



Intimate partner sexual violence is associated with unhealthy alcohol use among Kenyan women engaged in sex work

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HIGHLIGHTS

- Unhealthy alcohol use occurs frequently among Kenyan women engaged in sex work.
- Sexual intimate partner violence is associated with unhealthy alcohol use.
- Services for unhealthy alcohol use and gender-based violence should be integrated.

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ABSTRACT

Aim: Unhealthy alcohol use is often correlated with experiences of intimate partner violence (IPV). We investigated how different types of IPV (sexual, physical, emotional, and financial) were associated with unhealthy alcohol use among women engaged in sex work in Mombasa, Kenya.

Methods: This cross-sectional study included 283 HIV-negative women who engaged in sex work recruited from an ongoing cohort study. Modified Poisson analysis was used to assess associations between recent (≤ 12 months) or past (> 12 months) experiences of sexual, physical, emotional, or financial IPV and unhealthy alcohol use defined as an Alcohol Use Disorders Identification Test score ≥ 8 .

Results: Among 283 participants, 34.6 % had unhealthy alcohol use. Physical (62.5 %), emotional (60.4 %), and financial (66.4 %) IPV occurred more frequently than sexual IPV (43.8 %). Adjusted risk ratios (ARR) for relationships between physical and financial IPV and unhealthy alcohol use were elevated but not statistically significant. Compared to participants who had not experienced sexual IPV, those who had experienced recent or past sexual IPV had an increased risk of unhealthy alcohol use (ARR 1.56, 95 % confidence interval [1.09, 2.23] and ARR 1.48, 95 % confidence interval [0.97, 2.25], respectively).

Conclusion: Sexual IPV was associated with unhealthy alcohol use among Kenyan women who engage in sex work. Physical, emotional, and financial IPV were also highly prevalent in the study population, though not associated with unhealthy alcohol use. These findings affirm the potential benefit of providing integrated IPV and alcohol treatment services focused on recovery after experiences of IPV for this vulnerable population.

1. Introduction

Transactional sex is common in resource-limited settings such as Kenya and often accompanied by violence. One survey conducted in

Kenya in 2013 estimated that approximately 4%–6 % of adult women had engaged in sex work in the past 12 months, whether or not they identified as female sex workers (Odek et al., 2014). Women who engage in sex work in Kenya do so as their sole source of income or to

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supplement their primary income (Kerrigan et al., 2013). While most sex work in Kenya is based in bars and nightclubs (60%–70 %), sex work can be conducted in homes and on the street (Luchters et al., 2008; Odek et al., 2014). An estimated 25%–50 % of women who engage in sex work in Mombasa, Kenya report physical or sexual violence in the past 12 months, from clients, police, strangers, or intimate partners (Pack et al., 2013; Roberts et al., 2018). Because sex work is criminalized by national and municipal laws in Kenya, women who engage in sex work experience stigmatization, isolation, and police harassment that can exacerbate the impact of violence (Mbote et al., 2020).

Kenyan women who engage in sex work often work in bars and nightclubs where alcohol is readily available (Chersich et al., 2007) and is used to lower inhibitions or at the request of their clients (Lancaster et al., 2018). These women may use alcohol to cope with post-traumatic stress disorder, depression, and other mental health conditions (Beattie et al., 2020). Initiation of sex work at a young age has been shown to be a predictor of alcohol use among Kenyan women (Parcese et al., 2016b). In addition, unhealthy alcohol use among Kenyan women who engage in sex work has been previously correlated with experiences of violence, adverse childhood experiences, other substance use, housing instability, mental health conditions, and police arrest (Beksinska et al., 2022).

Intimate partner violence (IPV) has been found to correlate with unhealthy alcohol use among Kenyan women who engage in sex work. In a prior study among 619 such women who enrolled in a clinical trial, any IPV in the last 30 days was associated with possible alcohol use disorder as defined by a score on the alcohol use disorder identification test (AUDIT) of ≥ 16 (Pack et al., 2013). Among 286 women who engage in sex work who had a regular partner in Mombasa, those who reported possible alcohol use disorder (AUDIT score ≥ 16) had a higher odds of reporting any physical, sexual, or emotional violence from that partner in the past year (Wilson et al., 2016). In another study conducted among 719 women who engage in sex work in Mombasa, sexual violence, defined as being physically forced to have sex without payment, was associated with heavy episodic drinking (Chersich et al., 2007). A study conducted in 11 major towns in Ethiopia that enrolled 4886 women who engage in sex work found that participants who reported heavy episodic drinking had a 1.27-fold higher odds of reporting a physical beating in the past year (Amogne et al., 2021). Finally, in Kampala, Uganda, a study of 1440 adolescent girls and young women reporting high-risk sexual behavior (80 % of whom reported transactional sex), an AUDIT score ≥ 8 was associated with ever experiencing IPV (type not specified, Mayanja et al., 2020). While previous studies have demonstrated an association between IPV and unhealthy alcohol use among Kenyan women who engage in sex work, these studies have not separately evaluated sexual, physical, emotional, and financial IPV and their relation to unhealthy alcohol use, nor have they evaluated how time since experienced IPV relates to unhealthy alcohol use.

