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# Determinants of spousal physical violence against women in Zambia: a multilevel analysis

Million Phiri<sup>1,2\*</sup>, Sibongile Namayawa<sup>1</sup>, Bruce Sianyeuka<sup>3</sup>, Palver Sikanyiti<sup>3</sup> and Musonda Lemba<sup>1</sup>

## Abstract

**Background** Violence against women and girls is a major public health issue, a violation of human rights, and is linked to a number of harmful effects on one's physical, mental, sexual, and reproductive health. Studies conducted in other parts of sub-Saharan Africa (SSA) suggest that there is an association between contextual factors and experience of intimate partner violence. However, in Zambia, this association is not well documented. Thus, this study was conducted to examine how individual and community-level characteristics influence spousal violence against women in Zambia.

**Methods** Data from the most recent Zambia Demographic and Health Survey conducted in 2018 was used. A sample of 7,358 ever-married women aged 15–49 years was used in the analysis. Two level multilevel binary logistic regression models were employed to examine the association between individual and contextual-level factors and experience of spousal violence.

**Results** The prevalence of spousal physical violence against women in Zambia was 21.1% [95% CI, 19.8, 22.5]. Women aged 15–19 [aOR = 2.36, 95% CI = 1.34–4.14] and 20–24 [aOR = 2.11, 95% CI = 1.38–3.22], who did not own mobile phone [aOR = 1.36, 95% CI = 1.10–1.69], and had low decision making autonomy [aOR = 1.24, 95% CI = 1.01–1.54] were more likely experience spousal physical violence. Furthermore, communities which had a low proportion of women with decision making power [aOR = 1.66, 95% CI = 1.26–2.19] were more likely experience spousal physical violence. Additionally, women whose partners' drank alcohol [aOR = 2.81, 95% CI = 2.30–3.45] and those whose partners exhibited jealous behaviour [aOR = 2.38, 95% CI = 1.88–3.21] were more likely to experience spousal physical violence.

**Conclusion** Both individual and community-level factors influenced spousal physical violence in Zambia. Integrating community level factors when designing interventions to address gender-based would be key to reduce women's vulnerability to gender based violence in the country. There is need to re-evaluate and re-strategize current strategies being implemented to address gender based violence in the country to make them context specific.

**Keywords** Women, Physical spousal violence, Intimate partner violence, Multilevel analysis, Zambia

\*Correspondence:  
Million Phiri  
millsphiri@gmail.com

<sup>1</sup>Department of Population Studies, School of Humanities and Social Sciences, University of Zambia, Lusaka, Zambia

<sup>2</sup>Demography and Population Studies Programme, Schools of Public Health and Social Sciences, University of the Witwatersrand, Johannesburg, South Africa

<sup>3</sup>Zambia Statistics Agency, Lusaka, Zambia



## Introduction

The global epidemic of violence against women and girls is a major public health issue, a violation of human rights, and is linked to a number of harmful effects on one's physical, mental, sexual, and reproductive health [1–5]. Despite many international efforts to reduce violence against women and girls, especially in sub-Saharan Africa (SSA), the negative effects it has on the health and the wellbeing of women's and girls' continue unabated [2, 6, 7]. Any behaviour in an intimate relationship that hurts the other person physically, psychologically, or sexually is defined as intimate partner violence (IPV) [8]. IPV is one of the most common forms of violence against women and girls. It includes physical acts such as slapping, striking, kicking, and beating as well as unwanted sexual acts, mental abuse, and use of abusive behaviors on the side of an intimate partner [9, 10].

The World Health Organization (WHO) estimates that, one-third of women around the world have experienced some form of violence (physical or sexual) from a partner or non-partner at some point in their lifetime [10, 11]. Recent studies on IPV reveal that, globally, 13 to 61% of victims have experienced physical abuse from a partner, 4 to 49% have experienced severe physical abuse from a partner, 6 to 59% have experienced sexual abuse from a partner at some point in their lives, and 20 to 75% have experienced one emotionally abusive act in their lifetime [8, 12, 13].

