

**Determinants of Tobacco Usage Among Bangladeshi Males: A
Comparative Analysis in Rural and Urban Areas**

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Abstract

Tobacco consumption is harmful to health, and is one of the main cause of death in worldwide. It is evident that the prevalence of tobacco consumption is raising in most of low and middle income countries. It is alarming that Bangladesh is one of them with high population density where tobacco users are highly increasing. The aim of this project is to distinguish the determinants and impacts of tobacco using in rural and urban areas in a comparative view. This study represents the present condition of tobacco usage in Bangladeshi male. Logistic regression is used to conduct the analysis.

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Chapter 1

Introduction

1.1 Background

Tobacco is an agricultural product processed from the leaves of plants in the genus *Nicotiana*. Nicotine is one of the more than 4,000 poison chemicals in cigarettes. Bangladesh is one of the largest tobacco consuming countries in the world. Tobacco are cigarettes, biris, water pipe (hookah) chewing and snuff. It is an important risk factor-cancers, respiratory diseases and cardiovascular diseases. World Health Organization (WHO) reported that each year about 4 million deaths are attributable to tobacco use and among them 70% of those deaths occur in developing countries. It is also expected that the number of tobacco-related deaths will increase 8.4 million by 2020. Guindon and Boisclair (2003) analyzed that currently, almost 1.3 billion adult usage tobacco. Analysis predicted that if the prevalence and per capita cigarette consumption remain unchanged, there will be close to 1.9 billion usage in 2025 consuming more than 9 trillion cigarette. Consequently, the tobacco related deaths will also increase.

Cigarettes and biris account for most of smoked tobacco consumption. Over 58% of men and 29% of women use some form of tobacco, whether smoked (cigarettes and biris) or smokeless. In 2012, an estimated 46.3 million adults used some form of tobacco product, smoked or smokeless. Most smokers are male 28.3 % of adult men smoke cigarettes and 21.4% smoke biris. Smokeless tobacco use is substantial across both genders, with 26.4% of men and 27.9 percent of women using some form of smokeless tobacco. smokeless tobacco products gul, sada pata, zarda and khoinee. (Abul Barkat and Nigar Nargis and others, 2012) [4]

Youth tobacco use is a growing problem in Bangladesh. In 2007, 6.9% of in-school youth ages 13-15 years use of some tobacco product, including 2 % who reported cigarette smoking.

Overall tobacco usage consumption have been rising in Bangladesh in recent years, with cigarette smoking rising by over 40% between 1997 and 2010, and biri consumption rising by over 80% during the same period.

Given the high levels of tobacco use, Bangladesh faces considerable health and economic consequences from tobacco. Over 57,000 deaths are attributed to tobacco use each year, about one in six of all deaths among Bangladeshis 30 years. In 2004, nearly 51 billion taka were spent to treat the diseases caused by smoking, including 5.8 billion taka spent to working in household based establishment (Choudhury, S, 2010) [9]

1.2 Objective of the study

Major objective of this study is to identify the current scenario of tobacco usage among Bangladeshi males. Also we want to compare the adverse effects of it in Urban and Rural areas.

1.3 Review of literature

Considerable research shows that youth smoking is more than adult smoking, and cigarette smoking among girls is higher than among women, raising concerns about significantly increased prevalence among women in future years. Given the high levels of tobacco use, Bangladesh faces considerable health and economic consequences from tobacco usage. Some restrictions are applied on tobacco use in public places, advertise impact of tobacco usage in public health (Abul Barkat and Nigar Nargis and others, 2012) [4].

Rates of nicotine use are high in American Indians. Anxiety and depression tend to be associated with cigarette use, but the association of anxiety and depression with smokeless tobacco is less clear. Major depression, and posttraumatic stress disorder are related to lifetime ST use in 2 American Indian tribes. This study is the first to examine psychiatric conditions and lifetime smokeless tobacco usage. Although approximately 30% of tribal members were lifetime users of smokeless tobacco, the association with lifetime psychiatric disorders was not as strong as those observed with cigarette smoking. Understanding shared mechanisms between all forms of tobacco use with anxiety and depressive disorders remains an important area for investigation. (Craig N. Sawchuk and Craig N. Sawchuk 2012) [5]

The maternal smoking during pregnancy to have an effect on childhood overweight or obesity, the impact of maternal smoking on the trajectory of the body mass of their offspring. The participating mothers delivered 1619 babies during the study period. For male children, there was very strong evidence that the effect of age in months on the increase in BMI was enhanced by maternal smoking during pregnancy. For female children, there was only weak evidence for an interaction between age in months and maternal smoking during pregnancy, which suggests that the effect of maternal smoking during pregnancy on the early-life BMI trajectory of offspring differed by gender. (Kohta Suzuki and Naoki Kondo and others 2012) [9].

Tobacco Use Outcomes Among Patients With Lung Cancer Treated for Nicotine, current lack of consensus about the effectiveness of nicotine dependence treatment for cancer patients. This retrospective study examined the 6-month tobacco abstinence rate among lung cancer patients treated clinically for nicotine dependence.(Lisa Sanderson Cox and Christi A. Patten and others 2002)[3].

The prevention of tobacco-related morbidity and mortality through smoking cessation intervention is among the most vital missions of the chest clinician. This article summarizes the major findings and clinical recommendations of the US Department of Health and Human Services or Public Health Service Guideline, Treating Tobacco Use and Dependence. Chest clinicians can more effectively intervene with their patients who smoke(Jane E. Anderson and Douglas E. Jorenby and others 2002).[9]

1.4 Organization of the study

The study has been organized in five chapter. the first chapter contains introduction of the study,background,literature review,objective of the study. The second chapter contains source of data and variables. The third chapter contains overall methodology of the study to analysis. The fourth chapter contains fact finding and discussion of the study.The fifth chapter contains summary and conclusion of the study.

