Table S1

Findings on Alcohol's Impact on the Health of Women in LMICs: Effects from Women's Own Drinking

Harm	Countries	Study Design	Study Findings
Deaths	Russia, Belarus	Cohort; Case-control	Cohort studies among women in Russia and Belarus identified the greatest increase in risk of all-cause mortality was associated with combining high drinking frequency with a greater quantity of alcohol (Horvat et al., 2018). In Russia, a third of all deaths of women aged 15-54 years and 12% of women aged 55-74 years were attributable to excessive alcohol consumption (Zaridze et al., 2009).
Women's drinking and non-communicable diseases (NCDs) and other conditions	China, Taiwan, Angola, Congo, Gabon, Democratic Republic of Congo, Burundi, Comoros, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia, Lesotho, Namibia, Zimbabwe, Nigeria, Guinea, Niger, Benin, Cameroon, Chad, Ghana, Burkina-Faso, Cote d'Ivoire, Liberia, Mali, Senegal, Sierra Leone, Togo The Gambia, Argentina, India, Sri Lanka, Myanmar, Nepal, Thailand, Turkey, Ethiopia	Case-control; Cross-sectional; Review; Descriptive pilot study	In China and Taiwan, increased diagnoses among women who drank were reported for breast cancer (Gao et al., 2013) and oesophageal cancers (Sun et al., 2010; Tai et al., 2010). Among women in higher socio-economic groups in sub-Saharan African countries, alcohol was identified as a common risk factor for stroke, heart disease, cancers, and diabetes (Yaya et al., 2018). Heavy episodic drinking (HED) was found to cause stroke in women in Argentina (Bardach et al., 2017). A review of alcohol related harms in south Asian countries found that women who drank were more likely than those who did not to have comorbid reproductive disorders such as anovulation, amenorrhea and early menopause (Balhara & Mathur, 2012). In Turkey, a high prevalence of genitourinary health problems, including irregular menstrual cycles, sexual dysfunction, unwanted pregnancies and abortions was identified in alcohol-dependent women (Dissiz et al., 2010), and excess alcohol use was a predictor of gout (Ozturk et al., 2013). A higher risk of having an abortion was reported for women who did consume alcohol compared to those who did not in Ethiopia (Gelaye et al., 2014) and in China among female sex workers (FSWs; Zhang et al., 2014).
Infectious diseases, including sexually transmissible infections (STIs)	Tanzania, Turkey, South Africa, Brazil, India, Botswana, Russia, Ethiopia, Nepal, Uganda, Ethiopia	Case-control; Cohort study; Cross-sectional; Cluster-randomized field experiment; Descriptive pilot; Narrative Review; Qualitative interviews; Focus groups; Mixed methods; Event level experiment; Randomised control trial; Longitudinal	Women's own alcohol consumption was a factor contributing to the use of condoms and engaging in unprotected sex among several different population groups in Tanzania (Akarro, 2009), Turkey (Dissiz et al., 2010), South Africa (Kalichman et al., 2010; Myers et al., 2013; Schneider et al., 2014), Brazil (Sanchez et al., 2013), Kenya (Chersich et al., 2014) and India (Heravian et al., 2012). In South Africa, couples-based interventions were important for HIV prevention among women, suggesting this is a result of being able to reduce alcohol consumption and increase condom use among males (Wechsberg et al., 2016). Numerous studies have identified alcohol as a predictor of poor or non-adherence to antiretroviral therapy (ART; Adeniyi et al., 2018; Conroy et al., 2017; Do et al., 2010; Kader et al., 2014; Kekwaletswe & Morojele, 2014; King et al., 2018; Lifson et al., 2013; Lyimo et al., 2012; Lyimo et al., 2014; Magidson et al., 2017; Morojele et al., 2014; Sharma et al., 2013; B. Wandera et al., 2015) and as a barrier to seeking treatment or a factor of late presentation to treatment/care (Abaynew et al., 2011). Alcohol use was found to predict missing ARTs which in turn is associated with a decrease in CD4 counts and more rapid HIV disease progression leading to poorer health outcomes (Kader et al., 2015). Gmel and colleagues (2011) estimated that alcohol-attributable fractions of HIV outcomes due to non-adherence to antiretroviral treatment in the African Global Burden of Disease

