

ORIGINAL ARTICLE

Patterns of polysubstance use and associated factors among grade 11 students in Bangkok, Thailand

Eunyoung Ham^{1,2}, Bang-on Thepthein³, Prapapun Chucharoen³ and Seo Ah Hong³

¹ M.A., (Addiction Studies), ASEAN Institute for Health Development, Mahidol University, Thailand

² B.A., (Child Welfare), Namseoul University, Cheonan, South Korea

³ Ph.D., ASEAN Institute for Health Development, Mahidol University, Thailand

Corresponding Author: Bang-on Thepthein *Email:* bungon.the@mahidol.ac.th

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Abstract

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Polysubstance use, the use of more than one substance, is a current problem among adolescents. The study assessed the prevalence of polysubstance use and associated factors among grade 11 students in Bangkok, Thailand. A web-based, cross-sectional study was conducted utilizing the secondary datasets of the Bangkok Behaviour Surveillance Survey (BBSS) in 2017, and the data were collected from June to July 2017. The BBSS is conducted every two years. In the process of analysis, 1,755 adolescents were included. Chi-square test and multiple logistic regression were performed to identify the association between independent variables and polysubstance use.

The prevalence of use of alcohol, cigarette, and marijuana were 26.2%, 14.4%, and 5.9%, respectively. The polysubstance use during the past 12 months was 14.1%. Among 484 student substance users, more than half reported polysubstance use, and 17.4% have used all three substances. Male students were more likely to use polysubstance than females. Having a close friend who uses substances, persuasion of a close friend, recent grade point average (GPA), socio-economic status (SES), and sexual orientation were significantly associated with polysubstance use. As for psychological factors, anxiety and depression were not associated with polysubstance use. However, having had adverse childhood experiences (ACEs) was associated with polysubstance use. In addition, sexual perception and experience and risky sexual behaviour scores were significantly associated with polysubstance use. The multiple logistic regression analysis showed that having a boy/girlfriend, close friends smoking cigarettes, recent low GPA, sexual perception, sexual experience, and high and moderate SES significantly predicted polysubstance use.

Such findings can be used by prevention specialists and health educators to develop and implement alcohol tobacco and marijuana prevention programs and interventions specifically tailored to Thai adolescents.

Keywords: polysubstance use, grade 11 students, anxiety, depression, adverse childhood experiences, sexual behavior

รูปแบบของการใช้สารเสพติดมากกว่า 1 ชนิดและปัจจัยที่เกี่ยวข้องในกลุ่มนักเรียนมัธยมศึกษาชั้นปีที่ 5 ในกรุงเทพมหานคร ประเทศไทย

อิมยอง แสม^{1, 2} บังอร เทพเทียน³ ประภาพรณ จูเจริญ³ และโซ อะ หงษ์³

¹ M.A. (Addiction Studies), สถาบันพัฒนาสุขภาพอาเซียน มหาวิทยาลัยมหิดล ประเทศไทย

² B.A. (Child Welfare), มหาวิทยาลัยนำโซล, ซอนัน ประเทศเกาหลีใต้

³ Ph.D. สถาบันพัฒนาสุขภาพอาเซียน มหาวิทยาลัยมหิดล ประเทศไทย

บทคัดย่อ

อิมยอง แสม บังอร เทพเทียน ประภาพรณ จูเจริญ และ โซ อะ หงษ์ รูปแบบของการใช้สารเสพติดมากกว่า 1 ชนิดและปัจจัยที่เกี่ยวข้องในกลุ่มนักเรียนมัธยมศึกษาชั้นปีที่ 5 ในกรุงเทพมหานคร ประเทศไทย

ว. สาธารณสุขและการพัฒนา 2562;17(2):3-19

ปัจจุบันการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วงระยะเวลาหนึ่งเป็นปัญหาในหมู่วัยรุ่น การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษารูปแบบและปัจจัยที่เกี่ยวข้องกับการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมาในกลุ่มนักเรียนมัธยมศึกษาชั้นปีที่ 5 ในกรุงเทพมหานคร การศึกษาครั้งนี้เป็นการศึกษาแบบภาคตัดขวางโดยสำรวจข้อมูลทางเว็บไซต์วิเคราะห์ข้อมูลทุติยภูมิจากโครงการการเฝ้าระวังพฤติกรรมทางสุขภาพ ในปี 2560 ที่ได้ดำเนินการสำรวจข้อมูลในทุก 2 ปี จำนวน 1,755 ราย เก็บรวบรวมข้อมูลในช่วงเดือนมิถุนายน ถึง กรกฎาคม 2560 ใช้การทดสอบไคสแควร์และการถดถอยโลจิสติกพหุคูณเพื่อศึกษาความสัมพันธ์ระหว่างตัวแปรอิสระกับตัวแปรตามคือการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมา

