

# BMJ Open Factors associated with induced abortion among female entertainment workers: a cross-sectional study in Cambodia

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## ABSTRACT

**Objective:** To explore risk factors associated with induced abortion among sexually active female entertainment workers (FEWs) in Cambodia.

**Design:** Cross-sectional study.

**Setting:** Phnom Penh and Siem Reap, Cambodia.

**Participants:** This study included 556 FEWs aged 18–47 years randomly selected from entertainment establishments in the two cities in 2014 using a two-stage cluster sampling method. Data were collected through face-to-face interviews using a structured questionnaire.

**Primary outcome measure:** History of induced abortion during the time working as a FEW.

**Results:** Of the total sample, 45.6% reported currently using a contraceptive method with condom (42.4%) being the most common method, followed by pills (25.6%). One-fourth (25%) of the respondents reported having been pregnant at least once, and 21.4% reported having at least one induced abortion during the time working as a FEW. After controlling for other covariates in a multivariate logistic regression model, FEWs with a history of induced abortion remained significantly more likely to be currently working in a karaoke bar (AOR=1.75, 95% CI 1.10 to 2.78), to have worked longer as a FEW (AOR=1.42, 95% CI 1.06 to 1.43), to have had a greater number of sexual partners in the past 12 months (AOR=1.86, 95% CI 1.02 to 1.54), to be currently using a contraceptive method (AOR=1.52, 95% CI 1.01 to 2.29), to be able to find condoms when they needed them (AOR=2.03, 95% CI 1.09 to 3.82), and to report inconsistent condom use with non-commercial partners in the past 3 months (AOR=1.62, 95% CI 1.06 to 3.44).

**Conclusions:** This study highlights the high rates of unwanted pregnancies that ended in induced abortions among FEWs in Cambodia. Access of FEWs to quality sexual and reproductive healthcare services is deemed a high priority. Integrated interventions to improve sexual and reproductive health among these vulnerable women should be tailored to reach the most-at-risk groups.

## Strengths and limitations of this study

- This is the first study to examine potential factors associated with induced abortion among female entertainment workers—one of the most vulnerable populations in Cambodia.
- This study included sexually active young women working in different establishments such as karaoke bars, massage parlours, beer gardens, nightclubs, restaurants, etc. These women are considered to be at alarmingly high risk for sexual and reproductive health problems because of their involvement in direct and/or indirect sex work.
- Several factors that had not been examined in previous studies were included in this analysis, including condom use with non-commercial partners.
- Limitations of the study included the representativeness of the study sample, the validity of self-reported measures and the cross-sectional nature of the data.

## INTRODUCTION

In Cambodia, many young women from poor rural families migrate to urban areas to earn and remit income to their families in their home villages.<sup>1 2</sup> A common migratory pull are the garment factories that employ over 600 000 young women. Garment workers are typically not given fair wages, safe work environments or health insurance—a combination of factors that have resulted in worker unrest and mass fainting incidents at various factories. Claiming worker rights becomes a complicated challenge that involves risking their jobs, their livelihood and their ability to provide for family. As a result, more and more young migrant women become involved in alternative work opportunities in the entertainment industry, where many participate in direct and indirect sex work. ‘Female entertainment workers’

(FEWs) refers to women working in entertainment venues such as karaoke bars, massage parlours, restaurants (as hostesses or singers) or beer gardens.<sup>2</sup>

By 2013, there were approximately 40 000 FEWs in Cambodia, 24 000 of whom resided in the capital city of Phnom Penh.<sup>3</sup> This group has been increasing since the 2008 passage and implementation of the 'Law on Suppression of Human Trafficking and Sexual Exploitation,' which banned brothel-based sex work, and more women have moved into indirect sex work based out of entertainment venues. FEWs in Cambodia are considered at high risk for poor sexual and reproductive health outcomes because of their involvement in direct or indirect sex work,<sup>2</sup> with only limited access to sexual and reproductive healthcare services.<sup>4</sup> Recent studies indicate alarmingly high HIV prevalence among street-based sex workers (37.3%), brothel-based sex workers (17.4%) and women working in other entertainment establishments (9.8%).<sup>5</sup> While there have been remarkable increases in reported condom use in commercial sex work over the past decade, there may be misreporting of condom use as well as condom failure. In addition, no improvement has been observed in consistent condom use between FEWs and their non-commercial partners, such as boyfriends or other romantic relationships.<sup>4 6 7</sup> Moreover, unwanted pregnancies and induced abortions<sup>4</sup> as well as sexually transmitted infections (STIs)<sup>5 8</sup> are very common among these women. In our most recent survey, 46% of Cambodian FEWs reported having experienced at least one induced abortion, and 40% reported having experienced two or more induced abortions in their lifetime.<sup>4</sup>

