



Gambling Behavior Among Hong Kong College and University Students

Irene Lai Kuen Wong¹ · Ernest Moon Tong So¹ · Cheong Hay Chu¹ 

Accepted: 24 February 2021 / Published online: 4 March 2021

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Abstract

This study examined gambling behavior and correlates of pathological gambling among college and university students in Hong Kong. A survey questionnaire was administered to 510 Chinese students (302 men, 208 women) recruited from twelve tertiary institutions. The standardized questionnaire included questions on socio-demographic background, preferred lifetime and past-year gambling forms, attitudes towards gambling, perceived life satisfaction, social influence, intention to seek help, and a gambling screen to assess problematic gambling. The response rate is 86%. Results indicate the prevalence rate of lifetime and past-year gambling are 79.6% and 41.8% respectively with male domination. Many (60%) started gambling before 18 years. The estimate of lifetime vulnerability to pathological gambling is 14.7%. Pathological gambling is associated with the male gender, Internet gambling, monthly gambling expenditure, gambling attitude, betting on a great variety of games, and life dissatisfaction. Survey results have implications for campus awareness programs and future research.

Keywords Problem gambling · Chinese students · Risk factors · Gambling attitude

Gambling is risking money in a game of chance (e.g., lottery and roulette) or a game of skill (e.g., mahjong and horse races) with an unpredictable outcome. With the proliferation of gambling opportunities, problem gambling among college and university students has become a global public health issue. These students are particularly susceptible to gambling involvement because of time availability, affordability, and increased independence from family (Kam et al. 2017; Moore et al. 2013). Western studies show that 35–80% of college and university students gambled in the past 6 to 12 months (Barnes et al. 2010; Nowak 2018). For example, the past-year gambling participation rate among American psychology students was 35% (Atkinson et al. 2012). A higher past 6 months rate of 72% was found among Canadian

✉ Cheong Hay Chu
chchu@cihe.edu.hk

¹ Caritas Institute of Higher Education, Tseung Kwan O, Hong Kong

university students (Williams et al. 2012). A Macau study (Kam et al. 2017) showed that 32% of Chinese college and university students had gambled in the previous year. In India, only 19.5% of 5784 college students gambled in the past year but 7.4% reported problem gambling (George et al. 2016).

The rates of lifetime gambling participation range from 67 to 97%. For instance, Engwall et al. (2004) revealed that 67% of students from the Connecticut State University campuses had gambled in their lifetime. High rates of 90% (women: 91%, men: 97%) were found among the students at the University of Nevada (Oster and Knapp 1998). Wu and Tang (2012) estimated that the rate for Hong Kong and Macau university students was 86%. Lower estimates were found among South Indian (19.5%) (George et al. 2016) and Singaporean university students (14–32%) (Arthur et al. 2008).

Shaffer and Korn (2002) estimated the prevalence of problem gambling among university students was nearly three times higher than among the American adults. A review of fifteen worldwide studies (Blinn-Pike et al. 2007) postulated that the rate of lifetime pathological gambling among college students is 7.9%. Another meta-analysis (Nowak 2018) involving 72 studies concluded that the rate of problem gambling and pathological gambling was 10.2% and 6.1%, respectively.

Concurrent problem gambling ranges from 1 to 17% worldwide. Williams' research team (2006) reported that 6.2% of 585 Alberta university students surveyed were moderate-risk gamblers, and 1.4% were problem gamblers. Atkinson et al. (2012) discovered a higher rate of moderate-risk gambling (17%) and problem gambling (15%) among Canadian university students. Moore et al. (2013) estimated that 8.5% of Australian university students were moderate-risk gamblers, while 5% were problem gamblers. Kam et al. (2017) revealed that 3.6% of Macau university students were identified as moderate-risk gamblers and 5.3% were problem gamblers. A lower rate of problem gambling (2.5%) was found among 198 Macau university students a decade ago (Wong et al. 2008).

Student problem gambling damages finance, health, social and family relationships, academic results, and career prospects. According to the Diagnostic and Statistical Manual of Mental Disorders-fifth edition (DSM-V) criteria (American Psychiatric Association 2013), disordered gambling is characterized by dependence, loss of control, and harmful consequences. However, non-excessive recreational gambling may generate beneficial effects such as providing enjoyment, alleviating stress, and enhancing social interaction.

