



Impact of common tobacco products on human health and environmental pollution in Bangladesh

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Abstract

Worldwide, tobacco is one of the leading causes of disability and death. Over a million of pounds of toxic chemicals are released by tobacco products. This study aims to explore the effects of tobacco toxicants on human health and environmental pollution. Four districts (Dhaka, Kushtia, Chattogram and Rangpur) were selected where most of the tobacco product grown. Total 468 respondents were interviewed face-to-face using structured questionnaire to assess the knowledge about toxicant content in tobacco and health and environmental hazards of tobacco use. Survey results revealed that about 44.4% respondents used smoking tobacco products and 38.5% used smokeless tobacco, while only 17.1% used both. About two third (74.3%) of smoking tobacco users started smoking when they were between 15 to 24 years old and majority (61.6%) of smokeless tobacco users started tobacco when they were between 30 to 35 years above. Tobacco product has large impacts on health of young smokers. Smokers are suffering from various acute and chronic diseases. Among the respondents, 38% indicated that they were suffering from hypertension. The second most affected disease was COPD/Asthma (31.6%), while cancer was the least suffering disease (0.4%). Majority of the respondents were not aware about the presence of toxicants (i.e. nicotine, tar and metals) in tobacco products. However, 85.1% tobacco users had an idea about environmental pollution. There is a lack of knowledge among the survey respondents about toxicants in tobacco products that are linked to health hazards and environmental pollution. These results are important in strengthening existing policy considering adverse health effects of toxicants examined.

Key words: Tobacco products, human health, environmental pollution, nicotine, metals

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Introduction

Tobacco use is the most preventable cause of death worldwide and is responsible for the deaths of half of its long-term users. Statistics indicate that in the 20th century, there have been 100 million deaths caused by diseases related to tobacco use. In addition, there are 5.4 million deaths, equivalent to one death every six seconds attributed to tobacco related illness (WHO,

2008). At present, Tobacco is the second leading cause of death in the world and sources of momentous adverse effect on human health including maternal and child death. Although Tobacco is an avoidable cause of maternal, prenatal and neonatal mortality but recent study of Global Youth Tobacco Survey reveals that the intensity of Tobacco use (smoking) among young is

alarming; including non-cigarette tobacco products such as spit tobacco, biddies and water pipes at similar rates. The prevalence of smoking amid the students is frightening in Bangladesh which comprises the aged 18 to 26 (December 25, 2016, The Daily Star). Smoking and passive smoking are equally the most avoidable reason for death in Bangladesh, with major public health burden of morbidity, disability, mortality and community costs (WHO, 2007, 2009).

Smoking cigarettes and bidis are common habits among the overall male population in Bangladesh. Chewing tobacco like Zarda with betal quid or Gul also common in Bangladesh (Choudhury *et al.* 2007, Khan *et al.* 2006, Rahman *et al.* 2000). Data showed that among the general population of Bangladesh aged 30 years and above tobacco related illnesses accounted for 16% of the total deaths (Rahman *et al.* 2000). Studies in Bangladesh also reported that smoking positively related with drug use, which is another public health concern (Khan *et al.* 2006). World Health Organization analyzed the cost of tobacco consumption at the national level is found to be associated with the increased health-care costs, loss of productivity due to illnesses and early deaths and environmental pollution (WHO, 2005).

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 (GATS, 2009).

People are taking tobacco in various forms or patterns for various purposes and the prevalence of tobacco consumption is raising alarmingly in most of the low and middle income countries. Factors associated with tobacco consumption are influenced from friends,

perceived alleviation of stress, peer pressure, social acceptance, lower educational level of parents, and the desire to attain higher societal class etc. Some toxic metals are transferred to tobacco smoke when the cigarette is burned. In Bangladesh different toxicants/pollutants were assessed and conducted research on metals, particulate matter (PM_{2.5}), chemical residues in soil, water, fruits, vegetables, fish species, household biomasses etc (Hasan *et al.*, 2020; Islam *et al.*, 2020; Yeasmin *et al.*, 2019; Miah *et al.*, 2019; Rahman *et al.*, 2016; Uddin *et al.*, 2015; Islam *et al.*, 2015a,b), but no one report on metals or other toxicants availability in tobacco products. These metals accumulate into different parts of body like blood, kidney, bones, brain, respiratory tract, lungs and leads to diseases and these metals create environmental pollution. On the other hand, huge impact assessment related works conducted in Bangladesh, i.e.- climate change vulnerability and its adaptation (Haque *et al.*, 2019), perception and awareness on air pollution (Sarker *et al.*, 2018), disaster risk reduction and its coping strategies (Rahman *et al.*, 2018), scenario of renewable energy sources (Islam *et al.*, 2018), river bank erosion hazards (Islam *et al.*, 2017), environmental impact assessment on the frequencies of pesticide use during vegetable cultivation (Islam *et al.*, 2015) etc. Based on the information impact of tobacco toxicants on human health and environmental pollution is limited in Bangladesh context.