Chapter 2

Data and Variables

2.1 Data source

The 2011 Bangladesh Demographic and Health Survey (BDHS) was the sixth national-level demographic and health survey designed to provide information on demographic and maternal and child health in Bangladesh.[10] The BDHS included a household survey of ever-married women age 12-49 and ever-married men age 15-54. The BDHS also included a community questionnaire administered during the listing of households to informants in communities around the sample points from which the households were selected. This report presents major findings from data collected in the household survey using the Household Questionnaire, the women's Questionnaire and the Mens Questionnaire. A more comprehensive and detailed report is scheduled to be released later in 2012. The data in the final report are not expected to differ substantially from the findings presented in this preliminary report; however, the results presented here should be regarded as provisional and may be subject to modification. In order to examine trends, the findings from the 2011 survey have been compared with findings from the 1993-1994 BDHS, the 1996- 1997 BDHS, the 1999-2000 BDHS, the 2004 BDHS, and the 2007 BDHS.

The 2011 BDHS was conducted under the authority of the National Institute of Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. The survey was implemented by Mitra and Associates, a Bangladeshi research firm located in Dhaka. ICF International of Calverton, Maryland, USA provided technical assistance to the project as part of its international Demographic and Health Surveys program (MEASURE DHS), and financial assistance was provided by the U.S. Agency for International Development (USAID).

2.1.1 Sample design

The sample for the 2011 BDHS is nationally representative and covers the entire population residing in noninstitutional dwelling units in the country. The survey used as a sampling frame the list of enumeration areas (EAs) prepared for the 2011 population census of the Peoples Republic of Bangladesh (PCPRB 2011),

provided by the Bangladesh Bureau of Statistics (BBS). The primary sampling unit (PSU) for the survey is an EA created to have an average of about 100 households. Bangladesh is divided into seven administrative divisions: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet. Each division is divided into zilas, and each zila into upazilas. Each urban area in an upazila is divided into wards, and into mohallas within a ward; a rural area in the upazila is divided into union parishads (UP) and mouzas within an UP. These divisions allow the country as a whole to be easily separated into rural and urban areas. The survey is based on a two-stage stratified sample of households. In the first stage, 600 EAs were selected with probability proportional to the EA size, with 207 clusters in urban areas and 393 in rural areas. A complete household listing operation was then carried out in all the selected EAs to provide a sampling frame for the second stage selection of households.

In the second stage of sampling, a systematic sample of 30 households on average was selected per EA to provide statistically reliable estimates of key demographic and health variables for the country as a whole, for urban and rural areas separately, and for each of the seven divisions. With this design, the survey selected 18,000 residential households, and was expected to result in completed interviews with about 18,000 evermarried women. In addition, ever-married men age 15-54 in every third household were eligible for the male survey.

A household listing operation was carried out in all selected EAs from 22 May to 5 October, 2011 in four phases of about 3 weeks each. Initially, 19 teams of two persons each were deployed to carry out the listing of households and administer the Community Questionnaires. The number of teams was reduced to 15 in the second and third phases and to six in the final phase. In addition, 6 supervisors were deployed to check and verify the work of the listing teams.

2.1.2 Data processing

Questionnaires for the BDHS were periodically returned to Dhaka for data processing at Mitra and Associates. The data processing began shortly after fieldwork commenced. Data processing consisted of office editing, coding of open-ended questions, data entry, and editing of inconsistencies found by the computer program. The data were processed by 16 data entry operators and two data entry supervisors. Data processing commenced on 23 July, 2011 and ended on 15 January, 2012. Data processing was carried out using CSPRO, a joint software product of the U.S. Census Bureau, Macro International, and Serpro S.A.[11]

2.2 Variables

Dependent and independent variable are given below.

2.2.1 Response Variables

* Tobacco usage.

Tobacco usage is a dependent variable which having two catagories, yes denoting the individual usage any kind of tobacco (cigarette, using snuff, chewing, any others), no denoting not using tobacco (cigarette, using snuff, chewing, any others).

2.2.2 Explanatory Variable

Age of Respondent.

Division.

Type of Place of Residence.

Education Level.

Wealth Index.

Religion.

Watching TV:

Read Newspaper.

Listen to the Radio.

No of Household member

Occupation

Age of the Respondent:

Age of the Respondent is a potential factor tobacco usage. It has three level categorical variable (15-29 years, 30-49 years, 50+ years).

Division:

Administrative Division is one of the key elements which is taken to be a factor for our study. Bangladesh is divided into 7 divisions which are Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur and Sylhet.

Type of Place of Residence :

Differentials in Tobacco usage between urban and rural population are reported in various studies. The differences may be due to variation in life in urban and rural area. Therefore, place of residence has been included in the analysis to capture the residual effect of community that might directly or indirectly influence the Tobacco usage.

Education level:

Education level might have an influence on the Tobacco usage because educated people are thought to have knowledge on the ill effects of tobacco usage on health which might affect the rate of usage. It was divided four categories such that No education, Primary, Secondary, Higher.

Wealth Index :

One of the background characteristics used throughout this report is an index of household economic status. The wealth index used in this study was developed and tested in a large number of countries to measure inequalities in household income, use of health services, and health outcomes etc. Wealth index is considered as an important indicator in this study. Wealth index was categorized into 5 categories as, Poorest, Poor, Middle, Rich, Richest.

Media:

Listening to radio, watching television, reading newspaper is the exposure of the individual to media because media can play an important role in creating awareness. It was categorized as exposed to media (if the individual either listening to the radio or watching television, or reading newspaper) and unexposed to the media (if the individual neither listening radio, watching television, reading newspaper).

Religion:

Religion was categorized into two categories such that Muslim and Non-muslim. We are interested to observe if religion plays any role in the usage of tobacco.

