



Factors Related to Adolescent Smoking: A Nationally Representative Cross-Sectional Study in Thailand

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Abstract

AIM: This study aimed to explore the individual, familial, and social factors associated with different smoking statuses in Thai adolescents.

METHODS: The nationally representative sample of 6046 adolescents aged 15–19 years took part in the 2017 Cigarette Smoking and Alcohol Drinking Behavior Survey in Thailand. Multinomial logistic regression analysis was conducted to explore the associations between the individual, familial, and social factors and different smoking statuses.

RESULTS: The daily smoking and occasional smoking was 6.4% and 3.3%, respectively. Gender, alcohol use, substance use, attitudes toward smoking, exposure to secondhand smoke (SHS) at home, anti-smoking social media campaign, and graphic warning labels were related to daily and occasional smoking. Daily smoking was associated with exposure to SHS at school, restaurants, public transport, and exposure to tobacco advertising.

CONCLUSION: These findings suggest that smoking prevention intervention should focus on these factors and develop anti-smoking policies for smoking prevention among adolescents.

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Introduction

According to 2017 Thailand tobacco consumption statistics reported by the Tobacco Control Research and Knowledge Management Center [1], the number of Thai smokers aged more than 15 years was 10.7 million (19.1%), and the tobacco use rate in adolescents aged 15–18 years was 7.8%. Overall, the daily smoking rate had declined from 95% in 1991 to 88% in 2017, but the number of occasional smokers has gradually increased from 590,528 in 1991 to 1,251,695 in 2017. Recent data suggest that this increase could signify that the tobacco industry has a new marketing strategy that might affect increasing adolescent tobacco experimenters.

For adolescents, various tobacco control plans have been implemented [2], such as (1) teen smoking prevention: To reduce the initiations of adolescents to smoking, secondary schools, participate in smoke-free school projects, and (2) help teen quitting: To encourage quitting smoking or decrease the uptake of smoking. These plans can help in reducing teen

smoking initiation or reducing smoking uptake. Still, these plans can be limited in effectiveness because of tobacco companies using social media as channels for the marketing and promotion of tobacco products. There is strong evidence that adolescents are vulnerable to influence by the tobacco industry [3]. Approximately, 90% of the people who smoke for the first time begin during adolescence [4]. Most adults who habitually smoke began to smoke as adolescents [5], so it is crucial to monitor and prevent adolescent smoking. In this research, we used the socioecological model [6] to explain adolescent smoking. This model provides a framework to examine the relationships between individuals and their environments, divided into three levels: Individual, interpersonal and environmental factors. We expect that the individual, familial, and social factors should encourage adolescents not to begin smoking. However, there have not been any studies focusing on the factors related to adolescent smoking using the national cohort database in Thailand. Thus, this study aimed to explore the individual, familial, and social factors related to adolescent smoking in Thailand. It was hoped that this study would provide information for policymakers to help them create and

implement policies focused on preventing and reducing adolescent smoking nationwide.

Methods

This study was based on secondary data from the 2017 Cigarette Smoking and Alcohol Drinking Behavior Survey (CSAD) conducted in Thailand's National Statistical Office every three years. This CSAD was undertaken to obtain information on smoking status, sociodemographic, and smoking-related variables. Of the 15499 total respondents to CSAD 2017 aged between 15 and 19-years-old. Among 9453 respondents were excluded from the analyses because of missing relevant data. The final sample included a total of 6046 respondents aged 15–19. This study received Institutional Review Board Approval (No. 018/2019).

Study variables

Demographic variables included gender, alcohol use, and substance use. Self-reported smoking status was assessed with the following question: Do you smoke at present? The answer categories were "never," "ever," "yes, occasionally," and "yes, daily." The main outcomes were grouped into "never-smokers," "occasionally Smokers," and "daily Smokers."

Individual factors

Individual factors consisted of knowledge of smoking-related disease and attitudes toward smoking. Knowledge of smoking-related diseases was assessed with 12 questions: Which diseases are caused from smoking harm? (e.g., lung cancer, hypertension, etc.). Knowledge was dichotomized as 0 (low) and 1 (high). The question measured attitudes toward smoking: Do you agree that smoking should be categorized as hazardous to health. These responses were divided into two categories: Negative (agree) and positive (disagree).