In Cambodia, free and friendly sexual and reproductive health services are currently available through government and NGO providers to FEWs. However, some FEWs experience barriers to service use such as discrimination by providers and report a preference for private providers.<sup>9</sup> KHANA, the largest national HIV organisation in Cambodia, is currently offering specialised services for FEWs including free distribution of condoms, on-the-spot STI screening, a 'safe space' drop-in centre, community-based finger-prick HIV and syphilis testing, accompanied referrals to enrolment of HIV-positive FEWs to preantiretroviral therapy (ART) and ART services, the integration of sexual and reproductive health services with HIV services, partner tracing and prevention of mother to child transmission (PMTCT) programming.

Several factors have been linked to induced abortion among female sex workers (FSWs) in many countries. In a previous study in Cambodia, a lifetime history of induced abortion was found to increase with the number of clients, inconsistent condom use, recent condom breakage and recent forced unprotected sex.<sup>10</sup> A study in Spain found that a lifetime history of induced abortion was more common among FSWs who were older and married, had a higher number of pregnancies, had lower contraceptive knowledge and had

worked as FSWs for a longer period.<sup>11</sup> Among FSWs in Hong Kong, those who did not use a condom in their last episode of serving a client and those who would agree not to use a condom if they were paid more were more likely than others to have ever had induced abortion.<sup>12</sup> Other reported risk factors that may place women from the general population, and not sex workers specifically, at greater risk for induced abortion include early sexual debut,<sup>13</sup> lower education<sup>13</sup> and economic constraints.<sup>14</sup>

The low condom use rates within non-commercial relationships may be undermining the current efforts to reduce sexual and reproductive health risk behaviours among FEWs in Cambodia. Moreover, women who use induced abortion as a means to prevent births are particularly vulnerable to HIV and STIs as the epidemic spreads mainly through heterosexual intercourse.<sup>3</sup> For these reasons, investigations of risk factors for induced abortion among this high-risk population will provide useful information to inform health policies for the reduction of unwanted pregnancy and induced abortion as well as for the prevention of new HIV infections and STIs among these vulnerable women.

Despite the need for information, only a few studies have been conducted on induced abortion among FEWs in Cambodia or in other developing countries. Recent studies of FEWs in Cambodia found that 34–54% of FEWs reported always using condoms with their regular, non-commercial partners, and 83–85% reported always using condoms with commercial partners.<sup>7 15</sup> Furthermore, the relationship between induced abortion and risk behaviours, such as inconsistent condom use with non-commercial partners, has not been addressed. This study was therefore conducted to fill in the gaps in the literature and explore risk factors associated with induced abortion among FEWs in Cambodia.

## METHODS

### Study sites, population and sampling

This study was conducted in April and May 2014 in Phnom Penh and Siem Reap as part of an impact evaluation study of the Sustainable Action against HIV and AIDS in Communities (SAHACOM) Project. The number of FEWs in Phnom Penh and Siem Reap represents approximately 70% of the total population of FEWs in Cambodia.<sup>16</sup>

Data were collected through face-to-face interviews conducted in a private space at the workplace of FEWs randomly selected from a list of entertainment establishments enrolled in the SAHACOM using a two-stage cluster sampling method. The sample size was proportionally allocated to the number of FEWs in Phnom Penh and Siem Reap. At the first stage, probability proportional-to-size sampling was used to select entertainment establishments from a list of the venues. At the second stage, a proportionate number of participants were randomly selected from the list of FEWs at each

selected establishment. To be included in the study, a FEW must be: (1) at least 18 years of age, (2) biologically female, (3) able to provide consent to participate in the study and (4) able to present themselves on the day of the interview. FEWs were excluded if they were mentally and/or physically too sick to participate in the study.