Not all student gamblers are problematic. Research evidence indicates that a constellation of risk factors may place some individuals at increased risk for disordered gambling. This study adopted the risk factors model as the theoretical framework (Dickson et al. 2003), and focused on detecting various demographic and psychosocial risk factors for pathological gambling. The risk factors model guided our investigation in discovering the demographic (e.g., sex and age) and psychosocial characteristics of student pathological gamblers (e.g., gambling attitude, life dissatisfaction, peer and family influence). Identification of risk factors is useful to prevention of problematic gambling.

Risk factors found in previous gambling studies include the male gender, low self-esteem, sensation seeking and aggressive personality, poor social skills, weak problem solving and emotional management, and life dissatisfaction (Barrault and Varescon 2013; Borsoi and Toneatto 2003; Dowling et al. 2017; Kaare et al. 2009; Livazović and Bojčić 2019; Ricketts and Macaskill 2003; Rogier and Velotti 2017).

Abundant research data has confirmed that the male gender and older ages are the most commonly reported risk factors of student pathological gambling (e.g., George et al. 2016;

Kam et al. 2017; Wu et al. 2014). Recently increasing research interests cover other risk factors such as internet gambling, attitude towards gambling, and perceived life satisfaction. This study also shared the same research interest.

Research suggests one in four college students has wagered online (Montes and Weatherly 2017). Internet gamblers are more vulnerable to excessive gambling than the offline gamblers (Gainsbury et al. 2015). Matthew et al. (2009) reported that 37% of 127 UK university student online gamblers had gambling problems in their lifetime. In a sample of 427 Macau university students, online gambling was found associated with gambling problems (Wu et al. 2014).

The benefit of examining gambling attitudes has been recently endorsed (Salonen et al. 2017). Gambling attitudes reliably predict student gambling involvement and problem gambling (Williams et al. 2006). Positive attitude towards gambling is one of the characteristics that best differentiate student problem gamblers from non-problem gamblers. Brevers et al. (2013) pointed out that comparing with non-gamblers, problem gamblers exhibited positive attitudes towards gambling.

Little empirical attention has been given to exploring the impact of life dissatisfaction on student gambling problems. Porter et al. (2004) revealed that life dissatisfaction was linked particularly to female at-risk gambling in a sample of 829 undergraduate university students in the USA. Wong et al. (2008) found life satisfaction was negatively associated with problem gambling among 198 university students in Macau. Another study also confirmed life dissatisfaction was a risk factor for pathological gambling in a sample of 427 Macau university students (Wu et al. 2015).

There is a paucity of gambling research targeting college and university students in Hong Kong. A recent survey report (Hong Kong Polytechnic University 2017) revealed that at least 50% of 588 tertiary students (degree students: 54.6%; non-degree students: 50.8%) gambled in the past year, but lifetime gambling rates were not gauged. In the paper and pen self-administered questionnaire, a Chinese version of the nine criteria in the fifth edition of the Diagnostic and Statistical Manual (DSM-V criteria) (American Psychiatric Association 2013) was used to assess disordered gambling as if clinical interviews with the students were conducted. Hence, actually no validated DSM-5 gambling screens were used to gauge past-year disordered gambling (degree students: 1.5%; non-degree students: 6.3%).

This study attempted to fill the research gap by using a validated gambling screen. To our knowledge, this is the first study focused on investigating both lifetime and past-year gambling activities and gambling behavior among Chinese college and university students in Hong Kong. This survey aimed to gauge the prevalence rate of lifetime and past-year gambling participation, and explore students' lifetime vulnerability to pathological gambling. It also aimed to identify the demographic and psychosocial risk factors for developing pathological gambling. It was hypothesized that lifetime pathological gambling would be significantly correlated with gambling expenditure, Internet gambling, attitudes towards gambling, and life dissatisfaction. It was also hypothesized that there would be significant sex and age differences in pathological gambling. More male than female and more elder student gamblers could be categorized as pathological gamblers.

In brief, the significance of this survey includes filling a research gap as gambling among tertiary students has been under-studied in Hong Kong. The study findings may shed light on future research, and would inform campus preventive and intervention programs.

Methods

Procedures

The survey was conducted in the summer semester of 2018. Employing convenience sampling strategy, 510 students were recruited from six colleges and six universities (35–45 students from each institution) after obtaining institutional ethics approval to launch the study. Chinese students aged under 30 years and currently enrolled in any local tertiary full-time or part-time programs would be included in the study. Non-Chinese students would be excluded. With the help rendered by the tertiary institutions' teaching staff, the survey questionnaires were distributed to the participants by research assistants after classes. A verbal and written explanation about study purposes and procedures was also provided. Voluntary participation was anonymous with informed consent. The response rate is 86%.

