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Partner alcohol consumption and intimate partner violence among women in Papua New Guinea: a cross-sectional analysis of Demographic and Health Survey

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ABSTRACT

Objective We examined the association between partner alcohol consumption and the experience of intimate partner violence among women in Papua New Guinea.

Design We performed a cross-sectional analyses of data extracted from the 2016–2018 Papua New Guinea Demographic and Health Survey. We included 3319 women in sexual unions. Multilevel binary logistic regression analysis was used to examine the association between partner alcohol consumption and intimate partner violence, controlling for the covariates. Results from the regression analysis were presented using the crude odds ratios (cORs) and adjusted odds ratios (aORs), with 95% confidence intervals (CIs).

Setting Papua New Guinea.

Participants Women aged 15–49 years in sexual unions.

Outcome measures Physical, emotional, and sexual violence.

Results The prevalence of physical, emotional and sexual violence among women in sexual unions in Papua New Guinea were 45.9% (42.4 to 47.7), 45.1% (43.4 to 46.8) and 24.3% (22.9 to 25.8), respectively. The level of partner alcohol consumption was 57.3%. Women whose partners consumed alcohol were more likely to experience physical violence (aOR=2.86, 95% CI=2.43 to 3.37), emotional violence (aOR=2.89, 95% CI=2.44 to 3.43) and sexual violence (aOR=2.56, 95% CI=2.08 to 3.16) compared with those whose partners did not consume alcohol.

Conclusion This study found a relatively high prevalence of intimate partner violence among women in Papua New Guinea. Most importantly, this study found partner alcohol consumption to be significantly and positively associated with intimate partner violence. The study, therefore, recommends that interventions seeking to reduce intimate partner violence among women in Papua New Guinea should intensify behaviour change and education on reducing or eliminating partner alcohol consumption.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The use of nationally representative data ensures that our findings are generalisable to reproductive age women in Papua New Guinea.

⇒ Secondary data were used in the study and the analyses performed were restricted to only the variables found in the dataset.

⇒ Demographic and Health Survey employs cross-sectional design which makes it impossible for the study to make causal inferences.

⇒ The variables were assessed based on self-reports by the women, thereby increasing the likelihood of recall bias and other social desirability biases.

INTRODUCTION

Intimate partner violence (IPV) is defined as physical, sexual, psychological or economic violence that happens between former or current intimate partners.[1] IPV is a serious public health problem accompanied by severe physical (injury and death), mental (depression, anxiety, substance use problem), sexual and reproductive health risks (HIV, sexually transmitted infections, unwanted pregnancy, abortion and unfavourable pregnancy outcomes) and social consequences.[2] These consequences could have short-term and/or long-term impacts on the health of survivors, their families and children.[3–5] While men also experience IPV, it is predominantly a gendered issue perpetrated against women by male partners.[1] An estimated one in four women experiences violence at some point in their life, regardless of age, economic status and ethnicity.[6–8] However, a recent estimate showed that one in three women have experienced IPV in their lifetime.[9]

Although comparative global data are lacking, the prevalence of IPV among women varies substantially across countries as a function of personal characteristics, social context, culture and many other factors. The prevalence of IPV ranges from 37% in

the USA[10] to as high as 72% in Mali.[11] The prevalence of IPV among women, as well as its associated burden, is reported to be high in most low-income and middle-income countries,[11–13] with Papua New Guinea, reported to be one of the countries with the highest prevalence globally.[14 15]

Several factors could account for the high prevalence of IPV in Papua New Guinea. In an attempt to explain the experience of IPV among women, one reason that most resonates is the issue of strict gender roles and gender relations.[16 17] Thus, it constitutes a mechanism to keep women in their place and to assert who decides the relationship of power struggle. With this, several authors have reported that violence is normalised in Papua New Guinea and there is a widely shared perception that violence against women is a normal aspect of an intimate relationship.[6 16 18] Identified risk factors for IPV include childhood experience of violence, low education, stress, ineffective communication in a relationship, unequal power in the relationship, unemployment, gender inequitable masculinities and harmful attitudes to gender relations that result in female disempowerment and marginalisation and alcohol and drug use.[6 11 14 19]

The high prevalence of IPV in Papua New Guinea has resulted in targeted policy actions aimed at addressing the problem.[20] Some of these policies include the establishment of Family Support Centres at hospitals, dedicated Family and Sexual Violence Units and a number of safe houses. These policies and interventions are aimed at supporting women; but do not address the underlying factors associated with IPV in Papua New Guinea.

Given the high prevalence of IPV among women in Papua New Guinea and its associated burden, it is necessary to get a good understanding of its associated factors to guide intervention efforts. In an attempt to understand factors that could potentially influence the occurrence of IPV among women, one behaviour that has been reported by several studies to be associated with IPV is partner alcohol use;[21–25] however, a knowledge gap exists at the national level in Papua New Guinea in relation to the association between partner alcohol consumption and IPV among women in Papua New Guinea.

Riggs and O'Leary[26] explained the relationship between partner alcohol consumption and IPV among women using the model of courtship aggression. The model describes two general components, which contribute to the development and maintenance of IPV: background and situational factors. Under this model, the background factors constitute the historical, societal and individual-level characteristics that determine future aggression. The situational factors on the other hand are the factors that set the stage for the violence to occur, and they include expectations of the outcome of violence, interpersonal conflict, intimacy levels, lack of problem-solving skills and substance use, including alcohol consumption.[26]

Other complex models also exist to explain how alcohol use can potentially be related to IPV. Stuart et al[27] presented some theories that explain the association between alcohol use and IPV. The study made reference to a theoretical model by Leonard,[28 29] which posits that distal influences (such as personality traits, alcohol consumption, etc) combine with proximal/contextual factors (such as physiological and psychological effects of alcohol) to increase the likelihood of IPV among partners. The authors further presented Steele and Joseph's[30] model of alcohol myopia as a potential explanation for the association between alcohol use and IPV. This model posits that the use of alcohol increases the risk for aggression through reduced information processing, resulting in a narrowing attention to the most important, easy-to-access and immediate aspects of a situation which may in tend lead to IPV.