ผลการศึกษาพบว่าความชุกของการดื่มแอลกอฮอล์ สูบบุหรี่และเสพติดยาเท่ากับ 26.2%, 14.4% และ 5.9% ตามลำดับและการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วงในช่วง 12 เดือนที่ผ่านมาคือ 14.1% ในกลุ่มนักเรียนที่เคยใช้สารเสพติดในรอบปีที่ผ่านมาจำนวน 484 คน มากกว่าครึ่งรายงานว่าการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมา และ 17.4% ดื่มแอลกอฮอล์ สูบบุหรี่และเสพติดยา นักเรียนชายมีแนวโน้มที่จะใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมา มากกว่านักเรียนหญิง ปัจจัยที่มีความสัมพันธ์กับการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมาได้แก่ มีเพื่อนสนิทที่เคยใช้สารเสพติด มีเพื่อนสนิทชักชวนให้ใช้สารเสพติด คะแนนเฉลี่ย สถานะทางเศรษฐกิจและสังคม และเพศเกี่ยวข้องกับการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมาอย่างมีนัยสำคัญ สำหรับปัจจัยทางจิตวิทยา ความวิตกกังวลและภาวะซึมเศร้า ไม่สัมพันธ์กับการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมา อย่างไรก็ตามการมีประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์ มีความสัมพันธ์กับการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมา นอกจากนี้นักเรียนที่มีประสบการณ์ทางเพศและมีความเสี่ยงมีความสัมพันธ์กับการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมาอย่างมีนัยสำคัญ การวิเคราะห์ถดถอยโลจิสติกพหุคูณพบว่านักเรียนที่มีแฟน มีเพื่อนสนิทสูบบุหรี่ เกรดเฉลี่ยต่ำ, เพศชาย, มีประสบการณ์ทางเพศ, และมีเศรษฐกิจฐานะสูงเป็นปัจจัยที่มีนัยสำคัญต่อการใช้สารเสพติดมากกว่าหนึ่งชนิดในช่วง 12 เดือนที่ผ่านมา

ผลจากการศึกษาสามารถนำไปใช้โดยผู้เชี่ยวชาญด้านการป้องกันและนักการศึกษาด้านสุขภาพในการพัฒนาและดำเนินการโปรแกรมด้านการป้องกันและมาตรการการแทรกแซงการดื่มสุรา สูบบุหรี่และการใช้ยาที่ออกแบบมาโดยเฉพาะสำหรับวัยรุ่นไทย

คำสำคัญ: การใช้สารเสพติดมากกว่าหนึ่งชนิด นักเรียนมัธยมศึกษาชั้นปีที่ 5 ความวิตกกังวล ภาวะซึมเศร้า ประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์ พฤติกรรมทางเพศ

Introduction

The use of substances is a major public health concern—especially among persons under the age of 18. Polysubstance use, the use of more than one substance, is a current problem among adolescents given the increased behavioural and mental health risks. Polysubstance use and early age of initiation are considered to be risky, undesirable, and problematic behaviours of concern not only to individuals, but also to others.¹ The use of multiple drugs poses a major threat to someone's health, safety, and overall well-being. Risky substance use among adolescents has been linked to higher levels of depression and anxiety disorders, poor academic achievement, socio-economic disadvantages, increased risk for suicide, and higher sexually risky behaviours that may lead to illnesses.² Despite common knowledge on substance use, according to national survey research conducted in the high school setting, most adolescents have low risk perceptions of harm associated with using substances, and fail to conceptualize substance use problems as recurring and constituting a lifelong illness.³