This study has been designed to know the pattern of tobacco consumption with special emphasis on the identification of those socio-demographic groups who are more prone to tobacco consumption and to know tobacco related health consequences in people residing in study area of Bangladesh. It may also help to create an effective awareness programme to discourage the tobacco consumptions to protect people from the devastating consequences of tobacco usage. The current study aims to report the effects of tobacco toxicants on human health and environment and the knowledge of smokers about the harmful effects of tobacco products.

Materials and Methods

Study sample: Four districts were selected based on tobacco production and processing areas (Dhaka, Kustia, Chittagong, Rangpur). A total of 468 samples were selected from four selected districts (Dhaka, Kustia, Chittagong, Rangpur) of study area. The respondents were selected randomly from the study area.

Questionnaire preparation: Considering the objective of the study a questionnaire was prepared for the selected community. The questionnaire was used to detect the effects of different tobacco products on human health and environmental pollution, etc. This was the pre-tested in the field and necessary modification was done before finalization. Primary data have been collected from the Questionnaire Survey from the selected areas.

Sampling criteria: The respondents have been as sampling unit. The respondents (both male and female) whose ages over 20 years of old were selected as the major respondent group because they have more knowledgeable about the study area and with the topic of the study. Some data were collected through self-observation to realize the actual status of the study area.

Sampling technique: In this study, primary data was collected from purposively selected four districts (Dhaka, Kustia, Chittagong, Rangpur) of Bangladesh as a target population area because a large number of people are engaged in tobacco production/processing/consumption. A sample of tobacco users and non-users of tobacco was selected through multi-stage stratified random sampling at different levels of upazilla/thana, village/ward to collect primary data. At first-stage one upazilla/thana from each district (in total four) was selected randomly. Then two villages/wards from each selected upazilla (8 villages/wards in total) were selected randomly in the 2nd stage. Finally, since there is no complete list of tobacco users available, a

mapping exercise was done in the spot to select the respondents at ultimate (village/ward) levels.

Data analysis: After collecting the data from primary and secondary source efforts were made for processing the data. After sorting out the data and information were categorized and interpreted according to the objectives and analysis were done with the help of different analytical methods and computer programs (SPSS, Microsoft Excel).

Statistical techniques: Appropriate analytical model and statistical techniques were used to analyze the data. Respondent's age, education, occupation, income, smoking behavior, illness history and environmental issues were reported using graphs, tables and descriptive statistics (ratio, percentage, average, standard deviation etc.)

Results

Socio-demographic condition of tobacco products user type: Most of the respondent use different types of tobacco. Smoking and smokeless tobacco are these types of tobacco. It is observed that about 44.4% respondents used smoking tobacco products and 38.5% used smokeless tobacco, while only 17.1% used both (Figure 1).

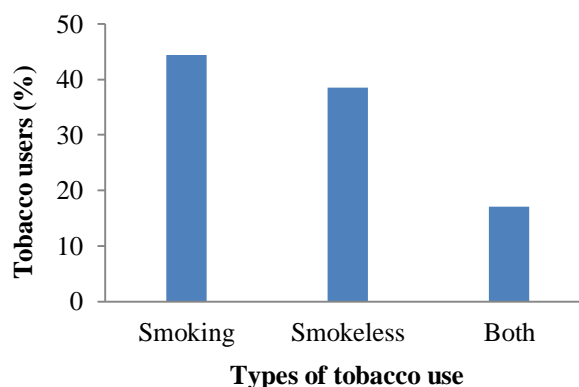


Figure1. Showing the distribution on the types of tobacco used by respondents of the study area.

Age of smoker: From the figure we see that young smokers commonly start smoking at the age of 15-24. Figure 2 represents the distribution of smoking tobacco users by smoking started age group. It is evident that about two third (74.3%) of smoking tobacco users started smoking when they were between 15 to 24 years, however about 2.8% started at the age of 35 years and above. It was also found that 5.2% were less than 15 years old, 14.2% were 25-29 years and 3.50% were 30-34 years' group.

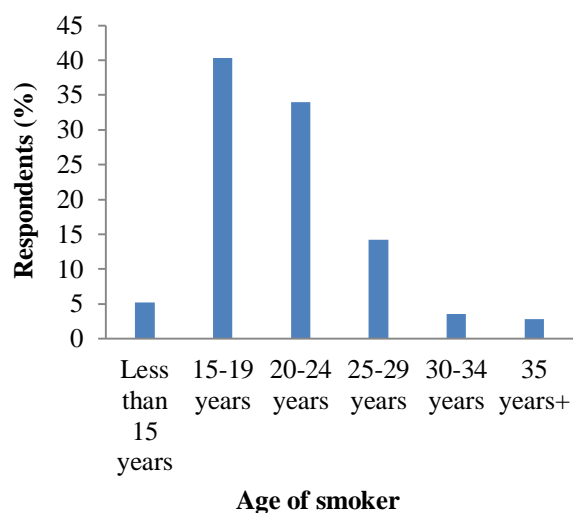


Figure 2. Distribution of smoking tobacco users based on the starting age group.

