ORIGINAL ARTICLE

FACTORS INFLUENCING SMOKING INITIATION AMONG THE SECONDARY SCHOOL STUDENTS IN BANGLADESH: FINDINGS FROM A CROSS SECTIONAL STUDY

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ABSTRACT

Smoking among school children is becoming a serious problem in developing countries, including Bangladesh. The early initiation of smoking needs urgent intervention to protect this vulnerable group and preventing them to be addicted. This study aims to determine the age at initiation of smoking and factors affecting it. A two-stage cluster sampling was used with a selection of schools on probability proportional to enrolment size followed by stratified random sampling of government and private schools and then a random start in classes VIII, IX and X of each school targeting the students aged 13 years and above. Data collected from secondary school students using self-administered structured questionnaire. All analyses were performed with SPSS version 20.0. Missing value was treated by multiple imputations. A total of 6877 data were analysed in which 84.7% were non-smoker, 9.5% were ever smoker and 5.8% were current smokers. Among the ever smoker (n=823), 38% were current smokers, 56.5% former and 5.5% were recent quitters. The mean (SD) age at initiation of smoking was 10.9 (0.2) years. Multinomial regression analysis revealed that class grade, peer pressure and offered free cigarette appeared to be significant predictors of smoking initiation (p<0.05). Parental smoking and type of schools appeared as significant factors for smoking initiation by bi-variate analysis, but regression analysis did not significantly influence (p>0.05). Promotion of smoking resistance skills among children and teens through comprehensive approaches designed to enhance general personal competence by teaching an array of personal and social life skills is recommended.

Keywords: Bangladesh, Secondary School, Students, Smoking

INTRODUCTION

Adolescence is the most vulnerable age group for all sorts of addictions[1]. It is a period of transition from childhood to adulthood that passes through physical and psychological changes. The family, peer group, school environment, social models have an influential role to play in the development of the child[2]. Adolescence is the phase in which the child is more susceptible to the varied interpersonal and environmental factors. A host of interpersonal, socio-cultural, psychological factors are contributing to early initiation of smoking[1-3]. Smoking by young people constitutes one of the main challenges for national tobacco control. Gilpin et al. (2005)[4] and Gritz et al. (2003)[5] documented the causes and conditions influencing smoking initiation by young people. Jason et al. (1999)[6] and Järvelaid (2004)[7] reported that those who start earlier are more at risk of becoming habitual smokers and their rate of quitting smoking is very low[8].

It is unquestionable that tobacco use prevention brings health benefit and these health benefits are gained from postponing the onset of tobacco use. Center for Disease Control and Prevention (CDC)[9] has shown that there is a time lapse of 2 to 3 years between the stage of experimenting tobacco and the development of a tobacco addiction. Study by Di Franza et al. (2002)[10] and Di Franza et al. (2007)[11] suggested that young people may become addicted to tobacco much quicker. The Global Tobacco Surveillance System (GTSS) has reported that both smoking and smokeless tobacco among those aged 13–15 years is high. The report also emphasized that interventions are necessary for the prevention of initiation and to promote cessation of tobacco among current users[12]. The GYTS, Bangladesh (2007) has reported about 9% of the students reported that they had ever smoked cigarettes. Boys (15.8%) were significantly more likely than girls

(4.8%) to ever smoke cigarettes. Almost 4 in 10 students (38.6%) smoked their first cigarette before age 10. More than 1 in 10 students (13.2%) who never smoked cigarettes are interested to initiate smoking within a year[13].

School going children especially secondary school students are often targeted by the tobacco industry for marketing[16]. Like high schools even colleges can also be targeted by the tobacco industry, though the most of the control programme is designed for the students. The main challenges in tobacco control are postponing smoking initiation by young people and ensuring they have a real risk perception. Therefore, the objective of this study was to find out at what age children start smoking, as well as their smoking habits and risk perceptions according to the different school-age groups.

METHODOLOGY

Study design and data collection
The study involved the analysis of cross sectional data from all the administrative divisions of Bangladesh. At first stage cluster sampling technique was adopted to select 30 districts using probability proportional to enrolment (PPE), i.e. schools with a high number of students were more likely to be selected than schools with a low number of students. At second stage, all the schools in the district were stratified into government and non-government, and one school from each stratum was then selected randomly. In the third stage, 8, 9 and 10th grade students were selected randomly, i.e. if any grades of students have more than one section, then it was selected randomly.

