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**Factors associated with alcohol use before sex among HIV-negative female sex workers in Zambia**

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## **ABSTRACT**

Female sex workers (FSW) are at high risk of HIV infection. Alcohol use prior to sex can compound this risk. We investigated the factors associated with having sex under the influence of alcohol among Zambian FSW. Community health workers and peer FSW recruited 331 HIV-negative FSW in Lusaka and Ndola. In a cross-sectional survey, we asked FSW how often they had sex under the influence of alcohol in the previous month, and categorised responses as 'always' and 'not always'. The adjusted odds ratios (AOR) of always having sex under the influence of alcohol were higher among FSW who: charged clients medium (AOR: 2.20, 95% confidence interval (CI): 1.04-4.68) and low fees (AOR: 2.65, 95% CI: 1.26-5.60) for sex versus high fees; received 9-19 (AOR: 2.37, 95% CI: 1.15-4.91) and 20 or more clients per month (AOR: 3.06, 95% CI: 1.47-6.37) versus up to eight clients per month; and never used condoms versus always used condoms with clients (AOR: 4.21, 95% CI: 1.53-11.55). FSW who always used alcohol before sex appeared more likely to engage in riskier sex and charge clients lower fees. Interventions for financial empowerment and alcohol risk reduction should complement existing HIV prevention interventions for FSW.

**Keywords:** Female sex workers; Alcohol; HIV; Zambia

## **INTRODUCTION**

With an estimated 980,000 (820,000- 1,200,000) new HIV infections every year, sub-Saharan Africa is in the midst of an epidemic.<sup>1</sup> One of the drivers of the HIV epidemic is alcohol use, which lowers inhibitions and elevates the likelihood of condomless sex.<sup>2-6</sup> Sex work is simultaneously characterised by risky sexual behaviour and frequent alcohol use.<sup>7</sup> Sex work usually occurs in drinking venues, making it likely that female sex workers (FSW) and/or their sexual partners will be intoxicated during ensuing sexual encounters.<sup>8,9</sup> These factors converge to render FSW vulnerable to acquiring and transmitting sexually transmitted infections (STI), including HIV.<sup>10-13</sup>

Though risky, having sex under the influence of alcohol is commonplace among FSW and is potentially tied to the financial relationship between FSW and their clients.<sup>7</sup> Globally, research shows that clients of FSW often purchase alcohol for FSW in order to facilitate the sexual transaction.<sup>7</sup> In Malawi and Zambia, FSW who frequently had sex under the influence of alcohol reported using alcohol to lower their inhibitions and attract clients.<sup>14,15</sup>

In Zambia, FSW have an estimated HIV prevalence of 50%, which is almost five times greater than that of the general population.<sup>1,16</sup> FSW also have a high prevalence (43%) of alcohol use, have no intermediaries and negotiate directly

with clients.<sup>17,18</sup> Drinking before sex diminishes an FSW's agency to negotiate safe sex with clients because alcohol use before sex: inhibits the discussion of risk between sexual partners; increases the frequency of condomless sex; and elevates the risk of acquiring HIV.<sup>19-21</sup> Finding out the factors associated with drinking before sex could inform the design of targeted behavioural interventions for FSW who are a high-risk group for HIV. Despite this, there are no studies among FSW in Zambia focusing on situational alcohol use and its potential consequences. To fill this knowledge gap, we studied the associated factors of having sex under the influence of alcohol among FSW in Zambia.

## **METHODS**

### **Design and setting**

This cross-sectional study draws from baseline questionnaires among FSW enrolled in an HIV-incidence study at two HIV research sites in Lusaka and Ndola. Participants were enrolled between September 2012 and May 2015.

### **Participants**

The inclusion criteria included identifying as a sex worker, i.e. exchanging sex for money, being unmarried, being HIV-negative and aged 18 to 45. Of the 419 FSW

interviewed at baseline, 331 FSW reported that they ever used alcohol, and thus formed the subset of our analysis for this study.

### **Study procedures**

The University of Zambia Research Ethics Committee (REF. No. 011-01-14) (Lusaka, Zambia) and the Emory University Institutional Review Board (IRB00071160) (Atlanta, USA) approved this study. Seventeen community-based health workers and 12 peer sex workers recruited FSW from sex work hotspots in Lusaka and Ndola. Recruiters approached FSW in bars, boarding houses, lodges and streets, handing out written invitations for HIV counselling and testing at the research site. FSW who tested HIV-negative were eligible to enrol in a broader HIV-incidence study of which our study is a subset.

Enrolled participants provided informed consent to take part in the study in English, Bemba or Nyanja. Medical staff, trained to minimise bias, administered a face-to-face standardised survey to all participants, which contained questions on socioeconomic information and HIV risk behaviour. FSW underwent gynaecological examinations with screening for syphilis (rapid plasma reagin serology) and for *trichomonas vaginalis* (microscopy of vaginal swabs).

