

# **Predictors of parental knowledge on health effect of tobacco and parental perceptions on tobacco control measures at household level in selected urban residential areas of Dhaka city, Bangladesh**

## **Abstract**

The study aimed to investigate the parental knowledge and perceptions of health effects and tobacco control measures at households in Dhaka city, Bangladesh. From 1,436 tobacco-using parents, 400 participants were selected for the cross-sectional survey involving probability-proportional-sampling. Overall knowledge and perceptions were scored. Multiple logistic regression was performed. There were 19.8% of parents who had good knowledge on the health effects of tobacco and 40.8% had positive perception on home initiatives of tobacco control measures. Knowledge of overall tobacco effects on health ( $AOR = 20.92$ , 95% CI = 2.60-167.83), asthma ( $AOR = 0.29$ , 95% CI = 0.17-0.49), infertility ( $AOR = 0.43$ , 95% CI = 0.24-0.77) and pre-eclampsia ( $AOR = 0.36$ , 95% CI = 0.14-0.90) were significantly increased the odds of parents good knowledge. Whereas, living in the joint family ( $AOR = 3.10$ , 95% CI = 1.88-5.13) was significantly associated with parental positive perceptions. Advanced education programs need to be developed to improve parental awareness on the adverse health effects of tobacco-use at households.

Keywords: Parental knowledge and perceptions; urban residential areas; tobacco use; tobacco control; health effects.

## **Introduction**

Tobacco epidemic is one of the biggest public health threats that the world has ever faced. The World Health Organization (WHO) recently estimated that tobacco kills more than 8 million people each year globally. More than 7 million of those deaths are the result of direct tobacco use, while around 1.2 million are of non-smokers being exposed to second-hand smoking (World Health Organization [WHO], 2019; WHO, 2015).

Bangladesh is considered as one of the top ten tobacco-consuming countries with more than 58% of men and 29% of women consume different forms of tobacco (Barkat et al.

2012). Nearly 42.0% of the youth (age 13 years' to 15 years) are exposed to second-hand smoke in public places, and 35.0% are exposed to second-hand smoke (SHS) at House Hold (HH) level (WHO, 2009). Bangladesh faces considerable health and economic consequences for high levels of tobacco-use tobacco (Barkat et al. 2012). Approximately, 161,000 people die in each year from tobacco consumption related diseases (Hasan, 2018). In particular, smoking prevalence is highest in the urban areas of Bangladesh and is gradually increasing with urbanization (Idris et al. 2007). Dhaka city is the top among world's most densely populated and polluted cities (American Society for Public Administration [ASPA], 2018; Salim, 2018) for it is continuous increase of passive smoking, and air pollution (ASPA, 2018).

WHO-Framework Convention on Tobacco Control (WHO-FCTC) has concluded that 100% of smoke-free environments are the only preventive measure to adequately protect the health of people from the harmful effects of second-hand tobacco smoke (WHO, 2009). Many countries have recently issued laws to regulate smoking at HH-level. Bangladesh amended the Tobacco Laws in 2013 to banned smoking in the public places (such as restaurants, roads, bars and workplaces), but not implemented the laws effectively, and there are no even such regulation or control programs to restrict smoking at the HH-level (Tobacco Control Laws, 2013). Instead, homes remain a site where children and pregnant women are dangerously exposed to environmental tobacco smoke (ETS) (Winickoff et al. 2009). The combination of tobacco smoke pollutants in indoor environment has been referred to as the so-called 'third-hand smoke' (THS) which is a new challenge in the field of tobacco control (Matt et al. 2011). However, parents hardly perceive that indoor surfaces can be a hidden reservoir of THS constituents that could be re-emitted for a long time after the cessation of active smoking (Ferrante et al. 2013).

Tobacco control measures at HH and community levels have made a significant impact around the world including many US cities — regardless of economic status, where tobacco-use at home is not restricted by laws, even (WHO, 2017; National Center for Chronic Disease Prevention and Health Promotion [CDC], 2019). However, till today, Bangladesh is in reverse track in terms of familial tobacco control measures. Despite scientific evidence about the harmful effects of smokeless tobacco (SLT), (Rahman et al. 2015) people at family-level usually do not perceive that different forms of smokeless products (*Zarda, Gul, SadaPata etc.*) are actually tobacco, which have adverse health effects on health (Hasib et al. 2016). In general, parents may know that tobacco use is harmful but it is usually seen merely as a bad habit and they choose them to indulge in (WHO, 2009). However, their knowledge and beliefs differ regarding the causation of various specific health effects. People of urban areas are usually more educated and knowledgeable about the consequences of tobacco use, but that does not mean, they are aware of the detrimental impact about tobacco-use at HHs (Haque et al. 2019).