Given the high prevalence of alcohol consumption among men in Papua New Guinea,[31] we hypothesise that partner alcohol consumption is associated with IPV among women in sexual unions in Papua New Guinea.

MATERIALS AND METHODS
Data source, study design and sampling technique
Data for the study were extracted from the 2016–2018 Papua New Guinea Demographic and Health Survey (DHS). We pooled the data from the women's file (IR file) for the study. DHS is a nationally representative survey that is undertaken regularly to offer an update on demographic and health conditions.[32] The Papua New Guinea DHS is conducted in partnership with the global DHS Programme, which is administered by Inner City Fund in Rockville, Maryland, USA. DHS employed a descriptive cross-sectional design. To recruit respondents for the survey, the DHS used a two-stage cluster sampling technique. The first stage involved the selection of 800 census units with probability proportional to the size of the census units. The second stage consisted of selecting a set number of 24 households in each cluster with an equal likelihood of systematic selection from the freshly constructed household listing, for a total sample size of about 19 200 homes. Detailed sampling methodology has been highlighted in the literature.[32 33] DHS collects data from respondents on a variety of topics, including domestic violence and substance use.[27] In this study, we included 3319 respondents (women in sexual unions) with complete observations on all variables of interest. We also followed the guideline for the Strengthening Reporting of Observational Studies in Epidemiology in writing the manuscript (online supplemental table 1).[34] The dataset is freely available to download at https://dhsprogram.com/data/dataset/Papua-New-Guinea_Standard-DHS_2017.cfm?flag=1.[35]

Variables
The model of courtship aggression underpins this study. As a result, the outcome variables, key explanatory variables and covariates were selected with reference to the courtship aggression model. Past-year experience of physical, emotional and sexual violence were the outcome

variables in the study. The questions used to assess the outcome variables were adapted from a modified version of the conflict tactile scale.[36 37] Also, previous studies have highlighted the definite questions used to assess the outcome variables.[38–40] From those studies and the DHS report, the response options to each of the questions were 'never', 'often', 'sometimes' and 'yes, but not in the recent 12 months'. We created a binary outcome for each of the outcome variables whereby respondents whose response option was either 'never' or 'yes, but not in the recent 12 months' were categorised as 'no' and was coded as '0'. Women who responded either 'often' or 'sometimes' were recoded as 'yes' and labelled as '1'. The recoding of each of the IPV variables was based on literature that utilised the DHS dataset.[38–40]

We considered partner alcohol consumption as the key explanatory variable. The selection of this variable was informed by literature.[41 42] To measure this variable, the women were asked the question *Does (did) your (last) (husband/partner) drink alcohol?* The response options were 'no' and 'yes'. This existing coding was kept and used for the final analysis.

Fifteen variables were included in the study as covariates. These variables were chosen based on prior studies,[42–45] as well as their availability in the DHS dataset. Age of women and their partners, educational level of women and their partners, marital status, current working status, exposure to mass media (television, radio and newspaper/magazine), parity, wealth index, sex of household head, place of residence, region, community socioeconomic status and community literacy level were the covariates in the study. These variables were further grouped into individual-level and household/community-level variables. The individual-level variables consist of the age of the women, educational level, marital status, current working status, exposure to mass media and parity. The household/community-level factors were partners' age, partners' educational level, wealth index, sex of household head, place of residence, region, community literacy level and community socioeconomic status. We maintained the existing coding in the DHS for current working status, wealth index, sex of household head, place of residence and region. Level of education was recoded as 'no education', 'primary', 'secondary' and 'higher'. Age of the women was coded as '15–24', '25–34' and '35–49'. Partner's age was however coded as '15–24', '25–34', '35–44' and '45 and above'. We recoded parity into 'nulliparity', 'primiparity', 'multiparity' and 'grand parity'. Mass media exposure was created as an index variable from frequency of listening to radio, frequency of watching television and frequency of reading newspaper or magazine. The responses in each of the variable were 'not at all', 'less than once a week' and 'at least once a week'. Women whose response options were 'not at all' were recoded as not exposed (no), while the remaining response options were recoded as exposed (yes) in each of the three variables. Based on the recoded responses, a new variable called the mass media exposure with the

categories being 'none (not exposed to any of the three variables)', 'one (exposed to only one of the three variables)' and 'two or more (exposed to at least two of the three variables)'.

Both community socioeconomic status and community literacy level were derived from principal component analysis. For community literacy level, the respondents with a higher education level than secondary school were deemed to be literate. The remaining participants were given a sentence to read. If they could read all or part of the phrase, they were called literate. As a result, individuals with higher than secondary education or no school or primary or secondary education who could read a whole sentence were considered to have high literacy. When respondents had no formal education and could only read part of a sentence, they were classified as having medium literacy. Respondents with low literacy had no education/primary/secondary education and could not read at all. High community literacy was grouped into tertile 1 (lowest score, least disadvantaged), medium community literacy was placed into tertile 2 and poor community literacy was defined into tertile 3 (highest score, most disadvantaged). Community socioeconomic status was estimated from the level of education, wealth and occupation of the respondents in a particular community. With an average rating of zero and a standard deviation of one, a standardised rating was created (1). The rankings were then divided into three tertiles: tertile 1 (least disadvantaged), tertile 2 (middle disadvantaged) and tertile 3 (most disadvantaged). The lowest score (tertile 1) indicates a higher socioeconomic position and the highest score (tertile 3) indicates lower socioeconomic status.

