A gender-focused multilevel analysis of how country, regional and individual level factors relate to harm from others' drinking

Abstract

Background: The aim of this study was to examine how gender, age and education, regional prevalence of male and female risky drinking and country-level economic gender equality are associated with harms from other people's drinking.

Methods: 24,823 adults in ten countries were surveyed about harms from drinking by people they know and strangers. Country-level economic gender equality and regional prevalence of risky drinking along with age and gender were entered as independent variables into three-level random intercept models predicting alcohol-related harm.

Findings: At the individual level, younger respondents were consistently more likely to report harms from others' drinking, while, for women, higher education was associated with lower risk of harms from known drinkers but higher risk of harms from strangers. Regional rate of men's risky drinking was associated with known and stranger harm, while regional-level women's risky drinking was associated with harm from strangers. Gender equality was only associated with harms in models in models that did not include risky drinking.

Conclusions: Youth and regional levels of men's drinking was consistently associated with harm from others attributable to alcohol. Policies that decrease the risky drinking of men would be likely to reduce harms attributable to the drinking of others.

Keywords: Alcohol; harm to others; gender.

Introduction

Gender equality is associated with many health outcomes for women (Borrell et al., 2014; Kawachi, Kennedy, Gupta, & Prothrow-Stith, 1999), children (Homan, 2017; Koenen, Lincoln, & Appleton, 2006), and men (Kavanagh, Shelley, & Stevenson, 2017; Kawachi et al., 1999) across different countries. A recent systematic review examining associations between gender equality and health found that, while there was variation in the effects of gender equality across different health metrics, overall, greater gender equality is associated with better health for both, men and women (King, Kavanagh, Scovelle, & Milner, 2018). However, the same review concluded that the benefits of gender equality do not appear to extend to all health areas. For example, greater gender equality may be associated with higher health risk behaviours, such as smoking among women (Bilal et al., 2016). There is also widespread concern that greater gender equality may be associated with higher alcohol consumption among women (R. Wilsnack, Wilsnack, Gmel, & Kantor, 2018), although the published evidence on the role of gender equality in women's drinking, to date, is inconclusive (King et al., 2018; Roberts, 2012). In addition, research has found greater gender equality to be associated with lower alcohol consumption among men (King et al., 2018; Rahav, Wilsnack, Bloomfield, Gmel, & Kuntsche, 2006; Roberts, 2012), which is consistent with literature finding lower mortality for men in more gender equitable places (Kolip & Lange, 2018). Given the link between gender equality and individuals' alcohol consumption, it is likely that alcohol's harm to others also may be linked to gender equality.

The relationship between gender equality and alcohol-related harm is complex; for instance, if gender equality is associated with women being more likely to drink in public places, such as bars, as found by one international study (Bond et al., 2010), this could mean that women are more likely to be exposed to alcohol-related harm from others in these settings. Alternatively, the increased presence of women in public drinking venues could change the culture of public drinking venues by making the places less focused on masculinity concerns and fights related to these concerns (Graham et al., 2013; Wells et al., 2009). However, findings from one study of gendered public drinking and alcohol-related harms (Roberts, Bond, Korcha, & Greenfield, 2013) do not support this latter interpretation, possibly because the presence of more women in these settings may increase rather than decrease violence-prone forms of masculinity. Nevertheless, factors such as societal gender equality could affect alcohol-related harms, particularly harms perpetrated by drinkers against victims who may not be drinking themselves, such as female partners or spouses of heavy drinking men.

In addition, increased gender equality could indicate that women have more economic resources and educational and employment opportunities of their own, and thus are less likely to be forced to stay with partners who perpetrate either familial or financial harms resulting from drinking. Although research has examined the relationship between gender equality and violence against women generally (e.g., Roberts, 2011), less is known about the relationship between gender equality and alcohol-related harms including violence.

Beyond the complex relationships between country-level factors (such as gender equality) and harms from others' drinking, regional differences in drinking practices within countries may be of additional importance. Regional variations in drinking patterns have been identified across a number of countries (Bloomfield, Grittner, Kraus, & Piontek, 2017; Branstrom & Andreasson, 2008; Kerr, 2010; Kraus, Augustin, Bloomfield, & Reese, 2001; Meyer, Rumpf, Hapke, & John, 1998; Robinson, Shipton, Walsh, Whyte, & McCartney, 2015; Winter, Karvonen, & Rose, 2002). In a recent analysis of 23 countries, regional variance in alcohol consumption has been shown to account for 2% of the variance in risky drinking over and above the 13% of variance accounted for at a country level (Grittner et al., 2019).

