

# Public Drinking Venues as Risk Environments: Commercial Sex, Alcohol and Violence in a Large Informal Settlement in Nairobi, Kenya

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## Introduction

Sub-Saharan African HIV/AIDS research emphasizes situating studies in locales where new sexual partnerships form and HIV transmission risk is high (Weir *et al.* 2003; Sandøy *et al.* 2008). Sub-Saharan Africa public drinking venues meet both criteria, with new partnerships formed between female sex workers (FSW) and male bar patrons, and HIV transmission rates elevated from alcohol-related behavior including interpersonal violence (Li and Stanton 2010; Woolf-King *et al.* 2013). As such sub-Saharan public drinking venues represent “risk environments,” a concept originally developed for injection drug use research (Rhodes 2002), but subsequently extended to commercial sex work (Deering *et al.* 2013). Rhodes *et al.* (2005:1027) defined HIV risk environments as “... the space, whether social or physical, in which a variety of factors exogenous to the individual interact to increase vulnerability

to HIV.” The goal of this study is to delineate risk patterns and interrelationships associated with commercial sex work, alcohol consumption, and interpersonal violence in the risk environment of public drinking venues, using data from the under-researched perspective of male bar patrons in the large informal settlement of Kibera, Nairobi, Kenya.

Early research on the sub-Saharan HIV/AIDS pandemic highlighted the epidemiological importance of female commercial sex work (Ngugi *et al.* 1988), and commercial sex remains an important driver of the HIV/AIDS pandemic in sub-Saharan Africa (Mishra *et al.* 2016). In addition, sub-Saharan commercial sex work research consistently revealed high levels of physical and sexual violence against FSW. For example, a multi-site Kenyan survey of 475 FSW reported that in the previous month 35% had been raped by a client (Elmore-Meegan *et al.* 2004). Furthermore, several studies have shown alcohol consumption exacerbates the dual risks of HIV infection and violence associated with commercial sex in sub-Saharan Africa. Reviews indicate strong associations between alcohol consumption and condom-less commercial sexual intercourse (Kalichman *et al.* 2007; Woolf-King and Maisto 2011), while Chersich *et al.* (2007) reported that Nairobi FSW who binge drink were more likely to be sexually assaulted by their clients compared to those who do not. Nairobi FSW recognize this last association and reported abstaining from drinking alcohol with clients in order to avoid potentially risky situations (Okal *et al.* 2011).

Violence against male clients by FSW is also reported, although far less frequently, and usually from high-income countries. In their synthesis of prostitution-related homicides drawn from a variety of criminal justice, vital statistics, and media databases in the United States, Brewer *et al.* (2006) found 49 murders of male clients in Chicago and St. Louis from 1965 to 1995. FSW were responsible for 77% of these homicides and pimps/managers for 13%. In Canada, Kurtz

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*et al.* (2004) reported that theft, robbery and violence against clients were common among the FSW they interviewed. Atchison's (2010) survey of 861 male clients of FSW revealed similar results: 43% of sex buyers had not received purchased services, 20% had been robbed by a FSW, 19% had been verbally abused, 14% had money or property stolen, and 5% had been assaulted. Notwithstanding comparatively higher risks of violence experienced by FSW, these findings suggest that interpersonal violence is not one-directional in commercial sex transactions, but rather relational and contextual (Langhinrichsen-Rohling 2010; Atchison *et al.* 2015).

### The Study Locale

Kibera is the largest informal settlement in East Africa. Earlier population estimates for the settlement ranged up to 800,000 people (Odek *et al.* 2009). While recent mapping projects reduced this estimate to less than 200,000 (Marras 2012), this remains an incredibly high number of people living within one square mile. The present location of Kibera was uninhabited until the 1920s, when it was awarded to Sudanese Nubian soldiers who fought in World War I (Bendikson 2007). However, the colonial government did not give property titles to residents; consequently the area was omitted from post-independence urban planning and received few public services. Today Kibera lacks paved roads and public sewage disposal, and most houses are made from mud with iron sheet roofs.