Statistical analyses

We performed the analyses using Stata software V.16.0 (Stata Corporation, College Station, TX, USA). At the initial stage, percentages with confidence intervals (CIs) were used to summarise the prevalence of IPV among women in sexual relationships (table 1). Second, cross-tabulation was adopted to examine the distribution of each of the IPV variables across the partner alcohol consumption and the covariates. Pearson χ^2 test of independence was later used to examine the relationship between the explanatory variables and each of the IPV variables. We checked for the existence of collinearity among the variables using the variance inflation factor (VIF) and the found the minimum, maximum and mean VIF to be 1.04, 5.19 and 2.50, respectively. Hence, there was no evidence of high collinearity among the studied variables. To examine the association between partner alcohol consumption and each of the IPV variables while controlling for the covariates, we used a multilevel binary logistic regression. Five models were developed and used to examine the association between partner alcohol consumption and the IPV variables. Model O, which was an empty model with no explanatory variables or covariates, showed the variance in the IPV variables

Table 1 Distribution of intimate partner violence across partner alcohol consumption and covariates

Variable	Weighted N (%)	Physical violence 45.9% (42.4–47.7)		Emotional violence 45.1% (43.4–46.8)		Sexual violence 24.3% (22.9–25.8)	
		Yes (%)	P-value	Yes (%)	p-value	Yes (%)	P-value
Partner alcohol consumption			<0.001		<0.001		0.083
No	1417 (42.7)	31.6 (26.6–37.1)		32.3 (27.2–37.8)		19.6 (14.6–25.9)	
Yes	1902 (57.3)	56.6 (53.0–60.2)		54.7 (51.2–58.1)		27.8 (23.5–32.6)	
Mean age of the women	32.5 (7.9)						
Women's age			<0.001		0.004		0.293
15–24	723 (21.8)	53.8 (48.1–59.4)		52.4 (46.6–58.0)		26.0 (18.7–34.9)	
25–34	1263 (38.1)	49.6 (43.5–55.6)		45.1 (40.9–49.4)		26.8 (22.3–31.9)	
35–49	1333 (40.1)	38.3 (33.9–42.8)		41.2 (36.5–46.0)		21.1 (17.5–25.2)	
Women's educational level			0.176		0.192		0.778
No education	935 (28.2)	39.6 (33.9–45.7)		41.3 (35.1–47.9)		25.1 (20.0–30.9)	
Primary	1541 (46.4)	45.8 (41.9–49.6)		45.4 (41.5–49.3)		25.2 (22.4–28.2)	
Secondary	678 (20.4)	51.0 (39.6–62.5)		44.8 (36.1–53.9)		22.3 (15.9–30.3)	
Higher	165 (5.0)	62.9 (36.3–83.4)		65.2 (39.5–84.4)		20.5 (6.8–47.6)	
Marital status			0.723		0.622		0.007
Married	2752 (82.9)	45.7 (41.1–50.5)		44.8 (40.9–48.8)		23.0 (20.5–25.6)	
Cohabiting	567 (17.1)	47 (41.3–52.9)		46.6 (40.6–52.6)		30.8 (25.5–36.7)	
Current working status			0.878		0.060		0.009
No	2265 (68.2)	45.8 (40.4–51.2)		43.3 (38.7–48.0)		22.4 (19.9–25.0)	
Yes	1054 (31.8)	46.3 (42.0–50.7)		49.0 (44.7–53.3)		28.5 (24.4–33.0)	
Parity			0.013		0.151		0.472
Nulliparity	302 (9.1)	53.6 (44.6–62.4)		46.0 (37.5–54.7)		28.0 (21.1–36.1)	
Primiparity	613 (18.5)	58.4 (42.7–72.6)		53.1 (41.5–64.5)		26.9 (21.4–33.2)	
Multiparity	1531 (46.1)	45.7 (42.1–49.2)		44.4 (40.6–48.2)		23.8 (20.6–27.3)	
Grand parity	873 (26.3)	35.0 (30.1–40.3)		40.5 (34.9–46.3)		22.1 (17.5–27.7)	
Exposure to mass media			0.001		<0.001		0.462
None	1734 (52.2)	40.0 (36.5–43.5)		39.3 (35.6–43.1)		23.1 (20.2–26.3)	
One	568 (17.1)	49.0 (42.1–55.8)		47.8 (40.7–55.0)		26.6 (20.9–33.1)	
Two or more	1017 (30.7)	54.5 (46.4–62.3)		53.5 (47.9–59.0)		25.2 (21.8–29.0)	
Partner's age			0.001		0.089		0.237
15–24	274 (8.3)	59.3 (41.6–74.9)		56.8 (38.6–73.3)		26.4 (15.5–41.2)	
25–34	1100 (33.1)	51.8 (46.8–56.8)		47.4 (42.4–52.5)		24.0 (20.5–27.9)	
35–44	1156 (34.8)	45.2 (40.2–50.3)		44.8 (40.5–49.1)		27.4 (23.1–32.2)	
45+	788 (23.8)	34.2 (29.4–39.3)		38.3 (33.3–43.6)		19.6 (15.6–24.3)	
Partner's educational level			0.685		0.702		0.871
No education	627 (18.9)	44.1 (37.7–50.6)		44.8 (38.5–51.2)		23.2 (18.4–28.7)	
Primary	1458 (43.9)	44.7 (40.7–48.7)		44.5 (40.1–48.9)		25.3 (21.6–29.3)	
Secondary	933 (28.1)	47.9 (42.1–53.8)		47.6 (41.7–53.7)		23.3 (17.0–31.0)	

