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Concordance of self- and partner-reported alcohol consumption among couples experiencing intimate partner violence in Zambia

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Abstract

Background: Hazardous alcohol use is a predictor of intimate partner violence (IPV) and both are increasingly prevalent in sub-Saharan Africa. The accurate measurement of alcohol consumption is therefore critical in IPV intervention studies that target hazardous drinking. Collecting a collateral report in addition to self-report is one convergent validity approach to improve alcohol measurement. We investigated concordance between self- and partner-reported alcohol use among women who reported recent IPV and their male partners in Zambia.

Methods: Data were from the baseline of a randomized IPV intervention trial of 247 heterosexual couples in which a woman has reported recent IPV and her male partner has recent hazardous alcohol use. Both partners completed the Alcohol Use Disorders Identification Test (AUDIT) in reference to their own drinking and in reference to their partner's drinking. We calculated percent agreement across a range of outcomes: any use, quantity, frequency, and hazardous use. We also compared self- and partner-reported AUDIT scores using t-tests.

Results: Concordance was poor across most outcomes. Percent agreement with respect to the women's drinking ranged from 60% to 65% across outcomes and with respect to the men's drinking from 51% to 89%. Women's average partner-reported AUDIT score (20.7) was statistically significantly (p<.0001) higher than men's average self-reported score (15.8).

Conclusions: In contrast to collateral report studies conducted in the U.S., concordance between self- and partner-reported alcohol consumption was poor among families experiencing IPV in Zambia. Given the possible biases associated with self-reported alcohol use, findings suggest that a convergent validity approach is useful in this research context.

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Keywords

sub-Saharan Africa; alcohol; intimate partner violence; measurement; social desirability

Introduction

Globally, 30% of ever-partnered women have experienced physical and/or sexual intimate partner violence (IPV) in their lifetime (WHO, 2013). In sub-Saharan Africa (SSA), lifetime prevalence of IPV is 37%, compared to 23% on average in high-income countries (WHO, 2013). In Zambia, the location of the present study, the prevalence of IPV is one of the highest in SSA (Kishor and Johnson, 2004; Schrauben et al., 2016).

Hazardous alcohol use is a critical contributing factor to IPV and one that is thought to be relatively amenable to public health intervention (Wilson et al., 2014). A meta-analysis of 47 studies found a significant association between male alcohol use/abuse and male-to-female IPV (Foran and O'Leary, 2008). Given this established link and studies demonstrating efficacy of interventions to reduce alcohol misuse, the World Health Organization now recommends that alcohol reduction initiatives be included in IPV prevention programming (McHugh et al., 2010; WHO/LSHTM, 2010; Wilson et al., 2014). In SSA generally (Shield et al., 2013), and Zambia specifically (World Health Organization, 2011), rates of hazardous alcohol use are increasing; this suggests that IPV interventions that include alcohol reduction components could have significant public health impact.

A key consideration in accurately assessing program impact is the use of valid and reliable alcohol consumption measures. Alcohol intervention studies typically employ a solitary self-report measure (e.g., the Alcohol Use Disorders Identification Test [AUDIT], Alcohol Timeline Followback) to assess consumption and/or alcohol-related problems (Saunders et al., 1993; Sobell and Sobell, 1992). Although self-report performs adequately in many contexts, it is not an objective measure of alcohol use and is subject to under- and/or inconsistent reporting due to social desirability, recall, or other biases (Ensminger et al., 2007; Fendrich and Rosenbaum, 2003; Jatlow and O'Malley, 2010; Latkin et al., 2016). In particular, the risk for underreporting may be higher among highly religious populations, stigmatized groups, and among clients in clinic-based settings who may avoid disclosing due to fear of losing access to services (Ensminger et al., 2007; Hahn et al., 2012). Several recent studies from SSA of clinic-based (Bajunirwe et al., 2014; Vinikoor et al., 2018) and community-based populations (Murray et al., 2015; Vellios and Van Walbeek, 2017) have demonstrated substantial underreporting of alcohol consumption. Underreporting threatens the validity of findings from prevalence studies, and inaccurate estimates of burden affect prioritization of alcohol-related health concerns, resource allocation, and program planning. This issue may be exacerbated in the context of a clinical trial, in which there is an increased possibility of the bias being differential by treatment arm (i.e., participants who receive an alcohol intervention may be more inclined to underreport than those in a control group).