A structured questionnaire was developed on the basis of the results from a pilot study and comments from public health experts in the areas of sexual and reproductive health in Cambodia. A 3-day training on data collection methods was conducted for all interviewers and field supervisors.

### Variables and measurements

The variables were measured using standardised tools adapted from previous studies in the same population,<sup>17–18</sup> the most recent Cambodia Demographic and Health Survey,<sup>19</sup> as well as from other studies in Cambodia.<sup>20–24</sup> Sociodemographic characteristics included age, marital status, completed years of formal education, average monthly income, living situations, types of establishment they were working for and duration they had worked in the current career as well as in the current place of employment.

The survey included questions assessing the history of pregnancy and induced abortion. The history of induced abortion was assessed via a question, “During your work as a FEW, have you experienced any induced abortion?” with three response options: (1) never had sexual intercourse, (2) no or (3) yes. We also collected information on age at their first pregnancy, number of pregnancies in their lifetime and during the time working as a FEW, number of induced abortions they had in their lifetime and during the time working as a FEW and the facility where they received their most recent induced abortion services. In addition, yes/no questions were used to ask whether the participants were currently using any contraceptive method and whether they had received any forms of sexual and reproductive health education in the past 6 months. They were also questioned about the type of contraceptive method being used and sources of sexual and reproductive health education they had received in the past 6 months.

Several variables on sexual behaviours and condom use were measured including age at the first sexual intercourse, number of sexual partners in the past 12 months, number of partners with whom they had sexual intercourse in exchange for money or gifts (commercial partners) in the past 3 months, number of partners with whom they had sexual intercourse not in exchange for money or gift (non-commercial partners) in the past 3 months and condom use with both types of sexual partners in the past 3 months. For condom use, we asked, “During the past 3 months, how often have you used condoms when you had sex with your sweetheart?” The same question was used to assess condom use when having sex in exchange for money or gifts. The participants answered these questions on a Likert scale with six-

point response options ranging from (1) ‘always’ to (6) ‘never.’ Those answering ‘always’ to the questions were considered consistent condom users. The respondents were also questioned whether they had clients who requested them not to use condoms in the past 3 months, and if they were able to find condoms when they needed them in the past 3 months (0=no, 1=yes).

### Data analyses

EpiData V.3 (Odense, Denmark) was used for double data entry. Descriptive analyses were conducted to describe sociodemographic characteristics and the history of pregnancy and induced abortion of the study sample using number (%) for categorical variables and mean with SD ( $\pm$ SD) for continuous variables.  $\chi^2$  test, or Fisher’s exact test when sample sizes were smaller than five in one cell, was used for categorical variables, and Student t test was used for continuous variables to compare sociodemographic characteristics, sexual behaviours, substance use, contraceptive use and exposure to sexual and reproductive health education among respondents with and without a history of induced abortion.

A multivariate logistic regression model was constructed to examine the independent association between sociodemographic characteristics and risky sexual behaviours and history of induced abortion. All variables found to have a significant association with a history of induced abortion in bivariate analyses at a level of  $p < 0.10$  were simultaneously included in a preliminary model. A final model was developed by removing variables with a  $p$  value  $> 0.05$ , refitting the model and repeating the steps until all  $p$  values of included variables were  $< 0.05$ . OR for bivariate analyses and adjusted OR (AOR) for multivariate analyses were calculated and presented with 95% CIs and  $p$  values. STATA V.13 (StataCorps LP, Texas, USA) was used for all data analyses.

### ETHICAL CONSIDERATIONS

The participants were informed that participation in this study was voluntary, and they could refuse or discontinue their participation at any time for any reason without any consequences. Written informed consent was obtained from each participant after a detailed description of the study objectives and procedures was provided. We strictly protected the privacy of respondents by conducting the interviews in a private place, and their confidentiality was ensured by using an identification number for each individual and no personal identifiers such as name or address were collected. Each respondent received approximately US\$2.5 as compensation for their time. The questionnaires and data collected from the participants were kept under the responsibility of KHANA’s Research Center. The study protocol and tools were approved by the National Ethics Committee for Health Research, Ministry of Health, Cambodia (No. 082NECHR).

## RESULTS

We interviewed 667 FEWs in total. For this study, we included only women who reported having sexual intercourse (n=556) and excluded 111 women who reported not having sexual intercourse in the past 3 months.