A growing body of literature has demonstrated that unhealthy alcohol use increases risk behaviors for human immunodeficiency virus (HIV) and other sexually transmitted infections (STI) among Kenyan women who engage in sex work (Chersich et al., 2007; Bengtson et al., 2014; White et al., 2016). For example, a prospective study of 405 such women in Mombasa, Kenya, found that unhealthy alcohol use (reported at 16.6 % of AUDIT assessments) was associated with a higher risk of detecting prostate specific antigen (a biomarker of unprotected sex) at study visits, relative to no alcohol use; unhealthy alcohol use was also associated with self-report of unprotected sex and with STI acquisition (White et al., 2016). Despite the link between unhealthy alcohol use and HIV/STI risk, current HIV prevention and care services for Kenyan women who engage in sex work lack staffing and resources to screen for and address unhealthy alcohol use and related factors in an integrated fashion (Lafort et al., 2016; Temmerman et al., 2019; Macleod et al., 2024).

Previous research has also suggested that interventions to reduce unhealthy alcohol use may decrease gender-based violence more

generally and IPV specifically. For example, a brief HIV prevention intervention delivered to South African women who engage in sex work decreased substance use and experiences of violence (being beaten, robbed, or raped) among intervention compared to control participants (Wechsberg et al., 2006). A more recent study demonstrated a decrease in physical violence reported by Kenyan women who engage in sex work after a brief intervention focused on alcohol harm reduction (Parcese et al., 2016a). That study focused on physical violence only, and did not measure sexual, financial, or emotional IPV. Interventions to reduce both unhealthy alcohol use and IPV among couples in India and Malawi have shown promising results (Hartmann et al., 2021; Conroy et al., 2024). Developing and scaling up effective interventions to reduce unhealthy alcohol use and prevent IPV among women who engage in sex work requires an improved understanding of the relationship between unhealthy alcohol use and different types of IPV.

The Sexual Violence study was a cross-sectional study conducted in Mombasa, Kenya, that examined the role of gender-based violence in general and IPV in particular in increasing HIV acquisition risk among HIV-negative women who engage in sex work through several hypothesized mediators including sexual behavior, mental health and substance use, and biomarkers of inflammation, physiologic stress, and immune activation. A prior analysis of Sexual Violence study data identified latent classes of IPV and reported associations between these classes and behavioral health outcomes including depressive symptoms, post-traumatic stress disorder symptoms, and unhealthy alcohol use (Roberts et al., 2018). In that study, participants belonging to latent classes indicating severe IPV or sexual IPV had higher levels of unhealthy alcohol use, relative to participants in a latent class indicating low levels of experienced gender-based violence. Of note, unhealthy alcohol use was not a primary outcome, and the latent classes identified, while intuitive, do not easily lend themselves to simple screening approaches.

In this study, we used data from the Sexual Violence study to investigate how specific types of IPV (sexual, physical, emotional, and financial) and the recency of these experiences correlate with unhealthy alcohol use. We hypothesized that unhealthy alcohol use would differentially associate with different types of IPV and that more recent IPV experiences would have stronger associations with unhealthy alcohol use than experiences in the past. This study is important given the high prevalence of unhealthy alcohol use and IPV among Kenyan women who engage in sex work and the limited resources available to provide services, resulting in a need to identify and prioritize those most in need of intervention.

