

ORIGINAL ARTICLE

A web-based survey on adverse childhood experience, anxiety, depression, sexual behavior affecting methamphetamine use among adolescents in Bangkok, Thailand

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Abstract

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Thailand is no longer a major source of illicit drugs but it has become a transit point for drug trafficking among countries in Southeast Asia, East Asia and Oceania. Bangkok is Thailand's major metropolis where socio-economic status is high and, thus, drug dealers are targeting affluent vocational school students. A cross-sectional web-based study on methamphetamine use among vocational school students (n= 755) was conducted by randomly sampling three schools. The study explored adverse childhood experiences (ACEs), anxiety and depression in Bangkok to predict the associated factors of methamphetamine use. The reliability of the survey instruments for assessing anxiety, depression and ACEs, was tested using Cronbach's alpha and yielded values of 0.9, 0.9 and 0.8 respectively. Chi-square test was used to assess the level of association between the methamphetamine use and each independent variable. Multiple logistic regression was performed to determine the predictors of methamphetamine use.

Among 755 adolescent students aged 16-19 years, 55.0% had at least one ACE, 44.9% had been screened as having anxiety, 44.0% seemed to have depression, and 2.4% reported methamphetamine use in the previous year. After adjusting for socio-demographic factors, sexual risk factors, psychological factors, gender (Adj OR=11.70, 95% CI=1.39-98.28), school strictness on drugs (Adj OR=7.49, 95% CI=1.91-29.44), current house (Adj OR=5.54, 95% CI=1.09-28.26), condom-less first sex (Adj OR=7.28, 95% CI=2.48-21.39), depression (Adj OR=9.61, 95% CI=2.50-36.95) and family violence (Adj OR=6.03, 95% CI=1.96-18.59) were associated with methamphetamine use among adolescents.

The study indicates that psychological factors, family violence and sexual risk behaviors increase vulnerability for methamphetamine use among adolescents in Bangkok. However, further qualitative research studies are warranted.

Keywords: adverse childhood experience, anxiety, depression, sexual behavior, methamphetamine use, adolescents

ประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์ ความวิตกกังวล ภาวะซึมเศร้า พฤติกรรมทางเพศ และพฤติกรรมการใช้เมทแอมเฟตามีนของวัยรุ่นในเขตกรุงเทพมหานคร ด้วยวิธีการสำรวจข้อมูลบนเว็บ

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บทคัดย่อ

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ประเทศไทยถึงแม้ว่าจะไม่ใช่แหล่งผลิตยาเสพติดที่ผิดกฎหมายแต่เป็นจุดส่งผ่านยาเสพติดระหว่างประเทศในเอเชียตะวันออกเฉียงใต้ เอเชียตะวันออกเฉียงใต้และโอเชียเนีย โดยมีกรุงเทพมหานครเป็นเมืองหลวงที่มีประชากรค่อนข้างมีฐานะทางเศรษฐกิจและสังคมสูง และนักเรียนอาชีวศึกษาเป็นกลุ่มเป้าหมายหนึ่งที่เป็นผู้เสพยาเสพติด ดังนั้นในการศึกษาครั้งนี้จึงมีจุดประสงค์เพื่อศึกษาพฤติกรรมการใช้เมทแอมเฟตามีน และปัจจัยทำนายได้แก่ประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์ ความวิตกกังวล ภาวะซึมเศร้า และพฤติกรรมทางเพศ ของนักเรียนอาชีวศึกษาในเขตกรุงเทพมหานคร โดยการสุ่มอย่างง่ายจาก 3 สถานศึกษา จำนวน 755 ราย ด้วยวิธีการสำรวจข้อมูลแบบตัดขวางบนเว็บ ค่าความเชื่อมั่นของเครื่องมือวัดความวิตกกังวล ภาวะซึมเศร้าและ ประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์เท่ากับ 0.9, 0.9 และ 0.8 ตามลำดับ วิเคราะห์ข้อมูลโดยใช้การทดสอบไคสแควร์เพื่อหาความสัมพันธ์ระหว่างการใช้เมทแอมเฟตามีนกับตัวแปรอิสระ ใช้การวิเคราะห์ถดถอยลอจิสติกพหุคูณเพื่อหาตัวทำนายการใช้สารเมทแอมเฟตามีน