### Sociodemographic characteristics

As shown in table 1, 437 (79%) respondents had no history of induced abortion during the time working as a FEW, and 119 (21%) had a history of at least one induced abortion during the time working as a FEW. The mean time of induced abortion during the time working as a FEW was 2.1 (SD=3.1). The most common facility where the most recent abortion was performed was private clinics or hospitals (45.4%), followed by home abortion using abortion medication bought from pharmacies (41.2%) and NGO clinics or hospitals (10.1%). Compared to respondents without a history of induced abortion, respondents with a history of induced abortion were significantly older (mean age: 26.1 years vs 27.5 years), more likely to have no formal education (6.4% vs 12.6%), had a significantly higher monthly income (median: US\$189.5 vs 199.5), more likely to work in a karaoke bar (45.1% vs 53.8%), had worked significantly longer in the entertainment industry (mean

duration: 23.1 months vs 53.3 months) and had worked for a significantly longer duration at the current establishment (mean duration: 14.8 months vs 30.3 months).

### Sexual behaviours, contraceptive use and pregnancy

Table 2 shows the comparisons of sexual behaviours, contraceptive use and history of pregnancy of FEWs with and without a history of induced abortion. Respondents with a history of induced abortion had a significantly higher mean number of sexual partners in the past 12 months (2.1 vs 5.4). They were also significantly more likely to report having sexual intercourse with a non-commercial partner in the past 3 months (35% vs 44.5%), always using condoms with their non-commercial partners in the past 3 months (34.4% vs 22.6%), having sexual intercourse with commercial partners in the past 3 months (20.6% vs 29.7%), having clients who requested them not to use condoms in the past 3 months (12.2% vs 27.8%), and that they were able to find condoms when they needed them (73.6% vs 88.1%). Regarding contraceptive use, respondents with a history of induced abortion were significantly more likely to report currently using a contraceptive method (42.9% vs 55.5%) and having been pregnant during their time working as a FEW (6.7% vs 98.3%).

**Table 1** Demographic characteristics of FEWs with and without a history of induced abortion

	Total	No history of induced abortion (n=437)	History of induced abortion (n=119)	p Value*
Age (in years)	26.4±5.5	26.1±5.4	27.5±5.5	0.02
Marital status				0.42
Never married	183 (32.9)	149 (34.0)	34 (28.6)	
Married and living together	190 (34.2)	144 (33.0)	46 (38.7)	
Divorced, separated or widowed	183 (32.9)	144 (33.0)	39 (32.7)	
Mean years of formal education	6.1±3.1	6.2±3.1	5.6±3.2	0.06
No formal schooling	50 (7.5)	35 (6.4)	15 (12.6)	0.02
Median monthly income (in US\$)	199.4	189.5	199.4	0.04
Currently living with				0.38
Parents	74 (13.3)	62 (14.2)	12 (10.1)	
Relatives/siblings	89 (16.0)	71 (16.2)	18 (15.1)	
Spouse/sexual partner	160 (28.8)	117 (26.8)	43 (36.1)	
Friends/colleagues	78 (14.0)	65 (14.9)	13 (10.9)	
Alone	103 (18.5)	80 (18.3)	23 (19.3)	
Others	52 (9.4)	42 (9.6)	10 (8.4)	
Current place of employment				0.01
Karaoke bar	261 (46.9)	197 (45.1)	64 (53.8)	
Restaurant	163 (29.3)	138 (31.6)	25 (21.0)	
Massage parlour	56 (10.1)	45 (10.3)	11 (9.2)	
Beer garden	18 (3.2)	15 (3.4)	3 (2.5)	
Other	58 (10.4)	42 (9.6)	16 (13.4)	
Mean working duration in entertainment industry (in months)	29.6±33.9	23.1±26.9	53.3±44.9	<0.001
Mean working duration for the current establishment (in months)	18.1±25.2	14.8±20.5	30.3±35.3	<0.001

Values are number (%) for categorical variables and mean±SD for continuous variables.

\* $\chi^2$  test or Fisher's exact test was used as appropriate for categorical variables, and t test was used for continuous variables. FEWs, female entertainment workers.



