

BMJ Open Pooled analysis of the association between alcohol use and violence against women: evidence from four violence prevention studies in Africa

Leane Ramsoomar ¹, Andrew Gibbs ², Esnat D Chirwa,¹ Kristin Dunkle,¹ Rachel Jewkes¹

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¹Gender and Health Research Unit, South African Medical Research Council, Pretoria, Gauteng, South Africa

²Gender and Health Research Unit, South African Medical Research Council, Durban, South Africa

Correspondence to

Dr Leane Ramsoomar;
leane.ramsoomar@mrc.ac.za

ABSTRACT

Objectives To test associations between men's past year alcohol use and patterns of drinking, and their perpetration of intimate partner violence (IPV) and non-partner sexual violence (NPSV). To test the associations between women's reports of partner alcohol use and their experience of IPV, in three countries in Africa.

Design Pooled analysis of cross-sectional baseline data from men and women participating in four IPV prevention studies across Africa and Asia.

Setting Data from five data sets generated by four violence against women and girls prevention studies in three countries in sub-Saharan Africa, South Africa, Ghana and Rwanda.

Participants 8104 men 18+ years old and 5613 women 18+ years old from a mix of volunteer and randomly selected samples.

Main outcome measures Studies employed comparable measures of past year alcohol use, harmful alcohol use (Alcohol Use Disorder Identification Test scale) and items from modified WHO Women's Health and Domestic Violence to measure physical IPV and NPSV perpetration among men and IPV experience among women.

Findings Overall harmful alcohol use among men was associated with a substantially increased odds of perpetrating physical IPV (adjusted OR (aOR)=3.45 (95% CI 2.56 to 4.64)) and NPSV (aOR=2.64 (95% CI 1.85 to 3.76)) compared with non-drinkers. Women who had seen their partner occasionally drunk (aOR=2.68 (95% CI 2.13 to 3.36)) or frequently drunk (aOR=5.94 (95% CI 4.19 to 8.41)) in the past 12 months had an increased odds of experiencing physical IPV.

Conclusions Alcohol use is associated with increased IPV and NPSV perpetration for men and (physical) IPV experience for women. Reported frequency of IPV and NPSV increase with increasing levels and frequency of alcohol use. Interventions aimed at reducing alcohol may also lead to reductions in IPV and NPSV perpetration and experience.

INTRODUCTION

Harmful alcohol use is a recognised driver of intimate partner violence (IPV) and non-partner sexual violence (NPSV), but its importance is still contested, and it is infrequently

Strengths and limitations of this study

- Provides a synthesis of comparable regional data (Africa) in the global South, thereby addressing the limited geographical scope of studies examining alcohol's association with violence against women and girls (VAWG).
- Extends the evidence base on the nexus between alcohol and violence in sub-Saharan Africa, where both alcohol use and VAWG are prevalent.
- Extends previous research on the association between alcohol and gender-based violence by examining past year alcohol use and violence as opposed to lifetime.
- Highlights the need to address alcohol use in prevention of intimate partner violence, and the need to address the experiences of violence in programmes addressing harmful alcohol use.
- The study does not adjust for women's own drinking, which has been found to increase their subsequent experiences of violence, as it was not included in all data sets.
- Only one of the four studies is population-based, limiting generalisability.

directly addressed in violence against women and girls (VAWG) prevention programmes. Although the associations between alcohol use and VAWG have been recognised and described for some time, most of the research evidence is from North America, and there has been considerable reluctance in some quarters to frame the link as causal due to a perception that this would lead to alcohol being blamed rather than the perpetrator.¹⁻³ There is also debate about whether the alcohol-VAWG associations described are driven by alcohol abuse/dependence or whether they hold at much lower levels of alcohol drinking. In North America, the links with alcohol abuse/dependence have been shown in a 30-year longitudinal study where having alcohol abuse/dependence symptoms



was associated with a twofold increased risk of perpetration of IPV by men, and a similar increase in risk of IPV victimisation among women.⁴

Research in low-and-middle income countries has not always found consistent associations between alcohol use and VAWG. For example, in the WHO Multi-Country Study on Women's Health and Domestic Violence, the association between women's past year IPV experience and their male partner's alcohol use were inconsistent.⁵ Similarly, in nine urban and non-urban settings included in a six-country study on men's violence in Asia and the Pacific, harmful alcohol abuse was associated with lifetime perpetration of IPV in only three of the settings.⁶ However, in four settings in the pooled sample, women's reports of their partner's alcohol use were associated with her having a higher risk of past year IPV experience.⁷ Community-based research in South Africa with men on perpetration found that past year drug use, but not harmful alcohol used, was associated with lifetime rape perpetration.⁸

Recent research in sub-Saharan Africa (SSA), drawing on the Demographic and Health Survey (DHS) has shown positive associations between women's lifetime experiences of IPV and their current partner's use of alcohol, but the analysis excluded many countries where heavy episodic drinking is relatively common.⁹ Patterns of alcohol use are critical to understand because prior research suggests that they may differ both in terms of IPV risk,¹⁰ as well as cultural and contextual norms around alcohol use and gender.¹¹ For example, heavy drinking is more strongly associated than moderate drinking with partner aggression and more severe IPV resulting in injuries and even death.^{12 13} Furthermore, as with much of the literature on the association between alcohol and IPV, analysis drawing on the DHS is limited as the DHS does not have measures of all the key known risk factors for IPV that need to be adjusted for.

