International Journal of Statistical Sciences *ISSN 1683-5603*
Vol. 21(1), 2021, pp 17-24

Multivariate Correspondence Analysis in Patterning Correlates of Tobacco Use in Bangladesh

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[Received December 2, 2020; Revised January 5, 2021; Accepted February 10, 2021]

Abstract

Bangladesh is a low-income country and one of the largest tobacco consuming countries in the world, smoking causes about 25% of all deaths in Bangladeshi men aged 25 to 69 years and an average loss of seven years of life per smoker in Bangladesh. This study aimed to reveal pattern of tobacco use in Bangladesh and identify their correlates using multivariate correspondence analysis (MCA). This study was based on the secondary data collected by the Global Adult Tobacco Survey (GATS), Bangladesh, 2009–10. It had been found that among the respondent who were not using any form of tobacco product 68.12% female and 31.88% male. Whereas, among the respondent who were smoking tobacco 2.64% female and 97.36% male; 69.46% were female and 30.54% were male among those who were taking smokeless tobacco; and among both smoking and smokeless tobacco user 5.14% were female and 94.86% were male. From multivariate correspondence analysis we found that people of age 35 to 54 years, less than primary completed, unsecured job, with low household wealth index etc. were corresponded to tobacco smoking and both (smoking and smokeless) tobacco use. On the other hand, people with age 55 years and above, had no formal schooling, home maker, with lowest household wealth index were corresponded to smokeless tobacco use. Therefore, policy makers and government should active the quitting tobacco use campaign more for disadvantaged people.

Keywords: Smoking pattern, Correspondence analysis, correlates, GATS.

AMS Classification: 62H25.

1. Introduction

Bangladesh is a low-income country and one of the largest tobacco consuming countries in the world (Ng et. al., 2014). 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. There are different types of tobacco e.g. smoked and smokeless (Khan and Mahmood, 2015). In 2012, an estimated 46.3 million adults used some form of tobacco product, smoked or smokeless. Tobacco smoking is a leading modifiable global disease risk factor, with nearly 6 million premature deaths, 6.9% of years of life lost, and 5.5% disability-adjusted life-years (DALYs) in 2010.According to a previous study of Bangladesh, smoking causes about 25% of all deaths in Bangladeshi men aged 25 to 69 years and an average loss of seven years of life per smoker (Alamet.al., 2013). The common uses of tobacco in Bangladesh are in smoking cigarettes, bidi, hooka etc. Most smokers were male-28.3% of adult men smoke manufactured cigarettes and 21.4% smoke bidis (Begum and Sultana, 2017). According to GATS, over 20 percent of the country's population currently use smokeless tobacco mostly betel quid (paan) with chewing tobacco and powdered tobacco (gul). Smokeless tobacco is tobacco that is not burned such as chewing tobacco, oral tobacco, spit or spitting tobacco, dip, chew and snuff. Smokeless tobacco use is common among women and men both, 28% of women and 26% of men use smokeless tobacco (Barkat et. al., 2012). Chewing tobacco is most commonly used by the Bangladeshi community with 9% of men and 19% of women (Tobacco and ethnic minorities: Action on Smoking and Health Fact Sheet, 2011). GATS is an initiative of World Health Organization (WHO), which was carried out in the country in 2009 and repeated in 2017 with support of Bangladesh Bureau of Statistics and National Tobacco Control Cell. Anti-tobacco campaigners welcomed the significant reduction in tobacco usage, but observed that the progress was not enough to turn Bangladesh into a tobacco-free country by 2040. Few works have done on smoking tobacco and smokeless tobacco use in Bangladesh (Hossain et. al., 2017; kabir, Goh and Khan, 2013; Khan et.al., 2009; Sultana et. al., 2015; Begum and Sultana, 2017, 2018). But, to best of our knowledge, no works has been done on pattern of tobacco use in Bangladesh using correspondence analysis (Anderson, 2003). Therefore, this study aimed to reveal pattern of tobacco use in Bangladesh and identify their correlates using multivariate correspondence analysis (MCA).

2. Data and statistical method

This study was based on the secondary data collected by the Global Adult Tobacco Survey (GATS), Bangladesh, 2009–10. Various statistical methodologies had been used to analyze the data. First descriptive analysis had been performed to know the characteristics of the study subjects. For our research first we selected our target variable. Tobacco using status was our target variable. We categorized

this variable in four categories such as nonuser, tobacco smoking, smokeless tobacco and both user. To be noted that these four categories were not mutually exclusive as both user is part of smoking and smokeless. For that frequencies with percentages had been reported. Frequencies indicated to us the number of cases (Respondents), which falls into each of the available categories. To identify correlates of tobacco use we used multivariate correspondence analysis. In this analysis, categories of tobacco use pattern were mutually exclusive. All analyses had been carried out using Stata version 13.0 and R 3.4.3 programing.