Participants

There were 208 women (40.8%) and 302 men (59.2%). The mean age of the participants is 23.0 years ($SD = 5.1$). Many had parental financial support (58.6%), while 63.7% also worked for money. The mean monthly income is HK\$6265.10 ($SD = 7379$). A great majority of the survey participants were full-time students (81%) enrolled in higher diploma (22%) or undergraduate programs (78%). The entire sample consisted of year one freshmen (21.6%), second year students (27.6%), third year students (23.3%), and fourth year students (27.5%).

Measures

There are several sections in the standardized questionnaire:

1. Demographic questions on sex, age, year of study, and monthly incomes
2. Questions on lifetime and past-year gambling activities, age of first gambling, monthly gambling expenditure, peer and family gambling influence
3. The Lie/Bet Questionnaire (Johnson et al. 1997), derived from the fourth edition of the Diagnostic and Statistical Manual (DSM-4) (American Psychiatric Association 2000), was used to assess pathological gambling. The questions on lying and betting more and more money have been identified as the best predictors of pathological gambling. An affirmative answer to one or both questions suggests probable pathological gambling.

The short test is often used as a quick discriminating tool for pathological gambling. It is particularly useful when researchers could not afford to use longer screening instruments due to time and resources constraints. The Lie/Bet screen has satisfactory diagnostic accuracy (Johnson et al. 1997; Johnson et al. 1998) with good sensitivity (0.99–1.00) and specificity (0.85–0.91), and good predictive value (Johnson et al. 1997; Johnson et al. 1998). It produces similar pathological gambling prevalence as that by the full DSM-IV criteria (Dowling et al. 2019). It has been used in student gambling studies (e.g., Grotestam et al. 2004; Lepper and Haden 2013; Rossow and Molde 2006).

4. The Satisfaction with Life Scale (SLS) (Pavot and Diener 2008) is commonly used to measure overall life satisfaction. The core question (i.e., “I am satisfied with my life”) best predicts perceived life satisfaction. The scale has been tested to be a valid and reliable assessment tool (Cronbach's $\alpha = 0.87$) (Pavot and Diener 2008). The participants were

asked to rate perceived life satisfaction on a 5-point Likert scale (0 = neither agree nor disagree, 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). Total scores range from 0 to 40. A score of 0 implies the respondents neither agree nor disagree that they feel satisfied with their lives. A score of 10–20 indicates life dissatisfaction. Scores of 30–40 suggest higher life satisfaction.

5. A 6-item Chinese Gambling Attitudes Questionnaire (CGAQ) was developed to explore the participants' perceptions of gambling activities on a 5-point scale (0-neither agree nor disagree, 1-strongly disagree, 2-disagree, 3-agree, 4-strongly agree). Total scores range from 0 to 24. Higher scores indicate more positive gambling attitude. The six items were constructed based on the Perceptions of Internet Gambling Questionnaire (Wong and So 2014) which assesses online gambling attitudes among Chinese students.

The CGAQ is reliable (Cronbach's alpha = 0.7) with satisfactory construct validity. A principal component analysis yielded two factors. The first factor labeled as "Positive perceptions of gambling" consists of item 2 (gambling is a trendy activity), item 6 (gambling is an enjoyable recreation), and item 4 (gambling provides an opportunity to win fast money). The second factor was made up of three items. It could be labeled as "Negative perceptions of gambling." These items include wasting money and time (item 1), causing problem gambling (item 3), and fostering greed for money (item 5). The CGAQ is a short tool to assess students' gambling attitudes;

6. Lastly, a question was used to collect information on students' help-seeking intention to cope with problems. Help-seeking intention was rated on a 4-point scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). Total scores range from 1 to 4. Higher the scores, greater is the desire to seek help.

Data Analysis

The statistical package IBM SPSS 20 was used to analyze the data. Most were descriptive tests (e.g., frequency, percentages, means, and standard deviations). *T*-tests and chi-squares were performed to compare differences between groups (e.g., gender differences). Pearson product moment tests were used to identify the correlates of pathological gambling. Logistic regression tests were computed to identify the predictors of pathological gambling. Results are noted significant at $p < 0.05$.

