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Gender-based violence, psychological distress, sexual behaviors, and binge drinking among female entertainment workers in Cambodia: A midterm survey of the Mobile Link trial

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ABSTRACT

Objective To examine the relationship between gender-based violence, HIV risks, psychological distress, and binge drinking among female entertainment workers (FEWs) in Cambodia.

Design Cross-sectional study.

Setting Phnom Penh and three provinces in Cambodia

Participants We recruited 600 FEWs from entertainment venues using a stratified random sampling method. Participants were eligible if they were at least 18 years old, working in the selected entertainment venues, and self-identified as a FEW.

Primary outcome measure Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Results The prevalence of binge drinking was 76.7%. Adjusted odds of binge drinking were significantly higher among FEWs who earned >USD250 per month than those who earned ≤USD120 per month, had been forced to drink >one time per month in the past three months than those who had never been forced to drink, worked at karaoke bars than those working at a restaurants/café, and experienced emotional abuse in the past six months than those who did not experience it. Interestingly, the odds of binge drinking were significantly higher among FEWs with lower psychological distress than those with higher psychological distress.

Conclusions This study highlights a high prevalence of binge drinking among FEWs, resulting from the working environment, conditions, and context. Our findings suggested that individual-based behavioral intervention may not be effective in reducing binge drinking among FEWs; structural and occupational health policy interventions are needed to change the working environment.

Keywords: Female sex workers, mental health, substance abuse, violence exposure, HIV risk, Asia

Strengths and limitations of this study

- This is the first study that determined the factors associated with binge drinking among female entertainment workers in Cambodia.
- The authors used the validated measures of binge drinking and psychological distress that allows us to compare the prevalence of these variables to other study.
- Binge drinking and other sexual practices data were self-reported; therefore, they may be subjected to social desirability bias.
- Cross-sectional study could not draw a causal inference.

INTRODUCTION

Female entertainment workers (FEWs) are a key population targeted for human immunodeficiency virus (HIV) and other health interventions in Cambodia. FEWs work in entertainment venues such as karaoke bars, massage parlors, restaurants, or beer gardens.[1 2] Due to the government sanction, the brothel business system became illegal in 2008.[3] An increasing number of female sex workers has moved to entertainment venues,[4 5] and the FEW populations have grown significantly over the past decade. The FEW population sizes in Cambodia increased from approximately 40,000 in 2014 to 70,000 in 2019.[6 7] The proportion of FEWs who reported having sex in exchange for money or gifts with commercial sex partners in the past three months ranged from 22.5% to 28.1%.[2 8 9] Another factor contributing to the increasing number of FEWs is women's movement from garment factories to entertainment venues to supplement their low wages from the garment industry.[10]

The growing number of FEWs means more effort is needed to provide resources and health care for this population. FEWs are generally at a greater risk of contracting HIV and other sexually transmitted infections (STIs) than the general population due to the nature of their work.[11] In Cambodia, the estimated HIV prevalence among the adult population aged 15-49 years was 0.6% in 2016;[12] the prevalence was 3.2% among FEWs in 2016.[13] Gender-based violence (GBV) and substance abuse among FEWs are also prevalent.[14] A Cambodian study found that 60.5% of FEWs experienced a form of GBV in their lifetime, and 37.5% experienced it in the past six months.[15] Additional to occupational risks, FEWs suffer from social stigma resulting in various forms of abuse and harassment in workplaces, communities, and from law-enforcement authorities because of the illegality of sex work.[16] A study found that 43.2% of FEWs in Cambodia reported having psychological distress, 19.5% having suicidal thoughts, and 7.3% attempting to commit suicide in the past three months.[2]

Most FEWs work in alcohol-based venues where they are pressured to drink. Across the globe, studies have reported high alcohol consumption rates among women working in the sex and entertainment industry.[17–22] In Cambodia, 83.4% of FEWs and sex workers reported binge drinking, defined as having more than four alcoholic drinks on at least one occasion in the past three months.[23] Moreover, 23.7% of

sex workers aged less than 29-year-old reported being drunk for more than 20 days in the last month.[14] A similar study found that 33.1% of FEWs had been forced to drink alcohol more than once a month.[7]

Excessive drinking is correlated with adverse health and social outcomes among FEWs and sex workers in other countries. Alcohol use may negatively influence the ability of FEWs to negotiate safer sex with commercial sex partners.[24–26] For instance, a cohort study of Kenyan female sex workers found that hazardous and harmful drinking was associated with unprotected sex and a higher number of sex partners than non-drinkers.[19] Hazardous drinking is defined as having an Alcohol Use Disorders Identification Test (AUDIT) score between 8 to 15, and harmful drinking is defined as having an AUDIT score ≥16, which includes alcohol dependence.[27] A systematic literature review identified the health impacts of alcohol use among female sex workers. The impacts include adverse physical health such as fatigue, sleep problems, acute intoxication, and chronic alcoholic cirrhosis.[28] Alcohol drinking was also associated with mental health problems, sexual-violence victimization, condomless sex, HIV, and other STIs.[28] Similarly, a study among female sex workers in China found that problem drinking (risk drinking, heavy drinking, and hazardous drinking) was associated with unprotected sex and an STI history.[29] Finally, alcohol use was associated with illicit drug use and heavy cigarette smoking among female sex workers in India and Nigeria.[20 28 30]

Young Cambodian women from low-income families in rural areas migrate to urban areas to earn a better income and send money to their families.[31] Many of them work for the garment sector.[32] Nevertheless, women still struggle financially due to low-paid jobs, and a large portion of their income contributed to their families.[10] Therefore, to improve their livelihoods, many decide to supplement their garment work income by working at entertainment venues, including beer gardens, massage parlors, and karaoke bars. Many women also engage in transactional sex work.[13] Hence, entertainment venues have been identified as one of the critical places targeting HIV and STI prevention. In Cambodia, women have accounted for more than half of all HIV infections.[33]

Heavy alcohol use is an issue among FEWs and paves a difficult path for reducing HIV and STIs. Examining factors associated with binge drinking among FEWs is essential to design an effective

intervention to reduce the binge drinking prevalence that would, in turn, reduce the incidence of HIV, STIs, GBV, and mental health problems in this population. A recent qualitative study reported several factors associated with binge drinking among FEWs in Cambodia, such as experiencing economic shock, sustaining a family income, experiencing psychological distress, bettering at work, and drinking for social life.[34] No previous quantitative studies have yet been conducted to determine the factors associated with binge drinking among FEWs in Cambodia. Therefore, this study aimed to examine the relationship between GBV, HIV risk behaviors, psychological distress, and binge drinking among FEWs in Cambodia.

METHODS

Design and study population

Data were collected in November 2018 as part of the mid-term survey of the *Mobile Link* trial.[5] The trial was a multisite, single-blinded randomized controlled trial with two arms. Six hundred FEWs were randomly assigned to the arms – 300 for the intervention and 300 for the control arms. FEWs assigned to the intervention arm received either short messages or voice messages, depending on their choices. FEWs in the control arm received the existing standard health care provided by the government and non-governmental organizations (NGOs). Standard health care included access to HIV and sexual and reproductive health services, including free HIV and STI testing, counseling, and linkages to care and treatment services. The trial was implemented in Phnom Penh and three provinces: Battambang, Banteay Meanchey, and Siem Reap. Details of the *Mobile Link* trial have been published elsewhere.[5]

Sample and sampling procedures

The study employed a stratified random sampling method to recruit FEWs from entertainment venues. Thirty venues were selected from a list of entertainment venues in the study sites based on the geographic information system mapping of HIV key populations in Cambodia.[35] The selected venues were then matched with 30 similar venues and randomized for their size and type. FEWs were sampled from the

selected venues until the sample pool reached 600 FEWs. Female interviewers approached the FEWs to conduct the interviews. FEWs were eligible for the study if they (a) were at least 18 years old at the time of the interview, (b) were working in the selected entertainment venues, (c) self-identified as a FEW, (d) were able to communicate in Khmer, (e) could provide written informed consent to participate in the study, and (f) agreed to present themselves on the day of the interview.

Data collection training and procedures

Female data collectors who previously worked with the research team on studies related to HIV among key populations were recruited. The data collection team received one-day training on interview techniques, confidentiality, privacy assurance, and quality control skills. Due to the high illiteracy among FEWs, the interviewers verbally explained the study to FEWs as part of the informed consent process before starting an interview. After obtaining their informed consent, the interviewer conducted the interviews with the FEWs in a place of their choice. The interview took approximately 30 minutes per participant. The participants received USD5 as time compensation.

Questionnaire development

A structured questionnaire was developed in English and translated into Khmer, the Cambodian national language. Back-translation from Khmer to English was conducted to ensure that the contents and meaning of the original questionnaire were maintained. The Khmer questionnaire was then pretested to ensure that the participants understood the questionnaire, and the contents were culturally appropriate. The Kobo Humanitarian Response platform was used to program the questionnaire, and the questionnaire was downloaded into the KoBoCollect application installed on tablets.

Variables and measurements

Alcohol drinking was assessed using the AUDIT-Concise.[36] The participants were first asked how often they drank at least one can or one small bottle of beer or one glass of other alcoholic beverages in the past

three months. If the participant responded to any quantity (once a month or less, 2–4 times a month, 2–3 times a week, and ≥4 times a week), the participants were then asked, "how often did you have more than four units of alcoholic drinks in 24 hours in the past three months." Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

The independent variables of interest comprise sociodemographic characteristics, entertainment work, sexual behaviors, GBV experiences in the past six months, psychological distress, type of venue best describes the current entertainment job, and work duration in entertainment establishments.

Sexual behaviors included the number of commercial partners in the past three months, condom use in the last sexual intercourse with non-commercial partners, sexual intercourse with commercial partners in the past three months, and frequency of forced drinking in the past three months.

The GBV experiences in the past six months were classified into four categories, namely emotional abuse, physical abuse (beating, kicking, or hitting from commercial sex partners, non-commercial sex partners or husbands), forced sex, and forced substance use (alcohol and drugs). Emotional abuse included verbal threats and controlling the ability to leave the house.

Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12).[37] The GHQ-12 consists of 12 questions measured on a four-point Likert scale, ranging from 0 to 3. Scoring was conducted through a method of the '0-0-1-1.' Those who responded 0 or 1 were coded as "0" and those who responded 2 or 3 were coded as "1." This method was used to avoid biases resulting from the tendency that participants choose to respond 0 and 3 or 1 and 2.[38] The mean of the total score for the entire sample was used as the cut-off to define lower or higher psychological distress among FEWs. The GHQ-12 score of ≤3 was defined as "low psychological distress," and ≥4 or more was defined as "high psychological distress".[39] The Cronbach's alpha for the GHQ-12 among study participants was 0.69.

Statistical analyses

Data were imported in Excel for editing to ensure the accuracy, consistency, and completeness of the data. The data were then imported into STATA 14 (Stata Corporation, Texas, USA) for analyses. We conducted descriptive statistics to describe the prevalence and characteristics of drinking among the participants. We used the Chi-square test (or Fisher's exact test when the sample sizes were smaller than five in one cell) for categorical variables and Student's *t*-test for continuous variables to compare the sociodemographic characteristics, GBV experiences, psychological distress, and sexual behavior characteristics among binge drinkers and non-binge drinkers.

We performed bivariate and multiple logistic regression analyses to examine the associated factors of binge drinking. Regarding the multiple logistic regression, we first included age, education, and all variables significantly associated with binge drinking at the *p*-value <0.20 in the bivariate logistic regression analyses in the model. Then we used the backward elimination method to eliminate variables with the highest *p*-value one-by-one from the multiple logistic regression models. Overall, five multiple logistic regression models were run. The odds ratios (OR) and adjusted odds ratio (AOR) with their 95% confidence interval (95% CI) were calculated.

Ethical considerations

Participants were informed about the study's objectives, risks, and benefits from the participation. Participation was voluntary, and participants could refuse or discontinue the participation anytime. To ensure the participants' privacy and confidentiality, we conducted interviews at a private place and assigned personal identification numbers in place of their personal identifiers.

Patients and public involvement

Representatives of FEWs and community-based organizations were involved in the design, conduct, and dissemination plans of our research.

RESULTS

Drinking prevalence and characteristics

Table 1 shows drinking prevalence and characteristics in the past three months among FEWs. More than two-thirds of the participants (61.7%) reported drinking at least one standard alcoholic drink ≥4 times a week, 15.5% drinking 2–3 times a week, 13.7% drinking 2–4 times per month, and 5.8% drinking once a month or less. On a typical day, the participants reported drinking 10 or more cans of beer or glasses of wine (28.1%), 7–9 cans of beer or glasses of wine (9.1%), 5–6 cans of beer or glasses of wine (22.2%), 3–4 cans of beer or glasses of wine (22.2%), and 1–2 cans of beer or glasses of wine (18.3%). The prevalence of binge drinking was 76.7%. Almost one in five (19.5%) reported having been forced to drink at least once a month.

Table 1 Prevalence and characteristics of alcohol drinking among female entertainment workers

Alcohol drinking in the past three months	Total number	Number (%)
Frequency of drinking at least one can of beer or one glass of wine	600	
Never		20 (3.3)
Once a month or less		35 (5.8)
2–4 times a month		82 (13.7)
2–3 times a week		93 (15.5)
4 or more times a week		370 (61.7)
Number of standard drinks containing alcohol on a typical day	580	
1–2		106 (18.3)
3–4		129 (22.2)
5–6		129 (22.3)
7–9		53 (9.1)
10 or more		163 (28.1)
Frequency of drinking more than 4 drinks in 24 hours	580	

Never		120 (20.7)
Less than once a month		39 (6.7)
Once a month		36 (6.2)
1–3 times a week		118 (20.3)
≥ 4 times a week		267 (46.0)
Had binge drinking at least once*	600	460 (76.7)
Frequency of forced drinking	600	
Never		404 (67.3)
≤ 1 time per month		117 (19.5)
> 1 time per month		79 (13.2)

* Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Socio-demographic characteristics

As shown in Table 2, most of the participants (72.5%) were born in rural areas, and their mean age was 24.8 (standard deviation = 4.0) years. More than half of them had six years of formal education or less, and 13% had finished grade 10 or higher. More than 40% of them had never been married, and 29.5% were currently married or cohabitated. A small portion (12.8%) of the participants lived in their own home, 26.8% rented a house by themselves, 25.0% rented a house with their families, 9.2% shared a rental house with friends, and 26.2% stayed in a dormitory at their workplaces. The proportion of participants working in Karaoke bars (64.6% vs. 48.6%), having monthly income of more than USD250 (42.0% vs. 29.3%), and having been forced to drink more than once a month in the past three months (16.1% vs. 3.6%) was significantly higher among binge drinkers than non-binge drinkers.