2. Materials and methods

2.1. Setting and population

This cross-sectional study enrolled women from the Mombasa Cohort, an ongoing cohort study that has followed women who self-report exchanging sex for cash, goods, or services since 1993 in Mombasa, Kenya, the country's second largest city and a major seaport (McClelland et al., 2015). Eligibility criteria for the Mombasa cohort include: age 16 and older, residing within 1-day commuting distance to the study clinic, self-identifying as exchanging sex for payment in cash or in kind, and able to provide informed consent. To be eligible for the Sexual Violence study, women had to be a Mombasa Cohort participant with HIV seronegative status per their last HIV rapid test. HIV-seropositive women were excluded, given the focus of the Sexual Violence study on risk for HIV acquisition among previously uninfected women. Women who were pregnant, menstruating, or < 6 months post-partum were excluded, as samples were collected to measure genital cytokines (Kwendakwema et al., 2025). Potentially eligible women were recruited at monthly Mombasa Cohort visits. If eligible and willing to provide informed consent, women were enrolled at the start of the research visit. A counselor or study nurse administered a questionnaire

verbally on sexual behavior and recent health as part of Mombasa Cohort data collection procedures, followed by a Sexual Violence study-specific questionnaire to assess for exposure to different types of violence including physical, sexual, emotional, and financial IPV. The Sexual Violence study was conducted between March 2014 and May 2015. Detailed procedures for the Mombasa Cohort study and this cross-sectional study have been previously described (McClelland et al., 2015; Heller et al., 2018; Roberts et al., 2018).

2.2. Ethics statement

All study participants provided written informed consent prior to joining the Mombasa Cohort and provided additional written informed consent for Sexual Violence study participation. The institutional review boards at the University of Washington and Kenyatta National Hospital approved the research protocol and provided oversight.

2.3. Measures

2.3.1. Exposure: intimate partner violence

Types of IPV and the approximate date each type was last experienced were measured using a modified version of the World Health Organization Violence Against Women (VAW) Questionnaire (Garcia-Moreno et al., 2006), which assessed lifetime experience of 18 specific acts of physical, sexual, emotional or financial violence from regular partners, casual partners, and clients. For each specific act experienced, women were asked about timing (past 12 months, > 12 months ago) and frequency (one, few, many times) (Roberts et al., 2018). Recent experience of IPV was defined as any IPV experience within the last 12 months, while past experience of IPV was defined as any experience greater than 12 months before the Sexual Violence study visit. Recent and past IPV categories were mutually exclusive categories and past categorization was based on date of the most recently reported experience. The WHO VAW was found to have good internal consistency in a multicountry study that included Tanzania and Ethiopia, has been applied in numerous settings, and is considered a reliable measure of IPV (Garcia-Moreno et al., 2006). In addition, the VAW measures have predictive (criterion) validity, given their ability to detect associations between IPV and a number of health outcomes (Ellsberg et al., 2008; Devries et al., 2011).

2.3.2. Outcome: alcohol use

Alcohol use was measured using the AUDIT with a 12-month time frame; an AUDIT score ≥ 8 was used to create a binary variable defining unhealthy alcohol use (yes, no) (Saunders et al., 1993). The AUDIT instrument has been found to be valid across a range of settings and populations (Reinert and Allen, 2007) and a score of 8 was recently found to be optimal in a study of adults from the general population in Tanzania, also in East Africa (Vissoci et al., 2023). Cronbach's alpha for the AUDIT in the study population was 0.858, which is consistent with prior studies among Kenyan sex workers in Mombasa (Chersich et al., 2007).

2.3.3. Sociodemographic characteristics

Sociodemographic characteristics recorded included the continuous variables of age, years of education, and years since initiation of sex work (asked as "years as a prostitute/barmaid"). These variables were collected at Mombasa Cohort enrollment; age and years since initiation of sex work were updated according to time since enrollment. Categorical variables collected at Mombasa Cohort enrollment included religion (Protestant, Catholic, Muslim, or other), sex work location (bar/restaurant/guesthouse, nightclub, or home-based/other), marital status (never married, currently married, or widowed/divorced) and income (≤ 1000 , 1001–2000, 2001–5000, or > 5000 Kenyan shilling). At enrollment into the Sexual Violence study, women were asked whether they had engaged in sex work in the past 12 weeks (yes, no).