Finally, individual-level factors, other than alcohol consumption, are also likely to play a role in the experience of alcohol related harms from others. A ten-country study found that women are more likely than men to be harmed by a drinker they know, while men are more likely to be harmed by strangers (Room et al., 2018). Furthermore, among those harmed by a drinker known to them, women were more likely to report harm from a man who was in their immediate family while men were more likely to report harm from men who were distant relatives or friends (Stanesby et al., 2018). Thus, women may be more likely to be harmed by men close to them, possibly in the home, while men are more likely to be harmed by men who are not as close to them. Young people consistently appear to have an increased likelihood of experiencing harm attributable to the drinking of others (Marmet & Gmel, 2017; Room et al., 2019). What is less clear is the relationship between education and experience of harm, as in some countries it appears that those with higher levels of education are more likely to report less serious harms but less likely to report more serious harms (Marmet & Gmel, 2017). However, in other studies little relationship with education can be found (Laslett, Stanesby, Callinan, & Room, 2019).

What is currently unknown is how country-level gender equality, regional drinking, and individual-level characteristics are associated with harm. The aim of this study is to examine associations between individual attributes (gender, age, education), sub-national regional risky drinking levels and country-level gender equality with the likelihood of experiencing harm attributable to the drinking of others (known drinkers and strangers). We hypothesize that greater gender equality will be associated with lower risk of harm from known drinkers for women and lower risk of harm from strangers for men. Further, we hypothesize that harms to both men and women will be positively associated with a higher rate of risky drinking by men at the regional level, but that the regional rate of risky drinking by women will not be associated with harm.

Materials and Methods

Sample

This paper draws on data from the GENder and Alcohol's Harm To Others (GENAHTO) project (S. Wilsnack, Greenfield, & Bloomfield, 2018). The conceptual history, survey design, sampling, and response rates of all participating countries' studies have been published

elsewhere (S Callinan et al., 2016; S. Wilsnack et al., 2018). Briefly, this study uses data from ten cross-sectional probability sample surveys (eight of them national and two regional – India and Nigeria) undertaken between 2008 and 2016. Countries for the present analysis were selected on the basis of availability of data to address the questions of interest. All studies aimed to provide estimates of population prevalence of harm experienced due to the drinking of others.

The surveys were conducted face-to-face in area-probability household samples, except for Australia, Switzerland and the United States. In these countries, respondents were interviewed via computer-assisted telephone interviewing (CATI), with samples selected using random digit dialling, stratified by area code and oversampling of certain area codes with difficult-to-reach subpopulations (S. Wilsnack et al., 2018). Response rates and additional survey characteristics are shown in Table 1.

Informed consent was obtained from all study participants. Ethical approval was gained from the appropriate Institutional Review Boards by all national fieldwork sites, as well as from the World Health Organisation Ethics Review Committee (as appropriate) and from La Trobe University for the compilation of the data from all participating countries (HEC15-108).

Measures

Country-level Gender Equality

Country-level Gender Equality was measured using the 2012 Global Gender Gap Index (GGI) (Hausmann, Tyson, & Zahidi, 2012). The GGI includes measures of women's economic participation and opportunity, educational attainment, political participation, and health and survival (relative to men). It has separate sub-indices for each of these four domains, as well as an overall index that comprises the four sub-indices. We use scores from the economic participation & opportunity sub-index, a measure of female:male labor force participation; wage equality between women and men for similar work; female:male earned income; female:male legislators, senior officials, and managers; and female:male professional and technical workers. Scores range from 0 – 1, with higher scores indicating higher gender equality. We also considered the Educational Attainment and Political Participation Sub-indices, but they showed less good fit in the models and were dropped from the presented analyses.

Regions

Regions in the present study are geographic areas within a country or a federal state of a country. All of them are based on administrative jurisdictions (e.g., federal states, provinces, local districts or counties). For some countries, smaller adjacent regions (states or provinces) had to be combined so that the sample size of each region was at least 60 and thus adequately stable for analytic purposes. This cut-point of 60 was chosen as it has been used in similar previous research (Grittner et al, 2019) and to maximise power between and

within regions, thereby ensuring that there is sufficient power both within each region but also at the regional level.