**Table 2** Sexual and reproductive health of FEWs with and without a history of induced abortion

	Total	No history of induced abortion (n=437)	History of induced abortion (n=119)	p Value*
Mean age at first sexual intercourse	19.6 (3.0)	19.6±2.8	19.5±3.6	0.59
Mean number of sexual partners (past 12 months)	2.8 (6.5)	2.1±4.4	5.4±11.1	<0.001
Had sexual intercourse with non-commercial partners (past 3 months)	205 (37.0)	152 (35.0)	53 (44.5)	0.04
Always used condom with non-commercial partners (past 3 months)	64 (31.4)	52 (34.4)	12 (22.6)	0.04
Had sexual intercourse with commercial partners (past 3 months)	124 (22.5)	89 (20.6)	35 (29.7)	0.04
Mean number of commercial partners (past 3 months)	1.1 (1.7)	0.9±1.5	1.5±2.1	0.08
Always used condom with commercial partners (past 3 months)	100 (78.7)	73 (78.5)	27 (79.4)	0.91
Having clients who requested not to use a condom (past 3 months)	21 (16.7)	11 (12.2)	10 (27.8)	0.03
Able to find a condom when it is needed (past 3 months)	426 (76.8)	321 (73.6)	104 (88.1)	0.002
Currently using a contraceptive method	252 (45.6)	186 (42.9)	66 (55.5)	0.04
Type of contraceptive method being used				0.41
Pills	64 (25.6)	46 (24.5)	18 (27.7)	
Condom	106 (42.4)	82 (44.3)	24 (36.9)	
Injection	22 (8.8)	17 (9.2)	5 (7.7)	
Other (IUD, implant, natural ways)	59 (23.2)	40 (21.6)	18 (27.7)	
Having been pregnant in their lifetime	402 (72.3)	283 (64.8)	119 (100.0)	
Mean age at first pregnancy (n=402)	21.3±3.3	21.2±3.2	21.3±3.5	0.64
Having been pregnant during the time working as a FEW (n=402)	136 (33.8)	19 (6.7)	117 (98.3)	<0.001

Values are number (%) for categorical variables and mean±SD for continuous variables.

\* $\chi^2$  test or Fisher's exact test was used as appropriate for categorical variables, and t test was used for continuous variables.

FEWs, female entertainment workers; IUD, intrauterine devices.

### Factors associated with induced abortion

Table 3 presents factors associated with a history of induced abortion in a multivariate logistic regression model. After adjustment for the effects of other covariates, FEWs with a history of induced abortion remained significantly more likely to be currently working in a karaoke bar (AOR=1.75, 95% CI 1.10 to 2.78), to have worked longer as a FEW (AOR=1.42, 95% CI 1.06 to 1.43), to have had more number of sexual partners in the past 12 months (AOR=1.86, 95% CI 1.02 to 1.54), to be currently using a contraceptive method (AOR=1.52, 95% CI 1.01 to 2.29), to be able to find condoms when they needed them (AOR=2.03, 95% CI 1.09 to 3.82), and to report inconsistent condom use with non-commercial partners in the past 3 months (AOR=1.62, 95% CI 1.06 to 3.44).

### DISCUSSION

This study is among a few attempts to explore factors associated with induced abortion among FEWs who are at high risk for HIV and sexual reproductive health problems. We found that the prevalence of consistent condom and contraceptive use, particularly with non-commercial partners, among FEWs in this study was low, while pregnancies ending in induced abortions were common. The majority of induced abortions were not carried out in public health or NGO facilities considered to be the safest place equipped with formally trained abortion care providers. We have identified several

sociodemographic and sexual reproductive health factors that increased the risk of induced abortions among these vulnerable women.

Surprisingly, induced abortion for those who engaged in sex work was not significantly associated with either the number of commercial partners or inconsistent condom use in the commercial relationships. Evidence from another study based on in-depth interviews with Cambodian FEWs found that, while condom use was generally high with commercial partners, non-commercial or romantic relationships were not characterised as risky and typically did not involve condom use.<sup>7</sup> Therefore, unprotected sex was more likely to be occurring between FEWs and their non-commercial romantic partners.

