

# Family and peer effect on young and adolescent smoking in Bangladesh

Moin Uddin Ahmed (✉ [moin.ahmed@westernsydney.edu.au](mailto:moin.ahmed@westernsydney.edu.au))

Western Sydney University <https://orcid.org/0000-0002-1733-5216>

Rubayyat Hashmi

University of Southern Queensland Faculty of Business Education Law and Arts

Mohammad Habibullah Pulok

Nova Scotia Health Authority

Kathy Tannous

Western Sydney University

Khorshed Alam

University of Southern Queensland Faculty of Business Education Law and Arts

---

## Research article

**Keywords:** tobacco, smoking, adolescent, young adults, peer, family, Bangladesh

**Posted Date:** January 14th, 2020

**DOI:** <https://doi.org/10.21203/rs.2.20836/v1>

**License:**   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

**Background:** Cigarette smoking among youth has become a major public health problem in many developing countries like Bangladesh. Many smokers start smoking in their teens; then they become addicted and deepen the dependency during early adulthood, maintaining their smoking behaviour. Current literature from Bangladesh has not examined how peer effect, family influence and smoking-related knowledge impact smoking behaviour of the adolescent and young adults from the urban areas of the country. This study aims to fill this gap in the literature by investigating the smoking patterns of urban male adolescents and young adults in Bangladesh. The study aims to examine the family and peer influence on the behaviour of smoking of this population group. The study also explores how knowledge on harmful effects of smoking affects the participation decision of smoking by young adults and adolescents.

**Methods:** This study is an educational institution-based cross-sectional study within the framework of the Global Youth Tobacco Survey (GYTS). Primary data has been collected from a sample of 995 urban male students aged between 10-24 years living in the seven divisional headquarters of Bangladesh. We use logistic regression and count data regression models to examine how smoking is associated with different factors.

**Results:** Our results suggest that a person is 45% more prone to smoke a cigarette if any of the family members is a smoker. The likelihood of smoking is about six times higher if he is offered a cigarette by his friend, whereas the likelihood of being a smoker is 15-fold if he has a smoker friend, as the findings reveal. However, institutional and family awareness are not significantly related to smoking.

**Conclusion:** Strong evidence of peer and family effect on smoking initiation indicates the need for effective smoking-prevention intervention at the national level, specifically targeted at family and educational institutions. The findings are also relevant for other countries which share the similar characteristics of Bangladesh in terms of adolescent smoking determinants.

## Background

Individuals become more familiar with their social networks during adolescence and young adulthood period. This is a period of adopting and keeping persistent patterns of behaviours. This transition time makes them vulnerable to smoking initiation and other addictions. Adolescence is a period of smoking onset for most adult smokers, and multiple social, psychological and biological factors influence this process [1, 2]. Family members and peers in the adolescents' social networks shape their socio-economic behaviour, including their smoking behaviour. The hypothesis that smoking onset is influenced by peers' and family members' smoking is well-documented in existing literature in developed countries [3–10].

On the other hand, in developing countries, the susceptibility of smoking onset and efficacy of prevention programmes differ in accord with the variation of ethnic and racial traits, socio-cultural context and socioeconomic status; accordingly, research is required in these countries [11, 12]. In addition, smoking

prevention and cessation programmes are not well-developed in developing countries compared to developed countries, where smoking prevention programmes are established in a comprehensive manner as they take into account both youngsters and parents within an integrated framework [13].

Bangladesh has a high smoking prevalence rate among developing countries, with 23 per cent of adult smokers [14]. The public health burden of Bangladesh is acute because 25 per cent of deaths in men is attributable to smoking [15, 16]. To address the issue of tobacco control, Bangladesh was the first country to sign the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) in 2003 [17]. Bangladesh enacted tobacco control law in 2005 and amended it in 2013 to make it more compliant with WHO FCTC [18]. Smoke-free places, health warning messages, tobacco-advertising ban in media, and increased tax rates on tobacco products are the main tobacco control strategies implemented in Bangladesh [19]. However, cessation service and related programmes are negligible in Bangladesh [20].

