Others (Muslims)	12.5 (± 4.4)	10.0 (± 4.0)	20.8 (± 5.3)	56.7 (± 6.5)
Total		13.2 (± 1.5)	10.6 (± 1.4)	22.7 (± 1.9)	53.5 (± 2.2)

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

Table 4: Proportion of adolescent students initiating tobacco before 10 years of age and the average age of initiating tobacco (n= 958)

Category		Initiating tobacco use	
Category		Proportion below 10 years of age	Mean age
Sex	Boys	19.2 (± 3.2)	12.76 (± 1.7) yrs
	Girls	19.1 (± 4.6)	12.40 (± 0.3) yrs
School	Government	18.9 (± 3.7)	12.82 (± 0.2) yrs
	Non Government	18.9 (± 3.7)	12.48 (± 0.2) yrs
Total		18.9 (± 2.6)	12.64 (± 0.2) yrs

Note: Values in the parenthesis indicate 95% Confidence Interval

Table 5: Predictors of ever tobacco use by general characteristics of respondents (logistic regression analysis)

Variables		Effects of variable on being ever user of tobacco product			
		ß	*SE*	Estimated Odds Ratio (95% confidence interval)	*P*
Sex	Girls *			1	
	Boys	1.15	0.09	3.15 (2.62 – 3.78)	<0.01
School	Government *			1	
	Non Government	0.95	0.09	2.58 (2.15 – 3.10)	<0.01
Ethnicity	Brahmin/Banayia*				
	Dhakad/Nagar			1	
	reserved (SC/ST/OBC)	0.39	0.10	1.48 (1.22 – 1.80)	<0.01
	Others (Muslims)	0.11	0.19	1.11 (0.77 – 1.62)	0.57
		0.02	0.15	1.01 (0.76 – 1.35)	0.91

Discussion

Nearly half (47.1%) of adolescent students studying in grades eight, nine and ten were ever users of tobacco. Most of other studies were mainly focused on the current use of tobacco products. The proportion of experimental users was very low among total ever users of tobacco products in those studies. Equal emphasis was given to collect the information regarding experimental use of tobacco products and current use of tobacco product in this study. Thus, high proportions (22.7%) of adolescent students were found using tobacco product for experimentation.

Boys were 3.15 times more likely to use tobacco as compared to girls. The finding is almost similar to the result of GYTS (2006). According to GYTS, 22.5% of boys and 7.9% of girls ever used any tobacco product in india.[8] The proportion of ever users may be higher among boys than girls as boys in Indian culture enjoy higher level of freedom regarding their individual behaviors than girls both from the family and society.

Non-government school students were 2.56 times more likely to use tobacco compared to government school students. Generally, students at non-government schools are from more affluent families than those at government schools. Thus, non-government school students may have more money to spend to purchase tobacco products than students at government schools, which may enable them to use tobacco more freely than government school students.

Adolescent students of the Dhakad/Nagar ethnic group were 1.48 times more likely to use tobacco than those from the Brahmin/Banayia ethnic group. The difference may be due to a combination of the higher economic status of the Dhakad/Nagar ethnic group and the more restricted culture of Brahmin/Banayia.

About one in seven (14.7%) adolescent students used tobacco in smoking form like cigarettes or bidis. Substantial proportions (41.2%) of adolescent students were using pan masala and gutkha of different brands available in the market. As some of the products like mouth fresheners and processed betel nuts, which does not contain tobacco, are available in the market in similar packaging. Thus students are not aware about the product that it really contain tobacco or not. Thus, they use pan masala unknowingly. During fieldwork, most of the students expressed that they were not aware that pan masala or gutkha were also tobacco products and harm them. Though, this information was not systematically collected in this study. Adolescent students were using pan masala or gutkha without knowing the ingredients and hazards, as mouth freshener or as processed betel nut. In addition pan masala and gutkha were convenient to hide from their parents and teachers, as use of these products is usually not allowed in younger age by their parents and teacher. In comparison to other tobacco products, use of surti or khaini was less common (3.0%) among adolescent students. The use of non-smoking tobacco products is increasing in india as they were easily available everywhere, easier to use than those smoked products and less expensive than cigarettes.

High proportions (22.7%) of adolescent students were experimental users during the time of the survey and about one in ten (10.6%) students had used tobacco products in the past but was not current users. Thirteen percent of adolescents were currently using tobacco products (1.7% regularly and 11.6% occasionally) at the time of study. The result is almost similar to the result from GYTS-2006, where 11.6% of students were using tobacco products currently, (15.3% were boys and 6.4% were girls).[8]

The prevalence of tobacco use among school adolescents of Kota was higher than earlier tobacco use studies in Rajasthan. The Global Youth Tobacco Survey in Central Developmental Region of India in 2006 reported that the ever use of tobacco was about 16.3% of adolescent students (22.5% boys and 7.9% girls).[9] Two different school based studies by Sharma S and Acharya GP et al. in a secondary school of Kathmandu also showed that the significantly more boys smoked as compared to girls.[10.11] . The

recent study from Turkey also showed that boys were more likely to use tobacco as compared to girls. Higher use of tobacco among adolescent students in Kota may be due to the differences in the ethnic distribution of study population and other confounding factors. The current use of tobacco was almost similar to other studies among adolescents and youths, but the experimental use of tobacco was higher than other studies. Thus, the use of tobacco is increasing in Kota as higher proportion of adolescents are currently experimenting the tobacco products especially tobacco products that are chewed.

A community based study in India among youths showed that the current use of tobacco in males was 17.2% as compared to females (6.7%).[12] The recent Demographic and Health Survey in India showed that the current use of any tobacco among the 15-19 age group was 36.7%.[1] These differences may be due to the differences in study groups. These results are from the community based studies whereas the present study is not a community based study in true sense.

The average age of initiating tobacco use was 12.64 years (12.76 for boys and 12.40 for girls). About one of five (18.9%) adolescent students initiated tobacco use before 10 years of age. Experimental use was the main reason for initiating tobacco use by adolescents along with peer pressure. Though the proportion of girls using tobacco was less than boys, boys initiated tobacco earlier than girls.

The proportion of adolescents initiating tobacco before they are 10 years of age was lower in this study (18.9%) compared to the GYTS in the Central Development Region of India. Results from the GYTS showed that 23.1% of adolescent students initiated smoking before they were 10 years of age in India and the median value of the proportion from all countries covered by the GYTS was 23.9%.[7] Other studies showed that initiation of tobacco use (cigarette or other products) starts around 13-14 years in most of the countries.[2] According to the study on tobacco economics in India, the age of first smoking was 16.6 years and was lower for females (15.8 yrs) than males (17.0 yrs).[12] Youth are perhaps experimenting sooner with smokeless tobacco products than cigarettes, thus the age of initiating tobacco use among them is lower than the age of first smoking.

When the trend of tobacco use analyzed, the age of initiating the tobacco use increased significantly after the 9 years of age in the present study. During this age, adolescents' activities are less supervised by their parents than in their earlier life and also are more influenced by the activities and behavior of peers. As both younger and older students are studying in the same school, the younger ones were influenced by the behavior of older ones. These older students could have a real influence on the younger students in terms of the younger ones who want to emulate the behaviour of the older ones.

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