

Prevalence and Factors Associated of Cigarette Smoking Behavior among University Male Students in Bangladesh: Survey in Rajshahi University

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ABSTRACT This epidemiological study was designed to determine the prevalence and risk factors of cigarette smoking behavior among 600 Rajshahi University male students in Bangladesh. The prevalence of cigarette smoking behavior among university students was 9.5 percent. The χ^2 -test demonstrated that monthly family income ($p < 0.05$), fathers' smoking status ($p < 0.01$), brother(s)/uncles' smoking status ($p < 0.01$), type of family ($p < 0.01$) and family residence ($p < 0.01$) were significantly associated with students' cigarette smoking behavior. Moreover, logistic regression model showed that students had higher chance to become cigarette smoker if they came from rich family ($p < 0.05$) and urban areas ($p < 0.01$). It was found that student had more chance to be smoker if his father ($p < 0.01$) and brother(s)/uncle(s) was also smoker ($p < 0.01$). In this study researchers found some modifiable predictors of students' cigarette smoking behavior that might be considered for reducing smoking habit among university students in Bangladesh.

INTRODUCTION

The tobacco epidemic is one of the biggest public health threats throughout the world. It reduces the life expectancy, increases the overall medical expenses and contributes to loss of productivity during the lifespan of individuals (Bronnum and Juel 2001). According to World Health Organization (WHO), each year tobacco causes about 6 million deaths (about 10% of all deaths) with 600,000 of these occurring in non-smokers due to second hand smoke and these deaths expected to rise 10 million by the year 2025. However, there are about 1.3 billion smokers in the world and approximately eighty percent of them live in developing countries (World Health Organization 1996; Rozi et al. 2007). In developed countries also, smoking is the largest preventable risk factor for morbidity and mortality where at least one in four adults smokes (Thomson et al. 2004).

Many researchers have studied about tobacco consumption due to its negative impact on health and economy around the world. Several researchers have studied on smoking habit and attitude among school teachers in Rumania, Syria, Bangladesh and Malaysia (Mihaltan et al. 1994; World Health Organization 2007; Rahman et al. 2011; Redhwan et al. 2012) and many other countries. Similar type of researches were also found among university students in Turkey, college students in US, Kuwait university male students, medical students in Pakistan, college students in Pakistan, university students in Jordan, university students in Malaysia, high school students in India, high school students in Iran and university students in Saudi Arabia (Metinta^o et al. 1998; Rigotti et al. 2000; Alansari 2005; Khan et al. 2005; Rozi et al. 2007; Khader and Alsadi 2008; Al-Naggar et al. 2011; Arora et al. 2017; Karimi et al. 2107; Kader and Ghamdi 2018).

Smoking and passive smoking are collectively the biggest preventable cause of death in Bangladesh with major public health burden of morbidity, disability, mortality and community costs (Nargis et al. 2015). An earlier epidemiological study conducted in 2004 showed that smoking was responsible for approximately 57,000 deaths and 1.2 million tobacco related illnesses per year in Bangladesh; sixteen percent of all deaths among those were of age 30 years

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and older were attributed to tobacco use (World Health Organization 2007). A more recent study reported that about twenty-five percent of all deaths among men aged 25 to 69 years are attributable to smoking leading to average loss of 7 years of life per smoker (Alam et al. 2013).

Many studies already have been done regarding smoking status among different population in Bangladesh. One of the studies investigated on cigarette smoking status among teen-aged school boys at south-east region in Bangladesh (Hossain et al. 2015). Recently, some researchers studied the prevalence, knowledge and attitude towards smoking among medical students in and private university students in Dhaka, Bangladesh (Karim et al. 2016; Pervin 2016). Some other studies in Bangladesh examined the prevalence of smoking status in rural community of Bangladesh (Chowdhury et al. 2007; Ahmed et al. 2008; Akhtar et al. 2015). Most of the researchers have focused on prevalence, knowledge and attitude of smoking among different population in Bangladesh. To the best of researcher's knowledge the study on cigarette smoking behavior among public university students in Bangladesh are rarely documented.

