Prevalence and Factors Predicting Tobacco Smoking and Alcohol Use among Thai High School Students*

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Abstract

   Purpose: This study aimed to examine the lifetime prevalence of alcohol and tobacco use in Thai high school students and determine the relationships between socio-demographic factors and substances use in Bangkok and Nakorn Pathom.

   Design: Descriptive study design.

   Method: 624 students from three high schools stratified by grade level were recruited. Data collection included socio-demographics and specific questions from the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) to examine lifetime use. Data analyses involved descriptive statistics followed by binary logistic regression analysis to create predictive models.

   Main findings: Almost ten percent of high school students reported ever smoking tobacco and 34.8% reported ever consuming alcohol. Regression modelling revealed that school type, sex, home structure, parent's education level, and grade point average (GPA) accounted for 18 % of the variance in predicting alcohol use among the students. However, sex, school type, perceived sufficient income, home structure, and GPA accounted for 15.8% of the variance in predicting tobacco smoking.

   Conclusion and recommendations: Alcohol use in this group was relatively low, but the percentage of students smoking tobacco is significantly higher than other countries. These data suggest that increased focus on developing and testing specific tobacco smoking prevention policies, as well as readily available tobacco cessation strategies are imperative to decrease the alarmingly high rates of tobacco smoking reported by students. Further study with larger cohorts of high school students is needed to confirm the lifetime prevalence of tobacco smoking reported here and to gather longitudinal surveillance data on the prevalence of continued smoking into adulthood.

Keywords: alcohols, smoking, students

ความชุกและปัจจัยทำนายการสูบบุหรี่ และการดื่มแอลกอฮอล์ของนักเรียนมัธยมศึกษาตอนปลาย*

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บทคัดย่อ

วัตถุประสงค์: การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาความชุกของการสูบบุหรี่และดื่มแอลกอฮอล์ และรวมถึงศึกษาความสัมพันธ์ระหว่างปัจจัยส่วนบุคคลกับการใช้สารเสพติดในนักเรียนระดับมัธยมศึกษาตอนปลาย จังหวัดกรุงเทพฯ และนครปฐม

รูปแบบการวิจัย: การวิจัยเชิงพรรณนา

วิธีดำเนินการวิจัย: กลุ่มตัวอย่าง คือ นักเรียนมัธยมศึกษาตอนปลายจำนวน 624 คน จากโรงเรียนมัธยม 3 แห่งในเขตกรุงเทพฯ และจังหวัดนครปฐม ซึ่งได้รับการเลือกจากการแบ่งระดับชั้นการศึกษา โดยใช้แบบสอบถามข้อมูลส่วนบุคคล และแบบวัดการใช้สารเสพติด (The Alcohol, Smoking and Substance Involvement Screening Test; ASSIST) วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนาและสถิติถดถอยโลจิสติกแบบไบนารีเพื่อสร้างสมการทำนาย

ผลการวิจัย: ผลการศึกษานักเรียนมัธยมศึกษาตอนปลายพบว่ามีการสูบบุหรี่ประมาณร้อยละ 10 และดื่มแอลกอฮอล์ร้อยละ 34.8 จากการทดสอบสมการทำนาย พบว่า เพศ ประเภทของโรงเรียน สถานภาพสมรสบิดามารดา ระดับการศึกษาของบิดามารดา และผลการศึกษา (GPA) ร่วมกันทำนายการดื่มแอลกอฮอล์ของกลุ่มตัวอย่างได้ร้อยละ 17.7 โดย เพศ ประเภทของโรงเรียน การรับรู้ความเพียงพอของรายได้ สถานภาพสมรสบิดามารดา และผลการศึกษา สามารถร่วมกันทำนายการสูบบุหรี่ของกลุ่มตัวอย่างได้ร้อยละ 15.8