To strengthen the evidence base from SSA and address some of the limitations of studies in the current literature, we undertook a pooled analysis of baseline data using consistent measurement methods from four IPV prevention studies conducted in three countries in Africa (South Africa, Ghana and Rwanda). We sought to answer the following questions relating to alcohol and IPV and NPSV perpetration and experience in the past 12 months¹: What proportion of men who currently use alcohol, and who used alcohol at harmful levels, perpetrated IPV against female partners?² What proportion of men with current, and harmful alcohol use perpetrated NPSV?³ What proportion of women who reported seeing their partner drunk or frequently drunk experienced IPV?⁴ Is there an increasing odds with increasing levels of alcohol use or frequency of drunkenness and IPV perpetration and experience?⁵ Is there an increasing odds with increasing levels of alcohol use and NPSV perpetration?

METHODS

The studies were conducted under the UK-Aid funded What Works to Prevent Violence Against Women and Girls? Global Programme (What Works). The primary goal of What Works was to advance knowledge on the prevalence and drivers of VAWG; test efficacy of interventions to prevent VAWG, estimate the cost-effectiveness of violence prevention interventions; and the costs of violence to households and businesses in 13 countries of the Global South. The current study used the baseline data of 8104 men and 5613 women from four VAWG prevention studies in three countries in SSA to assess the association between alcohol use and IPV and NPSV perpetration and experience. These studies include the Stepping Stones and Creating Futures intervention, Sonke CHANGE trial, Community Based Action Teams (COMBAT) community intervention, *Indashyikirwa* couples intervention and *Indashyikirwa* community diffusion. Further information on the studies is available in the study sources referenced in [table 1](#).

Patient and public involvement

Patients and the public were not involved in its design, implementation or analysis presented here. However, the individual projects had different levels of participant and public involvement as part of the wider What Works research uptake strategy.

Measures

All study participants were asked socio-demographic questions including age, current marital status, relationship residence status and education. All studies except *Indashyikirwa* in Rwanda asked whether male participants had worked in the past 3 months or not; and two studies asked whether female participants had worked in the past 3 months or not. Income assessments in *Indashyikirwa* were not included here, as they were tailored to the local context in which most participants engaged in subsistence agriculture.

The alcohol use and violence measures are presented in [table 2](#). In all the studies, except in the *Indashyikirwa* couples and community samples, harmful alcohol use among men was measured using the 10-item Alcohol Use Disorder Identification Test (AUDIT) scale.¹⁴ A shortened version of the AUDIT scale (3-item AUDIT-C) was used in the *Indashyikirwa* couples and community samples. An alcohol use score was derived for each study and relevant cut-offs were used to assess the prevalence of problem drinking in each sample (≥ 8 for the 10-item scale and ≥ 4 for the shortened version). We created a three-level variable, where men were coded either: 0=non-drinkers, 1=moderate drinkers and 2=harmful drinkers. We asked women in the studies about the frequency of seeing their partner drunk in the past year. Responses were 'never', 'less than once a month', 'once a month', 'weekly' and 'everyday or nearly every day'. We created a three-level variable coded as follows: 0=never seen drunk (if the response was 'never'), 1=occasionally drunk (if response

Table 1 Data sets used for men and women included in the pooled analysis

#	Study	Country	# clusters	N (Men)	N (Women)	Sampling or recruitment strategy	Age
1	Evaluation of Stepping Stones and Creating Futures	South Africa	34	674	677	Study volunteers	18–35
2	Evaluation of Sonke CHANGE trial	South Africa	18	2406	–	Household-based random sample survey	18–45
3	Evaluation of the COMBAT community intervention	Ghana	40	1973	1877	Household-based random sample survey	18+ (men) 18–45 (women)
4	<i>Indashyikirwa</i> -- couples intervention	Rwanda	28	1651	1660	Volunteer recruitment from savings and loan association groups	18–50
5	<i>Indashyikirwa</i> -- community diffusion	Rwanda	28	1400	1399	Household-based random sample of other community members in villages where the couples programme was implemented	18–50

COMBAT, Community Based Action Teams.

was either ‘less than a month’ or ‘once a month’) and 2=frequently drunk (if response was either ‘weekly’ or ‘everyday/nearly everyday’). Violence perpetration (IPV and NPSV) and experience (IPV) were measured using items from the WHO Women’s Health and Domestic Violence survey,¹⁵ modified where needed to assess men’s perpetration.⁶ The NPSV scale was first developed in South Africa¹⁶ and subsequently refined and used extensively in Asia-Pacific region.⁷ There was no question on NPSV perpetration in the *Indashyikirwa* couples and community questionnaires because it was not a target of the intervention.

Data analysis

Descriptive statistics (frequencies and percentages) were used to summarise participants’ socio-demographic characteristics within each study and in the pooled analysis. Within-study and pooled estimates considered any clustering with each study’s sampling procedures. All pooled estimates were weighted according to study sample size. We used forest plots, I^2 and Cochran’s Q statistics to assess consistency of outcomes across the studies. The I^2 values showed moderate heterogeneity in both physical IPV (66%, p value=0.018) and NPSV outcomes (40%, p value=0.189). To account for any heterogeneity across the studies due to methodological diversity, we opted for mixed effects models to estimate overall effects. We thus performed a one-stage individual patient data meta-analysis using mixed effects logistic regression models to account for within-study and between-study variances (heterogeneity) across studies.¹⁷ The model considered the study hierarchy (participants with study). Study specific estimates and forest plots were derived as part of the post-estimation model to the mixed effects logistic

regression model. Both the main and post-estimation models included participant’s age as fixed effects. All data were analysed in Stata V.16 and all models adjusted for participants’ ages.