Type of smoker: Most of the respondents use different types of smoking tobacco. The multiple response analysis reveals that 91.3% of all smoking tobacco users who responded smoke cigarette, while 25.7% and 1.7% respondents use Bidi and Hukka respectively (Table 1).

Table 1. Distribution of types of smoker.

Types of smoker	Number of smoker	Percentage
Cigarette	263	91.3
Bidi	74	25.7
Hukka	5	1.7

At the age of starting smokeless tobacco: From the figure we see that smokers commonly start smokeless tobacco at the age of 30-35 years above. Figure 3 represents the distribution of smokeless tobacco users started smokeless tobacco at different age group. It is evident that majority (61.6%) of smokeless tobacco users started tobacco when they were between 30 to 35 years+, however about 1.9% started at the age of less than 15 years, 4.6% were 15-19 years, 14.6% were 20-25 years and 17.3% were 25-29 years' group.

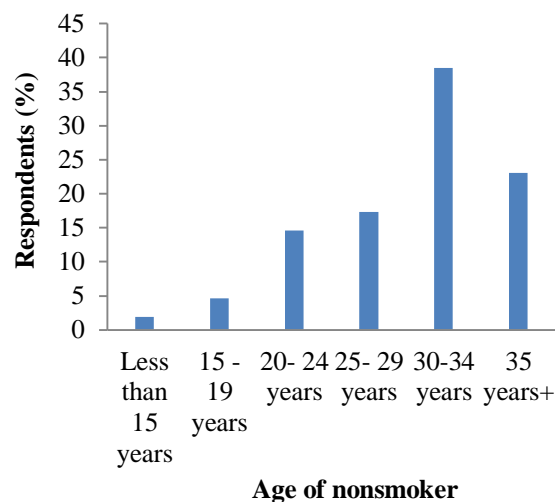


Figure 3. Distribution of nonsmoker tobacco users age.

Type of nonsmoker: Most of the respondents use different types of smokeless tobacco. From the survey, it has been shown that most of the smokeless user's respondents (87.3%) use Zarda, whereas 22.3% and 19.6% of the respondents use Sadapata and Gul respectively (Table 2).

Table 2. Distribution of types of nonsmoker.

Types of nonsmoker	Number of nonsmoker	Percentage
Zarda	227	87.3
Sadapata	58	22.3
Gul	51	19.6

Causes of tobacco use: There are several causes behind tobacco use. We have tried to find out some major causes of tobacco use. From the survey, it has been found that majority (30.13%) used to consume tobacco from addiction, (20.94%) persons were found consuming tobacco for better feeling, (26.71%) persons consumed to relieve tension, (8.12%) persons consumed from frustration and (14.1%) persons consumed by getting inspiration from friends and relatives (Figure 4).

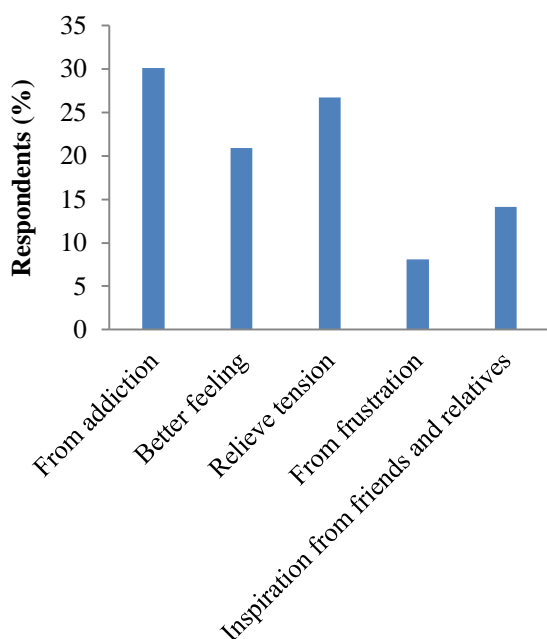


Figure 4. Causes of smoking tobacco.

Impact of tobacco toxicants on human health

Presence of multiple diseases among tobacco users:

Tobacco product has large impacts on health of young smokers. Smokers are suffering from various acute and chronic diseases. Among the respondents, 38% indicated that they were suffering from hypertension. The second most affected disease was COPD/Asthma (31.6%), while cancer was the least suffering disease (0.4%). It was also found that 21.4% were affected diseases from heart diseases, 3% were stroke, 16.2% were diabetes, 11.1% were TB and 28.2% were others diseases (Table 3).

Table 3. Information about suffering from multiple diseases among tobacco users.