สรุปและข้อเสนอแนะ: การศึกษานี้พบว่า อัตราการดื่มแอลกอฮอล์ในกลุ่มตัวอย่างค่อนข้างต่ำ แต่อัตราการสูบบุหรี่สูงกว่าประเทศอื่นๆ อย่างมีนัยสำคัญ ข้อมูลการวิจัยนี้สนับสนุนการพัฒนาและทดสอบนโยบายการป้องกันการสูบบุหรี่ที่มีความเฉพาะเจาะจง รวมทั้งกลยุทธ์การเลิกสูบบุหรี่เพื่อลดอัตราการสูบบุหรี่ที่สูงขึ้นของนักเรียน รวมถึงควรศึกษาเพิ่มเติมในกลุ่มตัวอย่างที่มีขนาดเพิ่มขึ้น เพื่อยืนยันความชุกของการสูบบุหรี่และเพื่อรวบรวมข้อมูลการเฝ้าระวังในระยะยาวเกี่ยวกับความชุกของการสูบบุหรี่ต่อเนื่องในวัยผู้ใหญ่

คำสำคัญ: แอลกอฮอล์, บุหรี่, นักเรียน

Background and Significance

The use of alcohol and tobacco products (cigarettes and/or chewing tobacco) and other types of recreational compounds constitutes a very important category of risk-taking behaviors among adolescents and young adults. Indeed, tobacco smoking is the leading preventable cause of premature morbidity and mortality worldwide[1]. A large body of evidence has also accumulated about negative health and social consequences of alcohol use in adolescents and young adults. These include poor school attendance and performance, family conflict, unsafe sexual behaviors, unwanted pregnancies, depression and anxiety symptoms, diverse illegal activities, physical and sexual violence, suicide and ongoing drug dependence in adulthood[2].

According to Thai national data[3], 30.6% of adolescents aged 15-24 reported ever using alcohol and 16.4% ever smoked tobacco. Comparing these data regarding alcohol use with other countries requires caution. For example, studies from 25 European countries reported prevalence rates in adolescents (age 12 to 16) of having ever consumed alcohol ranging from 34 to 60%; however, only about half of those reported having a drink in the past month[4]. Despite the methodological differences across multiple countries, the Thai national prevalence rates for having ever consumed alcohol are lower than reported elsewhere[5]. In terms of lifetime prevalence of tobacco smoking in adolescents and young adults, the Thai data are similar to some countries like Korea and Iran[6,7], but higher than a study in Canada[8] and lower than American data[9]. Previous studies reported sex differences between males and females[10], with males having higher rates of alcohol and tobacco use, but some more recent studies report that the gap between sexes is narrowing, especially in terms of tobacco smoking[9]. These diverse sets of data suggest that different individual, community and geopolitical factors across cultures influence alcohol use and tobacco smoking in adolescents.

Efforts in other countries to develop strategies targeting youth have focused on sociodemographic factors associated with smoking and alcohol drinking behaviors[10,11]. Adolescents whose friends smoke were up to 6 times more likely to smoke[12]. Socio-demographic factors that increase risk for using alcohol, tobacco or other substances include age, sex, ethnicity, peer use, perceived social control and single-parent families[10,13]. In Thailand it is illegal to purchase cigarettes or alcohol or to go into a bar until age 20. Yet national statistics suggest that alcohol use and tobacco smoking is common in those under 20. Indeed, only 4% of under-aged adolescents who participated in the national survey reported being asked for identification when purchasing cigarettes[3].

Despite the potential health problems associated with alcohol use, tobacco smoking and substance use in Thailand, there is a paucity of Thai literature available on socio-demographic factors that increase the likelihood of engaging in their use. As initiation of alcohol use and tobacco smoking occurs in adolescence, it is crucial to target this population in the design and testing of effective prevention and tobacco cessation programs, as well as age-appropriate public health messaging regarding alcohol use. This lack of data hampers any efforts to develop and test such interventions. Thus, to address these important public health issues in Thailand, it is imperative that data be collected with Thai adolescents regarding their use of alcohol and smoking tobacco and the individual and social factors that influence their use within the context of Thai society.

Objectives

The aims of this study were to a) determine the lifetime prevalence of alcohol, tobacco and other substance use and b) determine potential associated factors for their use among high school students in central Thailand. A secondary aim was to compare lifetime prevalence rates of alcohol use and tobacco smoking to last 3-month incidence rates.