Regional-level Risky Drinking

Rates of risky drinking within each region were calculated separately for men and women based on aggregated individual survey responses. Respondents reported the frequency of their own heavy episodic drinking (HED; 50-60g or more of pure alcohol consumed on a single occasion) in the past year. The proportions of men and women reporting risky drinking were used as regional-level variables.

Individual Level

Harm from known drinkers and by drinking strangers: For all countries except the US, three questions were used to assess harm from known drinkers and three to assess harm from strangers who had been drinking. More types of harms were asked about in each participating country, however these were the questions that were asked consistently across all participating countries. Two of these questions were asked in a way that assessed both groups at once. For those items, respondents were first asked: *In the last 12 months was your house, car or property damaged because of someone else's drinking/has someone who had been drinking harmed you physically?* Then each question was followed by: *Was that someone you didn't know, or a family member or friend, or both?* Next, respondents were asked another question about harms from known drinkers: *In the last 12 months did you feel threatened or afraid because of someone's drinking at home or in some other private setting?* A final question was used to assess harms from strangers' drinking: *In the last 12 months has someone not known to you who has been drinking been responsible for a traffic accident you were involved in?*

The US survey asked about four harms separately (house/car/property damaged; harmed physically; threatened or afraid; traffic accident), without mention of the respondent's relationship to the drinker. Those affirming a specific harm then were asked whose drinking was responsible for the harm, with possible multiple response options categorized into known drinkers (such as partner/spouse, family member, friend or co-worker) and strangers (Karriker-Jaffe & Greenfield, 2017). Respondents were classified into no harm and any harm categories for both stranger and known drinker harms.

Gender, age, education: Gender and age were self-reported. Education level was assessed in different ways across countries. However, for all countries, it was possible to group respondents in the following three categories: less than high school (<HS, code: 0), completed at least high school (HS, code: 1), completed tertiary education (HS+, code: 2). Sample descriptions for each country and proportions reporting harms from others' drinking are shown in Table 1.

<PLEASE INSERT TABLE 1 NEAR HERE>

Analysis

All analyses were undertaken using Stata version 14 (StataCorp 2014). Missing data on the outcome variables was low, 1.3% for known drinkers and 0.8% on harms from strangers. Missing data on the predictor variables for the current study was very low, with a maximum of 0.3% on any one variable. The same analyses presented here were run with only complete respondents and no difference was found in results, so the models including all respondents who have required data are shown here. Multiple multilevel binary logistic regression models (three-level random intercept models) were used to assess the association of country-level economic gender equality, regional-level risky drinking, and individual factors and the likelihood of an individual of being harmed by a drinker who (a) was known to the respondent or (b) was not known to the respondent (separate models for each dependent variable), with models fitted separately by gender using the xtmelogit command in Stata (StataCorp, 2017). Independent variables were gender equality at the country level, proportion risky drinking at the regional level, and age and education at the individual level. Given the wide variation between countries in regional levels of heavy drinking, a supplementary set of models with regional-level variables omitted were also run in order to isolate potential country-level characteristics that explain variance in the outcome.

Results

The population percentage of male and female respondents who engage in risky drinking in each region within each country is shown in Table 2. While there is some regional variation within countries, most of the variation appears to be between countries. In most regions, confidence intervals of the two genders do not overlap, indicating that women in these regions drink heavily significantly less often than their male counterparts. Rates of risky drinking among females in Thailand, Sri Lanka, Vietnam and, with some regional exceptions, Nigeria, India and United States were especially low. India, Vietnam, and Sri Lanka had a region where more than half of all men were risky drinkers, and the rate of risky drinking among Australian men was consistently around 40%.

<PLEASE INSERT TABLE 2 NEAR HERE>

In Table 3, multi-level models for harms from known drinkers and from drinking strangers as the dependent variable, stratified by gender, are shown. As shown in the first two columns, counter to hypotheses, harm from known drinkers was not significantly related to the country's economic gender equality. At the regional level, harm from a known drinker was

positively associated with regional-level rates of male risky drinkers for men's and women's harm, but not with regional-level female risky drinking. At the individual level, harm from a known drinker was positively associated with younger age for both men and women and with lower educational levels among women.