Table 2.1: Descriptive statistics concerning the independent variable

Variables	Categories or Level	Percentage
Region	Dhaka	17.9
	Chittagong	13.8
	Barisal	10.5
	Khulna	15.4
	Rajshahi	15.9
	Sylhet	11.5
	Rangpur	15.5
Education level	Higher	13.8
	Primary	33.5
	Secondary	26.8
	No Education	25.8
Occupation	Employed	31.6
	Self -Employed	66
	Student	1.7
	Retired/Unemployed	.7
Type of Place of Residence	Rural	64
	Urban	36
Age of Respondents	15-29	21.7
	30-49	62.9
	50+	20
Religion	Muslim	87.5
	Hinduism	12
	Buddhism	0.2
	Christian	0.4
Wealth Index	Richest	23.2
	Poorer	19.0
	Middle	19.2
	Rich	20.9
	poorest	17.7
Reading newspaper	No	56.8
	Yes	43.2
Watching TV	No	11.8
	Yes	98.2
Listening Radio	No	84.9
	Yes	15.1

Chapter 3

Methodology

Frequency tables, Cross tabulation and Chi-squared tests have been used in this study for exploring the dependent and independent variable and their possible relationship. Multiple logistic regression model are fitted to study the effect of the explanatory variables. Tobacco usage has two category (yes or no), and place of residence has two category (urban and rural). so multiple logistic regression will be fitted for two variables.

3.1 Frequency Table

Frequency table is the summary of the number of times different values of a variable occur. The frequencies provide statistics and graphical displays that are useful for describing many types of variables. For a first look at data, the frequencies procedure is a good place of start.

3.2 Cross Tabulation

Cross tabulation was used to study and measures the statistical relationship between the dependent and important independent variables influencing delivery care. The cross tabulation procedure forms two way analysis and provides a variety of tests and measures of association for two-way tables. In addition to counts, the table may display percentages, expected values.

3.3 Chi-square test

Chi-square test can be used to test the independence of two or more attributes. For testing the null hypothesis of independence of two attributes from an observed set of frequencies Pearson chi-square test can be used. Pearson chi-square test can also be used for tables with any number rows and columns. Let O_{ij} ($i=1,2,3,..r$ and $j=1,2,3,k$) denote observed frequencies and E_{ij} ($i=1,2,3,..r$ and $j=1,2,3,k$) denote the expected frequencies. Then the test statistics is defined as,

$$\chi^2 = \sum \sum \frac{[O_{ij} - E_{ij}]^2}{E_{ij}} \quad (3.1)$$

Where,
 O_{ij} =Observed
 E_{ij} =Expected frequency .

3.4 Level of Significance

The probability of rejecting a true null hypothesis is called the level of significance. It is denoted by α . By $\alpha = 10\%$ mean that there are about 5 chances in 100 of rejecting a true null hypothesis i.e. we are 90% confident in making the correct decision. The probability of committing a type-1 error is called the level of significance of the test.

3.5 P-Value

The p-value for a test may be defined as the smallest value of the level of significance at which the null hypothesis can be rejected. If the p-value is less than or equal to α , we reject the null hypothesis. If p-value is greater than α , we do not reject the null hypothesis.

3.6 Binary logistic regression

There are many multivariate statistical techniques. One important technique is binary regression analysis. Sometimes it is difficult to apply the technique when the dependent variable is categorized (dichotomous and polygamous). In such a situation it is very difficult to fit the linear logistic regression (Coxs 1970, Sclesselman, 1982). Since it does not require distribution assumption, unlike many other multivariate techniques (for example that the variables are normally distributed with equal variances), so it can appropriately handle situation in which the independent variables are qualitative or measure nominal or ordinal scales. It can be used to identify risk factors as well as predict the probability of success(P_i) to failure($1-P_i$) and relating it to the independent variables, the logistic parameter

can easily be interpreted in terms of odds and odds ratio ,relative odds can be estimated for the categories of each independent categorical variables or combination of such variables.

Binary logistic regression:-

$$Y = \frac{\exp(-\beta X)}{1 + \exp(-\beta X)} \quad (3.2)$$

Where

Y is a response variable

β is a parameter

3.7 Logistic regression model

A brief description of the model is given below. Suppose that there are individuals, some of them are called success and other are failure.

Let, Y_i denote the dependent variable for the i th observation and let, $Y_i=1$, if the i th individual is a success and

$Y_i=0$, if the individual is a failure.

Suppose for each of the n individuals, p independent variables $X_{i1}, X_{i2}, \dots, X_{ip}$, are measured. In the model, the dependence of the probability of success on independent variables is assumed to be

$$P_i = Pr(Y_i = 1) = \frac{1}{1 + \exp(-\sum \beta_i x_{ij})} \quad (3.3)$$

$$1 - P_i = Pr(Y_i = 0) = \frac{\exp(-\sum \beta_i x_{ij})}{1 + \exp(-\sum \beta_i x_{ij})} \quad (3.4)$$

Where, β_0 and β_i are unknown coefficients.

Equation (3.2) and (3.3) look complicated, however, the logarithm of the ratio of P_i and $(1-P_i)$ which are called logit of P_i and it turns out to be a simple linear function of X_{ij} .

We define

$$\text{Logit}(P_i) = \log \frac{P_i}{1 - P_i} = \sum_{i=0}^p \beta_i x_{ij} = \beta_0 + \sum_{j=1}^p \beta_j x_{ij} \quad (3.5)$$

The logit is the logarithm the odds of success, that is, the logarithm of the ratio of the probability of success to probability of failure. It is also called the logistic transform of success of P_i and equation (3.4) is the linear model. Thus the linear logistic model relates to the independent variable to the transform of P_i or the log of odds.

In logistic regression, the parameters of the model are estimated using the maximum likelihood estimation procedure. That is the coefficients that make our observed results most likely are selected. Since the logistic is non-linear, an iterative algorithm is necessary for parameters estimation. To understand the interpretation of the logistic coefficients, consider a re-arrangement of the equation for the logistic model. The logistic model can be re-written in terms of the odds of an event occurring. It has several nice properties. First, as P_i increases, so does $\text{logit}(P_i)$. Second, logit varies over the whole real line, where as P_i bounded only between 0 and 1. We see that logistic model can be expressed in two equivalent ways. First, we can fit a linear model in the logit scale (in terms of \log odds).