Methodology

A descriptive study design was used to collect data from high school students during classroom time.

Population and sample

Data for this analysis came from a larger study titled "Factors influencing psychological well-being and drugs use in secondary school student" conducting in three high schools in Bangkok and Nakhon Pathom province. In the larger study, the schools were classified by school type (male only, female only or mixed male and female). The classrooms were stratified to ensure an equal numbers of students across each school (n = 202 from each). Eleven students declined entry and 30 students were added for convenience as they shared the classrooms where data collection occurred. Thus, 624 high school students who were 15 to 19 years old, able to read and write in Thai, currently in grades 10 to 12 and without a history of being diagnosed with a mental disorder participated in the study.

Research instruments

1) A demographic information sheet included data on age, gender, religion, education level, grade point average (GPA), home structure, level of education of parents, and sufficiency of income (as perceived by the participants for their personal use).

2) The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)[14], a brief screening instrument developed by World Health Organization (WHO), was used to detect problematic and risky behaviors that have been associated with tobacco smoking and alcohol use. It consisted of eight questions regarding the use of alcohol and tobacco smoking, as well as perceptions of associated behaviors.

Validity and reliability

The ASSIST has been validated across diverse cultural groups, including from Australia, Brazil, India, and the USA[15]. It also showed good reliability (Cronbach's alpha coefficient) ranging from .80 - .90 and validity, including concurrent, construct, discriminative and predictive validity, across several studies[16]. Calculated Cronbach's alphas for this study with in 29 participants were .82, and .73 for the scores of tobacco and alcohol, respectively.

Protection of Human Subjects

The study was approved by the Institutional Review Board, Faculty of Nursing, Mahidol University, Bangkok, Thailand (COA No.IRB-NS2017/397.2301).

Data collection

The research team initially explained the objectives of the study and obtained permission from the directors of three schools. The research team then worked with the guidance counselors to develop strategies to support data collection. The process involved speaking to all students in the guidance counselor's class in each school, explaining the purposes and benefits of the study, the procedures, issues of confidentiality and anonymity, and their right to withdraw any time without any negative effects. If they agreed to participate in the study, an information sheet, assent and consent forms were sent home to inform parents about the study and to seek permission from the student and their parents. During data collection in the classroom, a research team member described the questionnaire and demographic form and reminded the students that they had the right to omit responses to any or all questions and could withdraw at any time. Research team members were available in the classroom to answer questions and to offer support if participants became distressed. However, no participant posed questions or required support during data collection.

Data Analysis

Data were obtained from 624 students and analyzed with free download PASW statistics 18.0. Descriptive statistics were used to assess frequencies, percentages, means, and standard deviations. Chi-square test was used to examine factors associated with reported tobacco smoking and alcohol use. As the two main outcome variables were binary (never used/smoked or ever used/smoked), binary logistic regression

was used to determine associations between socio-demographic variables and alcohol use and tobacco smoking and to develop predictive models[17].

Characteristics of participants

The 624 students included a total of 265 males and 359 females. Students' ages ranged from 15-19 years with a mean age of 16.4 (SD = .97). The age range of the participants meant that all alcohol use and tobacco smoking occurred illegally (before age 20). Almost all students considered themselves Buddhist (92%) and lived with their parent(s) (80.4%). Parents' education levels varied from lower primary school to a Bachelor's degree with about 50% of both parents having obtained a Bachelor's degree. In response to the question regarding income, most of students perceived they had sufficient personal income (94.1%).

Lifetime prevalence of smoking tobacco and alcohol use among high school students

Table 1 provides data regarding lifetime tobacco smoking and use of alcohol. Only 9.9% of all students reported ever smoking tobacco and 34.8 % of students reported ever consuming alcohol. The responses to the questions about smoking tobacco or alcohol use in the past 3 months as seen in Table 2 reflected a similar pattern, with rates of alcohol use higher than smoking tobacco. However, the reported 3-month prevalence rates for smoking tobacco and consuming alcohol were reduced from lifetime prevalence nearly 50%.