Understanding the role of family and peer effect on smoking is vital for developing smoking prevention and cessation interventions in Bangladesh. There are few studies from Bangladesh which examined the correlates of smoking behaviour among young adults and adolescents [21–24]. However, these studies did not consider peer and family members' smoking behaviour to understand the smoking pattern of this population group. This study aims to fill this gap in the literature by examining family and peer influence on the behaviour of smoking among urban young adults and adolescent males using data from an educational-institution based cross-sectional survey carried out in seven major cities of Bangladesh. We investigated not only the association of family and peer influence with the probability of smoking but also with the intensity of smoking.

## **Methods**

### **Study design and study population**

The research team conducted an educational-institution based, cross-sectional study within the framework of the Global Youth Tobacco Survey (GYTS). The educational institutions, considered in this study, were in the headquarters of each of the then-seven administrative divisions of Bangladesh. These headquarters were the cities of Dhaka, Chittagong (now- Chattagram), Rajshahi, Rangpur, Sylhet, Khulna and Barishal. Smoking is primarily a male-oriented activity in Bangladesh. The proportion of females aged 15 years and above who described themselves as a current smoker ranged between 1.1 per cent [14] and 1.5 per cent [25]. Therefore, the study focused exclusively on males. The target population, therefore, comprised urban male students aged 10 to 24 years of age who were studying at the relevant institutions during the period of data collection in 2014.

### **Sampling design and sample size**

A two-staged stratified clustered sampling with probability proportional to size (PPS) sampling method was used in this study. From the institution list of the Bangladesh Bureau of Educational Information and

Statistics (BANBEIS), two high schools, two colleges and one university were drawn randomly from each of the seven selected cities. This resulted in data being collected from 35 educational institutions. The study team followed the Bangladesh Household Income and Expenditure Survey (HIES) of 2010 to collect a size measure of the district adolescent and young adult population. From this measure, it employed a probability proportionate sampling strategy to draw an appropriate sample from the institutions. The estimated sample size of respondents was 806 with a design effect of 2, and the margin of error of 5 per cent. This was the minimum sample size required for the study. Allowing for data cleaning and contingencies, the final sample size proposed was 1,008. With a 1.3 per cent non-response rate, the sample size for analysis was 995.

## **Data collection**

A structured questionnaire was developed and used to collect primary data from respondents of 35 educational institutions. The study not only adopted core components of the GYTS questionnaire but also included additional questions to allow the analysis of the influence of family and peer behaviour on the smoking outcomes of the target group. Data were collected by trained enumerators, and the participants were assured that the data would be confidential. Consent from any of the parents or guardian was obtained where the participant was 16 years old or less. In this case the interview was conducted in the absence of any of the parents or guardian to reduce the social desirability bias.

## **Dependent and independent variables**

During the survey, the respondents were asked whether they smoked cigarettes in the last 30 days preceding the survey. Using this information, a binary dependent variable was constructed for analysis. Independent variables included socio-demographic characteristics such as age, education, income, financial support from family, parents' education, family history of smoking, conveying of information on the harmful effects of smoking by the educational institution, smoking status of friends and explicit activities of peers to encourage smoking by the target individuals. The age variable was disaggregated into three categories: 10–15 years, 16–18 years and 19–24 years. Education was also disaggregated into three categories: school (up to and including ten standard years of education), college (11–12 standard years) and university (more than 12 standard years of education). Economic variables included income (full-time, part-time or casual work) and financial support from family. These variables were dichotomous variables having the value of 0 if the answer was “no” and 1 if it was “yes”. Parents' education was divided into five categories: less than primary, secondary, higher- secondary, and tertiary. The location variable comprised the seven divisional cities, as the educational institutions attended by the students in the study were in these cities. The variable for family history of smoking, which was assigned two different value labels for “no” and “yes”, considered whether the participants' father, uncle, brother, cousin or grandfather was a smoker. The influence of peers was measured by two variables: whether any of the friends was a smoker, and whether the participant was encouraged to commence smoking by a friend (by being offered a cigarette). Information provided by family or by the education institution about the harmful effects of smoking were constructed as binary variables. Living location variable was classified

into four categories- living with parents, living in the dormitory, living with relatives and living in other places.