นักเรียนอาชีวศึกษาจำนวน 755 รายมีอายุระหว่าง 16-19 ปี ร้อยละ 55.0 มีประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์อย่างน้อยหนึ่งประสบการณ์ ร้อยละ 44.9 ได้รับการคัดกรองว่ามีความวิตกกังวล ร้อยละ 44.0 มีความเครียด และร้อยละ 2.4 มีการเสพยาเมทแอมเฟตามีนในรอบปีที่ผ่านมา หลังจากปรับปัจจัยลักษณะทางสังคม ปัจจัยเสี่ยงทางเพศและปัจจัยทางจิต แล้วพบว่าเพศชาย (Adj OR=11.70, 95% CI= 1.39-98.28)การรับรู้ความเข้มงวดของสถานศึกษา(Adj OR=7.49, 95% CI=1.91-29.44) อาศัยอยู่บ้านของบิดาและ/หรือมารดา (Adj OR =5.54, 95% CI=1.09-28.26) การไม่ใช้ถุงยางอนามัยเมื่อมีเพศสัมพันธ์ในครั้งแรก (Adj OR=7.28, 95% CI= 2.48-21.39) ความเครียด (Adj OR= .61, 95% CI=2.49-36.95) และมีประสบการณ์ในวัยเด็กเกี่ยวกับความรุนแรงในครอบครัว (Adj OR=6.03, 95% CI=1.96-18.59)เป็นตัวกำหนดพฤติกรรมการใช้เมทแอมเฟตามีนในนักเรียนอาชีวศึกษา

การศึกษานี้ชี้ว่าปัจจัยด้านจิตวิทยาได้แก่ ประสบการณ์ได้รับความรุนแรงจากครอบครัว ความเครียด ประกอบกับพฤติกรรมเสี่ยงทางเพศเป็นการเพิ่มความเปราะบางต่อพฤติกรรมการเสพยาเมทแอมเฟตามีนของวัยรุ่นในกรุงเทพมหานคร อย่างไรก็ตามการศึกษายังคงคุณภาพเพิ่มเติม

คำสำคัญ: ประสบการณ์ในวัยเด็กที่ไม่พึงประสงค์ ความวิตกกังวล ความเครียด พฤติกรรมทางเพศ พฤติกรรมการใช้เมทแอมเฟตามีน วัยรุ่น

Introduction

Thailand is no longer a major source for illicit drugs but it has become a transit territory for drug trafficking among Southeast Asia, East Asia and Oceania¹. Residents of Bangkok have higher socio-economic status and, thus, drug dealers are starting to target vocational school students. Results of the 2015 behavior surveillance survey in Bangkok (BSS) indicate that 7.3% of vocational school students used methamphetamines during the year prior to the survey. Methamphetamine is a potent, addictive psychostimulant that has dramatic effects on the central nervous system². Methamphetamine is the second most popular illicit drug (after cannabis) worldwide with annual global use prevalence of about 0.4%, though prevalence has been stable since 2000³.

The Centers for Disease Control and Prevention (CDC) sponsored a large-scale study with the purpose of examining the impact of adverse childhood experiences on adult health, entitled the Adverse Childhood Experiences (ACE) Study⁴. There are many research studies showing that ACE lead to poor mental health outcomes, smoking, alcohol abuse, and drug use, including methamphetamine⁵⁻¹⁰.

In a study on methamphetamine use and depression in a national study of adolescent health (USA), methamphetamine use had a strong association with depression¹¹. A significant relationship was found between the number of years a participant used methamphetamine and their level of depression¹². Likewise, research indicates that students may be experiencing moderate to high levels of anxiety throughout their education, and many students report feeling overwhelmed and anxious by the demands of school life¹³⁻¹⁴. Several lines of research indicate that

the approaches to coping with anxiety are linked to substance use¹⁵⁻¹⁶.