3. Results

Scio-demographic and economic characteristics of study subjects had been summarized in Table 1. Then various characteristic had been compared to pattern of tobacco use [Table 2]. It had been found that among the respondent who were not using any form of tobacco product 68.12% female and 31.88% male. Whereas, among the respondent who were smoking tobacco 2.64% female and 97.36% male; 69.46% were female and 30.54% were male among those who were taking smokeless tobacco; and among both smoking and smokeless tobacco user 5.14% were female and 94.86% were male.

From multivariate correspondence analysis we found that respondents of age 35-54 years were mostly correspond to tobacco smoking and both user, whereas respondents of age 55 years and above corresponded to smokeless tobacco use [Figure 1]. It had been also found that respondent with no formal schooling were correspond to smokeless tobacco use and respondents with less than primary school completed were correspond to tobacco smoking and both use [Figure 2]. It had been also found that businessman were mostly correspond to tobacco smoking; home maker and retired person were correspond to smokeless tobacco use, and farmer and agri/industrial worker were mostly correspond to both use [Figure 3]. Further it had been found that respondents who belonged to middle and the lowest household wealth index were mostly corresponds to smokeless tobacco use and respondents with low household wealth index corresponded to tobacco smoking and both use [Figure 4].

4. Conclusion

This study revealed that most of the correlates corresponded to tobacco smoking and both tobacco use in parallel. For example, people of age 35 to 54 years, less than primary completed, unsecured job, with low household wealth index etc. were corresponded to tobacco smoking and both (smoking and smokeless) tobacco use. On the other hand, people with age 55 years and above, had no

formal schooling, home maker, with lowest household wealth index were corresponded to smokeless tobacco use. Therefore, policy makers and government should active the quitting tobacco use campaign more for disadvantaged people.

Acknowledgement: The authors would like to acknowledge the members of the GATS Collaborative Group.

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Table 1: Socio-demographic and economic characteristics of the study subjects

Characteristics	**sample size=9629n(%)**
Residence	
Urban	4857(50.44)
Rural	4772(49.56)
Gender	
Female	5161(53.60)
Male	4468(46.40)
Age(years)	
15-24	2073(21.53)
25-34	2665(27.68)
35-44	2232(23.18)
45-54	1329(13.80)
55 & above	1330(13.81)
Educational Level	
No formal schooling	3416(35.48)
Less than primary school completed	1487(15.44)
Primary school completed	1115(11.58)

Less than secondary school completed	1937(20.12)
Secondary school completed	663(6.89)
High school completed	463(4.81)
College/University completed	273(2.84)
Post graduate degree completed	211(2.19)
Missing	64(0.66)
Occupation	
Government employee	221(2.30)
Non-government employee	740(7.69)
Business-small	865(8.98)
Business-large	128(1.33)
Farming(land owner & farmer)	826(8.58)
Agricultural worker	374(3.88)
Industrial worker	214(2.22)
Daily laborer	631(6.55)
Other self-employed	318(3.30)
Student	463(4.81)
Homemaker/Housework	4030(41.85)
Retired	113(1.17)
Unemployed(able to work)	153(1.59)
Unemployed(unable to work)	165(1.71)
Other(specify)	388(4.03)
Wealth index	
1(lowest)	1866 (19.38)
2	2068 (21.48)
3	1732 (17.99)
4	2040 (21.19)
5(highest)	1923 (19.97)

Note: Wealth index was calculated using principal component analysis. Asset information covered household ownership of a number of items, such as electricity, flush toilet, fixed telephone, cell telephone, television, radio, refrigerator, car, moped/scooter/motorcycle, washing machine, bicycle, sewing machine, *almirah*/ wardrobe, table, bed or cot, chair or bench, watch or clock, as well as the type of main material used for the roof of the main house (cement, tin and *katcha* such as

