Central Asian Journal of Global Health

Prevalence of Tobacco Smoking and Factors Associated with the Initiation of Smoking among University Students in Dhaka, Bangladesh

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Vol. 6, No. 1 (2017) | ISSN 2166-7403 (online)
DOI 10.5195/cajgh.2017.244 | http://cajgh.pitt.edu

Abstract

Introuduction: Tobacco smoking is considered to be the key preventable risk factor for morbidity and mortality at the global level. The aim of this study was to determine the prevalence of tobacco smoking and factors associated with the initiation of smoking among university students in Dhaka, Bangladesh.

Methods: A cross-sectional survey study was conducted with 264 students of Jahangirnagar University, Dhaka, Bangladesh in 2015. A standard, self-administered questionnaire consisting of questions on socio-demographic variables, tobacco smoking status, family and peer tobacco smoking history, attitudes and beliefs about tobacco smoking, as well as knowledge about the negative health consequences of tobacco smoking was administered to participants. Data were analyzed using logistic regression models, chi square, and Fisher exact tests.

Results: The overall prevalence of tobacco smoking was 60.2%, where males smoked at higher rates than females (68.81% and 19.56%, respectively). The influence of friends was the most significant reason for initiating tobacco smoking (OR: 0.862; CI: 0.810-0.917). Perception regarding tobacco smoking was significantly related to continuing tobacco use. Logistic regression models identified that smoking-related attitudes, potential health problems, and family members dying from cardiovascular disease and cancer were significantly associated with tobacco smoking.

Conclusion: The current tobacco smoking prevalence among university students in Bangladesh is over 60%. We suggest adopting WHO Framework Convention on Tobacco Control (FCTC) policies, especially for university students.

Keywords: *Student health, Tobacco smoking, Public Health, Bangladesh*

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Research

Tobacco smoking has been associated with multiple health problems and is considered to be a preventable risk factor for six of the eight leading causes of morbidity and mortality at the global level.[1] Smoking is a serious and growing public health problem globally, with a large number of tobacco-associated deaths occurring in low- and middle-income countries.[2] Future projections suggest that tobacco smoking will kill more than 8 million people each year worldwide by the year 2030, with 80% of these premature deaths occurring in low- and middle-income countries.[3] According to the World Health Organization, there are about 1 billion smokers in the world, 80% of whom are in developing countries.[2] Tobacco smoking has many detrimental effects on health in general and it is has been estimated that tobacco smokers die 10 years earlier than non-smokers.[4,5] Tobacco smoking leads to lung cancer, chronic obstructive lung disease, atherosclerotic

cardiovascular diseases, peptic ulcer disease, intrauterine growth retardation, spontaneous abortion, antepartum hemorrhage, female infertility, sexual dysfunction in men, and many other diseases.[6] It has been calculated that nearly a third of the world's population, aged 15 years above, are smokers[7] and smoking prevalence is on the rise, especially in the developing countries.[8] Large number of young people are initiating smoking at earlier ages, which is a major public health concern.[9]

University students constitute a high risk group for engaging in risky behaviors, such as smoking and illicit substance use.[10,11] These students are at high risk of initiating and continuing smoking as they are likely to be exposed to peers who smoke. At the same time, they face social, emotional, and educational challenges when they enter the university settings.[12-15] This predilection toward risk taking behaviors has been associated with the underdevelopment of the orbital-frontal cortex.[16] Moreover, identity development is a major concern for the youth, and young people are more susceptible to peer pressure.[14] The Global Youth Tobacco Survey (GYTS), conducted in 131 countries surveyed 750,000 college students, demonstrated that smoking starts as early as at 13–15 years of age. This survey found that approximately 9% of students were current cigarette smokers, while 11% currently used tobacco products other than cigarettes.[17] Another survey among undergraduate medical students at Addis Ababa University reported a lifetime smoking prevalence of 9% and a current smoking prevalence of 1.8%.[18] A survey conducted among university students in southwest Nigeria showed that the prevalence of ever smokers was 22.0%, while the prevalence of current smokers was 13.7%.[19] Similarly, a study conducted among university students in Cameroon reported an ever smoking prevalence of 30.1% and with a current smoking prevalence of 6.3%.[20] Another study among young adults in Nepal showed that 84.3% of smokers believed that tobacco use is harmful to their health.[21]