From, equation (3.4) we see that the coefficients can be interpreted as the change in \log odds associated with a one unit in the independent variable. Since it is easier to think of odds, rather \log odds, the logistic equation can terms of odds as

$$Odds = \frac{P_i}{1 - P_i} = \exp \sum_{j=0}^p \beta_j x_j \quad (3.6)$$

The exponential rose to the power P_i is the factor by which the odds change when j th independent variable increases by one unit. If β_j is positive, the factor will be greater than 1, which means that the odds are decreased. If β_j is 0, the factor equal 1, which leaves the odds are unchanged.

Second, it is almost equivalent to the modeling the logit of the probability of success a linear function of the independent variables, as given equation (3.2). The equation (3.2) express in the model as in the S-shape curve in the original probability scale. Equation (3.2) and equation (3.4) are equivalent. Besides in many ways, equation (3.4) is the model for normally distributed data.

In the logistic regression, just as linear regression, the codes for independent variable must be meaningful. We have coded all of our two categorical independent variables as either 0 or 1. This is called dummy variable or indicator variable coding.

For variables more than two categories, we have created new variables to represent the categories. The number of new variables required to represent a categorical variable is one less than of categories. The logistic regression procedure will automatically create new variables for categorical variables.

To fit a best regression model, we have considered a full model with all independent variables at a time. On the basis of odds ratio and it will be decided which variables are significant or not.

Effects of these social determinants on the prevalence of tobacco use were estimated using a multivariate logistic regression model using SPSS 17.0 software for complex samples. and R 3.00.

Chapter 4

Fact and Finding

4.1 Univariate analysis

This paper has investigated the socio-economic determinants of the probability of tobacco chewing, smoking and knowledge of the health risks of tobacco use. The descriptive statistics in table 4.1 shows that 40.5% among the aged man usage tobacco by smoking, 22.3% by using pipe, 5.6% by chewing and 7.9% by snuffing.

For measuring the association between tobacco usage and type of the place of residence, the study would like to use the following hypothesis.

H_0 : There is no association between tobacco usage and type of the place of residence.

H_1 : There is some association between the two attributes.

The descriptive statistics in table 4.3 shows that the prevalence of tobacco using by age group among adults aged 15+ ranged from 40.4% (15-29 years) to 33.7% (55-64 years). There was significant variation by place of residence for prevalence of tobacco tobacco using. Urban area tobacco usage (41.1%) is more than rural area (35.9%).

In contrast, there was a strong gradient in using tobacco prevalence by educational level. Tobacco usage higher (51.5%) in those people who are highly educated, it is 45% as secondary educated persons, and 33.8% in primary educated persons and 27.3% in those people who are not educated. Sylhet region (41%) which is highest tobacco usage region. second tobacco usage region (40.9%) is Rangpur, lowest tobacco usage region is Dhaka (33.9%) region and approximately same tobacco usage Chittagong, Khulna, Rajshahi region.

Table 4.1: Descriptive statistics of aged man tobacco usage

Variables	Categories or Level	Percentage
By smoking	No	59.5
	Yes	40.5
Using pipe	No	77.7
	Yes	22.3
By chewing	No	92.1
	Yes	5.6
By snuffing	No	92.1
	Yes	7.9

It is evident that 48.8% are using tobacco who reads newspaper and it is 29.4% for no reading newspaper expose. There was no significant variation by No. of household members for prevalence of tobacco using. For religion, tobacco usage is approximately same for both muslim and hinduism and no significant association with tobacco usage .

It is seen that 46% are using tobacco who listens radio and it is 36% for no listening radio expose. It is also seen that 42.4% are using tobacco who watches TV and it is 3.4% for no watching TV expose.

In addition, the prevalence of tobacco using was highest among those in the Richest people of the wealth index (48.1%) and lowest among those in the poorest people (24.2%) and middle class people consumes 37.6% who has prevalence of tobacco using. Tobacco using was more prevalent among employed (41%),self-employed (36.2%) and students(39.1%) adults than in the other occupational categories.

Table 4.2: Cross-table and Significant Factors for Tobacco Usage overall data

Attributes	Label	Tobacco Usage		$\chi^2(M - H)$
		No	Yes	
Age group	15-29	518	351	.031*
	30-49	1561	952	
	50-64	408	207	
Region	Dhaka	459	235	.019 *
	Chittagong	331	220	
	Barisal	270	151	
	Khulna	406	211	
	Rajshahi	384	250	
	Rangpur	365	254	
	Sylhet	272	189	
Type of Place	Rural	1640	920	0.01 *
	Urban	847	590	
Education level	Higher	268	285	0.000*
	Primary	887	453	
	Secondary	582	491	
	No Education	750	281	
Religion	Islam	2193	1303	0.102
	Hinduism	279	199	
	Buddhism	4	5	
	Christianity	11	3	
Reading Newspaper	No	1604	667	0.000*
	Yes	883	843	
Watching TV	No	455	16	0.000*
	Yes	2032	1494	
Listening Radio	No	2154	1208	0.000*
	Yes	333	302	

Table 4.2: Crosstable and Significant Factors for Tobacco Usage overall data(continuation)

Attributes	Label	Tobacco Usage		$\chi^2(M - H)$
		No	Yes	
Wealth Index	Richest	482	446	0.000*
	Poorer	511	247	
	Middle	480	289	
	Richer	479	357	
	Poorest	535	171	
Occupation	Employed	746	518	0.039 *
	Self Employed	1683	955	
	Student	42	27	
	Retired/Unemployed	16	10	
No of Household Member	1-4	985	601	0.266
	5-9	1320	778	
	10+	182	131	

Figure 4.1: Bar plot.