Previous studies in Bangladesh have shown tobacco-use to be merely part of cultural traditions. Still, there is dearth of research on parental knowledge and perceptions on health effects of tobacco use and tobacco control measures by parents at HH level (Idris et al. 2007; Rahman et al. 2015; Simons-Morton and Farhat, 2010; Uddin et al. 2009). As such, the aim of this research is to explore the status of tobacco-use at home and the prevalence of tobacco-use acceptance at HHs; and to investigate the parental knowledge on the health effect of tobacco-use, and to explore parental perceptions regarding the familial tobacco control measures at the HH-level in urban residential areas of Dhaka city, Bangladesh.

## Materials & Methods

### *Design and settings*

The data for this cross-sectional study was collected between March and October 2016 from four urban residential areas of Dhaka City.

### *Sample*

#### *Sample size and inclusion criteria*

A total of 400 participants were recruited in the study. Either of the adult parents ( $\geq 18$  years) using tobacco products were included in the study whereas, temporary migrants (guests) were excluded. The sample size was calculated using sample size formula  $\frac{z^2 p(1-p)}{d^2}$ , where,  $n$  = desired sample size,  $z = 1.96$  (at 95% CI),  $p$  = prevalence of overall current tobacco use (smoking or smokeless) among all adults in urban areas = 38.1%, (4)  $d$  = precision level (5%). Thus, the calculated sample size found 361, considering 10% non-response rate 400 participants were selected.

#### *Sampling strategy*

**Figure 1** illustrates the multi-staged probability-proportional sampling procedure of the study. At first, four urban residential areas from Dhaka city were selected purposively viz. Mohammadpur Housing Society and Sector-6, Uttara from North City Corporation, Dhanmondi, and Motijheel colony from South City Corporation. These places were selected to incorporate participants from all four quadrants of Dhaka city with emphasizing on the geographical representation of the whole City and to represent a population from recognized residential areas with having adequate city advantages.

[INSERT FIGURE 1]

At the second stage, a list of 3,024 households involving a total population of 11,853 was drawn up from the respective city corporation offices. After a short enumeration survey in the listed HHs, a total of 1,436 tobacco users were drawn up. Probability-proportional-to-size sampling was used to draw out the target population. A list of tobacco user comprising of 297,351,156, and 632 respectively for the four study settings were drawn up. It was used as four single sampling units of tobacco users, and then 400 tobacco using parents (from 400 households) were selected from the list using systematic sampling technique.

### ***Ethics***

The study protocol was approved by the National Research Ethics Committee (NREC) of the Bangladesh Medical Research Council (BMRC) (BMRC/NREC/2016-2019/1429). Prior to starting the data collection, the interviewers briefed participants about the background and objectives of the study and informed written consent was obtained from them. The anonymity and confidentiality of the participants were strictly maintained and no incentive was offered.

### ***Measures***

A semi-structured questionnaire was formed to gather quantitative data. A pilot study (taking a double pre-test) was conducted using a questionnaire (translated into local language) among non-sample sites in an urban residential area within Dhaka City. The first pre-test recruited 20 eligible participants (25% female), which helped do check the suitability and sequencing of the questions. Problematic and unrealistic questions were revised and edited accordingly. Afterward, using the retest approach at an interval of 3 weeks to 5 weeks, we ran an additional pre-test among 20 participants in similar non-sample settings in order to achieve the construct validation. The Cronbach alpha was

calculated to determine the reliability of the questions and values were 0.774 for the knowledge domain, 0.921 for the perception domain.