Finally, all the available students of grade 8, 9 and 10 in the selected section were included in the sample. The questionnaire was adapted from Global Youth Tobacco Survey questionnaire[14] and then it was translated into Bangla. However, back translation was also done for checking the consistency of the questionnaire. Bangla questionnaire was administered for field operation. In addition, specific policy options for tobacco free school questions were included as multiple varieties of tobacco both smoking and chewing tobacco are prevalent in Bangladesh. Content validity and reliability of the questionnaire were verified by the experts during questionnaire development workshop. The reliability of the questionnaire was tested among 30 cases in non-sampling school. The Cronbach's alpha coefficient was 0.837.

Data collection was done between February and March 2010 using self-administered questionnaire. Informed verbal consent was obtained from the school authority after explaining the purpose of the study. The questionnaire was distributed to the students of selected classes after explaining the purpose of the study and the instructions to fill-up the questionnaire. Considering the sensitivity of the issue, the school authority was requested not to be present in the class during filling of the questionnaire. Students were assured that the information provided by them would remain confidential and they were encouraged to be truthful in their responses.

They were informed that their participation was voluntary and they could withdraw from the study at any time. Any student absent on the day of the survey was excluded from the study. The study was approved by the Technical Review Committee of the Directorate General of Health Services (DGHS), Bangladesh. The field operation was conducted after obtaining the permission from the Directorate of Secondary and Higher Education, Ministry of Education and Headmasters of the selected schools. Ethical clearance was also taken from the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Mohakali, Dhaka-1212.

Study participants were divided into three groups on the basis of their self-reported age of smoking initiation: <10 years, 10–13 years, and 14 years and above. These cut-off points were chosen to mirror key educational transitions (i.e. moving from primary school to high school level). Former smokers were defined as participants who had quit smoking at least one year before the data collection and had refrained from smoking ever since. Those who quit smoking within the previous year were considered to be recent quitters and the current who smoked cigarette in last 30 days. The nicotine dependent was measured by asking whether they had always feel like having smoking a cigarette first thing in the morning considered as highly nicotine dependent and sometimes have or feel like having smoking a cigarette in the morning as nicotine dependent and no or don't have or feel like smoking first time in the morning as non-dependent to nicotine.

Data Analysis
Our data analysis was restricted to the students who had smoked cigarettes and given a full response to their history of smoking. Data analysis was performed using SPSS version 20.0 software. A weighting factor was used in the analysis to reflect the likelihood of sampling each student. Missing values were treated with multiple imputation technique. Student's t tests and one-way analysis of variance (ANOVA) were conducted to test differences in mean age in the socio-demographic and smoking-related covariates. Multinomial logistic regression analyses were conducted to assess factors associated with smoking initiation. Statistical significance was tested at 5% probability level.

RESULTS

Table 1 shows the bi-variate analysis of mean age at initiation of smoking and selected socio-demographic characteristics. Analysis revealed that not statistically significant mean difference was found in gender, father's occupation, ceiling materials for the house (proxy economic status) and family size (p>0.05). However, the statistically significant mean difference was found in terms of the class grade, type of school, mother's occupation (p<0.05) indicating that the mean age at initiation was lower among the students of class grade VIII (mean age 10.3 years) compared to class grade IX (mean 10.6 years) and class grade X (mean 12.6 years).

The students of private school significantly start smoking earlier (mean 10.9 years) than the public school (mean 11.4 years). It was also revealed that the students' of housewife started early smoking (mean 10.9 years) than others such as service or working mothers (mean 11.0 years).