Disease name	Number of tobacco users	Percentage of tobacco users
Heart disease	50	21.4
Hypertension	89	38.0
Stroke	7	3.0
Diabetes	38	16.2
Cancer	1	0.4
COPD / Asthma	74	31.6
TB	26	11.1
Others	66	28.2

Knowledge and perception on health hazards of tobacco use

Knowledge of the health hazards due to smoking tobacco:

It is obvious from the above table that almost all of the respondents (94%) had knowledge about the health hazards due to smoking and 6% had no knowledge about health hazards (Figure 5).

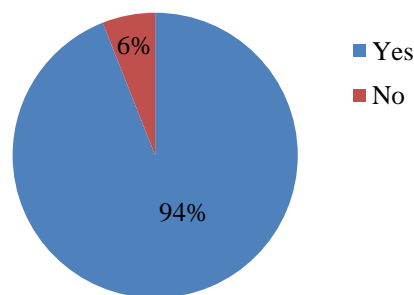


Figure 5. Tobacco users' knowledge about the health hazards due to smoking.

Types of health hazards created by smoking:

Different types of health hazards can be created by smoking. Table 4 shows that among the respondents, 78.4%, 72%, 36.9%, 24.1% and 17.8% thought that the use of smoking tobacco products create cancer, respiratory problems, heart disease, stroke and others respectively, while the least probable diseases were diabetes, causes

harm to fetus and others which accounted for 7.3%, 5.5% and 17.8% respectively.

Table 4. Tobacco users’ multiple response about the types of health hazards created by smoking.

Types of health hazards	Number of tobacco users	Percentage of tobacco users
Respiratory problems	316	72.0
Heart Disease	162	36.9
Stroke	106	24.1
Cancer	344	78.4
Diabetes	32	7.3
Causes harm to fetus	24	5.5
Others	78	17.8

Knowledge of the health hazards due to nonsmoker tobacco users: Most of the respondents (87.4%) have the knowledge about the health hazards due to smokeless tobacco products 12.6% have no knowledge about health hazards (Figure 6).

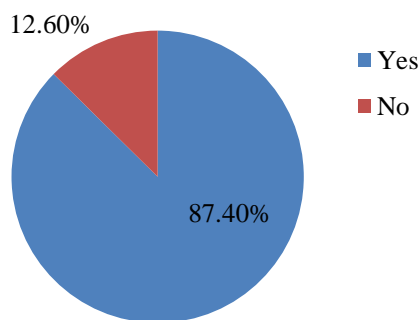


Figure 6. Tobacco users’ knowledge about the health hazards due to smokeless tobacco.

Types of health hazards created by nonsmoker: Different types of health hazards can be created by smokeless tobacco. Table 5 represents that among the respondents, 62.2%, 54.4%, 27.1% and 22.7% believed that the use of smokeless tobacco products create

cancer, respiratory problems, heart disease and stroke respectively, while the least probable diseases were diabetes, causes harm to fetus and others which accounted for 10.7%, 12.7% and 13.7%, respectively.

Table 5. Tobacco users’ multiple response about the types of health hazards created by nonsmoker.

Types of health hazards	Number of tobacco users	Percentage of tobacco users
Respiratory problems	223	54.4
Heart Disease	111	27.1
Stroke	93	22.7
Cancer	255	62.2
Diabetes	44	10.7
Causes harm to fetus	52	12.7
Others	56	13.7

Types of elements containing tobacco: Different types of elements that contain in tobacco. These types of elements are harmful for our health. It is noted that 82.5% of the respondents indicated tobacco contains Nicotine, while 32.2%, 15.4% and 24.5% believed contain Tar, Metals and Others respectively (Table 6).

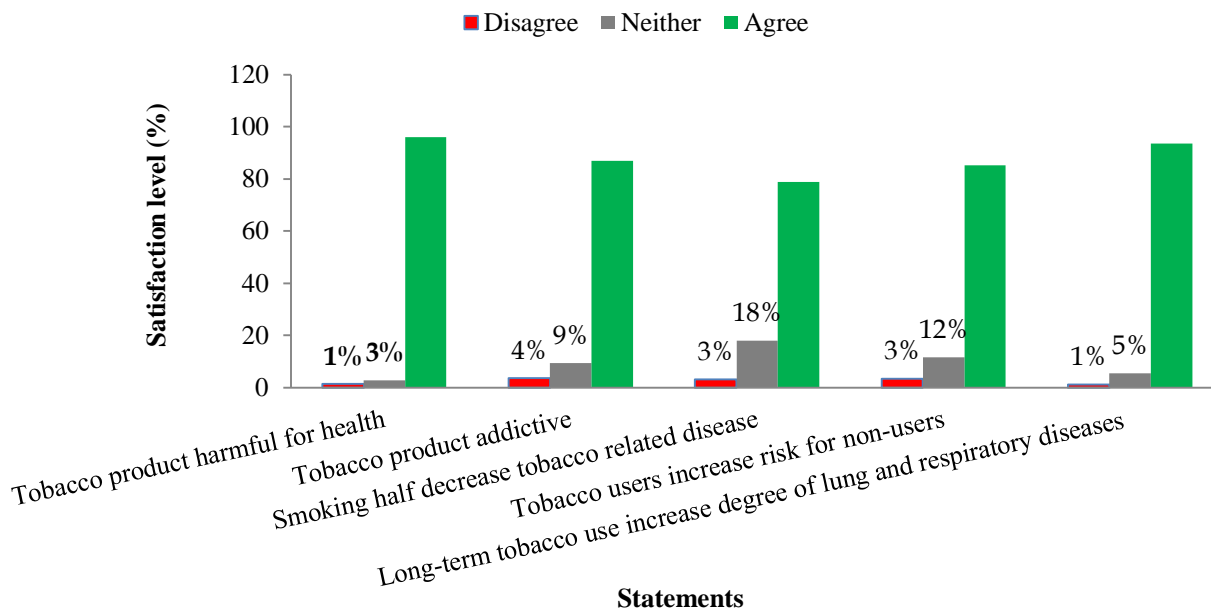
Table 6. Tobacco users’ response about types of elements containing tobacco.