Data available in Supplementary Table 1 shows 4 domains of the questionnaire: A. participants' socio-demographics; B. status of tobacco-use and its acceptance at HH-level; C. 15-items knowledge questions (Don't know/Yes) regarding adverse health effects of tobacco-use and D.14-items perceptions questions (Disagree/Agree) on parental tobacco control measures at HHs-level. These knowledge and perceptions questions were adapted from recent Global Adult Tobacco Survey (GATS) Report for Bangladesh, (Global adult tobacco survey [GATS], 2017) WHO tobacco epidemic control questionnaire, (WHO, 2017) and previous relevant studies (WHO, 2009; Matt et al. 2011; WHO, 2017; Rahman et al. 2015; Hasib et al. 2016; Haque et al. 2019; Bhatia et al. 2014; Siahpush et al. 2002; Andersen et., 2004; Tsoh et al. 2011). Overall knowledge level and perceptions was calculated by summing up items scores, and "Don't know" or "disagree" response was coded as 0 and correct or agree response was coded as 1. The total scores for knowledge ranged from 1 to 15 and for perceptions ranged from 1 to 14 score. A score of less than 50% was considered poor, 50% to 79% moderate/mediocre, and 80% and/or above was considered as good (Fashahsheh et al. 2015).

### ***Analysis***

Descriptive statistics, Chi-Square test and simple logistic regression analysis were performed using SPSS version 20 to explore the factors surrounding parental knowledge and perceptions on health effects and parental tobacco control measures at the HH-level. Multiple logistic regression was performed in order to adjust the impact of confounders (such as age, income, education, living status) on the association of potential predictors. Overall knowledge and perceptions scores were used as dependent variables. The

knowledge level was categorized as poor (poor-moderate) knowledge and good knowledge, and perceptions level were categorized as poor (poor-moderate) perceptions and good perception. Participants' socio-demographic characteristics, individual knowledge and perceptions items were used as independent variables, and the findings were interpreted using Odds Ratio (OR) with a 5% level of significance for each category. The prevalence of tobacco-use acceptances at home was calculated by dividing the total number of tobacco accepted in a household (either participant or other family members) with all sample households and only one tobacco user was considered from each HH.

## Results

The mean age ( $\pm$  SD) of participants was  $30.4 \pm 10.4$  years. Nearly one-third of the participants aged 30 years or above used tobacco products at the HH-level, which was found highly significant ( $P < 0.001$ ).

An overwhelming majority (84.6%) of tobacco users (especially SLT) at HHs in the study areas were female. There was a strong association ( $P < 0.001$ ) between sex and tobacco use at the HH-level. Lower and middle educated participants ( $P < 0.001$ ) as well as service working participants ( $P < 0.001$ ) were found to be more likely to use tobacco at the HHs than the educated group (Table 1).

**Figure 2** shows that over one-fifth (22.0%) of the participants allow smoking tobacco at HHs followed by 7% accepted smokeless tobacco-use at HHs and only 4% allowed both smoking and smokeless use at their HHs. The study revealed that overall one-third (33.0%) of the participants accepted any kind of tobacco use at the HH-level.

Only one-fifth of the participants (19.8%) had good knowledge and 40.8% had good level of perception regarding the health effect of tobacco-use (**Table 2**). Similarly, one-fifth of

the parents aged below 30 years old had good knowledge and around half of the parents of this age had good level of perception about the health effects of tobacco-use and parental tobacco control measures at HH-level. Good level of knowledge (20.4%) and perception (41.9%) were found among male participants than the female participants. A considerable percentage of parents who live with family had good level of knowledge (20.1%) and perception (41.1%) regarding the health effects of tobacco-use and parental tobacco control measures. Around a quarter of the parents living with joint family poses good level of knowledge (20.6%) and majority (58.9%) of them had good level of perception. In addition, higher educated parents' level of knowledge (20.2%) and perception (41.2%) were found better than the lower educated counterparts. However, level of good knowledge was indicated almost same for the working and non-working parents. Furthermore, 20.5% upper and high income parents had good level of knowledge and 40.4% parents of this group had good level of knowledge regarding the health effects of tobacco-use and parental tobacco control measures at HH-level.

Simple logistic regression analysis revealed that knowledge on overall health effect of tobacco use, tobacco residue can also cause harm at home ground, chewing tobacco is also harmful for health at home and specific health effects like asthma, infertility, pre-eclampsia were all associated factors with having good knowledge regarding health effect of tobacco-use at HH-level (**Table 3**).