A strategy to mitigate social desirability effects of reporting sensitive behaviors is the use of audio computer assisted self-interviewing (ACASI) instead of face-to-face interviews (Kane et al., 2016; Langhaug et al., 2010). ACASI permits study participants to respond to

questionnaire items on alcohol privately without an interviewer present. Although studies suggest that using ACASI is associated with reduced social desirability in responses (Adebajo et al., 2014; Beauclair et al., 2013; Langhaug et al., 2010), responding via ACASI has not always resulted in more accurate reporting of sensitive behaviors (Kelly et al., 2014; Latkin et al., 2017).

Alcohol and substance use researchers have long called for a convergent validity approach to address reporting bias (Ensminger et al., 2007; Latkin et al., 2016; Maisto et al., 1990). Recently, the use of biomarkers in research studies to augment self-report has increased (Anton, 2014; Hahn et al., 2012; Jatlow et al., 2014; McDonell et al., 2015; Vinikoor et al., 2018) with authors advocating for concurrent use when possible (Williams et al., 2016). In particular, low-cost point-of-care urine-based biomarker tests, such as ethyl glucuronide, may have significant potential to augment self-report in SSA (Vinikoor et al., 2018). However, their use is not yet feasible in many resource-limited countries where additional epidemiological investigation is also warranted. A more immediately available approach to convergent validity in SSA is *collateral reporting*, in which a participant self-reports his or her own alcohol consumption, and a second person (the 'collateral') also reports on that participant's alcohol consumption over the same time period. Collaterals can be anyone with intimate knowledge of the participant's drinking behavior; though in practice, it is often the participant's spouse/partner, close friend, or relative (Maisto and Connors, 1992).

A review by Connors and Maisto (2003) found that in most studies employing collateral reports, the concordance between participant and collateral was usually moderate-to-high and statistically significant (Connors and Maisto, 2003). Further, when discordance was reported, most frequently it was due to the collateral *underestimating* a participant's alcohol use (e.g., the participant would report recent alcohol use and the collateral would report that the participant had been abstinent). Similarly, a more recent meta-analysis of collateral report studies conducted among college students found that there was good agreement between participant and collateral report, and that slight discordance was attributable to collaterals underreporting alcohol use relative to the participant's self-report (Borsari and Muellerleile, 2009).

Collectively, these reviews have led to suggestions that the use of collateral reports are not necessary in studies of alcohol use (Borsari and Muellerleile, 2009; Laforge et al., 2005). However, published studies with collateral reporting have almost exclusively been conducted in high income countries. We are unaware of any study that has analyzed concordance of collateral alcohol reporting in SSA. Given the current limited capacity for use of a biomarker approach in many SSA settings, investigation into the utility of collaterals for augmenting self-report is warranted. In this study, we analyze the concordance in alcohol reporting between adult Zambian female and male partners in a relationship (married or dating), in which the female partner has reported recent IPV and at least one of the partners has reported that the male drinks heavily.

Material and Methods

Participants and Procedure

Data for this study were from the combined screening/baseline assessment of a randomized controlled trial (RCT) in Zambia, the Violence and Alcohol Treatment Study (VATU; Clinical Trials #), which tested the effectiveness of a cognitive-behavioral therapy-based intervention in reducing IPV and hazardous alcohol use. The trial was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and the University of Zambia Biomedical Ethical Review Committee.

Methods for the RCT have been published elsewhere (Kane et al., 2017). In brief, 248 family units consisting of an adult woman, her male partner, and a child of the couple (if applicable) were recruited by lay mental health counselors in Lusaka, Zambia. Recruitment procedures were designed to match existing community-based outreach programs in Lusaka and how a future program of the study intervention might be implemented in the real-world. Following public meetings where the study was introduced and feedback was elicited from community members, counselors went door-to-door to meet with couples and provide them with more information on the study. Inclusion criteria were: 1) the family had to be living in Lusaka; 2) all family members had to speak at least one of the study languages; 3) the adult male and female had to be in a relationship (married or dating); 4) all family members had to provide consent and, if a child from the family was participating, the mother had to provide permission; 5) the adult female had to report recent, moderate-to-severe IPV perpetrated by her male partner as measured by the Severity of Violence Against Women Scale (SVAWS) physical violence subscale (Marshall, 1992); and 6) the adult male was identified as having recent, hazardous alcohol use by his own self-report on the AUDIT (Saunders et al., 1993) and/or by the female's report on a partner-version of the AUDIT.