Types of elements containing tobacco	Number of tobacco users	Percentage of tobacco users
Nicotine	118	82.5
Tar	46	32.2
Metals	22	15.4
Others	35	24.5

Tobacco users’ opinion on different health hazards statement of tobacco use: Figure 7 shows that almost all of the respondents (94%) agreed that tobacco products are harmful for health and tobacco product is addictive (87%). Moreover, 85% opined that tobacco

users increase risk for non-users and 94% agreed that long-term tobacco use increase the chance of having

lung and respiratory diseases. It was also found that 87% were agreed that tobacco product addictive.



Statements

Figure 7. Tobacco users' opinions on different health hazards related to tobacco use.

Impact of tobacco toxicants on environmental pollution

Tobacco users' idea about climate change, global warming and environmental pollution: Tobacco products harm the environment in ways that go beyond air pollution. Tobacco growing and curing (the drying of the tobacco leaf) are both direct causes of deforestation, because forests are cleared for tobacco plantation and wood is burned to cure tobacco. Deforestation is a cause of climate change, global warming and environmental pollution. The smoke generated from burning tobacco, called secondhand smoke or environmental tobacco smoke that pollute both indoor and outdoor environments. Majority of the tobacco users did not have any idea about climate change and global warming, which accounted for 58.8% and 63.9% respectively. However, 85.3% tobacco users had an idea about environmental pollution (Table 7).

Table 7. Tobacco users' idea about climate change, global warming and environmental pollution.

Tobacco users' idea	Climate Change		Global Warming		Environmental Pollution	
	No.	%	No.	%	No.	%
Yes	193	41.2	169	36.1	399	85.3
No	275	58.8	299	63.9	69	14.7
Total	468	100.0	468	100.0	468	100.0

Tobacco users' opinion on different environment pollution: Figure 8 illustrates that most of the respondents agreed that tobacco consumption is a cause of environment pollution (87%). Moreover, 90% of them agreed with the statement that pollutants from tobacco products are hazardous for human health. Likewise, many of the respondents opined that huge tobacco use increases the intensity of environment pollution (86%). It was found that 80% respondents put

this opinion that tobacco product users create risk for environment.

