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

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Abstract

The study aimed to investigate parental knowledge of tobacco effects on health and parental perceptions on tobacco control measures at households in Dhaka city, Bangladesh. Out of 1436 tobacco-using parents, a total of 400 participants were selected for the cross-sectional survey using a multi-stage probability sampling. Overall knowledge and perceptions of parents were scored. Simple and multiple logistic regressions were performed. There were 19.8% of parents who had good knowledge about health effects of tobacco and 40.8% had positive perception on home initiatives of tobacco control measures respectively. The study revealed that 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, parental perceptions indicate that living in the joint family was positively associated with controlling tobacco use (AOR =3.10, 95% CI = 1.88-5.13). It suggests that health 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 consumption 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 13-15 years) are exposed to second-hand smoke in public places, and 35.0% are exposed to second-hand smoke (SHS) at Household (HH) level (WHO, 2009). Bangladesh faces considerable health and economic consequences for high levels of tobacco-use (Barkat et al. 2012). Approximately, 161,000 people die each year from tobacco consumption related diseases (Hasan, 2018). In particular, smoking prevalence is higher in the urban areas of Bangladesh given the gradual increase of urbanization (Idris et al. 2007). Dhaka city is one of 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 public places (such as restaurants, roads, bars and workplaces), yet the law is not implemented effectively, and there is even no 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 (WHO, 2017; National Center for Chronic Disease Prevention and Health   Promotion [CDC], 2019). However, till today, Bangladesh has no policy on 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 (Hasib et al. 2016).While some parents may view 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 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 fully aware of the detrimental impact about tobacco-use atHHs (Haque et al. 2019).

Previous studies in Bangladesh have shown tobacco-use is merely part of cultural traditions. Still, there is dearth of research on parental knowledge and perceptions on health effects of tobacco use and its 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 the research is to explore the status of tobacco-use and the prevalence of tobacco-use acceptance at HHs; and to investigate the parental knowledge of tobacco use on health, and finally 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 adult parents (aged 18 years or more) were recruited at the HH's study. Both male and female adult parents (≥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 $\frac{z^2 p(1-p)}{d^2}$ {$QUOTE\ n = \frac{z^2 pq}{d^2}$}, where, n = desired sample size, z = 1.96 (at 95% confidence interval-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-stage 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 form 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 was drawn up for four locations which comprising of 297, 351, 156, and 632. 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 a 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 (Fashafsheh 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 tobaccos 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 (± SD) of participants was 30.4 ± 10.4 years. Nearly one-third of the participants aged 30 years or above used tobacco products at the HH-level, which was found to be 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 between sex and tobacco use at the HH-level (P<0.001). Higher educated participants (P<0.001) as well as participants currently employed (P<0.001) were found to be more likely to use tobacco at the HHs level **(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. Nearly one-fourth of the participants (19.8%) had good knowledge of tobacco effects on health and 40.8% had good level of perception regarding control measures 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 respectively. Good level of knowledge (20.4%) and perception (41.9%) were found to be higher among male participants than 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 respectively. 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, level of knowledge (20.2%) and perception (41.2%) were found to be higher among educated parents than that of lower educated parents. The study found no difference between working and non-working parents who had good level of knowledge about tobacco effects. Furthermore, parents belong to upper and higher income 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 the 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, CI = 2.60-167.83) and tobacco residue can also cause harm at home ground (AOR = 0.07, CI = 0.04-0.15) were significantly increased the odds of parents good knowledge. In addition, for specific reported health outcomes, asthma (AOR = 0.29, CI = 0.17-0.49), infertility (AOR = 0.43, CI = 0.24-0.77) and pre-eclampsia (AOR = 0.36, CI = 0.14-0.90) had higher odds of 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 towards tobacco control measures **(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, using children to light or buy tobacco products, parental tobacco-use in front children, sharing tobacco products at HHs-level as the means of hospitality, parental religiosity practices, strong family bonding were significantly associated with overall positive perceptions for tobacco control measures at HH-level **(Table 4)**.

After adjusting the possible confounders, multiple logistic regression explored that the parents who lived in the joint family (AOR = 3.10, CI = 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 about 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 had 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 smoke 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 logistic regression analysis demonstrated that parents' knowledge had more than twenty times more likely to increase the odds of acting tobacco effect on health. Moreover, 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. 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' nearly were 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 seen 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 the 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 significantly 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 and IM 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)

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

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

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

Figures

Figure 1. Sampling procedure of the study

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