A study on women with methamphetamine use and sexual risk behavior (number of male partners, condom-less sex) points out the significant correlation between these two variables¹⁷. According to the CDC consultation on Methamphetamine use and sexual risk behavior, methamphetamine use is associated with sexual risk behavior in well documented various windows of behavioral assessment like three months, 12 months and most recent sexual encounter¹⁸. Therefore, understanding adolescent methamphetamine use and their co-factors, e.g., ACEs, anxiety, depression and sexual behavior is important for policy implementation and for developing effective prevention programs. The main purpose of the study is to identify the factors associated with methamphetamine use among adolescent vocational students in Bangkok so that the researchers can highlight the current situations of vulnerable adolescent vocational students.

Methods

Study design and participants

A school-based cross-sectional web-based self-administered study design was used to identify the associations of methamphetamine use behavior and each independent variable among vocational school students. Factors include socio-demographic characteristics, sexual risk behavior, adverse childhood experiences, anxiety and depression. A self-administered questionnaire has been developed to collect the data.

Population and Sample

The study was conducted in Bangkok, Thailand. Bangkok is major capital city of Thailand. It has a

population of 8,280,925 according to the 2010 census and contributes 12.6 percent of the national population. By comparing the different regions of Thailand, the Bangkok is the highest substance use region among North, Northeast, Central and South. According to the Office of the Vocational Education Commission, there have 21 governmental vocational schools and 3 private vocational schools in Bangkok. There have 3 years in vocational schools namely Year 1, Year 2 and Year 3. The sample size were determined by using the statistical formula for calculating a sample for proportions by Daniel¹⁹. The sample size was calculated using a confidence interval of 95%, an allowable error margin of 5% and a proportion of methamphetamine use from the previous study of 0.503²⁰.

Bangkok was divided into 3 clusters: Central, Middle and Suburb. The targeted populations of the Bangkok were public vocational school students (Year 2) in each 3 cluster of Bangkok. It was the age of adolescence period and complete puberty status for sexual risk. In the second sampling stage, from each zone, one vocational school has been chosen randomly. Then, total 3 schools were selected. In the third sampling stage, intact classes of a required subject during a required period are selected randomly. For each school, 10 classes of Vocational level 2 among 15 – 20 classes were selected randomly and students from each class were selected for survey. In each class, there may have 25 to 30 students and so nearly 250 students were selected from each school. Then, as a result 755 students were selected.

Dependent variable

The dependent variable, there was 1 question with 5 answers to measure methamphetamine use among

vocational school students within last year by means of frequency as never, try, once in a while, once in a month and always, which was dichotomized as “0” for never use and “1” as ever try, once in a while, once in a month and always.

Independent variables

Potential predictors were selected using Adverse Childhood Experiences Questionnaires from Center for Disease Control (WHO) and anxiety and depression by Hopkins Symptoms Checklist (HSCL-25) for adolescent Populations. For HSCL, there were 25 questions to screen the symptoms of anxiety and depression. Moreover the first 10 questions account for anxiety and the rest 15 questions account for depression. There have 4 choices for 1 item and scoring system was 1 for Not at all, 2 for A little, 3 for sometimes and 4 for often in both anxiety and depression items. For anxiety, total score divided by 10 was more than 1.75 and for depression, total score divided by 15 was more than 1.75, it was said to be anxiety and depression symptoms. For Adverse Childhood Experiences (ACEs), all questions related to ACEs occurred in their adolescent life were asked. The categories are verbal abuse, physical abuse, contact sexual abuse, a battered mother, household substance abuse, household mental illness, incarcerated household members, and parental separation or divorce. For each of the above questions, dummy variables were created, coded as 1 if participant answered “yes” and 0 if participant answered “no”. Exposure to ACEs is captured in the ACE score. The ACE score is a simple summation (integer count) of exposure to each of 11 categories of ACEs during participants’ adolescent life. Exposure to any ACE category counts as one point on the score. For risky sexual behavior, in terms of their sexual experience,

age at first sex, condom use at first sex, number of partners within the prior 12 months, and condom use at last sex were inquired. Mostly, yes or no questions were included in the questionnaire for the easily understandable to adolescence. To assess reliability of the instruments for testing anxiety, depression and ACEs, Cronbach's alpha was calculated and yielded values of 0.9, 0.9 and 0.8 respectively.

