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Social Influences on Adolescent Tobacco Smoking in Dhaka: The Role of Peers, Siblings, and Relatives

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ABSTRACT: ***Background:*** Adolescent tobacco use remains a major public health concern in Bangladesh, where social influences play a critical role in smoking initiation. Objective: This study assessed the impact of peers, siblings, and relatives on adolescent smoking in Dhaka. ***Methods:*** This was part of large case-control study conducted among 182 adolescents aged 15–19 years. Data was collected on smoking status of peer and sibling smoking, and household tobacco use. Logistic regression was used to examine associations, with results expressed as odds ratios (OR) and 95% confidence intervals (CI). ***Results:*** The mean age of respondents was 17.35 years. Smoking prevalence was strongly associated with peer and familial exposure. Among ever-smokers, 91.3% had brothers who smoked ($p < 0.01$). Adolescents with a smoking brother had six times higher odds of smoking (OR = 6.562, CI = 1.387–31.052), while having a best friend who smoked also increased smoking likelihood (OR = 3.789, CI = 1.717–8.358). Relatives smoking inside the home were significantly related to adolescent smoking ($p < 0.01$). ***Conclusion:*** Peers, siblings, and relatives substantially influence adolescent tobacco use in Dhaka. Prevention should target these social networks through school-based resistance programs, family-focused interventions, and stronger enforcement of tobacco control policies to reduce adolescent smoking and progress toward a tobacco-free Bangladesh.
Keywords: Adolescents, Tobacco Smoking, Bangladeshi Male Adolescents.

Article at a glance:
Study Purpose*: This study assessed the impact of peers, siblings, and relatives on adolescent smoking in Dhaka.*
Key findings: *Peers, siblings, and relatives strongly predict adolescent tobacco use in Dhaka; Adolescents with a smoking brother had more than sixfold higher odds of smoking.*
Newer findings: *Best friends' smoking increased the likelihood of smoking nearly fourfold.*
Abbreviations: *WHO: World Health organization; GYTS: Global Youth Tobacco Survey.*

INTRODUCTION

Tobacco use remains one of the leading preventable causes of morbidity and mortality worldwide. In Bangladesh, tobacco consumption is widespread, posing a major public health challenge. According to the World Health Organization (WHO), more than 60% of men and 21% of women aged 15 years and older used tobacco on a daily or occasional basis in 2010. By 2025, this figure is projected to decline to approximately 59% for men and 13% for women.[1] Data from the Global Adult Tobacco Survey (GATS) 2017 reported that 35.3% of Bangladeshi adults currently use tobacco, including 46% of men and 25.2% of women. Among them, 18% smoke tobacco, with men (36.2%) being the predominant smokers compared to women (0.8%).[2,3] Although overall tobacco use has decreased since 2009, cigarette expenditure and health-related costs have increased,

contributing significantly to the economic burden and poverty in the country.[3]

Adolescence is a critical developmental stage when health-risk behaviors, such as tobacco smoking, often emerge. Multiple studies have identified peer and sibling smoking as consistent predictors of smoking initiation and continuation among adolescents.[4-6] Evidence suggests that the influence of peers and siblings differs by age, gender, ethnicity, and cultural background. Peer smoking is particularly influential among younger adolescents, while sibling smoking exerts stronger influence during later adolescence. Additionally, peer influence tends to be more impactful on females than males and is generally stronger among white adolescents compared to non-white populations.[4] The strength and closeness of these social relationships, as well as perceived social norms, further determine their influence on adolescent tobacco use.

Several longitudinal studies have also highlighted the role of close friends, parents, and older siblings in smoking initiation. For instance, Bricker et al. demonstrated that smoking by close friends, parents, and siblings each independently increased the likelihood of daily smoking among adolescents, suggesting that family-focused interventions may be crucial in preventing tobacco use[5] Similarly, a cross-sectional study in Dhaka found peer pressure and parental influence to be highly significant factors for smoking initiation, with the average age of initiation being around 17 years for males.[6] These findings emphasize that interventions should not only target individuals but also address the broader family and peer networks that contribute to smoking behavior.

Social learning theory and social cognitive theory provide important frameworks for understanding these dynamics. Bandura's theories suggest that children and adolescents learn behaviors through observation, imitation, and reinforcement, often modeling their actions on siblings, peers, relatives, or other role models.[14] In Bangladesh, where tobacco products remain widely accessible and affordable to adolescents[11], social influences may play an especially critical role in shaping tobacco-related behaviors.

Recognizing the health and economic burden of tobacco use, Bangladesh has aligned with global targets under the Sustainable Development Goals (SDG-3) to reduce tobacco prevalence and has committed to achieving a tobacco-free nation by 2040.[13] To achieve these targets, it is vital to understand the social determinants of tobacco use, particularly among adolescents. This study explores the role of peers, siblings, and relatives in influencing adolescent smoking in Dhaka, thereby providing evidence to inform preventive strategies at the familial and community levels.