RESULTS

Men

The mean age of men across all studies was 32 years (table 3). Two-thirds (67%) of the men were living with their partner or spouse, 46% were married, 66% were cohabiting and a quarter (26%) were in a relationship, but not living with their partner. Most of the men had secondary school education or above (58%) and 56% were employed in the past 3 months.

Among the 8104 men, the prevalence of any (past year) alcohol use was 51% with study specific prevalence ranging from 37% to 69%. The overall prevalence of past year harmful alcohol use was 24% (range: 11%–44%). Almost one-third (29%) of the men across the four studies had perpetrated physical IPV in the past 12 months (range: 12%–50%). In the three studies where NPSV perpetration was measured, just over a quarter (26%) reported perpetrating NPSV in the past 12 months (range: 10%–39%).

Association between alcohol and violence perpetration

The association between moderate alcohol use and physical IPV perpetration was mixed. In the two South African studies (Stepping Stones and Creating Futures and Sonke), there were no significant associations between moderate alcohol use and past year physical IPV perpetration, compared with those who did not drink alcohol in the past year, in individual studies. However,

Table 2 Key measures

Construct	Indicator	Definition
Violence against women	Physical IPV perpetration	Five items were used to measure men's physical IPV perpetration including: In the last 12 months how many times ¹ did you slap your current or previous girlfriend or wife or throw something at her which could hurt her? ² Have you pushed or shoved a current or previous girlfriend or wife? ³ Have you hit a current or previous girlfriend or wife with a fist or with something else which could hurt her? ⁴ Did you kick, drag, beat, choke or burn a previous or current girlfriend, partner or wife? ⁵ Did you threaten to use or actually use a gun, knife or other weapon against a previous or current girlfriend, partner or wife? Responses: 'Never', 'Once', 'A few times' or 'Many times'. Men who responded 'Once' or more to one or more items were coded as perpetrating physical IPV. The items were developed during the WHO Women's Health and Domestic Violence survey, modified to assess men's perpetration of physical and NPSV in the past year. ^{6 15}
	Physical IPV experience	Five items used to capture women's violence experience including: In the past 12 months, ¹ how many times has a current or previous husband (or boyfriend) slapped you or thrown something at you which could hurt you? ² Pushed or shoved you? ³ Hit you with a fist or with something else which could hurt you? ⁴ Kicked, dragged, beaten, choked or burnt you? ⁵ Threatened to use, or actually used, a gun, knife or other weapon against you? ¹⁵ Responses: 'Never', 'Once', 'A few times' or 'Many times'. Women who responded 'Once' or more to one or more items were coded as experiencing physical IPV.
	NPSV perpetration	Five items about NPSV perpetration, including: In the last 12 months how many times have you ¹ : forced or persuaded a woman or girl who was <u>not</u> your girlfriend or wife at the time to have sex with you? ² Ever tried to force or persuade any woman or girl who was not your girlfriend or partner to have sex with you, but did not succeed? ³ Ever had sex with a woman or girl who was not your girlfriend or wife when she was too drunk or drugged to stop you? ⁴ Have you and other men ever had sex with a woman or girl at the same time who was not your girlfriend or wife when she did not agree to sex or you forced her? ⁵ Have you and other men ever had sex with a woman or girl at the same time who was not your girlfriend or wife when she was too drunk or drugged to stop you? Responses: 'Never', 'Once', 'A few times' or 'Many times'. Men who responded 'Once' or more to one or more items were coded as perpetrating NPSV. The scale was first developed in South Africa and subsequently refined and used extensively in Asia-Pacific region. ⁷
Alcohol use	Current alcohol use (past 12 months)	Current alcohol use by men was measured by asking one question about alcohol use in the 12 months preceding the baseline data collection ¹ : Have you drunk alcohol in the past 12 months?. Responses were either 'Yes' or 'No'.
	Patterns of alcohol use (past 12 months)	10-item Alcohol Use Disorders Identification Test (AUDIT) covering dimensions of alcohol consumption that reflect dependence symptoms and alcohol-related consequences in the past 12 months. We summed the scale, with possible range from between 0–40. Scores were coded as 0=None, 1–7=moderate, 8–40=harmful drinking (ICD-10, F10.1). The Cronbach's alphas for the AUDIT scale ranged from between 0.79–0.94 across the studies. 3-item AUDIT scale, with a possible range from 0 to 12, was coded as 0=none, 1–3=moderate, 4–12=harmful drinking.
	Seen partner drunk	One item assessing if women has seen their partner drunk in the past 12 months. Responses: 'Yes' or 'No'.
	Seen partner drunk frequently	One item assessing how often women had seen their partner drunk in the past 12 months. Responses were 'every day or nearly every day', 'Weekly', 'Once a month', 'Less than once a month', 'Never' and recoded into: 'never', 'occasionally', 'Frequently'.