2.3.4. Mental health and substance use characteristics

The following mental health and substance use characteristics were measured and used to describe the population with and without unhealthy alcohol use:

- The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptoms, with moderate to severe depression was defined by PHQ-9 cutoff score of 10 (Kroenke et al., 2001). The PHQ-9 instrument found to be valid and reliable in Kenya (Monahan et al., 2009). Cronbach's alpha for the PHQ-9 in the study population was 0.886.
- The Post Traumatic Stress Disorder Checklist — Civilian Version (PCL-C) was used to evaluate symptoms of post-traumatic stress, with a positive screen for post-traumatic stress disorder defined by a PCL-C cutoff score of 30 (Lang et al., 2003). The PCL-C has not been validated in Kenya, although the PCL-5 has been validated in Rwanda, East Africa (Meffert et al., 2024). Cronbach's alpha for the PCL-C in the study population was 0.935.
- The Drug Abuse Screening Test (DAST-10) was used to measure co-occurring substance use, with a cutoff score of 3 used to define moderate to severe drug use (Skinner, 1982; Gavin et al., 1989). While the DAST-10 has been validated in a number of global settings (Lam et al., 2015; Shirinbayan et al., 2020; Murad et al., 2022), it has not been validated in African settings, to our knowledge. Cronbach's alpha for the DAST-10 in the study population was 0.776.
- Participants were also asked if they chewed miraa or khat (a recreational stimulant common in East Africa), smoked tobacco, or smoked marijuana.

2.4. Data analysis

Descriptive statistics were used to describe sociodemographic, mental health and substance use characteristics of the study population, both overall and by unhealthy alcohol use status. Data for women with and without unhealthy alcohol use were compared using Wilcoxon rank-sum tests for continuous variables and Pearson's Chi-squared tests or Fisher's exact tests for categorical variables. We used modified Poisson analysis with robust standard errors to assess how past (greater than 12 months in the past) and recent (within 12 months) experiences of sexual, physical, emotional, or financial IPV (our four exposure variables) affected the relative risk of current unhealthy alcohol use (our outcome) after adjusting for potential confounders likely to be associated with both IPV and unhealthy alcohol use including age, years of education, marital status, income, and work location. These potential confounders were identified based on review of the literature and knowledge of the study population among the study team. Each type of IPV (sexual, physical, emotional, and financial) was evaluated as a predictor in a single regression analysis, in which the other IPV types were included as potential confounders. This was done in order to understand the independent association of each IPV type with unhealthy alcohol use. Stata version 17 (College Station, TX) was used for analyses, and a p value of < 0.05 was considered significant.

3. Results

3.1. Population characteristics

Table 1 presents characteristics of the participants overall. The study population was comprised of 283 participants, of whom 263 (93.3 %) reported sex work in the past 12 weeks and 98 (34.6 %) had an AUDIT score ≥ 8 meeting criteria for unhealthy alcohol use. Median age was 33.5 years. Among the entire cohort, 246 (86.9 %) had experienced any IPV, with 43.8 % reporting sexual IPV, 62.5 % reporting physical IPV, 60.4 % reporting emotional IPV, and 66.4 % reporting financial IPV. With respect to location, 47.0 % worked in a bar, restaurant, or a guesthouse; 40.6 % worked in a nightclub; and 12.0 % worked at home

Table 1

Characteristics of study participants, overall and by AUDIT score without and with unhealthy alcohol use (AUDIT score ≥ 8).

