Cannabis and Amphetamine Use Among Adolescents in Five Asian Countries

Karl Peltzer¹,², Supa Pengpid²,³

¹HIV/AIDS/STIs/and TB (HAST), Human Sciences Research Council, Pretoria, South Africa;
²Department of Research and Innovation, University of Limpopo, Turfloop, South Africa;
³ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Nakhonpathom, Thailand

Vol. 6, No. 1 (2017) | ISSN 2166-7403 (online)
DOI 10.5195/cajgh.2017.288 | http://cajgh.pitt.edu

New articles in this journal are licensed under a Creative Commons Attribution 4.0 United States License.

This journal is published by the University Library System of the University of Pittsburgh as part of its D-Scribe Digital Publishing Program and is cosponsored by the University of Pittsburgh Press.
Abstract

Introduction: There has been a global increase in illicit drug use among young people. The aim of this study was to estimate the prevalence of lifetime cannabis and amphetamine use, as well as to explore factors associated with substance use among adolescents in five Asian countries: Iraq, Kuwait, Malaysia, Mongolia, and Vietnam.

Methods: 38,941 school children (mean age 15.4 years, SD=1.5) completed the cross-sectional Global School-Based Student Health Survey (GSHS). Topics covered in the questionnaire included cannabis and amphetamine use. Personal, parental, and environmental attributes were explored as predictors of cannabis and amphetamine use. Logistic regression was used to assess the contribution of potential predictors on lifetime cannabis and lifetime amphetamine use.

Results: Overall, the prevalence of lifetime cannabis use was 0.9% and lifetime amphetamine use was 1.0% among research participants. Cannabis use was influenced by male gender (Kuwait, Mongolia), parental smoking habits (Kuwait, Iraq), and current cigarette smoking in all countries. Amphetamine use was associated with suicidal ideation (Kuwait, Malaysia, Vietnam), school truancy (Malaysia, Mongolia, Vietnam), being a victim of physical assault (Kuwait, Mongolia), bullying victimization (Iraq, Malaysia, Vietnam), as well as anxiety and current cigarette use in all countries.

Conclusions: Our preliminary results show the importance of personal attributes such as mental distress and environmental stressors on lifetime cannabis and lifetime amphetamine use. Future prospective studies are needed to identify causal relationships among personal attributes, parental attributes, environmental stressors, and illicit substance use.

Keywords: Cannabis use; Amphetamine Use; Adolescents; Asia

Cannabis and Amphetamine Use Among Adolescents in Five Asian Countries

Karl Peltzer1,2, Supa Pengpid2,3

1HIV/AIDS/STIs/and TB (HAST), Human Sciences Research Council, Pretoria, South Africa;
2Department of Research and Innovation, University of Limpopo, Turfloop, South Africa;
3ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Nakhonpathom, Thailand

Research

Previous research suggested that substance use among youth under the age of 24 may have negative effects on cognitive and emotional development in the transition from adolescence to early adulthood.1 The initiation of substance use usually takes place during adolescence, mostly in the form of tobacco and alcohol use prior to the use of illicit drugs.1 A recent review reported that the global burden of disease attributable to substance use among adolescents and young adults has substantially increased.1 There are significant gaps in the literature regarding epidemiological data on the extent of illicit drug use among adolescents in Asia, which we are addressing in this paper.

The World Health Organization (WHO), in collaboration with the Centers of Disease Control and Prevention (CDC) and national governments, have been conducting Global School-based Health Survey (GSHS) in various Asian countries to generate epidemiological information about substance use.
data on health behaviors, including illicit drug use. Since 2010, a new module on cannabis and amphetamine use was added to GSHS, which was implemented in Iraq and Kuwait in the Middle East, in Mongolia in Central Asia, and in Malaysia and Vietnam in Southeast Asia.

Based on the WHO ATLAS on substance use disorders, the estimated 12-month prevalence of drug use disorders in 2004 was 0.24% among women (15 years and over) and 0.66% among men (15 years and over) in Iraq. For Mongolia, the prevalence was 0.15% among women and 0.61% among men, and for Vietnam it was 0.10% among women and 0.47% among men. Al-Hemiary et al. reported that there was an increase in illicit drug use, including cannabis (in the form of hashish) and methamphetamines in Iraq in the decade prior to 2012. In a study among male university students in Kuwait, the prevalence of lifetime illicit drug use was 14.4%. In previous national school surveys, lifetime cannabis use was 1.5% among males and 0.4% among females (aged 12-19 years) in Malaysia, and the prevalence of lifetime illicit drug use among adolescents (12-19 years) was 1.7% in Malaysia. In a local survey in Malaysia conducted in 1979, Spencer and Navaratnam found that 11% of secondary students (12-19 years) had prior experience of drug use (mostly cannabis). In Vietnam, amphetamine use continues to increase, especially among adolescents in major cities.