The SVAWS and AUDIT eligibility criteria were assessed at an initial visit that served as the trial screening and baseline data collection via ACASI. Female and male adult participants each completed ACASI-based eligibility screeners in separate rooms. Questions were displayed on a laptop screen with accompanying audio recordings played through headphones. Interviews were administered in English or one of the two most commonly spoken languages in Lusaka, Bemba or Nyanja, based on participant preference. The female completed questions on demographics and the SVAWS, AUDIT-partner, and AUDIT-self assessments. The male completed questions on demographics and the AUDIT-self, and AUDIT-partner assessments. This paper only includes data from participants who were found to be eligible for participation in the trial.

Measures

The *Alcohol Use Disorders Identification Test (AUDIT)* is a 10-item measure of hazardous alcohol use (Babor et al., 2001; Saunders et al., 1993) previously validated in Zambia (Chishinga et al., 2011). Each item has response options ranging from 0–4; the total scale score can range from 0–40. The first three items cover frequency of use, quantity of use on days when drinking, and binge drinking; items 4–6 cover alcohol dependence symptoms; and, items 7–10 cover alcohol-related harm. A total AUDIT score is calculated across the 10

items. We used the NIAAA-recommended values of ≥8 for men and ≥4 for women to suggest hazardous use (NIAAA, 2005).

The AUDIT asks participants to report their own alcohol use. For example, the first question is phrased, "how often did *you* have a drink containing alcohol?" In this study, both female and male participants completed this original version of the AUDIT. Additionally, participants completed a partner-version of the AUDIT, in which items were rephrased to refer to the participant's perceptions of his/her partner's alcohol use. For example, Item 1 became "how often did *your partner* have a drink containing alcohol." Internal reliability for the AUDIT scales was strong (α=0.85 for male self-report; α=.87 for female self-report; α= 0.78 for male partner-report [the male's report of the female's alcohol use]; and α=0.80 for female partner-report [the female's report of the male's alcohol use]).

The *Severity of Violence Against Women Scale (SVAWS)* is a 46-item measure that asks women to report how often they experienced several types of intimate partner violence by their current partner over the past 12 months. For this study, we analyzed the SVAWS physical/sexual violence subscale, which includes 27 items (e.g., 'punched you', 'physically forced you to have sex'). This scale was chosen because of prior use among similar populations, including women in South Africa who had experienced IPV and whose male partners had unhealthy alcohol use (Peltzer and Pengpid, 2013). Response options for all items ranged from 1 (never) to 3 (many times). A total scale score was calculated. Internal reliability of the scale was 0.92.

In addition to the AUDIT and SVAWS, two mental health screening measures were included in the assessment and relevant for the present analysis:

The Center for Epidemiological Studies-Depression (CES-D) scale is a 20-item measure assessing frequency of depression symptoms over the past week (never, 1–2 days, 3–4 days, 5–7 days) (Radloff, 1977). A total scale score was calculated for all participants. Internal reliability was good for women (α=0.92) and men (α=0.88). A score of 16 or above was considered positive for clinically significant depression symptoms (Lewinsohn et al., 1997).

The Harvard Trauma Questionnaire (HTQ) is a 39-item measure of post-traumatic stress symptoms. Participants responded how much they have experienced each symptom over the past week (not at all, a little, quite a bit, extremely) (Mollica et al., 1992). An average item score was calculated for all participants. Scores of 2.5 or higher were considered positive for clinically significant post-traumatic stress symptoms (Mollica et al., 1992). Internal consistency was good for women (α=0.96) and men (α=0.95).

Additional demographic characteristics captured in the study and relevant for this analysis include age (categorized as 18–25, 26–35, 36–45, and 46+), relationship status (categorized as married or unmarried), education (categorized as having completed primary school or not), employment (categorized as part- or full-time employed or unemployed) and HIV status.

Statistical Analysis

Chi-squared statistics were used to compare demographic characteristics between female and male participants. We analyzed concordance of four alcohol use outcomes with respect to both female and male drinking using the self- and partner-reported AUDIT measures: any alcohol use (categorized as yes/no), quantity of alcohol use (categorized as 1–2 drinks or 3+ drinks), frequency of use (categorized as 1–4 times/month or 2+ times/week), and hazardous use (categorized as yes/no using the aforementioned cut-off values of ≥8 for men and ≥4 for women). We also conducted a sensitivity analysis with the hazardous use outcome. Although AUDIT cut-off values of ≥8 for men and ≥4 for women are recommended by NIAAA and found to be sensitive and specific for unhealthy alcohol use in a range of populations (Babor et al., 2001; Bradley et al., 1998; NIAAA, 2005; Reinert and Allen, 2002), these cut-off values have not been validated in Zambia. A study conducted among patients receiving treatment for HIV or tuberculosis in Zambia investigated the utility of the AUDIT in identifying alcohol use disorder compared to a psychiatric interview using the Mini-International Neuropsychiatric Interview (MINI). The study found optimal AUDIT cut-points of 20 for men and 24 for women (Chishinga et al., 2011). Given that this is the only known published AUDIT validation study in Zambia, we replicated our concordance analyses using the hazardous use variable with cut-off values of ≥20 and ≥24 for men and women, respectively. Additionally, we conducted an analysis using ≥8 as a cut-off for women given some evidence that it may be an appropriate value for identifying unhealthy alcohol use in both men and women (Babor et al., 2001).