Residence in Nairobi informal settlements in general is associated with substance abuse, early sexual onset and commercial sex (Mugisha *et al.* 2003; Kabiru *et al.* 2010; Zulu *et al.* 2011). Specific to Kibera, previous research indicated that FSW working in bars have increased risk of interpersonal violence (Chersich *et al.* 2007). More recent studies of Kibera FSW working out of bars found they have weak and small kinship support networks compared to same-aged Kibera women who never entered commercial sex work (Ngugi *et al.* 2012a), that many commercial sex cases involved condom-less anal/vaginal intercourse, with male clients paying extra for this service (Ngugi *et al.* 2012b; Benoit *et al.* 2013), and that social norms fostered acceptance of male involvement in commercial sex and equated all women in bars with FSW (Roth *et al.* 2014). Taken together, poverty, gender power differentials, social norms and lack of social support represent social and structural factors that make Kibera bars potentially a serious HIV risk environment.

### Materials and Methods

We developed a rapid assessment methodology to sample Kibera bars. Rapid assessment is a means to mount intervention programs quickly in specific local environments, and was

successful in HIV programs relating to injection drug use, FSW, and Men Who Have Sex with Men (Needle *et al.* 2003; Parry *et al.* 2008, 2009). When this research was conducted in 2012 Kibera was divided into 11 villages: Lindi, Soweto (East and West), Makina, Kianda, Mashimoni, Gatuikira, Kisumu Ndogo, Laini Saba, Siranga, and Raila. Because there are no population lists for Kibera, we stratified recruitment by community to make our sample as representative as possible. Key informants from each community identified the ten most popular bars in their community, and together we constructed social maps (Schenul *et al.* 1999) showing the location of each bar. As detailed elsewhere (Roth *et al.* 2014), sampling within bars raised security concerns for both study respondents and interviewers who respectively received and gave cash honoraria. Discussing these concerns with community key informants resulted in a strategy in which two male Kenyan interviewers entered a bar and each selected a bar patron as a potential participant. If the selected patron did not agree to participate another was selected. Patrons who agreed left the bar with the interviewers and went to a nearby private locale chosen by community key informants. There they read and signed an informed consent sheet, completed a short questionnaire, and received their study honorarium. Due to safety concerns, interviewers did not return to that bar. The total sample recruited in this manner during July–December, 2012 was 220 men, representing two male patrons from each of 10 bars in the 11 Kibera communities (i.e.,  $2 \times 10 \times 11 = 220$ ).

Respondents completed a questionnaire translated from English into Kiswahili and approved by human ethics committees at the researchers' home universities. Responses to one section asking about behavior in Kibera bars formed the study data for this analysis. This section featured 20 statements asking about interactions with FSW met in Kibera bars, including "I have had sex with a female sex worker I met in a bar," "When I go to a bar I intend to have sex with a FSW," and, "I often have more than one drink with a female sex worker I met in a bar." Unlike other questionnaire sections that used this format, these statements did not lend themselves to ranked responses. Instead these behaviors represented "yes/no" responses, e.g., one did or did not have sex with a Kibera FSW. Therefore responses were transformed into dichotomous categorical variables by forming: "yes" (3 = Agree, 4 = Strongly Agree) and "no" categories (1 = Strongly Disagree, 2 = Disagree).

The SAS®, Version 9.3 PROC FREQ subroutine generated Odds Ratios and corresponding 95% confidence intervals for responses to these statements. Odds represent the ratio of the expected number of times an event will occur to the expected number of times it will not. This can be expressed as  $p/1-p$ , where  $p$  is the probability of an event occurring and  $1-p$  the probability of it not occurring. Odds of 1.0 are equivalent to probabilities of 0.5, exemplified by the case of flipping a coin and having "heads" on top instead of "tails," i.e.,  $p_{\text{heads}} = 0.5$ ,

$p_{\text{tails}} = 0.5$ , Odds =  $0.5/1-0.5 = 1.0$ . Unlike probability, odds are not limited to 0–1, enabling multiplicative comparisons of different probability levels, so that a value of 20 means one event is 20 times more likely to occur than not (Allison 2013:16). Odds Ratios (OR) compare the odds of two different events, i.e.,  $OR = \text{odds for event1}/\text{odds for event2}$ . In this study, an example would be the odds of drinking with a FSW and the odds of having commercial sex with a FSW. Positive Odds Ratios have values above 1.0, and negative Odds Ratios below 1.0, while 95% confidence intervals that cross 1.0 are by definition non-significant, since they mean that the ratios are sometimes negative and sometimes positive.