It is interesting to note that FEWs with experience of induced abortion during the time working as a FEW were significantly more likely to report being currently on contraception than those who did not experience induced abortion. They were also more likely to respond that they were able to find condoms whenever they needed them. These findings may be an interpretation that women who did not have a history of induced abortions were less sexually active or less involved in sex work compared to those with a history of induced abortions. As a result, they did not see contraception or condoms necessary for them. Moreover, contraceptive use may be motivated by prior unintended pregnancies or induced abortions. In a previous study among FSWs in Cambodia, the frequency of the uptake of hormonal

**Table 3** Factors associated with a history of induced abortion in a multivariate logistic regression model (n=556)

Variables in the model	AOR (95% CI)	p Value*
Working at a karaoke bar		0.02
No	Reference	
Yes	1.75 (1.10 to 2.78)	
Duration working as a FEW	1.42 (1.06 to 1.43)	<0.001
More number of sexual partners in the past 12 months	1.86 (1.02 to 1.54)	0.002
Currently using a contraceptive method		0.04
No	Reference	
Yes	1.52 (1.01 to 2.29)	
Able to find a condom when it is needed		0.03
No	Reference	
Yes	2.03 (1.08 to 3.82)	
Condom use with non-commercial partners in the past 3 months		
Always	Reference	
Not always	1.62 (1.06 to 3.44)	0.04

FEW, female entertainment worker; AOR, adjusted OR.

contraception was more than doubled if women had an induced abortion in the past year.<sup>10</sup> Among FSWs in Spain, the risk for induced abortions also increased with the number of pregnancies.<sup>11</sup>

The history of induced abortions remained significantly associated with inconsistent condom use with non-commercial partners. This finding expands our understanding of the relationships between induced abortion and condom use with different types of partners. Previous studies have also reported the association between condom use and induced abortion but did not distinguish the different effects of condom use in commercial and non-commercial relationships.<sup>10 12 25 26</sup> This finding also highlights the consequences of low rates of consistent condom use in non-commercial relationships among FEWs in Cambodia<sup>4 15</sup> that may place women at a greater risk for unwanted pregnancies that in turn leads to induced abortions. FEWs tend to use condoms more consistently when having sexual intercourse in exchange for money or gifts.<sup>4 15</sup> However, a previous study found that the incidence and prevalence of induced abortions were associated with inconsistent condom use with both commercial and non-commercial partners.<sup>10</sup>

One of the most important findings in this study was the relationship between induced abortion and the increased number of sexual partners. A possible explanation for this tendency is the increased chance of condom failure, corresponding to the increased number of sexual intercourse. Even with the slightest chance of condom breakage (two broken condoms per 100 condoms used), the chances of condom failure accumulated as the number of sexual intercourse partners increased.<sup>27</sup> Similarly, a study among FSWs in Cambodia and Lao PDR found that the increase in the number of clients correlates with an increase in the number of induced abortions independent of the use of condoms with non-commercial partners.<sup>10</sup> On a different note, the low condom use with non-commercial partners

among FEWs,<sup>4</sup> which can be a major risk factor associated with unintended pregnancy, should be taken into consideration when interpreting this result. A study in Ethiopia found that one-third of FSWs had a regular partner, while condoms were not consistently used in such relationship and this practice increased the number of unintended pregnancies.<sup>28</sup>

Induced abortion retained its significant association with working in a karaoke bar and longer working duration in the current entertainment establishment. Similar findings were reported in a study among FSWs in Cambodia and Lao PDR, which found that induced abortion was more common among non-street-based sex workers such as women working in clubs or hotels.<sup>10</sup> It was noted that greater ability to pay for induced abortion procedures or medication for home abortions of establishment-based FSWs may explain the relationship, given their relatively high status and earnings compared to those working on the streets.<sup>10</sup> Women working in karaoke bars in Cambodia are also more likely to get involved in commercial sexual relationships and multiple sexual partners compared to women working in other establishments.<sup>29</sup> The relationship between duration of sex work and induced abortion has also been previously reported among FSWs.<sup>10 11 30</sup>

Some limitations of this study should be acknowledged. First, there was no time frame for induced abortion in the survey question that forms the outcome variable, and therefore we cannot tell if these were recent or past abortions; however, we did ask respondents to specify if their abortions occurred during their career as FEWs, and 90% of them replied that they had been working in this career for 6 years or less. Second, as with any self-reported measures, there may be inherent biases that may lead to both an under-reporting and over-reporting in the variables. Given the cultural norms governing sexual and reproductive health behaviours among Cambodian women, it is most likely that the sexual risk and outcomes found in this study were

under-reported. However, measures were taken to create conditions that encouraged valid responses from the women; their responses were confidential, and interviews were conducted in a private place. Third, causal inferences were not possible due to the cross-sectional nature of the data.