Continued

Table 1 Continued

Variable	Weighted N (%)	Physical violence 45.9% (42.4–47.7)		Emotional violence 45.1% (43.4–46.8)		Sexual violence 24.3% (22.9–25.8)	
		Yes (%)	P-value	Yes (%)	p-value	Yes (%)	P-value
Higher	301 (9.1)	50.1 (31.1–69.0)		41.1 (28.0–55.6)		25.2 (12.2–45.1)	
Wealth index			0.124		0.221		0.679
Poorest	624 (18.8)	41.6 (35.7–47.7)		41.5 (35.3–48.0)		24.6 (19.7–30.2)	
Poorer	644 (19.4)	43.0 (36.8–49.6)		42.9 (36.8–49.2)		23.6 (18.9–29.0)	
Middle	669 (20.2)	45.2 (39.4–51.2)		43.8 (37.8–50.1)		25.9 (21.1–31.3)	
Richer	622 (18.7)	44.3 (39.1–49.7)		45.1 (40.3–50.0)		26.1 (21.8–30.9)	
Richest	760 (22.9)	54.0 (43.4–64.3)		51.1 (43.2–59.0)		22.0 (18.7–25.7)	
Sex of household head			0.753		0.681		0.919
Male	2870 (86.5)	45.8 (41.3–50.3)		44.9 (41.1–48.8)		24.4 (21.9–27.1)	
Female	449 (13.5)	47.0 (40.2–54.0)		46.4 (39.9–53.1)		24.0 (18.8–30.3)	
Place of residence			0.064		0.035		0.280
Urban	375 (11.3)	52.7 (46.1–59.3)		52.5 (45.8–59.0)		27.5 (21.7–34.1)	
Rural	2944 (88.7)	45.1 (40.6–49.7)		44.2 (40.3–48.1)		23.9 (21.5–26.6)	
Region			0.363		0.141		0.090
Southern region	646 (19.5)	41.8 (37.5–46.1)		40.8 (36.2–45.5)		20.0 (16.6–24.0)	
Highlands region	1254 (37.8)	46.2 (41.2–51.2)		46.0 (41.1–51.0)		25.9 (22.0–30.3)	
Momase region	953 (28.7)	49.9 (39.3–60.4)		49.4 (41.1–57.8)		26.8 (22.0–32.3)	
Islands region	466 (14.0)	43.1 (38.5–47.9)		39.8 (35.4–44.5)		21.0 (17.3–25.4)	
Community literacy level			0.145		0.475		0.342
Low	1287 (38.8)	41.8 (37.1–46.8)		42.4 (37.6–47.3)		23.8 (20.2–27.9)	
Medium	1182 (35.6)	46.1 (41.3–50.9)		47.3 (42.0–52.6)		26.4 (22.1–31.1)	
High	850 (25.6)	52.0 (41.9–62.0)		46.3 (38.0–54.9)		22.3 (19.5–25.4)	
Community socioeconomic status			0.030		0.240		0.211
Low	1865 (56.2)	41.2 (38.1–44.5)		42 (38.5–45.5)		23.3 (20.6–26.2)	
Medium	293 (8.8)	56.3 (42.7–68.9)		50.4 (34.2–66.6)		32.0 (21.4–27.7)	
High	1161 (35.0)	50.9 (42.6–59.1)		48.8 (42.6–55.1)		24.1 (20.8–27.7)	

attributable to the primary sample units (PSUs). Model I included the partner alcohol consumption, whereas model II included it as well as the individual-level variables. Partner alcohol consumption and the household or community-level factors were included in model III. The final model (model IV) included all of the covariates as well as the partner alcohol consumption. The regression analyses' findings were tabulated, providing crude odds ratios (cORs) and adjusted odds ratios (aORs) with 95% CIs. We presented the full models (models O–IV) in a tabular form (online supplemental table 2). A p-value <0.05 was considered statistically significant for all the variables. Additionally, all five models included both fixed and random effects results. Fixed effects signified the measure of variation in IPV variables based on PSUs

(measured by intra-cluster correlation (ICC)), whereas random effects designated the measure of variation in IPV variables depending on covariates and/or partner alcohol consumption. Model fitness, or how well alternative models match the data, was measured using Akaike's Information Criterion (AIC). The 'melogit' command in Stata was used to execute the multilevel regression models. To accommodate for the complicated nature of DHS data, the 'svyset' command was used to compensate for disproportionate sampling and non-response.

Patient and public involvement

In the design and conduct of this research, patients and the public were not included.

RESULTS

Prevalence of physical, emotional and sexual violence among women in sexual unions in Papua New Guinea

Table 1 shows the prevalence of IPV (ie, physical, emotional and sexual violence) among women in sexual unions in Papua New Guinea. The prevalence of physical, emotional and sexual violence among the women in Papua New Guinea were 45.9% (42.4–47.7), 45.1% (43.4–46.8) and 24.3% (22.9–25.8), respectively.

Relationship between intimate partner violence and the explanatory variable and covariates

Table 1 shows the results of the association between IPV and the key explanatory variable and covariates. The study found that partner alcohol consumption (p<0.001); women's age (p<0.001); parity (p=0.013); exposure to mass media (p=0.001); partner's age (p=0.001) and community socioeconomic status (p=0.030) were significantly associated with physical violence. Also, partner alcohol consumption (p<0.001); women's age (p=0.004); exposure to mass media (p<0.001) and place of residence (p=0.035) were significantly associated with emotional violence. Again, marital status (p=0.007) and current working status (p=0.009) were significantly associated with sexual violence.

Association between partner alcohol consumption and physical violence among women in sexual unions in Papua New Guinea

Table 2 presents the results of the association between partner alcohol consumption and physical violence among women in Papua New Guinea. As shown in Model IV which controlled for all the covariates, the study found that women whose partners consumed alcohol were more likely to experience IPV compared to those whose partners did not consume alcohol (aOR=2.86, 95% CI=2.43 to 3.37). Moreover, women who were exposed to one mass media (aOR=1.27, 95% CI=1.02 to 1.58); those exposed to two or more mass media (aOR=1.41, 95% CI=1.12 to 1.76) and women who resided in highland region (aOR=1.42, 95% CI=1.13 to 1.79) were more likely to experience physical violence. However, women who had attained higher educational level (aOR=0.54, 95% CI=0.33 to 0.89); women whose partner's age were 45 years and above (aOR=0.63, 95% CI=0.42 to 0.96) and those who resided in rural areas (aOR=0.74, 95% CI=0.56 to 0.98) were less likely to experience physical violence (online supplemental table 2).