A large number of public university students are using tobacco and they are suffering various health problems. Public university students in Bangladesh come from the different parts of the country and they have different socio-economic background. University students may be considered as a leader of a country in future. So, special concentration should be given to them considering their potential influence on the country and their contribution to the nation's workforce. Therefore, it is important to investigate the prevalence of cigarette smoking behavior and determine the associated risk factors towards smoking.

Objectives

The purpose of this study is to estimate the prevalence of cigarette smoking behavior of Rajshahi university students, Bangladesh, and to investigate the effect of socio-demographic and behavioral factors on their cigarette smoking behavior.

MATERIAL AND METHODS

Study Design

This cross-sectional study considered 600 university male students as a sample and they

were selected using multistage random sampling. Data were collected from Rajshahi University, Bangladesh from October to December, 2016. Rajshahi University is the second largest university of Bangladesh and it is located the Northern part of Bangladesh. The university has eleven residential halls for male accommodating a total of 25,000 students at any particular time, and students come from the different parts of this country. The household socio-economic and demographic data such as community, literacy status, and occupation of father and mother were collected from each student. Information was also collected about the cigarette smoking behavior. Moreover, some relevant suggestions had been taken from the university students for reducing or removing tobacco use among students in Bangladesh.

Sample Size Determination and Sampling Procedure

A mathematical formula was used in this study for calculating sample size. Researchers considered eighty percent power of study and five percent level of significance in the formula. All necessary information for this formula has been taken from the previous study (Rozi et al. 2007; Khader and Alsadi 2008). The formula provided that 550 samples were adequate for the present study. As it was not possible to be certain that all students would be willing to participate in the study, researchers initially considered 630 samples for the researchers' study. Unfortunately 30 (4.76%) samples were not agreed for providing their information. Consequently, 600 samples were considered for the present study. The mean age of the students was 21.80 ± 1.77 years.

In the first step, researchers randomly selected three male students' residence halls from eleven halls of Rajshahi University. In the second step, students were selected from three selected halls using random sampling with proportional allocation. Necessary information was collected from respective hall authority for selecting our sample. Data were collected from selected students using a standard, pre- and post tested questionnaire.

Outcome Variable

University students' cigarette smoking behavior was considered as the outcome variable

in the present study. The outcome variable of this study was categorized into two categories; (i) Smoker (ii) Non-smoker.

Independent Variables

Some socio-economic, demographic and behavioral variables such as monthly family income, fathers' smoking status, brother(s)/uncles' smoking status, type of family, family residence, parents' education level etc. were considered as independent variables in the present study. The idea had been developed for selecting these variables from the previous studies (Rozi et al. 2007; Khader and Alsadi 2008).

Statistical Analysis

The prevalence of cigarette smoking behavior was determined by using frequency distribution. Chi-square test was used to find the association between selected independent variables and university students' cigarette smoking behavior. Multiple logistic regression was utilized in the present study to find the effect of the researchers selected independent variables on students' cigarette smoking behavior. Statistical analysis was carried out using SPSS software (IBM version 21). A value of $p < 0.05$ was considered as statistically significant in the analysis.

RESULTS

In the present study, 600 university students were interviewed about their cigarette smoking behavior. Since the students of Rajshahi University came from the different parts of Bangladesh, they had difference socio-economic background.

Table 1 revealed that the prevalence of cigarette smoker among Rajshahi university students was 9.5 percent. Among the cigarette smokers, it was found that more than eleven percent students came from rich family (monthly income >18001 BDT), while 6.9 percent students came from comparatively poor family, and χ^2 -test demonstrated that the association between students' cigarette smoking behavior and their family monthly income was significant ($p < 0.05$). It was noted that smoker fathers' sons was more into smoking (15.6%) than non-smoker fathers' sons (7.3%), and the association between cigarette smoking behavior and their fa-

thers' smoking status was statistically significant ($p < 0.01$). Also, researchers observed that if students had smoker brother(s)/uncle(s), he was more likely to be cigarette smoker than their counterparts, and the association between these two factors was significant ($p < 0.01$). More than sixteen percent smoker students came from joint family, while only 8.1 percent students came from nuclear family, the association between these two factors was significant ($p < 0.01$). Also, it was found that students who came from urban areas were two times higher cigarette smokers (16.7%) than students came from rural environment (8.1%), the association between students' original residence and their cigarette smoking behavior was significant ($p < 0.01$).