<i>Sociodemographic Variables</i>	Overall N = 283	AUDIT < 8 N = 185	AUDIT ≥ 8 N = 98	P value
Age in years (median, IQR) ^a	33.5 (27.2–40.6)	36.0 (29.3–43.3)	29.9 (25.1–35.5)	< 0.001
Years of education (median, IQR) ^a	8.0 (7.0–12.0)	8.0 (7.0–12.0)	10.0 (8.0–12.0)	0.039
Religion				0.880
Protestant	139 (49.1 %)	90 (48.6 %)	49 (50.0 %)	
Catholic	92 (32.5 %)	62 (33.5 %)	30 (30.6 %)	
Muslim	47 (16.6 %)	29 (15.7 %)	18 (18.4 %)	
Other	4 (1.4 %)	3 (1.6 %)	1 (1.0 %)	
Marital status ^b				0.290
Never married	133 (47.0 %)	80 (43.2 %)	53 (54.1 %)	
Currently married	2 (0.7 %)	1 (0.5 %)	1 (1.0 %)	
Widowed/divorced	146 (51.6 %)	103 (55.7 %)	43 (43.9 %)	
Income				< 0.001
≤ 1000 KSh	73 (25.8 %)	54 (29.2 %)	19 (19.4 %)	
1001–2000 KSh	76 (26.9 %)	57 (30.8 %)	19 (19.4 %)	
2001–5000 KSh	87 (30.7 %)	56 (30.3 %)	31 (31.6 %)	
> 5000 KSh	47 (16.6 %)	18 (9.7 %)	29 (29.6 %)	
Years since initiation of sex work (median, IQR) ^a	2.0 (0.0–5.0)	2.0 (0.0–5.0)	2.0 (0.0–4.0)	0.970
Sex work location ^a				< 0.001
Bar/restaurant/ guesthouse	133 (47.0 %)	102 (55.1 %)	31 (31.6 %)	
Nightclub	115 (40.6 %)	57 (30.8 %)	58 (59.2 %)	
Home-based/other	34 (12.0 %)	25 (13.5 %)	9 (9.2 %)	
DAST score > 3	19 (6.7 %)	6 (3.2 %)	13 (13.3 %)	0.001
Chews miraa or khat	73 (25.8 %)	31 (16.8 %)	42 (42.9 %)	< 0.001
Smokes cigarettes	35 (12.4 %)	15 (8.1 %)	20 (20.4 %)	0.003
Smokes marijuana	20 (7.1 %)	10 (5.4 %)	10 (10.2 %)	0.130
PHQ–9 score > 10	30 (10.6 %)	20 (10.8 %)	10 (10.2 %)	0.870
PCL-C score > 30	46 (16.3 %)	31 (16.8 %)	15 (15.3 %)	0.750
Any intimate partner violence ^c				0.026
None	37 (13.1 %)	27 (14.6 %)	10 (10.2 %)	
Past	104 (36.7 %)	76 (41.1 %)	28 (28.6 %)	
Recent	142 (50.2 %)	82 (44.3 %)	60 (61.2 %)	
Sexual violence ^c				0.006
None	159 (56.2 %)	115 (62.2 %)	44 (44.9 %)	
Past	60 (21.2 %)	38 (20.5 %)	22 (22.4 %)	
Recent	64 (22.6 %)	32 (17.3 %)	32 (32.7 %)	
Physical violence ^c				0.054
None	106 (37.5 %)	77 (41.6 %)	29 (29.6 %)	
Past	128 (45.2 %)	82 (44.3 %)	46 (46.9 %)	
Recent	49 (17.3 %)	26 (14.1 %)	23 (23.5 %)	
Emotional violence ^c				0.150
None	112 (39.6 %)	79 (42.7 %)	33 (33.7 %)	
Past	110 (38.9 %)	72 (38.9 %)	38 (38.8 %)	
Recent	61 (21.6 %)	34 (18.4 %)	27 (27.6 %)	
Financial violence ^c				0.073
None	95 (33.6 %)	68 (36.8 %)	27 (27.6 %)	
Past	107 (37.8 %)	72 (38.9 %)	35 (35.7 %)	
Recent	81 (28.6 %)	45 (24.3 %)	36 (36.7 %)	

AUDIT, Alcohol Use Disorders Identification Test; IQR, Interquartile range; KSh, Kenyan shilling (119 KSh \approx \$1.00); DAST, Drug Abuse Screening Test; PHQ, Patient Health Questionnaire; PCL-C, Post Traumatic Stress Disorder Screening Test- Civilian Version.

^a 1 missing value

^b 2 missing values

^c Definitions: Recent, violence experienced in the past 12 months; Past, violence experienced greater than 12 months ago

or another location.

3.2. Associations with unhealthy alcohol use

Table 1 also presents characteristics of participants according to whether or not they had unhealthy alcohol use. Based on Wilcoxon rank-sum tests, younger age and more years of education were each significantly associated with an AUDIT score ≥ 8 , while years since initiation of sex work was not. Based on Pearson's Chi-squared tests or Fisher's exact tests, having a higher income, reporting transactional sex in the past 12 weeks, and working in a nightclub were each significantly associated with an AUDIT score ≥ 8 , while religion and marital status were not. Having moderate-to-severe other substance use (i.e., DAST score > 3), chewing miraa or khat, and smoking tobacco were associated with an AUDIT score ≥ 8 , while moderate-to-severe depression, post-traumatic stress disorder, and smoking marijuana were not. Finally, having experienced any IPV (recent and past) and having experienced any sexual IPV (recent and past) were each significantly associated with unhealthy alcohol use, while physical, financial, and emotional IPV were not.