Familial factors

Exposure to secondhand smoke (SHS) at home was assessed by the question: How often did a family member smoke at your home. This item was scored on a 6-point rating scale (ranged between 0 and 5). Respondents who answer 1-5 points were classified as exposed to SHS at home.

Social factors

Social factors consisted of exposure to SHS at school, restaurant, and public transport, Exposure

to tobacco marketing and advertising, anti-smoking social media campaign, and graphic warning label. Exposure to SHS at school, restaurant, and public transport was identified by the question: Have you ever seen someone smoke in the public. Exposure to tobacco marketing was measured by the question: Within the past 30 days, have you seen smoking promotional strategies. exposure tobacco advertising was assessed by the question: Within the past 30 days, have you seen smoking advertisements. Respondents who answered "yes" were classified as exposure. Anti-smoking social media campaign was assessed by the question: Within the past 30 days, have you seen any information about anti-smoking in social media. Graphic warning labels was measured by the question: Within the past 30 days, have you noticed the warning label on smoking products. Respondents who answer "yes" were classified as perceived smoking-related harm.

Statistical analysis

The data were coded and analyzed using SPSS version 26 (IBM Corp., Armonk, NY, USA). At first, the association of different adolescent smoking status was tested with individual, familial, and social factors using the Chi-square test for group differences. Multinomial logistic regression analysis was used to examine the association between the factors and adolescent smoking status. The dependent variable was adolescent smoking status, with never-smokers as the reference category. We calculated the odds ratios (OR) with 95% confidence intervals (CIs) for each variable, and $p < 0.05$ was considered to be statistically significant.

Results

Table 1 presents the demographic characteristics. Of the 6046 adolescents included in the study, 50.1% were male, and 49.9% were female. The prevalence of alcohol use and substance use was 14.7% and 2.0%, respectively. The prevalence of daily smoking and occasional smoking was 6.4% and 3.3%, respectively.

Table 1: Demographic characteristics of adolescents (n=6046)

Characteristics	Classification	n (%)
Gender	Male	3032 (50.1)
	Female	3014 (49.9)
Alcohol Use	No	5156 (85.3)
	Yes	890 (14.7)
Substance Use	No	5927 (98.0)
	Yes	119 (2.0)
Smoking Status	Never-smoker	5467 (90.3)
	Occasional smoker	202 (3.3)
	Daily smoker	384 (6.4)

Chi-square test revealed significant differences between adolescent smoking and individual factors

(knowledge of smoking-related disease, attitudes toward smoking), familial factor (Exposure to SHS at home), and social factors (Exposure to SHS at school, restaurant, and public transport, exposure to tobacco advertising, anti-smoking social media campaign, graphic warning labels) (Table 2).

Table 2: Smoking prevalence of adolescents

Factors	Never-Smoker	Occasional Smoker	Daily Smoker	χ^2
Knowledge of smoking-related disease	70.5	65.8	58.3	26.624***
Attitudes toward smoking	96.0	84.2	72.6	394.987***
Exposure to SHS at home	28.3	59.4	72.1	387.594***
Exposure to SHS at school	17.5	13.3	23.8	10.233**
Exposure to SHS at restaurant	39.0	39.6	46.9	9.417**
Exposure to SHS at public transport	30.2	25.2	25.0	6.637*
Exposure to tobacco marketing	3.6	5.9	7.0	5.301
Exposure to tobacco advertising	11.3	13.9	19.0	21.166**
Anti-smoking social media campaign	36.3	24.3	22.9	39.122***
Graphic warning labels	64.1	78.2	72.6	27.346***

*p<0.05, **p<0.01, ***p<0.001. SHS: Secondhand smoke.

The results of multinomial logistic regression analysis (Table 3) revealed that the higher risks for being adolescent daily smokers were exposed to SHS at home (OR, 6.63; 95% CI, 4.98–8.82), school (OR, 2.02; 95% CI, 1.38–2.97), restaurant (OR, 1.57; 95% CI, 1.17 to 2.10), and public transport (OR, 1.42; 95% CI, 1.02–1.98), and tobacco advertising (OR, 1.90; 95% CI, 1.31–2.75). Meanwhile, those who perceived negative attitudes toward smoking (OR, 0.18; 95% CI, 0.12–0.26), had seen the information of anti-smoking on social media (OR, 0.59; 95% CI, 0.43–0.81), and also noticed graphic warning labels (OR, 0.67; 95% CI, 0.49–0.92) had a lower risk of adolescent daily smoking. However, results found that adolescent daily smoking was not significantly associated with knowledge of smoking-related disease.