## **Statistical analysis**

This study used both univariate and multivariate methods for statistical analysis. The distribution of participants between smokers and non-smokers based on different characteristics was determined using the univariate technique. Multivariate regression model was used to estimate the adjusted odds-ratio(OR) to study the association between the probability smoking and independent variables. Furthermore, count data regression model was employed to estimate the incidence rate ratio (IRR) of the intensity of smoking. Different specification of these models are checked to analyse the sensitivity of coefficients of interest. STATA (version 14.2) was used to perform data management and statistical analysis.

## **Ethics approval**

This study received ethical clearance from Bangladesh Medical Research Council (BMRC). The approval number is BMRC/NREC/2013–2016/214.

## **Results**

Table 1 presents the descriptive statistics of smoking prevalence among the study population. The number of smokers and non-smokers was 221 and 774, respectively, representing a smoking prevalence rate of 22.2 per cent. The prevalence of smoking differed by age group and ranged from 7.8 per cent for the 10–15 years old group to 43.3 per cent for the 19–24 years old group. In addition, factors such as level of education, residence, financial support from family, income, mother's education, smoking among family members or peers/friends, education institutional awareness, and smoking encouragement by friends were found to be different between the smoking and non-smoking groups.

Table 1  
Distribution of smoking status by independent variables

	Smoker		Non-smoker		p value
	frequency	percentage	frequency	percentage	
<b>Age</b>					
10–15 years	28	12.67	333	43.02	0.00
16–18 years	99	44.8	318	41.09	
19–24 years	94	42.53	123	15.89	
<b>Education</b>					
School	61	27.6	404	52.2	
College	120	54.3	312	40.31	
University	40	18.1	58	7.49	
<b>Location</b>					
Barishal	17	7.69	46	5.94	
Chittagong	30	13.57	168	21.71	
Dhaka	74	33.48	239	30.88	
Khulna	36	16.29	108	13.95	
Rajshahi	32	14.48	99	12.79	
Rangpur	15	6.79	77	9.95	
Sylhet	17	7.69	37	4.78	
<b>Financial support from family</b>					
No	19	8.6	24	3.1	
Yes	202	91.4	750	96.9	
<b>Income</b>					
No	167	75.57	712	91.99	
Yes	54	24.43	62	8.01	
<b>Father's Education</b>					
Less than primary	6	2.71	30	3.88	
Primary	47	21.27	125	16.15	

	Smoker		Non-smoker		
Secondary	30	13.57	100	12.92	0.42
Higher-Secondary	82	37.10	296	38.24	
Tertiary	56	25.34	223	28.81	
Mother's Education					
Less than primary	20	9.05	49	6.30	
Primary	74	33.48	190	24.55	
Secondary	53	23.98	168	21.71	0.00
Higher-Secondary	51	23.08	256	33.07	
Tertiary	23	10.41	111	14.34	
Family member smokes					0.00
No	88	39.82	476	61.5	
Yes	133	60.18	298	38.5	
Friend smokes					0.00
No	2	0.9	334	43.15	
Yes	219	99.1	440	56.85	
Family history of smoking					0.00
Father	73	54.89	207	69.46	
Uncle	19	14.29	34	11.41	
Brother	25	18.8	37	12.42	
Cousin	10	7.52	10	3.36	
Grandfather	6	4.51	10	3.36	
Friend offers					0.00
No	12	5.43	455	58.79	
Yes	209	94.57	319	41.21	
Institutional awareness					0.02
No	54	24.43	136	17.57	
Yes	167	75.57	638	82.43	
Family awareness					0.39

	Smoker		Non-smoker		
No	86	38.91	326	42.12	
Yes	135	61.09	448	57.88	
Living location					0.01
lives with parents	154	69.68	597	77.13	
if lives in hostel	27	12.22	96	12.4	
lives in mess/shared house	35	15.84	59	7.62	
others	5	2.26	22	2.84	