For each of the four alcohol outcomes, we present the percent agreement between self- and partner-report, the agreement between reporters that would be expected by chance alone, and the kappa statistic. Kappa is a statistic that measures inter-rater reliability for dichotomous variables while accounting for agreement between raters due to chance (Cohen, 1960). The statistic can range from −1 to 1. Values less than 0 suggest worse agreement than would be expected by chance. We considered values above 0.4 and 0.6 as indicative of moderate and substantial agreement, respectively, per standard interpretation (Landis and Koch, 1977; McHugh, 2012). We also compared total AUDIT scores between self- and partner-reports using Spearman correlations and by conducting a mean difference *t*-test.

In addition to analyzing concordance on alcohol variables, we estimated four separate multivariable logistic regression models for female and male drinking to assess predictors of concordance in alcohol reporting between partners. We derived two binary variables of concordance (1=concordant; 0=discordant) of reporting between partners separately with respect to female and male drinking for any alcohol use and hazardous alcohol use. The outcomes investigated therefore included binary variables of concordant/discordant with respect to: any female alcohol use (Model 1), any male alcohol use (Model 2), female hazardous alcohol use (Model 3), and male hazardous alcohol use (Model 4). Supplemental File 1 contains additional detail on the definitions used for concordance in each of the four models. All models included the same covariates. Based on previous review of collateral reporting studies (Babor et al., 2000; Connors and Maisto, 2003), we included age, education, employment, marital status, HIV status, having a mental health comorbidity (dichotomous variable of 1=meeting clinically significant symptom criteria for depression

and/or post-traumatic stress or 0=not meeting criteria for either depression or post-traumatic stress), and alcohol consumption (as measured by AUDIT score). In addition, we included the SVAWS physical violence scale score as a predictor to assess whether the female's report of experienced violence was associated with concordance of alcohol reporting. All analyses were conducted using Stata, version 15 (StataCorp, 2017). Statistical significance for all analyses was considered at a threshold of $p<.05$.

Results

In total, 248 couples were enrolled into the study. One female participant had missing self-reported alcohol data, so 247 couples were included in this analysis. Table 1 summarizes participant characteristics. 71.7% (N=177) of couples were eligible based on concordant report of male drinking, 22.3% (N=55) were eligible based on only the female reporting the male had hazardous drinking, and 6.0% (N=15) were eligible based on only the male reporting that he had hazardous alcohol use. A plurality of women (40.2%) and men (37.8%) were between 26 and 35 years old. There was a statistically significant difference in age between women and men, with 51.2% of men 36 and over compared to 33.3% of women. Over a third (37%) of couples reported being married. Men were more likely than women to have completed primary school or higher (51.4% vs. 34%), although this was marginally non-significant ($p=.06$). Just over half of men (55.5%) were employed either part- or full-time, compared to 41.3% of women; this difference was not statistically significant ($p=.68$). Women were significantly more likely to report having HIV than men (40.9% vs. 26.8%, $p<.0001$).

Concordance of alcohol reporting on female drinking

Concordance of women's self-reported alcohol use and male partner's report of women's use is presented in Table 2. Overall, 67.6% of women reported any alcohol use compared to 73.3% of men reporting that their female partners used any alcohol (64.4% agreement, $\kappa = 0.15$). Agreement was similar for frequency of use (65.2% agreement; $\kappa = 0.19$) and hazardous use (64.0% agreement, $\kappa = 0.18$). In the sensitivity analyses, when the AUDIT cut-off for hazardous use was increased to ≥8, percent agreement dropped to 59.5% with a similar kappa of 0.19. When the cut-off was increased to ≥24, percent agreement increased to 79% but with a lower kappa value of 0.02 (Supplemental File 2).