Results

Lifetime and Past-Year Gambling Participation

The rate of lifetime and past-year gambling participation among the participants is 79.6% ($n = 406$) and 41.8% ($n = 213$), respectively. There were more male than female lifetime gamblers (62.1% versus 37.9%) and past-year gamblers (58.2% versus 41.8%).

Lifetime Gambling Activities

Among 406 lifetime gamblers, the most popular lifetime gambling forms were mahjong (81.3%) and cards (79.1%). The other preferred lifetime legal games were legal Mark six

lotteries (66.3%), legal casino gambling (29.8%), legal soccer betting (26.4%), and online gambling at the Hong Kong Jockey Club (18.0%). More than one-tenth (11.8%) wagered at offshore gambling sites.

Past-Year Gambling Activities

Among 213 past-year gamblers, the most popular gambling activities were also mahjong (100%) and cards (93.9%). The other preferred past-year legal games were legal Mark six lotteries (84.5%), legal casino gambling (27.7%), legal soccer betting (23.0%), and online gambling at the Hong Kong Jockey Club (18.3%).

Lifetime Social and Pathological Gambling

As shown in Table 1, 20.4% of the participants (50 men and 54 women) had never gambled in their lifetime, and 64.9% ($n = 331$) were social gamblers without symptoms of pathological gambling. Using the Lie/Bet Questionnaire (Johnson et al. 1997), 14.7% ($n = 75$) of 510 participants could be classified as pathological gamblers. Many pathological gamblers (82.7%) felt the need to bet more and more money, while 44% lied about how much they gambled.

Significant Sex Difference in Pathological Gamblers

As shown in Table 1, there were more male pathological gamblers ($n = 54$, 72%) than their female counterparts ($n = 21$, 28%) ($\chi^2(1) = 4.9$, $p < 0.05$). Men also dominated in social gambling (198 men, 133 women) but the sex difference is not significant.

Pathological Gamblers Were Older than Social Gamblers

Pathological gamblers were slightly older (mean age = 23.6, SD = 5.4) than the social gamblers (mean age = 22.7, SD = 4.1) but the age difference is not significant.

Internet Gambling and Pathological Gambling

More than one-tenth (11.3%) of 213 past-year gamblers reported gambling online at offshore gambling sites, and 11.8% of 406 lifetime gamblers did so. More men (62.5%) than women (37.5%) gambled online in the previous year, and the sex ratio is similar for lifetime gamblers (60% versus 40%). More lifetime Internet gamblers (36.4%) met the criteria for probable

Table 1 Lifetime social and pathological gamblers ($n = 510$)

Types of gamblers	Male ($n = 302$, 59.2%)		Female ($n = 208$, 40.8%)		Total ($n = 510$, 100%)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Non-gamblers	50	48.1	54	51.9	104	20.4
Social gamblers	198	59.8	133	40.2	331	64.9
Pathological gamblers	54	72.0	21	28.0	75	14.7

pathological gambling than non-Internet gamblers (10.3%), and the difference is significant ($\chi^2(47) = 83.5, p < 0.01$).

Age of First Gambling

Among 394 lifetime gamblers, 32.5% made their first bet before 13 years, 27.1% during 13–17 years, and 40.4% during 18–29 years. Although the mean age of first betting is 24.1 years, 59.6% started gambling before 18 years.

The mean age of first betting among the social gamblers (14.6 years, $SD = 4.4$) and the pathological gamblers is similar (14.0 years, $SD = 5.0$), and no significant difference is found.

Gambling Expenditure

The social gamblers reported a lower monthly gambling expenditure (mean = HK\$75.8, $SD = 126.9$), whereas the pathological gamblers wagered significantly more money (mean = HK\$427.7, $SD = 1140.5$) ($t = -2.5, p < 0.05$).

Attitudes Towards Gambling

One-fifth of the participants perceived gambling as a trendy activity (20.2%) providing recreational enjoyment (40.8%) with an opportunity to win fast money (15.0%). Negative views about gambling include risk for developing problem gambling (59.6%), wasting time and money (54.4%), and fostering greed for money (46.5%). Pathological gamblers adopted more positive gambling attitudes than the social gamblers. They scored significantly higher on the gambling attitude questionnaire (mean score = 13.4, $SD = 6.7$) than the social gamblers (mean score = 8.1, $SD = 4.3$).