Table 2 presents the results from the multivariate logistic regression models. Model A included only family and peer smoking status along with peers' encouragement while Model B added other covariates. There was a statistically significant and positive association between the likelihood of smoking and age, education, smoking by a family member, smoking by a friend, being offered a cigarette by a friend and being dependent on financial support from family. Model B found that individuals were almost twice as probable to smoke (OR = 1.84 with 95% CI: 1.29, 2.62) if they came from a family where at least one member smoked. However, the likelihood was 11 times more (OR = 11.04, 95% CI: 2.36, 51.58) when the individual had a friend who smoked. The association between being a smoker and having been offered a cigarette by a friend was also positive. A person who, when still a non-smoker, was offered a cigarette by a friend, had 6.4 times more chance of becoming a regular smoker than those who did not receive such an offer (OR = 6.41, 95% CI: 3.23, 12.70).



Table 2

Correlates of smoking among adolescents as young adults: multivariate logistic regression models

	Model A		Model B	
	OR	95% CI	OR	95% CI
Age (Ref: 10–15 years)				
16–18 years			3.27***	(1.74–6.15)
19–24 years			5.83***	(2.57–13.22)
Education (Ref: School)				
College			0.56**	(0.32–1.00)
University			0.46*	(0.20–1.09)
Financial support from family (Ref: No)			0.48*	(0.21–1.11)
Income (Ref: No)			1.20	(0.69–2.10)
Family member smoke (Ref: No)	1.78***	(1.27–2.50)	1.84***	(1.29–2.62)
Friend smokes (Ref: No)	13.24***	(2.86–61.39)	11.04***	(2.36–51.58)
Friend offers (Ref: No)	7.54***	(3.85–14.74)	6.41***	(3.23–12.70)
Institutional awareness (Ref: No)			0.87	(0.55–1.36)
Living location (Ref: Parents)				
Living in dormitory			0.72	(0.41–1.27)
Living with relatives			1.16	(0.67–2.03)
Living other			0.45	(0.15–1.40)
Observations	995		995	
Notes: Level of significance *** p < 0.01, ** p < 0.05, * p < 0.1				

Table 3 presents the results from the analysis of negative binomial regression modelling. The data contained 77.9 percent zero observations with all other values being positive, making count data regression a suitable choice for the modelling [26]. The results suggest that the important factors associated with smoking intensity were age, presence of a smoker in the family, association with friends who smoke, being offered a cigarette by a friend and living with others in a dormitory. However, education level and family support were not associated with smoking. The incidence rate ratio (IRR) of the variable related to family member's smoking status was 1.45 (95% CI: 1.02, 2.07) which indicates that a person was 45 per cent more likely to be a smoker if one or more of their family members was a smoker. Again, a person was six times (IRR = 6.01, 95% CI: 3.48, 10.38) more likely to smoke if the respondent was offered

a cigarette by a friend, whereas the likelihood of being a smoker was 15-fold higher (IRR = 15.66, 95 per cent CI: 5.01, 48.94) if the respondent had a smoker friend. Similar to the results of the logit model, there was no clear evidence of a relationship between being a smoker and income or institutional promotion of the adverse effects of smoking.

Table 3

Correlates of smoking among adolescents as young adults: negative binomial model

	Incidence rate ratio (IRR)	95% CI
Age (Ref: 10–15 years)		
16–18 years	2.55***	(1.37–4.74)
19–24 years	3.66***	(1.65–8.14)
Education (Ref: School)		
College	1.01	(0.56–1.81)
University	1.79	(0.73–4.40)
Financial support from family (Ref: No)	0.47	(0.19–1.18)
Income (Ref: No)	1.24	(0.72–2.16)
Family member smoke (Ref: No)	1.45**	(1.02–2.07)
Friend smokes (Ref: No)	15.66***	(5.01–48.94)
Friend offers (Ref: No)	6.01***	(3.48–10.38)
Institutional awareness (Ref: No)	0.92	(0.59–1.43)
Living location (Ref: Parents)		
Living in dormitory	0.58*	(0.32–1.07)
Living with relatives	1.20	(0.69–2.07)
Living other	0.59	(0.21–1.61)
Constant	0.01***	(0.00–0.05)
Observations	995	
Notes: Level of significance *** p < 0.01, ** p < 0.05, * p < 0.1		
LR test of alpha = 0, p = 0.000		