Table 1. Socio-demographic characteristics of the students and age at initiation of smoking

Characteristics	n	%	Age at initiation (years)		p-value
			Mean	(Std.dev)	
Overall	823	100	10.9	0.2	-
Sex					
Boy	436	53.0	10.7	0.18	0.168[a]
Girl	387	47.0	11.0	0.23	
Class					
Class VIII	329	40.0	10.3	0.24	**<0.001[b]**
Class IX	271	32.9	10.6	0.25	
Class X	223	27.1	12.6	0.26	
Type of School					
Public	413	50.2	11.4	0.19	**<0.005[a]**
Private	410	49.8	10.9	0.16	
Fathers Occupation					
Others	115	14.0	10.9	0.35	0.090[b]
Agriculture	279	33.9	10.8	0.21	
Service	220	26.7	11.4	0.46	
Business	209	25.4	10.8	0.35	
Mother's occupation					
Housewife	681	82.7	10.9	0.16	**<0.021[a]**
Others	142	17.3	11.0	0.44	
Family size					
<6	475	57.7	11.0	0.21	0.736[a]
≥6	348	42.3	10.8	0.21	
Ceiling material					
Straw	51	6.2	10.9	0.57	0.251[b]
Tin	520	63.2	10.9	0.17	
Concrete	252	30.6	11.0	0.44	

*p<0.05; **p<0.01; ***p<0.001, [a]p-value reached from independent sample t test
[b]p-valuae reached from one-way analysis of variance

Table 2 shows the smoking related characteristics of the students. A total of 6,877 data was collected from secondary school students, of which 823 students had a history of smoking. Of the 823 participants surveyed, 38% were current smokers i.e. students reported to smoke at least one cigarette daily or smoke irregularly in the last 30 days considered as smokers and 56.5% were former smokers or ever smokers i.e. the students were reported smoking in the last one year either regular or irregular or experimented and 5.5% were recent quitters means quitting smoking before the last 30 days. Among the current smokers, 73.2% smokes 1-2 days in last 30 days and 15.7% smoked 3-9 days and another 11.2% smoked 10 days and more

in the last 30 days. Two-thirds of the student (67.4%) smoked less than one cigarette per day followed by at least one cigarette per day (17.9%), 3-9 sticks per day 11.5% and ten and above 3.2%.

Among the smokers, 11.5% students were highly nicotine dependent and 19.2% were dependent and 69.3% were non-dependent to nicotine. The overall mean age at initiation of smoking was 10.9 years with standard deviation 0.2 years. Analysis by One Way Analysis of Variance (ANOVA) indicated that no statistically significant mean difference of age at initiation was observed among the different smokers groups, number of days smoking per months, a number of cigarette smoked per day and nicotine dependent group (p>0.05).

Table 2. Selected smoking characteristics and age at initiation of smoking

Characteristics	n	%	Age at initiation (years)		p-value
			Mean	(Std.dev)	
Overall	823	100	10.9	0.2	-
Smoking status					
Current	313	38.0	11.3	2.84	0.299
Ever	465	56.5	11.1	2.74	
Recent quitter	045	5.5	11.6	2.53	
Smoking last 30 days					
1-2 days	229	73.2	11.2	2.91	0.510
3-9 days	49	15.7	11.7	2.51	
≥10 days	35	11.2	11.6	2.82	
No. of sticks/day					
<1 stick	211	67.4	11.4	2.87	0.477
1-2 stick	56	17.9	11.5	2.91	
3-9 sticks	36	11.5	10.8	2.47	
≥10 sticks	10	3.2	10.6	3.11	
Nicotine dependent					
Non-dependent	217	69.3	11.3	2.81	0.835
Dependent	60	19.2	11.5	2.88	
Highly dependent	36	11.5	11.3	3.00	

*p<0.05; **p<0.01; ***p<0.001
p-value reached from one way analysis of variance

Age at initiation of smoking was categorized into three groups and bi-variate analysis was done between selected socio-demographic characteristics (Table 3). The analysis found that statistically significant association was found in age at initiation of smoking and type of school and class grade (p<0.05) indicating students in private school and class VIII started smoking at the age of 10 years and less. No statistically significant association was found between parental occupation, family size, ceiling materials and gender of the student (p>0.05). However, early smoking less than 10 years were found to be higher among the students of working parents, family size more than 6 and concrete house's ceiling (proxy economic status).