In Bangladesh, the numbers of tobacco smokers are increasing rapidly because of the availability of cheap tobacco products, lack of strong tobacco control regulations, and weak enforcement of existing regulations. The Global Adult Tobacco Survey conducted by WHO reported that Bangladesh is one of the top ten countries in the world with high tobacco use (both smoking and smokeless forms) with a prevalence of 43.3% among adults (41.3 million), with 44.7% of men and 1.5% of women engaging in tobacco smoking.[22] A study based on demographic and health survey data reported that the prevalence of tobacco smoking among men in Bangladesh is 60%.[23] Another study among male university students in 2009 stated that 36.1% students smoked tobacco.[24] Among fourth-year dental students, the prevalence of cigarette smoking was reported to be 49.5% and 1.7% in males and females, respectively.[25]

An increasing trend of tobacco smoking is anticipated to occur among university students and this could be related to perceived alleviation of stress, life problems, peer pressure, social acceptance, class history of smoking, lower educational level of parents, and the desire to attain higher societal class.[26-28] Smoking among students in Bangladesh has been poorly investigated and our initial hypothesis was that it is possible that university students may be lacking knowledge on the link between smoking and adverse health effects. The aim of this study was to estimate the prevalence of tobacco smoking among university students and to identify factors that may be related to both initiation and prevalence of tobacco smoking.

Methods

Participants

All of the participants involved in this study have read and signed a written consent form. This study was approved by the Bio-safety, Bio-security & Ethical Committee of Jahangirnagar University. Participants

were informed that the information collected would be kept anonymous and participation was totally voluntary.

A cross-sectional study was undertaken in Jahangirnagar University, located approximately 30 km from the downtown area of Dhaka, Bangladesh (Figure 1). Approximately 14,500 students are enrolled in this university at the undergraduate and postgraduate programs in different faculties or departments. The inclusion criteria for the study included full-time student status, enrolment in one of the university's undergraduate or postgraduate programs, and age between 18 and 27 years.

Figure 1. Location Map of the Study Area

Data collection

Study questionnaire was distributed to a random sample of 346 students, with 264 students completing the questionnaire. Each participant completed a questionnaire consisting of 5 sections. The questionnaire was developed in our university and pretested in a pilot study of 50 students. Minor phrasing modifications were made on the original questionnaire after the pretest. The self-administered questionnaire included demographic data (age, sex, class, and family background, including paternal and maternal education levels, employment, and income levels), tobacco smoking patterns (type of smoking, frequency, age of initiation, and duration), risk factors for tobacco smoking initiation and retention, smoking status (current smoker, ever smoker and non-smoker), average number of cigarettes/self-rolled cigarettes smoked daily, socio-demographic status, and place of living. In order to maximize the response rate, trained researchers checked the questionnaires and if data were missing, the questionnaire was immediately returned to the respective respondent for completion.

We applied the standard of GYTS for calculating the prevalence of tobacco smoking.[29] Our estimates of tobacco smoking were derived from three questions resulting in two measures: ever smoker and current smoker. A smoker was defined as someone who was currently using ≥1 tobacco product (cigarettes (commercial), bidis (self-rolled), cigars etc.). Current smoking included daily and occasional smoking in the past 30 days preceding the survey. Ever smoker refers to a person who smoked at least 1 tobacco product (cigarettes, bidis, cigars, etc.) during their lifetime.[30,31]