Bivariate analysis focused on responses to the questionnaire statement, “*I often have more than one drink with a female sex worker I met in a bar,*” since this represented how men meet FSW in Kibera bars. These responses were analyzed in relation to responses to the statement asking whether respondents ever engaged in commercial sex, suffered or initiated physical violence with FSW, or were ever extorted, drugged, or robbed by FSW. Subsequent multivariate analysis featured log-linear modeling using SAS® 9.3 PROC CATMOD. Log-linear analysis is analogous to multivariable correlation analysis in that associations between variables are generated and no dependent variable is specified (Allison 2013). While correlation analysis is designed for continuous variables, log-linear modeling analyzes categorical variables. Log-linear modeling also differs in that analysis is hierarchical. Model building begins with a “saturated” model containing all main effects and variable interactions. Analogous to backward elimination procedures for logistic regression analysis, higher order interactions are eliminated if not statistically significant. The final fit between data and model was assessed with the likelihood ratio statistic ( $L^2$ ), which compared expected to observed frequencies, with good model fit represented by non-significant ( $p > .05$ ) values (Field and Miles 2010). For the final model Adjusted Odds Ratios (AOR), which control for other variables in the model, were calculated using SAS® PROC FREQ.

## Results

### Sample Composition

Male bar patrons’ ages ranged from 19 to 58 years, with a mean of 35.2 years. Less than 10% of patrons had any college/university education. Their average weekly income was just below 3500 Kenyan shillings per week (approximately \$42 US), and 78% were currently married. Respondents had a mean of 2.6 children, and lived in Kibera on average for more than 14 years. This last figure, combined with a mean bar visitation of 4 days per week, suggested that the sample

consisted of regular bar clients with a long residential history in Kibera (Table 1).

### Commercial Sex, Alcohol and Violence

Response frequencies for statements pertaining to alcohol consumption, commercial sex, and interpersonal violence show that 49% of respondents reported ever having commercial sex with FSW they met in Kibera bars, and 41% said they often had more than one drink with FSW in Kibera bars (Table 2). Further, 24% reported fighting with FSWs, and 15% said they had physically hurt FSW. Respondents also indicated that violence was a two-way street: 36% of respondents reported being robbed and 20% drugged by FSW, and 13% said they had been assaulted. These outcomes were all positively (Odds Ratios  $>1.0$ ) associated with buying alcohol for FSW met in Kibera bars, and with the exception of being drugged all were statistically significant ( $p < 0.05$ ) (Table 3).

For multivariate log-linear analysis variables relating to interpersonal violence, regardless if initiated or suffered by male bar patrons, were pooled to form a composite categorical variable termed VIOLENCE, so that any report of fighting with, hurting and being hurt, being extorted, robbed and/or drugged was coded as “1,” while no reports were coded as “0.” Reports of drinking with FSW in Kibera bars (no = 0, yes = 1) formed the variable DRINKING, and ever having sex with FSW met in Kibera bars comprised the variable COMMERCIAL SEX (no = 0, yes = 1). An initial saturated model generated values for the main effects, all two-way

**Table 1** Sample characteristics

Variable	Valid N.	Mean	Standard Deviation	Range
Age	219	35.2	7.9	19–58
Years in Kibera	219	14.3	9.8.	0–53
Income (Kenyan Shillings per Week)	215	3426	2945	300–25,000
Children	220	2.6	1.9	0–8
Days/Week in Bar	219	4.0	2.9	0–7
Marital Status		%		
Single/never married	32	15		
Divorced/separated	13	6		
Married	173	78		
Widowed	2	1		
Education (Last Grade/Form)		%		
None	15	7		
Primary	92	42		
Post-Primary/Vocational	89	1		
Secondary /A Level	19	41		
College Middle Level	3	9		