## Discussion

This study estimated the prevalence of smoking among male urban adolescents and young adults in Bangladesh. It examined the association between the smoking behaviour of young people, and the behaviour and status of their families and peers. The study also investigated whether education institutional promotion of the harmful effects of smoking affected the smoking status of the study population. The findings on smoking prevalence among urban adolescents and young adults are similar to those of earlier studies conducted in Bangladesh and other similar developing countries. The prevalence of smoking among the college students included in this study corresponds to the rate of the study by Tarafdar [24] where students in a higher secondary college in the Moulvibazar district of Bangladesh were the study participants. In another study of college students studying in private and public colleges in three towns of Karachi, Pakistan, [27, 28] it was 24 per cent. Kamal [23] surveyed 474 male students at the Islamic University, Kushtia, Bangladesh, and reported that about 36 per cent were current smokers. It should be noted that, as in our case, many studies only included male students in the target population since smoking prevalence is not high among female students in many low-middle income countries.

Several studies have linked the smoking behaviour of youth with the smoking behaviour of their parents. For example, Gilman and co-authors [5] studied the influence of parental smoking on adolescent smoking initiation. The results indicated that adolescents whose parents were regular smokers had a higher likelihood of being initiated into smoking (OR = 2.81) than adolescents whose parents never smoked. It is well established in the literature that paternal and family members' smoking status influences youth smoking behaviour [29, 30]. Our study also shares a similar view.

Students living with parents or siblings smoking were more likely to be initiated into smoking at an early age than are those who live in a non-smoking home environment. Parents who hold strong anti-smoking views may directly influence their adolescent children's intention to smoke and to socialise with smokers [29]. Karimy et al. [31] used demographic variables, psychological factors, and components of the theory of planned behaviour to identify factors contributing to cigarette smoking among male adolescents in Iran. They found that parents' smoking had a significant impact on the smoking behaviour of adolescents. Our research showed that the average number of smokers in a family was higher for respondents who were current smokers. This study further revealed that the probability of smoking among young people was positively related to their number of smoker friends. It also found that an offer to smoke by friends increased the chance of becoming a smoker.

This study found that most of the current smokers reported being offered a cigarette as the trigger for their initiation into smoking. Peer smoking has emerged as one of the most significant predictors of adolescent smoking in many studies. For example, Christophi et al. [32] showed that smoking by peers was the main predictor of smoking among adolescent students attending middle and high schools in Cyprus.

We found that parental education did not significantly reduce smoking among young adolescents and adults. This is similar to the findings in Kamal et al. [23], where the authors investigated socio-

psychological correlates of smoking among male students in selected Bangladeshi universities. The findings of a study conducted in Kerala, India also suggested that the father's educational attainment had no bearing on adolescent boys' smoking status [33].

This study found that obtaining knowledge about the harmful effects of smoking from the education provider does not significantly reduce the probability of smoking. The finding differs from those made in some other studies [34]. One reason for this could be that the level of knowledge sharing by the institutions is not intensive enough to be associated with a change in smoking behaviour. Another reason could be that the benefits of smoking are certain as well as immediate, while the costs are perceived to be uncertain and, if they are realised, occur a long way into the future. The place of residence was not found to be a strong factor in our study, which is similar to the findings of a Nepalese study that investigated correlates of use among junior college students in twin cities of western Nepal [34]. In this study, financial support from family was not associated with either the prevalence or intensity of smoking. This is consistent with the finding from Mall Leinsalu's study in Hungary in terms of self-generated income [35].

Our study has a few limitations. One of the limitations of the study is that biometric screening was not done to confirm the smoking status of the individuals. Therefore, there might exist some under-reporting or over-reporting, which is a common limitation of self-reported data. The present study tried to minimise this effect by employing a well-trained interviewer who was likely to convince the respondents that confidentiality would be strictly maintained. The modelling approach adopted in this study could lend itself to different kinds of interpretation. However, the coefficients of interest are not sensitive to the choice of variables, as depicted in supplementary Table 1.