Research shows that adolescents who report using substances at an early age are likely to manifest these symptoms earlier than adolescents who begin use at a later age.⁴ Direct correlation between age of first use and the onset of substance use disorders has been found such that youth who use substances at an early age are at significant risk for having a clinical substance use disorder compared to youth who initiate substances later during the developmental period.⁵ Studies have found that adolescents who initiated their first regular use of alcohol at an early age (e.g., 11–14 years) were at heightened risk for later progression

to having an alcohol use disorder.⁶ Other research among adolescent populations has shown that early uptake of cigarette smoking initiation substantially increases the risk of future nicotine physiological dependence.⁷ Recent studies have also provided evidence that early use of marijuana increases the risk for a cannabis use disorder and other emotional health issues among adolescents.⁸ Overall, little is known about other risk factors and behaviours linked to early adolescent substance use. Usage of substances early on by adolescents should be closely studied due to the developing brain phenomenon and the potential for future emotional, cognitive, and behavioural problems that may stem from such early usage.⁹ Problems such as low self-esteem, mood issues, antisocial behaviour, rebelliousness, aggressiveness, delinquency, and truancy are all commonly reported among adolescents with substance use issues.¹⁰ One important behavioural risk among adolescent populations that has received recent attention is polysubstance use, which is generally defined as the use of more than one drug in a specified period.¹¹ Polysubstance use is a fairly prevalent issue among adolescent populations. Based on research data, it has been estimated that rates of polysubstance use vary among adolescent populations from 18.0% to 40.0%.¹²

Progression to multiple drug use has been the focus of several recent studies. In a general population sample of young adults in Australia, polysubstance users were significantly older than those who consumed alcohol only.¹³ When polysubstance use, typically comprising alcohol, tobacco and cannabis, develops at an early age, there is a greater likelihood of various forms of illicit drug use in the future.¹⁴ The extent to which polysubstance use continues into

middle adulthood (> 30 years) is less clear, because methodologies are often very different from those used in younger samples. In UK adult population studies, polysubstance use (alcohol/tobacco excluded) is 4.2%.¹⁵ In US adult population surveys, polysubstance abuse/dependence is 1.7%.¹⁶ While the prevalence of illicit polysubstance use is relatively low in the general populations, some groups feature more prominently.

Although adolescent substance use patterns begin with experimentation of a single drug, research shows that such use can evolve into more complex and dangerous patterns of polysubstance use.¹⁷ Use of certain types of licit substances (e.g., tobacco and alcohol) tends to increase the probability of an adolescent also using other types of harder, illicit drugs, e.g., heroin, cocaine, and methamphetamine.¹⁸ Treatment outcome research has shown that, among adolescents (age 12-17 years) who have been in treatment for a substance use disorder, most are engaging in polysubstance use.

Polysubstance use most frequently involves mixing alcohol with tobacco, cannabis and/or amphetamine derivatives.¹³ However, the consequences of polysubstance use in substance progression are not well established. The prior studies have proved that polysubstance use is associated with even higher risks and worse consequences than single substance use. Therefore, examining concurrent substance use - or the use of two or more substances within a specified time period—during adolescence is critical, as adolescents who engage in concurrent use are at increased risk for negative health and social consequences compared to those who are single-substance users.¹⁹ However, in Thailand, there has been few research studies on adolescent health risk behaviours including substance

use problems, depression, anxiety, adverse childhood experiences (ACEs) and sexual behaviour.

The highest prevalence of polysubstance use was seen for consumers of alcohol, tobacco, and marijuana. When polysubstance use (typically comprising these three substances) develops at an early age, there is a greater likelihood of various forms of illicit drug use in the future.¹⁴ Therefore, the aim of this study was to identify prevalence of polysubstance use of such drugs as alcohol, tobacco, and marijuana, and determinants of use among Thai adolescents.

The expected benefits of this study are followed: 1) Providing evidence on the prevalence and the factors associated with polysubstance use among adolescents in Bangkok; 2) Better understanding of the importance of adolescence and polysubstance use pattern and behaviour among adolescents; and 3) Providing valuable insights into polysubstance use pattern and behaviours among adolescents for the health policy makers and school nurses to develop early prevention and interventions because school nurses who deal with students experiencing psychosocial effects of substance use can identify students at risk of polysubstance use and refer them to appropriate services.

Methods

A web-based, cross-sectional study was conducted utilizing the secondary datasets of Bangkok Behaviour Surveillance Survey (BBSS) in 2017 to identify the patterns of polysubstance use and associated factors among adolescents in Thailand. A total of 1,755 grade 11 students were randomly recruited from 12 public high schools. The survey was conducted from March 15 to April 5, 2017.