<PLEASE INSERT TABLE 3 NEAR HERE>

As shown in the last two columns, experiencing harms from people not known to the drinker was not significantly related to country-level economic gender equality; however, harm from drinking by a stranger was positively associated with the regional-level proportion of men and women reporting risky drinking for both male and female respondents. At the individual level, younger age was again associated with harm from drinking strangers, while completing high school and/or tertiary education was associated with higher risk of harm from strangers for women, but not for men.

Intraclass correlations presented in Table 3 for all four models suggest that there is more variation accounted for in the harm outcomes between countries than there is between regions. For instance, in the first model, differences between countries accounted for 19% of the total variance of experiencing harm and country and region effects together for about 24%. Thus, although the country-level differences on harms are larger, differences between regions add unique variance and allow for greater power in examining relationships with variables such as the percentage of risky drinkers in the region.

To verify whether gender equality and regional rates of risky drinking in men and women are interrelated, thus affecting associations of these variables with the harm outcomes, a sensitivity analysis was conducted. Table 4 presents the same models presented in Table 3, but excluding the regional drinking variables. Findings suggest the results presented above are fairly robust with individual level education predicting harm from known drinkers and age predicting harm from both known drinkers and strangers. Of note, however, with regional drinking variables excluded, country-level gender equality was significantly associated with lower probability of being harmed by known drinkers for men.

Discussion

Similar to previous work (Roberts, 2012) our study's results pertaining to the role of gender equality in relation to alcohol's harm to others do not indicate that higher levels of gender equality are associated with increased harms related to alcohol. However, there are some indications in the models that excluded regional-level risky drinking that greater gender equality is associated with lower risk of harm from known drinkers, but not so pronounced from drinking strangers, for men. This was contrary to the hypothesis that stranger harms would be lower for men as gender equality is higher, and that it was women who would experience lower risk of harms from known drinkers. However, this finding was not

completely surprising, as risky behaviour in men is lower in countries with greater gender equality (Kolip & Lange, 2018) and therefore this may be a reflection of lower harm from men's drinking. In fact, the finding that lower risk of harm from known drinkers and gender equality was positively associated when regional variables are not included provide some support this hypothesized mechanism. Further research to replicate these results in other samples, as well as studies to determine why this mechanism was not as influential for harms reported by women, would be helpful.

<PLEASE INSERT TABLE 4 NEAR HERE>

Regional-level men's risky drinking was strongly associated with harm from both known drinkers and strangers, among both men and women, while regional-level women's risky drinking was associated with alcohol-related harm from strangers experienced by both genders. At the individual level, youth was constantly associated with harm, while higher level of women's education was protective of harm from known drinkers but a risk factor for harm from strangers.

The finding that youth was a consistent risk factor for experience of harm from others drinking supports previous work on this topic (Marmet & Gmel, 2017; Room et al., 2019). The finding that education was a positive predictor of stranger harm but a negative predictor of known drinker harm for women might help to contextualise previous work that found that education was a positive predictor of less serious harm but a negative predictor of more serious harm (Laslett et al., 2019; Marmet & Gmel, 2017). Harms from strangers have traditionally been rated as less severe than harms from known drinkers (S. Callinan, 2014).

Taken together, predictors of harm from others drinking in women include age, education and regional level drinking. Firstly, there is exposure to harmful drinkers – the rate of risky drinking in men at the regional level was consistently associated with both types of harm. Secondly, a lower level of education was also important. This could be serving as a proxy for how much independence and autonomy individual women have in their living situation. Indeed, women with more education or autonomy may have more opportunities to avoid harmful drinkers that they know. However this autonomy could also lead to increased contact with drinkers that they do not know. Factors that facilitate opportunities for women to be around others who are drinking, such as regional rates of women's risky drinking and higher levels of personal education, may increase the likelihood of women being harmed by strangers.

For men, the story appears to be simpler: Regional rates of men's risky drinking and youth were the only consistent characteristics associated with being harmed by strangers and by known drinkers, although regional-levels of women's risky drinking were also positively associated with harm from strangers. Overall, youth and regional-levels of men's drinking

appear to be the most consistently associated with harm experience due to other's drinking. This finding is consistent with previous work that indicates harm is predicted by proximity to heavy drinking men {Stanesby, 2018 #736}.

