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High prevalence of unhealthy alcohol use and comparison of self-reported alcohol consumption to phosphatidylethanol among women engaged in sex work and their male clients in Cambodia

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ABSTRACT

Background: In Cambodia, most of the female sex workers (FSW) work in venues where unhealthy alcohol use is ubiquitous and potentially contributing to the HIV epidemic. However, no accurate data exists. We compare self-reported unhealthy alcohol consumption to a biomarker of alcohol intake in Cambodian FSW and male clients, and determine factors associated with unhealthy alcohol use.
Methods: A cross-sectional study was conducted among FSW (n = 100) and male clients (n = 100) in entertainment and sex work venues in Cambodia. Self-reported unhealthy alcohol use (AUDIT-C) was compared to phosphatidylethanol (PEth) positive ($\geq$50 ng/ml), a biomarker of alcohol intake. Sociodemographics data was collected. Correlates of self-reported unhealthy alcohol use and PEth positive were determined.
Results: The prevalence of PEth positive in FSW was 60.0%. Self-reported unhealthy alcohol consumption was reported by 85.0% of the women. Almost all women (95.0%) testing PEth positive also reported unhealthy alcohol use. Prevalence of unhealthy alcohol consumption (self-report and PEth positive) was higher in FSW working in entertainment establishments compared to other sex work venues ($p < 0.01$). Among male clients, 47.0% reported unhealthy alcohol consumption and 42.0% had a PEth positive. However, only 57.1% of male clients with PEth positive reported unhealthy alcohol use.
Conclusions: Unhealthy alcohol consumption is prevalent in Cambodian sex work settings. Self-reported unhealthy alcohol use is well reported by FSW, but less by male clients. These findings highlight the urgency of using accurate measures of unhealthy alcohol consumption and integrating this health issue into HIV prevention interventions.

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1. Introduction

Crucial progress has been made in reducing the HIV epidemic in Cambodia (Vun et al., 2014), however some populations remain at high risk, notably women working in the entertainment and sex work sectors (Couture et al., 2011; Page et al., 2013). Male clients of female sex workers (FSW) are also at high risk for contracting HIV and have potential to play an important role in the spread of the infection in the general population (Gorbach et al., 2000; Hor et al., 2005; Couture et al., 2008; Goldenberg et al., 2010; Jin et al., 2010). However, little or no data exists on HIV infection among male clients in Cambodia. Unhealthy alcohol use, which includes risky drinking and alcohol-use disorders (Kriston et al., 2008), is universally recognized as an important contributor to the HIV/STI epidemic, notably in settings where alcohol is prevalent, such as in sex work (Li et al., 2010). Systematic reviews and meta-analyses

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have shown that alcohol use is associated with HIV and STI infections, as well as risky sexual behaviors, including unprotected sex, multiple partnerships and transactional sex (Kalichman et al., 2007; Baliunas et al., 2010; Shuper et al., 2010; Scott-Sheldon et al., 2016).

Worldwide, alcohol use has been shown to be highly prevalent among FSW and their clients, leading to adverse health consequences (Li et al., 2010; Yang et al., 2013; Goodman-Meza et al., 2014; Semple et al., 2015). Alcohol use is often part of the sexual transaction, and both FSW and their clients frequently drink alcohol before sexual intercourse (Wang et al., 2010; Pitpitan et al., 2013; Yang et al., 2013). A review of the global literature has shown that the prevalence of daily alcohol consumption among FSW is 12–78%, and 14–88% of the male clients reported being under the influence of alcohol before purchasing sex (Li et al., 2010). Alcohol use in FSW, especially before sex with clients, is associated with unprotected sex, and higher risk of HIV and STI transmission (Zachariah et al., 2003; Chiao et al., 2006; Wang et al., 2010; Chen et al., 2013; Chersich et al., 2014). Alcohol use among FSW has also been associated with a higher risk of violence victimization (Wang et al., 2010; Zhang et al., 2013; Chersich et al., 2014). Among male clients, alcohol use has been associated with unprotected sex, multiple FSW partners, and HIV and STI infections (Wee et al., 2004; Madhivanan et al., 2005; Pitpitan et al., 2013; Goodman-Meza et al., 2014).

The typology of sex work has undergone significant changes in Cambodia following the promulgation of anti-sex-trafficking and sexual exploitation laws enacted in 2008 that resulted in closure of brothels (Maher et al., 2011; Page et al., 2013). The majority of FSW are now employed in entertainment venues, including bars, clubs and karaoke venues, where alcohol is an underlying construct of their livelihood, as well as sexual transactions (Maher et al., 2011; Page et al., 2013). In previous studies, we found that self-reported alcohol use was prevalent among Cambodian FSW: 23.7% reported being drunk for more than 20 days the prior month (Couture et al., 2011), a worrisome finding that showed a need for more research on alcohol exposures and health impacts in FSW. Less is known about unhealthy alcohol consumption among male clients of FSW or the general male population in Cambodia. In a recent national survey, 7.9% of the men reported having consumed ≥7 alcoholic drinks in the past week, however the prevalence was likely underestimated due to social stigma and social desirability bias (Banta et al., 2013). A more recent report has found that alcohol use is increasing in Cambodia, especially among young people; 58% of those aged between 15 and 25 reported drinking alcohol every day (Eng, 2014).