Sampling technique

The BBSS utilized random sampling to choose 12 public high schools (HS). According to the Office of the Secondary Educational Service Area (OSESA), there are 22 public secondary schools under the office 1 and 25 public secondary schools under the office 2. The researcher went to each school and selected 150 students from HS grades 4 to 6 in each school by using systematic random sampling, stratified by sex. Participating students logged into the study website and completed survey by using a school computer without teachers present. The inclusion criteria for this study were; 1) Those who both male and female adolescents attending public secondary schools in Bangkok under office 1, 2 of the secondary educational service areas, Ministry of Education. 2) Only students who were in grade 11 and 3) Adolescents who were randomly sampled in 4th to 6th classes.

Measurements of variables

The self-administered questionnaire covers socio-demographic characteristics, ACEs, anxiety, depression, sexual behaviour and substance use, and polysubstance use as the dependent variable.

Demographics Students provided information about sex (gender), friends and family composition. Parental education was provided by parents of the students via a survey completed when parents gave informed consent for their child's participation in the study.

Polysubstance Use is defined as use of more than one substance (alcohol, cigarette, and marijuana) at least one time during the past 12 months. The variable of polysubstance use was recoded as 0 = "No"

(never use or use only one substance) and 1 = "Yes" (use more than one substance within 12 months).

The ***ACEs*** questionnaire was adapted from the WHO Centre for Disease Control comprising emotional, physical or sexual abuse; emotional or physical neglect; witnessing violence at home such as child violence and/or parent violence; parental separation or divorce; living with family members who were substance abusers, mental illness, and having an imprisoned family member. Response was 'yes' or 'no' to each of the eleven ACEs. The total score was then grouped into low ACEs score of 0-2) and high ACEs (score of 3-11).

Anxiety and depression symptoms were assessed by the Hopkins Symptoms checklist – HSCL-25 (DSM-IV) which has 25 items: 15 items focusing on depression and ten items focusing on anxiety. The scoring system is 1 to 4, ranging from 'not at all,' 'a little,' 'sometimes' and 'often.' The total score was divided by 10 for anxiety and 15 for depression, with 1.75 as the cut-off point for anxiety and depression symptoms. Total anxiety and depression scores were categorized into low (score of 0-1 score) and high (score of 2)

Socio-economic status (SES) is an economic and sociological factor which combines parent's income and education. SES was calculated by the formula of $(5+5)*3$ which means father's education (5 categories) + mother's education (5 categories) multiplied by family income (3 categories). The resulting score was categorized into 1 = Low (6-9), 2 = Moderate (12-24), and 3 = High (27-30) .

In this study, ***sexual perception*** was defined as an enduring pattern of romantic or sexual attraction

(combination of sex and sex perception questions) to persons of the opposite sex, the same sex, or both sexes or more than one gender. It was determined by the question: “What sex are you?” and “Which of the following best describes your sex?” Response was categorized as 1 = “male as male”, 2 = “female as female”, and 3 = “male as female or other, female as male or other”.

Risky sexual behaviour refers to any sexual practice that increases one’s risk of substance use. Risky sexual behaviour was determined by whether the respondent had ever had sex, age at first sex, condom use at first sex, number of sex partners, and condom use at last sex. The Risky Sexual Behaviour score was calculated by the sum of the five items and categorized as 1 = Low (score of 0-1), 2 = Moderate (score of 2), and 3 = High (score of 3-5).

Data analysis

IBM Statistical Package for Social Science (SPSS) version 21 was used for data analysis that identified prevalence of polysubstance use among Thai adolescents. Descriptive statistics included frequencies, percentages, mean, median, standard deviation, inter-quartile range and quartile deviation were employed to analyse the data. The Chi-square test was used to examine the association between each independent variable and the dependent variable. Multiple logistic regression was used to obtain the adjusted odds ratios (Adj. OR) for the prediction of polysubstance use with socio-demographic factors, psychological factors, and risky sexual behaviour factors. Results were adjusted for all statistically significant covariates from the bivariate analyses. All statistical tests were considered significant at p-value

< 0.05, and the odds ratios (OR) were considered significant if values were not within the 95% confidence intervals.

Ethical consideration

The protocol for the Bangkok Behaviour Surveillance Survey 2017 was reviewed by Mahidol University Social Science Institutional Review Board (MU-SSIRB). The certified approval number for the BBSS is 2016/436.2311. The protocol for the secondary data analysis (this study) was approved by MU-SSIRB (Certificate of approval number 2018/038.1610).