Table 2 Comparison of socio-demographic characteristics, GBV, and psychological distress among binge drinkers and non-binge drinkers

Characteristics	Total (n = 600)	Binge drinking* Yes (n = 460)	No (n = 140)	P-value†
Type of venue best describes the current job in the entertainment				0.002
Restaurant/café	173 (28.8)	118 (25.7)	55 (39.3)	
Karaoke bar	365 (60.8)	297 (64.6)	68 (48.6)	
Beer garden/massage parlor/freelance	62 (10.3)	45 (9.8)	17 (12.1)	0.002
Age group in years (mean ± SD)	24.8 ± 4.0	24.9 ± 4.0	24.4 ± 4.1	0.19
18–24	280 (46.7)	214 (46.5)	66 (47.1)	0.52
25–29	239 (39.8)	180 (39.1)	59 (42.1)	
30–35	81 (13.5)	66 (14.4)	15 (10.7)	
Education level (in year)				0.15
Primary School (0–6)	309 (51.5)	245 (53.3)	64 (45.7)	
Secondary School (7–9)	213 (35.5)	161 (35.0)	52 (37.1)	
High School or above (≥ 10)	78 (13.0)	54 (11.7)	24 (17.1)	
Current marital status				0.80
Never married	243 (40.5)	183 (39.8)	60 (42.9)	
Currently married	180 (30.0)	139 (30.2)	41 (29.3)	
Widowed/divorced	177 (29.5)	138 (30.0)	39 (27.9)	
Level of monthly income (USD)				0.002
≤ 120	44 (7.3)	26 (5.7)	18 (12.9)	
121–250	322 (53.7)	241 (52.4)	81 (57.9)	
> 250	234 (39.0)	193 (42.0)	41 (29.3)	
Born in rural area	435 (72.5)	336 (73.0)	99 (70.7)	0.59
Current type of house				0.56

Their own/family house	77 (12.8)	55 (12.0)	22 (15.7)	
Rental house on their own	161 (26.8)	126 (27.4)	35 (25.0)	
Rental house with family	150 (25.0)	112 (24.4)	38 (27.1)	
Rental house with friends	55 (9.2)	41 (8.9)	14 (10.0)	
Dormitory at their workplace	157 (26.2)	126 (27.4)	31 (22.1)	
Number of children				0.36
0	305 (50.8)	229 (49.8)	76 (54.3)	
1	188 (31.3)	151 (32.8)	37 (26.4)	
≥ 2	107 (17.8)	80 (17.4)	27 (19.3)	
Duration of work as entertainment workers				0.62
Less than a year	226 (37.7)	171 (37.2)	55 (39.3)	
1 - 2 years	196 (32.7)	155 (33.7)	41 (29.3)	
More than 2 years	178 (29.7)	134 (29.1)	44 (31.4)	
GBV experiences in the past six months				0.047
Emotional abuse	70 (11.7)	62 (13.5)	8 (5.7)	
Forced substance use	34 (5.7)	25 (5.4)	9 (6.4)	
Physical abuse	28 (4.7)	24 (5.2)	4 (2.9)	
Forced sex	4 (0.7)	4 (0.9)	0 (0.0)	
High psychological distress (≥ 4)‡	235 (39.2)	171 (37.2)	64 (45.7)	0.007

Abbreviations: GBV, gender-based violence; SD, standard deviation.

* Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables, and Student's *t*-test was used for continuous variables.

‡ Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥ 4 was used to define "high psychological distress."

Prevalence of gender-based violence

Table 2 shows that 22.7% of participants reported GBV in the past six months, including emotional abuse (11.7%), forced substance use (5.7%), physical abuse (4.7%), and forced sex (0.7%). The proportion of emotional abuse (13.5% vs. 5.7%), physical abuse (5.2% vs. 2.9%), and forced sex in the past six months (0.9% vs. 0.0%).

Sexual behaviors and condom use

As shown in Table 3, 81.2% and 34.3% of participants reported having sexual intercourse with non-commercial sex partners and commercial sex partners in the past three months, respectively. In the past three months, 25.5% of them reported having sex with one or more commercial sex partners. Most participants (71.0%) reported never using condoms when having sexual intercourse with their non-commercial sex partners, and 77.8% reported consistently using condoms when having sexual course with commercial partners in the past three months. The proportion of participants who reported having sexual intercourse in the past three months (79.1% vs. 58.6%) and always using condoms when having sexual intercourse with commercial partners (19.2% vs. 14.3%) was significantly higher among binge drinkers than non-binge drinkers.

Table 3 Comparison of sexual behaviors among binge drinkers and non-binge drinkers

Sexual behaviors in the past 3 months	**Total**	**Binge drinking***		
	(*n* = 600)	**Yes (*n* = 460)**	**No (*n* = 140)**	**P-value†**
Had sexual intercourse	446 (74.3)	364 (79.1)	82 (58.6)	<0.001
Condoms use in last sex with a non-commercial partner	98 (27.1)	85 (29.1)	13 (18.6)	0.08
Frequency of condom use with commercial partners				0.049
Always	66 (18.2)	56 (19.2)	10 (14.3)	

Frequently	8 (2.2)	7 (2.4)	1 (1.4)	
Sometimes	31 (8.6)	30 (10.3)	1 (1.4)	
Never	257 (71.0)	199 (68.2)	58 (82.9)	
Sex with commercial partners	153 (34.3)	130 (35.7)	23 (28.1)	0.19
Frequency of having sex with commercial partners				0.61
Daily/a few times a week/weekly	35 (22.9)	31 (23.9)	4 (17.4)	
Monthly	26 (17.0)	23 (17.7)	3 (13.0)	
Once in a while when needed to	92 (60.1)	76 (58.5)	16 (69.6)	
Number of commercial sex partners				0.045
0 partner	447 (74.5)	330 (71.7)	117 (83.6)	
1 partner	64 (10.7)	54 (11.7)	10 (7.1)	
2–3 partners	46 (7.7)	40 (8.7)	6 (4.3)	
> 3 partners	43 (7.2)	36 (7.8)	7 (5.0)	
Condoms use in last sex with a commercial partner	142 (92.8)	120 (92.3)	22 (95.7)	0.57
Frequency of condom use with non-commercial partners				0.32
Always	119 (77.8)	98 (75.4)	21 (91.3)	
Frequently	8 (5.2)	8 (6.2)	0 (0.0)	
Sometimes	19 (12.4)	18 (13.9)	1 (4.4)	
Never	7 (4.6)	6 (4.6)	1 (4.4)	

* Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables, and Student's *t*-test was used for continuous variables.

Factors associated with binge drinking

Table 4 shows the results of bivariate and multiple logistic regression analyses. Bivariate analyses show that the odds of binge drinking in the past three months was significantly higher among participants with an average monthly income of >USD250 and USD121–250 than those with an average income of ≤ USD120 (OR = 3.26, 95% CI: 1.64–6.49; OR = 2.06, 95% CI: 1.07–3.95), participants who experienced forced drinking more than once than those who did not experience it in the past three months (OR = 5.68, 95% CI: 2.24–14.41), participants working in Karaoke bar than those working at restaurants/cafés (OR = 2.04, 95% CI: 1.34–3.08), and participants who experienced emotional abuse than those who did not experience it in the past six months (OR = 2.57, 95% CI: 1.19–5.51).

Table 4 Factors associated with binge drinking among female entertainment workers (*n*= 600)

Characteristics	Bivariate logistic regression		Multiple logistic regression*	
	OR (95% CI)	P-value	AOR (95% CI)	P-value
Age (years)	1.03 (0.98–1.08)	0.19	1.02 (0.97–1.07)	0.46
Education level (in year)				
High school or above (≥ 10)	Reference		Reference	
Secondary school (7–9)	1.38 (0.78–2.44)	0.28	1.19 (0.64–2.20)	0.58
Primary school (0–6)	1.70 (0.98–2.96)	0.06	1.49 (0.82–2.71)	0.19
Average monthly income (USD)				
≤ 120	Reference		Reference	
121–250	2.06 (1.07–3.95)	0.03	1.98 (0.98–3.99)	0.06
> 250	3.26 (1.64–6.49)	0.001	2.96 (1.40–6.24)	0.004
Number of commercial sex partners in the past three months				
0 partner	Reference			
1 partner	1.91 (0.94–3.88)	0.07		
2–3 partners	2.36 (0.98–5.72)	0.06		

> 3 partners	1.82 (0.79–4.21)	0.16		
Condoms use in the last had sex with a non-commercial partner				
No	Reference			
Yes	1.80 (0.94–3.46)	0.08		
Sex with commercial sex partners in the past three months				
No	Reference			
Yes	1.43 (0.84–2.41)	0.19		
Level of psychological distress				
Higher (GHQ-12 ≥ 4)	Reference		Reference	
Lower (GHQ-12 ≤ 3)	1.42 (0.97–2.09)	0.07	1.65 (1.09–2.49)	0.02
Frequency of forced drinking in the past three months				
Never	Reference		Reference	
1 time per month	1.57 (0.95–2.59)	0.08	1.64 (0.96–2.78)	0.07
> 1 time per month	5.68 (2.24–14.41)	<0.001	5.66 (2.19–14.65)	<0.001
Type of venue best describes the current job in the entertainment				
Restaurant/café	Reference		Reference	
Karaoke bar	2.04 (1.34–3.08)	0.001	1.85 (1.19–2.88)	0.006
Beer garden/massage parlor/freelance	1.23 (0.65–2.35)	0.52	0.92 (0.46–1.85)	0.82
Duration of work as an entertainment worker				
< 1 year	Reference			
1–2 years	1. 22 (0.77–1.92)	0.40		
> 2 years	0.98 (0.62–1.55)	0.09		
Experience emotional abuse in the past six months				
No	Reference		Reference	

Yes	2.57 (1.19–5.51)	0.02	2.71 (1.22–6.02)	0.01

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio.

* Adjusted for variables significantly associated with binge drinking at the *p*-value ≤ 0.20 in the bivariate logistic regression analyses and that remained statistically significant in six multiple logistic regression models using the backward elimination method.

† Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥ 4 was used to define "high psychological distress."

After adjustment, the odds of binge drinking remained significantly higher among participants with an average monthly income of >USD250 than those with an average income of ≤USD120 (AOR = 2.96; 95% CI: 1.40–6.24), participants who experienced forced drinking more than once per month than those who did not experience it in the past three months (AOR = 5.66; 95% CI: 2.19 – 14.65), participants working in karaoke bars than those working at restaurants/cafés (AOR = 1.85; 95% CI: 1.19 – 2.88), and participants who experienced emotional abuse than those who did not experience it in the past six months (AOR = 2.71; 95% CI: 1.22–6.02). Interestingly, the odds of binge drinking were significantly higher among participants with lower psychological distress than those with higher psychological distress (AOR = 1.65; 95% CI: 1.09–2.49).

DISCUSSION

This study explored the magnitude of binge drinking and its relationships with GBV, psychological distress, and sexual behaviors among FEWs in Cambodia, a key population working in an environment prone to HIV risks and substance abuse. We found a prevalence of binge drinking in the past three months of 76.7%. A prevalence of binge drinking of 83.4% has been reported in another study of Cambodian FEWs who were more heavily engaged in commercial sex (reporting two or more different sexual partners within the last month).[23] In our study, only 25.5% of participants reported having sex with one or more commercial sex partners in the past three months, which may explain the difference in the

binge-drinking prevalence. Consistent with our findings, the prevalence of alcohol drinking among female sex workers in other countries also appears high, ranging from 67.8% to 88.5%.[17 20 21 40]

We identified a significant relationship between binge drinking among FEWs and higher monthly income. Evidence suggests that FEWs discuss receiving better tips from commercial sex partners or monetary incentives from their bosses for drinking.[34] FEWs also discussed how they use alcohol to reduce shyness to perform their job better.[34] These might explain the correlation between binge drinking and higher monthly income among FEWs in Cambodia. Another plausible explanation for this correlation was suggested in the literature, as other studies have noted this same pattern. Higher levels of income among Kenyan female sex workers were associated with increases in higher-risk drinking.[19] As the level of risk for drinking increased, the median number of commercial sex partners also increased, from three in the past week among non-drinkers and low-risk drinkers to six partners in the past week among harmful drinkers.[19]

Our findings suggest that lower psychological distress was associated with binge drinking. FEWs who had lower psychological distress were 1.7 times more likely to report binge drinking than those who had higher psychological distress. A literature review shows that alcohol use was correlated with adverse mental health problems.[28] Therefore, we expected FEWs with higher psychological distress would be more likely to be binge drinkers. The possible explanation for our finding is that those who thought they had an issue with mental health might decide not to drink. Also, in a qualitative study in Cambodia, FEWs expressed feeling shy working in entertainment venues, and drinking alcohol helped them forget those feelings and perform the job better, resulting in better earnings.[34] Once FEWs earn better, they are less likely to be distressed, which may explain why those who have lower psychological distress were associated with binge drinking.

In our study, FEWs who worked in karaoke bars had a higher propensity to engage in binge drinking than those who worked in restaurants/cafés, beer gardens, massage parlor, or freelance. This finding is consistent with previous studies, which have discussed how karaoke bars are not just a place where commercial sex partners go for singing but also a place for drinking and entertaining with

women.[26 41] In such settings, FEWs can also be pressured by supervisors and commercial sex partners to drink.[26 41] Our findings also showed that FEWs who experienced forced drinking four times or more in the past three months were significantly more likely to report binge drinking.

Binge drinkers reported experiencing more emotional abuse in the past six months than non-binge drinkers. In line with this finding, in a qualitative study in Cambodia, FEWs shared their experience in excessive drinking to cope with the challenges in life and jobs.[34] Similarly, a Tanzanian study showed that female sex workers who reported hazardous or harmful drinking were two times more likely to experience GBV than those who reported less hazardous or harmful drinking.[42]

Alcohol consumption has been associated with the global burden of diseases and substantial health loss.[43] Alcohol consumption particularly becomes a significant public health concern among female sex workers because hazardous and harmful drinking is correlated with sexual risk behaviors, such as unprotected sex and a more significant number of commercial sex partners, than those who were abstained from drinking.[19 44] Consequently, the high binge-drinking prevalence among Cambodian FEWs implicates the need for occupational health intervention programs to mitigate alcohol use among FEWs. For instance, a WHO Brief Intervention for hazardous and harmful drinking[27] effectively reduced self-reporting alcohol consumption among non-dependent and non-treatment-seeking female sex workers in Mombasa, Kenya.[45]

Our study has several limitations. Firstly, this study is cross-sectional; therefore, we could not draw a causal inference between the risk factors and binge drinking. Secondly, social desirability bias[46] might be present since we asked women about sensitive issues such as sexual practices and substance use. Women might be less likely to report this type of sensitive information, resulting in underestimating the prevalence of the study variables. Moreover, since half of the participants were receiving an intervention, they might be more likely to have been exposed to health education than other FEWs who were not. Therefore, the results from this study might not be generalizable to other FEWs in Cambodia. The small sample size in some sub-populations is another limitation of this study. For instance, “beer gardens” are also supposed to be a drinking place and entertainment for commercial partners. However, due to the

small sample size, we grouped FEWs working in "beer gardens" with those working in "massage parlors" and as "freelancers." Therefore, an adequate sample size of FEWs working in "beer gardens" is needed to determine whether women working in "beer gardens" are at risk of binge drinking. Additionally, physical and sexual abuse might be linked to alcohol drinking and HIV risk. Nevertheless, given the small sample size, we could not include these variables in the multiple logistic regression.