Gambling Behavior Among Friends and Family

Almost half of the participants' friends (47.6%) had a gambling habit, while 22.4% disclosed that their peers had a gambling problem. A quarter (24.9%) admitted that their family members were probable problem gamblers.

Perceived Life Satisfaction

For the whole sample ($n = 510$), the life satisfaction mean score is 25 ($SD = 1.7$), slightly higher than the threshold of life dissatisfaction (i.e., a score less than 21). Overall speaking, the entire sample of participants was hardly satisfied with their life. The pathological gamblers scored lower (mean score = 15) than the social gamblers (mean score = 28) and the non-gamblers (mean score = 21) on the life satisfaction question. The difference is statistically significant ($t = 3.2, p < 0.05$).

Help-Seeking Intention

More than half of the participants (60.4%) were willing to seek professional help to cope with problems, but 37.7% had no opinions, and 8.9% refused to seek professional help. Problematic gamblers refused to seek help or show their opinions about help seeking.

Correlates of Lifetime Pathological Gambling

Pearson product moment analyses were performed to identify factors with significant correlation with lifetime pathological gambling. The Pearson correlation results (Table 2) indicate that lifetime pathological gambling is significantly associated with monthly gambling expenditure ($r = 0.24, p < 0.001$), gambling attitude ($r = 0.12, p < 0.05$), betting on a great variety of games ($r = 0.23, p < 0.01$), and life satisfaction ($r = -0.25, p < 0.05$).

Predictors of Lifetime Pathological Gambling

To identify the predictors of lifetime pathological gambling, the logistic regression analyses (Table 3) were computed with lifetime pathological gambling as the criterion variable, and sex, age, monthly incomes, year of study, first gambling age, monthly gambling expenditure, peer problem gambling, family problem gambling, gambling attitudes, and life satisfaction as the predictor variables. All the predictor variables created a model explaining 24% of the variance in pathological gambling. Only two significant predictors of lifetime pathological gambling were detected. They are gambling expenditure (odds ratio = 1.00, 95% CI = 1.01–1.03) and peer problem gambling (odds ratio = 0.26, 95% CI = 0.09–0.75).

Risk Factors for Developing Pathological Gambling

In addition to the correlates and predictors of lifetime pathological gambling, other risk factors for lifetime pathological gambling identified in this study are the male gender and Internet gambling. Male lifetime gamblers were significantly more vulnerable to pathological gambling than women gamblers, the sex ratio is 72% versus 28% ($\chi^2(1) = 4.9, p < 0.05$). More lifetime Internet gamblers (36.4%) reported symptoms of pathological gambling than the non-Internet gamblers (10.3%). Such a rate is very high as only 14.7% of the entire sample were identified as probable pathological gamblers.

Discussion

Consistent with previous studies, this survey confirms gambling is common among college and university students. Eighty percent of 510 students surveyed reported gambling in their lifetime, and 42% gambled in the preceding year. The past-year rate of 42% is comparable to those (degree students: 54.6%, non-degree: 50.8%) reported in a recent local survey (Hong

Table 2 Pearson correlations between Lie/Bet Questionnaire scores and various variables

Variables	Lie/Bet Questionnaire scores
Monthly gambling expenditure	0.24***
Gambling attitude	0.12*
Betting on various games	0.23**
Monthly income	-0.06
Age	-0.09
Life satisfaction	-0.25*

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests)

Table 3 Logistic regression analyses with pathological gambling as the criterion variable and other variables as the predictor variables

Criterion variable	Predictor variable	Beta	R ²
Lifetime pathological gambling	Sex	0.37	0.24
	Age	0.03	
	Monthly incomes	0.01	
	Year of study	0.89	
	First gambling age	−0.01	
	Gambling expenditure	0.20 *	
	Peer problem gambling	−0.37 **	
	Family problem gambling	0.19	
	Life satisfaction	−0.08	
	Gambling attitude	0.04	

* $p < .05$; ** $p < .01$ (two-tailed tests)

Kong Polytechnic University 2017) and in Macau studies (e.g., 32.3–50%) (Kam et al. 2017; Wu et al. 2014). Higher concurrent rates of 35–75% were noted in western studies (Atkinson et al. 2012; Moore et al. 2013; Williams et al. 2012).