Table 3: Multinomial logistic regression analysis for adolescent smoking

Variables	Classification	Occasional Smoker	Daily Smoker
Gender	Female	1.00 (reference)	1.00 (reference)
	Male	12.95 (6.92, 24.23)***	34.29 (16.62, 70.73)***
Alcohol use	No	1.00 (reference)	1.00 (reference)
	Yes	15.23 (10.95, 21.19)***	17.05 (12.87, 22.59)***
Substance use	No	1.00 (reference)	1.00 (reference)
	Yes	4.46 (2.16, 9.24)***	4.80 (2.54, 9.07)***
Knowledge of smoking-related disease	Low	1.00 (reference)	1.00 (reference)
	High	1.00 (0.71, 1.41)	1.23 (0.92, 1.63)
Attitudes toward smoking	Positive	1.00 (reference)	1.00 (reference)
	Negative	0.34 (0.22, 0.55)***	0.18 (0.12, 0.26)***
Exposure to SHS at home	No	1.00 (reference)	1.00 (reference)
	Yes	3.47 (2.52, 4.79)***	6.63 (4.98, 8.82)***
Exposure to SHS at school	No	1.00 (reference)	1.00 (reference)
	Yes	0.89 (0.60, 1.32)	2.02 (1.38, 2.97)***
Exposure to SHS at restaurant	No	1.00 (reference)	1.00 (reference)
	Yes	1.04 (0.73, 1.48)	1.57 (1.17, 2.10)**
Exposure to SHS at public transport	No	1.00 (reference)	1.00 (reference)
	Yes	1.29 (0.88, 1.91)	1.42 (1.02, 1.98)*
Exposure to tobacco advertising	No	1.00 (reference)	1.00 (reference)
	Yes	1.29 (0.81, 2.04)	1.90 (1.31, 2.75)**
Anti-smoking social media campaign	No	1.00 (reference)	1.00 (reference)
	Yes	0.53 (0.36, 0.77)**	0.59 (0.43, 0.81)**
Graphic warning labels	No	1.00 (reference)	1.00 (reference)
	Yes	0.51 (0.35, 0.74)**	0.67 (0.49, 0.92)*

Values are presented as odds ratio (95% confidence interval). *p<0.05, **p<0.01, ***p<0.001. SHS: Secondhand smoke.

The results also revealed that the higher risks for being adolescent occasional smokers were exposed to SHS at home (OR, 3.47; 95% CI, 2.52–4.79). Meanwhile, those who perceived negative attitudes toward smoking (OR, 0.34; 95% CI, 0.22–0.55), had seen the information of anti-smoking on social media

(OR, 0.53; 95% CI, 0.36–0.77), and also noticed graphic warning labels (OR, 0.51; 95% CI, 0.35–0.74) had a lower risk of adolescent occasional smoking.

However, results found that both daily and occasional smoking was not significantly associated with knowledge of smoking-related disease. No significant associations were found between occasional smoking and exposure to SHS at school, restaurant and public transport, as well as tobacco advertising.

In addition, the results found that those with alcohol use had a 15–17 times higher likelihood of both being the daily smokers (OR, 17.05; 95% CI, 12.87–22.59) and occasional smokers (OR, 15.23; 95% CI, 10.95–21.19) than the never smokers. Substance use was associated with a 4–5 times higher likelihood of both being the daily smokers (OR, 4.80; 95% CI, 2.54–9.07) and occasional smokers (OR, 4.46; 95% CI, 2.16–9.24) than the never smokers.