CONCLUSIONS

This study highlights a relatively high prevalence of binge drinking among FEWs in Cambodia. Factors associated with binge drinking were those linked to working environments and working conditions. Binge drinking was mainly reported by FEWs working in karaoke bars and those who experienced forced drinking as part of the job requirement. FEWs who experienced emotional abuse, defined as verbal threats or having the ability to leave the house not being under their control, were more likely to experience binge drinking than those who did not experience emotional abuse. The results from our study can be used to design interventions to reduce binge drinking among FEWs by providing safer working environments and addressing work-related violence, such as emotional abuse by commercial sex partners and entertainment establishment managers. The results from our study suggest that individual-based behavioral interventions may not be sufficient in reducing binge drinking among FEWs unless accompanied by structural and occupational health policy interventions that change these exploitative working environments.

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Contributors SY and CB conceived the parent study, obtained the research grant, and supervised the project implementation. ST and PC were responsible for project implementation, training, and data collection. SO conducted literature reviews, analyzed the data, and drafted the manuscript. PMG advised on the study design, data analyses, and manuscript writing. All authors provided critical comments for revisions and approved the final manuscript. SY confirmed that he has full access to all data and final responsibility for the decision to submit for publication.

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Competing interest None declared.

Patient consent for publication Not required.

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Data availability statement: Data used for this study can be accessed upon request from the Principal Investigator (Dr. Siyan Yi) at siyan@doctor.com.

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Reporting checklist for cross sectional study.

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		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	4 – 6
Objectives	#3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	#4	Present key elements of study design early in the paper	6
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	7
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7 – 8
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	7 – 8
Bias	#9	Describe any efforts to address potential sources of bias	7
Study size	#10	Explain how the study size was arrived at	6 – 7
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	9
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	9
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	n/a (small sample size)
Statistical methods	#12c	Explain how missing data were addressed	n/a (no missing data)
Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	n/a
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	n/a (already mentioned in method)
Participants	#13b	Give reasons for non-participation at each stage	n/a

Participants	#13c	Consider use of a flow diagram	n/a
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	11 – 13
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	n/a
Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	16 – 18
Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	16 – 18
Main results	#16b	Report category boundaries when continuous variables were categorized	16 – 17
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
Discussion			
Key results	#18	Summarise key results with reference to study objectives	18 – 20
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	20
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	21
Generalisability	#21	Discuss the generalisability (external validity) of the study results	20
Other Information			

Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

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Gender-based violence, psychological distress, sexual behaviors, and binge drinking among female entertainment workers in Cambodia: A cross-sectional study

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Gender-based violence, psychological distress, sexual behaviors, and binge drinking among female entertainment workers in Cambodia: A cross-sectional study

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ABSTRACT

Objective To examine the relationship between gender-based violence, HIV risks, psychological distress, and binge drinking among female entertainment workers (FEWs) in Cambodia.

Design Cross-sectional study.

Setting Phnom Penh and three other provinces in Cambodia.

Participants We recruited 600 FEWs from entertainment venues using a stratified random sampling method. Participants were eligible if they were at least 18 years old, working in the selected entertainment venues, and self-identified as a FEW.

Primary outcome measure Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Results The prevalence of binge drinking was 76.7%. Adjusted odds of binge drinking were significantly higher among FEWs who earned >USD250 per month than those who earned ≤USD120 per month (adjusted odds ratio [AOR] 2.96, 95% CI: 1.40–6.24), had been forced to drink more than once per month in the past three months than those who had never been forced to drink (AOR 5.66, 95% CI: 2.19–14.65), worked at karaoke bars than those working at a restaurants/café (AOR 1.85, 95% CI: 1.19–2.88), and experienced emotional abuse in the past six months than those who did not experience it (AOR 2.71, 95% CI: 1.22–6.02. Interestingly, the odds of binge drinking were significantly higher among FEWs with lower psychological distress than those with higher psychological distress (AOR 1.65, 95% CI: 1.09–2.49).

Conclusions This study highlights a high prevalence of binge drinking among FEWs, resulting from the working environments, conditions, and contexts. Our findings suggest that individual-based behavioral intervention may not be effective in reducing binge drinking among FEWs. Structural and occupational health policy interventions are needed to change the working environment.

Keywords: Female sex workers, mental health, substance abuse, violence exposure, HIV risk, Asia

Strengths and limitations of this study

- This is one of the few studies that determine the factors associated with binge drinking among female entertainment workers in Cambodia.
- We used the validated measures of binge drinking and psychological distress that allowed us to compare the prevalence of these variables to other studies.
- Binge drinking and other sexual practices data were self-reported; therefore, they may be subject to social desirability bias.
- The study's cross-sectional design did not allow us to draw a causal inference.

INTRODUCTION

Female entertainment workers (FEWs) in Cambodia are disproportionately experienced issues such as violence, sexual harassment, rights abuses, and lack of access to health services.[1] Many FEWs work in alcohol-based entertainment venues such as karaoke bars, massage parlors, restaurants, or beer gardens.[2,3] The FEW populations also include women working as freelance sex workers in public places, including streets, parks, or on call.[4] Frequently, FEWs are pressured to alcohol drinking during working hours, especially by their clients and supervisors.[5] Studies have reported high alcohol consumption rates among women working in the sex and entertainment industry across many countries.[6–11] In Cambodia, 83.4% of FEWs reported binge drinking, defined as having more than four alcoholic drinks on at least one occasion in the past three months.[12] Moreover, 23.7% of sex workers aged less than 29-year-old reported being drunk for more than 20 days in the last month.[13] A similar study found that 33.1% of FEWs had been forced to drink alcohol more than once a month.[14]

Excessive drinking is correlated with adverse health and social outcomes among female sex workers (FSWs) in other countries. Alcohol use may negatively influence the ability of FEWs to negotiate safer sex with commercial sex partners.[15–18] For instance, a cohort study of Kenyan FSWs found that hazardous and harmful drinking, as defined by having an Alcohol Use Disorders Identification Test (AUDIT) score between 8 to 15 for hazardous drinking and having an AUDIT score ≥16 for harmful drinking, which includes alcohol dependence,[19] was associated with unprotected sex and a higher number of sex partners than non-drinkers.[8] A systematic literature review identified the health impacts of alcohol use among FSWs. The impacts include adverse physical health such as fatigue, sleep problems, acute intoxication, and chronic alcoholic cirrhosis.[20] Alcohol drinking was also associated with mental health problems, sexual-violence victimization, condomless sex, HIV, and other sexually transmitted infections (STIs).[20] Likewise, a study among FSWs in China found that problem drinking (risk drinking, heavy drinking, and hazardous drinking) was associated with unprotected sex and an STI history.[21] Furthermore, alcohol drinking was associated with illicit drug use and heavy cigarette smoking among FEWs in India and Nigeria.[9,20,22]

In Cambodia, the FEW populations have grown significantly over the past decade, from approximately 40,000 in 2014 to 70,000 in 2019.[1,14] It is worth noting that most FEWs are migrants from rural low-income families and have to provide regular financial support to their families.[23] The pathway from rural community livelihood to the entertainment sector is common among the majority of FEWs.[14] Transactional sex is also common among FEWs.[4] For example, the proportion of FEWs who reported having sex in exchange for money or gifts with commercial sex partners in the past three months ranged from 22.5% to 28.1%.[3,24,25] The growing number of FEWs means more effort is needed to provide resources and health care for this population.

FEWs are generally at a greater risk of contracting HIV and other STIs than the general women population due to the nature of their work.[26] In Cambodia, the estimated HIV prevalence among pregnant women attending antenatal care aged 15-49 years was 0.6% in 2016.[27] The prevalence among FEWs was 3.2% in the same year.[4] Gender-based violence (GBV) among FEWs is also prevalent.[28] A Cambodian study found that 60.5% of FEWs experienced a form of GBV in their lifetime, and 37.5% experienced it in the past six months.[29] Additional to occupational risks, FEWs suffer from social stigma and discrimination, resulting in various forms of abuse and harassment in workplaces and communities and by law-enforcement authorities because of the illegality of sex work.[30] A study found that 43.2% of FEWs in Cambodia reported having psychological distress, 19.5% having suicidal thoughts, and 7.3% attempting to commit suicide in the past three months.[3]

Heavy alcohol drinking has been shown to increase the FEWs' risk of contracting HIV and other STIs by limiting FEWs' ability to successfully negotiate and use condoms with partners.[31] Examining factors associated with binge drinking among FEWs is essential to design an effective intervention to reduce the binge drinking prevalence that would, in turn, reduce the incidence of HIV and STIs in this population. A recent qualitative study reported several factors linked to binge drinking among FEWs in Cambodia, such as experiencing economic shock, sustaining a family income, experiencing psychological distress, working better, and drinking for social life.[5] No previous quantitative studies have identified factors associated with binge drinking among FEWs in Cambodia. Therefore, this study examined the

associations between socio-demographic characteristics, mental health-related factors, sexual risk behaviors, GBV, and binge drinking among FEWs in Cambodia.

METHODS

Design and study population

Data were collected in November 2018 as part of the mid-term survey of the *Mobile Link* trial.[32] The trial was a multisite, single-blinded randomized controlled trial with two arms. Six hundred FEWs were randomly assigned to the arms – 300 for the intervention and 300 for the control arms. FEWs assigned to the intervention arm received either short messages or voice messages, depending on their choices. FEWs in the control arm received the existing standard health care provided by the government and non-governmental organizations (NGOs). Standard health care included access to HIV and sexual and reproductive health services, including free HIV and STI testing, counseling, and sexual and reproductive health services. The trial was implemented in Phnom Penh and three other provinces: Battambang, Banteay Meanchey, and Siem Reap. Details of the *Mobile Link* trial have been published elsewhere.[32]

Sample and sampling procedures

This study employed a stratified random sampling method to recruit FEWs from entertainment venues. Thirty venues were selected from a list of entertainment venues in the study sites based on the geographic information system mapping of HIV key populations in Cambodia.[33] The selected venues were then matched with 30 similar venues and randomized for their size and type. FEWs were sampled from the selected venues until the sample pool reached 600 FEWs. Female interviewers approached the FEWs to conduct the interviews. FEWs were eligible for the study if they (a) were at least 18 years old at the time of the interview, (b) were working in the selected entertainment venues, (c) were able to communicate in Khmer, (d) could provide written informed consent to participate in the study, and (e) agreed to present themselves on the day of the interview.

Data collection training and procedures

Female data collectors who previously worked with the research team on studies related to HIV among key populations were recruited. The data collection team received one-day training on interview techniques, confidentiality, privacy assurance, and quality control skills. Due to the high illiteracy among FEWs, the interviewers verbally explained the study to FEWs as part of the informed consent process before starting an interview in a place of their choice. The interview took approximately 30 minutes per participant. The participants received USD5 as time compensation.

Questionnaire development

A structured questionnaire was developed in English and translated into Khmer, the Cambodian national language. Back-translation from Khmer to English was conducted to ensure that the contents and meaning of the original questionnaire were maintained. The Khmer questionnaire was then pretested to ensure that the participants understood the questionnaire and that the contents were culturally appropriate. The Kobo Humanitarian Response platform was used to program the questionnaire, and the questionnaire was downloaded into the KoBoCollect application installed on tablets.

Outcome variable measure

Alcohol drinking was assessed using the AUDIT-Consumption.[34] The participants were first asked how often they drank at least one can or one small bottle of beer or one glass of other alcoholic beverages in the past three months. If the participant responded to any quantity (once a month or less, 2–4 times a month, 2–3 times a week, and ≥4 times a week), the participants were then asked, “how often did you have more than four units of alcoholic drinks in 24 hours in the past three months.” Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Independent variables measure

The independent variables of interest comprise sociodemographic characteristics, including age, education level, current marital status, monthly income, place of birth, number of children, entertainment venue, and duration of work as an entertainment worker. We collected information on sexual intercourse, the number of partners, and the frequency of condom use with non-commercial and commercial partners in the past three months.

Regarding GBV, we assessed FEWs' experiences of emotional abuse, forced substance use, physical abuse, and forced sex using three questions for each type of GBV with multiple-choice response options. The questions were (1) "What type of violence, if any, have you ever experienced in your lifetime?"; (2) "What type of violence, if any, have you experienced in the past 6 months?"; and (3) "Who was the main perpetrator of the violence?" The GBV experiences in the past six months were classified into four categories – emotional abuse, physical abuse (beating, kicking, or hitting from commercial sex partners, non-commercial sex partners or husbands), forced sex, and forced substance use (alcohol and drugs). Emotional abuse included verbal threats and controlling the ability to leave the house.

Psychological distress was measured using the 12-item General Health Questionnaire (GHQ-12).[35] The GHQ-12 consists of 12 questions assessed on a four-point Likert scale, ranging from 0 to 3. Scoring was conducted through a method of the '0-0-1-1.' Those who responded 0 or 1 were coded as "0" and those who responded 2 or 3 were coded as "1." This method was used to avoid biases resulting from the tendency that participants choose to respond 0 and 3 or 1 and 2.[36] The mean of the total score for the entire sample was used as the cut-off to define lower or higher psychological distress among the respondents. The GHQ-12 score of ≤3 was defined as "low psychological distress," and ≥4 or more was defined as "high psychological distress."[37] The Cronbach's alpha for the GHQ-12 among this study's participants was 0.69.

Statistical analyses

Data were imported in Excel for editing to ensure accuracy, consistency, and completeness. The data were then imported into STATA 14 (Stata Corporation, Texas, USA) for analysis. We conducted descriptive

statistics to describe the prevalence and characteristics of alcohol drinking among the participants. We used the Chi-square test (or Fisher's exact test when the sample sizes were smaller than five in one cell) for categorical variables and Student's *t*-test for continuous variables to compare the sociodemographic characteristics, entertainment work, GBV experiences, psychological distress, and sexual behavior characteristics among binge drinkers and non-binge drinkers.

We performed bivariate and multiple logistic regression analyses to examine the associated factors of binge drinking in the total sample of 600 FEWs and among a subgroup of 365 FEWs working in karaoke bars. In the multiple logistic regression, we first included age, education, and all variables significantly associated with binge drinking at the *p*-value <0.20 in the bivariate logistic regression analyses in the model. Then we used the backward elimination method to eliminate variables with the highest *p*-value one-by-one from the multiple logistic regression models. Overall, five multiple logistic regression models were run. The final multiple logistic regression model was evaluated according to the model calibration with Hosmer-Lemeshow goodness-of-fit (*p*-value >0.05), variance inflation factors (VIF) to check for the multi-collinearity and predictive accuracy with areas under the curve. The odds ratios (OR) and adjusted odds ratio (AOR) with their 95% confidence interval (95% CI) were calculated.