Statistical analysis

Data analysis included descriptive statistics as well as inferential statistics approaches. Descriptive statistics for categorical variables included frequencies and proportions; means and standard deviations were utilized for continuous variables. Differences between categorical variables were assessed for significance using the chi-square or Fisher's exact test, as appropriate. Variables that were found to be significantly associated with tobacco smoking were further analyzed using logistic regression. In simple regression analysis, we adjusted for several relevant factors including: age, sex, smoking status, second-hand exposure to smoking, knowledge, attitude and practices among the tobacco smokers, and smoking associated diseases that caused fatality among family members. Adjusted odds ratios (ORs) and 95% confidence intervals were reported. The level of significance was $P<0.05$. Data were first entered into Microsoft Excel and then transferred to SPSS software for Windows, version 22.0 (Chicago, IL, USA) for analyses.

Results

Among the respondents, 46 (17.4%) were female and 218 (82.6%) were male, which was found to be a statistically significant difference ($P < 0.001$) (Table 1). A total of 82 individuals did not complete the survey; therefore, the response rate was 76.30%. Respondents ranged in age from 18-27 years, with a mean of 21.55 (± 1.98) years (Table 2). Among tobacco smokers, 94.34% were males and 5.66% were females. Forty-three percent of the respondents were first year

students, and 26%, 11%, and 4% were from 2nd year, 3rd year, and 4th year respectively. The remaining 16% of the respondents were from Masters level programs. Out of 264 respondents, 206 (78%) mentioned their department of studies. Thirty-three percent were in the Biological Sciences, 31% were in the Arts and Humanities, 17% were in the Mathematical & Physical Sciences, 13% were in the Social Sciences, and 6% were in Business Studies.

Table 1. Demographic characteristics of study population and proportion of students using tobacco (n=264)

Table 2. Age Comparison of the study population

The average age of initiating tobacco smoking for both males and females was 17.91 years (SD: 2.1). Age of initiation of tobacco smoking for females was 20.22 years (SD: 1.4) and for males it was 17.8 years (SD: 2.02). The 95% confidence interval for these means was 19.15 – 21.29 and 17.44 – 18.09 for female and male respondents, respectively. Some students reported initiation of tobacco smoking as early as 12 years of age and nearly one third (30%) of ever smokers initiated it before they were 17 years of age. Initiation of tobacco smoking was found to be dramatically increased after 17 years of age until 21 years, and then smoking decreases (Figure 2). The most significant factor for initiating tobacco smoking was the influence of a friend ($p < 0.001$) (Table 3). Family history of tobacco smoking was also a significant factor for smoking initiation. A large proportion (69.62%) of students reported that at least one family member smoked tobacco. Of these respondents, 64.30 % reported that the father smoked tobacco, and 51.80 % reported that a brother smoked tobacco.

Among tobacco smokers, almost 62% attempted to give up tobacco smoking at any stage after initiation; however, most were unable to successfully quit. Students were asked which factors influenced smoking continuation. Majority of the respondents (54.18%) reported depression as the reason they continued to smoke tobacco (Table 3). Other reasons for continued smoking/use of other tobacco products were difficulties in a relationship with a girlfriend (41.51%) and educational problems (14%). Less than 2% of respondents refused to answer this question.

Figure 2. Percent of Age of initiating tobacco smoking by gender

Table 3. Factors for initiating tobacco use

The knowledge and perceptions about tobacco smoking were measured with both open-ended questions and multiple choice questions. Students were asked if they were aware of the harmful effects of tobacco smoking. Of the total respondents, 253 (95.83%) students claimed to have knowledge about the hazards of tobacco smoking (Table 4). Among the students who reported to have knowledge about the health hazards of tobacco smoking, 218 (86.16%) have ever used tobacco products (mainly cigarettes) and 35 (13.83%) never used. Approximately 78.4% of the participants agreed with the statement that students should not smoke; however, 35.8% of smokers did not agree with this statement. Among them, 81.30% reported that use of tobacco, especially cigarette smoking, makes them mentally alert or brings mental tranquility.