The range of countries included was a strength of the current study, as both country level variables, GDP and GGI, had a good range. Conversely, the primary limitation of this study pertains to the number of countries included. The relatively small number of countries limited more detailed analyses at the country level, and it meant we were also unable to assess interactions of the country-level variables with variables at a regional or individual level. Further limitations include those that are inherent to most survey research: Respondents' accuracy is not guaranteed, and, while all countries attempted to recruit random samples, varying response rates indicate that the representativeness of each sample varies.

However, as one of the first papers to look at gender equality and alcohol's harm to others, the current study provides insight into valuable avenues for further investigation. When more countries can be included, work on how gender equality at a country, regional and/or a household level impacts the drinking patterns of both men and women and how that, in turn, dictates who is at increased risk of harm, may help to inform policies that could reduce harm from others' drinking. The current study focussed on gender equality in economic participation and opportunity and also on the specific types of harms that were consistently asked across all surveys. Future work would be well served to assess different metrics of gender equality and additional harms experienced.

Conclusion

Overall, results from this study indicate that investigations of alcohol's harm to others need to consider the role of gender when assessing characteristics associated with being harmed. Regional-levels of men's risky drinking was consistently associated with both types of harm while women's drinking was only associated with harm from strangers. Meanwhile, at an individual level, women's education was a predictor of harm while men's was not. While regional-levels of men's risky drinking were strongly associated with rates of being harmed, factors that increase a women's autonomy and ability to participate in drinking practices in public places, such as education and regional-level women's risky drinking, were positively associated with the likelihood of harm from a stranger who is drinking. Care should be taken to ensure that tools and resources for women experiencing harm from heavy drinkers in their home lives are suitable for and available to women with lower education. Policies that reduce regional levels of men's risky drinking would be effective in reducing the harm that both men and women experience attributable to the drinking of others.

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Declaration of Interest

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Table 1 Descriptive and demographic summaries of the sample (countries ordered by GDP, in US $)

Country	Response Rate (%)	Sample Sizes (Total N= 24,823)	% Female	Mean Age	% Finished high school	Gross Domestic Product (GDP per capita, in US $)	Gender Gap Index: Economic Equality Sub-Index (Score)	Percent Experiencing Harms from Known Drinkers[a] (95% CI)	Percent Experiencing Harms from Stranger Drinkers[b] (95% CI)
Australia	35.2	2388	58.9	44.7	88.3	67035.57	0.76	11.4 (10.0, 12.8)	14.4 (12.6, 15.9)
Switzerland	37.2	3726	55.1	42.7	26.1	55244.65	0.80	2.6 (2.0, 3.5)	2.4 (1.8, 3.0)
United States	60.0[c]	2336	56.1	47.7	42.5	49965.27	0.81	2.2 (1.7, 2.9)	1.3 (0.9,1.9)
New Zealand	64.0	2611	60.6	43.7	90.8	37749.44	0.78	7.7 (6.7, 9.0)	12.1 (10.7, 13.6)
Thailand	94.2	1695	59.1	46.1	35.1	5479.76	0.70	11.3 (9.7, 13.1)	5.6 (4.4, 7.0)
Sri Lanka	93.0	2353	51.6	40.9	78.5	2923.13	0.56	15.9 (14.3, 17.7)	7.4 (6.2, 8.8)
Vietnam	99.2	1479	50.0	42.2	73.0	1595.81	0.71	13.8 (12.0, 15.9)	4.4 (3.4, 5.8)
Nigeria	99[c]	2248	38.8	40.1	37.8	1555.41	0.63	2.6 (2.0, 3.4)	1.4 (0.9, 2.0)
India	97.0	3351	52.6	38.5	34.7	1489.24	0.46	26.1 (24.5, 27.7)	9.4 (8.3, 10.5)
Lao PDR	99.0	1212	58.4	40.0	32.3	1399.21	0.80	9.3 (7.6, 11.3)	4.8 (3.5, 6.5)

a: Harms were property damage, feeling threatened or afraid and/or physically harmed. b: Harms were property damage, physically harmed and traffic accident.

c: Cooperation rate, response rate was unavailable.

Table 2. Proportion of male and female respondents (95%CI) in each region who drank more than 60g of alcohol on an occasion at least once in past year.