Agreement was poorer regarding quantity of alcohol used (60.5% agreement; $\kappa = -0.01$). The correlation between total AUDIT score for female self-report and male partner-report was 0.24. The mean AUDIT score for women's self-report was 10.8 (SD=11.0) compared to 10.0 (SD=9.0) for men's partner report, a difference of 0.8 (SD=12.9) that was not statistically significant ($p=0.31$).

Concordance of alcohol reporting on male drinking

For all alcohol outcomes, concordance between partners with reference to the male's drinking was poorer than for the female's drinking (results for male drinking also presented in Table 2). Overall, 90.7% of men reported any alcohol use compared to 98.4% of women who reported their male partners had any alcohol use (89.1% agreement, $\kappa = -0.03$).

Agreement was also very poor for hazardous alcohol use (71.7% agreement, $\kappa = -0.10$), quantity (70.3%, $\kappa = 0.08$) and frequency (50.7% agreement, $\kappa = 0.07$). In the sensitivity analysis, when the AUDIT cut-off for hazardous use was increased to ≥20, percent agreement decreased to 57.1% and the kappa value increased to 0.16 (Supplemental File 2).

The correlation between total AUDIT score for male self-report and female partner-report was 0.14. The mean AUDIT score among men for self-report was 15.8 (SD=9.4) compared to women's partner-report, which was a mean of 20.7 (SD=9.4), a statistically significant ($p<.0001$) difference in AUDIT score of 4.9 (SD=13.0).

Predictors of concordance

Results from the multivariable logistic regression models predicting concordance are presented in Table 3. Self- and partner-reported AUDIT scores were both significantly associated with increased odds of concordant reporting with respect to both male and female drinking and for both the any alcohol and hazardous alcohol use outcomes; that is, higher AUDIT scores were associated with increased odds of concordance in all four models. In Model 1, male mental health comorbidity and male education were both associated with lower odds of concordance with respect to female drinking for the any alcohol use outcome. There were no other significant predictors of concordance across any of the four models.

Discussion

This study investigated the concordance between self- and partner-reported alcohol use among couples who reported recent IPV in Zambia. The results indicate poor agreement in alcohol reporting across a range of consumption indicators—any use, frequency of drinking, quantity of drinking, and hazardous use. These findings diverge markedly from prior studies of collateral alcohol reporting (almost exclusively conducted in the U.S. or other high income countries and often with college student populations), which have generally found high concordance between self- and collateral report (Borsari and Muellerleile, 2009; Connors and Maisto, 2003; Laforge et al., 2005).

Poor agreement was observed across alcohol outcome types regardless of the analysis approach used. With respect to female alcohol use (i.e., female self-report and male partner-report) percent agreement ranged from 60–65% across the four outcome types. The corresponding kappa values for female drinking were all below 0.20, which is considered very poor (Landis and Koch, 1977). Although there was no statistically significant difference between average self- and partner- AUDIT score for female drinking, the correlation between the two was 0.24. This is substantially lower than prior studies which have generally found correlations of greater than 0.4 (Babor et al., 2000; Laforge et al., 2005; Sobell et al., 1997; Stasiewicz and Stalker, 1999).

Except for the frequency outcome, percent agreement between partners was higher for male drinking (range: 70–89%). This should not, however, be taken as an indication that concordance was better for male drinking. The kappa statistics (all below 0.10) suggest that agreement was either only slightly better than, or even worse than, what would be expected by chance alone for men's drinking. The high rates of actual agreement are attributable to

the severity of alcohol use in the male sample—that is, the high prevalence of either the female or male positively endorsing the alcohol items, which was expected given the study's recruitment strategy and inclusion criteria. Still, the actual agreement rate is lower than what has been observed in previous studies; Babor et al (2000), for example, reported an actual agreement between self- and collateral reports of 97% (Babor et al., 2000). The continuous AUDIT score outcome for male drinking also demonstrated poor concordance; there was a statistically significant difference in mean AUDIT score between self- and partner-reports and the correlation between the reports was a slight 0.14.