Table 4. Proportion of students by knowledge and perception about hazardous tobacco smoking

Smokers were asked if they had health problems typically associated with tobacco smoking during the last three months, with 46% reporting that they were suffering from smoking associated diseases. Almost 63% reported that they experienced coughing. Other health problems that have been reported included breathing problems (46.7%), asthma (9.3%), chest pain (37.3%), lack of appetite (41.3%), and other problems (5.3%) (Figure 3).

Figure 3. Self-Reported Health Problems of Smokers

Among the tobacco smokers, 37.7% smoked 1 to 5 cigarettes, 47.8% smoked 6 to 10 cigarettes, and 14.5% smoked more than 10 cigarettes per day. On average, the smokers in this study consumed 6.94 (SD: 3.1) cigarettes daily. We estimated that the total yearly expenditure for tobacco smoking was 2.7 million BD taka ($33,920) for the smokers enrolled in this study. On average, 37.1% tobacco smokers were spending more than 50 taka (>$ 0.63) per day for smoking. Thirty four percent of the smokers were spending 30-50 taka ($ 0.38 - 0.63) per day and the remaining 29% spent up to 30 taka (≤ $ 0.38) in a day.

Table 5 reports the results of the logistic regression. The most important independent predictors of tobacco smoking among the students were the perceptions– looking smart (OR = 1.642; 95% CI = 1.48 – 1.908), and looking modern (OR = 1.40; 95% CI = 1.02 – 2.847). The findings of the logistic regression analysis also demonstrated the strongest relationship between tobacco smoking and coronary heart diseases and cancer among the family members of the respondents (e.g., father, uncle, or grandfather) who have had a long history of tobacco use (OR = 0.327; 95% CI = 0.161 – 0.665). Another significant finding was the association of second-hand tobacco smoke with the study population (OR: 0.20; 95% CI: 0.094-0.425 for male and OR: 0.509; 95% CI: 0.253-1.025 for smokers).

Table 5. Logistic regression analyses for smoking-related factors among the students

Discussion

This study demonstrated that perception of social appearance is a very important predictor for tobacco smoking initiation. This finding is consistent with the idea that culture plays a key role in determining behavior. In Bangladesh, tobacco use is widely practiced, especially among adults. Adolescents and young adults are the most vulnerable groups for smoking initiation. In this study, we have found that almost 60% of students were involved in tobacco smoking, with the majority of smokers being males. This finding is in agreement with previously published literature from the Kingdom of Saudi Arabia (KSA) and for Muslim countries where culture and norms play an important role in female behaviors and customs.[14,33,34] Our estimate of tobacco smoking prevalence among females is low compared with the estimate from other studies.[35-37] Though smoking among females (5.7%) was lower than for males, estimates show that this rate is approximately 3.8 times higher than previously reported WHO findings.[22] From a public health standpoint, the increase in the number of female tobacco smokers in Bangladesh is of concern.

Our study suggests that age was an important factor related to tobacco smoking among university students, with older students being at a higher risk for smoking.[27] The differences between the age of smokers and non-smokers were statistically significant (p = 0.042), which was also observed in a study in China.[32] According to the World Health Organization, most of the students start using tobacco early, often beginning in their high school years.[22] Among respondents, most of the students started tobacco smoking during adolescence. The finding of our study is similar to that reported by the World Health Organization. [22]

The majority of the students reported that they initiated tobacco smoking due to the influence of friends (62.26%) and by the imitation of family members. Smoking among friends and their influence may indicate a link between peer pressure and the development of smoking habits.[15,38-40] Family association also has an influence on tobacco smoking; the smoking habits of family members (father's use: OR = 0.308; 95% CI: 0.158-0.603, brother's use: OR = 0.288; 95% CI: 0.141-0.588, and grandfather's use: OR = 2.151; 95% CI: 1.0-4.624) are statistically significant factors relating to the smoking habits of their offspring or siblings. This is consistent with findings from

previous tobacco studies among students.[14,15] Almost 37.20% of tobacco smokers in our study reported that they had started tobacco smoking because of curiosity. Unstable relationships among family members were also a factor for continuing to smoke tobacco.