In multiple analysis, after adjusting for possible confounders, the study determined that knowledge of overall tobacco effects on health ( $AOR = 20.92, 2.60-167.83$ ) and tobacco residue can also cause harm at home ground ( $AOR = 0.07, 0.04-0.15$ ) were significantly increased the odds of parents good knowledge. In addition, for specific reported health outcomes, asthma ( $AOR = 0.29, 0.17-0.49$ ), infertility ( $AOR = 0.43, 0.24-0.77$ ) and pre-eclampsia ( $AOR = 0.36, 0.14-0.90$ ) had higher odds for knowledge. On the other hand,



parents categorized as living with family, having higher education, and higher family income were insignificantly related to have good knowledge (**Table 3**).

Simple logistic regression analysis also shows that participants' socio-demographic characteristics such as living with joint family was significantly associated with overall parental perception (**Table 4**). Additionally, parents perceived factors such as parent at HH can easily control tobacco, parents should first quit using tobacco, parental guidance about the harms of tobacco-use, parental tobacco-use in front of children, parental religiosity practices, strong family bonding were significantly associated with overall positive perceptions for tobacco control measures at HH-level.

After adjusting the possible confounders, multiple logistic regression explored that the parents who lived in the joint family ( $AOR = 3.10, 1.88-5.13$ ) was a significant predictors to have positive perception level. However, parental perceptions such as parent at HH can easily control tobacco, parents should first quit using tobacco, parental guidance about the harms of tobacco-use, parental tobacco-use in front the children, parental religiosity practices, and strong family bonding were found to be not associated with parental good perceptions regarding familial initiatives for tobacco control measures at HH-level. Furthermore, multiple logistic regression analysis reported that parental age, living status, religion, occupation, socio-economic condition and other perceived factors like parental restriction on tobacco use, sharing tobacco products at HHs-level as the means of hospitality, sharing the struggling history of tobacco quitting, and parental sitting on non-smoking section had less likely to have overall positive parental perceptions tobacco control measures at HH-level. (**Table 4**).

## **Discussion**

This study was potentially first to explore that overall one-third (33.0%) of participants' HHs accepted tobacco-use (smoking or smokeless) in urban residential areas. This finding is consistent with another study conducted in Bangladesh (Ullah et al. 2013). The Times of India, however, reported that 40.0% of Indian adults accept smoking tobacco at the HH-level (Dey 2015).

The study revealed that one-fifth of the parents had good knowledge about the harmful effects of tobacco-use. Multiple analysis demonstrated that parents' knowledge of the overall health effects of tobacco-use had more than twenty times more likely to increase the odds of overall knowledge level on tobacco effect. However, in regard to specific health outcomes due to tobacco-use such as asthma, infertility, and pre-eclampsia were found to be significant predictors of having good knowledge. A similar study in South-East Asia region showed that although tobacco use is harmful for health, many aspects of tobacco use have not been adequately explained consequently, they are not well understood by most tobacco users (Bhatia et al. 2014).

The study distinctively documented that more than two-fifths of the participants had good perceptions of the parental tobacco control measures at the HH-level, and the level of knowledge and perceptions among the parents is associated with their socio-economic and educational status (Table 2). This finding is consistent with the results of multi-national studies which showed that tobacco use and its health effects are associated with poverty and illiteracy, both at the individual and the country level (Siahpush et al. 2002; McCullough et al. 2009).

The simple logistic regression model identified that the parents had positive perceptions of ‘parental tobacco-use before the children are the great obstacles to control tobacco products at HHs’ were nearly three times more likely to have good perceptions compared to the other parents. Our multiple logistic regression shows that the likelihood of a good perception level rose about thirty five times when they perceived that parents should provide guidance to their children about the harmful effect of tobacco use versus parents not doing so. There is evidence of using parental guidance and counselling to control tobacco use and building a good family tie so that they can share any problems among family members. Both of these two factors were supported by another two studies from USA, and reported that parental self-abstaining from tobacco-use, antismoking actions, guidance to the children towards avoiding tobacco products at home lead to less use of tobacco products at the HH- level (Andersen et al. 2004). If parents, grandparents and other older family members smoked or used tobacco items in front of children, it latently encouraged tobacco use by those children in the future (Ullah et al. 2013; Rosenstock and IM 1974). However, parents perceiving ‘strong family bonding can be helpful to prevent tobacco-use at HHs-level’ were less likely to be positively perceived regarding familial tobacco control initiatives. Conversely, a study conducted in Vietnam identified that continuous family support, counselling and good interactions and bonding among the family members influence a heavy smoker to give up smoking (Fashafsheh et al. 2015). In addition, consistent with the findings regarding parental perceptions reported in a present study, a few prior studies demonstrated how positive parental perceptions, their tobacco-using behavior and attitude could work as effective interventions on the way to tobacco control in the HH context (WHO, 2017; National Center for Chronic Disease Prevention and Health Promotion [CDC], 2019).