In a previously published systematic review of cannabis use in high school and college students (≤18 years) in Iran, the prevalence of lifetime cannabis use was 5.0% (95% CI = 3.0%,7.0%). In a study focusing on high school students (mean age 15.0 years, SD=3.7) in Eastern India, the lifetime illicit drug use was 6.1% among rural and 0.6% among urban students. Lifetime illicit drug use was reported to be 7.9% among adolescents (15-18 years) attending primary health care centers in Saudi Arabia. In 38 European and North American countries, 19.9% of adolescents (22.9% of males and 17.0% of females) reported lifetime cannabis use. Among 15-16 year olds in Europe, lifetime amphetamine use ranged from 1% in Finland, Norway and Romania to 6% in Bulgaria and Latvia. Only a few studies were conducted in Asian countries, and information on the types of illicit drugs included in these studies was limited.

Risk factors for cannabis and/or amphetamine use among adolescents can be grouped following an ecological framework into 1) sociodemographic factors, 2) personal attributes, 3) parental attributes, 4) environmental stressors, and 5) peer factors. Sociodemographic factors influencing drug use include male gender and age. Personal attributes may include mental distress, smoking, school truancy, and lack of peer support. Parental attributes may include parental substance use, lack of parental support, including lack of parental monitoring and lack of parental connectedness. Environmental stressors may include hunger, lower economic status, bullying, fighting, and aggression.

The aim of this study was to estimate the prevalence of cannabis and amphetamine use and explore factors associated with drug use among adolescents in five Asian countries. It was hypothesized that the prevalence of lifetime cannabis and amphetamine use was lower in Asian countries than in Europe and North America.

Methods

Participants

This study was a secondary analysis of preexisting data from the GSHS from five Asian countries (limited to countries that utilized the cannabis and amphetamine use module). The purpose of the GSHS is to provide nationally representative data on health behaviors and protective factors among students aged 13-17 years. The GSHS used a two-stage (schools and classrooms) cluster sampling design to produce nationally representative samples of students.
| Variables          | Question                                                                 | Response options                                                                 |
|-------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Cannabis use      | “During your life, how many times have you used marijuana (also called hashish)?” or other country specific names | 1=0 times, 2=1 or 2 times, 3=3-9 times, 4=10-19 times and 5=20 or more times (coded 1=0 and 2-5=1) |
|                   | “During the past 30 days, how many times have you used marijuana (also called hashish)?” or other country specific names | 1=0 times, 2=1 or 2 times, 3=3-9 times, 4=10-19 times and 5=20 or more times (coded 1=0 and 2-5=1) |
| Amphetamine use   | “During your lifetime, how many times have you used amphetamines or methamphetamines (also called Parkizol or Artane)?” or other country specific names | 1=0 times, 2=1 or 2 times, 3=3-9 times, 4=10-19 times and 5=20 or more times (coded 1=0 and 2-5=1) |

**Personal attributes**

| Anxiety            | “During the past 12 months, how often have you been so worried about something that you could not sleep at night?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |
|-------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Loneliness        | “During the past 12 months, how often have you felt lonely?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |
| Suicidal ideation | “During the past 12 months, did you ever seriously consider attempting suicide?” | 1 = yes, 2 = no |
| Current smoking cigarettes | “During the past 30 days, on how many days did you smoke cigarettes?” | 1=0 days to 7=All 30 days (coded 1=0 and 2–7=1) |
| School truancy    | “During the past 30 days, on how many days did you miss classes or school without permission?” | 1=0 days to 5= 10 or more days (coded 1=0 and 2–5=1) |
| Peer support      | “During the past 30 days, how often were most of the students in your school kind and helpful?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |

**Parental attributes**

| Either or both parents use tobacco | Which of your parents or guardians use any form of tobacco? | 1=neither, 2=my father or male guardian, 3=my mother or female guardian |
|-----------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------|
| Parental monitoring              | “During the past 30 days, how often did your parents or guardians check to see if your homework was done?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |
|                                   | “During the past 30 days, how often did your parents or guardians go through your things without your approval?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |
| Parental connectedness           | “During the past 30 days, how often did your parents or guardians understand your problems and worries?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |
| Parental bonding                 | “During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?” | 1=never to 5=always (coded 1–3=0 and 4–5=1) |