Table 1: Frequency and percentage of lifetime and three-month tobacco smoking and alcohol use

Lifetime used	Yes		No	
	Frequency	Percent	Frequency	Percent
Tobacco smoking (n = 616)	61	9.9	555	90.1
Alcohol use (n = 623)	217	34.8	406	65.2

Table 2: Percentage of three-month tobacco smoking and alcohol use

Three-Month Used	Never	Once or Twice	Monthly	Weekly	Almost Daily
Tobacco smoking (n = 624)	94.9	2.4	1	1.4	0.3
Alcohol use (n = 624)	79.8	14.4	4.2	1.4	0.2

Factors related to tobacco smoking and alcohol use in high school students

Chi-square tests were used to investigate sociodemographic variables associated with tobacco smoking and alcohol use. Tobacco smoking was significantly related to school type, gender, perceived sufficient personal income and home structure; whereas alcohol use was significantly associated with school type, sex, home structure and parents' education level. The students were also dichotomized into groups (those who had ever smoked and those that had never smoked; those who had ever used alcohol and those that had never used alcohol). Independent t-tests showed significant differences of GPA between the groups. (Table 3)

Table 3: Prevalence of tobacco smoking and alcohol use grouped by sociodemographic characteristics

	Total participants (N = 624)		Smoking (%)		χ^2	Alcohol (%)		χ^2
	n	**%**	**Yes**	**No**		**Yes**	**No**	
School type								
All male	194	31.09	14.6	85.4	7.09[*]	20.7	79.3	29.58[***]
All female	231	37.02	7.1	92.9		36.4	63.6	
Mixed	199	31.89	8.5	91.5		46.7	53.3	
High school grade[a]								
Grade 10	232	37.18	11.2	88.9	98.00	33.2	66.8	1.67
Grade 11	195	31.25	10.4	89.6		33.5	66.5	
Grade 12	194	31.09	8.2	91.8		38.7	61.3	
Missing	3	0.48						
Gender								
Male	265	42.47	15.2	84.8	14.49[***]	29.2	70.8	6.48[*]
Female	359	57.53	5.9	94.1		39.0	61.0	
Perceived sufficient personal income								
Insufficient	37	5.90	22.2	77.8	6.50[*]	48.6	51.4	3.31
Sufficient	587	94.10	9.1	90.9		34.0	66.0	
Home structure								
Two parents living in same home	502	80.40	8.5	91.5	7.70[*]	30.9	69.1	17.19[***]
One parent (one parent passed away)	20	3.20	10.0	90.0		45.0	55.0	
One parent (separated or divorced)	99	15.90	17.7	82.3		52.0	48.0	
Missing	3	0.50						
Father's Education								
≤ Primary school	72	11.50	8.5	91.5	1.77	41.7	58.3	26.58[***]
Secondary school	166	26.60	10.6	89.4		47.0	53.0	
Diploma/ Bachelor degree	305	48.90	11.2	88.8		31.3	68.8	
> Bachelor's degree	65	10.40	6.2	93.8		13.8	86.2	
Missing	16	2.60						
Mother's Education								
≤ Primary school	80	12.80	9.0	91.0	5.64	40.0	60.0	18.33[***]
Secondary school	162	26.00	11.9	88.1		45.7	54.3	
Diploma/ Bachelor's degree	315	50.50	10.9	89.1		31.2	68.8	
> Bachelor's degree	60	9.60	1.7	98.3		20.9	39.1	
Missing	7	1.10						
	$\overline{X}$	SD	$\overline{X}$		t	$\overline{X}$		t
Grade point average (0–4)	3.39	.44	3.17	3.43	3.65[**]	3.28	3.46	4.91[***]

[*]p < .05, [**]p < .01, [***]p < .001,
[a] = Thai educational equivalent (Grade 10 = Mattayom 4; Grade 11 = Mattayom 5; Grade 12 = Mattayom 6)

The multivariate analyses included the data from participants who had completed all items in each of the questionnaires (N = 565 for tobacco smoking; N = 558 for alcohol use). After entering all statistically significant socio-demographic characteristics from the univariate analyses into the multivariate analysis, the model predicted 15.8% (Nagelkerke R^2) of the probability of tobacco smoking and correctly classified 91.2% of cases. Males were 6 times more likely to smoke than females. Students from single parent homes (parents divorced or separated), were twice as likely to smoke as those from two parent homes. Students who perceived insufficient personal income were approximately 3 times more likely to smoke tobacco. Decreasing GPA was also associated with an increased likelihood of smoking (Table 4).