This study identified that sharing tobacco products at HHs-level should not be considered as the means of hospitality. However, a study conducted in urban areas explored this perception to be associated with promoting the tobacco-use at HH-level (Haque et al. 2019). Such offering tobacco to guests and intimate friends who come to visit home is a traditional cultural practice in Bangladesh, and helps to continue the use of tobacco (especially SLT) products in the home environment over generations (Hasib, 2014).

### **Limitations**

Though this study was the first of its kind conducted in Bangladesh, and it followed scrutinized multistage randomized sampling procedures, this study had several limitations. The cross-sectional nature of the study does not permit speculation about the causal direction of the relationships observed, and it limited our ability to conclude whether the risk perceptions were prejudiced behaviour, as hypnotized by the Health Belief Model or vice versa (Rosenstock 1974). In addition, due to a very high rate of migration/relocation among Dhaka city dwellers (more than one-third), the study could not enrol some sample HHs during the data collection and had to consider next HHs from the sampling frame, which may cause possible selection bias. Besides, this study was confined to urban residential areas only with a low number of participants (n=400). Thus, the findings may not wholly represent the true picture for all urban areas of Bangladesh. Furthermore, we cannot ignore the tendency of participants to provide more socially desirable responses (response bias), as the study was exclusive to tobacco users that determined the self-reported knowledge and perceptions and explored better perceptions than their knowledge as well, but how the tobacco users are translating their knowledge into real-life perceptions requires further investigation in a broader context.

## **Conclusion**

With a comprehensive view, the study identified that almost all the parents merely knew tobacco-use might affect their health, nevertheless only one-quarter of them had good knowledge of specific adverse health effects of tobacco-use. This study can provide the baseline information for policymakers, researchers, national and international agencies to introduce educational programs for parents and implement strict legislations to stop use of tobacco products at HHs.

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## **Conflict of interest**

The authors declare that there is no conflict of interest.

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## Tables

**Table 1.** Socio-demographic characteristics of the participants by their tobacco- use at the HH-level (n=400)

Socio-demographic characteristics	Place of Tobacco use		$\chi^2$	<i>P value</i>
	At household level  f (%)	Outside household  f (%)		
Overall				
Tobacco-use by participants (yes)	71 (17.7)	329 (82.3)	-	-
Tobacco-use by other family members (yes)	32 (8.0)	368 (92.0)	-	-
Summery	Total tobacco use at HHs level 103 (25.7%); tobacco use outside HHs 297 (74.3%)			
Age				
< 30 Years	28 (10.7)	234 (89.3)	25.94	<0.001
>30 Years	43 (31.2)	95 (68.8)		
Mean ± SD	30.4 ± 10.4			
Sex				
Male	60 (15.5)	327 (84.5)	41.14	<0.001
Female	11 (84.6)	2 (15.4)		
Living place				
With family	54 (18.2)	243 (81.8)	0.15	0.112
Alone/Outside family	17 (16.5)	86 (83.5)		
Family type				
Nuclear Family	55 (18.8)	238 (81.2)	.83	0.08
Joint Family	16 (15.0)	91 (85.0)		
Education				

Primary- Secondary	2 (14.3)	12 (85.7)	11.86	<0.001
Higher education	69 (17.9)	317 (82.1)		
Occupational status				
Non-working	14 (10.1)	124 (89.9)	8.35	<0.001
Working	57 (21.8)	205 (78.2)		
Socio-economic condition				
Low and middle income	4 (16.7)	20 (83.3)	0.021	0.218
Upper and high income	67(17.8)	309(82.2)		
Religion				
Muslims	65 (17.2)	313 (82.8)	1.44	0.102
Hindu and others	6 (27.3)	16 (72.7)		