Contrary to much of the extant literature, our results suggest that discrepancies in reporting for both males and females are due to self-report being lower (in terms of any use, quantity of use, and hazardous use) than collateral report. Previous studies have suggested the opposite: that discordance is primarily attributable to the collateral underreporting use relative to the subject's self-report (Borsari and Muellerleile, 2009; Connors and Maisto, 2003). The finding is in line with recent studies suggesting that underreporting of alcohol use is common in studies conducted in SSA (Bajunirwe et al., 2014; Murray et al., 2015; Vellios and Van Walbeek, 2017; Vinikoor et al., 2018). In Zambia, as in other countries in SSA (Thakarar et al., 2016; Trangenstein et al., 2018), consumption of homebrewed alcohol is common, which may contribute to inaccurate reporting. A recent qualitative study by Crane et al. (2018) in Zambia also found that there may be differences in alcohol consumption reporting and treatment seeking between men and women. Specifically, heavy consumption of alcohol is perceived as 'shameful' among women but relatively socially acceptable among men. This may then help to explain possible underreporting among women in our study. Crane et al. (2018) also reported that there is substantial stigma generally around receiving treatment for alcohol problems. Given that data for this study were collected within the context of an intervention trial, it is possible that stigma may also account in part for underreporting among both women and men. To our knowledge, there have not been any qualitative investigations focused on the context of alcohol use within romantic relationships and this would be an important line of future research.

Previous studies have investigated several correlates of discrepancies in reporting, including age, education, frequency of contact with subject, mental health comorbidity, and alcohol consumption. Babor et al. (2000) found that males, older age, less education, less frequent contact with the collateral, and greater alcohol consumption were associated with greater discordance (Babor et al., 2000). Our results similarly suggest discordance is greater with respect to male drinking, but we found no association of concordance with age and male education was only a significant predictor with respect to any female drinking (female education was not significant for any of the outcomes). We did not have the ability to test frequency of contact in this study. We did investigate the association between marital status and concordance and found no association. Similar to Stasiewicz et al. (1997), we found no clear evidence that having a mental health comorbidity was associated with worse discordance except for one outcome (Stasiewicz et al., 1997): male mental health comorbidity was associated with worse concordance with respect to female drinking for the any alcohol use outcome. We also found no association between HIV status and concordance, which diverges from findings in a study by Eyawo and colleagues (2018) that

found participants with hepatitis C virus (HCV)/HIV co-infection were more likely than those without HCV/HIV to underreport alcohol consumption.

We did find an association between AUDIT score and concordance but in the opposite direction of what was found by Babor et al. (2000) (Babor et al., 2000). In our study, higher AUDIT scores were associated with greater odds of agreement between self- and partner-report in all four models. It is possible that among this population, greater alcohol consumption translated into greater knowledge of alcohol use by partners and/or a greater salience of partners' use. However, if this was the case, it only was so to a point- if greater severity of use was associated with greater knowledge or salience of use than it would be expected that the hazardous use outcome would exhibit demonstrably higher concordance than the 'any' alcohol use outcome and this was not the case for female or male drinking. It should also be noted that the effect size for these variables, while statistically significant, was small in magnitude.

The regression model therefore did not provide much in the way of explaining the high rates of discordance. The results are similar in that respect to a recent study by Magidson and colleagues (2019) in Uganda, which found that males were more likely to underreport than females but otherwise there were no other significant predictors of alcohol underreporting (other predictors in that study included CD4 count, age, household asset index, physical and mental health, stigma, months since HIV diagnosis and structural barriers). One distinct but unmeasured possibility in our study is that participants under-reported their own alcohol consumption due to social desirability or stigma (Bajunirwe et al., 2014; Vinikoor et al., 2018), although stigma was also not a significant predictor in the aforementioned Uganda study (Magidson et al., 2019). Another possible contributor is the presence of IPV within these families. We did not observe an association between IPV and concordance in our model, but this could perhaps be reflective of the fact that that all of the women were eligible for the study on the basis of experiencing high levels of violence. It is possible that the experience of violence linked to episodes of a partner's drinking may make a woman more likely to recall the instance of use. She may also, in the context of violence, be more attuned to negative consequences of drinking, such as injury to others, that an individual may not remember, recognize or want to report.

One final possibility is that the partners did not have high awareness of each other's drinking. However, we find this unlikely, particularly for the *any* alcohol use outcome with respect to the male drinking, given that the couples were explicitly recruited and enrolled into the study based on the male's alcohol consumption and were informed during the consent process that the study served in part as a trial of an intervention to address hazardous use. It should also be noted that our participants likely knew that their partner was reporting on their own alcohol use, which is typically thought to be an incentive for more accurate reporting (Connors and Maisto, 2003).