Data collection procedure

Data collection took three weeks starting from 15th March, 2017 to 5th April, 2017. Students were given a password to enter the web-based survey system via the internet. They used their personal mobile devices and answered the questions during their break time under supervision of the research team. The web-based survey prevents discussion, copying, leaving out some items and creates privacy and confidentiality for participants. Before the start of the data collection in the school, the research team explained the confidentiality, and the steps to answer the questions from the web-based survey. The research team was available to explain unclear items if asked. The data were stored in an online database by using the Lime Survey application and downloaded into a spreadsheet for data analysis. Socio-demographic characteristics, sexual practice, and psychological conditions (e.g., anxiety, depression and ACEs) were analyzed.

Statistical analyses

Descriptive statistics were used to measure frequency distributions, mean, median, standard deviation (SD) and quartile deviation (QD). Age

and recent GPA are described by mean of mean and standard deviation while family income is analyzed with median and quartile deviation (QD). The possible determinants and outcome variables were analyzed for bivariate association by using Chi-square test with the significance level of 0.05. Multiple logistic regression was used to identify the most suitable model to describe the relationship between independent variables and outcome variable.

Ethical consideration

This research project was approved by the Ethical Committee of Mahidol University with approval number of 2017/061.1403.

Results

Socio-demographic characteristics included age, sex, current residence, current relationship status, recent GPA, parents' education and family income. The study sample consisted of 755 participants. Table 1 shows the general characteristics of this sample of 755 vocational students. These Year 2 vocational students range in age from 16 to 19 years. The majority (79.8%) are age 17 to 18 years, and about two-thirds are male and reside in their own home with parents or relatives. Nearly half have no lover but one-fifth had ever had a lover in the past. Nearly two-thirds of respondents had a GPA of 2.5 to 3.5. Nearly one-third of their parents had only secondary school education and there is not much difference between father's and mother's education. Nearly half have family income less than 30,000 baht per month.

Table 1 Frequency distribution of respondents by socio-demographic factors

Characteristics	Number	Percent
Age (years)		
16	99	13.1
17	420	55.6
18	183	24.3
19	53	7.0
Mean (SD) = 17.2 (0.7), Min = 16, Max = 19		
Sex		
Male	457	60.5
Female	298	39.5
Current residence		
Own house (with parents or relatives)	517	68.5
Rented room	204	27.0
Outside dormitory	12	1.6
School Dormitory	1	0.1
Others	21	2.8
Current relationship status		
No lover	345	45.7
Ever had a lover but not now	138	18.3
Living together with a lover	64	8.5
Have a lover, living separately	208	27.5
School regulations on drugs		
Not strict	43	5.7
Minimally strict	44	5.8
Slightly strict	52	6.9
Moderately strict	216	28.6
Usually strict	236	31.3
Always strict	164	21.7
Recent GPA		
≤1.5	10	1.3
1.51-2.0	35	4.6
2.01-2.5	89	11.8
2.51-3.0	209	27.8
3.01-3.5	206	35.2
≥3.6-4.0	144	19.1
Mean (SD) = 3.1 (0.6), Min = 1.17, Max = 4.0		
Father's education		
Primary (Grade 1-6)	175	23.0
Secondary (Grade 7-12)	246	32.6
Vocational	120	15.9
Bachelor's degree	176	23.3
Higher than bachelor's degree	39	5.2
Mother's education		
Primary (Grade 1-6)	144	19.1
Secondary (Grade 7-12)	235	31.1
Vocational (1-5)	148	19.6
Bachelor's degree	173	22.9
Higher than bachelor's degree	55	7.3
Family monthly income (Thai baht)		
≤29,999	350	46.4
30,000-50,000	254	33.6
>50,000	151	20.0
Median (QD) = 30,000 (17,500), Min = 1,000, Max = 4,000,000		

ACEs are grouped into childhood abuse, childhood neglect, negative parents' condition and family conditions (Table 2). In each domain, about one-third of students have experienced abuse, neglect, and negative parent and family conditions. Some students may have more than one ACE. The total ACEs score indicates the number of ACEs experienced. Nearly half had one ACE but only one-tenth had more than five ACEs among 11 ACE scores. For anxiety and depression screening, using mean of 1.75 as a cut-off

point adapted from the HSCL-25 screening questionnaires, nearly half of the study population reported symptoms of anxiety and depression.