Measuring unhealthy alcohol consumption is essential to inform effective prevention interventions and treatment. All of the data collected on unhealthy alcohol use in sex work settings in Cambodia and elsewhere have been collected using self-report (Li et al., 2010; Couture et al., 2011; Banta et al., 2013), which may be underestimated as a result of stigma, social desirability and recall biases (Stein et al., 2000; Del Boca and Darkes, 2003; Bajunirwe et al., 2014; Jain et al., 2014).

Direct metabolites of alcohol consumption, such as ethyl glucuronide, ethyl sulfate, phosphatidylethanol (PEth), and fatty acid ethyl esters (Wurst et al., 2015) have recently been developed as objective measures of consumption, each with their own rate of elimination. PEth is formed only in the presence of alcohol, and thus is highly specific, and a useful measure of alcohol consumption because it can be detected for 2–3 weeks after drinking (Wurst et al., 2015). In a study among HIV-positive patients, reporting a range of drinking from abstaining through very heavy drinking (median 490.6 g of alcohol over 90 days [Interquartile range (IQR): 267.2, 1272.7]), the PEth subtype 16:0/18:1 detected using liquid chromatography with tandem mass spectrometry (LC–MS/MS) with a cutoff of ≥10 ng/ml had 95% sensitivity and 73% specificity for any heavy alcohol consumption in the prior 21 days (Hahn et al., 2012). Other studies have shown high validity of PEth detected using high performance liquid chromatography (HPLC), with 97–99% sensitivity in alcohol-dependent patients and 100% specificity in abstainers to detect heavy alcohol over a period of 2–3 weeks (Aradottir et al., 2006; Hartmann et al., 2007). A handful of studies have compared PEth results to self-reported alcohol use in diverse populations with varying results (Stewart et al., 2010; Bajunirwe et al., 2014; Jain et al., 2014; Francis et al., 2015). PEth can conveniently be tested from dried blood spots (DBS; Jones et al., 2011) and may be useful to corroborate or supplement results on unhealthy alcohol consumption obtained by self-report from FSW and their male clients.

The goals of this study were 1) to assess unhealthy alcohol use prevalence in FSW and their male clients in Cambodia; 2) to compare self-reported unhealthy alcohol use among FSW and their clients to PEth results; 3) to determine the factors associated with self-reported alcohol use and PEth.

2. Material and methods

2.1. Study setting

A cross-sectional pilot study was conducted in October 2011 among FSW and male clients recruited at entertainment/drinking establishments and other sex work venues in Preah Sihanouk province, Cambodia. Participants were surveyed regarding sociodemographics, sexual behaviors, and alcohol and drug consumption. Blood samples were collected to assess biomarkers of alcohol use and to test for HIV. The study protocol was approved by the Cambodian National Ethical Committee on Human Research and the Committee on Human Research at University of California San Francisco.

2.2. Study population and recruitment

Convenience samples of FSW and male clients were recruited directly in entertainment/drinking establishments (karaoke bars, beer gardens, and nightclubs) and other sex work venues (brothels, parks, streets, guest houses) by trained staff from local organizations working in HIV prevention in sex work settings. Inclusion criteria for FSW were: being female, aged ≥18 years, understanding of Khmer, reporting at least two different sexual partners in the last month *or* engagement in transactional sex (sex in exchange for money, goods, services, or drugs) within the last three months, and being able to provide voluntary informed consent. The eligibility criteria were carefully worded to be as sensitive as possible to avoid stigmatization and protect the women engaged in sex work, which is criminalized in Cambodia. All of the women participating in the study confirmed receiving money, gifts or goods from at least one partner in the last three months in a subsequent question of our survey, indicating transactional sex. For the male clients the inclusion criteria were: presence at the sex work venue or entertainment/drinking establishment during fieldwork and reporting having a sexual encounter in the last 3 months with a FSW for which the client had paid in money or goods, aged ≥18 years, understanding of Khmer, and able to provide voluntary informed consent.

Entertainment/drinking establishments and sex work venues were mapped by trained field assistants employed by local community partners. FSW and their male clients were recruited directly from these locations by field assistants with the help of collaborating FSW, and managers of venues. Field assistants described the study and conducted a brief eligibility screening. The consent process included an explanation that blood samples would be tested for alcohol use as well as HIV. Eligible participants were asked to come to the Provincial AIDS Office (PAO) the following day. Partic-

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