Majority of the students who participated in this study (95.83%) were knowledgeable about the link between smoking cigarettes and chronic diseases, which is encouraging for future programs targeting smoking cessation. The findings of the present study are similar to that reported in the United States, Great Britain, and Australia among adults where the proportion of respondents knowledgeable on cigarette smoking as cause of heart disease and lung cancer were (85.8%, 94.4%), (92.3%, 98.2%), and (94%, 91%) respectively.[41-43] However, the proportion of adolescents in Denmark who were knowledgeable on lung and heart diseases was lower, 46.3% and 49.3%, respectively.[44]

The perception of smokers about tobacco smoking is also an important predictor of the retention of tobacco smoking habit. We found a significant association between smoking and the personal perception; in our study smokers believe that smoking makes them look smarter, or more modern compared to those who do not smoke. Previously published studies have also shown a significant association between these variables.[34,39,40,45]

There are some limitations of this study. First, the information is self-reported, which is subject to recall bias. Second, we had a relatively small sample area and sample size, the results of our study may not be fully representative of other parts of the country. Third, the study focused only on smoking tobacco, no information was collected about illicit drug use or other non-smoking tobacco use, which needs to be explored in the future studies.

Conclusion

The findings of our study reveal that tobacco smoking is initiated by students during the early adolescent years and continues throughout the university years. Smoking was more prevalent among males, possibly due to fewer opportunities to smoke due to cultural and social restrictions among females. Curiosity, peer pressure, and psychological stress were the main causes of initiating tobacco smoking, with family members of the tobacco smokers playing a vital role indirectly to initiate tobacco use. Public awareness measures, such as anti-smoking campaigns must be implemented to create awareness, reduce smoking levels, and avoid negative health consequences in Bangladesh. This study provides justification for the implementation of the WHO Framework Convention on Tobacco Control (FCTC) policies for students. Our findings also contribute to a knowledge base from which to develop targeted tobacco control policies for university students. If we can establish a holistic approach for tobacco control in university level, the overall tobacco control movement in Bangladesh will be accelerated. Besides, a smoke free campus policy will encourage other universities to create a healthy environment for education in future. The government of Bangladesh should take steps to eradicate tobacco smoking, and smoking control laws and policies should be strongly enforced by the tobacco control agencies. Tobacco education should start at the grade school level to educate children about harmful effects of tobacco smoking. These measures, along with the legislative control, will go a long way in creating a tobacco smoking free society in Bangladesh and globally.

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Table 1. Demographic characteristics of study population and proportion of students using tobacco (n=264)

Demographic and personal characteristics of study participants		Smoker (%) N=159	Non-smoker (%) N=105	P-value
Gender	Male	150 (94.34)	68 (64.76)	0.001[a]
	Female	9 (5.66)	37 (35.24)	
Age	≤ 19 years	10 (52.60)	9 (47.40)	0.042[a]
	20 – 23 years	117 (58.20)	84 (51.80)	
	24 – 27 years	32 (72.70)	12 (27.30)	
Academic year	1st	69 (61.06)	44 (38.94)	0.159[b]
	2nd	34 (48.57)	36 (51.43)	
	3rd	20 (71.43)	8 (28.57)	
	4th	7 (63.64)	4 (36.36)	
	Masters	29 (69.04)	13 (30.96)	
Department[c]	Business Studies	7 (58.33)	5 (41.67)	0.004[b]
	Social Sciences	14 (56)	11 (44)	
	Mathematical & Physical Sciences	21 (56.76)	16 (43.24)	
	Arts & Humanities	47 (73.44)	17 (26.56)	
	Biological Sciences	28 (41.17)	40 (58.83)	

[a] p-values from Chi-square tests.

[b] p-values from Fisher's exact test

[c]Only 206 (78%) answered this question.