The final limitation concerns the representativeness of the study sample. Although a wide range of subpopulations of FEWs were included, data were collected only from FEWs in the capital city and a large province where the KHANA's SAHACOM, a comprehensive community-based project aiming to improve the sexual and reproductive health of FEWs, has been implemented. The levels of sexual and reproductive health risk and outcomes reported in this study may therefore represent a more optimistic view than in other areas of Cambodia. However, the main purpose of this study was not to explore the prevalence of induced abortion among FEWs when they are engaged in sex work. We instead intended to show that these at-risk women are vulnerable to induced abortions and are not all availing themselves of safe abortion services.

Despite these limitations, the findings from this study have important implications for interventions and programming for the improvement of sexual and reproductive health among FEWs in Cambodia. Overall, this study highlights the high rates of pregnancies that end in induced abortions as a result of the low rates of consistent condom and contraceptive use among these vulnerable women. In addition, the use of unregulated private facilities and home medication abortions was high among this group. Access of FEWs to sexual and reproductive healthcare services is deemed a high priority. Recently, great efforts have been made in the implementation of integrated HIV and reproductive health interventions in order to improve the quality of and access to service packages among key populations in Cambodia. Such interventions should be tailored to reach these most vulnerable women and ensure that they could receive quality services.

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**Contributors** SY managed the literature review, designed the study, developed the research protocol, analysed the data and prepared the manuscript. ST, PC, KP, KT and CB supported the study design, protocol development, data collection and analyses of the study findings. All authors read and approved the final manuscript.

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**Data sharing statement** No additional data are available.

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## REFERENCES

- Webber G, Edwardsb N, Grahamet ID, *et al.* Life in the big city: the multiple vulnerabilities of migrant Cambodian garment factory workers to HIV. *Womens Stud Int Forum* 2010;33:159–69.
- Union Aid Abroad—Australian People for Health, Education and Development Abroad (APHEDA). *Cambodia—addressing HIV vulnerabilities of indirect sex workers during the financial crisis: situation analysis, strategies and entry points for HIV/AIDS workplace education*. Bangkok, Thailand, 2011.
- National Center for HIV/AIDS, Dermatology, and STDs (NCHADS). Annual report 2012. Phnom Penh, Cambodia: NCHADS, 2013.
- Yi S, Chhoun P, Brant S, *et al.* The Sustainable Action against HIV and AIDS in Communities (SAHACOM): end-of-project evaluation. Phnom Penh, Cambodia: KHANA, 2014.
- Couture MC, Sansothy N, Saphon V, *et al.* Young women engaged in sex work in Phnom Penh, Cambodia, have high incidence of HIV and sexually transmitted infections, and amphetamine-type stimulant use: new challenges to HIV prevention and risk. *Sex Transm Dis* 2011;38:33–9.
- Bui TC, Markham CM, Tran LT, *et al.* Condom negotiation and use among female sex workers in Phnom Penh, Cambodia. *AIDS Behav* 2013;17:612–22.
- Maher L, Mooney-Somers J, Phlong P, *et al.* Condom negotiation across different relationship types by young women engaged in sex work in Phnom Penh, Cambodia. *Glob Public Health* 2013;8:270–83.
- Couture MC, Page K, Stein ES, *et al.* Cervical human papillomavirus infection among young women engaged in sex work in Phnom Penh, Cambodia: prevalence, genotypes, risk factors and association with HIV infection. *BMC Infect Dis* 2012;12:166.
- Ministry of Education, Youth, and Sport (MEYS). *Examining life experiences and HIV risks of young entertainment workers in four Cambodian cities*. Phnom Penh, Cambodia: MEYS, 2010.
- Morineau G, Neilsen G, Heng S, *et al.* Falling through the cracks: contraceptive needs of female sex workers in Cambodia and Laos. *Contraception* 2011;84:194–8.
- Tsakiridu DO, Franco Vidal A, Vázquez Valdés F, *et al.* Factors associated with induced abortion in women prostitutes in Asturias (Spain). *PLoS ONE* 2008;3:e2358.
- Lau JT, Mui LW, Tsui HY, *et al.* Prevalence of induced abortion and associated factors among Chinese female sex workers in Hong Kong. *J Sex Marital Ther* 2007;33:19–29.
- Regushevskaya E, Dubikaytis T, Laanpere M, *et al.* Risk factors for induced abortions in St Petersburg, Estonia and Finland. Results from surveys among women of reproductive age. *Eur J Contracept Reprod Health Care* 2009;14:176–86.
- David PH, Reichenbach L, Savelieva I, *et al.* Women's reproductive health needs in Russia: what can we learn from an intervention to improve post-abortion care? *Health Policy Plan* 2007;22:83–94.
- Yi S, Tuot S, Chhoun P, *et al.* The impact of a community-based HIV and sexual reproductive health program on sexual and healthcare-seeking behaviors of female entertainment workers in Cambodia. *BMC Infect Dis* 2015;15:221.
- National Center for HIV/AIDS, Dermatology, and STDs (NCHADS). *Updated data on entertainment workers in Cambodia 2009*. Phnom Penh, Cambodia: NCHADS; 2010.
- Heng S, Morineau G, Neal J, *et al.* 2005 Cambodia STI Prevalence Study: integrated biological and behavioral survey. Phnom Penh, Cambodia: National Center for HIV/AIDS, STDs, and Dermatology (NCHADS), 2008.
- Heng S, Chhea C, Tuot S. *The baseline survey on HIV/AIDS knowledge, attitudes, practices and related risk behaviors among MARP*. Phnom Penh, Cambodia: KHANA, 2010.
- National Institute of Public Health, National Institute of Statistics and ORC Macro. *Cambodia demographic and health survey 2010*. Phnom Penh, Cambodia and Calverton, Maryland, USA: National Institute of Public Health, National Institute of Statistics, and ORC Macro, 2010.
- Ministry of Education, Youth, and Sports (MEYS). *Most at risk young people survey in Cambodia 2010*. Phnom Penh, Cambodia: MEYS, 2010.