Harm	Countries	Study Design	Study Findings
			Regions, ranged from 0 to 0.17% among women. Higher than national rates of sexually transmissible diseases were identified in alcohol-dependent women in Turkey (Dissiz et al., 2010). STIs have been associated with drinking among higher-risk population groups, e.g., among FSWs in South Africa (Chersich et al., 2014; Tsai et al., 2013; Vandepitte et al., 2013). In South Africa, HED was reported among 56.2% of FSWs, placing them at risk for a range of sexual risk behaviours and HIV (Jaffer et al., 2022; Yeo et al., 2022). For FSWs in Uganda, advice to avoid alcohol while seeking ART conflicted with their desire to consume alcohol while working (to negotiate the price for sex and condom use) and consequently impacted their adherence to treatment (Mbonye et al., 2016).
Mental health	China, India, Sri Lanka, Myanmar, Nepal, Thailand, India, Brazil, Colombia, Mexico.	Review; Cross-sectional; Case-control	Associations between women's drinking and mental health were found for: borderline personality disorder in China (Wong et al., 2010); antisocial personality disorder in South Asian countries (Balhara & Mathur, 2012); severe psychological distress and suicidal thoughts in India (Jaisoorya et al., 2018); self-harm, including suicide risk or suicide attempts in Brazil (Barbosa et al., 2014) and in Bogota, Colombia (Perez-Olmos et al., 2008) and among sex workers in Mexico (Singh & Lathrop, 2008). In Brazil, alcohol dependence and the presence of one or more problems related to alcohol consumption in women was associated with higher risks of major/severe depressive symptoms (Coelho et al., 2014). Excessive alcohol consumption among women was found to be a predictor of chronic pain in Brazil (Sa et al., 2008).
Self-rated health	Malaysia	Cross-sectional	Self-rated poor health was associated with being a current drinker and a former drinker, with females more likely to rate their health as poor than males in Malaysia (Chan et al., 2015). Few studies were found linking women's own alcohol consumption and quality of life or personal wellbeing in LMICs.
IPV and women's consumption of alcohol	Nigeria, Uganda, South Africa, Kazakhstan	Cross-sectional;	In Nigeria, women who reported consuming alcohol also reported being at higher risk of experiencing courtship and dating violence (Umana et al., 2014). Girls and young women in slum areas in Kampala, Uganda who reported drunkenness were statistically more likely to report having been raped (Swahn et al., 2015). Being a problem drinker was associated with a higher likelihood of GBV as was sexual risk behaviour. For instance, meeting sex partners in a drinking venue and engaging in transactional sex were significantly associated with GBV (Pitpitan et al., 2013). In a study of young women in South Africa, their hazardous drinking was associated with a six-fold increase in physical and/or sexual abuse, both with and without emotional abuse (Jina et al., 2012). Intersections of experiences of poorer health, alcohol consumption and IPV were identified (Wilson et al., 2016), e.g., women living with HIV who reported severe alcohol problems were more likely to report IPV in Kazakhstan (Jiwatram-Negron et al., 2018).