Only 18 students answer they use methamphetamine within 12 months in term of try, once in a while, once a month and always. Then, the prevalence of Methamphetamine use among 755 vocational school students is 2.4%. Among the 2.4% of methamphetamine use, 0.3% answer that they always used it (Table 2).

Table 2 Distribution of respondents by ACEs, psychological factors and methamphetamine use

Characteristics	Number	Percent
Childhood abuse		
Emotional Abuse (yes)	123	16.3
Physical Abuse (yes)	73	9.7
Sexual Abuse (yes)	75	9.9
Childhood Neglect		
Emotional Neglect (yes)	104	13.8
Physical Neglect (yes)	48	6.4
Parent		
Parental Separation or Divorce (yes)	205	27.2
Family		
Household violence		
+ in family members (yes)	105	13.9
+ by family members (yes)	49	6.5
Household drug use (yes)	131	17.3
Household mental problem (yes)	175	23.1
Incarcerated household member (yes)	56	7.4
ACE score		
0 score	339	44.9
1 score	167	22.0
2 scores	93	12.3
3 scores	52	6.9
4 scores	30	4.0
5 scores	28	3.7
6-11 scores	46	6.2
Mean (SD) = 1.5 (2.2) , Min = 1, Max = 11		
Anxiety (Mean score)		
1.00-1.75	332	44.0
1.76-4.00	423	56.0
Mean (SD) = 1.75 (0.6), Min = 1, Max =4		
Depression (Mean score)		
1.00-1.75	339	44.9
1.76-4.00	416	55.1
Mean (SD) = 1.75 (0.6), Min = 1, Max =4		

Table 2 Distribution of respondents by ACEs, psychological factors and methamphetamine use (conts.)

Characteristics	Number	Percent
Anxiety and Depression (score)		
0 score	362	47.9
1 score	115	15.2
2 score	278	36.9
Mean (SD) = 0.9 (0.9), Min = 0, Max = 2		
Methamphetamine Use with 12 months		
Yes	18	2.4
No	737	97.6

Sexual risk behaviors of the participants is described in terms of their sexual experience, age at first sex, condom use at first sex, number of partners within the prior 12 months, and condom use at last sex. Nearly half of the adolescent participants reported

having had sex before and 28.6% had their sexual debut at age 15 years or younger. However, more than two-third of the sexually-active youth used a condom at last sex (Table 3).

Table 3 Frequency distribution of respondents by sexual behavior

Characteristics	Number	Percent
Ever had sex		
Yes	354	46.9
Never since birth	401	53.1
Age at first Sex		
≤15	101	28.6
>15	253	71.4
Mean (SD) = 15.5 (1.4), Min = 12, Max =18		
Condom use at first sex		
No	131	37.0
Yes	223	63.0
No of sexual partners within 12 month		
> 1 partner	91	40.8
Only 1 partner	132	59.2
Medium (QD) = 1 (1), Min = 1, Max = 60		
Condom use at last Sex		
No	78	35.0
Yes	145	65.0
Risk sexual behavior score		
0	401	53.1
1	124	16.4
2	119	15.8
3	65	8.6
≥4	46	6.1
Mean (SD) = 1.0 (1.3), Min = 0, Max =5		

In Table 4, the Chi-square test for association was applied to find out the significant factors associated with methamphetamine use. Among the socio-demographic factors: age, relationship status, recent academic performance, parents' education and family income had no association with methamphetamine use. Only three variables, namely, sex, current residence, and school strictness on substance use

had an association with methamphetamine use with p-values of 0.003, 0.044 and 0.009, respectively. For the sexual risk factors, although the number of partners within the past 12 month had no association with methamphetamine use, sexual experience, age at first sex, and condom use at first and last sex were associated with methamphetamine use, with p-values of 0.002, 0.024, <0.001 and 0.007, respectively.