The chi-square test provided the significant associated factors, and only these factors were considered as independent variables in the multiple logistic regression model for finding the effect of socio-economic, demographic and behavior factors on students' cigarette smoking behavior. Table 2 demonstrated that university students who came from rich (monthly income >18001 BDT) family were more likely to be smokers than students who came from comparatively poor family (monthly income <18000 BDT) [OR= 0.448, 95% CI: 0.174-1.157; $p < 0.05$]. On the basis of logistic regression results, researchers observed that smoker father's son (student) was more likely to be smoker than non-smoker fathers' son [OR= 0.435, 95% CI: 0.237-0.800; $p < 0.01$]. In this study, it was also found that students had more chance to be a smoker if they had smoker brother(s)/uncle(s) compared with their counterparts [OR= 0.419, 95% CI: 0.205-0.857; $p < 0.05$]. Logistic regression model also showed that students who came from urban environment had more chance to be a smoker than students who came from rural area [OR= 1.843, 95% CI: 0.997-3.407; $p < 0.05$].

DISCUSSION

In the present study, researchers investigated the cigarette smoking behavior of Rajshahi University male students in Bangladesh. The percentage of cigarette smoker among Rajshahi University students was 9.5 percent. Same prevalence (9.8%) had been reported in a study that was done with Mashhad university students in Iran (Taheri et al. 2015). Another similar result

Table 1: Association between students' cigarette smoking behavior and their socio-economic and demographic characteristics

Variables	Categories N (%)	Cigarette smoking behavior N (%)		Chi-square value	P-value
		Non-smoker 543 (90.5)	Smoker 57 (9.5)		
Monthly Family Income	<18000 BDT*, 259 (43.2)	241 (93.1)	18 (6.9)	3.4	0.04
	>18001BDT*, 341 (56.8)	302 (88.6)	39 (11.4)		
Fathers' Education Level	Uneducated, 58 (9.7)	50 (86.2)	8 (13.8)	2	0.5
	Primary education,142 (23.7)	128 (90.1)	14 (9.9)		
	Secondary education, 208 (34.7)	192 (92.3)	16 (7.7)		
	Higher education, 192 (32)	173 (92.3)	19 (7.7)		
Fathers' Smoking Status	Non-smoker, 440 (73.3)	408 (92.7)	32 (7.3)	9.5	0.01
	Smoker, 160 (26.7)	135 (84.4)	25 (15.6)		
Mothers' Education Level	Uneducated, 81 (13.5)	73 (90.1)	8 (9.9)	0.1	0.9
	Primary education, 221 (36.8)	200 (90.5)	21 (9.5)		
	Secondary education, 235 (39.2)	213 (90.6)	22 (9.4)		
	Higher education, 63 (10.5)	57 (90.5)	6 (9.5)		
Brother (s)/Uncle(s)' Smoking Status	Non-smoker, 513 (85.5)	472 (92.0)	41 (8.0)	9.4	0.01
	Smoker, 87 (14.5)	71 (81.6)	16 (18.4)		
Type of Family	Joint, 96 (16)	80 (83.3)	16 (16.7)	6.8	0.01
	Nuclear, 504 (84)	463 (91.9)	41 (8.1)		
Family's Residence	Urban, 217 (36.7)	80 (83.3)	16 (16.7)	3.4	0.01
	Rural, 383 (63.8)	463 (91.9)	41 (8.1)		

*BDT: Bangladeshi Taka (Currency), 1 US dollar = 80 Taka

Table 2: The effect of socio-economic, demographic and behavior factors on university students' cigarette smoking behavior