Women who have a history of experiencing intimate partner violence can be at risk to many diseases and conditions [14–16]. Major effects of IPV on women include drug and alcohol abuse, eating and sleeping disorders, physical inactivity, low self-esteem, post-traumatic stress disorder, smoking, and self-harm, while major risks for children include anxiety, depression, poor academic performance, and unfavourable health outcomes [14–19]. Previous studies on IPV conducted in different countries in SSA including Zambia have identified various factors like place of residence, maternal age, level of education, wealth status, employment status, number of children, media exposure, women's decision making power, gender norms and type of marriage as being associated with experience of IPV [2, 5, 9, 20–26].

However, no evidence showed studies conducted in Zambia at a national or subnational level to examine the influence of contextual-level factors on experience of spousal physical violence via multilevel analysis. Studies conducted in other countries found that communities with a high proportion of empowered women, rich households and education women had less exposure to spousal violence while those with high acceptance of IPV norms had higher prevalence of intimate partner violence [27–31]. Studying both individual and contextual factors that are associated with spousal violence would

be key to inform designing of evidence-based interventions to address differing community needs. Therefore, the results of this current analysis will help policymakers implement context-specific interventions aimed at reducing intimate partner violence in the country. Moreover, the study findings will also provide evidence to give direction for multisectoral bodies to focus on different strategies to eliminate the vice and overcome its negative consequences. Therefore, the objective of this study is to examine individual and contextual factors that are associated with experience of spousal physical violence against women in Zambia using multivariate mixed effect analysis based on the most recent 2018 Zambia Demographic and Health Survey.

## Methods and data

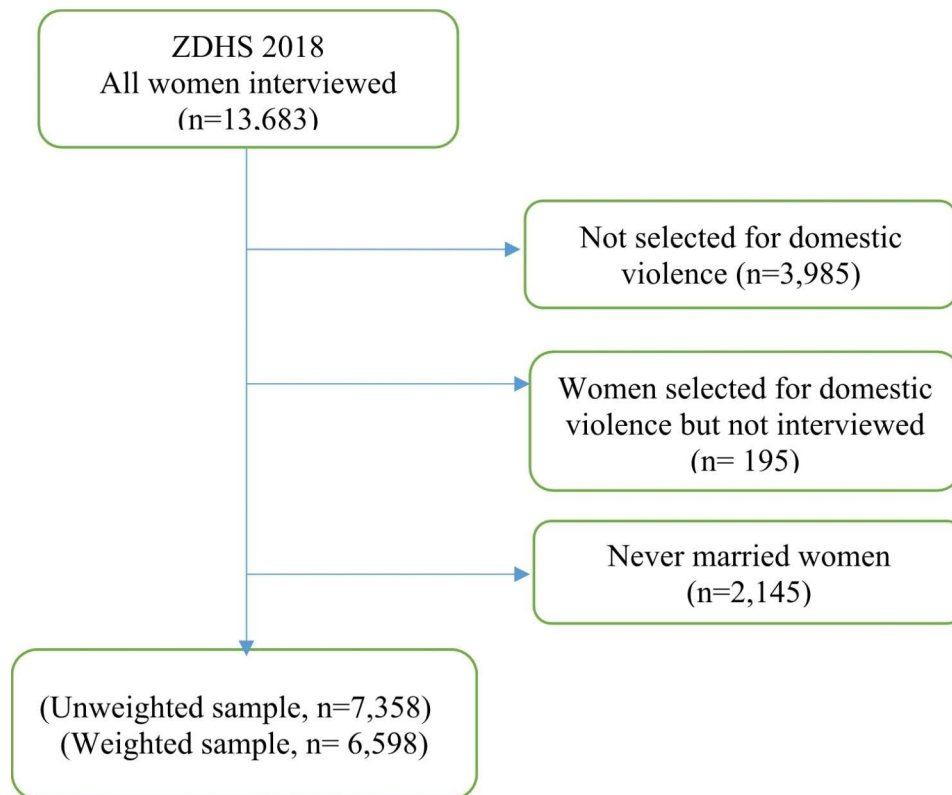
### Data source

Data from the Zambia Demographic and Health Survey (ZDHS) conducted in 2018 was used in this study. Specifically, the study used the women's dataset which contains the responses of women of reproductive ages 15–49 years. The Demographic and Health Survey is a nationwide survey that is carried out across many low-and middle-income countries every five-years [32] to collect data on a number of indicators such as family planning, maternal health, child health and domestic violence. The DHS has been an essential source of health data on issues surrounding maternal health in developing countries as it gathers data on several maternal health and sexual and reproductive health issues. The DHS uses two-stage sampling to select enumeration areas (EAs) in the first stage and households in the second stage. For this analysis, a sample of 7,358 (weighted=6,598) ever-married women aged 15–49 years who completed the domestic violence module and had complete information on the outcome variable of interest (physical violence) were included in the analysis. The selection criteria for the analytical sample size is described Fig. 1.