ICD-10, International Classification of Diseases 10th Revision.

there were significant associations in the Ghanaian and Rwandan studies (COMBAT, *Indashyikirwa*-couples and *Indashyikirwa*-community) between moderate alcohol use and IPV perpetration, with adjusted associations ranging from (adjusted OR (aOR)=1.91 (95% CI 1.47 to 2.48)) in the *Indashyikirwa*-couples sample to (aOR=3.18 (95% CI 2.28 to 4.45)) in COMBAT. In the pooled analysis of all five studies, there was a significant association between moderate drinking and physical IPV perpetration (aOR=1.57 (95% CI 1.04 to 2.38)).

There were consistent associations between harmful alcohol use in the past year and past year physical IPV perpetration across all the individual studies, and in the pooled analysis. Across individual studies the adjusted

association for harmful alcohol use and past year IPV perpetration ranged from (aOR=2.32 (95% CI 1.61 to 3.34)) in Stepping Stones and Creating Futures to (aOR=5.68 (95% CI 3.96 to 8.15)) in COMBAT (table 4). Among men who used alcohol at harmful levels, in the pooled analysis the odds of perpetration of physical IPV were increased almost three and a half times (aOR=3.45 (95% CI 2.56 to 4.64)), compared with those who did not report alcohol use in the past year.

There were no associations between moderate alcohol use and perpetration of NPSV in the two South African studies (Stepping Stones and Creating Futures and Sonke CHANGE), but there was a significant association between moderate alcohol use and perpetration

Table 3 Socio-demographics, prevalence and patterns of alcohol use and violence perpetration among men in the included data sets

	Stepping Stones and Creating Futures, South Africa (n=674)				Sonke CHANGE trial, South Africa (n=2406)				COMBAT, Ghana (n=1973)		Indashyikirwa-couples, Rwanda (n=1651)		Indashyikirwa-community, Rwanda (n=1400)		All studies (n=8104)	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Age group																
18–25 years	473 (70.2)	997 (41.4)	378 (19.2)	123 (7.5)	2073 (25.6)											
26–35 years	201 (29.8)	1134 (47.1)	560 (28.4)	760 (46)	3348 (41.3)											
36–45 years	0 (0)	275 (11.4)	456 (23.1)	589 (35.7)	1802 (22.2)											
≥46 years	0 (0)	0 (0)	579 (29.3)	179 (10.8)	881 (10.9)											
Current marital status																
Married	22 (3.3)	448 (18.8)	1271 (64.4)	1095 (66.3)	3721 (46.1)											
In a relationship	508 (75.4)	1539 (64.7)	533 (27)	556 (33.7)	3651 (45.2)											
Not in a relationship	144 (21.4)	391 (16.4)	169 (8.6)		704 (8.7)											
Relationship residence status																
Living together	73 (10.8)	932 (39.2)	1314 (66.6)	1651 (100)	5370 (66.5)											
Not living together	457 (67.8)	1055 (44.4)	490 (24.8)		2002 (25.8)											
Not in a relationship	144 (21.4)	391 (16.4)	169 (8.6)		704 (8.7)											
Education																
None	0 (0)	0 (0)	372 (18.9)	265 (16.1)	878 (10.9)											
Primary school	77 (11.4)	140 (5.9)	334 (16.9)	1088 (65.9)	2552 (31.6)											
Secondary school or above	597 (88.6)	2249 (94.1)	1267 (64.2)	298 (18)	4657 (57.6)											
Employed in past 3 months	240 (35.7)	1192 (50)	1231 (71.6)	*	2663 (55.7)											
Current alcohol use (past year)	464 (68.8)	1527 (63.8)	861 (43.6)	744 (45.1)	4119 (50.9)											
Current pattern of alcohol use (past year)																
None	210 (31.2)	868 (36.2)	1112 (56.4)	906 (54.9)	3973 (49.1)											
Moderate	170 (25.2)	559 (24.2)	570 (28.9)	498 (30.2)	2180 (26.9)											
Harmful	294 (43.6)	948 (39.6)	291 (14.8)	246 (14.9)	1939 (24)											
Physical IPV perpetration (past year)	337 (50.2)	952 (39.7)	235 (11.9)	402 (24.4)	2292 (28.7)											
NSPV perpetration (past year)	261 (38.8)	834 (34.8)	196 (9.9)	*	1291 (25.6)											

*Not measured.

COMBAT, Community Based Action Teams; IPV, intimate partner violence; NPSV, non-partner sexual violence.

Table 4 Socio-demographics, prevalence of seeing partner drunk and frequency of drunkenness and violence experience among women in the four studies