Association between partner alcohol consumption and emotional violence among women in sexual unions in Papua New Guinea

Table 3 shows the result of the association between partner alcohol consumption and emotional violence among women in Papua New Guinea. It was found that women whose partners consumed alcohol were more likely to experience IPV compared to those whose partners did not consume alcohol (aOR=2.89, 95% CI=2.44 to 3.43) (Model IV-controlled for all the covariates). We also found that women who were currently working (aOR=1.28, 95% CI=1.08 to 1.52); women who were exposed to two or more mass media (aOR=1.54, 95% CI=1.22 to 1.94) and women who resided in highland region (aOR=1.37, 95% CI=1.07 to 1.76) were more likely to experience emotional violence. However, women whose age ranged from 25 to 34 (aOR=0.76, 95% CI=0.59 to 0.98); those aged 35–49 (aOR=0.63, 95% CI=0.46 to 0.87); those who had secondary or higher education (aOR=0.68, 95% CI=0.50 to 0.91) and those who resided in rural areas (aOR=0.64, 95% CI=0.48 to 0.86) were less likely to experience emotional violence (online supplemental table 2).

Association between partner alcohol consumption and sexual violence among women in sexual unions in Papua New Guinea

Table 4 outlines the result of the association between partner alcohol consumption and sexual violence among women in Papua New Guinea. As shown in Model IV which controlled for all the covariates, the study found that women whose partners consumed alcohol had higher odds of experiencing IPV compared to those whose partners did not consume alcohol (aOR=2.56, 95% CI=2.08 to 3.16). Those who were cohabiting (aOR=1.38, 95% CI=1.09 to 1.75); those who were currently working (aOR=1.36, 95% CI=1.12 to 1.67); those who resided in the Highlands region (aOR=1.42, 95% CI=1.06 to 1.92) and those who resided in the Momase region (aOR=1.52, 95% CI=1.12 to 2.06) were more likely to experience sexual violence. On the contrary, women whose age ranged from 35 to 49 (aOR=0.57, 95% CI=0.39 to 0.82); those who had secondary or higher education (aOR=0.67, 95% CI=0.47 to 0.95); those with primiparity (aOR=0.63, 95% CI=0.44 to 0.92) and those who resided in rural areas (aOR=0.69, 95% CI=0.49 to 0.97) were less likely to experience sexual violence (online supplemental table 2).

DISCUSSION

This study examined the prevalence of IPV, as well as the association between partner alcohol consumption and IPV among women in sexual unions in Papua New Guinea. The prevalence of physical, emotional and sexual violence among the women in Papua New Guinea were 45.9%, 45.1% and 24.3%, respectively. The high prevalence of IPV among the women could be linked to the normalisation of violence against women in Papua New Guinea. For instance, some studies have reported that violence is normalised in the country and perceive violence against women as a normal aspect of an intimate relationship.[16 18 46] Also, strict gender roles and gender relations that give men more power while making women less powerful and only to submit to men[16 17] could be another reason for the high rates of IPV against women in Papua New Guinea. This finding suggests that more efforts in terms of education and installation of stringent

Table 2 Association between partner alcohol consumption and physical violence among women in Papua New Guinea

Variable	Model O	Model I cOR (95% CI)	Model II aOR (95% CI)	Model III aOR (95% CI)	Model IV aOR (95% CI)
Fixed effect					
Partner alcohol consumption					
No		1.00	1.00	1.00	1.00
Yes		3.18***(2.72 to 3.71)	2.92***(2.49 to 3.43)	2.96***(2.52 to 3.48)	2.86***(2.43 to 3.37)
Random effect result					
PSU variance (95% CI)	0.247 (0.140 to 0.437)	0.174 (0.079 to 0.381)	0.164 (0.071 to 0.379)	0.146 (0.058 to 0.367)	0.138 (0.052 to 0.367)
ICC	0.070	0.050	0.047	0.042	0.040
LR test	18.46 (<0.001)	8.54 (<0.002)	7.28 (0.003)	5.92 (0.007)	5.91 (<0.001)
Wald χ^2	Reference	211.33 (<0.001)	252.91 (<0.001)	252.82 (<0.001)	271.99 (<0.001)
Model fitness					
Log-likelihood	−2261.6712	−2148.3626	−2120.4423	−2120.2859	−2106.7314
AIC	4527.342	4302.725	4270.885	4284.572	4281.463
N	3319	3319	3319	3319	3319
Number of clusters	746	746	746	746	746

*P<0.05, **p<0.01, ***p<0.001.
1, reference category; AIC, Akaike Information Criterion; aOR, adjusted OR; cOR, crude OR; ICC, intra-class correlation; LR, likelihood ratio test; PSU, primary sampling unit.

Table 3 Association between partner alcohol consumption and emotional violence among women in Papua New Guinea

Variable	Model O	Model I cOR (95% CI)	Model II aOR (95% CI)	Model III aOR (95% CI)	Model IV aOR (95% CI)
Fixed effect					
Partner alcohol consumption					
No		1.00	1.00	1.00	1.00
Yes		3.07***(2.62 to 3.61)	2.90***(2.46 to 3.43)	2.96***(2.51 to 3.50)	2.89***(2.44 to 3.43)
Random effect result					
PSU variance (95% CI)	0.404 (0.266 to 0.614)	0.334 (0.205 to 0.544)	0.297 (0.174 to 0.510)	0.287 (0.167 to 0.494)	0.271 (0.152 to 0.481)
ICC	0.109	0.092	0.083	0.080	0.076
LR test	42.06 (<0.001)	27.76 (<0.001)	21.53 (<0.001)	20.96 (<0.001)	18.13 (<0.001)
Wald χ^2	Reference	185.81 (<0.001)	226.16 (<0.001)	218.93 (<0.001)	247.37 (<0.001)
Model fitness					
Log-likelihood	−2233.2409	−2134.1838	−2109.5064	−2113.674	−2095.1659
AIC	4470.482	4274.368	4249.013	4271.348	4258.332
N	3319	3319	3319	3319	3319
Number of clusters	746	746	746	746	746

*P<0.05, **p<0.01, ***p<0.001.
1, reference category; AIC, Akaike Information Criterion; aOR, adjusted OR; cOR, crude OR; ICC, intra-class correlation; LR test, likelihood ratio test; PSU, primary sampling unit.