Limitations

The findings must be considered in light of several limitations. First, there was not an objective measure of alcohol (i.e., biomarker) in this study, therefore we have no ability to discern the absolute accuracy of either self- or partner-report—only the relation of the

reports to each other. Second, we did not have a measure of frequency of contact, which has previously been found to be an important predictor of concordance. Third, our sample size was somewhat limited for the multivariable regression models, and as such, these results should be considered preliminary. Fourth, the study did not include additional mental health problems that may related to IPV, including personality disorders, externalizing behaviors such as aggression, or attention-deficit hyperactivity disorder. Finally, we acknowledge that a limitation of the kappa statistic is that it is influenced by the prevalence index. However, reporting only the raw percent agreements would be problematic as they do not account for agreement that would occur by chance alone and thus may be overestimated. For this reason, we have followed the recommendation of McHugh (2012) and presented *both* the kappa and the actual percent agreement.

Conclusion

The results of our investigation suggest that there is utility in capturing collateral alcohol reports among partners affected by IPV in Zambia for research, particularly in intervention studies. More broadly, and in line with previous research among HIV and trauma-affected populations in SSA, the findings also suggest that underreporting of alcohol use is common. Underreporting of alcohol use can reduce validity of research study findings and the impact of programs, introduce bias into intervention trials, and recently was even found to be associated with increased risk of mortality (Eyawo et al., 2018). It follows that the solitary use of self-reported alcohol consumption for research in these contexts is likely inadequate. We recommend that a convergent validity approach (Connors and Maisto, 2003; Sobell and Sobell, 1980) be used in research studies when feasible. Ideally, this would include a self-report conducted in tandem with collection of an objective biomarker of alcohol consumption (Williams et al., 2016). In the absence of biomarkers, collateral (e.g., partner) reports can be useful even if discordant. For example, in a clinical trial, investigators can have more confidence that an intervention had a ‘real’ effect if similar alcohol reduction is evidenced in both using participant and collateral reports as outcomes, even if a discrepancy exists regarding consumption overall. The results suggest that the use of collateral reports, while not necessary in some situations (i.e., among college students in the U.S.), may be useful in other contexts and we encourage additional research on collateral reporting in novel environments and populations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Characteristics of sample (n=247)

	N (%)		
	Women	**Men**	**X^2**
Age category			
18–25	65 (26.4)	27 (11.0)	
26–35	99 (40.2)	93 (37.8)	161.0*
36–45	48 (19.5)	74 (30.1)	
46+	26 (13.8)	52 (21.1)	
Relationship status[a]			
Married	92 (37.2)	92 (37.2)	-
Unmarried	155 (62.8)	155 (62.8)	
Education			
Did not complete primary school	163 (66.0)	120 (48.6)	3.3
Completed primary school or higher	84 (34.0)	127 (51.4)	
Employed	102 (41.3)	137 (55.5)	0.17
HIV positive	101 (40.9)	66 (26.8)	28.4*
Mental health comorbidity	107 (43.3)	85 (34.1)	1.07

*p<.05

[a]No comparison conducted. Status obtained from female report.

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Table 2

Concordance of partner and self-report for alcohol outcomes (N=247)

	Female alcohol use					Male alcohol use				
	N (%)					N (%)				
Categorical outcomes	**Self-report**	**Partner-report**	**% Actual agreement**	**% Expected agreement due to chance**	**Kappa**	**Self-report**	**Partner-report**	**% Actual agreement**	**% Expected agreement due to chance**	**Kappa**
Any alcohol use[a]	167/247 (67.6)	181/247 (73.3)	64.4	58.2	0.15	224/247 (90.7)	243/247 (98.4)	89.1	89.4	−0.03
Quantity[b]										
1–2 drinks	42/147 (28.6)	41/167 (24.5)	60.5	60.5	−0.01	54/217 (24.9)	38/239 (15.9)	70.3	67.9	0.08
3+ drinks	105/147 (71.4)	126/167 (75.5)				163/217 (75.1)	201/239 (84.1)			
Frequency[c]										
1–4 times/month	96/149 (64.4)	118/168 (70.2)	65.2	56.9	0.19	129/217 (59.5)	85/239 (35.6)	50.7	47.0	0.07
2+ times/week	53/149 (35.6)	50/168 (30.0)				88/217 (40.6)	154/239 (64.4)			
Hazardous use[d]	161/247 (65.2)	174/247 (70.5)	64.0	56.2	0.18	192/247 (77.7)	232/247 (93.9)	71.7	74.4	−0.10
	Mean (SD)					**Mean (SD)**				
Continuous outcome	**Self-report**	**Partner-report**	**Spearman correlation**	**Mean Difference (SD)**	***t***	**Self-report**	**Partner-report**	**Spearman correlation**	**Mean Difference (SD)**	***t***
AUDIT score	10.8 (11.0)	10.0 (9.0)	0.24	0.8 (12.9)	1.01	15.8 (10.4)	20.7 (9.4)	0.14	4.9 (13.0)	−5.9[*]

[a]Response of ‘once a month’ or more to AUDIT Item # 1 (how often do you have a drink containing alcohol?) and/or response of ‘yes in the past year’ to AUDIT Item # 9 (have you or someone else been injured as a result of your drinking) or #10 (has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down).