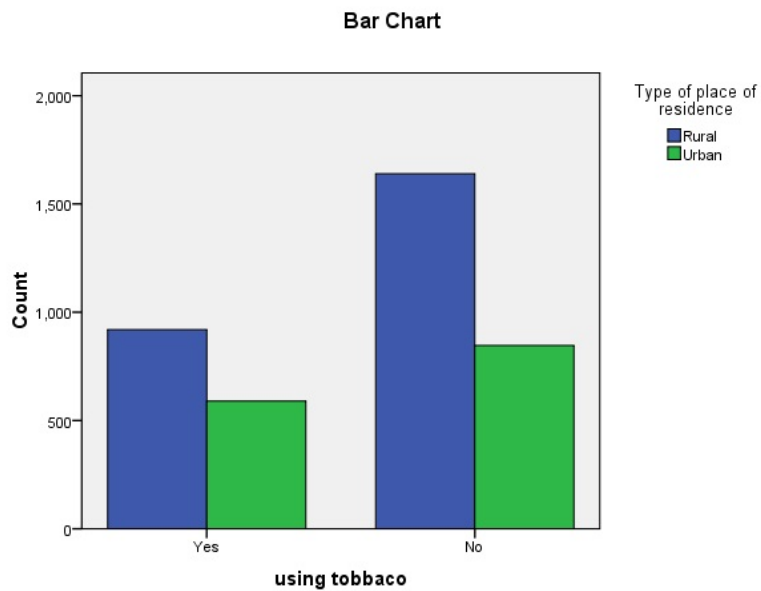


Table 4.3: Descriptive statistics concerning the dependent variable

Variables	Categories or Level	Percentage
Using Tobacco	Yes	37.8
	No	62.2

Here we have the accumulated categories for tobacco usage ,we merge the categories of tobacco usage into two categories yes and no.Those who are involved with smoking,pipe sucking,chewing or snuffing are categorised to yes and the others into no.Here in table 4.3,we can see that 37.8% people are involved with tobacco using.

In the figure the percentage of tobacco use is higher in urban region. To test the hypothesis, the following 2 * 2 contingency table was constructed (Table 4.2). Through chi-square as well as Mantel-Hansel tests for Table 4.2, it is observed that there is significant¹ association between tobacco usage and type of the place of residence and the direction of the association is negative.

4.1.1 Usage in urban region

The descriptive statistics in table 4.4 shows that the prevalence of tobacco using in urban area by age group among adults aged 15+ ranged from 41% (15-29 years) to 44.6% (55-64 years). In contrast, there was a strong gradient in using tobacco prevalence by educational level.Tobacco usage higher(52.8%) in those people who are highly educated,it is 43% as secondary educated persons,and 35% in primary educated persons and 32% in those people who are not educated.

¹* significance level 0.1

Table 4.4: Cross-table and Significant Factors for Tobacco Usage of Urban data

Attributes	Label	Tobacco Usage		$\chi^2(M - H)$
		No	Yes	
Age group	15-29	186	130	.501*
	30-49	543	365	
	50-64	118	95	
Region	Dhaka	199	113	.002*
	Chittagong	150	89	
	Barisal	90	45	
	Khulna	128	90	
	Rajshahi	118	89	
	Rangpur	91	81	
	Sylhet	71	83	
Education level	Higher	159	178	0.000*
	Primary	148	277	
	Secondary	242	184	
	No Education	169	80	
Religion	Islam	765	515	0.177
	Hinduism	77	73	
	Buddhism	1	1	
	Christianity	4	1	
Reading Newspaper	No	493	184	0.000*
	Yes	454	406	
Watching TV	No	81	3	0.00*
	Yes	766	587	
Listening Radio	No	753	496	0.008*
	Yes	94	94	

table 4.4:Cross-table and Significant Factors for Tobacco Usage of Urban data(continuation)

Attributes	Tobacco Usage Label			$\chi^2(M - H)$
		No	Yes	
Wealth Index	Richest	382	331	0.000*
	Poorer	60	37	
	Middle	120	58	
	Richer	212	134	
	Poorest	73	30	
Occupation	Employed	354	246	0.523
	Self Employed	392	272	
	Student	434	302	
	Retired/Unemployed	14	14	
No of Household Member	1-4	368	254	0.985
	5-9	413	289	
	10+	66	47	

Sylhet region tobacco usage(53.9%) which is highest tobacco usage region. second tobacco usage region (47.1%) is Rangpur,lowest tobacco usage (33.3%) in the Barisal region,36.2% in Dhaka region and approximately same tobacco usage Chittagong, Khulna,Rajshahi region. It is evident that 47.2% are using tobacco who reads newspaper and it is 32% for no reading newspaper expose. There was no significant variation by No. of household members for prevalence of tobacco using.

For religion, tobacco usage is approximately same for both muslim and hinduism and no significant association with tobacco Usage It is seen that 50% are using tobacco who listens radio and it is 39.7% for no listening radio expose. It is also seen that 43% are using tobacco who watches TV and it is 3.6% for no watching TV expose.

In addition, the prevalence of tobacco using was highest among those in the middle class people of the wealth index (50%) and poorer people of wealth index with 48.7% and lowest among those in the richer people (20%) and poorest class people consumes 41% who has prevalence of tobacco using.

Tobacco using was more prevalent among employed (41%),self-employed (41%) and students(50%) adults than in the other occupational categories.

4.1.2 Usage in rural region

For rural region the descriptive statistics in table 4.6 shows that the prevalence of tobacco using by age group among adults aged 15+ ranged from 40% (15-29 years) to 27.9% (55-64 years). In contrast, there was a strong gradient in using tobacco prevalence by educational level. Tobacco usage higher(49.5%) in those people who are highly educated, it is 47.4% as secondary educated persons, and 33.3% in primary educated persons and 25.7% in those people who are not educated. Cittaogong region tobacco usage(42%) which is highest tobacco usage region, lowest tobacco usage (31.9%) in the Dhaka region and approximately same tobacco usage Khulna, Rajshahi, Barisal and rangpur region more than 37%.