Ethical considerations

Participants were informed about the study's objectives and anticipated risks and benefits of their participation. Participation was voluntary, and participants could refuse or discontinue the participation anytime. To ensure the participants' privacy and confidentiality, we conducted interviews at a private place and assigned personal identification numbers in place of their identifiers.

Patients and public involvement

Representatives of FEWs and community-based organizations were involved in designing, conducting, and disseminating our research. We invited the key stakeholder representatives to a consultative workshop to design the study and develop the study protocol and materials. The workshop aimed to

gather the stakeholders' opinions to ensure that our study addressed their critical health issues and responded to their needs. We also invited them to discuss the questionnaire to receive their feedback on its contents and wording.

RESULTS

Drinking prevalence and characteristics

As shown in Table 1, 28.1% of the participants reported drinking 10 or more cans of beer or glasses of other alcoholic beverages on a typical day in the past three months. The prevalence of binge drinking was 76.7% among all FEWs, 81.4% among FEWs working in karaoke bars, 68.2% among FEWs working in restaurant/café, and 72.6% among FEWs working in other entertainment venues including beer gardens, massage parlors, and as freelance sex workers. Almost one in five (19.5%) reported having been forced to drink at least once a month in the past three months.

Table 1 Prevalence and characteristics of alcohol drinking among female entertainment workers stratified by type of entertainment venues

Alcohol drinking in the past three months	**Total (n = 600)**	**Type of entertainment venues**		
		Karaoke bar (*n* = 365)	**Restaurant/café (*n* = 173)**	**Other* (*n* = 62)**
Frequency of drinking at least one can of beer or one glass of wine				
Never	20 (3.3)	4 (1.1)	9 (5.2)	7 (11.3)
Once a month or less	35 (5.8)	18 (4.9)	14 (8.1)	3 (4.8)
2–4 times a month	82 (13.7)	53 (14.5)	24 (13.9)	5 (8.1)
2–3 times a week	93 (15.5)	62 (16.9)	29 (16.8)	2 (3.2)
4 or more times a week	370 (61.7)	228 (62.5)	97 (56.1)	45 (72.6)
Number of standard drinks containing alcohol on a typical day				

1 – 2	106 (18.3)	35 (9.7)	63 (38.4)	8 (14.6)
3 – 4	129 (22.2)	76 (21.1)	45 (27.4)	8 (14.6)
5 – 6	129 (22.2)	90 (24.9)	21 (12.8)	18 (32.7)
7 – 9	53 (9.1)	37 (10.3)	11 (6.7)	5 (9.1)
10 or more	163 (28.1)	123 (34.1)	24 (14.6)	16 (29.1)
Frequency of drinking more than 4 drinks in 24 hours				
Never	120 (20.7)	64 (17.7)	46 (28.1)	10 (18.2)
Less than once a month	39 (6.7)	23 (6.4)	15 (9.2)	1 (1.8)
Once a month	36 (6.2)	18 (4.9)	14 (8.6)	4 (7.3)
1 – 3 times a week	118 (20.3)	81 (22.4)	32 (19.5)	5 (9.1)
≥ 4 times a week	267 (46.0)	175 (48.5)	57 (34.8)	35 (63.6)
Had binge drinking at least once†	460 (76.7)	297 (81.4)	118 (68.2)	45 (72.6)
Frequency of forced drinking				
Never	404 (67.3)	245 (67.1)	116 (67.1)	43 (69.4)
≤ 1 time per month	117 (19.5)	75 (20.6)	33 (19.1)	9 (14.5)
> 1 time per month	79 (13.2)	45 (12.3)	24 (13.9)	10 (16.1)

Values are numbers (%).

* Other venues included beer gardens, massage parlors, and freelance.

† Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Sociodemographic characteristics

Table 2 shows that most of the participants (72.5%) were born in rural areas, and their mean age was 24.8 (standard deviation [SD] 4.0) years. More than half of them had six years of formal education or less, and 13% had finished grade 10 or higher. More than 40% of them had never been married, and 29.5% were currently married or cohabitated. The proportion of participants working in karaoke bars (64.6% vs.

48.6%), having monthly income of more than USD250 (42.0% vs. 29.3%), and having been forced to drink more than once a month in the past three months (16.1% vs. 3.6%) was significantly higher among binge drinkers than non-binge drinkers.

Table 2 Comparison of sociodemographic characteristics, GBV, and psychological distress among binge drinkers and non-binge drinkers

Characteristics	**Total**	**Binge drinking***		
	***n* = 600**	**Yes**	**No**	**P-value†**
		(*n* = 460)	**(*n* = 140)**	
Type of venue best describes the current job in the entertainment				0.002
Restaurant/café	173 (28.8)	118 (25.7)	55 (39.3)	
Karaoke bar	365 (60.8)	297 (64.6)	68 (48.6)	
Beer garden/massage parlor/freelance	62 (10.3)	45 (9.8)	17 (12.1)	
Age group in years (mean ± SD)	24.8 ± 4.0	24.9 ± 4.0	24.4 ± 4.1	0.19
18–24	280 (46.7)	214 (46.5)	66 (47.1)	0.52
25–29	239 (39.8)	180 (39.1)	59 (42.1)	
30–35	81 (13.5)	66 (14.4)	15 (10.7)	
Education level (in year)				0.15
Primary School (0–6)	309 (51.5)	245 (53.3)	64 (45.7)	
Secondary School (7–9)	213 (35.5)	161 (35.0)	52 (37.1)	
High School or above (≥ 10)	78 (13.0)	54 (11.7)	24 (17.1)	
Current marital status				0.80
Never married	243 (40.5)	183 (39.8)	60 (42.9)	
Currently married	180 (30.0)	139 (30.2)	41 (29.3)	

Widowed/divorced	177 (29.5)	138 (30.0)	39 (27.9)	
Level of monthly income (USD)				0.002
≤ 120	44 (7.3)	26 (5.7)	18 (12.9)	
121–250	322 (53.7)	241 (52.4)	81 (57.9)	
> 250	234 (39.0)	193 (42.0)	41 (29.3)	
Born in rural area	435 (72.5)	336 (73.0)	99 (70.7)	0.59
Current type of house				0.56
Their own/family house	77 (12.8)	55 (12.0)	22 (15.7)	
Rental house on their own	161 (26.8)	126 (27.4)	35 (25.0)	
Rental house with family	150 (25.0)	112 (24.4)	38 (27.1)	
Rental house with friends	55 (9.2)	41 (8.9)	14 (10.0)	
Dormitory at their workplace	157 (26.2)	126 (27.4)	31 (22.1)	
Number of children				0.36
0	305 (50.8)	229 (49.8)	76 (54.3)	
1	188 (31.3)	151 (32.8)	37 (26.4)	
≥ 2	107 (17.8)	80 (17.4)	27 (19.3)	
Duration of work as entertainment workers				0.62
Less than a year	226 (37.7)	171 (37.2)	55 (39.3)	
1 - 2 years	196 (32.7)	155 (33.7)	41 (29.3)	
More than 2 years	178 (29.7)	134 (29.1)	44 (31.4)	
GBV experiences in the past six months				0.047
Emotional abuse	70 (11.7)	62 (13.5)	8 (5.7)	
Forced substance use	34 (5.7)	25 (5.4)	9 (6.4)	
Physical abuse	28 (4.7)	24 (5.2)	4 (2.9)	
Forced sex	4 (0.7)	4 (0.9)	0 (0.0)	

High psychological distress (≥ 4)‡	235 (39.2)	171 (37.2)	64 (45.7)	0.007

Abbreviations: GBV, gender-based violence; SD, standard deviation.

Values are numbers (%) for continuous variables and mean (SD) for continuous variables.

* Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables, and Student's *t*-test was used for continuous variables.

‡ Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥4 was used to define "high psychological distress."

Prevalence of gender-based violence

Table 2 shows that 22.7% of participants reported having experienced GBV in the past six months, including emotional abuse (11.7%), forced substance use (5.7%), physical abuse (4.7%), and forced sex (0.7%). The proportion of emotional abuse (13.5% vs. 5.7%), physical abuse (5.2% vs. 2.9%), and forced sex (0.9% vs. 0.0%) in the past six months were higher among binge drinkers than non-binge drinkers. Sensitivity analyses, including only FEWs working in karaoke bars, showed similar sociodemographic characteristics, GBV experiences, and psychological distress. However, a significantly higher proportion of binge drinkers were born in rural areas than non-binge drinkers (73.4% vs. 57.4%) (Supplementary Table S1).

Sexual behaviors and condom use

As shown in Table 3, 25.5% of the study participants reported having sex with one or more commercial sex partners in the past three months. The proportion of participants who reported having sexual intercourse in the past three months (79.1% vs. 58.6%) and always using condoms when having sexual intercourse with non-commercial partners (19.2% vs. 14.3%) was significantly higher among binge

drinkers than non-binge drinkers. Overall, the characteristics of sexual behaviors and condom use of the total participants were similar to those of FEWs working in karaoke bars only (Supplementary Table S2).

Table 3 Comparison of sexual behaviors among binge drinkers and non-binge drinkers

Sexual behaviors in the past 3 months	**Total**	**Binge drinking***		
	(*n* = 600)	**Yes**	**No**	**P-value†**
		(*n* = 460)	**(*n* = 140)**	
Had sexual intercourse	446 (74.3)	364 (79.1)	82 (58.6)	<0.001
Condoms use in last sex with a non-commercial partner	98 (27.1)	85 (29.1)	13 (18.6)	0.08
Frequency of condom use with non-commercial partners				0.049
Always	66 (18.2)	56 (19.2)	10 (14.3)	
Frequently	8 (2.2)	7 (2.4)	1 (1.4)	
Sometimes	31 (8.6)	30 (10.3)	1 (1.4)	
Never	257 (71.0)	199 (68.2)	58 (82.9)	
Sex with commercial partners	153 (34.3)	130 (35.7)	23 (28.1)	0.19
Frequency of having sex with commercial partners				0.61
Daily/a few times a week/weekly	35 (22.9)	31 (23.9)	4 (17.4)	
Monthly	26 (17.0)	23 (17.7)	3 (13.0)	
Once in a while, when needed to	92 (60.1)	76 (58.5)	16 (69.6)	
Number of commercial sex partners				0.045
0 partner	447 (74.5)	330 (71.7)	117 (83.6)	
1 partner	64 (10.7)	54 (11.7)	10 (7.1)	
2–3 partners	46 (7.7)	40 (8.7)	6 (4.3)	
> 3 partners	43 (7.2)	36 (7.8)	7 (5.0)	

Condoms use in last sex with a commercial partner	142 (92.8)	120 (92.3)	22 (95.7)	0.57
Frequency of condom use with commercial partners				0.32
Always	119 (77.8)	98 (75.4)	21 (91.3)	
Frequently	8 (5.2)	8 (6.2)	0 (0.0)	
Sometimes	19 (12.4)	18 (13.9)	1 (4.4)	
Never	7 (4.6)	6 (4.6)	1 (4.4)	

Values are numbers (%).

* Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables.

Factors associated with binge drinking

Table 4 shows the results of bivariate and multiple logistic regression analyses. Bivariate analyses show that the odds of binge drinking in the past three months was significantly higher among participants with an average monthly income of >USD250 and USD121–250 than those with an average income of ≤USD120 (OR 3.26, 95% CI: 1.64–6.49; OR 2.06, 95% CI: 1.07–3.95), participants who experienced forced drinking more than once than those who did not experience it in the past three months (OR 5.68, 95% CI: 2.24–14.41), participants working in karaoke bars than those working at restaurants/cafés (OR 2.04, 95% CI: 1.34–3.08), and participants who experienced emotional abuse than those who did not experience it in the past six months (OR 2.57, 95% CI: 1.19–5.51).

Table 4 Factors associated with binge drinking among female entertainment workers (n = 600)

Characteristics	**Bivariate logistic regression**	**Multiple logistic regression***

	OR (95% CI)	P-value	AOR (95% CI)	P-value
Age (years)	1.03 (0.98–1.08)	0.19	1.02 (0.97–1.07)	0.46
Education level (in years)				
High school or above (≥10)	Reference		Reference	
Secondary school (7–9)	1.38 (0.78–2.44)	0.28	1.19 (0.64–2.20)	0.58
Primary school (0–6)	1.70 (0.98–2.96)	0.06	1.49 (0.82–2.71)	0.19
Average monthly income (USD)				
≤120	Reference		Reference	
121–250	2.06 (1.07–3.95)	0.03	1.98 (0.98–3.99)	0.06
>250	3.26 (1.64–6.49)	0.001	2.96 (1.40–6.24)	0.004
Level of psychological distress				
Higher (GHQ-12 ≥4)	Reference		Reference	
Lower (GHQ-12 ≤3)	1.42 (0.97–2.09)	0.07	1.65 (1.09–2.49)	0.02
Frequency of forced drinking in the past three months				
Never	Reference		Reference	
1 time per month	1.57 (0.95–2.59)	0.08	1.64 (0.96–2.78)	0.07
>1 time per month	5.68 (2.24–14.41)	<0.001	5.66 (2.19–14.65)	<0.001
Type of venue best describes the current job in the entertainment				
Restaurant/café	Reference		Reference	
Karaoke bar	2.04 (1.34–3.08)	0.001	1.85 (1.19–2.88)	0.006
Beer garden/massage parlor/freelance	1.23 (0.65–2.35)	0.52	0.92 (0.46–1.85)	0.82
Experience emotional abuse in the past six months				
No	Reference		Reference	
Yes	2.57 (1.19–5.51)	0.02	2.71 (1.22–6.02)	0.01

292 Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio.

[*] Adjusted for variables significantly associated with binge drinking at the *p*-value ≤0.20 in the bivariate logistic regression analyses and those that remained statistically significant in six multiple logistic regression models using the backward elimination method.

[†] Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥4 was used to define "high psychological distress."

After adjustment, the odds of binge drinking remained significantly higher among participants with an average monthly income of >USD250 than those with an average income of ≤USD120 (AOR 2.96, 95% CI: 1.40–6.24), participants who experienced forced drinking more than once per month than those who did not experience it in the past three months (AOR 5.66, 95% CI: 2.19–14.65), participants working in karaoke bars than those working at restaurants/cafés (AOR 1.85, 95% CI: 1.19–2.88), and participants who experienced emotional abuse than those who did not experience it in the past six months (AOR 2.71, 95% CI: 1.22–6.02). Interestingly, the odds of binge drinking were significantly higher among participants with lower psychological distress than those with higher psychological distress (AOR 1.65, 95% CI: 1.09–2.49).