Discussion

This study examined the association of individual, familial, and social factors with smoking status in the Thai adolescent population. The prevalence of daily and occasional smoking among adolescents was 6.4% and 3.3%, respectively. Male were more likely to smoke than female. This result is consistent with previous studies in Thailand [7], [8]. In Thai society, males' smoking is more considered as socially acceptable than smoking by females [9]. Accordingly, smoking by male is a serious health problem in Thailand. Alcohol use and substance use were associated with adolescent smoking. These results indicated that cigarettes, alcohol, and other substances tend to be used together [10]. Consistent with previous studies, alcohol use and substance use were associated with an increase in the likelihood of smoking among adolescents [10], [11], [12].

Individual factor such as attitudes toward smoking was negative associated with adolescent smoking. Attitude toward smoking play a protective role against adolescent smoking [13]. Adolescent with negative attitudes toward smoking are less likely to smoke than those with positive attitudes toward smoking. These results are in line with other studies [13], [14], [15]. Encouraging negative attitudes toward smoking might prevent smoking initiation and also encourage smoking cessation among adolescents.

Our results suggest that exposure to SHS at home increased the risk for adolescent smoking in both daily and occasional smokers. This finding is consistent with previous studies, which reported that adolescents who were current smokers had a higher likelihood of being exposed to SHS at home [16], [17], [18]. A previous

study [19] showed that exposure to SHS at home predicted adolescent smoking initiation. In addition, youth with high parental monitoring/supervision or home smoking bans appeared to decrease the likelihood of adolescent smoking [20], [21], [22]. Our study points out the importance of the familial factor and should be considered due to the highest risk factors. Hence, the government should enact a law prohibiting smoking. Prevention programs and implemented policies should continue promoting smoke-free homes. Parents should quit smoking inside their homes, leading adolescents not to try smoking, or reduce smoking initiation.

Social factors such as exposure to SHS in public places (school, restaurant, and public transport) and exposure to tobacco advertising were positively associated with adolescent daily smoking. Exposure to SHS in public places was higher among daily smokers, consistent with other studies [23], [24]. SHS exposure in a public place might be a risk factor among adolescent smoking [17]. This is probably because of the poor strict implementation of the smoke-free law. Therefore, comprehensive smoke-free law in public places and intervention to reduce SHS exposure is needed. The present study revealed that adolescents exposed to tobacco advertising appeared to increase the odds of smoking. Other previous studies found an association between tobacco advertising and adolescent daily smokers [25], [26], [27]. There is a comprehensive ban and restriction on tobacco advertising [28], but adolescents still have been exposed to tobacco advertising. Tobacco control efforts should focus on strict enforcement of existing tobacco control laws.

In addition, social factors such as anti-smoking social media campaigns and perceived graphic warning labels decreased the risk for adolescent smoking in both daily and occasional smokers. Adolescents who were exposed to related anti-smoking messages on social media were less likely to smoke. A possible explanation for this finding is that social media messages may serve as effective strategies for adolescents. Previous studies showed the benefit of social media in promoting anti-smoking messages to reduce and quit smoking [29], [30], [31]. Thus, social media-based intervention about anti-smoking messages is further needed. The present study also revealed that adolescents who were perceived graphic warning labels appeared to decrease the likelihood of smoking. Recently, Drovandi *et al.* [32] reported that graphic warning labels strongly affected adolescent never-smokers. Graphic warning labels may help to reduce smoking [33] and decide not to start smoking among adolescents [34], [35]. This is probably because these warnings may increase health awareness. Developing effective graphic warning labels is needed to prevent smoking onset among adolescents.

This limitation of the study was its cross-sectional design. Cross-sectional design cannot be used to infer causality or cause and effect. This is the

reason why further research will be needed. Future studies should be longitudinal studies to investigate the influence and the relationship of independent variables on smoking status with different periods. They may use qualitative data for such in-depth details. The major strength of this study is that this is the first study to investigate socioecological factors associated with adolescent smoking in Thailand on a national scale. We hope that our findings will provide better insight into the significance of socioecological factors in predicting adolescent smoking. This will allow the development of strategies to integrate smoking interventions with a socioecological approach to help adolescents avoid smoking initiation and promote smoking cessation.

Conclusion

Based on the research findings, we can conclude that the individual, familial, and social factors on adolescent smoking in Thailand. These findings suggest that smoking prevention intervention should focus on these factors and develop anti-smoking policies for smoking prevention among adolescents.

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