**Environmental stressors**

| Hunger                          | “During the past 30 days, how often did you go hungry because there was not enough food in your home?” | 1 = never to 5 = always (coded 1–3=0 and 4–5=1) |
| Bullied                         | “During the past 30 days, on how many days were you bullied?” | 1=0 days to 7=All 30 days (coded 1=0 and 2–7=1) |
| In a physical fight             | “During the past 12 months, how many times were you in a physical fight?” | 1=0 times to 8=12 or more times (coded 1=0 and 2–8=1) |
| Physically attacked             | “During the past 12 months, how many times were you physically attacked?” | 1=0 times to 8=12 or more times (coded 1=0 and 2–8=1) |

Table 1. Description of variables
Students were requested to complete a self-administered questionnaire under the supervision of trained survey administrators. National Ethics Committees (e.g., in Kuwait: The Ministry of Health; in Malaysia: the Medical Research and Ethics Committee, Ministry of Health Malaysia; in Mongolia: the Committee on Ethics, Ministry of Health) approved the study protocol, and written informed consent was obtained from the students, parents, and/or school officials.

**Questionnaire**

The GSHS questionnaire (translated into the national languages of the study countries) utilized in this study consisted of modules on tobacco cannabis and amphetamine use, violence, and a range of other health related behaviors, such as hygiene and physical activity, as well as demographics such as age and gender. The study variables are described in Table 1.

**Statistical analysis**

Descriptive statistics were used to describe the characteristics of participants and patterns of illicit drug use. Logistic regression was used for assessing the contribution of potential predictors (sociodemographic factors such as age and gender, personal attributes such as anxiety and current smoking, parental attributes such as parental tobacco use and parental monitoring, and environmental stressors such as experiencing hunger and being bullied) on lifetime cannabis and lifetime amphetamine use. All analyses were adjusted for the multi-stage stratified cluster sampling strategy, and performed using STATA software version 12.0 (Stata Corporation, College Station, TX, USA).

**Results**

The sample included 38,941 school-aged adolescents (mean age 15.4 years, SD=1.5), age range 11-18 years, from Iraq (response rate=88%), Kuwait (85%), Malaysia (89%), Mongolia (88%), and Vietnam (response rate=96%). The range of students participating per country ranged from 2,038 in Kuwait to 25,507 in Malaysia. Across all respondents from all countries, lifetime cannabis use was 0.9%, ranging from 0.6% in Vietnam to 3.2% in Kuwait, and lifetime amphetamine use was 1.0%, ranging from 0.2% in Vietnam to 3.1% in Kuwait. The prevalence of past month cannabis use was 2.1% in Iraq, 3.1% in Kuwait, 0.9% in Malaysia, and 1.1% in Mongolia (Table 2).