Participants were reimbursed for their travel to and from the study sites. We also provided food and beverages to all participants during enrolment visits.

## **Outcome**

FSW were asked how often they had sex under the influence of alcohol in the preceding month, to which they responded: 'always', 'most of the time', 'sometimes', 'rarely', or 'never'. For ease of interpretation, we dichotomised this variable into 'always' and 'not always' to create our study outcome. Since only 3% (n=10) of FSW reported never having sex under the influence of alcohol, we had inadequate statistical power to compare this sub-group against FSW who reported drinking before sex. We did not use the AUDIT or CAGE questionnaires to inform our outcome as these measures typically assess problem drinking/alcohol misuse, whereas the focus of our study was situational alcohol use, i.e. drinking before sex.

## **Explanatory Variables**

We examined associations between volunteer characteristics and our outcome.

The literature informed our explanatory variable choices, which fell broadly under one of three categories: socioeconomics, behaviour, or STI test results.<sup>12,22</sup>

Socioeconomic variables were: age, level of education, city of residence, reason for beginning sex work, number of years in sex work, and amount charged per sexual act. Charges for sex with clients were categorised as low ( $\leq 45$  Zambian Kwacha [ZMK]), medium (46-89 ZMK) and high ( $\geq 90$  ZMK) (one United States Dollar [USD] =  $\sim 13$  ZMK). Behavioural variables included monthly volume of clients and



condom use with clients. STI test results were for syphilis and *trichomonas vaginalis*.

### **Statistical analysis**

Descriptive statistics calculated were frequencies, percentages, and chi-squared tests to examine the difference in sample characteristics between FSW who always/not always had sex under the influence of alcohol. We then conducted bivariate logistic regression analysis to test each of the explanatory variables against the outcome. Variables that were significant in bivariate analysis at  $p < 0.25$  were selected for multivariable analysis as per recommended guidelines.<sup>23</sup> We employed a forward stepwise method to construct the final multivariable logistic regression model. We chose to adjust for the potential confounding effect of age *a priori* because our study participants had a broad age range (18-45). We conducted a complete case analysis to deal with missingness. All statistical analyses were performed using Stata version 14.2 (StataCorp, College Station, Texas, USA).

### **RESULTS**

The median age of participants was 23 with an interquartile range (IQR) of 20 to 28. As shown in Table 1, the majority of women enrolled lived in Lusaka (68%) and had primary school level education (52%). The median duration in sex work

was 2 years (IQR: 1-3). FSW in our cohort saw a median of 10 clients per month (IQR: 6-20).

Of the 331 women who reported using alcohol before sex in the preceding month, 88 (27%) always had sex under the influence of alcohol; 72 (22%) mostly had sex under the influence of alcohol; 101 (30%) sometimes had sex under the influence of alcohol; 60 (18%) rarely had sex under the influence of alcohol; and 10 (3%) never had sex under the influence of alcohol. Table 1 displays comparisons of sample characteristics by always versus not always having sex under the influence of alcohol. Ndola-based FSW had a higher proportion of sexual encounters that were always under the influence of alcohol than Lusaka-based FSW ( $p<0.05$ ) (Table 1). Older and more educated FSW had a lower proportion of sexual encounters exclusively under the influence of alcohol than their younger and less educated counterparts ( $p<0.05$ ) (Table 1). FSW with more years of experience had a higher proportion of sexual encounters that were always under the influence of alcohol than less experienced FSW ( $p<0.05$ ) (Table 1).

Table 2 shows the variables associated with sex under the influence of alcohol in multivariable logistic regression analysis. FSW who never used condoms with clients had a four-fold increase in odds (AOR: 4.21, 95% CI: 1.53-11.55) of always having sex under the influence of alcohol compared to FSW who always used

condoms with clients. We also found that FSW who charged clients medium (AOR: 2.20, 95% CI: 1.04-4.68) and low fees (AOR: 2.65, 95% CI: 1.26-5.60) were over twice as likely to always have sex under the influence of alcohol as FSW who charged clients high fees for sex. Compared to FSW who saw up to eight clients per month, FSW who saw 9-19 (AOR: 2.37, 95% CI: 1.15-4.91) and 20 or more clients per month (AOR: 3.06, 95% CI: 1.47-6.37) had increased odds of always having sex under the influence of alcohol.

## **DISCUSSION**

Our results show that 97% of FSW reported some level of alcohol use before sex in the preceding month. This prevalence is higher than that found among FSW in Kenya (76%), China (30%), Mexico (69%) and the Middle East and North Africa (37%).<sup>12,13,24,25</sup> We found that FSW who charged clients lower fees, saw more clients, and never used condoms with clients were more likely to always have sex under the influence of alcohol. Our findings collectively suggest that drinking before sex results in FSW engaging in risky sexual behaviour and receiving decreased income from sex work.