It is evident that 50.5% are using tobacco who reads newspaper and it is 28.5% for no reading newspaper expose. There was no significant variation by No. of household members for prevalence of tobacco using. For religion, tobacco usage is approximately same for both muslim and hinduism and no significant association with tobacco usage. It is seen that 46% are using tobacco who listens radio and it is 33.7% for no listening radio expose. It is also seen that 41.7% are using tobacco who watches TV and it is 3.1% for no watching TV expose.

In addition, the prevalence of tobacco using was highest among those in the Rich-est people of the wealth index (53.5%) and richer people of wealth index(45.5%) and lowest among those in the poorest people (23.4%) and middle class people consumes 39.1% who has prevalence of tobacco using. Tobacco using was more prevalent among employed (41%), self-employed ((34.3%) and students(31.7%) adults than in the other occupational categories.

Table 4.5: Cross-table and Significant Factors for Tobacco Usage Rural data

Attributes	Tobacco Usage		$\chi^2(M - H)$
	Label	No	Yes
Age group			
	15-29	332	221
	30-49	1018	587
	50-64	290	112
Region			
	Dhaka	260	122
	Chittagong	181	131
	Barisal	180	106
	Khulna	278	121
	Rajshahi	266	161
	Rangpur	274	173
	Sylhet	201	106
Education level			
	Higher	109	107
	Primary	610	305
	Secondary	340	307
	No Education	581	201
Religion			
	Islam	1428	788
	Hinduism	202	126
	Buddhism	3	4
	Christianity	7	2
Reading Newspaper			
	No	1211	483
	Yes	429	437
Watching TV			
	No	374	13
	Yes	1266	907
Listening Radio			
	No	1401	712
	Yes	239	208

Table 4.5: Crosstable and Significant Factors for Tobacco Usage overall data (continuation)

Attributes	Tobacco Usage Label			$\chi^2(M - H)$
		No	Yes	
Wealth Index				
	Richest	100	115	0.000*
	Poorer	451	210	
	Middle	360	231	
	Richer	267	223	
	Poorest	462	1141	
Occupation				
	Employed	354	246	0.018 *
	Self Employed	1249	653	
	Student	28	13	
	Retired/Unemployed	9	8	
No of Household Member				
	1-4	617	347	0.158
	5-9	907	489	
	10+	116	84	

4.2 Bivariate analysis

From table 4.6, tobacco usage in Sylhet and Rangpur are 0.65 and 0.61 times than Dhaka division. Tobacco usage in Chittagong and Rajshahi are 1.54 and 1.45 times than Dhaka region. In the residence, tobacco usage in Urban region are 1.2 times more than the Rural region. From the table, we see that tobacco usage in illiterate people is 7.6% lower in comparison to the higher educated people, tobacco usage for primary educated peoples are 0.806 times higher and tobacco usage for secondary educated peoples are 1.15 times higher than higher educated peoples.

Table 4.6: Predictors of current tobacco use among adults age 15 years and above in Bangladesh using logistic regression analysis:BDHS 2011

Selected characteristics	Regression coefficient	P value	Odds ratio
Age			
30-49(15-29 ^r)	0.09366	0.28	.882
50-64	0.1255	0.295	.969
Place of Residence			
Urban(Rural ^r)	0.18253	0.0317*	1.2
Educational status			
Primary education(Heigher education ^r)	- .216	0.039*	.806
Secondary education	0.1379	0.23	1.15
No education	-.078	0.079*	0.924
Employment status			
Self Employed(Employed ^r)	-0.0502	.523	0.95
Student	-0.145	0.6070	0.86
Unemployed/Retired	0.253	0.562	1.29
Wealth index			
Richer(Richest ^r)	0.08434	0.4429	1.09
Middle	-0.20008	0.1044	.78
Poorer	-0.34567	0.01*	.675
Poorest	-0.5942	4.58E-05*	.55
Reading Newspaper			
Yes(No ^r)	0.4429	1.51E-5*	1.557
Listening Radio			
Yes(No ^r)	0.5016	8.64E-6*	1.651
Watching TV			
Yes(No ^r)	2.8477	.000*	17.25
Region			
Chittagong(Dhaka ^r)	.436	0.010*	1.546
Barisal	.114	0.1238	1.121
khulna	-.0642	.6031	0.94
Rajshahi	.3525	.0038*	1.450
Rangpur	-.4893	7.2E-5*	0.613
Sylhet	-0.43554	0.001*	0.65
Intercept	3.20817	.000	

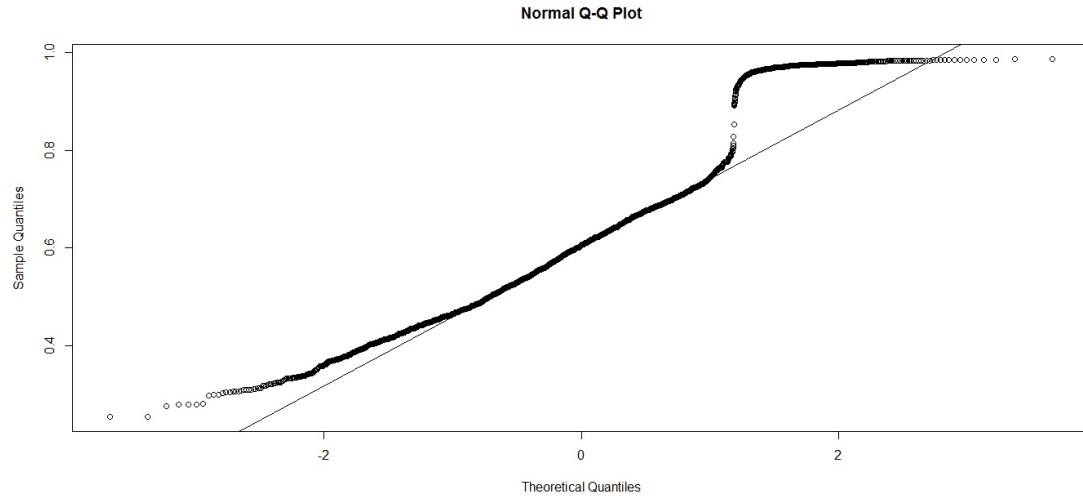
For age category, 30-49 year persons exposed tobacco usage 0.882 times than 35+ age groups and 50-64 year persons exposed the tobacco usage 0.97 times than 35+ age group. It is evident that tobacco usage of poorest class family 0.55 times than richest class family, poorer class family 0.68 times than richest and middle class family tobacco usage 0.78 times than richest class.