Table 4 Association between socio-demographic factors and sexual risk behavior with methamphetamine use

Factors	Methamphetamine Use					P-value
	Total	Yes		No		
	n	n	%	n	%	
Socio demographic						
Sex						0.003
Male	457	17	3.7	440	96.3	
Female	298	1	0.3	297	99.7	
School strictness						0.009
High	400	15	3.8	385	96.3	
Low	355	3	0.8	352	99.2	
Current domicile						0.044*
Own	517	16	3.1	501	96.9	
Rent	238	2	0.8	236	99.2	
Sexual Behavior						
Ever had sex before						0.002
Yes	354	15	4.2	339	95.8	
No	401	3	0.7	398	99.3	
Age at first sex						0.024*
<=15	101	5	0.5	96	95.0	
>15	253	10	0.4	243	96.0	
Condom use at first sex						<0.001*
No	131	9	6.9	122	93.1	
Yes	223	6	2.7	217	97.3	
Condom use at last sex						0.007*
No	78	5	0.7	73	9.3	
Yes	276	10	0.4	266	9.6	

* Fisher's Exact Test

For the psychological factors, there were three variables, namely anxiety, depression and ACEs. Both anxiety and depression had an association with methamphetamine use, with p-values of 0.005 and 0.001, respectively. However, while there are four domains in ACEs; experience of physical neglect and family violence items were significantly associated with methamphetamine use with p-values of 0.023 and 0.007, respectively (Table 5).

The interaction between MA use in the past 12 months and socio-demographic, sexual risk behavior

and psychological factors, with a trend of adjusted odds ratios as sex (male) associated with increased risk of MA use than female (Adj OR 11.70, 95% CI: 1.39–98.28), school strictness on drugs (Adj OR 7.49, 95% CI: 1.91–29.44), current house (Adj OR 5.54, 95% CI: 1.09–28.26), condom use at first sex (Adj OR 7.28, 95% CI: 2.48–21.39), depression (Adj OR 9.61, 95% CI: 2.50–36.95), and family violence (Adj OR 6.03, 95% CI: 1.96–18.59) are predictors of methamphetamine use (Table 6).

Table 5 Association between psychological factors and methamphetamine use

Psychological Factors	Methamphetamine Use					P-value
	Total	Yes		No		
	n	n	%	n	%	
Anxiety						0.005
Yes	339	14	4.1	325	95.9	
No	416	4	1.0	412	99.0	
Depression						0.001
Yes	332	15	4.5	317	95.5	
No	423	3	0.7	420	99.3	
Physical neglect						0.023*
Yes	48	4	8.3	44	91.7	
No	707	14	2.0	693	98.0	
Family Violence						0.007
Yes	105	7	6.7	98	93.3	
No	650	11	1.7	639	98.3	

* Fisher's Exact Test

Table 6 Adjusted odds ratios for associations between socio-demographic, ACEs, Depression, and sexual behavior with methamphetamine use

Variables	Methamphetamine Use			
	Adj OR	95% CI		P-value
		Lower	Upper	
Sex				
Male	11.70	1.39	98.28	0.024
Female	1			
School strictness				
High	7.49	1.91	29.44	0.004
Low	1			
Current House				
Own	5.54	1.09	28.26	0.040
Rent	1			
Condom use at first sex				
No	7.28	2.48	21.39	<0.001
Yes	1			
Depression				
Yes	9.61	2.50	36.95	0.001
No	1			
Family violence				
Yes	6.03	1.96	18.59	0.002
No	1			

Discussion

The result explained that adverse childhood experiences, anxiety, depression, sexual behavior have a relationship with methamphetamine use in the study population. The prevalence of these variables, association with independent variables and prediction model for methamphetamine use are discussed in the following sequences.

The results showed that in the childhood abuse domain, the percentage of emotional experience was the highest (16.3%), followed by sexual experience is (9.9%) and physical experience (9.7%). This reflects common knowledge that the easiest way to abuse someone is emotionally, not physically or sexually.

In the childhood neglect domain, emotional-neglect prevalence is higher than physical. For the parent domain, the divorce or separation experience of the study population is 27.1% and that is higher than the divorce rate of the Southeast Asia region²¹. However, the study is only conducted among the vocational students and is not a representative one.

The experience of household mental problems (23.1%) is the highest among the family adverse experiences domain. According to WHO, Thailand's suicide rate is 12.7 per 100,000 population per year²². Although the prevalence rate of alcohol abuse is relatively high in Thailand, the percentage of this sample reporting problem drinking in the family was

only 17.3%. More than half of the study population had at least one ACE, and that is consistent with international ACE studies²³. There was no significant difference by gender for ACE.