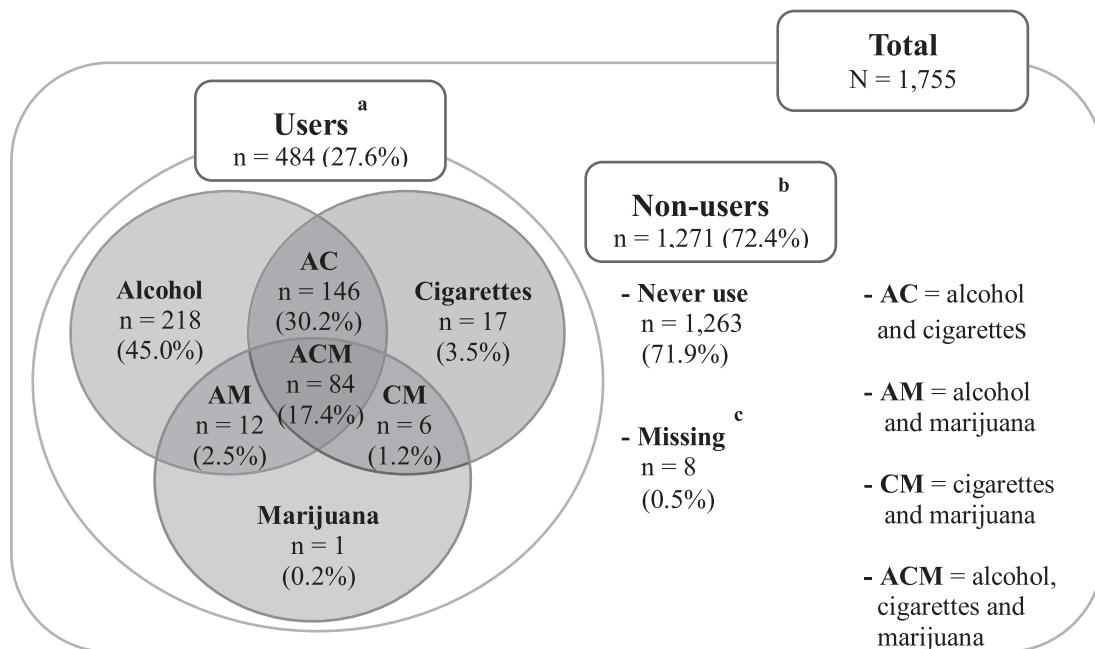
Results

Socio-demographic characteristics

The range in age among this sample of high school students was 15 to 19 years. The majority of the respondents were 16 to 17 years old (91.3%). Nearly two-thirds lived in their own house with parents. About half never had a boy/girlfriend but nearly 20.0% ever had one in the past. The study points out that nearly half of the respondents had close friends who drink alcohol, about one-third had close friends who smoke cigarettes, and nearly one-fifth had close friends who use illicit drugs. However, nearly one-fifth of respondents were persuaded to use any form of substances by their close friend. For the academic performance of the respondents, more than half have a high GPA of ≥ 3.01 . For the family background, nearly one-third of their parents graduated from secondary school and there was not much difference between their father and mother’s education level. More than half had family income less than 30,000 baht per month. According to the parents’ education level and family monthly

income, the family SES is considered as low. The majority of those with male biological sex reported that their sexual orientation was male; the majority

of those with female biological sex reported feeling female. However, 8.4% of participants had a sexual identity that differed from their sex at birth.



a Total number and percentage of students by use of alcohol, cigarettes and marijuana

b Total number of non-users including never use and absence of any form of substance use among 1,755 students within 12 months.

c Students who used any form of substance but did not answer what type; hence they were excluded from user group.

Figure 1 Distribution of substance users and non-users

Polysubstance use

Figure 1 shows that the number and percentages of students who used substances among the total number of 1,755 participants during the past 12 months. Fully 1,263 students reported never using any forms of substances and eight cases were excluded from the three-substance-user group because they didn't answer which substance they used during the past 12 months. The circle in the middle of the figure shows students' substance use rates and

patterns of use. Altogether, 484 students have used three substances (27.6%). Each circle reveals the number and percentage of students' single substance use and polysubstance use of alcohol, cigarette and marijuana among 484 substance users of. Nearly half have used single substance of alcohol (45.0%), cigarettes (3.5%) and marijuana (0.2%). As for polysubstance use, more than half of respondents have reported polysubstance use (51.3%) and, among them, 17.4% used all three substances during the past 12 months.