**Table 2. Parental knowledge & perception scores by socio-demographic characteristics**

Characteristics	Knowledge level				Perception level			
	Poor ( < 50% score)	Moderate (Mediocre) (50–79% score)	Good ( > 80% score)		Poor ( < 50% score)	Moderate (Mediocre) (50–79% score)	Good ( > 80% score)	Total
Overall	36 (9.0)	285 (71.2)	79 (19.8)		13 (3.2)	224 (56.0)	170 (40.8)	36 (9.0)
Mean score ± SD	10.43 ± 2.34]				10.96± 1.85]			
Age								
< 30 Years	10 (3.8%)	195 (74.4%)	57 (21.8%)		2 (0.8%)	146 (55.7%)	114 (43.5%)	262
>30 Years	26 (18.8%)	90 (65.2%)	22 (15.9%)		11 (8.0%)	78 (56.5%)	49 (35.5%)	138
Sex								
Male	26 (6.7%)	282 (72.9%)	79 (20.4%)		13 (3.4%)	212 (54.8%)	162 (41.9%)	387
Female	10 (76.9%)	3 (23.1%)	0 (0.0%)		0 (0.0%)	12 (92.3%)	1 (7.7%)	13
Living place								
With family	36 (9.3%)	275 (70.7%)	78 (20.1%)		13 (3.3%)	216 (55.5%)	160 (41.1%)	389
Alone/Outside family	0 (0.0%)	10 (90.9%)	1 (9.1%)		0 (0.0%)	8 (72.7%)	3 (27.3%)	11
Family type								
Nuclear Family	30	206	57		12	181	100	293

	(10.2%)	(70.3%)	(19.5%)		(4.1%)	(61.8%)	(34.1%)	
Joint Family	6 (5.6%)	79 (73.8%)	22 (20.6%)		1 (0.9%)	43 (40.2%)	63 (58.9%)	107
<b>Education</b>								
Primary- Secondary	2 (14.3%)	11 (78.6%)	1 (7.1%)		0 (0.0%)	10 (71.4%)	4 (28.6%)	14
Higher education	34 (8.8%)	274 (71.0%)	78 (20.2%)		13 (3.4%)	214 (55.4%)	159 (41.2%)	386
<b>Occupational status</b>								
Non-working	8 (5.8%)	103 (74.6%)	27 (19.6%)		2 (1.4%)	82 (59.4%)	54 (39.1%)	138
Working	28 (10.7%)	182 (69.5%)	52 (19.8%)		11 (4.2%)	142 (54.2%)	109 (41.6%)	262
<b>Socio-economic condition</b>								
Low and middle income	2 (8.3%)	20 (83.3%)	2 (8.3%)		0 (0.0%)	13 (54.2%)	11 (45.8%)	24
Upper and high income	34 (9.0%)	265 (70.5%)	77 (20.5%)		13 (3.5%)	211 (56.1%)	152 (40.4%)	376
<b>Religion</b>								
Muslims	33 (8.7%)	269 (71.2%)	76 (20.1%)		12 (3.2%)	213 (56.3%)	153 (40.5%)	378
Hindu and others	3 (13.6%)	16 (72.7%)	3 (13.6%)		1 (4.5%)	11 (50.0%)	10 (45.5%)	22

**Table 3.** Adjusted predicting factors associated with participants' knowledge on adverse health effects of tobacco-use