Among participants who worked at karaoke bars, the odds of binge drinking were significantly higher among those who were born in rural areas than those who were born in urban areas (AOR 0.51, 95% CI: 0.28–0.92), had sexual intercourse in the past three months than those who did not (AOR 2.94, 95% CI: 1.64–5.29), and those with lower psychological distress than those with higher psychological distress (AOR 2.15, 95% CI: 1.22–3.81) (Supplemental Table S3).

DISCUSSION

This study explored the magnitude of binge drinking and its relationships with GBV, psychological distress, and sexual behaviors among FEWs in Cambodia, a key population working in an environment prone to HIV risks and substance abuse. We found an overall prevalence of binge drinking in the past three months of 76.7% and 81.4% among those who worked at karaoke bars. A prevalence of binge

drinking of 83.4% has been reported in another study of Cambodian FEWs who were more heavily engaged in commercial sex (reporting two or more different sexual partners within the last month).[12] In our study, only 25.5% of participants reported having sex with one or more commercial sex partners in the past three months, which may explain the difference in the binge-drinking prevalence. Consistent with our findings, the prevalence of alcohol drinking among FSWs in other countries also appears high, ranging from 67.8% to 88.5%.[6,9,10,38]

We identified a significant relationship between binge drinking among FEWs and higher monthly income. Evidence suggests that FEWs discuss receiving better tips from commercial sex partners or monetary incentives from their bosses for drinking.[5] FEWs also discussed how they use alcohol to reduce shyness to perform their job better.[5] These might explain the correlation between binge drinking and higher monthly income among FEWs in Cambodia. Another plausible explanation for this correlation was suggested in the literature, as other studies have noted this same pattern. Higher-income was associated with increases in higher-risk drinking among Kenyan FSWs.[8] As the level of risk for drinking increased, the median number of commercial sex partners also increased, from three in the past week among non-drinkers and low-risk drinkers to six partners in the past week among harmful drinkers.[8]

Our findings suggest that lower psychological distress was associated with binge drinking. FEWs who had lower psychological distress were 1.7 times more likely to report binge drinking than those who had higher psychological distress. A literature review shows that alcohol use was correlated with adverse mental health problems.[20] Therefore, we expected FEWs with higher psychological distress would be more likely to be binge drinkers. The possible explanation for our finding is that those who thought they had an issue with mental health might decide not to drink. Also, in a qualitative study in Cambodia, FEWs expressed feeling shy working in entertainment venues, and drinking alcohol helped them forget those feelings and perform the job better, resulting in better earnings.[5] Once FEWs earn better, they are less likely to be distressed, which may explain why those who have lower psychological distress were associated with binge drinking. This finding emphasizes the social need to support the FEWs with their health and psychological wellbeing in Cambodia.

In our study, FEWs who worked in karaoke bars had a higher propensity to engage in binge drinking than those who worked in restaurants/cafés, beer gardens, massage parlors, or freelance. This finding is consistent with previous studies, which have discussed how karaoke bars are not just a place where clients go for singing but also a place for drinking and entertaining with women.[17,39] In such settings, FEWs can also be pressured by supervisors and clients to drink.[17,39] Our findings also showed that FEWs who experienced forced drinking four times or more in the past three months were significantly more likely to report binge drinking. These findings highlight the need to target karaoke bars to improve their working conditions and reduce forced alcohol and drug use. Additionally, interventions that help FEWs transit to other safer occupations, such as hairdressing, should also be an alternative.

Binge drinkers reported experiencing more emotional abuse in the past six months than non-binge drinkers. Emotional abuse is a type of GBV that has received less attention from researchers, policymakers, and intervention programs. Emotional abuse is associated with several social, economic, and health problems.[40] In line with this finding, in a qualitative study in Cambodia, FEWs shared their experience in excessive drinking to cope with the challenges in life and jobs.[5] Similarly, a Tanzanian study showed that FSWs who reported hazardous or harmful drinking were two times more likely to experience GBV than those who reported less hazardous or harmful drinking.[41]

Alcohol consumption has been associated with the global burden of diseases and substantial health loss.[42] Alcohol consumption particularly becomes a significant public health concern among FSWs because hazardous and harmful drinking is correlated with sexual risk behaviors, such as condomless sex and a higher number of sexual partners, than those who were abstained from alcohol drinking.[8,43] Findings from this study provide important information for program implementation and policy to reduce the prevalence of binge drinking among FEWs in Cambodia. For instance, the high binge-drinking prevalence among Cambodian FEWs implicates the need for occupational health intervention programs to mitigate alcohol use among FEWs. For instance, the WHO's Brief Intervention for Hazardous and Harmful Drinking[19] effectively reduced self-reporting alcohol consumption among non-dependent and non-treatment-seeking FSWs in Mombasa, Kenya.[44] Additionally, findings from our study indicate that

individual-level interventions would not be sufficient to reduce binge alcohol consumption among FEWs in Cambodia. It requires interventions addressing the structural and social contexts.[45]

This study has several limitations. Firstly, the study's cross-sectional design did not allow us to draw a causal inference between risk factors and binge drinking. Secondly, social desirability bias[46] might be present since we asked women about sensitive issues such as GBV, sexual practices, and substance use. Women might be less likely to report this type of sensitive information, resulting in underestimating the prevalence of the study variables. Moreover, since half of the participants received an intervention, they might be more likely to have been exposed to health education than other FEWs who were not. Therefore, the results from this study might not be generalizable to other FEWs in Cambodia. The small sample size in some sub-populations is another limitation of this study. For instance, FEWs working in beer gardens are likely to be involved in heavy alcohol drinking at work. However, we grouped them with FEWs working in massage parlors and as freelance sex workers due to the small sample size. Finally, we could not include physical and sexual abuse in the multiple logistic regression, given the small sample size.

CONCLUSIONS

This study highlights a relatively high prevalence of binge drinking among FEWs in Cambodia. Factors associated with binge drinking were those linked to working environments and working conditions. Binge drinking was mainly reported by FEWs working in karaoke bars and those who experienced forced drinking as part of the job requirement. FEWs who experienced emotional abuse, defined as verbal threats or having the ability to leave the house not being under their control, were more likely to experience binge drinking than those who did not experience it. These findings can be used to design interventions to reduce binge drinking among FEWs by providing safer working environments and addressing work-related violence, such as emotional abuse by clients and entertainment establishment managers. Our study suggests that individual-based behavioral interventions may not be sufficient in reducing binge drinking

among FEWs unless accompanied by structural and occupational health policy interventions that change these exploitative working environments.

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Contributors CB and SY conceived the parent study, obtained the research grant, and supervised the project implementation. ST and PC were responsible for project implementation, training, and data collection. SO conducted literature reviews analyzed the data and drafted the manuscript. PMG advised on the study design, data analyses, and manuscript writing. All authors provided critical comments for revisions and approved the final manuscript. SY confirmed that he has full access to all data and final responsibility for the decision to submit for publication.

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Competing interest None declared.

Patient consent for publication Not required.

Ethics approval The National Ethics Committee for Health Research (No. 142NECHR) of the Ministry of Health in Cambodia, the Institutional Review Board of Touro University California (No. PH-0117), and the University of California, Los Angeles (No. 20-001053) approved this study.

Data availability statement: Data used for this study can be accessed upon request from the Principal Investigator (Dr. Siyan Yi) at siyan@doctor.com.

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Supplementary Tables

Table S1 Comparison of socio-demographic characteristics, GBV, and psychological distress among binge drinkers and non-binge drinkers who worked in karaoke bars

Characteristics	Total	Binge drinking*		
	(*n* = 365)	Yes (*n* = 297)	No (*n* = 68)	P-value†
Age group in years (mean ± SD)	25.1 ± 4.0	25.2 ± 3.9	24.4 ± 4.2	0.11
18–24	162 (44.4)	127 (42.8)	35 (51.5)	0.42
25–29	144 (39.5)	120 (40.4)	24 (35.3)	
30–35	59 (16.2)	50 (16.8)	9 (13.2)	
Education level (in year)	5.9 ± 2.9	5.9 ± 2.9	6.5 ± 3.2	0.09
Primary School (0–6)	199 (54.5)	168 (56.6)	31 (45.6)	0.18
Secondary School (7–9)	125 (34.3)	99 (33.3)	26 (38.2)	
High School or above (≥ 10)	41 (11.2)	30 (10.1)	11 (16.2)	
Current marital status				0.24
Never married	156 (42.7)	121 (40.7)	35 (51.5)	
Currently married	99 (27.1)	82 (27.6)	17 (25.0)	
Widowed/divorced	110 (30.1)	94 (31.7)	16 (23.5)	
Level of monthly income (USD)				0.86
≤ 120	22 (6.0)	17 (5.7)	5 (7.4)	
121–250	195 (53.4)	160 (53.9)	35 (51.5)	
> 250	148 (40.6)	120 (40.4)	28 (41.2)	
Born in rural area	257 (70.4)	218 (73.4)	39 (57.4)	0.009
Current type of house				0.36
Their own/family house	36 (9.9)	28 (9.4)	8 (11.8)	

Rental house on their own	83 (22.7)	66 (22.2)	17 (25.0)	
Rental house with family	82 (22.5)	63 (21.2)	19 (27.9)	
Rental house with friends	34 (9.3)	27 (9.1)	7 (10.3)	
Dormitory at their workplace	130 (35.6)	113 (38.1)	17 (25.0)	
Number of children				0.16
0	189 (51.8)	148 (49.8)	41 (60.3)	
1	112 (30.7)	92 (30.9)	20 (29.4)	
≥ 2	64 (17.5)	57 (19.2)	7 (10.3)	
Duration of work as entertainment workers				0.72
Less than a year	135 (36.9)	107 (36.0)	28 (41.2)	
1 - 2 years	123 (33.7)	102 (34.3)	21 (30.9)	
More than 2 years	107 (29.3)	88 (29.6)	19 (27.9)	
GBV experiences in the past six months				0.37
Emotional abuse	38 (10.4)	34 (11.5)	4 (5.9)	
Physical abuse	19 (5.2)	16 (5.4)	3 (4.4)	
Forced substance use	15 (4.1)	10 (3.4)	5 (7.4)	
Forced sex	2 (0.6)	2 (0.7)	0 (0.0)	
High psychological distress (≥ 4)[‡]	134 (36.7)	100 (33.7)	34 (50.0)	0.01

GBV, gender-based violence; SD, standard deviation.

Values are numbers (%) for continuous variables and mean (SD) for continuous variables.

[*] Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

[†] Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables, and Student's *t*-test was used for continuous variables.

‡ Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥ 4 was used to define "high psychological distress."

Table S2 Comparison of sexual behaviors among binge drinkers and non-binge drinkers who worked in karaoke bars

Sexual behaviors in the past 3 months	**Total** (*n* = 365)	**Binge drinking***		
		Yes (*n* = 297)	**No** (*n* = 68)	**P-value†**
Had sexual intercourse	264 (72.3)	228 (76.8)	36 (52.9)	<0.001
Condoms use in last sex with a non-commercial partner	66 (30.7)	59 (32.2)	7 (21.9)	0.24
Frequency of condom use with non-commercial partners				0.04
Always	45 (20.9)	41 (22.4)	4 (12.5)	
Frequently	8 (3.7)	7 (3.8)	1 (3.1)	
Sometimes	23 (10.7)	23 (12.6)	0 (0.0)	
Never	139 (64.7)	112 (61.2)	27 (84.4)	
Sex with commercial partners	100 (37.9)	90 (39.5)	10 (27.8)	0.18
Frequency of having sex with commercial partners				0.09
Daily/a few times a week/weekly	18 (18.0)	18 (20.0)	0 (0.0)	
Monthly	15 (15.0)	15 (16.7)	0 (0.0)	
Once in a while when needed to	67 (67.0)	57 (63.3)	10 (100)	
Number of commercial sex partners				0.03
0 partner	265 (72.6)	207 (69.7)	58 (85.3)	
1 partner	47 (12.9)	41 (13.8)	6 (8.8)	
2–3 partners	32 (8.8)	28 (9.4)	4 (5.9)	
> 3 partners	21 (5.8)	21 (7.1)	0 (0.0)	
Condoms use in last sex with a	89 (89.0)	80 (88.9)	9 (90.0)	1.00

commercial partner				
Frequency of condom use with commercial partners				0.52
Always	77 (77.0)	68 (75.6)	9 (90.0)	
Frequently	3 (3.0)	3 (3.3)	0 (0.0)	
Sometimes	14 (14.0)	14 (15.6)	0 (0.0)	
Never	6 (6.0)	5 (5.6)	1 (10.0)	

Values are numbers (%) for continuous variables and mean (SD) for continuous variables.

* Binge drinking was defined as drinking more than four units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables

Table S3 Factors associated with binge drinking among Karaoke female entertainment workers (n = 365)

Characteristics	Bivariate logistic regression		Multiple logistic regression*	
	OR (95% CI)	**P-value**	**AOR (95% CI)**	**P-value**
Age (years)	1.05 (0.99 – 1.13)	0.11	1.01 (0.94 – 1.09)	0.73
Education level (in years)				
High school or above (≥ 10)	Reference		Reference	
Secondary school (7–9)	1.39 (0.62 – 3.15)	0.42	1.27 (0.53 – 3.05)	0.59
Primary school (0–6)	1.99 (0.90 – 4.38)	0.09	1.62 (0.68 – 3.85)	0.27
Place of birth				
Rural	Reference		Reference	
Urban	0.49 (0.28 – 0.84)	0.01	0.51 (0.28 – 0.92)	0.03
Had sexual intercourse in the past three months				
No	Reference			
Yes	2.94 (1.69 – 5.06)	<0.001	2.94 (1.64 – 5.29)	<0.001
Level of psychological distress				
Higher (GHQ-12 ≥ 4)	Reference		Reference	
Lower (GHQ-12 ≤ 3)	1.97 (1.16 – 3.36)	0.013	2.15 (1.22 – 3.81)	0.01

AOR, adjusted odds ratio; CI, confidence interval; GHQ, General Health Questionnaire; OR, odds ratio.

* Adjusted for variables significantly associated with binge drinking at the p-value ≤ 0.20 in the bivariate logistic regression analyses and those that remained statistically significant in six multiple logistic regression models using the backward elimination method.

† Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥ 4 was used to define "high psychological distress."

Reporting checklist for cross sectional study.