In multivariable unconditional regression analysis, male gender in Kuwait (OR=11.17, 95% CI=2.97, 42.02) and Mongolia (OR=2.01, CI=1.03, 3.95) was associated with lifetime cannabis use. In terms of personal attributes, anxiety (OR=2.48, 95% CI=1.19, 5.20) and suicidal ideation (OR=3.91, 95% CI=1.63, 9.35) in Kuwait, current smoking in all five countries (OR ranging from 5.25 in Mongolia to 38.12 in Vietnam), and school truancy (OR=6.70, 95% CI=2.65, 16.96) in Vietnam were positively associated with lifetime cannabis use. School truancy was negatively associated with lifetime cannabis use (OR=0.35, 95% CI=0.17, 0.71) in Iraq. Lack of peer support (OR=0.39, 95% CI=0.22, 0.68) in Malaysia and having positive peer support (OR=2.73, 95% CI=1.45, 5.15) in Mongolia were associated with lifetime cannabis use. In relation to parental attributes, parental or guardian tobacco use in Iraq (OR=2.59, 95% CI=1.04, 6.47) and Kuwait (OR=2.13, 95% CI=1.30, 3.49) were associated with lifetime cannabis use. While lack of parental or guardian bonding (OR=0.40, 95% CI=0.24, 0.68) in Malaysia was associated with lifetime cannabis use, parental or guardian bonding (OR=5.18, 95% CI=1.87, 14.37) in Vietnam and parental or guardian monitoring (OR=2.15, 95% CI=1.18, 3.90) in Malaysia were positively associated with lifetime cannabis use. With environmental stressors, food insecurity (OR=9.77, 95% CI=3.03, 31.56) in Iraq, being bullied (OR=11.26, 95% CI=1.83, 69.38) in Vietnam, and having been physically attacked (OR=2.14, 95% CI=1.02, 4.46) in Mongolia were associated with lifetime cannabis use (Table 3).
In multivariable unconditional regression analysis, male gender (OR=4.76, 95% CI=1.10, 20.55) in Kuwait, younger age (OR=0.78, 95% CI=0.63, 0.98) in Malaysia, and older age (OR=1.84, 95% CI=1.07, 3.15) in Vietnam were associated with lifetime amphetamine use. In terms of personal attributes, anxiety (OR= ranging from 2.29 in Kuwait to 3.82 in Iraq), current smoking (OR= ranging from 2.68 in Mongolia to 17.23 in Vietnam) in all countries, suicidal ideation in Kuwait (OR=3.19, 95% CI=1.35, 7.55), Malaysia (OR=2.28, 95% CI=1.26, 4.12) and Vietnam (OR=6.86, 95% CI=1.07, 43.91), and school truancy in Malaysia (OR=2.31, 95% CI=1.40, 3.81), Mongolia (OR=1.90, 95% CI=1.11, 3.28) and Vietnam (OR=9.12, 95% CI=3.06, 27.19) were associated with lifetime amphetamine use. Lack of peer support (OR=0.35, 95% CI=0.20, 0.62) was associated with lifetime amphetamine use in Malaysia. In relation to parental attributes, no associations were found with lifetime amphetamine use. With environmental stressors, experiencing food insecurity (OR=4.98, 95% CI=1.35, 18.33) in Iraq, being bullied in Iraq (OR=5.16, 95% CI=1.55, 17.18), Malaysia (OR=2.51, 95% CI=1.55, 4.08) and Vietnam (OR=9.16, 95% CI=1.05, 79.60), and having been physically attacked in Kuwait (OR=2.27, 95% CI=1.14, 4.52) and Mongolia (OR=3.07, 95% CI=1.55, 6.07) were associated with lifetime amphetamine use (Table 4).

Discussion

In this study of school-going adolescents in five Asian countries from Middle East, Central Asia, and Southeast Asia the prevalence of lifetime cannabis and amphetamine use was found to be generally lower than previously reported in North America and Europe,13,14 India,11 Iran10 and Saudi Arabia,12 but was similar to previously reported results in Malaysia.5,7 Compared to the studied countries, the higher prevalence of cannabis and possibly amphetamine use in North America and Europe may be related to a greater cannabis liberalization.13