	Stepping Stones and Creating Futures, South Africa (n=677)	COMBAT, Ghana (n=1877)	Indashyikirwa- couples, Rwanda (n=1660)	Indashyikirwa- community, Rwanda (n=1399)	All studies (n=5613)
Women	n (%)	n (%)	n (%)	n (%)	n (%)
Age group					
18–25 years	455 (67.2)	561 (29.9)	265 (16)	217 (15.5)	1498 (26.7)
26–35 years	222 (32.8)	727 (38.7)	852 (51.3)	697 (49.8)	2498 (44.5)
36–45 years	0 (0)	458 (24.4)	488 (29.4)	401 (28.7)	1347 (24)
≥46 years	0 (0)	131 (7)	55 (3.3)	84 (6)	270 (4.8)
Current marital status					
Married	29 (4.3)	1068 (56.9)	1096 (66)	828 (59.2)	3021 (53.8)
In a relationship	524 (77.4)	664 (35.4)	564 (34)	570 (40.8)	2322 (41.4)
Not in a relationship	124 (18.3)	145 (7.7)	0 (0)	0 (0)	269 (4.8)
Relationship residence status					
Living together	113 (16.7)	1303 (69.4)	1660 (100)	1398 (100)	4474 (79.7)
Not living together	440 (65)	429 (22.9)	0 (0)	0 (0)	869 (15.5)
Not in a relationship	124 (18.3)	145 (7.7)	0 (0)	0 (0)	269 (4.8)
Education					
None	0 (0)	401 (21.4)	288 (17.4)	240 (17.2)	929 (16.5)
Primary school	56 (8.3)	426 (22.7)	1115 (67.2)	911 (65.2)	2508 (44.7)
Secondary school or above	621 (91.7)	1050 (55.9)	257 (15.5)	247 (17.7)	2175 (38.8)
Employed in past 3 months	173 (25.6)	1174 (62.7)	*	*	1347 (23.8)
Seen partner drunk in past year	357 (52.7)	268 (14.3)	742 (44.7)	712 (50.9)	2079 (37)
Seen partner frequently drunk in past year					
Never	320 (47.3)	1609 (85.7)	918 (55.3)	687 (49.1)	3534 (63)
Occasionally	220 (32.5)	115 (6.1)	471 (28.4)	386 (27.6)	1192 (21.2)
Frequently	137 (20.2)	153 (8.2)	271 (16.3)	326 (23.3)	887 (15.8)
Experienced physical IPV in past year	403 (59.5)	290 (15.5)	629 (37.9)	633 (45.3)	1955 (34.8)

*Not measured.

COMBAT, Community Based Action Teams; IPV, intimate partner violence.

of NPSV in the Ghanaian study (COMBAT), compared with those who reported no alcohol use in the past year. In COMBAT men with moderate alcohol use were more likely to perpetrate NPSV, with an adjusted association of (aOR=1.98 (95% CI 1.38 to 2.83)).

Harmful alcohol use was significantly associated with NPSV perpetration in the past year across the three studies, compared with those who did not use alcohol in the past year, with adjusted associations ranging from (aOR=2.02 (95% CI 1.40 to 2.92)) in Stepping Stones and Creating Futures to (aOR=4.45 (95% CI 3.06 to 6.47)) in COMBAT and a pooled estimate of (aOR=2.64 (95% CI 1.85 to 3.76)) (table 4).

Women

Overall, women's mean age was 31 years, just over half (54%) of women were married, 41% were in a relationship, 80% were living with their partner or spouse and 15% were not living with their partner (table 5). Among the 5163 women, just over one-third (37%) reported

having seen their partner drunk in the past 12 months with study specific prevalence ranging from 14% to 53%; 16% reported seeing their partner frequently drunk in the past 12 months, (range: 8%–23%).

Association between alcohol and violence experience

Among women there were consistent associations between occasionally having seen their partner drunk in the past 12 months, compared with never, and their experience of physical IPV, with adjusted associations ranging from (aOR=1.63 (95% CI 1.12 to 2.37)) to (aOR=3.42 (95% CI 2.41 to 4.85)). Similarly, among women who had seen their partner frequently drunk in the past year, the adjusted associations ranged from (aOR=2.93 (95% CI 1.92 to 4.46)) in Stepping Stones and Creating Futures to (aOR=8.27 (95% CI 5.42 to 12.61)) in *Indashyikirwa-Couples* (table 6).

In the pooled analysis women who occasionally saw their partner drunk in the past 12 months, compared with never, had a more than 2.5-fold increased odds of

Table 5 Association between men's current alcohol use, harmful alcohol use and physical IPV and NPSV perpetration in the past year*