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		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	4 – 6
Objectives	#3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	#4	Present key elements of study design early in the paper	6
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	7
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7 – 8
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	7 – 8
Bias	#9	Describe any efforts to address potential sources of bias	7
Study size	#10	Explain how the study size was arrived at	6 – 7
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	9
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	9
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	n/a (small sample size)
Statistical methods	#12c	Explain how missing data were addressed	n/a (no missing data)
Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	n/a
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	n/a (already mentioned in method)
Participants	#13b	Give reasons for non-participation at each stage	n/a

Participants	#13c	Consider use of a flow diagram	n/a
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	11 – 13
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	n/a
Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	16 – 18
Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	16 – 18
Main results	#16b	Report category boundaries when continuous variables were categorized	16 – 17
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
Discussion			
Key results	#18	Summarise key results with reference to study objectives	18 – 20
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	20
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	21
Generalisability	#21	Discuss the generalisability (external validity) of the study results	20
Other Information			

Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

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Gender-based violence, psychological distress, sexual behaviors, and binge drinking among female entertainment workers in Cambodia: A cross-sectional study

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Gender-based violence, psychological distress, sexual behaviors, and binge drinking among female entertainment workers in Cambodia: A cross-sectional study

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ABSTRACT

Objective To examine the relationship between gender-based violence, HIV risks, psychological distress, and binge drinking among female entertainment workers (FEWs) in Cambodia.

Design Cross-sectional study.

Setting Phnom Penh and three other provinces in Cambodia.

Participants We recruited 600 FEWs from entertainment venues using a stratified random sampling method. Participants were eligible if they were at least 18 years old, working in the selected entertainment venues, and self-identified as a FEW.

Primary outcome measure Binge drinking was defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Results The prevalence of binge drinking was 76.7%. Adjusted odds of binge drinking were significantly higher among FEWs who earned >USD250 per month than those who earned ≤USD120 per month (adjusted odds ratio [AOR] 2.96, 95% CI: 1.40–6.24), had been forced to drink more than once per month in the past three months than those who had never been forced to drink (AOR 5.66, 95% CI: 2.19–14.65), worked at karaoke bars than those working at a restaurants/café (AOR 1.85, 95% CI: 1.19–2.88), and experienced emotional abuse in the past six months than those who did not experience it (AOR 2.71, 95% CI: 1.22–6.02). The odds of binge drinking were significantly higher among FEWs with lower psychological distress than those with higher psychological distress (AOR 1.65, 95% CI: 1.09–2.49).

Conclusions This study highlights a high prevalence of binge drinking among FEWs and its associations with working environments, conditions, and contexts. Our findings suggest that individual-based behavioral intervention may not effectively reduce binge drinking among FEWs. Structural and occupational health policy interventions may be needed to change the working environment.

Keywords: Female sex workers, mental health, substance abuse, violence exposure, HIV risk, Asia

Strengths and limitations of this study

- This is one of the few studies that determine the factors associated with binge drinking among female entertainment workers in Cambodia.
- We used the validated measures of binge drinking and psychological distress that allowed us to compare the prevalence of these variables to other studies.
- Binge drinking and other sexual practices data were self-reported; therefore, they may be subject to social desirability bias.
- The study's cross-sectional design did not allow us to draw a causal inference.

INTRODUCTION

Female entertainment workers (FEWs) in Cambodia are disproportionately experienced issues such as violence, sexual harassment, rights abuses, and lack of access to health services.[1] Many FEWs work in alcohol-based entertainment venues such as karaoke bars, massage parlors, restaurants, or beer gardens.[2,3] The FEW populations also include women working as freelance sex workers in public places, including streets, parks, or on call.[4] Frequently, FEWs are pressured to alcohol drinking during working hours, especially by their clients and supervisors.[5] Studies have reported high alcohol consumption rates among women working in the sex and entertainment industry across many countries.[6–11] In the baseline survey of the Cambodian Integrated HIV and Drug Use Prevention Intervention, 83.4% of FEWs aged ≥ 18 with ≥ 2 sexual partners or transactional sex within the last month reported binge drinking, defined as having more than five alcoholic drinks on at least one occasion in the past three months.[12] Moreover, 23.7% of sex workers aged less than 29-year-old reported being drunk for more than 20 days in the last month.[13] A similar study found that 33.1% of FEWs had been forced to drink alcohol more than once a month.[14]

Excessive drinking is correlated with adverse health and social outcomes among female sex workers (FSWs) in other countries. Alcohol use may negatively influence the ability of FSWs to negotiate safer sex with commercial sex partners.[15–18] For instance, a cohort study of Kenyan FSWs found that hazardous and harmful drinking, as defined by having an Alcohol Use Disorders Identification Test (AUDIT) score between 8 to 15 for hazardous drinking and having an AUDIT score ≥16 for harmful drinking, which includes alcohol dependence,[19] was associated with unprotected sex and a higher number of sex partners than non-drinkers.[8] A systematic literature review identified the health impacts of alcohol use among FSWs. The impacts include adverse physical health such as fatigue, sleep problems, acute intoxication, and chronic alcoholic cirrhosis.[20] Alcohol drinking was also associated with mental health problems, sexual-violence victimization, condomless sex, HIV, and other sexually transmitted infections (STIs).[20] Likewise, a study among FSWs in China found that problem drinking (risk drinking, heavy drinking, and hazardous drinking) was associated with unprotected sex and an STIs history.[21]

Furthermore, alcohol drinking was associated with illicit drug use and heavy cigarette smoking among FSWs in India and Nigeria.[9,20,22]

In Cambodia, the FEW populations have grown significantly over the past decade, from approximately 40,000 in 2014 to 70,000 in 2019.[1,14] It is worth noting that most FEWs are migrants from rural low-income families and have to provide regular financial support to their families.[23] The pathway from rural community livelihood to the entertainment sector is common among most FEWs.[14] Transactional sex is also common among FEWs.[4] For example, the proportion of FEWs who reported having sex in exchange for money or gifts with commercial sex partners in the past three months ranged from 22.5% to 28.1%.[3,24,25] The growing number of FEWs means more effort is needed to provide resources and health care for this population.

FEWs are generally at a greater risk of contracting HIV and other STIs than the general women population due to the nature of their work.[26] In Cambodia, the estimated HIV prevalence among pregnant women attending antenatal care aged 15-49 years was 0.6% in 2016.[27] The prevalence among FEWs was 3.2% in the same year.[4] Gender-based violence (GBV) among FEWs is also prevalent.[28] A Cambodian study found that 60.5% of FEWs experienced a form of GBV in their lifetime, and 37.5% experienced it in the past six months.[29] Additional to occupational risks, FEWs suffer from social stigma and discrimination, resulting in various forms of abuse and harassment in workplaces and communities and by law-enforcement authorities because of the illegality of sex work.[30] A study found that 43.2% of FEWs in Cambodia reported having psychological distress, 19.5% having suicidal thoughts, and 7.3% attempting to commit suicide in the past three months.[3]

Heavy alcohol drinking has been shown to increase the FEWs' risk of contracting HIV and other STIs by limiting FEWs' ability to successfully negotiate and use condoms with partners.[31] Examining factors associated with binge drinking among FEWs is essential to design an effective intervention to reduce the binge drinking prevalence that would, in turn, reduce the incidence of HIV and STIs in this population. A recent qualitative study reported several factors linked to binge drinking among FEWs in Cambodia, such as experiencing economic shock, sustaining a family income, experiencing psychological

distress, working better, and drinking for social life.[5] No previous quantitative studies have identified factors associated with binge drinking among FEWs in Cambodia. Therefore, this study examined the associations between socio-demographic characteristics, mental health-related factors, sexual risk behaviors, GBV, and binge drinking among FEWs in Cambodia.

METHODS

Design and study population

Data were collected in November 2018 as part of the mid-term survey of the *Mobile Link* trial.[32] The trial was a multisite, single-blinded randomized controlled trial with two arms. Six hundred FEWs were randomly assigned to the arms – 300 for the intervention and 300 for the control arms. FEWs assigned to the intervention arm received either short messages or voice messages, depending on their choices. FEWs in the control arm received the existing standard health care provided by the government and non-governmental organizations (NGOs). Standard health care included access to HIV and sexual and reproductive health services, including free HIV and STIs testing, counseling, and sexual and reproductive health services. The trial was implemented in Phnom Penh and three other provinces: Battambang, Banteay Meanchey, and Siem Reap. Details of the *Mobile Link* trial have been published elsewhere.[32]

Sample and sampling procedures

This study employed a stratified random sampling to recruit FEWs from entertainment venues. First, we purposively selected the capital city and three provinces because of their large FEW population sizes and high HIV burdens. Second, two study sites (operational districts) were purposively selected from the capital city and one from each province. Third, entertainment venues were classified by venue types based on a list of all entertainment venues in the study obtained from the geographic information system mapping of HIV key populations in Cambodia.[33] Finally, a probability proportional to size sampling method was used to randomly select FEWs from the selected venues according to their type and size.

Female interviewers approached the selected FEWs to conduct the interviews. FEWs were eligible for the study if they (a) were at least 18 years old at the time of the interview, (b) were working in the selected entertainment venues, (c) were able to communicate in Khmer, (d) could provide written informed consent to participate in the study, and (e) agreed to present themselves on the day of the interview.

Data collection training and procedures

Female data collectors who previously worked with the research team on studies related to HIV, substance abuse, and GBV among key populations in Cambodia were recruited. The data collection team received one-day training on interview techniques, confidentiality, privacy assurance, and quality control skills. The interview was conducted in a place of their choice and took approximately 30 minutes per participant. The participants received US$5 as time compensation.

Questionnaire development

A structured questionnaire was developed in English and translated into Khmer, the Cambodian national language. Back-translation from Khmer to English was conducted to ensure that the contents and meaning of the original questionnaire were maintained. The Khmer questionnaire was then pretested to ensure that the participants understood the questionnaire and that the contents were culturally appropriate. The Kobo Humanitarian Response platform was used to program the questionnaire, and the questionnaire was downloaded into the KoBoCollect application installed on tablets.

Outcome variable measure

Alcohol drinking was assessed using the AUDIT-Consumption.[34] The participants were first asked how often they drank at least one can or one small bottle of beer or one glass of other alcoholic beverages in the past three months. If the participant responded to any quantity (once a month or less, 2–4 times a month, 2–3 times a week, and ≥4 times a week), the participants were then asked, “how often did you have more than five units of alcoholic drinks in 24 hours in the past three months.” Binge drinking was

defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Independent variables measure

The independent variables of interest comprised sociodemographic characteristics, including age groups (18-24, 25-29, 30-35), education levels (primary school, secondary school, high school or above), current marital status (never married, currently married, widowed/divorced), average monthly income in the past six months (≤ US$120, US$121-250, >UD$250), place of birth (rural, urban), number of children (0, 1, ≥2), entertainment venue (restaurant/café, karaoke bar, beer garden, massage parlor, freelance), and working duration as an entertainment worker (<1 year, 1-2 years, >2 years). We also collected information on transactional sex (yes, no), the number of sexual partners (0, 1, 2-3, >3), and the frequency of condom use with non-commercial and commercial partners (always, frequently, sometimes, never) in the past three months.

Regarding GBV, we assessed FEWs' experiences of emotional abuse, forced substance use, physical abuse, and forced sex using three questions for each type of GBV with multiple-choice response options. The questions were (1) "What type of violence, if any, have you ever experienced in your lifetime?"; (2) "What type of violence, if any, have you experienced in the past six months?"; and (3) "Who was the main perpetrator of the violence?" We classified GBV experiences into four categories: (1) emotional abuse (verbal threats or controlling the ability to leave the house by commercial sex partners, non-commercial sex partners, husbands, entertainment establishment owners, or managers), (2) physical abuse (beating, kicking, or hitting by commercial sex partners, non-commercial sex partners, or husbands), (3) forced sex (by commercial sex partners, non-commercial sex partners, or husbands), and (4) forced substance use (alcohol and drugs by commercial sex partners, non-commercial sex partners, or husbands).

Psychological distress was measured using the 12-item General Health Questionnaire (GHQ-12).[35] The GHQ-12 consists of 12 questions assessed on a four-point Likert scale, ranging from 0 to 3. Scoring was conducted through a method of the '0-0-1-1.' Those who responded 0 or 1 were coded as "0" and

those who responded 2 or 3 were coded as "1." This method was used to avoid biases resulting from the tendency that participants choose to respond 0 and 3 or 1 and 2.[36] The mean of the total score for the entire sample was used as the cut-off to define lower or higher psychological distress among the respondents. The GHQ-12 score of ≤3 was defined as "low psychological distress," and ≥4 or more was defined as "high psychological distress."[37] The Cronbach's alpha for the GHQ-12 among this study's participants was 0.69.

Statistical analyses

Data were imported in Excel for editing to ensure accuracy, consistency, and completeness. The data were then imported into STATA 14 (Stata Corporation, Texas, USA). We conducted descriptive statistics to describe the prevalence and characteristics of alcohol drinking among the participants. We used the Chi-square test (or Fisher's exact test when the sample sizes were smaller than five in one cell) for categorical variables and Student's *t*-test for continuous variables to compare the sociodemographic characteristics, entertainment work, GBV experiences, psychological distress, and sexual behavior characteristics among binge drinkers and non-binge drinkers.

We performed bivariate and multiple logistic regression analyses to examine the associated factors of binge drinking in the total sample of 600 FEWs and among a subgroup of 365 FEWs working in karaoke bars. In the multiple logistic regression, we first included age, education, and all variables significantly associated with binge drinking at the *p*-value <0.20 in the bivariate logistic regression analyses in the model. Then we used the backward elimination method to eliminate variables with the highest *p*-value one-by-one from the multiple logistic regression models. Overall, five multiple logistic regression models were run. The final multiple logistic regression models were evaluated according to the model calibration with Hosmer-Lemeshow goodness-of-fit (*p*-value >0.05)[38]. The odds ratios (OR) and adjusted odds ratio (AOR) with their 95% confidence interval (95% CI) were calculated. In addition, we conducted sensitivity analyses, including only FEWs working in karaoke bars, given their large sample

and nature of their work that may uniquely expose them to binge drinking, GBV, psychological distress, and sexual risks.

Ethical considerations

Participation was voluntary, and participants could refuse or discontinue the participation anytime. Regardless of their literacy, the interviewers verbally briefed all the participants about the study's objectives and anticipated risks and benefits of their participation. Thereafter, written informed consent was obtained from all the participants. In case a participant could not sign, the interviewer would sign on their behalf with their agreement. To ensure the participants' privacy and confidentiality, we conducted interviews at a private place and assigned personal identification numbers in place of their identifiers. Participants were offered escorted referrals to peer counselors and required services upon request.

Patients and public involvement

Representatives of FEWs and community-based organizations were involved in designing, conducting, and disseminating our research. We invited the key stakeholder representatives to a consultative workshop to design the study and develop the study protocol and materials. The workshop aimed to gather the stakeholders' opinions to ensure that our study addressed their critical health issues and responded to their needs. We also invited them to discuss the questionnaire to receive their feedback on its contents and wording.

RESULTS

Drinking prevalence and characteristics

As shown in Table 1, 28.1% of the participants reported drinking 10 or more cans of beer or glasses of other alcoholic beverages on a typical day in the past three months. The prevalence of binge drinking was 76.7% among all FEWs, 81.4% among FEWs working in karaoke bars, 68.2% among FEWs working in restaurants/cafés, and 72.6% among FEWs working in other entertainment venues, including beer

gardens, massage parlors, and as freelance sex workers. Almost one in five (19.5%) reported having been forced to drink at least once a month in the past three months.