Table 4 Association between partner alcohol consumption and sexual violence among women in Papua New Guinea

Variable	Model O	Model I cOR (95% CI)	Model II aOR (95% CI)	Model III aOR (95% CI)	Model IV aOR (95% CI)
Fixed effect					
Partner alcohol consumption					
No		1.00	1.00	1.00	1.00
Yes		2.62***(2.15 to 3.19)	2.59***(2.11 to 3.17)	2.61***(2.13 to 3.21)	2.56***(2.08 to 3.16)
Random effect result					
PSU variance (95% CI)	0.485 (0.304 to 0.773)	0.477 (0.295 to 0.771)	0.430 (0.254 to 0.728)	0.430 (0.257 to 0.720)	0.395 (0.226 to 0.691)
ICC	0.128	0.126	0.116	0.116	0.107
LR test	32.73 (<0.001)	30.25 (<0.001)	23.86 (<0.001)	25.14 (<0.001)	20.40 (<0.001)
Wald χ^2	Reference	90.33 (<0.001)	137.87 (<0.001)	123.39 (<0.001)	158.89 (<0.001)
Model fitness					
Log-likelihood	−1730.9475	−1681.7152	−1655.0027	−1662.9293	−1641.9958
AIC	3465.895	3369.43	3340.005	3369.859	3351.992
N	3319	3319	3319	3319	3319
Number of clusters	746	746	746	746	746

*P<0.05, **p<0.01, ***p<0.001.
1.00, reference category; AIC, Akaike Information Criterion; aOR, adjusted odds ratio; cOR, crude odds ratio; ICC, intra-class correlation; LR test, likelihood ratio test; PSU, primary sampling unit.

legal actions are needed to reduce the high prevalence of IPV perpetration against women in Papua New Guinea.

This study has found a strong positive association between partner alcohol consumption and IPV. Particularly, women whose partners consumed alcohol were more likely to experience IPV (ie, physical, emotional and sexual). Other studies[21–25] also found similar results. This finding supports the model of courtship aggression propounded by Riggs and O'Leary.[26] The model proposes that background (ie, historical, societal and individual attributes) and situational factors contribute to the development and maintenance of IPV. For instance, substance use such as alcohol consumption triggers the perpetration of violence against women.[14] This linkage could be due to the increased likelihood of engaging in aggressive behaviour after alcohol intoxication.[47 48] This finding implies that for IPV to be alleviated, more efforts should be directed at partner alcohol consumption.

Research has shown that mass media exposure is a protective factor against IPV.[49] However, this study has revealed that women who were exposed to at least one mass media were more likely to experience IPV (ie, physical and emotional). This finding validates that of a previous study.[50] A possible reason for this finding is that the mass media outlets in Papua New Guinea showcase programmes that publicly condone or permit violence against women which makes the women more likely to see physical and emotional violence as a socially accepted norm in intimate relationships.[50–52] This finding calls for proper scrutiny and streamlining of programmes that are held on media platforms in Papua New Guinea.

Akin to previous studies,[53 54] this study found that women who were currently working were more likely to experience IPV (ie, emotional and sexual) compared with those who were not working. This finding was surprising as it is commonly known that being economically stable (ie, employed) serves as a protective factor against IPV.[55] A plausible explanation for this observation could be that employed women may devote less time to performing culturally ascribed roles such as household chores,[56] which may lead to spousal conflict.[57] Moreover, women's employment status might threaten a male partner's status as the breadwinner of the family particularly in conservative communities where strict gender roles are upheld.[54] This finding implies that being employed does not necessarily shield women from being emotionally and sexually abused.

Women who resided in rural areas were less likely to experience IPV (ie, physical, emotional and sexual). This finding contradicts other studies,[45 58] which found that rural residence was associated with severe IPV against women. This was attributed to cultural perception, and lack of knowledge and information in rural areas where physical, emotional and sexual violence may be considered a means of modifying women's behaviours.[58] However, it was rather surprising that this study found an unexpected result and a plausible reason for this finding could be that women who reside in rural areas

in Papua New Guinea are not exposed to mass media which predisposes them to programmes that will make them see violent behaviours against women as a normal phenomenon, reducing their likelihood of being abused. Further studies are also warranted to further investigate this surprising finding.

Corroborating the finding of a previous study,[11] women whose partners were older were less likely to experience IPV (ie, physical, emotional and sexual). Women whose partners are older may have lost the interest to abuse their partners or do not have the physical strength to exhibit their masculinity by abusing them.[11] It could also be that women who had older partners were able to resist any temptations of violence from their male partners, reducing their likelihood to report being abused.

Women who had secondary or higher education were less likely to experience IPV (ie, emotional and sexual). This finding supports the idea that education is a protective factor for IPV.[43 57] A plausible reason for this finding could be that women who have been educated are more empowered to fight for their rights and also advocate the same for their less privileged fellow women.[43 59] Based on this finding, more efforts should be invested in educating women in Papua New Guinea to further empower them which leads to a further decrease in their likelihood of being emotionally or sexually abused by their intimate partners.

Strengths and limitations

The major strength of the study is the use of a nationally representative survey which allows for the generalisability of the findings to women in sexual unions in Papua New Guinea. Also, the study used sophisticated data analysis methodologies that ensure our analyses of the data are rigorous. Despite these strengths, the study also has some limitations that need to be highlighted. The first limitation is the use of cross-sectional design. The cross-sectional design adopted hinders the study's ability to draw causal inferences between partner alcohol consumption and IPV among women in Papua New Guinea. Additionally, due to the sensitive nature of IPV issues, there may have been under-reporting and social desirability bias. Moreover, recall biases may have also resulted from the retrospective nature of reporting IPV.

Implications for policy/practice

This study provides two critical perspectives that need to be appreciated. First, this study provides empirical data needed to support Papua New Guinea's IPV epidemiological monitoring and surveillance system both at the national and subnational levels. Essentially, this study has identified the most vulnerable groups of women (ie, women whose partners consumed alcohol, women exposed to two or more mass media, women who are employed, women who reside in urban areas and less educated women) in Papua New Guinea who are more likely to be abused by their intimate partners. Moreover, residing in rural areas, having older partners and having

higher education protect Papua New Guinean women against IPV. Second, this study has implications for the formulation and enforcement of public health policy such as increasing taxes on alcoholic beverages and stringent legal actions against men who abuse women under the influence of alcohol. This will prevent most of the men from alcohol consumption which consequently could reduce the prevalence of IPV against women in Papua New Guinea.