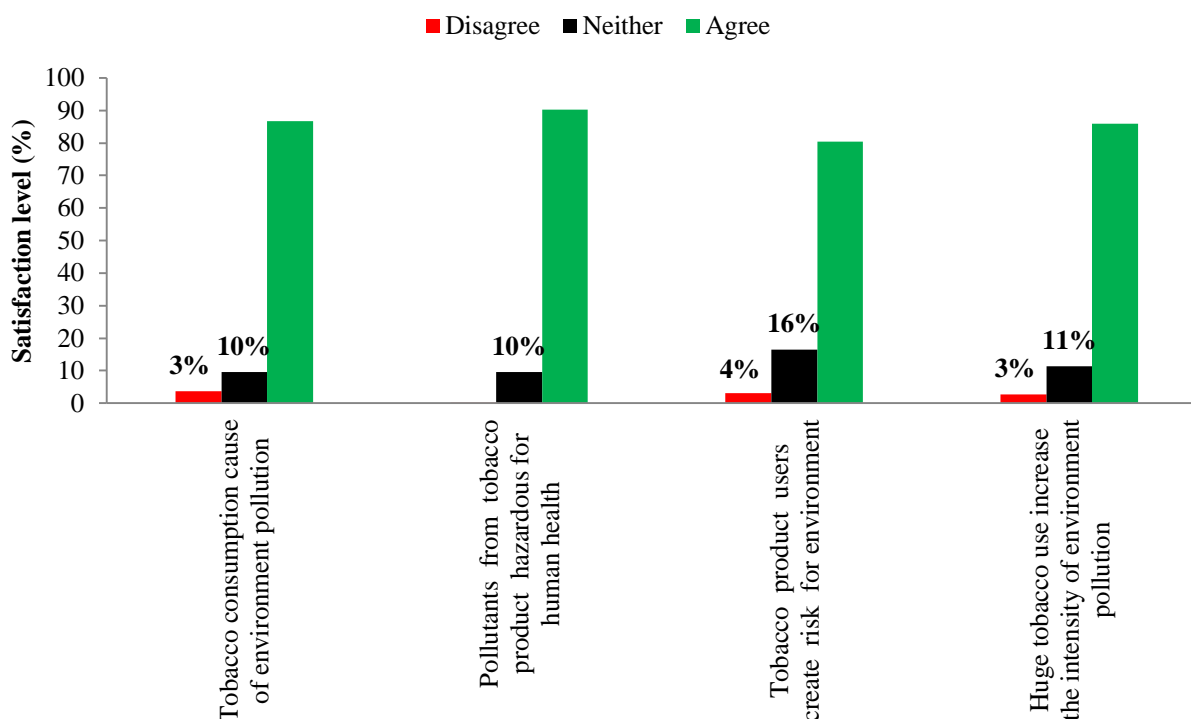


Figure 8. Tobacco users' opinions on different environment pollution statements related to tobacco use.

Discussion

Tobacco use: It was observed that about 44.4% respondents used smoking tobacco products and 38.5% used smokeless tobacco, while only 17.1% used both (Figure 1). This finding is similar to Biswas *et al.* (2011) expressed that among the respondents of tobacco consumption, 45.80% consumed smoking tobacco, 36.64% consumed smokeless tobacco and 17.56% consumed both smoking and smokeless tobacco. This finding is also similar to Chandrupatla *et al.* (2017) revealed that the prevalence of smoking, smokeless tobacco and poly tobacco use among current tobacco users were 35.1%, 43.3% and 21.5% respectively. Nargis *et al.* (2015) revealed that most of the respondents use any type of tobacco 42.4%, Cigarette and/or bidi smoking 22.2% and Smokeless tobacco 28.6%.

From the study, it was evident that about two third (74.3%) of smoking tobacco users started smoking when they were between 15 to 24 years, however about 2.8% started at the age of 35 years and above (Figure 2). This finding is similar to Khan *et al.* (2018) found that most of the adolescent (86.79%) started smoking when they were 14-17 years old. Goon *et al.* (2014) reported that most of the drivers (53.8%) started their smoking before the age of 15 (13–26). From the discussion it has been found that majority of the respondents started smoking tobacco in young age.

The multiple response analysis revealed that 91.3% of all smoking tobacco users who responded smoke cigarette, while 25.7% and 1.7% respondents use Bidi and Hukka respectively (Table 1). Debnath *et al.* (2017) revealed that the distribution of the respondents by types of smoking tobacco use. The smoking tobacco

users were multiple responses. There were some respondents take varieties smoking tobaccos responses. Among them 52.07 % used Bidi, 44.63% used Cigarette, 1.65 % used Hookah and 1.65 % used all. GATS (2017) reported that, 18.0% overall (19.2 million adults), 36.2% of men and 0.8% of women currently smoked tobacco. 14.0% overall (15.0 million adults), 28.7% of men and 0.2% of women currently smoked cigarettes. 5.0% overall (5.3 million adults), 9.7% of men and 0.6% of women currently smoked bidis. Al-Ghanem *et al.* (2016) disclosed that the majority of tobacco smokers (70.7%) used cigarettes, 27.3% used water pipe and 2% use cigar respectively. From the discussion, it has been found that majority of the respondents use cigarette than other products.

From the study, it was evident that majority (61.60%) of smokeless tobacco users started tobacco when they were between 30 to 35 years+, however about 1.9% started at the age of less than 15 years (Figure 3). This finding is similar to Hossain *et al.* (2014) revealed that the average age at first use was 31.5 years. Mia *et al.* (2017) reported that both men and women started to use SLT in their 30s, with an average age of 35.0 years (mean \pm SD 35.1 \pm 13.6 years). So it has been found that majority of the respondents started smokeless tobacco in middle age.

From the survey, it has been shown that most of the smokeless user's respondents (87.3%) use Zarda, whereas 22.3% and 19.6% of the respondents use sadapata and gul respectively (Table 2). Noor *et al.* (2016) revealed that the distribution of the respondents by types of smokeless tobacco use. The smokeless tobacco users were multiple responses. There were some respondents take varieties smokeless tobaccos responses. Among them 45.3 % used zarda, 10.5 % used gul, 17.1 % used sadapata and 27.2 % used khaini. GATS (2017) reported that, 20.6% overall (22.0 million adults), 16.2% of men, and 24.8% of women currently used smokeless tobacco. 18.7% overall (20.0 million adults), 14.3% men and 23.0% of women currently used betel quid with tobacco. 3.6% overall

(3.9 million adults), 3.1% men and 4.1% women currently used gul. From the discussion, it has been found that majority of the respondents use zarda than other products.