**Table 2** Frequency of responses to questions about commercial sex, alcohol and commercial sex given as numbers and percentages

Statement	Yes (%)	No (%)
I often have more than one drink with sex workers	91 (41)	129 (59)
I have had sex with sex workers I met in a bar.	107 (49)	113 (51)
I have had physical fights with sex workers I met in a bar.	52 (24)	168 (76)
I have been physically hurt by sex workers I met in a bar.	29 (13)	191 (87)
I have physically hurt sex workers I met in a bar.	33 (15)	187 (85)
I have been robbed by sex workers I met in a bar.	78 (36)	142 (64)
Sex workers have threatened to tell my wife/ girlfriend about having sex with me.	50 (23)	170 (77)
I have been drugged by sex workers I met in a bar.	44 (20)	176 (80)

interactions, and the three-way interaction, DRINKING\*COMMERCIAL SEX \*VIOLENCE (Table 4). Since this was a saturated model fitting all the data, the resultant likelihood ratio value is 0. Results showed that the highest order, three-way interaction, was statistically non-significant, and it was removed in a second run (Table 5). In this second model the two-way interactions DRINK\*COMMERCIAL SEX and DRINK\*VIOLENCE, were statistically significant, while the last two-way interaction COMMERCIAL SEX\*VIOLENCE, was not. This meant that respondents were

almost four times more likely to have sex with FSW if they drank with them (Adjusted Odds Ratio = 3.80, 95% CI = 2.13–6.77,  $p < .001$ ), and two times more likely to have a violent encounter with FSW if they drank with them (Adjusted Odds Ratio = 2.08, 95% CI = 1.17–3.72,  $p = 0.01$ ). In contrast, respondents who had sex with FSW were only slightly more likely (32%) to have a violent encounter with FSW (Odds Ratio = 1.32, 95% CI = 0.74–2.44,  $p = 0.32$ ). Finding two of the three possible two-way interactions statistically significant negated removing this level of interaction (Table 5). Overall model fit was good, featuring a likelihood ratio probability of 0.74.

## Summary and Discussion

This study analyzed data generated by rapid assessment methodology that included social mapping, key informants and a short questionnaire to survey male bar patrons throughout the large informal settlement of Kibera, Nairobi, Kenya. Our study goal was to understand patterns and interrelationships between alcohol use, violence and commercial sex reported from the under-researched perspective of male bar patrons in the risk environments (Rhodes *et al.* 2005) represented by Kibera public drinking venues. Bivariate analysis showed statistically significant linkages between drinking with FSW, commercial sex, and interpersonal violence. In addition to reporting violence against FSW, male bar patrons reported being robbed, physically hurt, drugged and extorted by FSW. Compared to Atchison's (2010) survey of North American clients cited earlier, Kibera male clients' reported higher levels of being robbed (36% vs. 20%) and assaulted

**Table 3** Possible outcomes following drinking with FSW in Kibera bars

	I often have more than one drink with sex workers		Odds Ratio (95% CI)
	Yes	No	
I have had sex with sex workers I met in a bar	Yes	62	3.99*** (2.26–7.06)
	No	29	
I have had physical fights with sex worker	Yes	31	2.66** (1.41–5.03)
	No	60	
I have been physically hurt by sex workers	Yes	19	3.14** (1.38–7.13)
	No	72	
I have physically hurt sex workers	Yes	23	4.03*** (1.81–8.96)
	No	68	
I have been robbed by sex workers	Yes	44	2.62*** (1.48–4.62)
	No	47	
Sex workers have threatened to tell my wife/ girlfriend about having sex with me	Yes	28	2.16* (1.14–4.10)
	No	63	
I have been drugged by sex workers	Yes	23	1.74 <sup>†</sup> (0.89–3.38)
	No	68	

\* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$ , <sup>†</sup> =  $p > 0.05$