Table 4: Summary of Logistic Regression Analysis Predicting which factors are associated with tobacco smoking (n = 565)

	B	SE	Wald statistic	p	OR	95%CI Lower	95%CI Upper
School type							
Mixed school	-	-	-	-	Ref	-	-
Male school	-.18	.41	.19	.66	.84	.38	1.86
Female school	.48	.59	.66	.42	1.61	.51	5.12
Gender							
Female	-	-	-	-	Ref	-	-
Male	1.79	.61	8.47	.00	5.97	1.79	19.88
Perceived sufficient personal income							
Sufficient	-	-	-	-	Ref	-	-
Insufficient	1.04	.48	4.60	.03	2.82	1.09	7.27
Home structure							
Two parents in home	-	-	-	-	Ref	-	-
One parent (Father or mother pass away)	.49	.81	.37	.54	1.64	.33	8.08
One parent (divorce or separation)	.88	.36	5.88	.02	2.41	1.18	4.92
GPA	-1.22	.33	14.00	.00	.30	.16	.56
Constant	1.48	1.23	1.45	.23	4.39		

Note: -2LL = 312.751; X^2 = 43.482, df = 7, p = .000; Nagelkerke R^2 = 15.8%; Hosmer and Lemeshow test p = .233; Classification accuracy = 91.2%

A logistic regression was performed to confirm the effects of school type, sex, home structure, education level of parents and GPA on the likelihood that students consume alcohol. The model predicted 17.7% (Nagelkerke R^2) of the probability of alcohol use and correctly classified 70.3% of cases. Students who attended the mixed school had an increased likelihood of using alcohol. If their parents were separated or divorced, students were 2 times more likely to use alcohol than students who lived with both father and mother. Only the education level of fathers was associated with alcohol use in students. Similar to the data from tobacco smoking, decreasing GPA was associated with an increased likelihood of alcohol use (Table 5).

Table 5: Summary of logistic regression analysis predicting high school students ever consuming alcohol (n = 558)

	B	SE	Wald	p	OR	95%CI	
						Lower	Upper
School type							
Mix school	-	-	-	-	Ref	-	-
Male school	-1.31	.33	16.22	.00	.27	.14	.51
Female school	-.66	.26	6.56	.01	.52	.31	.87
Gender							
Female (ref)	-	-	-	-	Ref	-	-
Male	.23	.32	.52	.47	1.27	.67	2.39
Home structure							
Two parents in home	-	-	-	-	Ref	-	-
One parent (other parent passed away)	.36	.51	.51	.48	1.44	.53	3.89
One parent (divorced or separated)	.82	.26	10.22	.00	2.26	1.37	3.73
Parents' education level							
Higher than Bachelor's degree	-	-	-	-	Ref	-	-
Diploma / Bachelor's degree	1.19	.46	6.52	.01	3.28	1.32	8.15
Secondary school	1.30	.43	9.31	.00	3.67	1.59	8.47
Primary school and lower	.78	.40	3.75	.05	2.18	.99	4.79
GPA	-.84	.23	13.14	.00	.43	.28	.68
Constant	1.56	.98	2.51	.11	4.76		

Note: -2LL = 637.462; X^2 = 77.800, df = 9, p =.000; Nagelkerke R^2 = 18%;
Hosmer and Lemeshow test p = .572; Classification accuracy = 70.3%

Discussion

This study focused on lifetime prevalence rates of ever smoking tobacco or using alcohol among high school students. Several distinctions related to our findings are worth noting. All our participants were between 15 and 19 years of age with a mean age of 16.4. The higher prevalence rates of tobacco smoking and alcohol use in the mixed school adds further evidence that the context of a typical adolescent social environment (mixed male and female) and the resultant peer pressure and/or can increase the risk of engaging in these behaviours[18]. In addition, the marked decreases in the rates of ever smoking tobacco or ever consuming alcohol compared to the rates in the last three months provide evidence that for many Thai high school students their tobacco smoking and/or alcohol use was more experimental or irregular than reflecting heavy

or chronic use. Finally, it was more common for students to engage in both smoking tobacco and consuming alcohol. More common was. This combination increases the likelihood of smoking more tobacco and pairing the two behaviors makes it more difficult to curtail the use of either one.