Characteristics/ Predictors			Simple logistic regression analysis OR (95% CI)	P-value	Multiple logistic regression analysis AOR (95% CI)	P-value
Socio-demographic predictors						
Age		<30 Years <sup>RC</sup>	1	0.167	1	0.168
		>30 Years	0.682 (0.39-1.17)		0.68 (0.39-1.17)	
Living status		Living alone/others <sup>RC</sup>	1	0.384	1	0.974
		Living with family	2.50 (1.32-4.32) 0.32-19.89)		0.95 (0.05-17.41)	
Family type		Nuclear family <sup>RC</sup>	1	0.806	1	0.415
		Joint family	1.07 (.62-1.85)		1.27 (0.71-2.28)	
Education		Primary- Secondary <sup>RC</sup>	1	0.254	1	0.024
		Higher education	3.29 (1.42-7.55) 0.42-25.55)		3.38 (1.43-7.81) 1.43-26.81)	
Socio- economic condition		Low and middle income <sup>RC</sup>	1	0.165	1	0.235
		Upper and high income	2.83 (0.65-12.31)		3.55 (0.43-28.78)	
Religion		Hindu and others <sup>RC</sup>	1	0.462	1	0.444
		Muslims	1.59 (0.46-5.53)		1.63 (0.46-5.76)	
Predictors of overall knowledge on health effects of tobacco-use at HHs level						
Predictors of knowledge of general /environmental health effects	Tobacco in any form can affect your health	Don't know <sup>RC</sup>	1	0.155	1	0.004
		Yes	4.36 (0.57-33.28)		20.92 (2.60-167.83)	
	Tobacco residue can also cause harm at home ground	Don't know <sup>RC</sup>	1	<0.001	1	<0.001
		Yes	0.08 (0.05-0.15)		0.07 (0.04-0.15)	
	Lack of proper ventilation SHS causes harm for women and children	Don't know <sup>RC</sup>	1	0.139	1	0.262
		Yes	4.63 (1.61-13.25) 0.61-35.25)		6.11 (1.26-30.49) 1.26-144.49)	

	Chewing tobacco is also harmful for health at home	Don't know <sup>RC</sup>	1		1	0.063
		Yes	0.06 (0.02-0.15)	<0.001	0.36 (0.12-1.05)	
<i>Predictors of knowledge of specific health effects</i>	Heart diseases	Don't know <sup>RC</sup>	1	0.403	1	0.799
		Yes	0.80 (0.49-1.32)		1.07 (0.62-1.82)	
	Asthma	Don't know <sup>RC</sup>	1	<0.001	1	<0.001
		Yes	0.30 (0.18-0.50)		0.29 (0.17-0.49)	
	Mouth infections	Don't know <sup>RC</sup>	1	0.229	1	0.659
		Yes	0.73 (0.44-1.22)		0.88 (0.52-1.51)	
	Loss of taste	Don't know <sup>RC</sup>	1	0.062	1	0.077
		Yes	0.61 (0.36-1.03)		0.60 (0.34-1.05)	
	Stroke	Don't know <sup>RC</sup>	1	0.139	1	0.243
		Yes	4.63 (0.61-35.24)		5.74 (0.305-107.98)	
	Cancer	Don't know <sup>RC</sup>	1	0.175	1	0.162
		Yes	4.09 (0.53-31.32)		4.37 (0.55-34.61)	
<i>Predictors of knowledge of specific</i>	Infertility	Don't know <sup>RC</sup>	1	0.004	1	0.004
		Yes	0.43 (0.24-0.77)		0.43 (0.24-0.77)	
	Pre-eclampsia	Don't know <sup>RC</sup>	1	0.036	1	0.030
		Yes	0.39 (0.16-0.94)		0.36 (0.14-0.90)	
	Abortion	Don't know <sup>RC</sup>	1	0.457	1	0.296
		Yes	1.33 (0.62-2.85)		1.52 (0.69-3.33)	
	Still birth	Don't know <sup>RC</sup>	1	0.526	1	0.118
		Yes	1.19 (0.70-2.03)		1.57 (0.89-2.78)	
	Low birth weight	Don't know <sup>RC</sup>	1	0.175	1	0.215
		Yes	4.09 (0.53-31.32)		3.70 (0.46- 29.22)	

**Table 4.** Adjusted predicting factors associated with participants' perceptions on parental tobacco control measures at HH-level