**Table 4** Log-linear analysis results, initial saturated model

Source	Degrees of freedom	Chi-squared value	Probability
Commercial sex	1	0.26	0.61
Violence	1	2.48	0.12
Drink	1	5.05	0.02
Drink* commercial sex	1	20.48	<.0001
Drink* violence	1	5.95	0.01
Commercial sex*violence	1	0.98	0.32
Commercial sex *drink* violence	1	0.11	0.74

Likelihood Ratio = 0, d.f. = 0

(13% vs. 3%). Differences in working definitions of violence towards FSW, e.g., client vs. intimate partners, physical versus sexual violence, and time units (e.g., past six months versus lifetime) negate comparing our study's self-reports with others. However, we can say that the levels of violence against and by FSW in this study indicate that interpersonal violence associated with commercial sex is not unidimensional, but rather complex and relational (Langhinrichsen-Rohling 2010; Atchison *et al.* 2015).

Subsequent multivariate log-linear analysis found significant interactions between drinking with FSW in Kibera bars and commercial sex, and drinking with FSW and interpersonal violence, regardless of who initiated violence. Equally important, there were non-significant interactions between commercial sex and interpersonal violence and between the three-way interaction for drinking with FSW, commercial sex, and interpersonal violence. While providing strong support for the concept of Kibera public drinking venues as risk environments (Rhodes *et al.* 2005), the interactions between drinking and commercial sex and drinking and violence results also invoke the concept of syndemics originally proposed by Singer (1996) for the interrelated complex of health and social factors facing the urban poor. Specifically, the syndemic known as SAVA (substance abuse, AIDS and violence) proposed by Singer (1996) for North American urban minorities and now globally applied to girls and women (Meyer *et al.* 2011;

**Table 5** Final log-linear model

Source	Degrees of freedom	Chi-squared value	Probability
Commercial sex	1	0.32	0.57
Violence	1	2.41	0.12
Drink*commercial sex	1	20.41	<.0001
Drink* violence	1	6.18	0.01
Commercial sex*violence	1	0.90	0.34

Likelihood Ratio = 0.11, Degrees of Freedom =1, Probability =0.73

Gilbert *et al.* 2015) seems relevant to Kibera public drinking venues.

These results suggest that education/intervention programs focusing on only one factor, e.g., HIV risk, would be ineffective in syndemic settings. In their review of global venue-based interventions to reduce HIV risk behaviors in public drinking venues Pitpitan and Kalichman (2015) report positive results for two sub-Saharan African programs adopting the Popular Opinion Leader model (Kelly *et al.* 1991), originally developed for North American gay/bisexual men, and whose primary objective is to change patrons' social norms surrounding alcohol consumption and sexual risk behaviors. Previous Kibera research (Roth *et al.* 2014) showed the importance of patriarchal social norms, including peer acceptance of commercial sex, and the presumption that buying alcohol for a women in a bar means she consents to have sex. In light of this study's results, interventions to alter male social norms not only pertaining to commercial sex but also alcohol consumption in public drinking venues and interpersonal violence are warranted. To construct such programs, ethnographic studies of African bars are critically needed to understand the context, as well as the patterning, of sexual and physical health risks. Examples of such studies from other regions highlight drinking establishment diversity and relate this to intervention/education program feasibility (Balán *et al.* 2014). To accomplish this in sub-Saharan Africa will necessitate additional studies in urban and rural, poor and wealthy, settings.

This study has limitations. It is not based upon a random sample, and therefore results cannot be extrapolated to other populations and/or settings. In addition, it relies on reported behaviors from male bar clients that may be subject to social desirability bias, such as underestimating their own involvement in violence and commercial sex. Finally, data were collected in early evening hours to protect interviewer personal security, and may not reflect conditions later in the night, when rates of alcohol-related violence could be different. Nonetheless, these findings support previous research focusing upon sub-Saharan African public drinking venues as sites where multiple health risks arise from the intersection of alcohol use, commercial sex and interpersonal violence and highlight the need to implement venue-based education and intervention programs.

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