This study has a number of policy implications for tobacco control in Bangladesh. First, most of the tobacco control law focuses on tobacco advertising and promotion, health warning messages and smoke-free public places. Bangladesh government is also exploring tax-raising policies to control tobacco use. However, little to no attention has been paid to prevention campaigns that involve parents or campaigns aimed at teaching young and adolescents peer refusal skill. Second, Bangladesh also lacks cessation interventions targeting adult smokers specially smoker parents. Quitting helpline and tobacco treatment interventions are also unavailable in Bangladesh. Third, studies have found that family engagement and family cohesion on anti-smoking behaviour reduce smoking among adolescents and young adults [36, 37] and in line with our findings, we suggest that Bangladesh government could design interventions aimed at parents and educational institutions. While not covered in this study, smoke-free air law initiatives have been successful in other countries [38] and should be initiated as a potentially successful intervention in Bangladesh, for example, introducing smoke-free campuses in educational institutions. Future research on designing family and peer intervention would benefit Bangladesh on tobacco control.

## Conclusion

The current study expanded the understanding of the Bangladeshi young and adolescents' smoking onset in the context of smoking exposure from family members and peers. The research findings validated that both family members and peers are significant factors in young and adolescents' cigarette smoking status. We found that peer smoking status was substantially associated with a higher risk than family members smoking behaviour for the Bangladeshi young and adolescents' smoking onset. In addition, the risk of smoking initiation is also higher if the respondents' friends offer to smoke. However, institutional and family awareness did not significantly reduce the risk of smoking initiation, which suggests the need for improving the quality and breadth of smoking prevention interventions at the educational institutions. The findings are also relevant for other countries which share the similar characteristics of Bangladesh in terms of adolescent smoking determinants.

## List Of Abbreviations

BANBEIS: Bangladesh Bureau of Educational Information and Statistics

BMRC: Bangladesh Medical Research Council

FCTC: Framework Convention on Tobacco Control

GYTS: Global Youth Tobacco Survey

HIES: Household Income and Expenditure Survey

IRR: Incidence Rate Ratio

OR: Odds-Ratio

PPS: Probability Proportional to Size

WHO: World Health Organization

## Declarations

### **Ethics approval and consent to participate**

This study received ethical clearance from Bangladesh Medical Research Council (BMRC). The approval number is BMRC/NREC/2013-2016/214. Written consents of the participants were taken before the interview. The written informed consent for participation was also obtained where participants were children (under 16 years old) from one of their parents or guardian.

### **Consent for Publication**

Not applicable

## Availability of data and materials

The datasets analysed during the current study are not publicly available due to confidentiality and privacy issues but are available from the corresponding author on reasonable request.

## Competing interest

The authors declare that they have no competing interests.

## Funding

This study was supported by a research grant from Bangladesh Centre for Communication Programs (BCCP). The grant number is GC#BCCP/Tobacco Control/2014-16. However, the BCCP played no role in the study design and interpretation of the findings. Views and opinions of this article are solely of the authors and do not necessarily represent the official position or policies of the funding body.

## Author's contributions

MA had general oversight of the study, contributed in the study design, conducted statistical analysis and wrote the first draft. MP and RH were responsible for overseeing the overall process of data collection and interpreting results. MP, RH and KA co-wrote the Introduction and Discussion sections. KT contributed to interpreting results and writing discussion section. All the authors contributed to the writing of the manuscript. All authors approved the final manuscript.

## Acknowledgement

Authors would like to thank all students who participated in the study. Authors are also grateful for the financial support from Bangladesh Centre for Communication Programs (BCCP).