Table 3. Relationship between age at smoking initiation and selected socio-demographic characteristics

Characteristics	n	Age at initiation (years)			p-value
		<10	10-13	14+	
Type of school					
Public	413	31.7	36.9	31.4	*<0.057*
Private	410	40.7	34.9	24.4	
Class					
Class VIII	329	52.3	31.2	16.5	*<0.001*
Class IX	271	42.0	38.8	19.1	
Class X	223	13.9	37.1	49.0	
Father's occupation					
Others	115	40.0	35.5	24.5	0.904
Agriculture	279	41.5	33.3	25.1	
Service	220	32.0	39.5	28.5	
Business	209	43.7	35.6	20.8	
Mother's occupation					
Housewife	681	39.9	36.9	23.2	0.124
Working mother	142	44.7	22.5	32.8	
Family size					
<6	475	37.1	41.0	21.9	0.129
≥6	348	43.0	30.6	26.4	
Ceiling material					
Straw	51	39.6	30.6	29.8	0.956
Tin	520	40.6	35.6	23.8	
Concrete	252	40.8	33.5	25.7	
Gender					
Boy	436	41.1	38.2	20.7	0.305
Girl	387	40.2	32.6	27.2	

*p<0.05; **p<0.01; ***p<0.001
p-value reached from chi square test

Bivariate analysis of age at initiation of smoking and selected parental, environmental, behavioral factors and is presented in Table 4.

Analysis revealed that peer smoking and somebody offered free cigarette appeared to be important factors for initiation of smoking at the age of 10 years or less (p<0.05). The data showed that an early initiation of smoking below the age of 10 was higher among the students with nicotine dependence, number of sticks 10 and above daily, exposure to second hand smoking and teachers smoking. On the contrary, a higher preponderance of delayed initiation was observed among the students with negative attitude towards smoking, knowledge on harmfulness and strongly supportive smoking free school. But the association was not statistically significant (p>0.05).

Table 4. Relationship between age at smoking initiation and selected characteristics

Characteristics	n	Age at initiation (years)			p-value
		<10	10-13	14+	
Father's smoking					
No	538	43.5	32.3	24.1	0.260
Yes	285	34.8	39.9	25.3	
Mother's smoking					
No	797	40.7	35.5	23.7	0.281
Yes	26	36.5	19.7	43.8	
Nicotine dependent					
Non dependent	727	40.6	36.3	23.1	0.135
Dependent	60	45.9	23.0	31.1	
Highly dependent	36	28.6	23.3	48.1	
No. of sticks/day					
<1	211	38.1	32.8	29.0	0.352
1 stick/day	56	48.7	27.7	23.6	
3-9 sticks/day	36	41.6	34.0	24.4	
≥10 sticks/day	10	94.4	3.0	2.6	
Peer smoking					
Yes	420	31.7	39.8	28.4	**<0.010**
No	403	48.0	30.8	21.3	
Second-hand smoking					
Yes	638	41.2	35.4	23.4	0.693
No	185	38.5	33.5	28.0	
Offered free cigarette					
Yes	83	75.3	17.6	7.1	**<0.001**
No	740	36.6	36.9	26.5	
School curriculum					
Yes	474	40.4	36.0	23.6	0.743
No	349	40.9	32.4	26.7	
Teacher's smoking					
Yes	277	47.1	33.1	19.8	0.228
No	546	37.9	35.7	26.4	
Attitude toward smoking					
Positive	415	37.4	38.6	24.0	0.341
Negative	408	43.7	31.3	25.1	
Knowledge on harmfulness					
Yes	788	40.4	35.4	24.2	0.635
No	35	42.7	24.8	32.5	
Smoking free school					
Less supportive	535	39.7	36.7	23.6	0.487
Strongly supportive	288	42.9	29.8	27.3	

*p<0.05; **p<0.01; ***p<0.001*

Multinomial logistic regression analysis
Finally, we performed a multinomial regression analysis to assess the factors predictive of age of smoking initiation for students who started smoking before age 10 relative to those who began smoking 10-13 years or 14 years and above (Table 5). For the students, being class grade VIII (OR = 9.94, 95% CI: 4.14, 23.85), class grade IX (OR = 7.40, 95% CI: 3.10, 17.43), peer smoking (OR = 0.50, 95% CI: 0.27, 0.93) and offered free cigarette (OR=7.36, 95% CI: 2.72, 19.90) were significant predictors of early smoking initiation.