[b]Derived from AUDIT Item # 2 (how many drinks containing alcohol do you have on a typical day when you are drinking?). Denominator includes only those who reported a response of ‘once a month’ or more to AUDIT Item # 1.

[c]Derived from AUDIT Item #1. Denominator includes only those who reported a response of ‘once a month’ or more to AUDIT Item # 1.

[d]For women hazardous use defined as AUDIT score of >=4; for men >=8

[*]p<.0001

Table 3.

Predictors of alcohol reporting concordance between female and male partners (n=247)

	Any alcohol use		Hazardous use	
	Model 1 Female (n=247)	**Model 2 Male (n=247)**	**Model 3 Female (n=247)**	**Model 4 Male (n=247)**
Female age				
18–25	REF	REF	REF	REF
26–35	0.96 (0.41, 2.24)	2.41 (0.48, 12.23)	1.10 (0.49, 2.44)	2.74 (0.63, 12.0)
36–45	0.49 (0.17, 1.47)	1.86 (0.17, 20.94)	0.88 (0.31, 2.49)	1.82 (0.34, 9.73)
46+	0.61 (0.15, 2.42)	2.73 (0.09, 84.73)	0.99 (0.26, 3.73)	0.66 (0.08, 5.14)
Male age				
18–25	REF	REF	REF	REF
26–35	1.07 (0.37, 3.13)	0.76 (0.12, 4.81)	1.09 (0.41, 2.97)	0.62 (0.13, 3.09)
36–45	1.14 (0.33, 3.88)	2.35 (0.22, 25.65)	1.23 (0.39, 3.87)	1.23 (0.18, 8.29)
46+	0.97 (0.23, 4.14)	1.87 (0.10, 36.14)	0.88 (0.22, 3.50)	0.80 (0.09, 6.79)
Female completed primary or higher	0.80 (0.42, 1.52)	0.58 (0.14, 2.32)	0.66 (0.36, 1.24)	1.01 (0.34, 2.93)
Male completed primary or higher	**0.53 (0.29, 0.99)**	0.49 (0.13, 1.94)	0.70 (0.39, 1.27)	1.97 (0.68, 5.67)
Married	1.43 (0.76, 2.69)	0.43 (0.11, 1.72)	0.84 (0.46, 1.53)	0.51 (0.17, 1.49)
Male employed	0.72 (0.39, 1.33)	1.0 (0.28, 3.50)	0.84 (0.47, 1.52)	2.30 (0.85, 6.20)
Female employed	1.04 (0.56, 1.94)	2.28 (0.63, 8.23)	0.92 (0.51, 1.68)	1.03 (0.38, 2.80)
Male HIV positive	1.51 (0.72, 3.14)	0.65 (0.12, 3.41)	1.36 (0.67, 2.76)	0.78 (0.25, 2.44)
Female HIV positive	1.50 (0.77, 2.94)	2.28 (0.51, 10.28)	1.37 (0.72, 2.60)	2.60 (0.82, 8.24)
Partner-report AUDIT	**1.07 (1.03, 1.11)**	**1.13 (1.04, 1.23)**	**1.06 (1.02, 1.10)**	**1.17 (1.09, 1.26)**
Self-report AUDIT	**1.07 (1.03, 1.11)**	**1.50 (1.27, 1.78)**	**1.06 (1.02, 1.10)**	**1.58 (1.37, 1.82)**
Female mental health comorbidity	1.12 (0.57, 2.22)	0.59 (0.15, 2.36)	0.90 (0.46, 1.73)	0.55 (0.17, 1.79)
Male mental health comorbidity	**0.45 (0.23, 0.88)**	0.77 (0.18, 3.39)	0.71 (0.38, 1.34)	0.30 (0.09, 0.95)
Physical violence (female report)	1.01 (0.99, 1.04)	0.99 (0.94, 1.03)	1.01 (0.99, 1.03)	0.97 (0.94, 1.01)

Coefficients are: Odds Ratio (95% CI). Bold indicates $p<.05$