This study demonstrated a large geographic variation in the prevalence of lifetime and past month cannabis use and lifetime amphetamine use,
| Variable                      | AOR (95% CI) Iraq | AOR (95% CI) Kuwait | AOR (95% CI) Malaysia | AOR (95% CI) Mongolia | AOR (95% CI) Vietnam |
|-------------------------------|-------------------|-------------------|---------------------|----------------------|---------------------|
| **Sociodemographic**          |                   |                   |                     |                      |                     |
| Age (years)                   | 0.63 (0.35, 1.11) | 0.99 (0.75, 1.31) | 1.00 (0.80, 1.26)   | 0.93 (0.74, 1.17)    | 1.16 (0.66, 2.02)   |
| Gender                        |                   |                   |                     |                      |                     |
| Females (48.2%)               | Reference         | Reference         | Reference           | Reference            | Reference           |
| Males (51.8%)                 | 0.75 (0.14, 3.91) | 11.17 (2.97, 42.02)** | 1.51 (0.77, 2.99)   | 2.01 (1.03, 3.95)*   | 0.93 (0.05, 16.98) |
| **Personal attributes**       |                   |                   |                     |                      |                     |
| Anxiety (14.4%)               | 0.77 (0.29, 2.04) | 2.48 (1.19, 5.20)* | 1.73 (0.89, 3.36)   | 2.01 (0.79, 5.14)    | Not assessed        |
| Loneliness (15.3%)            | 2.02 (0.74, 5.50) | 1.35 (0.60, 3.04) | 1.91 (0.98, 3.71)   | 1.09 (0.45, 2.67)    | 1.82 (0.36, 9.23)   |
| Suicidal ideation (19.1%)     | 2.52 (0.95, 7.05) | 3.91 (1.63, 9.35)** | 1.74 (0.87, 3.50)   | 1.46 (0.56, 3.83)    | 1.69 (0.29, 9.93)   |
| Current smoking (8.9%)        | 9.20 (3.62, 23.41)*** | 7.30 (2.34, 22.73)** | 11.06 (5.41, 22.60)*** | 5.26 (2.35, 11.81)*** | 38.12 (8.02, 181.19)*** |
| School truancy (36.6%)        | 0.35 (0.17, 0.71)** | 1.34 (0.84, 2.13) | 2.07 (0.90, 4.76)   | 1.86 (0.88, 3.97)    | 6.70 (2.65, 16.96)*** |
| Peer support (29.2%)          | 0.60 (0.13, 2.72) | 0.65 (0.26, 1.62) | 0.39 (0.22, 0.68)*** | 2.73 (1.45, 5.15)**  | 1.41 (0.51, 3.89)   |
| **Parental attributes**       |                   |                   |                     |                      |                     |
| Either or both parents use    |                   |                   |                     |                      |                     |
| tobacco (21.4%)               | 2.59 (1.04, 6.47)* | 2.13 (1.30, 3.49)** | 1.03 (0.71, 1.49)   | 1.34 (0.65, 2.77)    | Not assessed        |
| Parental or guardian          |                   |                   |                     |                      |                     |
| monitoring (25.6%)            | 0.40 (0.12, 1.32) | 0.99 (0.49, 2.02) | 2.15 (1.18, 3.90)*  | 0.69 (0.39, 1.24)    | 0.26 (0.04, 1.54)   |
| Parental or guardian          |                   |                   |                     |                      |                     |
| connectedness (31.9%)         | 1.13 (0.47, 2.75) | 1.82 (0.50, 6.67) | 1.02 (0.67, 1.57)   | 0.77 (0.29, 2.00)    | 0.40 (0.05, 3.42)   |
| Parental or guardian bonding  |                   |                   |                     |                      |                     |
| (36.4%)                       | 0.22 (0.05, 1.06) | 1.34 (0.66, 2.72) | 0.40 (0.24, 0.68)*** | 0.54 (0.28, 1.04)    | 5.18 (1.87, 14.37)** |
| **Environmental stressors**   |                   |                   |                     |                      |                     |
| Hunger (11.2%)                | 9.77 (3.03, 31.56)*** | 1.24 (0.48, 3.21) | 1.35 (0.70, 2.61)   | 2.87 (0.65, 12.69)   | Not assessed        |
| Bullied (45.1%)               | 1.25 (0.47, 3.32) | 1.70 (0.60, 4.80) | 1.59 (0.96, 2.61)   | 0.78 (0.36, 1.66)    | 11.26 (1.83, 69.38)** |
| In physical fight (44.8%)     | 1.12 (0.33, 3.80) | 1.01 (0.51, 2.00) | 1.84 (0.84, 4.03)   | 1.33 (0.61, 2.86)    | 0.95 (0.37, 2.49)   |
| Physically attacked (34.0%)   | 1.10 (0.41, 2.96) | 1.43 (0.66, 3.12) | 1.10 (0.64, 1.88)   | 2.14 (1.02, 4.46)*   | 0.49 (0.19, 1.26)   |

AOR = Adjusted Odds Ratio; CI = Confidence Interval; ***P<0.001; **P<0.01; *P<0.05

**Table 3.** Factors associated with lifetime cannabis use
with a higher prevalence in Iraq and Kuwait, and lower prevalence in Malaysia, Mongolia, and Vietnam. The higher prevalence of cannabis and amphetamine use in Iraq may be explained by a high degree of exposure to environmental stressors, such as ongoing violence and unrest, as well as the experience of hunger or food insecurity. The relatively low lifetime amphetamine use in Southeast Asia (Malaysia and Vietnam) in this study may reflect a further stabilizing of the past “peak of the methamphetamine epidemic” in Southeast Asia.27 The low prevalence of illicit drug use in Malaysia may also be attributed to school prevention programs.7

Overall, the study found that a higher number of males when compared to females were lifetime cannabis users in Kuwait and Mongolia. Lifetime amphetamine use among males in Kuwait was higher in males. There was no significant gender difference in the other countries, which is an interesting finding. The role of gender in substance abuse requires further investigation28, as UNODC29 noted that the “gender gap (i.e. the difference between the prevalence of substance use among males and females) has in fact been closing.” The gender difference in Kuwait and Mongolia may reflect stronger gender role differences that predispose men to engage in substance use behavior when compared with Iraq, Malaysia, and Vietnam.20

The study found that adolescents who were current smokers were more likely to be lifetime amphetamine users. This seems to indicate that certain problem behaviors may become a trend during adolescence, and the use of one drug may lower the barriers of taking another drug.30 Poly-drug use (tobacco use and cannabis and/or other drugs) has also been reported by previous studies18,31,32 and suggests the need for poly-drug use interventions.