Table 5. Predictors of smoking initiation by selected variables: Multinomial Regression Analysis

Characteristics	<10 years		10-13 years	
	Odds ratio	95% CI	Odds ratio	95% CI
Type of school				
Public	0.66	0.41,1.06	0.865	0.566,1.321
Private (RC)	-	-	-	-
Class grade				
Class VIII	9.94***	4.14,23.85	2.46*	1.22,4.94
Class IX	7.40***	3.10,17.43	2.75*	1.37,5.52
Class X (RC)	-	-	-	-
Peer smoking				
Yes	0.50*	0.27,0.93	1.00	0.56,1.77
No (RC)	-	-	-	-
Offered free cigarette				
Yes	7.36***	2.72, 19.90	1.80	0.54, 5.98
No (RC)	-	-	-	-
Mother's smoking				
Yes	0.40	0.09, 1.76	0.27	0.06, 1.26
No (RC)	-	-	-	-
Model chi square	6.340 p<0.001			
n	837			

RC = Reference Category

14+ years as the reference category across age of smoking initiation groups
*p<0.05; **p<0.01; ***p<0.001

DISCUSSION

In this analysis, an attempt was made to assess the age at initiation of smoking and its associated factors among the secondary school children. Previous study suggested that the study of age of smoking is much more important than the amount of smoking[18]. Unger & Chen (1999) reported that age of smoking initiation is an important determinant of individual's probability of becoming addicted to tobacco, probability of smoking cessation, and the risk of adverse

health outcomes[19]. Initiation of smoking during adolescence that is at or before the age of 13 is likely to be smokers in adulthood[20] and increases the likelihood of nicotine dependence[21]. Our analysis found that the students who began smoking by age less than 10 were 9.94 times higher among the students of class grade VIII compared to Class grade IX (7.40 times) indicating that most of the students initiated smoking at their age of

primary schooling. The mean age at initiation of smoking was 10.9 years in our study. This was a little bit lower than the study done by Azevedo et al. (1999)[22]. However, it is consistent with Narain et al. (2011)[23] where the mean age at initiation of smoking was 12.4 years.

In the present study, however, no statistically significant differences were observed in the overall mean ages of initiation for different smokers groups and its patter (p>0.05), even no statistically significant gender differential was found. The mean age at initiation of 'smoking' was lower in boys as compared to girls. Gilman et al. (2009)[24] observed that parental smoking is significantly associated with higher risk of smoking initiation among adolescent and the likelihood of smoking initiation increased with the number of smoking parents and the duration of exposure to parental smoking, suggesting a dose-response relation between parental smoking and offspring smoking.

But in our study we did not find any statistically significant association between smoking initiation and parental smoking (p>0.05) though the preponderance of smoking initiation was found to be high among the parental smoking.

According to Bandura (1977)[25] social learning theories modulated the role parents, family members, and peer pressure in modelling, reinforcing, and establishing behavioural patterns. Our finding that did not find parental influence in smoking initiation (p>0.05). This might be due to the fact of parental influence wanes as a result of developing self-identity further potentiated through peer pressure and society at large. Our analysis found a significant association of smoking initiation and pressure and somebody offered free cigarette (p<0.05). This might be due to their socialization.

This cross-sectional study was not designed to test hypotheses. The purpose was to analyse the correlates of the initiation of smoking among secondary school
students. Not a large number of children are currently smoking or experimenting with smoking at this age group. Therefore, subgroup analysis within different groups did not show a significant effect.

Another limitation was that small sample sizes do not provide enough power to show statistical significance even when a difference is considerably large. However, we believe that the findings of this research reveal some factors that were correlated with the problem and/or solutions that potentiate the importance of studying school children about the subject matters. Another inherent limitation on cross sectional study relies on self-reported history. Therefore, some students were smokers might have been absent from the school on the day of the survey. The study did not take any attempt to interview them

may have under reported their smoking status. Moreover the existing taboo about smoking some female students in particular might also be underreported.

CONCLUSION

Despite the potential limitations, the present study provides insights into individual and environmental factors influencing smoking initiation among the adolescents. The findings help to develop the strategic planning to reduce smoking initiation of vulnerable age group should focus on smoking-related health education, particularly on the short-term and permanent risks associated with smoking. The study recommends an integrated approach that incorporates the information about the dangers of smoking into school curriculums and also through sociocultural and religious institutions as they interact with children and young age group.

ACKNOWLEDGMENTS

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