For media, tobacco usage 1.151 times when who is exposed to newspaper than unexposed to newspaper. Tobacco usage 1.651 times when who is exposed to radio listening than unexposed to radio listening. Tobacco usage 17 times higher when who is exposed to TV than unexposed to watching TV. For occupation, do not defer tobacco usage for the employment status categories.

Table 4.7: Predictors of current tobacco use among adults age 15 years and above in Rural place of Bangladesh using logistic regression analysis:BDHS 2011

Selected characteristics	Regression coefficient	P value	Odds ratio
Age			
30-49(15-29 ^r)	0.05365	0.62701	1.05
50-64	0.2765	0.07596	1.32
Educational status			
Primary education(Heigher education ^r)	-0.07589	0.69862	0.87
Secondary education	-0.21760	0.21114	0.926
No education	-0.14359	0.51351	0.80
Employment status			
Self Employed(Employed ^r)	0.10795	0.31090	1.113
Student	0.12270	0.76094	1.13
Unemployed/Retired	0.14247	0.79366	1.15
Wealth index			
Richer(Richest ^r)	0.22222	0.2071	1.25
Middle	0.2993	0.09703 *	1.35
Poorer	0.55497	0.00281*	1.74
Poorest	0.78881	7.44E-05*	2.20
Reading Newspaper			
Yes(No ^r)	-0.535	1.2.68E-05*	0.59
Listening Radio			
Yes(No ^r)	-0.52617	4.68E-06*	0.59
Watching TV			
Yes(No ^r)	-2.79606	.000*	0.061
Region			
Chittagong(Dhaka ^r)	-0.33872	0.04781*	0.7126
Rajshahi	-0.26057	0.10317	0.770
khulna	0.20292	0.22318	1.224
Barisal	-0.24064	0.17514	0.79
Sylhet	-0.14174	0.42849	0.867
Rangpur	-0.33545	0.03358*	0.72
Intercept			
	3.15063	2.13e-15	

Figure 4.2: Normal p-p plot.

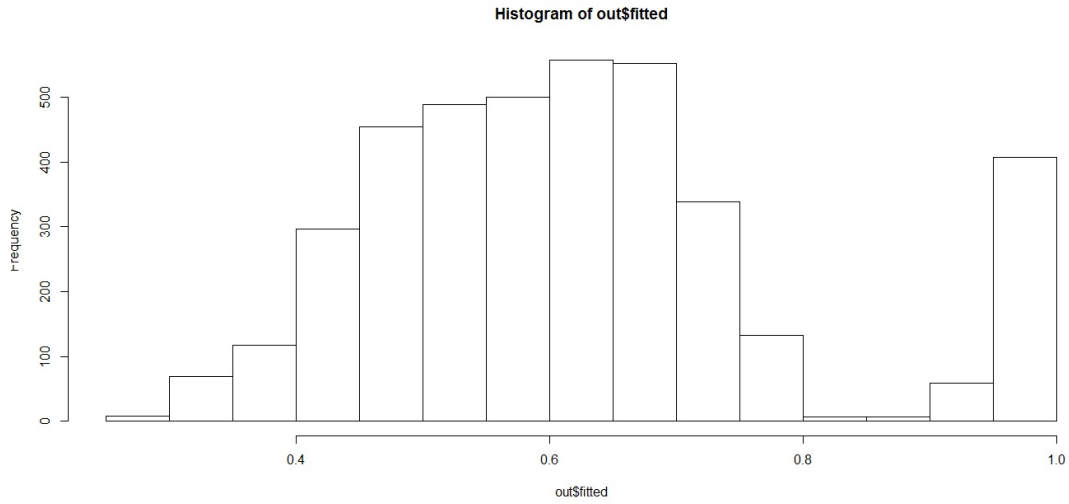


Normal probability plot shows a nearly S shaped-curve indicates shorter than normal tails for the fitted values.

From table 4.7, tobacco usage in Sylhet and Rangpur are 0.87 and 0.72 times than Dhaka division. Tobacco usage in Chittagong and Rajshahi are 0.7 and 0.77 times than Dhaka region. From the table , tobacco usage for illiterate peoples are 0.8 times than higher educated peoples, tobacco usage for primary educated peoples are 0.87 times and tobacco usage for secondary educated peoples are 0.936 times ore than higher educated peoples.

For age category, 30-49 year persons exposed tobacco usage 1.05 times than 35+ age groups and 50-64 year persons exposed the tobacco usage 1.32 times than 35+ age group. It is evident that tobacco usage of poorest class family 2.2 times than higher than richest class family,poorer class family 1.74 times than richest and middle class family tobacco usage 1.35 times than richest class. For media, tobacco usage 0.59 times when who is exposed to newspaper than unexposed to newspaper. Tobacco usage 0.59 times when who is exposed to radio listening than unexposed to radio listening. Tobacco usage .061 times when who is exposed to TV than unexposed to watching TV. For occupation, do not defer tobacco usage for the employment status categories.

Figure 4.3: Histogram.