### Study measurements

#### Outcome measure

The outcome variable for this study was “intimate partner violence” focusing on physical violence. Most studies on gender based violence in SSA have shown that physical violence is the most common abuse inflicted on women [2, 6, 33, 34]. Intimate partner violence was measured in two forms in the DHS. The first form measured the proportion of women who ever experienced intimate partner violence and the second form the experience of violence in the past 12 months preceding the survey. In this study, we used a more recent measure of violence. Thus, our dependent variable was experience of physical violence in the past 12 months preceding the DHS. In DHS definition; physical violence constituted any of the following



**Fig. 1** Description of sample derivation criteria

acts: pushed, slapped, punched with a fist, kicked, strangled, threatened by knife and arm twisted. Thus, experiencing any of the seven acts of physical violence qualified one to be classified as having experienced physical violence [35]. The dependent variable was categorised as binary with “1” representing experience of physical spousal violence and “0” representing non-experience of spousal physical violence.

#### **Independent correlates**

Based on exiting literature [36–40], the following explanatory variables were selected: age of a woman, education, wealth status, residence, employment status, age at first marriage, marital status, parity, owner of mobile phone, exposure to family planning messages, exposure of radio/television, newspaper, and desired family size. These variables were categorised at individual and contextual-levels.

#### **Individual level factors**

Based on existing literature [2, 6, 33, 34], a number of independent correlates were identified, these included: age of a woman; level of education attained by a woman; wealth status of household; age at first marriage; ownership of mobile phone; and decision making power at household level. The woman’s independent correlates were classified as follows: age categorized as [15–49];

education level (none, primary, secondary and higher); household wealth status (poor, middle and rich); employment status (not working and working); age at first marriage (less than 15, 15–19, 20 year or above); ownership of mobile phone (yes/no); and woman decision making autonomy (low/high). The variable, woman decision making autonomy, was a composite variable created from a set of three variables captured in the DHS (decision about health, decision about large household purchases and decision about visit to family or relatives). Media exposure was also created as a composited variable from the 3 DHS variables, frequency of listening to radio, frequency of watching television and frequency of reading newspapers. The indicator was measured as a binary response (yes/no). The study also identified variables that relate to a woman’s partner or husband. These included: whether partner has other wives; whether partner drinks alcohol; whether partner exhibited jealous behaviour; and whether partners accuses a woman of unfaithfulness. The correlates related to a partner or husband were classified as follows: partner’s level of education (none, primary, secondary and higher); whether partner has other wives (yes/no); whether partner drinks alcohol (yes/no); whether partner exhibited jealous behaviour (yes/no) and whether partners accuses a woman of unfaithfulness (yes/no).

### Community-level factors

The aggregation of sociodemographic characteristics, access and behaviour-related factors from individual-level to contextual-level was done to study variables at the community level. These variables were chosen based on their significance in previous studies [41, 42]. The primary sampling unit (i.e., cluster) of the ZDHS survey was defined as a community [43]. The proportion of women in the cluster was determined by their place of residence, household wealth status, women's education, employment status, decision making autonomy at household level, age at first marriage, and exposure to media. Percentiles were categorised into three levels for simple interpretation (low, middle, and high). Contextual-level variables were categorised as place of residence (rural, urban). Socioeconomic factors included the following community wealth (low, medium, high); community education (low, medium, high); and community employment status (low, medium, high). Gender norms included: community woman decision making autonomy (low, medium, high); and access to information, community exposure to media (low, medium, high).

### Statistical analysis

Data analysis was done at three levels, descriptive, bivariate and multi-level logistic regression. All analyses were performed using Stata version 17 software. At descriptive level, proportional distributions of outcome indicators were determined. At bivariate level, cross-tabulations with chi-square tests were used to assess the association between experience of spousal physical violence and selected independent variables. To assess the effects of several individual and community level factors on experience of spousal violence among the ever-married women in Zambia, a two-level multi-level binary logistic regression model was applied on 2018 DHS survey. The "melogit" command was used in Stata software to perform a two-level' multilevel analysis.