From the study, it has been found that majority (30.13%) used to consume tobacco from addiction, (20.94%) persons were found consuming tobacco for better feeling, 26.71% persons consumed to relieve tension, 8.12% persons consumed from frustration and 14.1% persons consumed by getting inspiration from friends and relatives (Figure 4). This finding is almost similar to Khan *et al.* (2015) revealed that majority (29.92%) used to consume tobacco from addiction, 103 (28.53%) persons were found consuming tobacco for better feeling, 75 (20.78%) persons consumed to relieve tension, 34 (9.42%) persons consumed by getting inspiration from friends and relatives, 22 (6.09%) persons consumed from false belief, 7 (1.94%) persons consumed for recreation, 6 (1.66%) persons consumed from frustration and 3 (0.83%) were found consuming tobacco to decrease hunger and out of their curiosity for each. Bhojani *et al.* (2009) found in India that, addiction (31.1%), pleasure (18.8%), friends (18.8%), likings (12.5%) and to overcome tension or boredom (12.5%) influenced tobacco consumption. Uddin *et al.* (2007) found in Bangladesh that people initiate smoking due to peer pressure (40.7%), imitation (37.3%), to relieve tension (7.6%) and without reason (14.4%). From the discussion, it has been found that the main causes of tobacco use among the respondents from addiction and peer pressure or relieve tension.

Impact of tobacco toxicants on human health: Among there respondents, 38% indicated that they were suffering from hypertension. The second most affected disease was Asthma (31.6%), while cancer was the least suffering disease (0.4%) (Table 3). Goon *et al.* (2014) reported that most of the drivers have different types of diseases caused by smoking. Chest pain (34.4%), heart disease (25.8%), pulmonary disease (17.2%), and gastric (25.8%) were detected among

these smokers by self-report. Hossain *et al.* (2017) reported that almost 63%, 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%). Azad *et al.* (2011) revealed that smoking has large impacts on health of young smokers. Almost 20% young smokers feel that smoking habit is responsible for headache, 32.2% feel that loose energy, 9.4% disturb in sound sleep, 30% pain in chest, 32.8% feel weakness, 17.8% feel nervous, 29.4% take long time to cure disease and they also feel the other minor problem on health. Debnath *et al.* (2017) expressed that 38.3% patients' single ulcer was detected in the palate and upper jaw and 52.9% patients had multiple ulcers in the tongue. Single ulcer was found to be high among 69.4% patients having habit of chewing betel leaf and highest multiple ulcers, 47.1% were reported for patients taking gul inside mouth. Tobacco smoking and chewing betel quid are strong risk factors in the development of oral cancer.

Knowledge and perception on health hazards of tobacco use: It was identified that almost all of the respondents (94%) had knowledge about the health hazards due to smoking (Figure 5). Among the respondents, 78.4%, 72%, 36.9% and 24.1% thought that the use of smoking tobacco products create cancer, respiratory problems, heart disease and stroke respectively, while the least probable diseases were diabetes, causes harm to fetus and others which accounted for 7.3%, 5.5% and 17.8% respectively (Table 4). This finding is slightly similar to GATS (2017) reported that 88.9%, 89.5%, and 94.8% of adults believed smoking tobacco causes stroke, heart attack, and lung cancer, respectively. Dawood *et al.* (2016) revealed that the percentages of smokers who had awareness toward seven health risk effects of smoking outcome. The knowledge score was high for lung cancer (80.6%), decay in the lung of smokers (80.3%), and stained teeth in the smokers (72.3%); and low knowledge score for lung cancer in non-smokers

(30.1%), impotence in the male smokers (52.6%), premature aging (64%), and stroke (66.3%).

Most of the respondents (87.4%) have the knowledge about the health hazards due to smokeless tobacco products (Figure 6). Among the respondents, 62.2%, 54.4%, 27.1% and 22.7% believed that the use of smokeless tobacco products create cancer, respiratory problems, heart disease and stroke respectively, while the least probable diseases were diabetes, causes harm to fetus and others which accounted for 10.7%, 12.7% and 13.7% respectively (Table 5). GATS (2017) reported that 82.0%, 82.5%, and 91.0% of adults believed using smokeless tobacco causes stroke, heart attack, and oral/mouth cancer, respectively.

It is noted that 82.5% of the respondents indicated tobacco contains Nicotine, while 32.2%, 15.4% and 24.5% believed contain Tar, Metals and Others respectively (Table 6). Jradi *et al.* (2014) revealed that few students (16%) responded that carbon monoxide (CO) is the component of tobacco smoke that is mainly responsible for the increased risk for coronary artery disease. Substances mentioned by at least 42% of the medical students were nicotine, tar, or a combination of both substances. Siahpush *et al.* (2006) disclosed that 51.7% respondents believe that tobacco smoke contains cyanide, 17.1% respondents believe mercury, 42.1% believe arsenic and 85% respondents believe Carbon monoxide respectively in USA. From the discussion, majority of the respondents knows that tobacco contain nicotine and have less knowledge about other substances.