Study	Alcohol use	No IPV		IPV		No NPSV		NPSV		P value	aOR (95% CI)†	P value
		n (%)*	n (%)*	n (%)*	n (%)*	n (%)*	n (%)*	aOR (95% CI)†	aOR (95% CI)†			
Stepping Stones and Creating Futures, South Africa	None	118 (56.7)	90 (43.3)	138 (66.4)	70 (33.7)	1	1	0.078	0.71 (0.45 to 1.11)	0.134		
	Moderate	109 (64.1)	61 (35.9)	125 (73.5)	45 (26.5)	0.73 (0.48 to 1.11)	0.71 (0.45 to 1.11)	<0.001	2.02 (1.40 to 2.92)	0.001		
	Harmful	108 (36.7)	186 (63.3)	148 (50.3)	146 (49.7)	2.32 (1.61 to 3.34)	2.02 (1.40 to 2.92)	<0.001	2.18 (1.79 to 2.65)	<0.001		
Sonke CHANGE trial, South Africa	None	594 (68.8)	270 (31.3)	617 (71.5)	246 (28.5)	1	1	0.694	0.85 (0.67 to 1.08)	0.201		
	Moderate	388 (67.1)	190 (32.9)	430 (74.4)	148 (25.6)	1.07 (0.85 to 1.34)	0.85 (0.67 to 1.08)	<0.001	2.18 (1.79 to 2.65)	<0.001		
	Harmful	460 (48.6)	487 (51.4)	506 (53.5)	439 (46.5)	2.32 (1.92 to 2.82)	2.18 (1.79 to 2.65)	<0.001	2.18 (1.79 to 2.65)	<0.001		
COMBAT, Ghana	None	1042 (93.7)	70 (6.3)	1040 (93.5)	72 (6.5)	1	1	<0.001	1.98 (1.38 to 2.83)	0.001		
	Moderate	480 (84.2)	90 (15.8)	508 (89.1)	62 (10.9)	3.18 (2.28 to 4.45)	1.98 (1.38 to 2.83)	<0.001	4.45 (3.06 to 6.47)	<0.001		
	Harmful	216 (74.2)	75 (25.8)	229 (78.7)	62 (21.3)	5.68 (3.96 to 8.15)	4.45 (3.06 to 6.47)	<0.001	4.45 (3.06 to 6.47)	<0.001		
Indashyikirwa-couples, Rwanda	None	746 (82.5)	158 (17.5)	n/a	n/a	1	n/a	<0.001	n/a	n/a		
	Moderate	360 (72.6)	136 (27.4)	n/a	n/a	1.91 (1.47 to 2.48)	n/a	<0.001	n/a	n/a		
	Harmful	137 (55.9)	108 (44.1)	n/a	n/a	3.87 (2.84 to 5.25)	n/a	<0.001	n/a	n/a		
Indashyikirwa-community, Rwanda	None	700 (80.5)	170 (19.5)	n/a	n/a	1	n/a	<0.001	n/a	n/a		
	Moderate	246 (68.3)	114 (31.7)	n/a	n/a	1.94 (1.47 to 2.57)	n/a	<0.001	n/a	n/a		
	Harmful	78 (48.8)	82 (51.3)	n/a	n/a	4.41 (3.10 to 6.29)	n/a	<0.001	n/a	n/a		
Overall effect	None	3200 (80.9)	758 (19.2)	1795 (82.2)	388 (17.8)	1	1	0.033	1.06 (0.67 to 1.70)	0.801		
	Moderate	1583 (72.8)	591 (27.2)	1063 (80.7)	255 (19.3)	1.57 (1.04 to 2.38)	1.06 (0.67 to 1.70)	<0.001	2.64 (1.85 to 3.76)	<0.001		
	Harmful	999 (51.6)	938 (48.4)	883 (57.7)	647 (42.3)	3.45 (2.56 to 4.64)	2.64 (1.85 to 3.76)	<0.001	2.64 (1.85 to 3.76)	<0.001		

Bold values significance is to indicate and highlight to the reader that these are statistically significant results e.g. p<0.001.

*All row percentages.

†All models adjusted for participant's age.

aOR, adjusted OR; COMBAT, Community Based Action Teams; IPV, intimate partner violence; NPSV, non-partner sexual violence.

Table 6 Association between women's reports of having seen their partner drunk, and frequently drunk, and experience of physical IPV in the past year*

Study	Seen partner drunk	No IPV	IPV	aOR (95% CI)†	P value
		n (%)*	n (%)*		
Stepping Stones and Creating Futures, South Africa	Never	158 (49.4)	162 (50.6)		
	Occasional	82 (37.3)	138 (62.7)	1.63 (1.12 to 2.37)	<0.001
	Frequently	34 (24.8)	103 (75.2)	2.93 (1.92 to 4.46)	<0.001
COMBAT, Ghana	No	1418 (88.1)	191 (11.9)		
	Occasional	80 (69.6)	35 (30.4)	3.42 (2.41 to 4.85)	<0.001
	Frequently	89 (58.2)	64 (41.8)	5.66 (3.82 to 8.40)	<0.001
<i>Indashyikirwa</i> -couples, Rwanda	Never	703 (76.6)	215 (23.4)		
	Occasional	248 (52.7)	223 (47.4)	2.97 (2.36 to 3.72)	<0.001
	Frequently	80 (29.5)	191 (70.5)	8.27 (5.42 to 12.61)	<0.001
<i>Indashyikirwa</i> -community, Rwanda	Never	496 (72.2)	191 (27.8)		
	Occasional	184 (47.7)	202 (52.3)	2.91 (2.27 to 3.72)	<0.001
	Frequently	86 (26.4)	240 (73.6)	7.61 (5.62 to 10.31)	<0.001
Overall effect	Never	2775 (78.5)	759 (21.5)		
	Occasional	594 (49.8)	598 (50.2)	2.68 (2.13 to 3.36)	<0.001
	Frequently	289 (32.6)	598 (67.4)	5.94 (4.19 to 8.41)	<0.001

*All row percentages.

†All models adjusted for participant's age.

aOR, adjusted OR; COMBAT, Community Based Action Teams; IPV, intimate partner violence.

experiencing IPV in the past 12 months (aOR=2.68 (95% CI 2.13 to 3.36)). While women reporting seeing their partner frequently drunk in the past 12 months had an almost sixfold increased odds of experiencing physical IPV in the past year (aOR=5.94 (95% CI 4.19 to 8.41)), compared with those who had never seen them drunk.

DISCUSSION

In a pooled sample of data from five data sets arising from four studies in three countries across SSA, we found strong evidence of a clear association between men's harmful alcohol use, and their perpetration of violence, with a mixed association between men's moderate alcohol use and violence perpetration. Among women, we found a consistent association between witnessing their partner drinking and experience of IPV.