When it comes to personal attributes, mental distress (anxiety and suicidal ideation) and school truancy were found to be associated with cannabis and amphetamine use in several countries that we investigated, corroborating previous studies in Malaysia and Africa.7,19-21 Having mental distress may increase adolescents’ vulnerability to drug use.16 Adolescents who are mentally distressed may use cannabis and/or amphetamine to alter their well-being,33 or they may want to cope with mental distress by using illicit drugs.20 Illicit drug use or school truancy may be seen as a marker of other deviant behaviors, which may lead to a greater likelihood of experimenting with cannabis and/or amphetamine use outside of school settings.34 In agreement with a previous study,5 this study found an association between lack of peer support and cannabis and amphetamine use in Malaysia, but not in the other countries. Strong peer relations or support may help to protect from illicit drug use.

Regarding parental attributes, this study corroborated a study from Ghana,23 suggesting that parental tobacco use was associated with lifetime cannabis use. Parents play an important role in the formation of norms and practices among adolescents.35 Adolescents are more likely to engage in similar behavior as their parents when it comes to substance abuse behaviors.35 Although parental or guardian monitoring and/or bonding was protective from cannabis use in Malaysia, none of the parental support measures were protective in relation to lifetime amphetamine use, unlike in findings from previous investigations.7,21,24 Parental monitoring and bonding behavior may demonstrate concern and support, which may prevent children from the development of illicit drug use habits.23

In agreement with previous studies,17-19,21 this study found that environmental stressors, including experiencing hunger (or low socioeconomic status), being bullied and having been physically attacked, were associated with lifetime cannabis and/or amphetamine use in several countries. It is possible that adolescents who experience various forms of environmental stressors are more likely to associate themselves with deviant
| Variable                      | AOR (95% CI) Iraq | AOR (95% CI) Kuwait | AOR (95% CI) Malaysia | AOR (95% CI) Mongolia | AOR (95% CI) Vietnam |
|-------------------------------|-------------------|---------------------|-----------------------|-----------------------|---------------------|
| **Sociodemographic**          |                   |                     |                       |                       |                     |
| **Age (years)**               | 0.75 (0.51, 1.10) | 0.86 (0.59, 1.26)   | 0.78 (0.63, 0.98)*    | 1.02 (0.82, 1.26)    | 1.84 (1.07, 3.15)*  |
| **Gender**                    |                   |                     |                       |                       |                     |
| **Females (48.2%)**           | Reference         | Reference           | Reference             | Reference             | Reference           |
| **Males (51.8%)**             | 0.88 (0.20, 4.08) | 4.76 (1.10, 20.55)* | 1.47 (0.75, 2.90)     | 0.92 (0.52, 1.64)    | 2.78 (0.10, 79.01)  |
| **Personal attributes**       |                   |                     |                       |                       |                     |
| **Anxiety (14.4%)**           | 3.82 (1.08, 13.50)* | 2.29 (1.68, 3.14)*** | 2.52 (1.36, 4.66)*** | 2.82 (1.36, 5.86)**  | Not assessed        |
| **Loneliness (15.3%)**        | 0.76 (0.13, 4.55) | 1.06 (0.58, 1.94)   | 1.71 (0.90, 3.25)     | 0.91 (0.40, 2.06)    | 0.91 (0.16, 5.18)   |
| **Suicidal ideation (19.1%)** | 1.28 (0.30, 5.50) | 3.19 (1.35, 7.55)*  | 2.28 (1.26, 4.12)**   | 1.32 (0.67, 2.62)    | 6.86 (1.07, 43.91)* |
| **Current smoking (8.9%)**    | 6.66 (2.03, 15.74)** | 5.97 (2.92, 12.20)** | 5.73 (3.47, 0.48)**   | 5.73 (3.47, 0.48)**  | 17.23 (3.07, 96.77)** |
| **School truancy (36.6%)**    | 0.63 (0.27, 1.49) | 1.36 (0.89, 2.08)   | 2.31 (1.40, 3.81)***  | 1.90 (1.11, 3.28)*   | 9.12 (3.06, 27.19)*** |
| **Peer support (29.2%)**      | 0.48 (0.16, 1.45) | 0.87 (0.35, 2.13)   | 0.35 (0.20, 0.62)***  | 1.32 (0.50, 3.48)    | 2.27 (0.64, 7.98)   |
| **Parental attributes**       |                   |                     |                       |                       |                     |
| **Either or both parents use**| 1.87 (0.76, 4.59) | 1.74 (0.87, 3.49)   | 0.95 (0.62, 1.44)     | 1.35 (0.73, 2.49)    | Not assessed        |
| **tobacco (21.4%)**           |                   |                     |                       |                       |                     |
| **Parental or guardian**      | 0.74 (0.25, 2.22) | 0.99 (0.56, 1.78)   | 1.70 (0.95, 3.05)     | 0.62 (0.30, 1.30)    | 0.59 (0.05, 6.77)   |
| **monitoring (25.6%)**        |                   |                     |                       |                       |                     |
| **Parental or guardian**      | 0.40 (0.06, 2.59) | 1.40 (0.51, 3.88)   | 0.77 (0.42, 1.40)     | 0.35 (0.10, 1.28)    | 0.13 (0.01, 3.09)   |
| **connectedness (31.9%)**     |                   |                     |                       |                       |                     |
| **Parental or guardian**      | 0.45 (0.07, 2.98) | 1.07 (0.52, 2.24)   | 0.65 (0.38, 1.14)     | 0.80 (0.36, 1.78)    | 3.62 (0.80, 16.37)  |
| **bonding (36.4%)**           |                   |                     |                       |                       |                     |
| **Environmental stressors**   |                   |                     |                       |                       |                     |
| **Hunger (11.2%)**            | 4.98 (1.35, 18.33)* | 1.15 (0.39, 3.43)   | 1.35 (0.51, 3.56)     | 0.88 (0.10, 7.56)    | Not assessed        |
Bullied (45.1%) 5.16 (1.55, 17.18)** 2.20 (0.63, 7.77) 2.51 (1.55, 4.08)*** 1.13 (0.55, 2.34) 9.16 (1.05, 79.60)*
In physical fight (44.8%) 1.16 (0.38, 3.51) 0.97 (0.38, 2.51) 1.72 (0.99, 2.99) 2.05 (0.93, 4.53) 0.94 (0.15, 5.72)
Physically attacked (34.0) 0.62 (0.27, 1.43) 2.27 (1.14, 4.52)* 1.26 (0.77, 2.07) 3.07 (1.55, 6.07)** 0.55 (0.08, 3.56) 6.07)**