Histogram of the fitted values looks multimodal and supposedly roughly symmetric.

From table 4.8, tobacco usage in Sylhet and Rangpur are 0.47 and 0.5 times than Dhaka division. Tobacco usage in Khulna and Rajshahi are 0.71 times than Dhaka region. From the table , tobacco usage for illiterate peoples are 1.63 times higher than educated peoples, tobacco usage for primary educated peoples are 1.75 times and tobacco usage for secondary educated peoples are 1.54 times more than higher educated peoples.

For age category, 30-49 year persons exposed tobacco usage 1.13 times than 35+ age groups and 50-64 year persons exposed the tobacco usage 0.93 times than 35+ age group. It is evident that tobacco usage of poorest class family 1.55 times than higher than richest class family and middle class family tobacco usage 1.41 times more than richest class. For media, tobacco usage 0.73 times when who is exposed to newspaper than unexposed to newspaper. Tobacco usage 0.64 times when who is exposed to radio listening than unexposed to radio listening. Tobacco usage .053 times when who is exposed to TV than unexposed to watching TV. For occupation, do not defer tobacco usage for the employment status categories.

The high prevalence of tobacco use in Bangladesh reported here is consistent with most of the national and sub-national surveys among the adult population in this nation of more than 145 million people located in northeastern south Asia. This analysis indicated that, in Bangladesh, the use of tobacco is more common among older adults aged 35+ years, living in rural areas, with higher socioeconomic status and higher education for both genders.

Given our findings and based on earlier research, it would likely be advantageous to develop appropriate public health interventions to reduce tobacco use

Table 4.8: Predictors of current tobacco use among adults age 15 years and above in Urban place of Bangladesh using logistic regression analysis:BDHS 2011

Selected characteristics	Regression coefficient	P value	Odds ratio
Age			
30-49(15-29 ^r)	0.119423	0.402381	1.126
50-64	-0.072085	0.709753	0.930
Educational status			
Primary education(Heigher education ^r)	0.563968	0.005395*	1.75
Secondary education	0.436781	0.00572*	1.54
No education	0.491867	0.063962*	1.63
Employment status			
Self Employed(Employed ^r)	-0.210768	0.076672	0.8099
Student	-0.388268	0.337309	0.67
Unemployed/Retired	0.676897	0.419322	1.967
Wealth index			
Richer(Richest ^r)	0.001188	0.9938	1.0011
Middle	0.35012	0.08279 *	1.419
Poorer	-0.038211	0.883	0.9625
Poorest	0.443154	0.1074	1.55
Reading Newspaper			
Yes(No ^r)	-0.309073	0.082050*	0.734
Listening Radio			
Yes(No ^r)	-0.43339	0.009*	0.64
Watching TV			
Yes(No ^r)	-2.923715	9.29E-7	0.053
Region			
Chittagong(Dhaka ^r)	-0.208966	0.26416	0.811
Rajshahi	-0.350793	0.073881*	0.704
khulna	-0.347812	0.068947*	0.7062
Barisal	-0.004463	0.984788	0.99
Sylhet	-0.76938	0.000239*	0.463
Rangpur	-0.66512	0.00159*	0.514
Intercept			
	3.15063	2.13e-15	

in Bangladesh with a focus on the disadvantaged populations. Given the morbidity and mortality associated with tobacco use, regulating the production, sales, and marketing of tobacco in Bangladesh could be considered. More resources for effective public health education and interventions may be created by raising taxes on tobacco and then earmarking part of the funds for public health initiatives. Unfortunately, there are common misconceptions among different socio-demographic sectors of population in South-East Asia that smokeless tobacco is less harmful than cigarettes and actually good for the teeth and gums, resulting in it being often used in the form of a dentifrice. An estimated 5% of Bangladeshi adults use tobacco as dentifrice.[8]

Bangladesh ratified the World Health Organization (WHO) Framework Convention for Tobacco Control (FCTC) in 2004, formulated national tobacco control legislation in 2005, and issued further regulations in 2006. GATS data for the first time offered an opportunity to study some critical elements of the WHO FCTC and monitoring component of WHO MPOWER. To prevent premature morbidity and mortality associated with smokeless tobacco use, it is desirable to revise the tobacco control policy in Bangladesh to include provisions for prevention and control of smokeless tobacco in national tobacco control policies and programs.[9]

The present study found statistically significant difference in the prevalence of smoking between the urban and rural populations. Bangladesh has implemented a textual health warning on smoking products, but it has done this only on cigarette packs, not on packs of bidis and smokeless tobacco products. In view of low literacy rate in Bangladesh, pictorial health warnings likely would provide a more effective public health message.

The WHO Framework Convention has called for graphic health warnings covering 50% or more of the front and back of all tobacco products, and providing such warnings should contribute to prevent and reduce initiation, and promote cessation.

Chapter 5

Summary and conclusion

Sylhet region is a highest tobacco usage region, Barisal is lowest tobacco usage division. Tobacco usage is higher in Urban areas than rural areas. In urban region students are more involved in consuming tobacco. The use of tobacco by age was highest among older adults (55+ years) in urban region. The proportion of adults consuming tobacco was higher among urban adults than among rural adults.

Age of the respondent, tobacco usage is higher in 35+ old adults. For media, media does play a vital role in tobacco usage in urban area, overall and rural area. It is higher in those persons who are exposed to media means it is higher where people watches TV, reads newspaper and listens radio. Tobacco usage is higher in educated people, specially primary and secondary educated people. It is evident that tobacco usage is higher in richest with respect to rural and overall area, for urban area, tobacco usage is higher in middle class than poorer people.

In terms of the occupational status index, there was no notable gradient, with the percentage of adults consuming tobacco. Implementation of tobacco control strategies drawn from the standards outlined in the WHO Framework Convention on Tobacco Control (FCTC) and WHO MPOWER could have benefits in reducing tobacco use and preventing premature death.

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