Table S2

The Impact of Alcohol via Others' Drinking on the Health of Women in LMICs

Harm	Countries	Study Design	Study Findings
Physical and mental health outcomes for women and men's drinking.	India, Uganda, Malaysia	Cross-sectional; Explanatory Model Interview; Commentary; Qualitative	In India, common mental disorders (CMDs) were observed in 11% of married women, with husband's alcohol use associated with elevated risk of CMDs (Shidhaye & Patel, 2010); deliberate self-harm was more common in women who reported that their husband had an alcohol use disorder (Parkar et al., 2009). In Uganda, problem drinking by a partner was associated with suicidal ideation in women (Culbreth et al., 2018). Partners' alcohol use was found to affect postnatal depression in women experiencing IPV in Malaysia (Ahmed et al., 2018). Also in India, partners' alcohol use was associated with mothers' experiences of postpartum depression (Savarimuthu et al., 2010).
Gender-based violence [GBV] and intimate partner violence [IPV] and men's drinking.	Iran, Mongolia, Mexico, Nigeria, Kenya, Malawi, Tanzania, South Africa, Russia, Turkey, Bangladesh, Philippines, Nepal, India, Peru, Brazil, Russia, Burkina Faso, Cameroon, Comoros, Cote d'Ivoire, Democratic Republic of the Congo, Gabon, Malawi, Mali, Mozambique, Nigeria, Sierra Leone, Tanzania, Uganda, and Zimbabwe Ghana, Rwanda, Egypt, Ethiopia, India, Ukraine, Vietnam	Cross-sectional; Longitudinal; Qualitative; Prospective cohort	In Iran, one in three women reported IPV from their husbands, and "alcohol abuse" increased the risk of IPV (Rabiei & Nikooseresht, 2009). In Mongolia, nearly 40% of women reported some form of IPV in the previous six months, with women with unemployed drinking partners significantly more likely to report IPV (Oyunbileg et al., 2009). Across eight indigenous regions of Mexico, the prevalence of severe IPV (such as pointing a gun or threatening the partner with a sharp object, inflicting burns, firing a gun, attempting to choke or suffocate, or forcing sexual intercourse) in the previous 12 months was 10%. In this study, high frequency of partner alcohol use (daily or weekly) was associated with seven times the odds of severe IPV (Valdez-Santiago et al., 2013). Men's drinking was a commonly identified factor in studies of IPV across several LMICs, including in Nigeria (Fawole et al., 2010), Kenya (Kimuna & Djamba, 2008; Makayoto et al., 2013), Malawi (Mandal & Hindin, 2013), Tanzania (Messersmith et al., 2017), South Africa (Gass et al., 2011; Machisa et al., 2017; Ramsoomar et al., 2021; Townsend et al., 2011), Russia (Zhan et al., 2011), Turkey (Ozcakir et al., 2008), Bangladesh (Dalal et al., 2009; Sambisa et al., 2010); Philippines (Ansara & Hindin, 2009; Kerridge & Tran, 2016), Nepal (Atteraya et al., 2015; Deuba et al., 2016; Dhungel et al., 2017; Oshiro et al., 2011; Pandey, 2016), India (Chibber et al., 2012; Chokkanathan, 2012; Das et al., 2013; Jin et al., 2014; Madhivanan et al., 2014; Ramadugu et al., 2015), Peru (Castro et al., 2017), and Brazil (Gilchrist et al., 2017). In a Russian study of men attending a sexual health clinic, men who reported alcohol misuse were more than three times as likely as those who did not misuse alcohol to perpetrate IPV (Zhan et al., 2011). Nationally representative data from 86,024 women who participated in the Demographic and Health Surveys undertaken in 14 countries in sub-Saharan Africa were used to study the relationship between male partner alcohol use and women experiencing IPV. The prevalence of partner alcohol use (3-62%) and IPV (11-60%) ranged substantially across countries. Using multilevel mixed-effects models, partner alcohol use was associated with a significant increase in the odds of reporting IPV for all 14 countries. Furthermore, the relationship between alcohol use and IPV, although largely explained at the individual level by partner alcohol use, was also attributable to overall prevalence of alcohol use in a given country (Greene et al., 2017). Pooled analysis of the association between alcohol use and violence against women from four GBV prevention studies in Africa (South

Harm	Countries	Study Design	Study Findings
			Africa [two studies], Ghana, and Rwanda) found that harmful alcohol use among men was associated with a substantially increased odds of perpetrating physical IPV (adjusted OR [aOR] = 3.45) and non-partner sexual violence (aOR = 2.64), and that women who had seen their partner frequently drunk were almost six times more likely to experience physical IPV (Ramsoomar et al., 2021). Individual studies also demonstrate that women in many LMICs reported that their partner's (synonymously in these contexts, the man's) use of alcohol is quantitatively associated with physical IPV. Women's reports of their partner's use of alcohol were quantitatively associated with physical IPV in the Democratic Republic of Congo (Tlapek, 2015), Rwanda (Ntaganira et al., 2008; Ntaganira et al., 2009; Thomson et al., 2015), Egypt (Ibrahim et al., 2015), Ethiopia (Abeya et al., 2011; Balogun et al., 2012; Dibaba, 2008; Fawole et al., 2008; Onigbogi et al., 2015; Umana et al., 2014), India (Patrikar et al., 2017), and in Mexico (Avila-Burgos et al., 2009; Mojarro-Iniguez et al., 2014). In Ukraine a nationally representative survey found that women who reported that their partners were frequently intoxicated and exhibiting marital controlling behaviours were more likely to experience emotional and physical violence (Barrett et al., 2012). In Vietnam, using data from the national survey on violence against women, men who used behavioural tactics to exert power and consumed alcohol were more likely to perpetrate IPV (Jansen et al., 2016).
Pregnancy, men's drinking and IPV	Rwanda, Egypt, Ethiopia, Kenya, South Africa, Zimbabwe, Jordan, Vietnam, India, Brazil.	Cross-sectional; Longitudinal	Partner's use of alcohol was quantitatively associated with physical IPV among pregnant women in Rwanda (Ntaganira et al., 2008; Ntaganira et al., 2009; Thomson et al., 2015), Egypt (Ibrahim et al., 2015), Ethiopia (Abeya et al., 2011; Dibaba, 2008), Kenya (Owaka et al., 2017), South Africa (Brittain et al., 2017) and Zimbabwe (Shamu et al., 2013). In Jordan, among women attending reproductive health clinics, partner alcohol use was identified as a risk factor for IPV during pregnancy – with this reported by 15% of pregnant women (Clark et al., 2009). In a survey of women and men at "shebeens" (unlicensed drinking establishments) in disadvantaged townships in South Africa, substantial proportions of those surveyed reported pregnancy and IPV, with rates of binge drinking among women associated with increasing rates of IPV (Davis et al., 2017; Eaton et al., 2012). In a Vietnamese study of pregnant women and their husbands, after controlling for other psychosocial risk factors, comorbid perinatal common mental disorders (CMDs) and alcohol dependence in husbands increased by 4.7 times the probability of perinatal CMDs in their wives via IPV (the reverse was not true, i.e., women's perinatal common mental disorders did not impact on men's outcomes; Tran et al., 2012). In Mumbai, India, women who lived with a husband who drank alcohol, relative to one who did not, were twice as likely to report postpartum IPV (Wagman et al., 2018). In Brazil, in a sample of mothers attending primary healthcare services, alcohol use by the mother or partner in the family was associated with physical IPV (Moraes et al., 2011).
Women living with HIV, men's drinking and IPV	Nigeria, Uganda	Cross-sectional; cohort study	Among women living with HIV, alcohol use by the partner was associated with higher risk of IPV (primarily physical and emotional violence) in Nigeria (Olowookere et al., 2015). In Uganda, women who reported that their partner drank before sex, or that they and their partner drank before sex, were more likely to report physical violence and sexual coercion (Zablotska et al., 2009), and IPV (Kouyoumdjian et al., 2013). Also in Uganda, women whose partners