CONCLUSION

This study has found a relatively high prevalence of IPV among women in Papua New Guinea. Most importantly, this study has shown that partner alcohol consumption was significantly and positively associated with IPV (ie, physical, emotional and sexual violence). Other factors associated with IPV have also been identified in this study. The study recommends that interventions that seek to reduce or eliminate IPV among women in Papua New Guinea should intensify behaviour change and education on reducing partner alcohol consumption.

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REFERENCES

1 van Gelder N, Peterman A, Potts A, *et al.* COVID-19: reducing the risk of infection might increase the risk of intimate partner violence. *EClinicalMedicine* 2020;21:100348.
2 Black M, Basile K, Breiding M, *et al.* National intimate partner and sexual violence survey: 2010 summary report. 2011.
3 Karakurt G, Patel V, Whiting K, *et al.* Mining electronic health records data: domestic violence and adverse health effects. *J Fam Violence* 2017;32:79–87.
4 Smith SG, Fowler KA, Niolon PH. Intimate partner homicide and corollary victims in 16 states: national violent death reporting system, 2003-2009. *Am J Public Health* 2014;104:461–6.
5 Kelly RJ, El-Sheikh M. Longitudinal relations between marital aggression and children's sleep: the role of emotional insecurity. *J Fam Psychol* 2013;27:282–92.
6 Adu C, Asare B-A, Agyemang-Duah W, *et al.* Impact of socio-demographic and economic factors on intimate partner violence justification among women in union in papua new guinea. *Arch Public Health* 2022;80:136.
7 World Health Organization. *Understanding and addressing violence against women: intimate partner violence*. WHO, 2012.
8 World Health Organization. *Violence against women: a 'global health problem of epidemic proportions. [News Release]*. Geneva: World Health Organization, 2013.
9 World Health Organization. *Violence against women prevalence estimates, 2018: global, regional and national prevalence estimates for intimate partner violence against women and global and regional prevalence estimates for non-partner sexual violence against women*. WHO, 2021.
10 Bott S, Guedes A, Ruiz-Celis AP, *et al.* Intimate partner violence in the americas: a systematic review and reanalysis of national prevalence estimates. *Rev Panam Salud Publica* 2019;43:e26.
11 Izugbara CO, Obiyan MO, Degfie TT, *et al.* Correlates of intimate partner violence among urban women in sub-Saharan Africa. *PLoS One* 2020;15:e0230508.
12 Aduloju PO, Olagbuji NB, Olofinbiyi AB, *et al.* Prevalence and predictors of intimate partner violence among women attending infertility clinic in south-western nigeria. *Eur J Obstet Gynecol Reprod Biol* 2015;188:66–9.
13 Ogum Alangea D, Addo-Lartey AA, Sikweyiya Y, *et al.* Prevalence and risk factors of intimate partner violence among women in four districts of the central region of Ghana: baseline findings from a cluster randomised controlled trial. *PLoS One* 2018;13:e0200874.
14 Asare B-A, Agyemang-Duah W, Adomako EB, *et al.* Association between experiences of intimate partner sexual violence and cigarette smoking among women in union in papua new guinea: evidence from a nationally representative survey. *BMC Public Health* 2022;22:613.
15 Lakhani S, Willman AM. Trends in crime and violence in papua new guinea (english). In: *Research and Dialogue Series*. Washington, DC: World Bank Group, 2014: 1.
16 Acosta P. Early discontinuation of counselling by survivors of family violence in Papua New Guinea. *Intervention* 2019;17:109.
17 Eves R. Masculinity matters: men, gender-based violence and the AIDS epidemic in papua new guinea. *Civic Insecurity: Law, Order and HIV in Papua New Guinea* 2010;1.

18 United Nations. Report of the special rapporteur on violence against women, its causes and consequences, on her mission to papua new guinea (18–26 march 2012). 2013. Available: https://www.ohchr.org/documents/issues/women/a.hrc.20.16_en.pdf

19 Capaldi DM, Knoble NB, Shortt JW, *et al*. A systematic review of risk factors for intimate partner violence. *Partner Abuse* 2012;3:231–80.

20 Rooney NM, Forsyth M, Lawihin D, *et al*. Thinking incrementally about policy interventions on intimate partner violence in papua new guinea: understanding 'popcorn'and 'blanket. *Culture, Health & Sexuality* 2022;19:1–6.

21 Caetano R, McGrath C, Ramisetty-Mikler S, *et al*. Drinking, alcohol problems and the five-year recurrence and incidence of male to female and female to male partner violence. *Alcohol Clin Exp Res* 2005;29:98–106.

22 Klostermann KC, Fals-Stewart W. Intimate partner violence and alcohol use: exploring the role of drinking in partner violence and its implications for intervention. *Aggression and Violent Behavior* 2006;11:587–97.

23 La Flair LN, Bradshaw CP, Storr CL, *et al*. Intimate partner violence and patterns of alcohol abuse and dependence criteria among women: a latent class analysis. *J Stud Alcohol Drugs* 2012;73:351–60.

24 Hove MC, Parkhill MR, Neighbors C, *et al*. Alcohol consumption and intimate partner violence perpetration among college students: the role of self-determination. *J Stud Alcohol Drugs* 2010;71:78–85.

25 Thompson MP, Kingree JB. The roles of victim and perpetrator alcohol use in intimate partner violence outcomes. *J Interpers Violence* 2006;21:163–77.

26 Riggs DS, O'LEARY KD. Aggression between heterosexual dating partners: an examination of a causal model of courtship aggression. *Journal of Interpersonal Violence* 1996;11:519–40.