Factors associated with polysubstance use

Among the socio-demographic characteristics, sex, ever had boy/girlfriend, had close friends use substances, experienced peer persuasion, recent GPA,

SES and sexual perception were significantly associated with polysubstance use with p-value < 0.001 (Table 1). SES was also significantly associated with polysubstance use with p-value = 0.048.

Table 1 Socio-demographic factors associated with polysubstance use

Socio-demographic Factors	Polysubstance use				Chi-square value	P-value
	Yes		No			
	n	%	n	%		
Sex					47.00	<.001**
Male	179	19.6	734	80.4		
Female	69	8.2	773	91.8		
Had a boyfriend/girlfriend					20.88	<.001**
Yes	155	18.0	706	82.0		
No	93	10.4	801	89.6		
Had a friend drinking alcohol					37.24	<.001**
Yes	159	19.6	652	80.4		
No	89	9.4	855	90.6		
Had a friend smoking cigarettes					84.59	<.001**
Yes	161	23.8	516	76.2		
No	87	8.1	991	91.9		
Had a friend using illicit drug					53.12	<.001**
Yes	88	26.7	241	73.3		
No	160	11.2	1,266	88.8		
Experienced peer persuasion to use substances					60.74	<.001**
Yes	86	28.3	218	71.7		
No	162	11.2	1,289	88.8		
Recent GPA					31.55	<.001**
Low	153	19.3	641	80.7		
High	95	9.9	866	90.1		
Mean (SD) = 3.03 (0.54), Min = 0.91, Max = 4.00						
SES					6.09	0.048*
High	22	18.2	99	81.8		
Moderate	174	15.0	988	85.0		
Low	52	11.0	420	89.0		
Sexual perception					55.91	<.001**
Male as male	172	20.6	663	79.4		
Female as female	60	7.8	713	92.2		
Other	16	10.9	131	89.1		

Table 2 presents of the 11 types of ACEs, only two had an association with polysubstance use: physical neglect, and household alcoholism/drug abuse with p-values of 0.046 and 0.001 respectively. Moreover, the total score of ACEs also had association with polysubstance use with p-value = 0.021. Those who reported physical neglect (20.2%) had more polysubstance use than those who did not report that (13.7%). Moreover, the students who had a member of the household who was addicted to alcohol and/or other drugs had more polysubstance use compared with those with no addicted household members (20.0% and 13.0%). In terms of ACEs scores, those who had high ACEs had more polysubstance use compared to those who had low ACEs.

Sexual experience and risky sexual behaviour scores were significantly associated with polysubstance use with p-value < 0.001. The students who had sexual experience had more polysubstance use compared to those who had no sexual experience. In terms of risky sexual behaviour scores, the respondents who reported high risk had more polysubstance use compared to those with moderate and low, with prevalence of 30.5%, 26.6%, and 11.7%, respectively.

However, the associations between anxiety, depression, total score and polysubstance use were not significant.

Prediction for polysubstance use

Table 3 shows the adjusted odds ratio for polysubstance use. After adjusting for all the independent variables, only ever having had a boy/girlfriend, having close friends smoke cigarettes, recent GPA, sexual perception, ever had sex, and SES were significantly associated with polysubstance use.

The students who ever had a boy/girlfriend were nearly 1.5 times more likely to be polysubstance users compared to those who did not. The students who had close friends smoked cigarettes were 3.1 times more likely to use polysubstance. The students with low recent GPA were about 1.6 times more likely to use polysubstance compared with students having high recent GPA. Male students who reported their sexual perception male were about three times more likely to be polysubstance users than other groups. Those who had sex were 2.6 times more likely to use polysubstance compared to who reported never had sex. Students from high SES families were twice more likely to use polysubstance compared to low SES students. Similarly, the moderate SES students were 1.4 times more likely to use polysubstance compared to low SES students.