The Figure 7 shows that almost all of the respondents (96%) agreed that tobacco products are harmful for health and tobacco product is addictive (87%). Moreover, 85% opined that tobacco users increase risk for non-users and 94% agreed that long-term tobacco use increase the chance of having lung and respiratory diseases. This finding is similar to Sansone (2014) revealed that overall, while the majority (over 85%) of all respondents believed that both smoked and smokeless tobacco are not good for your health. This

finding is also similar to Yang *et al.* (2010) revealed that majority of current smokers agreed that smoke is dangerous to non-smokers (88.5%) and tobacco is addictive (83.4%). About three-quarters of current smokers agreed that every cigarette damages health. In contrast, less than one-fifth of smokers agreed that smoking has damaged his/her health, one-third of current smokers (33.7%) reported no worry about the future damage from smoking and approximately 35% of current smokers agreed that that they would experience future health benefits very much if they quit smoking within the next 6 months. Patle *et al.* (2014) revealed that the overall population studied 221 out of 250 (88.4%, CI=0.48-1.28) was aware that tobacco is injurious to health, of which 97.34% were males and 81.02% were females. Hakim *et al.* (2018) reported that Considering the knowledge and attitudes towards smoking, among current smokers who had attempted to quit, about 63.6% did not believe that smoking cause's serious illness, and 53.0% did not believe that cigarettes are addictive.

Impact of tobacco toxicants on environmental pollution: Tobacco products harm the environment in ways that go beyond air pollution. Tobacco growing and curing (the drying of the tobacco leaf) are both direct cause of deforestation, because forests are cleared for tobacco plantation and wood is burned to cure tobacco. Deforestation is a cause of climate change, global warming and environmental pollution. The smoke generated from burning tobacco, called secondhand smoke or environmental tobacco smoke that pollute both indoor and outdoor environments. Majority of the tobacco users did not have any idea about climate change and global warming, which accounted for 58.8% and 63.9% respectively. However, 85.3% tobacco users had an idea about environmental pollution (Table 7). Ng *et al.* (2014) revealed that tobacco smoke pollutes indoor and outdoor environments and remains a pervasive and persistent source of toxicants long after the cigarette has been extinguished. It is estimated that in 2012,

some 967 million daily smokers consumed approximately 6.25 trillion cigarettes worldwide.

From the study area, it was found that most of the respondents agreed that tobacco consumption is a cause of environment pollution (87%). Moreover, 90% of them agreed with the statement that pollutants from tobacco products are hazardous for human health. Likewise, many of the respondents opined that huge tobacco use increases the intensity of environment pollution (86%) (Figure 8). This finding is similar to Azad *et al.* (2011) revealed that 79.4% respondents believe that cigarette pollutes the environment and 65% respondents feel that smoking habit spoils the overall environment of education and institution. Ali *et al.* (2015) expressed that most of the respondents believe that smoking impact on air pollution which 22% too much, 24% much and 52% medium respectively.

Conclusion

Tobacco being called a silent killer not only cause physical problem but also a burden for a developing country like in Bangladesh. Each year, most of the people die from tobacco-related illness. In the study area, a significant number of tobacco users opined that both smoking and smokeless tobacco create various serious types of health hazards and environmental pollution. Majority of the respondents started smoking tobacco in young age and smokeless tobacco in middle age.

Tobacco control measures should be implemented following the guiding principles of Framework Convention on Tobacco Control by introducing laws and regulations and taking measures to enforce the laws. In the context of Bangladesh, the following policy options have to be given serious attention in order to avoid this problem. Government should take some steps to stop people smoking in public places, especially on public vehicles and tax should be increased on tobacco products, for both importation and purchase.

Acknowledgments

The study was conducted with technical input from the Bangladesh Center for Communication Programs (BCCP) and Institute for Global Tobacco Control, Baltimore, USA and financial support from the Bloomberg Initiative. The content is solely the responsibility of the researchers and does not necessarily represent the official views of BCCP. Technical assistance and continuous guidance provided by Dr. Md. Kapil Ahmed is greatly appreciated. The author gratefully acknowledges the BCCP Tobacco Grant Research Team members for their valuable comments, suggestions during the period of the study. Author acknowledges to all of the post-graduate students of the Department of Environmental Science, Bangladesh Agricultural University who are involved in sample collection, laboratory preparation, analysis, survey data collection in selected districts of Bangladesh. The authors would like to express their gratitude to the data collectors for their utmost care in data collection. The authors would also like to express their gratitude to the study participants for their voluntary participation.

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