3.3. Adjusted associations between types of IPV and unhealthy alcohol use

Table 2 reports the results of the modified Poisson analysis to identify associations between the 3-category variable (recent, past, or none) for each type of IPV (sexual, physical, emotional, and financial) and unhealthy alcohol use, after adjustment for the sociodemographic characteristics selected as potential confounders. In this analysis, the association between sexual IPV and unhealthy alcohol use remained significant. Compared to participants who had not experienced sexual IPV, those with recent sexual IPV had an adjusted risk ratio (ARR) of 1.56, with a 95 % confidence interval [CI] of 1.09–2.23 for meeting unhealthy alcohol use criteria at the study visit. Those with past sexual IPV had a similarly increased risk (ARR 1.48, 95 % CI 0.97–2.25). Associations between unhealthy alcohol use and physical, emotional, and financial IPV were not significant. However, adjusted risk ratios for physical and financial violence were elevated. Compared to participants

Table 2

Associations between type and recency of intimate partner violence and unhealthy alcohol use (AUDIT ≥ 8) by modified Poisson regression.

<i>Predictor Variable</i>	<i>Adjusted RR (95 % CI)^a</i>	<i>P value</i>
Sexual violence ^b		0.034
None	Reference	
Past	1.48 (0.97–2.25)	
Recent	1.56 (1.09–2.23)	
Physical violence ^b		0.49
None	Reference	
Past	1.15 (0.78–1.71)	
Recent	1.33 (0.83–2.14)	
Emotional violence ^b		0.99
None	Reference	
Past	0.98 (0.65–1.49)	
Recent	0.99 (0.64–1.51)	
Financial violence ^b		0.53
None	Reference	
Past	1.15 (0.75–1.78)	
Recent	1.27 (0.84–1.92)	

AUDIT, Alcohol Use Disorders Identification Test; KSh, Kenyan shilling (119 KSh \approx \$1.00)

^a Adjusted for age, years of education, marital status, income category, work location, and all other types of violence (n = 282)

^b Definitions: Recent, violence experienced in the past 12 months; Past, violence experienced greater than 12 months ago

who had not experienced physical IPV, those with recent physical IPV had a 1.33-fold increased risk (95 % CI 0.83–2.14) of unhealthy alcohol use and those with past physical IPV had a 1.15-fold increased risk (95 % CI 0.78–1.71) of unhealthy alcohol use. Compared to participants who had not experienced financial IPV, those with recent financial IPV had a 1.27-fold increased risk (95 % CI 0.84–1.92) of unhealthy alcohol use and those with past financial IPV had a 1.15-fold increased risk (95 % CI 0.75–1.78) of unhealthy alcohol use. Adjusted risk ratios for emotional violence were not elevated (ARR 0.99 for recent and 0.98 for past emotional violence).

Supplemental Table 1 provides information on the associations between potential confounders included in the modified Poisson analysis and unhealthy alcohol use, providing additional context. Younger age, higher income, and working in a nightclub were all associated with unhealthy alcohol use, while marital status and years of education were not.

4. Discussion

This study of 283 Kenyan women who engaged in sex work examined the relationship of unhealthy alcohol use with experiences of different types of IPV and found that sexual but not physical, emotional, or financial IPV was significantly associated with unhealthy alcohol use as defined by an AUDIT score ≥ 8 . Adjusted risk ratios for unhealthy alcohol use for physical and financial IPV were increased, but these findings were not statistically significant. This finding is novel, as no previous studies with Kenyan women who engaged in sex work that we could identify have investigated relationships between specific types of IPV and unhealthy alcohol use. The relationship between recent sexual IPV and unhealthy alcohol use was stronger than that for past sexual IPV. This trend was also observed for physical and financial IPV suggesting that timeliness of response to IPV events could be important, for a variety of IPV experiences. Given that over half of participants had experienced any sexual IPV and nearly a third had experienced recent sexual IPV, these findings suggest that interventions integrating sexual violence prevention and treatment with alcohol treatment have the potential to have a large impact in this population.