Variables	Group	B	p-value	OR	95% CI for OR	
					Lower	Upper
Monthly family income	<18000 BDT Vs > 1800 BDT ^R	-0.8	0.04	0.4	0.2	1.2
Fathers' smoking status	Non-smoker vs Smoker ^R	-0.8	0.01	0.4	0.2	0.8
Brother(s)/Uncles' smoking status	Non-smoker vs Smoker ^R	-0.9	0.027	0.4	0.2	0.9
Type of family	Joint vs Single ^R	0.5	0.2	1.6	0.8	3.2
Family's residence	Urban vs Rural ^R	0.6	0.04	1.8	0.9	3.4
	Constant	-0.4	0.4	0.7		

*: Brothe(s)/Uncle(s), BDT: Bangladeshi Taka, R: Reference category

(7.8%) was also found from the survey of Malaysian school teachers (Redhwan et al. 2012). The prevalence of cigarette smoker among university students in Jordan was 28.6 percent

which was higher than the researchers' study (Khader and Alsadi 2008). Also, much higher prevalence (61.14%) was reported in a study with teenaged male undergraduate students in Paki-

stan (Bushra et al. 2013). In Bangladesh, very high prevalence of cigarette smoker was found among the private medical college (68.4%) and students of private university (31%) in Dhaka respectively (Siddiqui et al. 2011; Pervin 2016). Many researchers reported that family status was most important predictors for getting cigarette smoking, and the researchers' finding with other previous information demonstrated that students who came from rich family were more likely to be smokers than comparatively poor family, usually private university/college students come from rich family in Bangladesh (Khader and Alsadi 2008; Redhwan et al. 2012; Akhtar et al. 2015). On the other hand, Rajshahi University is a public university and most of the students come from middle and poor families. Researchers think this is one of the most important reasons for getting difference in the prevalence of cigarette smokers among private and public university students in Bangladesh.

The current study showed that family income was an important predictor of students' cigarette smoking behavior, students who came from rich family were more likely to be smokers than who came from poor family. This result was supported by some other studies such as Jordan, Bangladesh and Malaysia (Khader and Alsadi 2008; Redhwan et al. 2012; Akhtar et al. 2015). One of the most important reasons is that rich family has the ability to provide extra money to their children, and student spends money for other purpose such as cigarette purchase for making enjoyable life at university campus. The researchers' study also reported that parental educational status was not significantly associated with the cigarette smoking behavior of university students. This finding is consistent with another study, they reported that there was no relationship between parental educational level and student cigarette smoking behavior (Pervin 2016). The most important finding of the researchers' present study was that the cigarette smoking behavior of the university student was significantly associated with fathers, brother and uncle's cigarette smoking behavior. This major finding also was supported by several researches in Bangladesh (Bushra et al. 2013; Huq et al. 2015; Pervin 2016; Chulasiri et al. 2017) as well as different countries around the world (Khader and Alsadi 2008; Redhwan et al. 2012; Taheri et al. 2015). In every society in the world, usually children follow their senior family members such as father, brother and uncles' behavior; if any of

the family member is smoker, then children have more chance to take up smoking. Moreover, this study also showed that family residence is an important factor which influences the university students' cigarette smoking behavior; urban students were more cigarette smokers than rural students. The results of the study were supported by different researches in Bangladesh (Pervin 2016) and in Malaysia (Redhwan et al. 2012). In Bangladesh, students who come from urban areas, they are comparatively rich than rural students, and this factor influences urban students' cigarette smoking behavior.

CONCLUSION

In this study, researchers investigated the prevalence and associated factors of cigarette smoking behavior among university students in Bangladesh, and data were collected from Rajshahi University. In Bangladesh, cigarette smoking behavior of students has increased rapidly like other countries in the world. The researchers' selected statistical models demonstrated that different types of factors such as monthly family income, father's smoking status, brother's/uncle's smoking status and family's residence were important predictors of university students' cigarette smoking behavior.

RECOMMENDATIONS

Government and non-government health authorities may consider these factors for initially taking step for creating awareness among university students about the bad effects of smoking. Moreover, different intervention strategies, educational programs, antismoking advertisements in media might also be taken in order to save the bright future of young leader of the country.

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