This study also found a lifetime gambling rate (80%) close to those reported in early studies. Wu and Tang (2012) reported a 86% lifetime participation rate in a Macau college student survey, and higher rates of 90% were discovered on the University of Nevada campuses (Oster and Knapp 1998).

Our estimate of lifetime pathological gambling (15%) is also similar to the overall lifetime rates of problem and pathological gambling (16%) derived from meta-analyses of western gambling studies (Engwall et al. 2004; Nowak 2018; Shaffer and Hall 2001). Compared with the existing Asian research data, our estimate is high. In South India, only 7.4% of 5580 college students reported problem gambling (George et al. 2016). Asian studies gauging lifetime rates of gambling and problem gambling are scarce, so more research is needed to enhance cross-cultural comparison of gambling behavior, and to identify correlates of problem gambling.

Replicating previous research data, the correlational findings of this study confirm pathological gambling is associated with monthly gambling expenses (Petry and Gonzalez-Ibanez 2015; Wong 2010; Wong and So 2014), positive gambling attitude (Brevers et al. 2013; Williams et al. 2006; Wong and So 2014), life dissatisfaction (Porter et al. 2004; Wong et al. 2008; Wu et al. 2015), and betting on a great variety of games (Wong and So 2014).

The other verified risk factors are gender and Internet gambling. Problem gambling is more prevalent among college males than females (Barnes et al. 2010; Koross 2016; Wu et al. 2014). Secondary prevention should target the male gamblers, while primary awareness programs may include both genders.

This study provides evidence that more online gamblers (36.4%) reported symptoms of pathological gambling than offline gamblers (10.3%), suggesting an elevated risk associated with online gambling (Gainsbury 2015; Gainsbury et al. 2015; Wong and So 2014). In Hong Kong, wagering at offshore gambling sites is a criminal offense. Financial institutions are prohibited to process money transfer yet 12% of the participants had gambled at these sites during their lifetime. The government should improve the law enforcement measures. Internet gambling being a borderless activity will continue to be a global public health problem.

An interesting finding needs further investigation. Social gamblers were more satisfied with their lives than the pathological gamblers and the non-gamblers. Social gambling might enhance life satisfaction due to the beneficial effects of socialization and recreation. Student problem gamblers reported life dissatisfaction in both western and Asian studies (Porter et al. 2004; Wong et al. 2008; Wu et al. 2015).

To conclude, this study increases our understanding of college students' gambling behavior and lifetime vulnerability to pathological gambling. Significant risk factors for developing pathological gambling have also been identified. However, similar to many surveys, the study has limitations. First, it relied on the participants' self-reports. It is likely that the participants might have denied exhibiting symptoms of pathological gambling due to stigmatization. Second, in this study, 510 students were recruited. Future studies may use a larger sample. Third, the use of a convenience sample hinders generalization about the whole population of Hong Kong college and university students. Future research should use more vigorous sampling methods to improve research generalizability.

The survey findings have implications for future research and intervention services. We suggest future research should identify the sources of student life dissatisfaction, while preventive programs should address life dissatisfaction, gambling attitudes, and help-seeking intention. Campus health clinics and counseling centers play an important role in identification and treatment of student problem gamblers. In campus awareness programs, students should be provided with information on helplines, gambling risk, symptoms, and deleterious consequences of problem gambling.

In short, problem gambling among college and university students should be addressed in an efficient and proactive manner. To prevent and minimize harms associated with student gambling problems, there should be increases in gambling research funds, improvement in campus-based education, preventive and counseling services. It is necessary to incorporate systematic evaluation mechanisms in these programs and services to assess cost-effectiveness. College and university students are tomorrow's leaders, early prevention and efficacious intervention may reduce individual harms and social costs.

Acknowledgements The authors would like to thank the survey participants, the colleges and the universities, and all those who have provided support to this study, including Mr. Oscar Lai and Mr. Shun Hee Lau who assisted in data collection and data entry.

Author Contribution Irene Lai Kuen Wong and Ernest Moon Tong So led survey design, data analysis, and data interpretation. Cheong Hay Chu coordinated data collection. Mr. Oscar Lai and Mr. Shun Hee Lau assisted in data collection and data entry. Irene Lai Kuen Wong led drafting of the manuscript, while Ernest Moon Tong So and Cheong Hay Chu assisted with writing the manuscript.

Funding This study was funded by the Asian Association of Addiction Prevention (AAAPR118).

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (reference number: SS1851), and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of Interest The authors declare no competing interests.

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