Results from this study are consistent with previous studies linking violence experienced by East African women who engage in sex work from regular partners, casual partners or clients with unhealthy alcohol use (Chersich et al., 2007; Pack et al., 2013; Wilson et al., 2016; Mayanja et al., 2020; Amogne et al., 2021). While previous studies have focused on possible alcohol use disorder (i.e., AUDIT score ≥ 16 , Pack et al., 2013; Wilson et al., 2016) and heavy episodic drinking (Chersich et al., 2007; Amogne et al., 2021), we found an association with alcohol use at a cutpoint including hazardous use (i.e., AUDIT score ≥ 8). This is similar to the study by Mayanja et al. in a younger population of Ugandan women who engage in sex work (Mayanja et al., 2020). While we found a strong association between sexual IPV and unhealthy alcohol use, the associations between physical, emotional, and financial IPV and unhealthy alcohol use were not significant and weakened after adjustment for confounding. Our results suggest that future studies investigating IPV and unhealthy alcohol use in East African women who engage in sex work should ask specifically about sexual violence and not combine all violence types, ask about the timing of sexual violence, and conduct a full AUDIT-type review that captures both severe and more moderate unhealthy alcohol use.

Other characteristics that were associated with unhealthy alcohol use in our study population included younger age, higher income, working in a nightclub, and other drug use. A previous study investigating heavy episodic (binge) drinking among women who engage in sex work in Mombasa, Kenya, found similar relationships between unhealthy alcohol use and younger age, higher income, and working in night clubs or bars (Chersich et al., 2007). The present study differentiated between bars and nightclubs as workplaces and found that a higher proportion of women who engage in sex work working in night

clubs had unhealthy alcohol use. These observed associations suggest that offering interventions to younger women who work in nightclubs may have the greatest impact. Moderate-to-severe drug use, miraa or khat use, and cigarette smoking were all more common among women with unhealthy alcohol use and should also be addressed in substance use counseling and treatment. Notably, moderate-to-severe depression and PCL-C scores were not associated with unhealthy alcohol use in this cross-sectional study. The lack of correlation between the mental health measures and unhealthy alcohol use in our study suggests that mental health is not a primary driver of concurrent alcohol use or vice versa in Kenyan women who engage in sex work. Longitudinal studies evaluating temporal relationships between IPV, unhealthy alcohol use, and mental health could help address this question.

Due to the cross-sectional design of our study, we were unable to draw causal inferences or comment on the direction of the relationship between IPV and unhealthy alcohol use. In contrast, a randomized controlled trial that enrolled Kenyan women who engage in sex work was able to infer that alcohol use leads to subsequent sexual IPV. This study enrolled participants with AUDIT scores of 7–19 and found that a 6-month counseling intervention to reduce alcohol use decreased both unhealthy alcohol use and experiences of sexual IPV compared to the control group (L'Engle et al., 2014). Another interventional study evaluated incidence of physical violence in Kenyan women who engage in sex work after an alcohol harm reduction intervention and found that incidence of physical violence was decreased in participants who received an adapted version of WHO's Brief Intervention for Hazardous and Harmful Drinking compared to those who did not (Parcesepe et al., 2016a). These studies suggest that unhealthy alcohol use is a likely causal factor contributing to increased incidence of sexual and physical violence in this population. It may also be that sexual IPV increases the risk of unhealthy drinking, which then increases the risk of future sexual IPV events, setting off a harmful cycle of events unless an intervention interrupts this cycle. Our finding of a stronger association between sexual IPV and unhealthy alcohol use when sexual IPV occurred in the past year suggests that longitudinal observational studies examining the timing of onset and maintenance of unhealthy alcohol use relative to IPV occurrences could also provide important insights on the impact of different IPV exposure histories on unhealthy alcohol use. These insights would be particularly useful for modeling studies to elucidate the impact of structural determinants such as IPV on HIV risk, including unhealthy alcohol use as a mediator, as prior modeling studies of HIV risk among women who engage in sex work have not explicitly evaluated the impact of unhealthy alcohol use as a mediator of condom use and other HIV prevention behaviors (Shannon et al., 2015).

There are several important implications of our work. First, the findings from this study suggest that interventions to decrease unhealthy alcohol use or sexual violence and other types of IPV should recognize the complex relationships between these two entities among women who engage in sex work in Kenya and similar settings. In HIV prevention services and in other relevant clinical settings, this could mean screening for IPV in patients who screen positive for alcohol use disorder or vice versa. As previous research suggests that harmful alcohol use is a predictor of future experience of sexual IPV (L'Engle et al., 2014), offering anticipatory guidance on IPV prevention may be useful in the context of a positive AUDIT screen. In addition, our research suggests that clinics for victims of sexual violence in Kenya or similar settings should consider including alcohol use counseling and treatment for alcohol use disorder in their service mix. Finally, while other types of violence did not have significant associations with unhealthy alcohol use in this study, they affected the majority of women in this study and are all to commonly experienced among women who engage in sex work. Efforts to address this violence are important whether or not they have an impact on unhealthy alcohol use.