Characteristics/ Predictors		Simple logistic regression analysis OR (95% CI)	P-value	Multiple logistic regression analysis AOR (95% CI)	P-value
Socio-demographic predictors					
Age	<30 Years <sup>RC</sup>	1	≤ 0.122	1	0.085
	>30 Years	0.72 (0.47-1.09)		0.64 (0.39-1.06)	
Living status	Living alone/others <sup>RC</sup>	1	0.364	1	0.067
	Living with family	1.86 (0.49-7.13)		5.21 (0.89-30.52)	
Family type	Nuclear family <sup>RC</sup>	1	<0.001	1	<0.001
	Joint family	2.76 (1.75-4.35)		3.10 (1.88-5.13)	
Education	Primary- Secondary <sup>RC</sup>	1	0.351	1	0.440
	Higher education	1.75 (0.54-5.68)		2.80 (1.20-38.54)	
Occupation	Non-working <sup>RC</sup> (Unemployed)	1	0.632	1	0.230
	Working	1.10 (0.73-1.69)		1.34 (0.82-2.19)	
Socio- economic condition	Low and middle income <sup>RC</sup>	1	0.602	1	0.787
	Upper and high income	0.80 (0.35-1.84)		0.84 (0.25-2.83)	
Religion	Hindu and others <sup>RC</sup>	1	0.645	1	0.973
	Muslims	0.82 (0.34-1.94)		1.01 (0.40-2.52)	
Predictors of overall perception level for parental tobacco control measures at HHs level					
Parent (Household Head) can easily control tobacco use at HHs	Disagree <sup>RC</sup>	1	<0.001	1	0.966
	Agree	2.76 (1.74-.4.35)		0.95 (0.13-6.76)	
Parents should first quit using tobacco at HHs-level	Disagree <sup>RC</sup>	1	<0.001	1	0.857
	Agree	2.82 (1.78-4.47)		1.20 (0.15-9.20)	
	Disagree <sup>RC</sup>	1	<0.001	1	0.090



Parents should provide guidance about the harms of tobacco-use	Agree	2.97(1.88-4.69)		35.26 (0.57-170.74)	
Using children to light or buy tobacco products can promote tobacco-use at HHs	Disagree <sup>RC</sup>	1		1	0.721
	Agree	1.04 (0.69-1.59)	0.839	0.91 (0.56-1.48)	
Parental restriction of tobacco-use can control tobacco use at HHs	Disagree <sup>RC</sup>	1	0.181	1	0.617
	Agree	1.31 (0.88-1.97)		0.39 (0.01-15.29)	
Parental tobacco use before the children is the great obstacles to control tobacco products at HHs	Disagree <sup>RC</sup>	1	<0.001	1	0.442
	Agree	2.73 (1.74-4.27)		0.41 (0.04-3.86)	
Sharing tobacco products at HHs-level should not be considered as the means of hospitality	Disagree <sup>RC</sup>	1	0.080	1	0.956
	Agree	1.44 (0.95-2.18)		1.04 (0.21-4.99)	
Parental religiosity practices (Regular praying or worshiping/ Read holy books etc.) can help families to be tobacco free	Disagree <sup>RC</sup>	1	0.003	1	0.061
	Agree	1.89 (1.25-2.84)		0.15 (0.02-1.09)	
Sharing the struggling history of tobacco quitting to other HH members	Disagree <sup>RC</sup>	1	0.152	1	0.888
	Agree	1.37 ( 0.89-2.12)		1.25 (0.05-29.42)	
Tobacco products should be quite inaccessible at HHs	Disagree <sup>RC</sup>	1	0.075	1	0.314
	Agree	1.45 ( 0.96-2.18)		3.32 (0.32-34.27)	
Parental sitting in non-smoking sections outside of HHs	Disagree <sup>RC</sup>	1	0.688	1	0.644
	Agree	1.09 ( 0.71-1.67)		1.12 (0.67-1.87)	
Strong family bonding within family members can be helpful to prevent tobacco-use at HHs-level	Disagree <sup>RC</sup>	1	<0.001	1	0.586
	Agree	2.76 (1 .76-4.33)		0.39 (0.01-11.45)	
Intervention need to be covered to make parental awareness of adverse effects (by GO/NGO)	Disagree <sup>RC</sup>	1	0.812	1	0.366
	Agree	1.08 ( 0.56-2.10)		1.45 (0.64- 3.26)	
Home is out of tobacco region should go as social campaign	Disagree <sup>RC</sup>	1	0.002	1	0.249
	Agree	1.90 (1 .27-2.87)		2.91 (0.47-17.94)	

## **Figures**

Figure 1. Sampling procedure of the study

Figure 2. Acceptance of tobacco use at participant's household level