The association between men's moderate consumption of alcohol and perpetration of physical IPV varied by country. In three of the data sets (COMBAT, *Indashyikirwa*-couples and *Indashyikirwa*-community), moderate alcohol use was associated with a greater likelihood of IPV perpetration, while in the two South African studies (Stepping Stones and Creating Futures and Sonke), there was no association. One explanation for these findings may be related to the difference in the background level of drinking and drinking patterns between the countries. In South Africa, men's drinking is normative; 69% and 64% of men in the South African studies were current drinkers, compared with 44% in Ghana and 45% and

37% in Rwanda couples and community samples, respectively. Also, in the South African studies, 44% of men in Stepping Stones and Creating Futures and 40% of men in Sonke CHANGE trial drank harmfully (8+ on AUDIT scale). Therefore, in places like South Africa where alcohol consumption is more prevalent and socially normative, it may be that moderate alcohol use is both unremarkable and too common to serve as an indicator of risky or anti-social behaviour, whereas in settings where alcohol use is less common, any use may be indicative of being somewhat socially rebellious and associated with this is violence perpetration. A second explanation may lie in the generalised very high rates of violence in South African informal settlements. In both the Stepping Stones and Creating Futures and the Sonke CHANGE samples, 50% and 40% (respectively) of men reported perpetrating past year physical IPV, suggesting that even in the absence of alcohol, IPV perpetration may be driven by other salient factors such as poverty, patriarchal privilege and the normative use of violence in interpersonal relationships.³ Future mixed method research into the drivers of violence in informal settlements is merited.

Across all studies we found significant associations between harmful alcohol use, and IPV perpetration among men, and IPV experience among women. This is consistent with previously published literature.^{5 6} We also found correlated increases, whereby men who used more alcohol were also more likely to report recent perpetration of violence. Addressing harmful alcohol use should remain a focus

globally in alcohol and IPV prevention interventions. These findings are especially important in the Global South, considering the high levels of harmful and heavy episodic drinking in the region.¹⁸ This points to the need for interventions that seek to reduce violence against women and girls in the Global South to take account of the significant contribution of men's drinking and harmful patterns of alcohol use in violence perpetration, alongside other currently recognised drivers of violence.³

We also found that harmful alcohol use was strongly correlated with perpetration of NPSV. In SSA, there has been little data assessing the association between alcohol use and NPSV. A previous population-based study in South Africa covering three districts across two provinces showed an association between NPSV and drug use, but not alcohol use,⁸ while population-based samples across four countries in the Asia and Pacific did show an association between alcohol use and NPSV.⁷ Our findings show a clear association between harmful alcohol use and NPSV perpetration, and again, that increasing alcohol consumption was correlated to increased likelihood of reporting recent perpetration of violence. This makes the current analysis an important contribution to understanding the alcohol NPSV nexus in the Global South and underscores the potential importance of addressing alcohol in VAWG prevention.

Among women, we similarly found that occasionally seeing their partner drunk in the past year, and seeing their partner drunk frequently, were both associated with an increased likelihood of reporting past year IPV. As with men's reports in the three studies, the findings indicate that any drunkenness around an intimate partner, and not just a pattern of heavy drinking, or a culture of drinking, is a risk factor for alcohol-related violence. It also confirms that the risk for violence increases with men's increasing levels and frequency of alcohol use. Two plausible explanations may account for this association. One, it is possible that alcohol use directly increases aggression in at least some people through disinhibition or other physiological impacts, and therefore men's risk of use of violence increases with increasing levels and frequency of alcohol use. Second, and particularly in contexts where many men drink, drinking alcohol to harmful levels may concurrently embody an image of 'what it means to be a man' that includes demonstrations of toughness and strength and dominance and control over women. However further research is required to unpack these issues and better understand which, if either, may predominate in any given setting. These reflections have important implications for planning future violence prevention interventions, and our findings indicate that in settings where harmful drinking is common, IPV prevention interventions should also address alcohol consumption.

In the settings where we have comparable data for women's reports of their partners drunkenness and men's reports of their harmful drinking (*Indashyikirwa* couples, *Indashyikirwa* community and COMBAT), we found that in *Indashyikirwa* (couples and community samples), men

reported less harmful drinking than women reported their partners drunkenness. However, in Ghana, the opposite is true, with men reporting more harmful drinking than women do their partner's drunkenness. It is unclear whether this is due to men's under-reporting of harmful drinking or differences in understanding of what constitutes drunkenness in the different settings.

Addressing the intersections of alcohol-related VAWG is a critical intervention challenge. A variety of interventions have been shown to be effective in reducing alcohol-related VAWG. Structural interventions focusing on legal and policy reforms to make alcohol more expensive (price increases, minimum unit pricing, increases on excise tax) and less available (limiting hours and days of week sale, limit on quantities purchased and alcohol outlet density) have been shown to reduce drinking and alcohol-related IPV,^{19 20} but this has largely been in high-income settings. Community-based interventions in SSA have primarily focused on working directly with couples and groups. For example, psychotherapeutic interventions with couples with exceedingly high levels of alcohol use and IPV in their relationships show promise in reducing both of these.²¹ Intervening with couples to shift beliefs and social norms that drive IPV, such as poor conflict resolution, key triggers of IPV including raised awareness of alcohol (ab)use as a key trigger of IPV is an important approach for impacting alcohol use, and reducing alcohol-related IPV.²² Another set of interventions implemented in SSA have provided a group context in which to offer gender-transformative, social empowerment interventions and these have shown promise with men and reduced alcohol use and IPV perpetration.^{23 24} Gender transformative programmes provide men with opportunities to reflect on, and reframe their lives as men, change their relationships, and reduce their use of violence and other harmful practices, including heavy drinking.²⁴ They have great potential to incorporate an assessment of the use and patterns of alcohol use in their design to comprehensively address the link between alcohol use and VAWG. It is notable that some of the latter interventions, implemented in SSA, notably Stepping Stones, although not specifically designed to reduce alcohol use have showed significant declines in alcohol use.^{23 24} Therefore, addressing the intersecting issues of gender, masculinity and alcohol use on IPV, may be an important target in IPV prevention planning, both as part of a multicomponent approach and by exploring the huge potential of gender transformative programme within which to address alcohol-related violence.