Table 2 Adverse child experiences and sexual behaviour factors associated with polysubstance use

ACEs and sexual behaviour	Polysubstance use				Chi-square value	P-value
	Yes		No			
	n	%	n	%		
Adverse Childhood Experiences						
Physical neglect					3.99	0.046*
Yes	25	20.2	99	79.8		
No	223	13.7	1,408	86.3		
Household alcoholism and drug abuse						
					11.29	0.001*
Yes	79	19.2	333	80.8		
No	169	12.6	1,174	87.4		
ACEs scores						
					5.32	0.021*
Low ACEs	184	13.2	1,214	86.8		
High ACEs	64	17.9	293	82.1		
Mean (SD) = 1.51 (2.35), Min = 0, Max = 11						
Sexual behavior						
Had ever had sex					73.59	<.001**
Yes	102	28.1	261	71.9		
No	146	10.5	1,246	89.5		
Risky sexual behaviour scores						
					52.48	<.001**
High	40	30.5	91	69.5		
Moderate	33	26.6	91	73.4		
Low	175	11.7	1,325	88.3		

Table 3 Predictive factors for polysubstance use

Variables	Adj OR	95% CI		P-value
		Lower	Upper	
Had a boyfriend/girlfriend				
Yes	1.462	1.072	1.995	0.016*
No	1			
Had close friends smoking cigarettes				
Yes	3.126	2.330	4.194	<.001**
No	1			
Recent GPA				
Low	1.593	1.185	2.140	0.002*
High	1			
Sexual perception				
Male as male	3.083	2.256	4.213	<.001**
Other	1.451	0.811	2.598	0.210
Female as female	1			
Ever had sex				
Yes	2.603	1.888	3.588	<.001**
No	1			
SES				
High	2.142	1.180	3.891	0.012*
Moderate	1.397	0.982	1.989	0.032*
Low	1			

*P-value <0.05

**P-value <0.001

Discussion

The prevalence of polysubstance use among adolescents in Bangkok in the last 12 months was 14.1%. Polysubstance use was defined as “used more than one substance (i.e., alcohol, cigarettes, and marijuana) at least one time during the past 12 months”. Among the school-based surveys of adolescents in middle or high school, between 15.0% and 39.0% of adolescents could be classified as polysubstance users worldwide.¹² The prevalence in the current study was lower compared to Australia (18.0% in 12-17 year olds⁶, 34.0% prior to age 16⁷), Romania (15.4% in 15-17 year olds²⁰), Hungary (21.7% in 14-16 years²¹), Germany (25.8% in 15 years²²), and European students (27.0%, based on one month prevalence).²³ However, one cohort study conducted in the US showed that the prevalence of polysubstance use was lower than the current study with 12.3% and 14.1%, respectively.²⁴ In the Thailand global school-based student health survey 2008, the prevalence of polysubstance use (alcohol and cigarettes) during the past 30 days was 7.4%.²⁵ This study found that 14.1% had polysubstance use within the past 12 months.

As for family SES, the findings in this study are contrary to previous studies in adolescents which found that lower SES is associated with higher rates of substance use such polysubstance.²⁶ However, in this study, the students who were high SES used more polysubstance than the low SES students similar with study among young adults with the highest family background SES were most prone to alcohol and marijuana use.²⁷ Because wealth is the strongest predictor of heavy episodic drinking, sole reliance on a different SES measure. There are studies which found that adolescents with higher SES use

polysubstance more than adolescents with lower SES.²⁸ Similarly, another cohort study conducted in the US among childhood cancer survivor adolescents also showed that higher SES was associated with greater marijuana use.²⁴ According to findings of many studies, we can estimate that adolescents with higher SES (having greater financial resources) may have the ability to spend more for substances than adolescents with lower SES. However, SES is difficult to measure accurately for level income, wealth, and education. As the period between high school graduation and career attainment has elongated, consistent SES estimation has become an emerging issue for researchers. Limitations of our work include not having available measures of parental or family history of substance use, or neighborhood context.

Research on anxiety has shown a relationship with alcohol problems while controlling for anxiety and negative effects.²⁹ According to Howell, et al.³⁰, anxiety is incrementally related to coping-related drinking motives, alcohol problems, and risk of developing an alcohol use disorder. The relationship between anxiety and substance use problems suggests that anxiety might be an important underlying mechanism that explains drinking behaviours without any anxiety symptoms. The research on the relationship between anxiety sensitivity and alcohol use appears to be mixed. Some research supports the self-medication hypothesis, such that individuals with moderate and severe anxiety are more motivated to drink in order to reduce symptoms. For instance, to lessen discomfort associated with physical sensations, individuals who use substances may also be high on anxiety.³¹ Evidence suggests that high anxiety individuals may consume more alcohol, drink more fre-

quently, and for more risky reasons compared to those with lower anxiety.³² Depression is also prevalent in adolescence. Adolescence is characterized by increasing substance dependence and depressive symptoms, both of which can have short- and long-term intervention.³³ Many studies have found strong correlations between substance dependence and depression, though it is not clear if the association is causal, and if it is, in which direction(s) the process operates. However, this study did not find an association between anxiety and depression with polysubstance use because our study on substance user, not abuser or dependence.