## References

1. Mayhew KP, Flay BR, Mott JA: **Stages in the development of adolescent smoking.** *Drug Alcohol Depend* 2000, **59**(SUPPL. 1):61-81.
2. Nichter M, Nichter M, Van Sickle D: **Popular perceptions of tobacco products and patterns of use among male college students in India.** *Soc Sci Med* 2004, **59**(2):415-431.
3. De Vries H, Engels R, Kremers S, Wetzels J, Mudde A: **Parents' and friends' smoking status as predictors of smoking onset: Findings from six European countries.** *Health Educ Res* 2003, **18**(5):627-636.
4. Alexander C, Piazza M, Mekos D, Valente T: **Peers, schools, and adolescent cigarette smoking.** *Journal of Adolescent Health* 2001, **29**(1):22-30.
5. Gilman SE, Rende R, Boergers J, Abrams DB, Buka SL, Clark MA, Colby SM, Hitsman B, Kazura AN, Lipsitt LP *et al*: **Parental smoking and adolescent smoking initiation: An intergenerational perspective**

- on tobacco control. *Pediatrics* 2009, **123**(2):e274-e281.
6. US DHHS: **Preventing tobacco use among youth and young adults: a report of the surgeon general.** Atlanta. : Centers for Disease Control and Prevention; 2012.
  7. Kobus K: **Peers and adolescent smoking.** *Addiction* 2003, **98**(SUPPL. 1):37-55.
  8. Chassin L, Presson C, Seo DC, Sherman SJ, Macy J, Wirth RJ, Curran P: **Multiple Trajectories of Cigarette Smoking and the Intergenerational Transmission of Smoking: A Multigenerational, Longitudinal Study of a Midwestern Community Sample.** *Health Psychol* 2008, **27**(6):819-828.
  9. Scragg R, Laugesen M, Robinson E: **Parental smoking and related behaviours influence adolescent tobacco smoking: Results from the 2001 New Zealand national survey of 4th form students.** *New Zealand Med J* 2003, **116**(1187).
  10. Simons-Morton BG, Farhat T: **Recent findings on peer group influences on adolescent smoking.** *J Prim Prev* 2010, **31**(4):191-208.
  11. Haiman CA, Stram DO, Wilkens LR, Pike MC, Kolonel LN, Henderson BE, Marchand LL: **Ethnic and racial differences in the smoking-related risk of lung cancer.** *New Engl J Med* 2006, **354**(4):333-342.
  12. Baris E, Brigden LW, Prindiville J, Da Costa e Silva VL, Chitanondh H, Chandiwana S: **Research priorities for tobacco control in developing countries: A regional approach to a global consultative process.** *Tob Control* 2000, **9**(2):217-223.
  13. De Vries H, Mudde A, Leijts I, Charlton A, Vartiainen E, Buijs G, Clemente MP, Storm H, González Navarro A, Nebot M *et al*: **The European Smoking prevention Framework Approach (EFSA): An example of integral prevention.** *Health Educ Res* 2003, **18**(5):611-626.
  14. World Health Organization: **Global adult tobacco survey: Bangladesh Report 2009.** Bangladesh: World Health Organization; 2009.
  15. Alam DS, Jha P, Ramasundarahettige C, Streatfield PK, Niessen LW, Chowdhury MAH, Siddiquee AT, Ahmed S, Evans TG: **Smoking-attributable mortality in Bangladesh: Proportional mortality study.** *Bull WHO* 2013, **91**(10):757-764.
  16. Wu F, Chen Y, Parvez F, Segers S, Argos M, Islam T, Ahmed A, Rakibuz-Zaman M, Hasan R, Sarwar G *et al*: **A Prospective Study of Tobacco Smoking and Mortality in Bangladesh.** *PLoS ONE* 2013, **8**(3).
  17. Bangladesh W: **National Strategic Plan of Action for Tobacco Control, 2007-2010.** In.; 2015.
  18. Masud J: **The Present Status of Tobacco Control in Bangladesh.** *J Diabetes Metab Disord Control* 2015, **2**(1):00031.
  19. World Health Organization: **WHO report on the global tobacco epidemic, 2017: monitoring tobacco use and prevention policies.** Switzerland: World Health Organization; 2017.
  20. World Health Organization: **WHO report on the global tobacco epidemic, 2017 , Country profile: Bangladesh.** Bangladesh: World Health Organization; 2017.
  21. Rahman MM, Ahmad SA, Karim MJ, Chia HA: **Determinants of smoking behaviour among secondary school students in Bangladesh.** *J Community Health* 2011, **36**(5):831-838.