Region	Total N	Male Risky Drinking	Female Risky Drinking
Australia			
NSW & ACT	820	42.7 (37.5, 48.1)	15.3 (12.3, 18.7)
Queensland	463	38.8 (31.9, 46.1)	15.4 (11.7, 20.1)
South Australia	172	42.1 (31.5, 53.5)	24.0 (16.4, 33.5)
Victoria & Tasmania	651	39.6 (33.9, 45.5)	18.3 (14.7, 22.5)
WA and NT	268	42.7 (34.1, 51.9)	15.9 (10.9, 22.6)
United States			
Mid-Atlantic	278	17.6 (11.5, 26.0)	7.1 (4.0, 12.0)
Mountain	148	12.5 (6.6, 22.4)	2.6 (0.7, 10)
Northeast Central	290	20.4 (14.5, 28.0)	6.5 (3.5, 11.7)
Northwest Central	140	21.3 (12.7, 33.4)	5.1 (1.9, 12.8)
New England	84	20.0 (10.2, 35.4)	4.5 (1.1, 16.7)
Pacific	369	16.9 (11.7, 23.8)	4.1 (2.1, 7.7)
South Atlantic	437	14.3 (10.0, 19.9)	5.4 (3.2, 9.1)
Southeast Central	142	16.7 (9.7, 27.2)	2.9 (0.7, 10.8)
Southwest Central	317	13.6 (8.7, 20.6)	3.2 (1.5, 7.0)
New Zealand			
Lower North	380	36.3 (29.2, 44.0)	17.7 (13.2, 23.4)
Lower South	194	32.2 (23.2, 42.7)	20.6 (13.9, 29.3)
Mid North	227	33.8 (24.1, 45.1)	19.3 (13.8, 26.5)
Upper North	1,368	34.8 (30.8, 38.9)	15.1 (12.9, 17.7)
Upper South	442	38.1 (31.2, 45.5)	15.0 (11.2, 19.9)
Switzerland			
Lake Geneva Area	372	37.6 (32.3, 43.2)	21.4 (17.8, 25.5)
Central	284	34.6 (28.4, 41.4)	14.9 (11.0, 19.9)
Eastern	151	27.9 (21.8, 35.0)	12.7 (8.8, 17.9)
Northeastern	166	29.7 (23.7, 36.4)	20.3 (15.5, 26.1)
Plateau	424	31.7 (27.2, 36.6)	18.4 (15.1, 22.1)
Tessin	101	24.4 (16.3 34.9)	11.9 (7.0, 19.5)
Zurich	368	24.5 (20.1, 29.5)	14.4 (11.1, 18.5)
Thailand			
Bangkok	210	20.2 (12.9, 30.2)	2.4 (0.8, 7.2)
Chiang Mai	296	34.8 (27.2, 43.2)	3.7 (1.7, 8.1)
Chonburi	278	28.8 (21.1, 38.0)	1.2 (0.3, 4.7)
Khon Kaen	297	32.0 (24.3, 40.8)	5.1 (2.7, 9.6)
Other Provence	355	28.5 (21.2, 37.1)	3.0 (1.4, 6.2)

Surat Than	259	15.1 (9.7, 22.8)	2.1 (0.7, 6.5)
Sri Lanka			
Plantation distr.	385	29.8 (24.4, 35.8)	5.0 (2.4, 10.1)
Plantation + rural	383	22.9 (17.0, 30.2)	0.4 (0.1, 3.1)
Mostly rural	336	17.0 (11.9, 23.7)	0 (0, 0)
Northeast	259	51.6 (43.8, 59.2)	0 (0, 0)
South Provence	252	13.8 (8.0, 22.8)	0 (0, 0)
Western Region	738	26.6 (22.1, 31.6)	0 (0, 0)
India			
Bangalore	978	26.6 (21.9, 31.9)	0.7 (0.3, 1.8)
Hubli	776	34.5 (29.7, 39.5)	3.8 (2.4, 6.1)
Kolar	779	23.7 (20.0, 27.8)	14.4 (11.0, 18.7)
Manipal	759	60.2 (55.6, 64.6)	24.7 (20.2, 29.8)
Nigeria			
Akwa Ibom	649	34.4 (30.2, 38.8)	11.7 (8.1, 16.6)
Benue	709	28.9 (24.9, 33.3)	2.4 (1.1, 4.9)
Rivers	732	18.2 (14.7, 22.2)	6.3 (4.1, 9.5)
Vietnam			
Dak Lak	249	21.8 (14.0, 32.4)	1.2 (0.3, 4.6)
Dong Nai	248	13.1 (8.3, 20.1)	1.7 (0.4, 6.6)
Khanh Hoa	243	25.5 (18.2, 34.4)	3.0 (1.1, 7.8)
Lai Chau	246	44.3 (36.5, 52.4)	1.0 (0.1, 7.0)
Long An	240	51.6 (43.7, 59.4)	2.4 (0.6, 9.0)
Vinh Phuc	241	8.4 (4.4, 15.4)	0.7 (0.1, 5.1)
Lao PDR			
Champasack	399	28.4 (22.4, 35.1)	9.8 (6.4, 14.7)
Luangprabang	410	13.1 (8.5, 19.7)	3.0 (1.5, 5.9)
Vientainne	403	27.3 (21.0, 34.6)	11.8 (8.2, 16.5)