Harm	Countries	Study Design	Study Findings
			got drunk often were six times more likely to report physical IPV compared to those whose partners never drank alcohol (Tumwesigye et al., 2012), and in two further studies of married women, women who reported that their husbands sometimes or often got drunk were at greater risk of IPV (Kwagala et al., 2013; Wandera et al., 2015).
FSWs, men's drinking and GBV	India, China	Qualitative focus groups & interviews; Cross-sectional	For FSWs in India there was evidence of a cycle of IPV and alcohol problems, with some FSWs describing how their husband's use of alcohol and unemployment led to pressure to do sex-work. Many of these women reported they then experienced IPV from their intimate partners that was worse than violence they experienced from their clients (Panchanadeswaran et al., 2008). In China, in a study of sex-workers, partner's frequent alcohol use was associated with greater risk of IPV (Zhang et al., 2014).
War, poverty, violence & men's drinking	Uganda, Tanzania, Ethiopia	Cross-sectional; cluster randomised trial	In a North-eastern Ugandan survey of 605 women, reported male partner alcohol misuse was associated with exposure to armed conflict and IPV (Mootz et al., 2018). In Tanzania, among men having ever consumed alcohol and experience of childhood violence, was associated with increased risk of perpetrating all forms of IPV (Mulawa et al., 2018). In an Ethiopian refugee camp, women who reported their husband was a drunkard [sic] were twice as likely to experience physical IPV (Feseha et al., 2012).
Sexual violence and HIV	Uganda, India, Nepal, South Africa, Guatemala-Mexico border	Qualitative focus groups; Qualitative critical incident study; Mixed methods; Cross-sectional; Event level study	Alcohol intoxication featured heavily in Ugandan women's narratives regarding their experiences of sexual violence (Swahn et al., 2014), particularly in being forced to participate in unprotected sex with HIV positive partners (Emusu et al., 2009). In India, when men consumed alcohol there was a higher likelihood of unprotected sex with female partners (Chakrapani et al., 2010) and while among HIV-infected FSWs there was no association between alcohol use and risky sexual behaviours, among their HIV-infected male clients, those with heavy alcohol use reported more unprotected transactional sex encounters (Samet et al., 2010). In India, FSWs reported that alcohol led to coercion in terms of condom use, with men plying women with alcohol, leaving them vulnerable to rape and multiple unwanted partners, increasing the risk of HIV infection (Panchanadeswaran et al., 2008). As described above, alcohol's role in unprotected sex and condom use was a common finding among these studies, including among Nepalese males, where alcohol consumption contributed to liaisons with FSWs which increased both men's risk of HIV infection and their wives' risk of infection through unprotected sexual intercourse (Thapa et al., 2016). A study of the most recent sexual encounter reported by women who use substances in South Africa, found an association between alcohol use by both partners and multiple rounds of sex, and alcohol use and condom use during all rounds of sex (Zule et al., 2018). South African study participants noted that gender roles and cultural expectations adversely influence the power women have, e.g., in terms of economic dependency on males and condom use during sex (Wechsberg et al., 2012; Wechsberg et al., 2013). Similarly, migrant FSWs on the Guatemala-Mexico border identified a range of ways in which external pressures to drink during sex work were perceived 'as undermining their capacity to negotiate safer sexual practices with clients' (Goldenberg et al., 2018).