27 Stuart GL, Moore TM, Elkins SR, *et al*. The temporal association between substance use and intimate partner violence among women arrested for domestic violence. *J Consult Clin Psychol* 2013;81:681–90.

28 Leonard K. Domestic violence and alcohol: what is known and what do we need to know to encourage environmental interventions? *Journal of Substance Use* 2001;6:235–47.

29 Leonard KE, Department of Health and Human Services. *Alcohol and interpersonal violence: fostering multidisciplinary perspectives*. Rockville, MD: National Institutes of Health, 1993: 253–80.

30 Steele CM, Josephs RA. Alcohol myopia. its prized and dangerous effects. *Am Psychol* 1990;45:921–33.

31 Rarau P, Vengiau G, Gouda H, *et al*. Prevalence of non-communicable disease risk factors in three sites across papua new guinea: a cross-sectional study. *BMJ Glob Health* 2017;2:e000221.

32 National Statistical Office -NSO/Papua New Guinea and ICF. *Papua new guinea demographic and health survey 2016-18*. Port Moresby, Papua New Guinea, and Rockville, Maryland, USA: NSO and ICF, 2019.

33 Aliaga A, Ruilin R. Cluster optimal sample size for demographic and health surveys. 7th International Conference on Teaching Statistics–ICOTS; July 2, 2006:2–7

34 von Elm E, Altman DG, Egger M, *et al*. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Int J Surg* 2014;12:1495–9.

35 DHS. DHS data source. n.d. Available: https://dhsprogram.com/data/dataset/Papua-New-Guinea_Standard-DHS_2017.cfm?flag=1

36 Kishor S. n.d. Domestic violence measurement in the demographic and health surveys: the history and the challenges. *Division for the Advancement of Women*;2005:1–0.

37 Straus MA. Measuring intrafamily conflict and violence: the conflict tactics (CT) scales. *Journal of Marriage and the Family* 1979;41:75.

38 Aboagye RG, Okyere J, Seidu A-A, *et al*. Experience of intimate partner violence among women in sexual unions: is supportive attitude of women towards intimate partner violence a correlate? *Healthcare (Basel)* 2021;9:563.

39 Ahinkorah BO, Onayemi OM, Seidu A-A, *et al*. Association between girl-child marriage and intimate partner violence in sub-saharan africa: insights from a multicountry analysis of demographic and health surveys. *J Interpers Violence* 2022;37:13560–80.

40 Ahinkorah BO. Polygyny and intimate partner violence in sub-saharan africa: evidence from 16 cross-sectional demographic and health surveys. *SSM Popul Health* 2021;13:100729.

41 Greene MC, Kane JC, Tol WA. Alcohol use and intimate partner violence among women and their partners in sub-saharan africa. *Glob Ment Health (Camb)* 2017;4:e13.

42 Solanke BL. Does exposure to interparental violence increase women's risk of intimate partner violence? evidence from nigeria demographic and health survey. *BMC Int Health Hum Rights* 2018;18:1.

43 Abramsky T, Watts CH, Garcia-Moreno C, *et al*. What factors are associated with recent intimate partner violence? findings from the who multi-country study on women's health and domestic violence. *BMC Public Health* 2011;11:1–17.

44 Islam MJ, Rahman M, Broidy L, *et al*. Assessing the link between witnessing inter-parental violence and the perpetration of intimate partner violence in bangladesh. *BMC Public Health* 2017;17.

45 Sabri B, Renner LM, Stockman JK, *et al*. Risk factors for severe intimate partner violence and violence-related injuries among women in India. *Women Health* 2014;54:281–300.

46 Eves R. *Exploring the role of men and masculinities in papua new guinea in the 21st century. how to address violence in ways that generate empowerment for both men and women*. Caritas Australia, 2006.

47 Eckhardt CI, Crane C. Effects of alcohol intoxication and aggressivity on aggressive verbalizations during anger arousal. *Aggress Behav* 2008;34:428–36.

48 Stappenbeck CA, Fromme K. The effects of alcohol, emotion regulation, and emotional arousal on the dating aggression intentions of men and women. *Psychol Addict Behav* 2014;28:10–9.

49 Krause KH, Haardörfer R, Yount KM. Individual schooling and women's community-level media exposure: a multilevel analysis of normative influences associated with women's justification of wife beating in Bangladesh. *J Epidemiol Community Health* 2017;71:122–8.

50 Shamu S, Shamu P, Machisa M. Factors associated with past year physical and sexual intimate partner violence against women in Zimbabwe: results from a national cluster-based cross-sectional survey. *Glob Health Action* 2018;11:1625594.

51 Easteal P, Holland K, Judd K. Enduring themes and silences in media portrayals of violence against women. *Women's Studies International Forum* 2015;48:103–13.

52 Jesmin SS. Married women's justification of intimate partner violence in Bangladesh: examining community norm and individual-level risk factors. *Violence Vict* 2015;30:984–1003.

53 Cools S, Kotsadam A. Resources and intimate partner violence in sub-saharan africa. *World Development* 2017;95:211–30.

54 Iman'ishimwe Mukamana J, Machakanja P, Adjei NK. Trends in prevalence and correlates of intimate partner violence against women in zimbabwe, 2005-2015. *BMC Int Health Hum Rights* 2020;20:2.

55 Aizer A. The gender wage gap and domestic violence. *Am Econ Rev* 2010;100:1847–59.

56 Okenwa LE, Lawoko S, Jansson B. Exposure to intimate partner violence amongst women of reproductive age in lagos, nigeria: prevalence and predictors. *J Fam Viol* 2009;24:517–30.

57 Obi SN, Ozumba BC. Factors associated with domestic violence in south-east nigeria. *J Obstet Gynaecol* 2007;27:75–8.

58 Chernet AG, Cherie KT. Prevalence of intimate partner violence against women and associated factors in ethiopia. *BMC Womens Health* 2020;20:22.

59 Amegbor PM, Rosenberg MW. What geography can tell us? effect of higher education on intimate partner violence against women in Uganda. *Applied Geography* 2019;106:71–81.