21. Ministry of Education, Youth, and Sports (MEYS). *Examining life experiences and HIV risks of young entertainment workers in four Cambodian cities*. Phnom Penh, Cambodia: MEYS, 2012.
22. Yi S, Poudel KC, Yasuoka J, *et al*. Influencing factors for seeking HIV voluntary counseling and testing among tuberculosis patients in Cambodia. *AIDS Care* 2009;21:529–34.
23. Yi S, Poudel KC, Yasuoka J, *et al*. Role of risk and protective factors in risky sexual behavior among high school students in Cambodia. *BMC Public Health* 2010;10:477.
24. Yi S, Poudel KC, Yasuoka J, *et al*. Risk vs. protective factors for substance use among adolescents in Cambodia. *J Subst Use* 2011;16:14–26.
25. Abdala N, Zhan W, Shaboltas AV, *et al*. Correlates of abortions and condom use among high risk women attending an STD clinic in St. Petersburg, Russia. *Reprod Health* 2011;8:28.
26. Cleeve A, Phrasisombath K, Sychareun V, *et al*. Attitudes and experiences regarding induced abortion among female sex workers, Savannakhet Province, Laos. *Sex Reprod Healthc* 2014;5:137–41.
27. Center for Disease Control and Prevention (CDC). *Clinical prevention guidance: sexually transmitted diseases, treatment guidelines 2010*. Atlanta, GA, USA: CDC, 2011.
28. Weldegebreal R, Melaku YA, Alemayehu M, *et al*. Unintended pregnancy among female sex workers in Mekelle city, northern Ethiopia: a cross-sectional study. *BMC Public Health* 2015;15:40.
29. Mun P. *Comparison of HIV risk behaviors between karaoke workers and beer promotion girls in 2003 (in Khmer)*. Phnom Penh: International University Press, 2005.
30. Decker MR, Yam EA, Wirtz AL, *et al*. Induced abortion, contraceptive use, and dual protection among female sex workers in Moscow, Russia. *Int J Gynaecol Obstet* 2013;120:27–31.