Future research should investigate opportunities to disrupt the association between experiences of IPV and harmful alcohol use. Implementation science and hybrid effectiveness-implementation clinical

trials of effective interventions should be conducted. In addition, longitudinal cohort studies would be helpful in better understanding these complex relationships over time, while qualitative studies may have utility in revealing contextual factors influencing the complex relationships between alcohol use and IPV. Studies investigating experiences of IPV are challenging, as intensive resources are needed to support study participants with a history of trauma. Unfortunately, current services to address sexual and other forms of gender-based violence are often understaffed and under resourced (Temmerman et al., 2019), as are services for treatment of unhealthy alcohol use (Jaguga and Kwobah, 2020). These authors are not aware of any meaningful efforts in Kenya to integrate treatment for substance use disorders and prevention and treatment for experiences of IPV for Kenyan women who engage in sex work, within HIV prevention services or otherwise. Such efforts should be prioritized.

4.1. Implications

The findings of this study emphasize how experiences of sexual, physical, financial, and emotional IPV and unhealthy alcohol use are common among Kenyan women engaged in sex work. Experiences of sexual IPV and unhealthy alcohol use were found to be correlated in this study, emphasizing the need for increased availability of and colocalization of resources for treatment and prevention of unhealthy alcohol use and IPV. Further research should focus on prospective studies evaluating the effectiveness of interventions aimed to treat and prevent unhealthy alcohol use and IPV.

4.2. Limitations

This study has several limitations. First, its cross-sectional design inherently limits any inference of causality between AUDIT scores and experiences of IPV. Second, the modest size of the study may have led to missed opportunities to detect associations between types of IPV other than sexual IPV and unhealthy alcohol use. Third, our definition of recent IPV as occurring within 12 months may have missed stronger associations between very recent IPV and unhealthy alcohol use. Similarly, while participants were able to report both recent and past IPV, we did not incorporate multiple prior experiences, IPV frequency, or IPV severity into this study, in an effort to focus on measures with immediate clinical utility for screening and risk stratification. In addition, there is a paucity of research to validate measures of IPV in different social contexts and geographic settings (Alexander et al., 2022). Fourth, measures were self-reported and subject to both social desirability and recall bias. Fifth, women with HIV were excluded from the study and consequently its findings are not generalizable to Kenyan women engaged in sex work who are living with HIV. Finally, the women who engaged in sex work who took part in this study were participants in a longitudinal cohort study and not representative of all women who engage in sex work in Mombasa or women who engage in sex work from other geographic areas of Kenya or similar settings. In addition, although the majority of eligible Mombasa Cohort participants participated in the study, we did not keep detailed information on invitation outcomes, and so we cannot comment on differences between women who participated and those who declined.

5. Conclusions

Sexual IPV was associated with unhealthy alcohol use among Kenyan women who engage in sex work. Physical, emotional, and financial IPV were also highly prevalent in the study population, though not associated with unhealthy alcohol use. These findings affirm the potential benefit of providing integrated IPV and alcohol treatment services focused on recovery after experiences of IPV for this vulnerable population.

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Contributors

DT and SMG conceptualized the study. DT, STR, and SMG designed methodology. RD, GW, and JS conducted data collection. STR and SMG performed data curation. DT and SMG performed formal data analysis and wrote the manuscript. SMG, JRJ and GC provided mentorship and guidance throughout manuscript development and execution. All authors provided substantive written feedback on the original draft and subsequent revisions.

CRedit authorship contribution statement

Susan M. Graham: Writing – review & editing, Writing – original draft, Supervision, Methodology, Formal analysis, Data curation, Conceptualization. **R. Scott McClelland:** Writing – review & editing, Supervision. **Geetanjali Chander:** Writing – review & editing, Supervision. **Jocelyn R. James:** Writing – review & editing, Supervision. **Juma Shafi:** Writing – review & editing, Investigation. **George Wanje:** Writing – review & editing, Investigation. **Ruth Deya:** Writing – review & editing, Investigation. **Sarah T. Roberts:** Writing – review & editing, Methodology, Data curation. **Daniel Tolstrup:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.dadr.2024.100315](https://doi.org/10.1016/j.dadr.2024.100315).

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