The findings from this study are consistent with the majority of previous studies, which found that male adolescents were more likely to use substances than females. A study conducted in the US found that the prevalence of polysubstance use in males was higher than females.³⁴ Moreover, a study conducted in Iran also found that male adolescents used substances more than females.³⁵ Also, one systematic review found that polysubstance use was more prevalent among males. Sex/gender differences exist in neurobiologic factors mediating both reinforcement (dopamine, opioids) and aversiveness (CRF, dynorphin), as well as intrinsic factors (personality, psychiatric co-morbidities) and extrinsic factors (history of abuse, environment especially peers and family) which influence the progression from initial use to abuse.³⁶

ACEs rarely occur independently. Negative mental health outcomes are likely associated with the co-occurrence of several types of adversity. A study found that if a child experiences a single type of adverse experience, s/he has at least a 75.0% chance of experiencing a second type of adverse

experience during childhood.³⁷ Another study found that nearly half of respondents had one ACE but only one-tenth had more than five ACEs among the 11 types.³⁸ Likewise, this study found that nearly half of respondents had at least one ACE. Moreover, having a high ACE score was significantly associated with polysubstance use. Consistently, two studies found that having more ACEs score is more likely leading to substance use than no or fewer ACEs.³⁷⁻³⁸

Age at first sexual intercourse, condom use at first sexual intercourse, number of sexual partners, and condom use at last sexual intercourse had no significant association with polysubstance use. The prevalence of students who ever having had sex and had high scores of risky sexual behaviours were higher than other school-based, cross-sectional surveys for the period from 2009 to 2013 in Bangkok. Among drug using adolescents, the prevalence of ever having sex among students at grades 8, 11, and 2nd year of vocational college, aged 14-17 years was 11.2%.³⁹ Consistently, many studies found that risk sexual behaviours was significantly associated with substance use. A Latent class analysis study found a correlation between elevated sexual risk behaviours and infectious disease prevalence amongst polysubstance users.⁴⁰ The relationship between sexual risk behaviours and substance use, due to other factors and their interactions, such as socio-demographic status, types of partner, condom use, and substance use type.⁴¹ Other studies have failed to show an association between different types of sexual risk behaviours and the use of certain drugs and/or STI diagnosis.⁴² However, the current found that students who had high risky sexual behaviour were significantly more likely to practice polysubstance use.

Conclusions

The current study examined the prevalence and correlates of self-reported polysubstance users among grade 11 students in Bangkok, Thailand. The primary study findings are as follows: (1) Use of the three substances (alcohol, cigarettes and marijuana) was prevalent among the population in this study (14.1%). Nearly all substance users (98.4%) had used drugs in the past 12 months. Moreover, among substance users, 48.7% reported single substance use, while more than half reported polysubstance use. Among polysubstance users, one-third reported using all three substances of interest. By using multiple logistic regression, this study found that ever having had a boy/girlfriend, having close friends smoke cigarettes, recent GPA, sexual perception, sexual experience, and SES were predictive of polysubstance use among Thai adolescents.

Recommendations

The study provides the prevalence and associated factors of polysubstance use among Bangkok adolescents. Moreover, the population at risk were explored. Based on the findings, the study provides following recommendations for future implementation. At first, preventive intervention needed when students do not have sexual experience. During adolescence, students are sexually active and their sexual experience was significantly associated with polysubstance use. Moreover, this study has found that sexual experience predicted polysubstance use among grade 11 students. Thus, sexual experience of students should be explored more. Secondly, peer support should be considered to protect adolescents from substance use. According to this research and

many researches findings, close friends' substance use is big dangerous and challenging factors of substance use among adolescents. Therefore, school teachers and nurses should try to make a proper program such as counselling and activities for students and should play role an early prevention and intervention by recognizing students who are using substances and referring them to appropriate services.

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