Table 1 Prevalence and characteristics of alcohol drinking among female entertainment workers stratified by type of entertainment venues

Alcohol drinking in the past three months	**Total (n = 600)**	**Type of entertainment venues**		
		Karaoke bar (*n* = 365)	**Restaurant/café (*n* = 173)**	**Other* (*n* = 62)**
Frequency of drinking at least one can of beer or one glass of wine				
Never	20 (3.3)	4 (1.1)	9 (5.2)	7 (11.3)
Once a month or less	35 (5.8)	18 (4.9)	14 (8.1)	3 (4.8)
2–4 times a month	82 (13.7)	53 (14.5)	24 (13.9)	5 (8.1)
2–3 times a week	93 (15.5)	62 (16.9)	29 (16.8)	2 (3.2)
4 or more times a week	370 (61.7)	228 (62.5)	97 (56.1)	45 (72.6)
Number of standard drinks containing alcohol on a typical day				
1 – 2	106 (18.3)	35 (9.7)	63 (38.4)	8 (14.6)
3 – 4	129 (22.2)	76 (21.1)	45 (27.4)	8 (14.6)
5 – 6	129 (22.2)	90 (24.9)	21 (12.8)	18 (32.7)
7 – 9	53 (9.1)	37 (10.3)	11 (6.7)	5 (9.1)
10 or more	163 (28.1)	123 (34.1)	24 (14.6)	16 (29.1)
Frequency of drinking more than five drinks in 24 hours				
Never	120 (20.7)	64 (17.7)	46 (28.1)	10 (18.2)
Less than once a month	39 (6.7)	23 (6.4)	15 (9.2)	1 (1.8)
Once a month	36 (6.2)	18 (4.9)	14 (8.6)	4 (7.3)
1 – 3 times a week	118 (20.3)	81 (22.4)	32 (19.5)	5 (9.1)

≥ 4 times a week	267 (46.0)	175 (48.5)	57 (34.8)	35 (63.6)
Had binge drinking at least once†	460 (76.7)	297 (81.4)	118 (68.2)	45 (72.6)
Frequency of forced drinking				
Never	404 (67.3)	245 (67.1)	116 (67.1)	43 (69.4)
≤ 1 time per month	117 (19.5)	75 (20.6)	33 (19.1)	9 (14.5)
> 1 time per month	79 (13.2)	45 (12.3)	24 (13.9)	10 (16.1)

Values are numbers (%).

* Other venues included beer gardens, massage parlors, and freelance.

† Binge drinking was defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

Sociodemographic characteristics

Table 2 shows that most of the participants (72.5%) were born in rural areas, and their mean age was 24.8 (standard deviation [SD] 4.0) years. More than half of them had six years of formal education or less, and 13% had finished grade 10 or higher. More than 40% of them had never been married, and 29.5% were currently married or cohabitated. The proportion of participants working in karaoke bars (64.6% vs. 48.6%), having monthly income of more than USD250 (42.0% vs. 29.3%), and having been forced to drink more than once a month in the past three months (16.1% vs. 3.6%) was significantly higher among binge drinkers than non-binge drinkers.

Table 2 Comparison of sociodemographic characteristics, GBV, and psychological distress among binge drinkers and non-binge drinkers

Characteristics	**Total**	**Binge drinking***		
	***n* = 600**	**Yes**	**No**	**P-value†**
		(*n* = 460)	**(*n* = 140)**	

Type of venue best describes the current job in the entertainment				0.002
Restaurant/café	173 (28.8)	118 (25.7)	55 (39.3)	
Karaoke bar	365 (60.8)	297 (64.6)	68 (48.6)	
Beer garden/massage parlor/freelance	62 (10.3)	45 (9.8)	17 (12.1)	
Age group in years (mean ± SD)	24.8 ± 4.0	24.9 ± 4.0	24.4 ± 4.1	0.19
18–24	280 (46.7)	214 (46.5)	66 (47.1)	0.52
25–29	239 (39.8)	180 (39.1)	59 (42.1)	
30–35	81 (13.5)	66 (14.4)	15 (10.7)	
Education level (in year)				0.15
Primary School (0–6)	309 (51.5)	245 (53.3)	64 (45.7)	
Secondary School (7–9)	213 (35.5)	161 (35.0)	52 (37.1)	
High School or above (≥ 10)	78 (13.0)	54 (11.7)	24 (17.1)	
Current marital status				0.80
Never married	243 (40.5)	183 (39.8)	60 (42.9)	
Currently married	180 (30.0)	139 (30.2)	41 (29.3)	
Widowed/divorced	177 (29.5)	138 (30.0)	39 (27.9)	
Level of monthly income (US$)				0.002
≤ 120	44 (7.3)	26 (5.7)	18 (12.9)	
121–250	322 (53.7)	241 (52.4)	81 (57.9)	
> 250	234 (39.0)	193 (42.0)	41 (29.3)	
Born in rural area	435 (72.5)	336 (73.0)	99 (70.7)	0.59
Current type of house				0.56
Their own/family house	77 (12.8)	55 (12.0)	22 (15.7)	
Rental house on their own	161 (26.8)	126 (27.4)	35 (25.0)	

Rental house with family	150 (25.0)	112 (24.4)	38 (27.1)	
Rental house with friends	55 (9.2)	41 (8.9)	14 (10.0)	
Dormitory at their workplace	157 (26.2)	126 (27.4)	31 (22.1)	
Number of children				0.36
0	305 (50.8)	229 (49.8)	76 (54.3)	
1	188 (31.3)	151 (32.8)	37 (26.4)	
≥ 2	107 (17.8)	80 (17.4)	27 (19.3)	
Duration of work as entertainment workers				0.62
Less than a year	226 (37.7)	171 (37.2)	55 (39.3)	
1 - 2 years	196 (32.7)	155 (33.7)	41 (29.3)	
More than 2 years	178 (29.7)	134 (29.1)	44 (31.4)	
GBV experiences in the past six months				0.047
Emotional abuse	70 (11.7)	62 (13.5)	8 (5.7)	
Forced substance use	34 (5.7)	25 (5.4)	9 (6.4)	
Physical abuse	28 (4.7)	24 (5.2)	4 (2.9)	
Forced sex	4 (0.7)	4 (0.9)	0 (0.0)	
High psychological distress (≥ 4)‡	235 (39.2)	171 (37.2)	64 (45.7)	0.007

Abbreviations: GBV, gender-based violence; SD, standard deviation.

Values are numbers (%) for continuous variables and mean (SD) for continuous variables.

* Binge drinking was defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables, and Student's *t*-test was used for continuous variables.

‡ Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥4 was used to define "high psychological distress."

Prevalence of gender-based violence

Table 2 shows that 22.7% of participants reported having experienced GBV in the past six months, including emotional abuse (11.7%), forced substance use (5.7%), physical abuse (4.7%), and forced sex (0.7%). In the past six months, the proportion of emotional abuse (13.5% vs. 5.7%) and physical abuse (5.2% vs. 2.9%) was higher among binge drinkers than non-binge drinkers. Sensitivity analyses, including only FEWs working in karaoke bars, showed similar sociodemographic characteristics, GBV experiences, and psychological distress. However, a significantly higher proportion of binge drinkers were born in rural areas than non-binge drinkers (73.4% vs. 57.4%) (Supplementary Table S1).

Sexual behaviors and condom use

As shown in Table 3, 25.5% of the study participants reported having sex with one or more commercial sex partners in the past three months. The proportion of participants who reported having sexual intercourse in the past three months (79.1% vs. 58.6%) and always using condoms when having sexual intercourse with non-commercial partners (19.2% vs. 14.3%) was significantly higher among binge drinkers than non-binge drinkers. Overall, sexual behaviors and condom use of the total participants were similar to those of FEWs working in karaoke bars only (Supplementary Table S2).

Table 3 Comparison of sexual behaviors among binge drinkers and non-binge drinkers

Sexual behaviors in the past 3 months	**Total**	**Binge drinking***		
	(*n* = 600)	**Yes**	**No**	**P-value†**
		(*n* = 460)	**(*n* = 140)**	
Had sexual intercourse	446 (74.3)	364 (79.1)	82 (58.6)	<0.001
Condoms use in last sex with a non-commercial partner	98 (27.1)	85 (29.1)	13 (18.6)	0.08
Frequency of condom use with non-commercial partners				0.049

Always	66 (18.2)	56 (19.2)	10 (14.3)	
Frequently	8 (2.2)	7 (2.4)	1 (1.4)	
Sometimes	31 (8.6)	30 (10.3)	1 (1.4)	
Never	257 (71.0)	199 (68.2)	58 (82.9)	
Sex with commercial partners	153 (34.3)	130 (35.7)	23 (28.1)	0.19
Frequency of having sex with commercial partners				0.61
Daily/a few times a week/weekly	35 (22.9)	31 (23.9)	4 (17.4)	
Monthly	26 (17.0)	23 (17.7)	3 (13.0)	
Once in a while, when needed to	92 (60.1)	76 (58.5)	16 (69.6)	
Number of commercial sex partners				0.045
0 partner	447 (74.5)	330 (71.7)	117 (83.6)	
1 partner	64 (10.7)	54 (11.7)	10 (7.1)	
2–3 partners	46 (7.7)	40 (8.7)	6 (4.3)	
> 3 partners	43 (7.2)	36 (7.8)	7 (5.0)	
Condoms use in last sex with a commercial partners	142 (92.8)	120 (92.3)	22 (95.7)	0.57
Frequency of condom use with commercial partners				0.32
Always	119 (77.8)	98 (75.4)	21 (91.3)	
Frequently	8 (5.2)	8 (6.2)	0 (0.0)	
Sometimes	19 (12.4)	18 (13.9)	1 (4.4)	
Never	7 (4.6)	6 (4.6)	1 (4.4)	

Values are numbers (%).

* Binge drinking was defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables.

Factors associated with binge drinking

Table 4 shows the results of bivariate and multiple logistic regression analyses. Bivariate analyses show that the odds of binge drinking in the past three months were significantly higher among participants with an average monthly income of >US$250 and US$121–250 than those with an average income of ≤US$120 (OR 3.26, 95% CI: 1.64–6.49; OR 2.06, 95% CI: 1.07–3.95). We also found that the participants who experienced forced drinking more than once per month were 5.68 times more likely to experience binge drinking than those who did not experience it in the past three months (OR 5.68, 95% CI: 2.24–14.41). Additionally, the odds of binge drinking in the past three months were significantly higher among participants working in karaoke bars than those working at restaurants/cafés (OR 2.04, 95% CI: 1.34–3.08) and among participants who experienced emotional abuse than those who did not experience it in the past six months (OR 2.57, 95% CI: 1.19–5.51).

Table 4 Factors associated with binge drinking among female entertainment workers (n = 600)

Characteristics	Bivariate logistic regression		Multiple logistic regression*	
	OR (95% CI)	**P-value**	**AOR (95% CI)**	**P-value**
Age (years)	1.03 (0.98–1.08)	0.19	1.02 (0.97–1.07)	0.46
Education level (in years)				
High school or above (≥10)	Reference		Reference	
Secondary school (7–9)	1.38 (0.78–2.44)	0.28	1.19 (0.64–2.20)	0.58
Primary school (0–6)	1.70 (0.98–2.96)	0.06	1.49 (0.82–2.71)	0.19
Average monthly income (US$)				
≤120	Reference		Reference	
121–250	2.06 (1.07–3.95)	0.03	1.98 (0.98–3.99)	0.06
>250	3.26 (1.64–6.49)	0.001	2.96 (1.40–6.24)	0.004

Level of psychological distress				
Higher (GHQ-12 ≥4)	Reference		Reference	
Lower (GHQ-12 ≤3)	1.42 (0.97–2.09)	0.07	1.65 (1.09–2.49)	0.02
Frequency of forced drinking in the past three months				
Never	Reference		Reference	
1 time per month	1.57 (0.95–2.59)	0.08	1.64 (0.96–2.78)	0.07
>1 time per month	5.68 (2.24–14.41)	<0.001	5.66 (2.19–14.65)	<0.001
Type of venue best describes the current job in the entertainment				
Restaurant/café	Reference		Reference	
Karaoke bar	2.04 (1.34–3.08)	0.001	1.85 (1.19–2.88)	0.006
Beer garden/massage parlor/freelance	1.23 (0.65–2.35)	0.52	0.92 (0.46–1.85)	0.82
Experience emotional abuse in the past six months				
No	Reference		Reference	
Yes	2.57 (1.19–5.51)	0.02	2.71 (1.22–6.02)	0.01

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio.

* Adjusted for variables significantly associated with binge drinking at the *p*-value ≤0.20 in the bivariate logistic regression analyses and those that remained statistically significant in five multiple logistic regression models using the backward elimination method.

† Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥4 was used to define "high psychological distress."

After adjustment, the odds of binge drinking remained significantly higher among participants with an average monthly income of >US$250 than those with an average income of ≤USD120 (AOR 2.96, 95% CI: 1.40–6.24). Furthermore, participants who experienced forced drinking more than once per month were 5.66 times more likely to experience binge drinking than those who did not experience it in

the past three months (AOR 5.66, 95% CI: 2.19–14.65). We also found that the participants who worked in karaoke bars had a significantly higher odds of binge drinking than those working at restaurants/cafés (AOR 1.85, 95% CI: 1.19–2.88) and among participants who experienced emotional abuse than those who did not experience it in the past six months (AOR 2.71, 95% CI: 1.22–6.02). Interestingly, the odds of binge drinking were significantly higher among participants with lower psychological distress than those with higher psychological distress (AOR 1.65, 95% CI: 1.09–2.49).

Among participants who worked at karaoke bars, the odds of binge drinking were significantly higher among those who were born in rural areas than those who were born in urban areas (AOR 0.51, 95% CI: 0.28–0.92), had sexual intercourse in the past three months than those who did not (AOR 2.94, 95% CI: 1.64–5.29), and those with lower psychological distress than those with higher psychological distress (AOR 2.15, 95% CI: 1.22–3.81) (Supplemental Table S3).