AOR = Adjusted Odds Ratio; CI = Confidence Interval; ***P<0.001; **P<0.01; *P<0.05

Table 4. Factors associated with lifetime amphetamine use

We thank the World Health Organization for making the data available for analysis, and the Ministries of Education and Health. We also would like to thank the study participants for making the GSHS possible.

Acknowledgements

This work is licensed under a Creative Commons Attribution 4.0 United States License.
6. Howard J, Ali H. Cannabis use among young people in Pacific Island Countries and Territories. Aust N Z J Public Health. 2014;38(1):89-90.

7. Yusoff F, Sahril N, Rasidi NM, Zaki NA, Muhamad N, Ahmad N. Illicit drug use among school-going adolescents in Malaysia. Asia Pac J Pub Health. 2014, 26(5 Suppl), 100S-7S.

8. Spencer C, Navaratnam V. Patterns of drug use amongst Malaysian secondary schoolchildren. Drug Alcohol Depend. 1980;5(5):379-91.

9. United Nations Office on Drugs and Crime (UNODC). Patterns and trends of amphetamine-type stimulants and other drugs: Challenges for Asia and the Pacific. Vienna: UNODC, 2013. Available at: https://www.unodc.org/documents/scientific/2013_Regional_ATS_Report_web.pdf (Accessed December 4, 2017)

10. Nazarzadeh M, Bidel Z, Mosavi Jarahi A, et al. Prevalence of cannabis lifetime use in Iranian high school and college students: A systematic review, meta-analyses, and meta-regression. Am J Mens Health. 2015;9(5):397-409.

11. Tsering D, Pal R, Dasgupta A. Licit and illicit substance use by adolescent students in eastern India: Prevalence and associated risk factors. J Neurosci Rural Pract. 2010;1(2):76-81.

12. Aleissa EI. The frequency of health-related behaviors among Saudi adolescents visiting primary health care centers in Riyadh city. J Family Community Med. 2001;8(1):19-26.

13. Shi Y, Lenz M, An R. Cannabis liberalization and adolescent cannabis use: A cross-national study in 38 countries. PLoS One. 2015;10(11):e0143562.