Table 2. Age Comparison of the study population

	Male (±SD)	Female (±SD)	P-value[a]	95% CI	
				Lower	Uper
Smoker	21.55 (2.042)	23.78 (1.563)	0.002	- 3.601	- 0.862
Non-smoker	21.54 (1.807)	21.00 (1.780)	0.141	- 0.184	1.272

[a]p-values from Independent Samples T test

Table 3. Factors for initiating tobacco use

	Prevalence,%	P-value[a]	Odds Ratio	95% CI
Influencing factors for starting cigarette smoking				
Friend's influence	62.26	< 0.001	0.862	0.810 - 0.917
Father's use	64.30	0.001	0.308	0.158 - 0.603
Brother's use	51.80	0.001	0.288	0.141 - 0.588
Uncle's use	53.60	0.914	0.964	0.491- 1.891
Grandfather's use	21.40	0.050	2.151	1.00 - 4.624
Influencing factors for continuing cigarette smoking				
Mental depression	54.18	0.628	0.642	0.107 - 3.848
Bad family relations	6.92	0.999	0.000	0.00
Educational problems	13.84	0.097	4.878	0.751 - 31.705
Diifficulties in relationship with girlfriend	41.51	0.708	0.720	0.129 - 4.020
Curiosity	36.48	0.846	0.826	0.119 - 5.709

[a]p-values from Logistic regression analyses. ["No" is the reference category for each variable.]

Table 4. Proportion of students by knowledge and perception about hazardous tobacco smoking

Personal attitudes towards smoking	Smoker (N, %)		Non-smoker (N, %)		P-value
	Agreed	Disagreed	Agreed	Disagreed	
Student should not smoke	102 (64.2)	57 (35.8)	105	-	0.216[a]
Tobacco brings mental tranquility	126 (81.30)	29 (18.70)	-	-	0.065 [a]
Use of tobacco is a cause of economic loss	109 (77.65)	50 (22.35)	96(91.43)	9 (8.57)	<0.001[a]
Having knowledge of tobacco's association with non-communicable diseases	218 (86.16)		35 (13.83)		0.009[b]

[a]p-values from Logistic regression analyses.

[b]p-values from Chi-square test

Table 5. Logistic regression analyses for smoking-related factors among the students

Category	Variable	OR	95% CI	P-value
Smoker's personal perceptions	Bad	1 (ref)	-	-
	Smart	1.642	1.48 – 1.908	<0.001[a]
	Modern	1.40	1.02 – 2.847	<0.001[a]
	General	2.497	1.868 – 5.688	<0.001[a]
Student should not smoke	Female	1 (ref)	-	-
	Male	0.424	0.109 – 1.649	0.216[b]
Smoking due to peer pressure	Female	1 (ref)	-	-
	Male	1.031	0.121 – 8.788	0.978[b]
Reported health problems due to tobacco smoking	Female	1 (ref)	-	-
	Male	0.135	0.017 – 1.110	0.062[b]
Family members that died from CHD and Cancer	Died: person wasn't smoker	1 (ref)	-	-
	Died: person was smoker	0.327	0.161 – 0.665	0.002[b]
Exposure to environmental tobacco smoke	Female	1 (ref)	-	-
	Male	0.20	0.094 – 0.425	<0.001[b]
	Non-smoker	1 (ref)	-	-
	Smoker	0.509	0.253 – 1.025	0.059[b]

[a]p-values from Multinomial logistic regression analyses

[b]p-values from Binary logistic regression analyses.

Abbreviation: CI = confidence intervals, OR= odds ratio.

Figure 1. Location Map of the Study Area.