22. Ahsan H, Underwood P, Atkinson D: **Smoking among male teenagers in Dhaka, Bangladesh.** *Prev Med* 1998, **27**(1):70-76.
23. Kamal SMM, Islam MA, Rahman MA: **Sociopsychological correlates of smoking among male university students in Bangladesh.** *Asia-Pac J Public Health* 2011, **23**(4):555-567.
24. Tarafdar MMA, Nahar S, Rahman MM, Hussain SMA, Zaki M: **Prevalence and determinants of smoking among the college students in selected district of Bangladesh.** *Bangladesh Medical Journal* 2009, **38**(1):3-8.
25. World Health Organization ROFS-EA: **Global Youth Tobacco Survey (GYTS), Bangladesh Report, 2013.** New Delhi: WHO-SEARO; 2015.
26. Mullahy J: **Heterogeneity, excess zeros, and the structure of count data models.** *J Appl Econom* 1997, **12**(3):337-350.
27. Rozi S, Akhtar S, Ali S, Khan J: **Prevalence and factors associated with current smoking among high school adolescents in Karachi, Pakistan.** *Southeast Asian J Trop Med Public Health* 2005, **36**(2):498-504.
28. Rozi S, Butt ZA, Akhtar S: **Correlates of cigarette smoking among male college students in Karachi, Pakistan.** *BMC Public Health* 2007, **7**.
29. Harakeh Z, Scholte RHJ, Vermulst AA, De Vries H, Engels RCME: **Parental factors and adolescents' smoking behavior: An extension of the Theory of planned behavior.** *Prev Med* 2004, **39**(5):951-961.
30. Akpinar E, Yoldascan E, Saatci E: **The smoking prevalence and the determinants of smoking behaviour among students in Cukurova University, Southern Turkey.** *West Indian Medical Journal* 2006, **55**(6):414-419.
31. Karimy M, Niknami S, Heidarnia AR, Hajizadeh E, Shamsi M: **Refusal self efficacy, self esteem, smoking refusal skills and water pipe (Hookah) smoking among Iranian male adolescents.** *Asian Pac J Cancer Preven* 2013, **14**(12):7283-7288.
32. Christophi CA, Savvides ECG, Warren CW, Demokritou P, Connolly GN: **Main determinants of cigarette smoking in youth based on the 2006 Cyprus GYTS.** *Prev Med* 2009, **48**(3):232-236.
33. Mohan S, Sarma PS, Thankappan KR: **Access to pocket money and low educational performance predict tobacco use among adolescent boys in Kerala, India.** *Prev Med* 2005, **41**(2):685-692.
34. Sreeramareddy CT, Kishore PV, Paudel J, Menezes RG: **Prevalence and correlates of tobacco use amongst junior collegiates in twin cities of western Nepal: A cross-sectional, questionnaire-based survey.** *BMC Public Health* 2008, **8**.
35. Leinsalu M, Kaposvári C, Kunst AE: **Is income or employment a stronger predictor of smoking than education in economically less developed countries? A cross-sectional study in Hungary.** *BMC Public Health* 2011, **11**(1):97.
36. Gottfredson NC, Hussong AM, Ennett ST, Rothenberg WA: **The Role of Parental Engagement in the Intergenerational Transmission of Smoking Behavior and Identity.** *Journal of Adolescent Health* 2017, **60**(5):599-605.



37. Rajesh V, Diamond PM, Spitz MR, Wilkinson AV: **Smoking initiation among Mexican heritage youth and the roles of family cohesion and conflict.** *Journal of Adolescent Health* 2015, **57**(1):24-30.
38. Farrelly MC, Loomis BR, Kuiper N, Han B, Gfroerer J, Caraballo RS, Pechacek TF, Couzens GL: **Are tobacco control policies effective in reducing young adult smoking?** *Journal of Adolescent Health* 2014, **54**(4):481-486.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile1.docx](#)
- [Additionalfile2.doc](#)