The prevalence of anxiety (44.0%) and depression (44.9%) of the study population is higher than found by studies in Bangkok (34.9%)²⁴ and Chiang Mai (14.6%)²⁵. This may be due to the different age of the study populations and different diagnostics. Additional, in-depth study is needed to explore why anxiety and depression was so high in this study. Around 46.9% of the sample had ever had sex, and this is higher than other countries like Nigeria where the history of sexual exposure among of female secondary school students is 25.7%²⁶. However, the study populations are different and this study did not present gender-specific sexual history. The prevalence of methamphetamine use in the last year among the study population was 2.4%, while the 2015 Behavior Surveillance Survey in Bangkok found a prevalence of 7.3% in vocational students. However, the BSS sample was generally older than the sample in this study. Globally, prevalence of methamphetamine use is 0.4%³. The research approaches web-based and it may be more comfortable for the participants to disclose the sensitive questions like adverse childhood experiences, sexual behavior and reflect the high prevalence.

The independent variables included socio-demographic, sexual risk behavior and psychological factors (anxiety, depression and ACEs). Among the socio-demographic factors, males had higher risk of methamphetamine use than females, and this finding is consistent with many gender-related methamphetamine studies²⁷⁻²⁹. High perception of school drug

regulation strictness is associated with more risk of methamphetamine use. A possible explanation is that it is readily available as a small tablet in the market and the pattern of methamphetamine use is not frequently per day like cocaine²⁹. Thus, although the school regulation on drugs is very strict, the chance of being caught is low. Another explanation is that adolescence is a time when prohibitions invite defiance. Likewise, although methamphetamine is not an expensive recreational drug, it is not cheap either for vocational students. Students who live with their parents or relatives had higher risk than those living in a dormitory or rented room. Most youth used methamphetamine during the day and did not use the drug at night when they returned home from school²⁹. Methamphetamine is a sympathomimetic and sexually-active drug. Thus, sexually-active students are at higher risk of methamphetamine use and this finding is consistent with many studies^{3, 17-18, 30}. Although young age at first sex is associated with risk for sexually transmitted diseases, early sexual debut is not a high risk for methamphetamine use. Young adolescents explore sex for the sensual pleasure, while older adolescents use methamphetamine to upgrade or strengthen sexual drive. Condom-less sex is associated with methamphetamine use because of the heightened sensation caused by both practices¹⁸.

Both anxiety and depression are associated with risk for methamphetamine use, and that finding is consistent with many studies^{11, 12, 31}. Although family member substance use is a strong predictor of methamphetamine use in previous studies, it is not significant in this study³².

After adjusting for the socio-demographic, sexual risk behavior and psychological factors, males were 11

times more at risk than females for methamphetamine use. It is known that females need a greater amount of drug than males to have the same effect, due to biological differences²⁷. High perception of school strictness on drugs confers 7 times more risk for methamphetamine use than perception of lax school drug control. Students who live in their own domicile were 5 times more at risk of methamphetamine use than students who rented their domicile. Some of these findings are counter to common sense and need more in-depth study. For example, this study only asked about perception of school regulation policy and not actual strictness. Students having condom-less sex had 7 times more risk of methamphetamine use, and those with depression had 9 times more risk of use.

Conclusions and recommendations

The prevalence of methamphetamine use among vocational students (2.4%) may seem low. However, the global target of ‘Sustainable Development Goals 3.5 by WHO’ indicates that Thailand needs to continue its effort to prevent an increase of methamphetamine use by means of policy and regulations for supply side, and therapeutic cessation services to decrease the demand for methamphetamine use.

On the other hand, the associated factors (e.g., depression and anxiety) among adolescent vocational students are high (44.9% and 44.0%) and need to be addressed concurrently. Depression is a strong predictor of methamphetamine use in this study, and there have been many studies highlighting that it is a high risk factor for methamphetamine use. A qualitative exploratory research study on depression and methamphetamine use among vocational students should be conducted in the future.

Methamphetamine is a sexual stimulant and, therefore, it is not surprising that there is a statistical association between the drug and sex. History of sex among this sample of adolescent vocational students is 46.9%. Accordingly, safe-sex education needs to be reinforced alongside drug-free promotion programs in high school and vocational schools.

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