### **Socioeconomics**

In our cohort, FSW who charged their clients low fees had over two-fold greater odds of always having sex under the influence of alcohol than FSW who charged

clients high fees. This is an important finding in the context of low-income countries, such as Zambia, where FSW mostly come from impoverished backgrounds.<sup>26</sup> In support of this, our data show that 83% of FSW began practising sex work to meet their financial needs. This is consistent with the economic background of FSW from other African countries, whose motivations for beginning sex work are financial.<sup>27,28</sup>

The literature demonstrates a link between low economic empowerment and increased risk-taking behaviour such as condomless sex among African FSW.<sup>29,30</sup> In our analysis, the median monthly client volume for FSW who charged high fees (n=12) was similar to that of FSW who charged low fees (n=10). This implies that, irrespective of client volume, FSW who charge low fees for sex earn less monthly income than FSW who charge high fees for sex. Recent evidence from a FSW cohort in Cameroon reveals that high monthly income corresponds to a reduction in new HIV infections.<sup>31</sup> Charging clients lower fees for sex due to the apparent influence of alcohol could hence be detrimental to both the livelihood and sexual health of FSW. This calls for HIV prevention interventions for FSW to include financial empowerment tools, which improve FSW agency to negotiate condom use and be more selective of clients, as shown in Tanzania.<sup>32</sup> This package would combine negotiating skills and risk reduction counselling around alcohol use to better preserve the financial and sexual wellbeing of FSW.

## **Risky sexual behaviour**

It is well corroborated that alcohol use before sex is associated with multiple sexual partners and inconsistent condom use.<sup>21</sup> We found that FSW who saw more clients and never used condoms with clients had higher odds of having sex under the influence of alcohol. Our findings mirror those among FSW in Kenya and China, where having sex under the influence of alcohol was associated with lower condom use and higher rates of STI.<sup>12,13</sup> Though we did not identify any direct associations between sex under the influence of alcohol and syphilis or trichomoniasis, it is likely that condomless sex mediates this relationship.

These findings further reinforce our recommendation that HIV prevention programmes for FSW include risk reduction interventions on alcohol consumption before sexual encounters. In Kenya, FSW who received a peer-delivered behavioural HIV prevention intervention were more likely to use condoms with occasional clients than those who did not.<sup>33</sup> This is an encouraging example for other sub-Saharan African countries such as Zambia, where FSW have a high prevalence of alcohol use before sex, linked to condomless sex. Using FSW to deliver such interventions to their peers could help circumvent the barriers of stigma that FSW face from healthcare workers.<sup>34,35</sup>

## **Limitations and future directions**

In spite of their significance, our findings have certain limitations. We cannot infer causality from our results due to the cross-sectional methodology of our study.

The variables on frequency of sex under the influence of alcohol, charges, client volume, and condom use in the past month were all self-report and subject to recall bias. Moreover, alcohol use itself can affect recall. Providing coital calendars to participants could help surmount the challenge of recall.

Our study only presented the perspective of the FSW and not that of the client. In the context of sex work in Zambia, negotiation and sexual encounters are a *two-way street* between FSW and client. Conducting a similar study among clients of FSW, who also use alcohol before sex,<sup>7</sup> would provide a more complete picture of why sex under the influence of alcohol is likely cheaper and condomless.

Amidst the outlined limitations, our findings contribute importantly to the literature. To our knowledge, this is the first paper to elucidate that sex under the influence of alcohol results in a decrease in the financial earnings of FSW. This finding may be generalisable in sub-Saharan Africa where FSW are typically poor and regularly use alcohol.<sup>36-38</sup> In the future, qualitative studies among FSW and their clients could shed more light on how drinking before sex affects the negotiation of price.

## **CONCLUSIONS**

We have shown, among HIV-negative FSW in Zambia, that always having sex under the influence of alcohol results in lower charges and risky sexual behaviour with clients. This calls for multi-level interventions that target both FSW and their clients. Based on previously cited successful interventions in Tanzania and Kenya,<sup>32,33</sup> we offer that these interventions be three-tiered and serve to: 1) empower FSW with financial negotiation skills; 2) counsel FSW on alcohol risk reduction; 3) offer alcohol risk reduction counselling to clients of FSW. Such interventions could simultaneously tackle the coexisting burdens of poverty and alcohol use before sex, which—if left unabated—fuel the concentrated HIV epidemic among FSW in sub-Saharan Africa.