Not surprisingly, sex differences were found in prevalence rates of both tobacco smoking and alcohol use. However, this finding is not unequivocal across studies from other countries. This low percentage of prevalence rates among female may reflect social norms[19]. Most Thai women perceive that female smokers are not acceptable in Thai society as compare to male smokers. However, concerns have been expressed that the rates of smoking tobacco in girls and women in low and middle income countries are predicted to rise.

Another demographic factor strongly

associated with smoking and alcohol use was home structure. Several studies revealed that students living with only father or mother were at risk for smoking[4]. Similar findings were reported for Korean students[11]. Home structure also predicted increased risk for alcohol use. The association between a single parent family and increased risk for alcohol use and increased overall amount of alcohol consumed in adolescents has been widely reported across multiple countries[20, 21]. The experience of parent separation might be a serious stressor during adolescence. In addition to increases in alcohol use, serious stressors in this age group can lead to mental health problems, such as anxiety and depression. Moreover, high school students whose parents had recently separated were more likely using alcohol in greater quantities[20].

In considering the implications of how personal income sufficiency was related to smoking tobacco, purchasing tobacco can be costly, depending on source and number of cigarettes smoked per day. National survey data suggest that the amount spent on tobacco per month is not significantly different between adults and adolescents (470 compared to 407 Baht/month)[3]. Potential cost containment strategies could include crafting your own from papers and tobacco, sharing amongst friends or obtaining cigarettes from parents; however, these appear not to be popular. Indeed, students who smoked tobacco perceived themselves as not having enough income. However, given the majority of students who smoked tobacco also consumed alcohol, it is difficult to interpret if their perceptions regarding income are related to illegally obtaining tobacco or alcohol or both.

Similar to other studies, a strong negative association was found between GPA or academic performance and the use of tobacco and alcohol in students[6,22]. GPA, as an indicator of academic performance can be a significant source of stress for students. Students may consider smoking tobacco and using alcohol as a stress management strategy. Given that most students who smoked tobacco also used alcohol,

more general stress management programs that focus on healthy coping strategies may be more broadly applicable to this age group.

Conclusion and Recommendations

The percentage of high school students who used alcohol was found to be higher than the percentage of those smoking tobacco, however tobacco smoking and alcohol use were frequently paired behaviors. Students identified at higher risk to smoke tobacco were male students, living in a home where parents were separated, perceived themselves as having insufficient personal income, and had lower academic achievement. Similar risk factors were observed for alcohol use, with the exception of attending a mixed-school setting. These data provide a starting point for further research to support the development of age appropriate targeted and perhaps more general programs to support high school students to make healthy life style choices, to address negative peer pressure and to respond to individual sources of stress in positive and healthy ways.

Implications for policy and practice

The aims of this study were to collect data specific to Thai adolescents regarding the prevalence of tobacco smoking and alcohol use and to delineate factors associated with smoking tobacco and alcohol use. The data provides additional information to develop and test prevention, harm reduction and cessation interventions specific to adolescents. Key to these developmental activities is the finding of the significant overlap between alcohol use and tobacco smoking, suggesting that a more general approach regarding making healthy life choices might be more beneficial than separate tobacco and alcohol harm reduction and cessation programs. Careful consideration is needed to identify high risk groups and to create programs that will attract adolescents into them.

Implications for further study

The data provides a rich context for further studies. For the adolescent health issues related

to alcohol use and smoking tobacco, this study focused on only personal factors, which identified individuals at higher risk. Other factors including psychosocial dimensions (social support, family dynamics, mood and anxiety symptoms) community characteristics (recreational resources, adolescent health services, choices of types of school settings) might help delineate additional protective and risk factors.

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