14. United Nations Office on Drugs and Crime (UNODC). World Drug Report 2010. Vienna: UNODC, 2010. Available at: https://www.unodc.org/documents/wdr/WDR_2010/World_Drug_Report_2010_lo-res.pdf (Accessed December 4, 2017)

15. Yi S, Peltzer K, Pengpid S, Susilowati IH. Prevalence and associated factors of illicit drug use among university students in the association of southeast Asian nations (ASEAN). Subst Abuse Treat Prev Policy. 2017;12(1):9.

16. Brook JS, Morojele NK, Pahl K, Brook DW. Predictors of drug use among South African adolescents. J Adolesc Health. 2006;38(1):26-34.

17. Sznitman SR, Kolobov T, Bogt TT, Kuntsche E, Walsh SD, Boniel-Nissim, Harel-Fisch, Y. Exploring substance use normalization among adolescents: a multilevel study in 35 countries. Soc Sci Med, 2013;97:143-51.

18. Tu AW, Ratner PA, Johnson JL. Gender differences in the correlates of adolescents’ cannabis use. Subst Use Misuse. 2008;43(10):1438-63.

19. Siziya S, Muula AS, Besa C, Babaniyi O, Songolo P, Kankiza N, Rudatsikira E. Cannabis use and its socio-demographic correlates among in-school adolescents in Zambia. Ital J Pediatr. 2013; 39:13.

20. Alwan H, Viswanathan B, Rousson V, Paccaud F, Bovet P. Association between substance use and psychosocial characteristics among adolescents of the Seychelles. BMC Pediatrics. 2011; 11:85.

21. Peltzer K. Prevalence and correlates of substance use among school children in six African countries. Int J Psychol. 2009;44(5): 378-86.

22. Plüddemann A, Flisher AJ, McKetin R, Parry CD, Lombard CJ. A prospective study of methamphetamine use as a predictor of high school non-attendance in Cape Town, South Africa. Subst Abuse Treat Prev Policy. 2010; 5: 25.

23. Asieh F, Owusu A, Quacoe O. An analysis of family dynamics on high school adolescent risk behaviors in Ghana. J Child Adolesc Subst Abuse. 2017; 5: 425-431.

24. Rudatsikira E, Maposa D, Mukandavire Z, Muula AS, Siziya S. Prevalence and predictors of illicit drug use among school-going adolescents in Harare, Zimbabwe. Ann Afr Med. 2009;8(4): 215-20.

25. Plüddemann A, Flisher AJ, McKetin R, Parry C, Lombard, C. Methamphetamine use, aggressive behavior and other mental health issues among high-school students in Cape Town, South Africa. Drug Alcohol Depend. 2010; 109(1-3):14-9.

26. McKetin R, Kozel N, Douglas J, Ali R, Vicknasingam B, Lund J, Li JH. The rise of methamphetamine in Southeast and East Asia. Drug Alcohol Rev. 2008;27(3):220-8.
28. Saban A, Flisher AJ, Distiller G. Association between psychopathology and substance use among school-going adolescents in Cape Town, South Africa. J Psychoactive Drugs. 2010;42(4): 467-76.

29. United Nations Office on Drugs and Crime (UNODC). Guidelines on drug prevention and treatment for girls and women. Vienna: UNODC, 2016. Available at: https://www.unodc.org/documents/drug-prevention-and-treatment/unodc_2016_drug_prevention_and_treatment_for_girls_and_women_E.pdf (Accessed December 4, 2017)

30. Suerken CK, Reboussin BA, Sutfin EL, Wagoner KG, Spangler J, Wolfson M. Prevalence of marijuana use at college entry and risk factors for initiation during freshman year. Addict Behav. 2014;39(1):302–7.

31. Degenhardt L, Coffey C, Moran P, Carlin JB, Patton GC. The predictors and consequences of adolescent amphetamine use: findings from the Victoria Adolescent Health Cohort Study. Addiction. 2007;102(7):1076-84.

32. Agrawal A, Budney AJ, Lynskey MT. The co-occurring use and misuse of cannabis and tobacco: a review. Addiction. 2012;107(7):1221-33.

33. Baumann M, Spitz E, Predine R, Choquet M, Chau N. Do male and female adolescents differ in the effect of individual and family characteristics on their use of psychotropic drugs? Eur J Pediatr. 2007;166(1):29-35.

34. Siziya S, Muula AS, Rudatsikira E. 2007. Prevalence and correlates of truancy among adolescents in Swaziland: findings from the Global School-Based Health Survey. Child Adole Psychiatry Ment Health, 1(1): 15.

35. Kuntsche EN, Kuendig H. What is worse? A hierarchy of family-related risk factors predicting alcohol use in adolescence. Subst Use Misuse. 2006;41(1):71-86.