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**Table 1: Sample characteristics by frequency of sex under the influence of alcohol among Zambian FSW (N=331)**

	Sex under the influence of alcohol			X <sup>2</sup> p-value
	Total Sample (N=331) n (%)	Always (n=88) n (%)	Not Always (n=243) n (%)	
<i>Demographics</i>				
<i>Age</i>				
18-20	101 (30)	36 (41)	65 (27)	0.034
21-25	109 (33)	22 (25)	87 (36)	
26-45	121 (37)	30 (34)	91 (37)	
<i>Education</i>				
None	28 (8)	9 (10)	19 (8)	0.022
Primary	172 (52)	55 (63)	117 (48)	
Secondary or higher	131 (40)	24 (27)	107 (44)	
<i>City of residence</i>				
Ndola	225 (68)	77 (88)	148 (61)	0.000
Lusaka	106 (32)	11 (12)	95 (39)	
<i>Number of years in sex work</i>				
1-3	107 (33)	22 (25)	85 (36)	0.040
4-6	100 (31)	24 (28)	76 (32)	
7-9	51 (15)	14 (16)	37 (15)	
10+	68 (21)	27 (31)	41 (17)	
<i>Reason for beginning sex work</i>				
Financial	276 (84)	76 (87)	200 (82)	0.712
Nothing to do	11 (3)	2 (2)	9 (4)	

Peer pressure	13 (4)	2 (2)	11 (5)	
Other	31 (9)	8 (9)	23 (9)	
Charge per sexual act				
High ( $\geq 90$ ZMK)	116 (35)	18 (21)	98 (40)	0.001
Medium (46-89 ZMK)	104 (32)	29 (33)	75 (31)	
Low ( $\leq 45$ ZMK)	109 (33)	40 (46)	69 (29)	
<i>Behaviour</i>				
Monthly client volume				
$\leq 8$	101 (35)	15 (18)	86 (42)	0.000
9-19	102 (36)	32 (39)	70 (34)	
20+	83 (29)	35 (43)	48 (24)	
Condom use with clients in previous month				
Always	56 (20)	6 (7)	50 (25)	0.000
Sometimes	157 (54)	42 (51)	115 (56)	
Never	74 (26)	35 (42)	39 (19)	
<i>STI test results</i>				
Syphilis				
Negative	291 (90)	75 (90)	216 (90)	0.924
Positive	32 (10)	8 (10)	24 (10)	
<i>Trichomonas vaginalis</i>				
Negative	294 (92)	76 (92)	218 (92)	0.814
Positive	25 (8)	7 (8)	18 (8)	

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*FSW= female sex workers; STI= sexually transmitted infection; ZMK= Zambian Kwacha*

*NB: Ns don't always equal the total due to missingness*

**Table 2: Adjusted and unadjusted factors associated with always having sex under the influence of alcohol among Zambian FSW (N=331)**

	Sex under the influence of alcohol			
	Crude OR	95% CI	Adjusted OR	95% CI
<i>Demographics</i>				
Age				
18-20	1	-	-	-
21-25	0.46	0.25-0.85*	-	-
26-45	0.60	0.33-1.06	-	-
Education				
None	1	-	-	-
Primary	0.99	0.42-2.33	-	-
Secondary or higher	0.47	0.19-1.17	-	-
City of residence				
Ndola	1	-	-	-
Lusaka	0.22	0.11-0.44***	-	-
Number of years in sex work				
1-3	1	-	-	-
4-6	1.22	0.63-2.35	-	-
7-9	1.46	0.67-3.17	-	-
10+	2.54	1.30-4.10**	-	-
Reason for beginning sex work				
Financial	1	-	-	-
Nothing to do	0.58	0.12-2.77	-	-
Peer pressure	0.48	0.10-2.21	-	-

Other	0.92	0.39-2.13	-	-
Charge per sexual act				
High ( $\geq 90$ ZMK)	1	-	1	-
Medium (46-89 ZMK)	2.11	1.09-4.08*	2.20	1.04-4.68*
Low ( $\leq 45$ ZMK)	3.16	1.67-5.96***	2.65	1.26-5.60*
<i>Behaviour</i>				
Monthly client volume				
$\leq 8$	1	-	1	-
9-19	2.62	1.31-4.68**	2.37	1.15-4.91*
20+	4.18	1.73-6.24***	3.06	1.47-6.37**
Condom use with regular clients in previous month				
Always	1	-	1	-
Sometimes	3.04	1.21-7.62*	2.10	0.81-5.45
Never	7.48	2.86-19.57***	4.21	1.53-11.55**
<i>STI test results</i>				
Syphilis				
Negative	1	-	-	-
Positive	0.96	0.41-2.23	-	-
<i>Trichomonas vaginalis</i>				
Negative	1	-	-	-
Positive	1.12	0.45-2.77	-	-

FSW= female sex workers; STI= sexually transmitted infection; ZMK= Zambian Kwacha

OR= odds ratio (age-adjusted); CI= confidence interval;

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$