METHODS

Study design, Sampling, and Survey

This study was part of a larger case-control investigation conducted in Dhaka (January–December 2018), focusing here on social influences on adolescent tobacco smoking. Male students aged 15–19 years in grades 11 and 12 were recruited from selected colleges. A total of 91 ever-smokers (cases) and 91 never-smokers (controls) were enrolled between September and October 2018 using purposive sampling from the same classes. Smoking status was determined by self-reported responses to a screening question: *"Have you ever smoked tobacco products in your lifetime (at least a single puff)?"*

Measures

Ever smoker: Respondents who had ever smoked at least once.

Never smoker: Respondents who had never tried tobacco products.

The semi-structured questionnaire, adapted from the Global Youth Tobacco Survey (GYTS, 2013), WHO STEPS, and previous literature, captured socio-demographics, peer and family influences, and smoking knowledge. Influencing factors included sibling/relative smoking, friends' smoking status, discussions about smoking, and awareness of health hazards. Selected items were assessed using a validated five-point Likert scale.

Data Collection and Ethics

Data was collected through self-administered questionnaires after classroom-based recruitment. Tools were pre-tested, and inputs from literature and expert review informed their finalization. Ethical approval was granted by the Institutional Review Board of Bangabandhu Sheikh Mujib Medical

University (Memo: BSMMU/2018/8788). Written consent/assent was obtained from all participants, who were assured of confidentiality and the right to withdraw.

Statistical Analysis

Data were entered into SPSS v23 and checked for completeness, consistency, and outliers. Descriptive statistics summarize socio-demographic and smoking characteristics. Chi-square and Fisher's exact tests assessed associations between smoking status and influencing factors. Variables significant at $p < 0.05$ were included in univariate logistic regression models to estimate odds ratios (OR) and 95% confidence intervals (CI).

RESULTS

Table 1 states that, mean age of respondents was 17.35(±0.902) with a range of 15-19 years out of total 182 respondents. Brother smokes in the family, relatives' smokes in the family and inside home, best friends' positive smoking status were significantly associated with ever smoking history of the respondents (p<0.01). A total of 91.3% of brothers of ever smoker respondents smoked in the family which was significantly higher (p<0.010) compared to brothers of never smoker respondents.

Table 1: Tobacco smoking status relative to social influencing factors reported by respondents

Influencing factors	Ever smoker		Never smoker		p-value
	n (91)	Percent	n (91)	Percent	
Age in years (n=182) Mean ±SD	17.35 ± 0.902				
Relationship with brother [a] (n=116)					
Good	53	50%	53	50%	0 .07
Usual to Poor	8	80%	2	20%	
Relationship with sister [b] (n=101)					
Good	49	50%	49	50%	0.51
Usual to Poor	1	33.3%	2	66.7%	
Brother smokes in family (n=75)					
Yes	21	91.3%	2	8.7%	<0.01*
No	32	61.5%	20	38.5%	
Relatives smoke in family (n=75)					
Yes	19	100%	0	0%	<0.01*
No	34	39.6%	22	16.4%	
Brother smokes inside home (n=43)					
Yes	5	83.3%	1	16.7%	0.304
No	23	62.2%	14	37.8%	
Relatives smoke inside home in family (n=43)					
Yes	10	100%	0	0%	<0.01*
No	18	54.5%	15	45.5%	
Any family member smoke in presence of respondents inside home (n=75)					
Yes	23	67.6%	11	32.4%	
No	18	64.3%	10	35.7%	0.180
Don't know	12	92.3%	1	7.7%	
Any family member ever sent to buy smoking product to store (n=75)					
Yes	30	75.0%	10	25.0%	0.378
No	23	65.7%	12	34.3%	
Best friend's smoking status (n=182)					
Yes	81	60.9%	52	39.1%	<0.01*
No	10	79.6%	39	20.4%	
Anyone smokes inside educational place in presence of respondents in last 30 days (n=182)					
Yes	52	55.9%	41	44.1%	0.103
No	39	43.8%	50	56.2%	

Earn by self (n=182)					
Yes	10	71.4%	4	28.6%	0.095
No	81	48.2%	87	51.8%	
Participants informed about smoking is injurious to health (n=182)	91	50.0%	91	50.0%	
Knows hazards of smoking (n=182)					
Well informed	65	46.4%	75	53.6%	0.113
Moderately informed	25	61.0%	16	39.0%	
Less informed	1	100%	0	0%	
Friends ever discussed about health risk of tobacco smoking (n=182)					
Yes	54	50.5%	53	49.5%	0.880
No	37	49.3%	38	50.7%	
Teachers ever discussed about health risk of tobacco smoking (n=182)					
Yes	80	47.9%	87	52.1%	0.059
No	11	73.3%	4	26.7%	
Text books contain health risk message of smoking (182)					
Yes	66	48.2%	71	51.8%	0.390
No	25	55.6%	20	44.4%	

P value*= <0.05 considered statistically significant, obtained by Chi-square test; *P value= Fisher's exact test; Relationship with brother[a] (excluding number of no brother, n=66); Relationship with sister[b] (excluding number of no sister, n= 81); Sister smoking status were 0 inside home, Not anyone smoke in family= 139, Not smoke anyone inside home=107, All results were expressed by row percentages.