Table S3

Qualitative Studies of the Harms and Ways in which Alcohol is Entangled in Experiences of IPV

Harm	Countries	Study Design	Study Findings
Range of harms and ways in which alcohol is entangled in experiences of IPV	Argentina, Nigeria, Uganda, Uruguay and Sri Lanka, India, Ghana, Kenya, Liberia, Thailand, Democratic Republic of Congo, Thai-Burma border, South Sudan, Iraq	Qualitative studies	In a qualitative cross-national study in seven countries including Argentina, Nigeria, Uganda, Uruguay and Sri Lanka, most participants (aged 18-37 years, recruited via snowballing to talk about their views and opinions as persons living in their particular culture or country) identified that intoxication by men was perceived as a culturally acceptable excuse, alcohol's pharmacological effects were perceived to make violent behaviour more likely, heavy drinking affected relationships in a negative way, and the victim's drinking (as well as the perpetrator's) increased the risk of violence (Annan & Brier, 2010; Holmila et al., 2014). The intersection of unequal power relations and drinking for particular groups of women was described in India, *"Sexual coercion and forced group sex in the context of alcohol use [by clients] posed formidable barriers for condom use negotiation [by sex-workers]*" (Panchanadeswaran et al., 2008, p. 106). In Ghana in a qualitative study of patrilineal women (who experience unequal inherited economic power) found: *"[P]articipants attributed violence to several factors including gendered domestic relations, cultural and marital rites and alcohol use. Abused women reported health problems such as feelings of worthlessness, sleeplessness, suicidal ideation, eye injuries, bodily weakness, hypertension, genital sores and the premature termination of pregnancy*" (Sedziafa et al., 2016, p. 1379). Qualitative studies also described a causal relation and the ubiquity of alcohol-related IPV in a rural Indian community (Kaur & Garg, 2010), and more ways in which alcohol was associated with IPV (Ragavan et al., 2014). Women in Bangalore, India, who reported having an alcoholic and/or abusive husband and who experienced IPV appeared to be more susceptible to severe and prolonged periods of depression and suicide attempts (Travasso et al., 2014). In several countries, including Nigeria, qualitative studies also highlighted the impact of alcohol on different groups of women, for example, *"[T]he frequent mention of alcohol in domestic violence stresses the importance of addressing substance use as part of violence prevention. Heavy alcohol use in this region [Northern Uganda conflict zone] is unsurprising; substance use is known to increase after exposure to traumatic events, especially among those with PTSD"* (Annan & Brier, 2010, p. 158). In Kenya, Liberia, Uganda, and Thailand, drinking was identified in a cross-national qualitative study as a concern that exacerbated GBV (Ezard et al., 2011). Finally, qualitative studies on partners or husbands' alcohol consumption and IPV or sexual violence have also been conducted in the Congo (Kohli et al., 2015), Nepal (Atteraya, Gnawali et al. 2015, Deuba, Mainali et al. 2016, Dhungel, Dhungel et al. 2017; Puri et al., 2011) and Sri Lanka (Jayasuriya et al., 2011). In a qualitative cross-national study in countries with a history of recent warfare, use of alcohol was widespread, particularly, in Kenya, Liberia, Uganda, and Thailand, and believed by participants to be linked to a range of health, social and protection problems,

Harm	Countries	Study Design	Study Findings
			including illness, injury (intentional and unintentional), GBV, risky behaviour for HIV-AIDS and other sexually transmitted infection and blood-borne virus transmission (Ezard et al., 2011). In an in-depth study of alcohol use in a conflict-displaced population in a refugee camp on the Thai-Burma border, IPV was identified as a key concern. Alcohol use changed under the pressures of displacement and IPV was an emergent alcohol-related harm, with the relationship between IPV and alcohol complex and gendered (Ezard, 2014). Findings from studies in three refugee camps in South Sudan, Kenya and Iraq revealed interrelated factors that triggered and perpetuated IPV: gendered social norms and roles, destabilization of gender norms and roles, men's substance use, women's separation from family, and rapid remarriages and forced marriages. These factors paint a picture of individual, family, community and societal processes that exacerbate women's risk of IPV in extreme conditions created by displacement (Wachter et al., 2018).