Strengths and limitations

One of the study's key strengths is the pooled analysis of data from multiple settings and interventions across the SSA, using comparable measures of IPV and NPSV perpetration, experience of IPV and alcohol use. This

overcomes the limitation of many previous studies both globally and in the Global South examining the associations between alcohol use and IPV and NPSV. It also examines associations between alcohol use and IPV/NPSV over the same recall period, that is, over the past 12 months, thereby reducing recall bias and problems with the temporal nature of the association. This shorter recall period is particularly important for alcohol-related research, where accuracy and volume of recollections may already be compromised. The study is also strengthened by the synthesis of comparable regional data (Africa) in the Global South, thereby addressing the limited geographical scope of studies examining alcohol's association with VAWG. It extends the evidence base on the alcohol violence nexus, as we have increased the number of settings in SSA and included (South Africa), where alcohol use is highly prevalent. Furthermore, it examines both violence perpetration and experience, from the perspectives of both men and women, thereby strengthening our understanding of the relationship between IPV/NPSV and alcohol use. However, we also acknowledge limitations in the research. Previous research suggests that there is likely a bidirectional relationship between alcohol and IPV, particularly for women.²⁵ Future longitudinal studies focused on examining the temporal relationships are needed to examine this. We acknowledge that both men and boys may also experience alcohol-related violence from women and other men. However, there was no data on this from these studies. Only one of the four studies (Ghana) was population-based and other studies were limited in generalisability, as they were based on populations recruited for the purpose of impact evaluation. We did not adjust for women's own drinking, which has been found to increase their subsequent experiences of violence, as it was not included in all data sets. Despite the current limitations, the study confirms alcohol as a robust correlate of IPV and NPSV perpetration and of women's experiences of IPV in SSA.

CONCLUSION

In five studies in SSA, harmful alcohol use was associated with increased odds of IPV and NPSV, while moderate alcohol use showed varied associations with IPV and NPSV, potentially shaped by background levels of alcohol use and violence perpetration. Public health programming needs to address alcohol use in prevention and treatment of IPV, and experiences of violence needs to be addressed in programmes addressing harmful alcohol use.

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Contributors LR conceptualised the analysis with AG and RJ. EDC led the statistical analysis. AG was a principal investigator (PI) on the Stepping Stones and Creating Futures study in South Africa, EDC was a PI on the COMBAT study in Ghana, KD was a PI on the Indashyikirwa study in Rwanda and RJ was the

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Patient consent for publication Not required.

Ethics approval Ethical clearance for all studies was obtained prior to the studies commencing. For the Stepping Stones and Creating Futures intervention, clearance was obtained from the South African Medical Research Council's Ethics Committee (EC006-2/2015) and the University of KwaZulu-Natal's Biomedical Research Ethics Committee (BFC043/15). For the Sonke CHANGE intervention, clearance was obtained from the University of Witwatersrand's Ethics Committee (M150443). For *Indashyikirwa* in Rwanda, ethical approval was obtained from the Rwandan National Ethics Committee (340/RNEC/2015) and the South Africa Medical Research Council Ethics Committee (EC033-10/2015). A required research permit was obtained from the National Institute of Statistics Rwanda (0738/2015/10/NISR). For the Community Based Action Teams (COMBAT) intervention in Ghana, the Noguchi Memorial Institute for Medical Research, University of Ghana (# 006/15-16) and the South African Medical Research Council's Ethics Committee (EC031-9/2015) granted ethical clearance for the study. All studies followed ethical and safety guidelines for research on violence against women. All participants provided written informed consent before participation. Further information on the studies ethics is available in the study sources referenced in Table 1.

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Data availability statement Data are available in a public, open access repository. De-identified individual participant data for Stepping Stones and Creating Futures (South Africa), Sonke CHANGE trial (South Africa) and Evaluation of the COMBAT intervention (Ghana), are available to anyone who wishes to access the data for any purpose at <https://medat.samrc.ac.za/index.php/catalog/WWW>. De-identified individual participant data from the Indashyikirwa couples cohort and community surveys (Rwanda) are available from the Principal Investigator of the study, Dr Kristin Dunkle: kristin.dunkle@mrc.ac.za, but may require permission from the Rwandan Ministry of Gender and Family Promotion (MIGEPROF) before transfer.

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ORCID iDs

Leane Ramsoomar <http://orcid.org/0000-0003-1934-579X>

Andrew Gibbs <http://orcid.org/0000-0003-2812-5377>

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