DISCUSSION

This study explored the magnitude of binge drinking and its relationships with GBV, psychological distress, and sexual behaviors among FEWs in Cambodia, a key population working in an environment prone to HIV risks and substance abuse. We found an overall prevalence of binge drinking in the past three months of 76.7% and 81.4% among FEWs working at karaoke bars. A prevalence of binge drinking of 83.4% has been reported in another study of Cambodian FEWs who were more heavily engaged in commercial sex (reporting two or more different sexual partners within the last month).[12] In our study, only 25.5% of participants reported having sex with one or more commercial sex partners in the past three months, which may explain the difference in the binge-drinking prevalence. Consistent with our findings, the prevalence of alcohol drinking among FSWs in other countries also appears high, ranging from 67.8% to 88.5%.[6,9,10,39]

We identified a significant relationship between binge drinking among FEWs and higher monthly income. Evidence suggests that FEWs discuss receiving better tips from commercial sex partners or monetary incentives from their bosses for drinking.[5] FEWs also discussed how they use alcohol to reduce

shyness to perform their job better.[5] These might explain the correlation between binge drinking and higher monthly income among FEWs in Cambodia. Another plausible explanation for this correlation was suggested in the literature, as other studies have noted this same pattern. Higher-income was associated with increases in higher-risk drinking among Kenyan FSWs.[8] As the level of risk for drinking increased, the median number of commercial sex partners also increased, from three in the past week among non-drinkers and low-risk drinkers to six partners in the past week among harmful drinkers.[8]

Our findings suggest that lower psychological distress was associated with binge drinking. FEWs with lower psychological distress were 1.7 times more likely to report binge drinking than those who had higher psychological distress. A literature review shows that alcohol use was correlated with adverse mental health problems.[20] Therefore, we expected FEWs with higher psychological distress would be more likely to be binge drinkers. The possible explanation for our finding is that those who thought they had an issue with mental health might decide not to drink. In a qualitative study in Cambodia, FEWs expressed feeling shy working in entertainment venues. Alcohol drinking helped them forget those feelings and perform the job better, resulting in better earnings.[5] Once FEWs earn better, they are less likely to be distressed, which may explain why those who have lower psychological distress were associated with binge drinking. This finding emphasizes the social need to support the FEWs in Cambodia with their health and psychological wellbeing.

In our study, FEWs who worked in karaoke bars had a higher propensity to engage in binge drinking than those who worked in restaurants/cafés, beer gardens, massage parlors, or freelance. This finding is consistent with previous studies, which have discussed how karaoke bars are not just a place where clients go for singing but also a place for drinking and entertaining with women.[17,40] In such settings, FEWs can also be pressured by supervisors and clients to drink.[17,40] Our findings also showed that FEWs who experienced forced drinking four times or more in the past three months were significantly more likely to report binge drinking. These findings highlight the need to target karaoke bars to improve their working conditions and reduce forced alcohol and drug use. Additionally, interventions that help FEWs transit to other safer occupations, such as hairdressing, should also be an alternative.

Binge drinkers reported experiencing more emotional abuse in the past six months than non-binge drinkers. Emotional abuse is a type of GBV that has received less attention from researchers, policymakers, and intervention programs. Emotional abuse is associated with several social, economic, and health problems.[41] In line with this finding, in a qualitative study in Cambodia, FEWs shared their experience in excessive drinking to cope with the challenges in life and jobs.[5] Similarly, a Tanzanian study showed that FSWs who reported hazardous or harmful drinking were two times more likely to experience GBV than those who reported less hazardous or harmful drinking.[38]

Alcohol consumption has been associated with the global burden of diseases and substantial health loss.[42] Alcohol consumption particularly becomes a significant public health concern among FSWs because hazardous and harmful drinking is correlated with sexual risk behaviors, such as condomless sex and a higher number of sexual partners, than those who were abstained from alcohol drinking.[8,43] Findings from this study provide critical information for program implementation and policy to reduce the prevalence of binge drinking among FEWs in Cambodia. For instance, the high binge-drinking prevalence among Cambodian FEWs implicates the need for occupational health intervention programs to mitigate alcohol use among FEWs. For instance, the WHO's Brief Intervention for Hazardous and Harmful Drinking[19] effectively reduced self-reporting alcohol consumption among non-dependent and non-treatment-seeking FSWs in Mombasa, Kenya.[44]

Additionally, findings from our study indicate that individual-level interventions would not be sufficient to reduce binge alcohol consumption among FEWs in Cambodia since the risk factors were primarily environmental, occupational, and structural. For instance, we found that binge drinkers were more likely to make more money, were forced to drink at work, mainly worked in the karaoke bars, and experienced emotional abuse. An intervention promoting individual health behaviors to FEWs might not affect these factors. Therefore, it requires interventions addressing the structural and social contexts.[45]

This study has several limitations. Firstly, the study's cross-sectional design did not allow us to draw a causal inference between risk factors and binge drinking. For example, a higher proportion of binge drinkers reported experiencing emotional abuse in the past six months than non-binge drinkers. Yet,

as this finding was based on a cross-sectional association, the temporal relationship between GBV and binge drinking could not be determined. Future longitudinal studies are required to investigate this temporal relationship. Alternatively, qualitative studies to explore FEWs' experience of GBV might help researchers to understand in-depth whether experience GBV might lead to binge drinking. Secondly, social desirability bias[46] might be present since we asked women about sensitive issues such as GBV, sexual practices, and substance use. Women might be less likely to report this type of sensitive information, resulting in underestimating the prevalence of the study variables. Moreover, since half of the participants received an intervention, they might be more likely to have been exposed to health education and services than other FEWs who were not. Therefore, the results from this study might not be generalizable to other FEWs in Cambodia.

Additionally, the small sample size in some sub-populations is another limitation of this study. For instance, FEWs working in beer gardens are likely to be involved in heavy alcohol drinking at work. However, due to the small sample size, we grouped them with FEWs working in massage parlors and as freelance sex workers. Finally, we could not include physical and sexual abuse in the multiple logistic regression, given the small sample size.

CONCLUSIONS

This study highlights a relatively high prevalence of binge drinking among FEWs in Cambodia. Factors associated with binge drinking were those linked to working environments and working conditions. Binge drinking was mainly reported by FEWs working in karaoke bars and those who experienced forced drinking as part of the job requirement. FEWs who experienced emotional abuse, defined as verbal threats or having the ability to leave the house not being under their control, were more likely to experience binge drinking than those who did not experience it. These findings can be used to design interventions to reduce binge drinking among FEWs by providing safer working environments and addressing work-related violence, such as emotional abuse by clients and entertainment establishment managers. Our study suggests that individual-based behavioral interventions may not be sufficient in reducing binge drinking

among FEWs unless accompanied by structural and occupational health policy interventions that change these exploitative working environments.

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Contributors CB and SY conceived the parent study, obtained the research grant, and supervised the project implementation. ST and PC were responsible for project implementation, training, and data collection. SO conducted literature reviews analyzed the data and drafted the manuscript. PMG advised on the study design, data analyses, and manuscript writing. All authors provided critical comments for revisions and approved the final manuscript. SY confirmed that he has full access to all data and final responsibility for the decision to submit for publication.

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Data availability statement: Data used for this study can be accessed upon request from the Principal Investigator (Dr. Siyan Yi) at siyan@doctor.com.

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Supplementary Tables

Table S1 Comparison of socio-demographic characteristics, GBV, and psychological distress among binge drinkers and non-binge drinkers who worked in karaoke bars

Characteristics	**Total**	**Binge drinking***		
	***(n* = 365)**	**Yes**	**No**	**P-value†**
		***(n* = 297)**	***(n* = 68)**	
Age group in years (mean ± SD)	25.1 ± 4.0	25.2 ± 3.9	24.4 ± 4.2	0.11
18–24	162 (44.4)	127 (42.8)	35 (51.5)	0.42
25–29	144 (39.5)	120 (40.4)	24 (35.3)	
30–35	59 (16.2)	50 (16.8)	9 (13.2)	
Education level (in year)	5.9 ± 2.9	5.9 ± 2.9	6.5 ± 3.2	0.09
Primary School (0–6)	199 (54.5)	168 (56.6)	31 (45.6)	0.18
Secondary School (7–9)	125 (34.3)	99 (33.3)	26 (38.2)	
High School or above (≥ 10)	41 (11.2)	30 (10.1)	11 (16.2)	
Current marital status				0.24
Never married	156 (42.7)	121 (40.7)	35 (51.5)	
Currently married	99 (27.1)	82 (27.6)	17 (25.0)	
Widowed/divorced	110 (30.1)	94 (31.7)	16 (23.5)	
Level of monthly income (USD)				0.86
≤ 120	22 (6.0)	17 (5.7)	5 (7.4)	
121–250	195 (53.4)	160 (53.9)	35 (51.5)	
> 250	148 (40.6)	120 (40.4)	28 (41.2)	
Born in rural area	257 (70.4)	218 (73.4)	39 (57.4)	0.009
Current type of house				0.36
Their own/family house	36 (9.9)	28 (9.4)	8 (11.8)	

Rental house on their own	83 (22.7)	66 (22.2)	17 (25.0)	
Rental house with family	82 (22.5)	63 (21.2)	19 (27.9)	
Rental house with friends	34 (9.3)	27 (9.1)	7 (10.3)	
Dormitory at their workplace	130 (35.6)	113 (38.1)	17 (25.0)	
Number of children				0.16
0	189 (51.8)	148 (49.8)	41 (60.3)	
1	112 (30.7)	92 (30.9)	20 (29.4)	
≥ 2	64 (17.5)	57 (19.2)	7 (10.3)	
Duration of work as entertainment workers				0.72
Less than a year	135 (36.9)	107 (36.0)	28 (41.2)	
1 - 2 years	123 (33.7)	102 (34.3)	21 (30.9)	
More than 2 years	107 (29.3)	88 (29.6)	19 (27.9)	
GBV experiences in the past six months				0.37
Emotional abuse	38 (10.4)	34 (11.5)	4 (5.9)	
Physical abuse	19 (5.2)	16 (5.4)	3 (4.4)	
Forced substance use	15 (4.1)	10 (3.4)	5 (7.4)	
Forced sex	2 (0.6)	2 (0.7)	0 (0.0)	
High psychological distress (≥ 4)[‡]	134 (36.7)	100 (33.7)	34 (50.0)	0.01

GBV, gender-based violence; SD, standard deviation.

Values are numbers (%) for continuous variables and mean (SD) for continuous variables.

[*] Binge drinking was defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

[†] Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables, and Student's *t*-test was used for continuous variables.

‡ Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥ 4 was used to define "high psychological distress."

Table S2 Comparison of sexual behaviors among binge drinkers and non-binge drinkers who worked in karaoke bars

Sexual behaviors in the past 3 months	**Total** (*n* = 365)	**Binge drinking***		
		Yes (*n* = 297)	**No** (*n* = 68)	**P-value†**
Had sexual intercourse	264 (72.3)	228 (76.8)	36 (52.9)	<0.001
Condoms use in last sex with a non-commercial partner	66 (30.7)	59 (32.2)	7 (21.9)	0.24
Frequency of condom use with non-commercial partners				0.04
Always	45 (20.9)	41 (22.4)	4 (12.5)	
Frequently	8 (3.7)	7 (3.8)	1 (3.1)	
Sometimes	23 (10.7)	23 (12.6)	0 (0.0)	
Never	139 (64.7)	112 (61.2)	27 (84.4)	
Sex with commercial partners	100 (37.9)	90 (39.5)	10 (27.8)	0.18
Frequency of having sex with commercial partners				0.09
Daily/a few times a week/weekly	18 (18.0)	18 (20.0)	0 (0.0)	
Monthly	15 (15.0)	15 (16.7)	0 (0.0)	
Once in a while when needed to	67 (67.0)	57 (63.3)	10 (100)	
Number of commercial sex partners				0.03
0 partner	265 (72.6)	207 (69.7)	58 (85.3)	
1 partner	47 (12.9)	41 (13.8)	6 (8.8)	
2–3 partners	32 (8.8)	28 (9.4)	4 (5.9)	
> 3 partners	21 (5.8)	21 (7.1)	0 (0.0)	
Condoms use in last sex with a	89 (89.0)	80 (88.9)	9 (90.0)	1.00

commercial partner				
Frequency of condom use with commercial partners				0.52
Always	77 (77.0)	68 (75.6)	9 (90.0)	
Frequently	3 (3.0)	3 (3.3)	0 (0.0)	
Sometimes	14 (14.0)	14 (15.6)	0 (0.0)	
Never	6 (6.0)	5 (5.6)	1 (10.0)	

Values are numbers (%) for continuous variables and mean (SD) for continuous variables.

* Binge drinking was defined as drinking more than five units of alcoholic drinks in 24 hours on at least one occasion in the past three months.

† Chi-square test or Fisher's exact test (when sample sizes were smaller than five in one cell) was used for categorical variables

Table S3 Factors associated with binge drinking among Karaoke female entertainment workers (n = 365)

Characteristics	Bivariate logistic regression		Multiple logistic regression*	
	OR (95% CI)	**P-value**	**AOR (95% CI)**	**P-value**
Age (years)	1.05 (0.99 – 1.13)	0.11	1.01 (0.94 – 1.09)	0.73
Education level (in years)				
High school or above (≥ 10)	Reference		Reference	
Secondary school (7–9)	1.39 (0.62 – 3.15)	0.42	1.27 (0.53 – 3.05)	0.59
Primary school (0–6)	1.99 (0.90 – 4.38)	0.09	1.62 (0.68 – 3.85)	0.27
Place of birth				
Rural	Reference		Reference	
Urban	0.49 (0.28 – 0.84)	0.01	0.51 (0.28 – 0.92)	0.03
Had sexual intercourse in the past three months				
No	Reference			
Yes	2.94 (1.69 – 5.06)	<0.001	2.94 (1.64 – 5.29)	<0.001
Level of psychological distress				
Higher (GHQ-12 ≥ 4)	Reference		Reference	
Lower (GHQ-12 ≤ 3)	1.97 (1.16 – 3.36)	0.013	2.15 (1.22 – 3.81)	0.01

AOR, adjusted odds ratio; CI, confidence interval; GHQ, General Health Questionnaire; OR, odds ratio.

* Adjusted for variables significantly associated with binge drinking at the p-value ≤ 0.20 in the bivariate logistic regression analyses and those that remained statistically significant in six multiple logistic regression models using the backward elimination method.

† Psychological distress was assessed using the 12-item General Health Questionnaire (GHQ-12). The GHQ-12 score of ≥ 4 was used to define "high psychological distress."

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

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In your methods section, say that you used the STROBE cross sectional reporting guidelines, and cite them as:

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		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	4 – 6
Objectives	#3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	#4	Present key elements of study design early in the paper	6
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	7
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7 – 8
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	7 – 8
Bias	#9	Describe any efforts to address potential sources of bias	7
Study size	#10	Explain how the study size was arrived at	6 – 7
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	9
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	9
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	n/a (small sample size)
Statistical methods	#12c	Explain how missing data were addressed	n/a (no missing data)
Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	n/a
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	n/a (already mentioned in method)
Participants	#13b	Give reasons for non-participation at each stage	n/a

Participants	#13c	Consider use of a flow diagram	n/a
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	11 – 13
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	n/a
Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	16 – 18
Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	16 – 18
Main results	#16b	Report category boundaries when continuous variables were categorized	16 – 17
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
Discussion			
Key results	#18	Summarise key results with reference to study objectives	18 – 20
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	20
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	21
Generalisability	#21	Discuss the generalisability (external validity) of the study results	20
Other Information			

Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22