Table 3. Odds Ratios and 95%CI from Multiple multilevel logistic models for harms from drinkers known to the respondent and harms from drinking strangers (dependent variable), separate models by gender (three –level random intercept models).

			Known Drinker		Drinking Stranger	
			Male	Female	Male	Female
Country	Economic gender equality		0.97 (0.92, 1.02)	0.98 (0.93, 1.03)	1.00 (0.95, 1.06)	1.00 (0.93, 1.07)
Region	% female risky drinking		1.01 (0.99, 1.03)	0.99 (0.97, 1.01)	1.02** (1.00, 1.04)	1.03* (1.00, 1.05)
	% male risky drinking		1.02** (1.01, 1.04)	1.02*** (1.01, 1.04)	1.03*** (1.01, 1.04)	1.02* (1.00, 1.04)
Individual	Age		0.98*** (0.97, 0.98)	0.98*** (0.98, 0.99)	0.97*** (0.97, 0.98)	0.98*** (0.97, 0.98)
	Education	< High school	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
		High school	0.90 (0.74, 1.10)	0.69*** (0.57, 0.83)	1.03 (0.82, 1.30)	1.30* (1.01, 1.66)
		> High school	0.84 (0.70, 1.02)	0.69*** (0.59, 0.81)	1.12 (0.91, 1.37)	1.25* (1.00, 1.55)
Random Effects	Country		0.80 (0.27, 2.41)	0.85 (0.30, 2.39)	0.98 (0.33, 2.91)	1.39 (0.49, 3.96)
	Country > Region		0.22 (0.12, 0.42)	0.14 (0.08, 0.25)	0.16 (0.07, 0.37)	0.14 (0.05, 0.40)
Intra-class correlations	Country		18.6% (7.0, 40.9)	19.9% (8.1, 41.0)	22.0% (8.6, 46.0)	28.9% (12.4, 53.8)
	Country|region		23.7% (11.7, 42.1)	23.1% (11.1, 42.2)	25.8% (12.2, 46.4)	31.8% (15.4, 54.4)

Table 4. Sensitivity analysis: Odds Ratios and 95%CI of multiple multilevel logistic models for harms from drinkers known to the respondent and harms from drinking strangers (independent variable), stratified by gender, without regional rates of risky drinking.

			Known		Stranger	
			Male	Female	Male	Female
Country	Economic gender equality		0.96** (0.93, 0.99)	0.97 (0.93, 1.01)	0.99 (0.95, 1.02)	0.99 (0.94, 1.05)
Individual	Age		0.98*** (0.98, 0.99)	0.98*** (0.98, 0.99)	0.98*** (0.97, 0.98)	0.98*** (0.97, 0.98)
	Education	< High school	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
		High school	0.78* (0.66, 0.97)	0.62*** (0.52, 0.74)	0.84 (0.68, 1.05)	1.20 (0.94, 1.53)
		> High school	0.72*** (0.60, 0.86)	0.61*** (0.53, 0.72)	0.88 (0.73, 1.06)	1.15 (0.93, 1.42)
Random Effects	country		0.31 (0.12 0.79)	0.62 (0.24, 1.56)	0.44 (0.17, 1.10)	0.90 (0.35, 2.31)
Intra-class correlations	country		8.6% (3.5, 19.3)	15.8 (6.9, 32.2)	11.8 (5.0, 25.0)	21.6% (9.7, 41.3)

< High school = did not finish high school; high school = completed high school; > high school = tertiary education.