Table 2: Logistic regression analysis assessing the association between smoking status and social influencing factors

Influencing factors	Unadjusted OR	95% CI
Brother smokes in family[a] (n=75)		
No	1.00	
Yes	6.562	1.387-31.052
Best Friend smoke (n=182)		
No	1.00	
Yes	3.789	1.717-8.358

[a]Excluding the number of respondents who did not apply for these answers during analysis as it was multiple responses; The frequency of all significant variables are not same, so all cannot be carried out in multivariate logistic regression analysis.

Table 2 explains that respondents had higher odds of being ever smoker whose brother smokes in the family (OR 6.562 CI 1.387-31.052); best friends' smokes (OR 3.789 CI 1.717-8.358).

DISCUSSION

This study explored the influence of peers, siblings, and relatives on adolescent tobacco smoking in Dhaka. Our findings highlight the significant role of social networks in shaping smoking behaviors among adolescents, consistent with social learning theory and the broader literature on adolescent risk-taking. In this study, the mean age of respondents was 17.35 (±0.902), with a range of 15–19 years among 182 participants. Several social factors were significantly associated with smoking behavior. Brothers who smoked in the family, relatives smoking inside the home, and best friends' smoking status were all strongly related to respondents' smoking history ($p < 0.01$).

The findings of the study highlight the intertwined influence of family and peer environments on adolescent smoking in Dhaka. Having a best friend or if their best friend smoked had higher odds (OR = 3.789, CI = 1.717–8.358). Peers

emerged as the most powerful influence on smoking initiation and continuation. Adolescents with close friends who smoke were substantially more likely to report smoking themselves. This finding aligns with previous research in Bangladesh, which identified peer smoking as a critical determinant of smoking susceptibility among school-going adolescents.[7,10] Peer groups provide both normative pressure and behavioral modeling opportunities that encourage smoking uptake. In Dhaka's urban context, where adolescents often spend unsupervised time with peers, such influence may be particularly strong. These results underscore the importance of addressing peer dynamics in prevention strategies, such as school-based programs that teach resistance to peer pressure and promote positive peer norms.

The role of siblings and relatives was also pronounced. Having an older sibling or close relative who smokes significantly increases the likelihood of adolescent smoking. Notably, 91.3% of brothers of ever-smoker respondents also smoked, which was significantly higher compared to brothers of never-smoker respondents ($p < 0.01$). Adolescents had higher odds of smoking if their brother smoked in the family (OR = 6.562, CI = 1.387–31.052).This is consistent with international evidence showing that sibling smoking nearly doubles the risk of smoking initiation in adolescence.[8, 9] These familial influences may operate through observational learning, normalization of tobacco use, and easier access to cigarettes.[9] In the Bangladeshi context, where extended families often live together or in close proximity, such influences may be amplified. Furthermore, family smoking may undermine parental authority in discouraging tobacco use, making it more difficult for adolescents to resist initiation.[5]

The findings must also be interpreted within the socio-cultural context of Bangladesh. Tobacco use, particularly among males, is often perceived as a symbol of maturity and masculinity.[12] This perception may magnify the modeling effect of peers and siblings. Additionally, the availability of low-cost tobacco products and weak enforcement of tobacco control laws facilitate access for adolescents.[11] These contextual factors, when combined with peer and familial influences, create an environment that fosters adolescent tobacco use. Our results suggest that tobacco prevention efforts in Dhaka should adopt a multi-level approach. School-based interventions must focus on strengthening adolescents' refusal skills and resilience against peer pressure. Community-level initiatives should target families, raising awareness about the impact of sibling and relative smoking on youth behavior.

Furthermore, stricter enforcement of existing laws restricting tobacco sales to minors and stronger regulation of tobacco advertising are crucial. Recent evidence from Bangladesh suggests that exposure to tobacco marketing remains a significant driver of adolescent smoking susceptibility.[12-15] Addressing these structural factors will be essential to reducing adolescent smoking.[16-18]

Limitations

This study has several limitations. The case-control design prevents establishing causal relationships, and reliance on self-reported smoking may have led to underreporting due to social desirability bias. Future longitudinal research is needed to clarify the temporal pathways between peer, sibling, and relative influence on smoking initiation. Additionally, qualitative studies could provide deeper insights into the mechanisms of influence, including how cultural values and gender norms shape smoking behaviors among adolescents in Dhaka.

CONCLUSION

In conclusion, peers, siblings, and relatives exert a substantial influence on adolescent smoking behavior in Dhaka. Interventions that target these social networks, combined with broader policy measures, are likely to be most effective in reducing tobacco initiation and use among adolescents.

Author's Contribution

FN, FH, SSI participated in the design of the study, data interpretation and drafted the manuscript. FN, FH, SSI, KAM, TR, CS contributed to the data design, data interpretation and data analysis. FN, FH, SSI, KAM, and TR did critical review of the manuscript.

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