Table 2: Prevalence of tobacco use pattern to various characteristics

Characteristics	Pattern of tobacco use (prevalence)			
	No Use	**Tobacco Smoking**	**Smokeless Tobacco**	**Both smoking and smokeless**
Residence				
Urban	54.25	49.87	43.66	42.58
Rural	45.75	50.13	56.34	57.42
Age				
15-24	32.35	12.82	5.4	4.85
25-34	31.83	27.84	18.22	22.76
35-44	19.23	27.77	27.01	31.57
45-54	8.78	17.07	22.31	20.56
55 and above	7.81	14.5	27.06	20.26
Gender				
Female	68.12	2.64	69.46	5.14
Male	31.88	97.36	30.54	94.86
Work Status				
Employee (govt./non-govt.)	10.82	12.95	5.86	8.81
Business(small/large)	6.95	21.97	7.22	20.12
Farming(land owner & farmer	4.58	18.56	7.17	22.17
Agri/industrial worker, daily labour, self-employment	9.44	33.25	13.07	35.98
Home maker/house worker	53.26	1.74	54.77	3.52
Retired, unemployed(able/unable to work)	3.87	4.9	6.16	3.52
Student/ other	11.08	6.64	5.75	5.87
Education level				
No formal schooling	24.07	42.46	55.48	54.33
Less than primary school completed	14.6	17.78	15.45	18.21
Primary school completed	12.91	8.89	11.36	8.96
Less than secondary school completed	25.55	17.4	10.95	12.19
Secondary school completed	9.38	5.09	3.03	3.23
High school completed	6.91	3.41	1.56	1.32
College/University completed and above	6.58	4.96	2.17	1.76
Wealth Index				
Lowest	15.25	21.59	25.69	27.9
Low	18.91	24.68	23.78	27.17
Middle	17.75	18.17	18.27	17.62
High	22.61	20.1	19.43	18.06
Highest	25.47	15.46	12.82	9.25

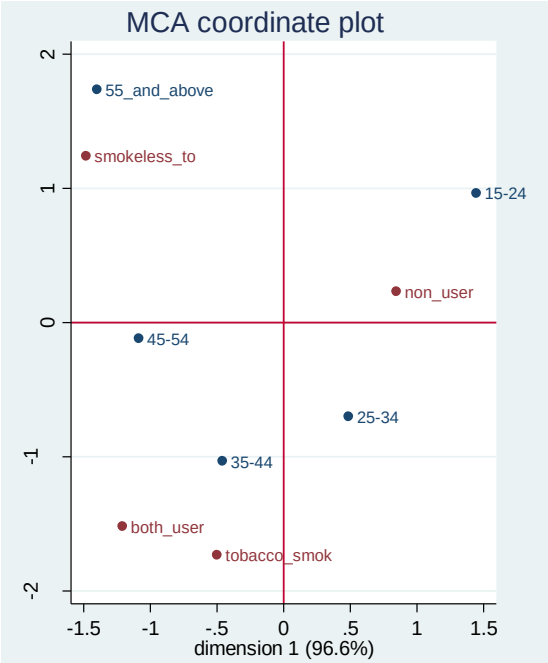

Figure 1: MCA to age and pattern of tobacco use

Figure 2: MCA to education and pattern of tobacco use

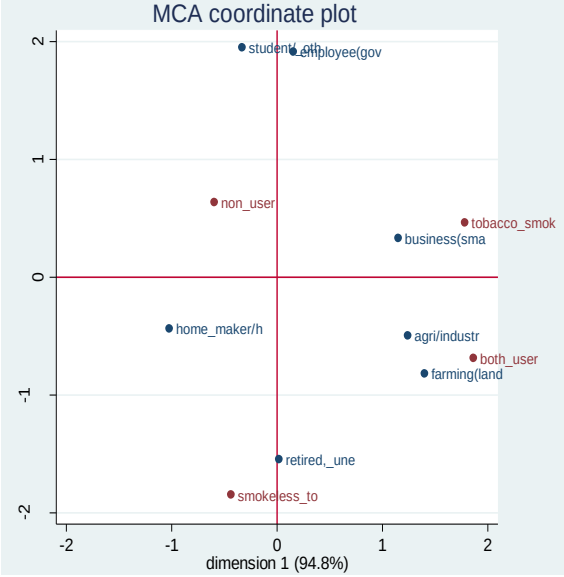

Figure 3: MCA to job and pattern of tobacco use

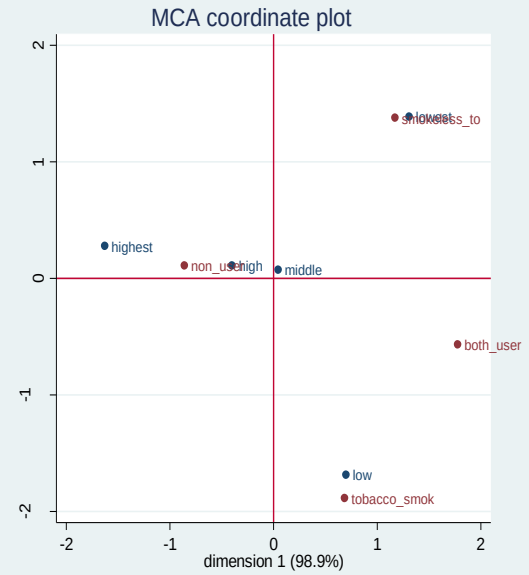

Figure 4: MCA to wealth index and pattern of tobacco use