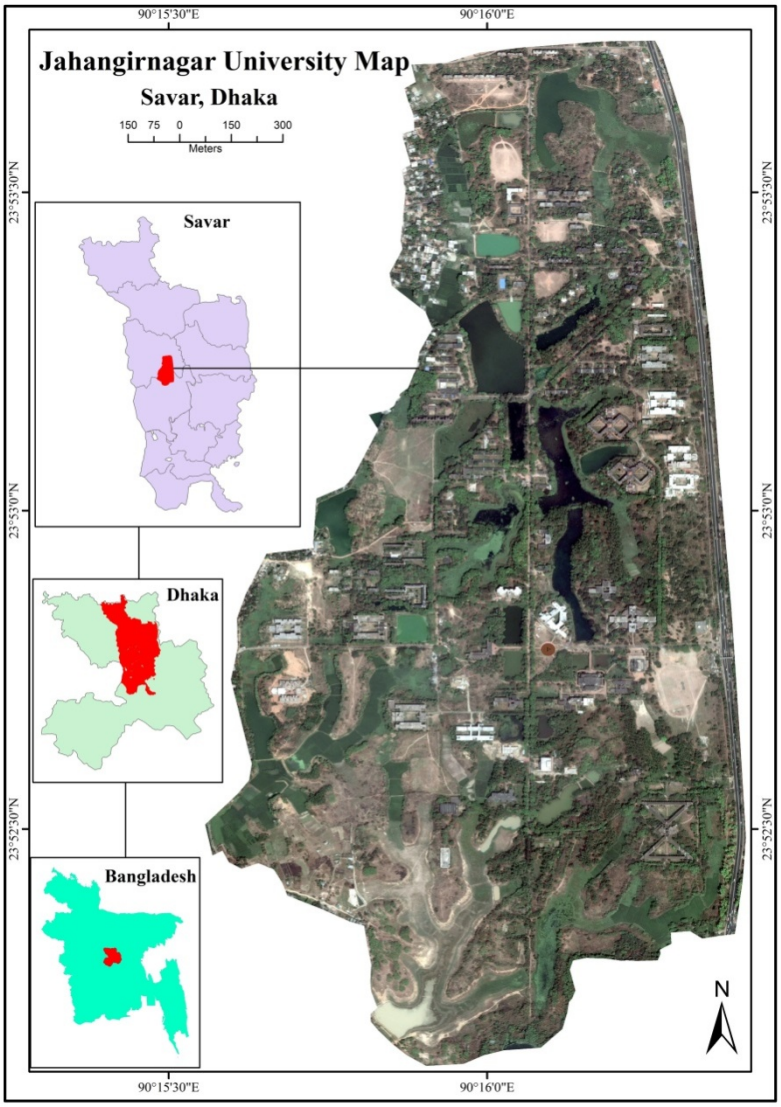


Figure 2. Percent of Age of initiating tobacco smoking by gender

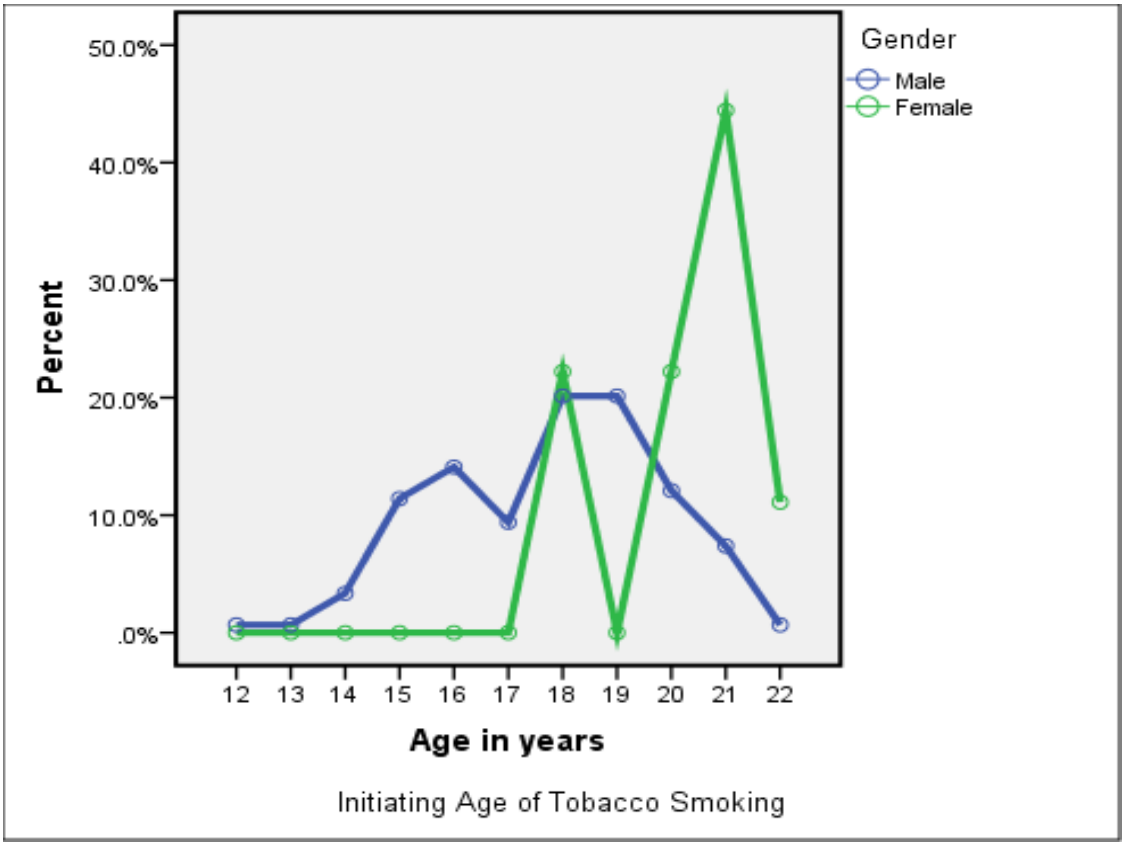
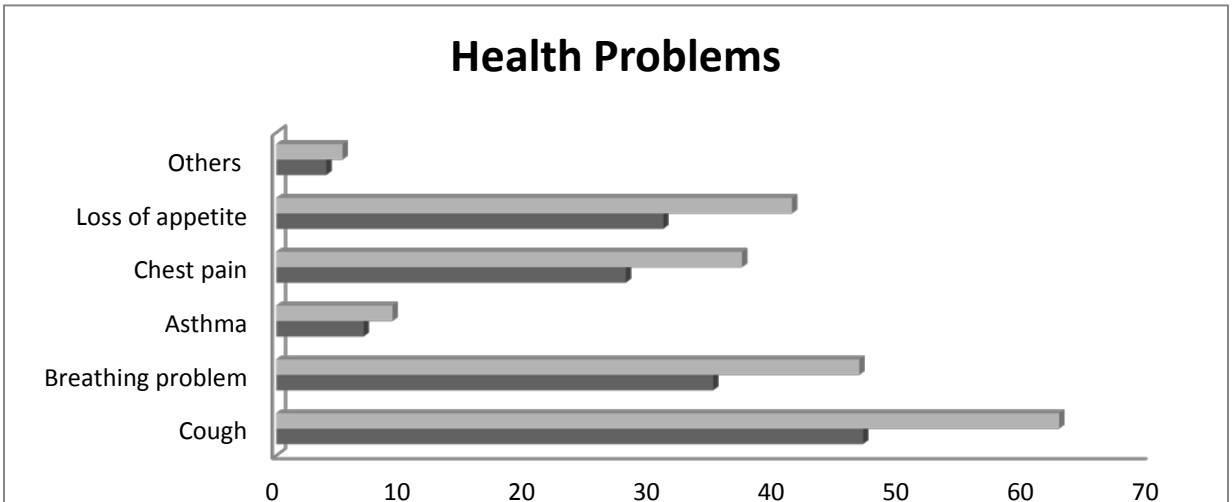


Figure 3. Self-Reported Health Problems of Smokers



	Cough	Breathing problem	Asthma	Chest pain	Loss of appetite	Others
Percent	62.7	46.7	9.3	37.3	41.3	5.3
Frequency	47	35	7	28	31	4