Adjusted odds ratios (aOR) with corresponding 90%, 95% and 99% confidence intervals (CI) were reported in the presentation of results. Four multilevel logistic models were estimated. Model 0 only included the outcome variable. Model 1 included the individual level variables and model 2 included only community level variables, while Model 3 had both the individual and community level variables.

In terms of variances used to understand the variations of relationships between communities and the relative effect of community-level variables, the intraclass correlation coefficient (ICC) was used. The ICC provides information on the share of variance at each level to explain the heterogeneity in the probabilities of early marital experience, the Proportional Change in Variance

(PCV) was computed for each model in comparison to the empty model [44–46].

The goodness of fit of the models were evaluated using the Akaike Information Criteria (AIC) and a model with a lower AIC was considered to be a better fit for the data. Wanatabe – Aikake Information Criteria (WAIC) were used to compare models and measure goodness of fit [45, 46]. All variables with level of level of significance of less than 0.2 were included in multivariate multilevel analysis.

### Ethical approval

The data analysed in this study is available in the public domain at (<https://dhsprogram.com/>) Permission to the data was obtained from the DHS program. All data used did not contain any identifying information. The original Zambia DHS 2018 Biomarker and survey protocols were approved by Tropical Disease and Research Center (TDRC) and the Research Ethics Review Board of the Centers for Disease Control and Prevention (CDC) Atlanta. Thus, all data collection methods were carried out in accordance with relevant ethical guidelines and regulations. The DHS protocols ensured that all participants older than 18 years who were enrolled in the DHS give their informed consent during enumeration. Additionally, parents or guardians of all participants aged 15 to 17 gave informed consent before the legal minors were asked for their assent.

## Results

### Description of sample characteristics

The findings regarding the background characteristics of the study sample are summarized in Table 1. Slightly close to 1 in 5 (19.8%) of the study sample were within 25–29 years while about 5% were in the age range 15–19 years. Most (50.5%) of the study respondents had primary level education while 5% had attained tertiary level education. About 41% and 40% of them were from rich and poor households, respectively. The majority (58.1%) of the respondents were married when they were in the age range 15–19 years and about 10% were married at an age below 15 years. The study sample was also made up of close to 62% of women who were in employment. The largest proportion of the sampled women (35.8%) had parity of two or three children at the time of the survey and more than half (58.5%) of them were living in rural areas. Majority of women owned a mobile phone (53.9%).

### Prevalence of spousal physical violence among ever-married women

Table 2 shows the distribution of results for experience of spousal physical violence across different individual and household level factors. With regard to the individual-level factors, the highest prevalence of spousal physical violence was found among women aged 20–24 (24.4%),

**Table 1** Percent distribution of background characteristics of ever-married women (15–49 years), 2018 DHS, Zambia

Background Characteristics	DHS 2018 (N=7,358)	
	Number	Percent
<b>Age</b>		
15–19	319	4.8
20–24	1,160	17.6
25–29	1307	19.8
30–34	1210	18.3
35–39	1144	17.3
40–44	835	12.7
45–49	624	9.5
<b>Residence</b>		
Urban	2740	41.5
Rural	3858	58.5
<b>Education level</b>		
None	673	10.2
Primary	3334	50.5
Secondary	2258	34.2
Higher	332	5.0
<b>Wealth status</b>		
Poor	2642	40.0
Middle	1269	19.2
Rich	2687	40.7
<b>Age at first marriage</b>		
Less than 15	656	9.9
15–19	3832	58.1
20+	2110	32.0
<b>Employment status</b>		
Not working	2516	38.2
Working	4073	61.8
<b>Living children</b>		
Zero–One	285	4.3
Two–Three	2365	35.8
Four–Five	1971	29.9
Six or more	1976	30.0
<b>Ownership of mobile phone</b>		
No	3058	46.3
Yes	3540	53.7

those not working (21.5%), those who were married when in the age group 15–19 (22.6%), those who did not own a mobile phone (24.4%), and those with primary or no education (22.9% and 21.5%, respectively). Furthermore, women who had no decision autonomy (24.4%) and those with no exposure to media (23.0%) had higher rates of experiencing spousal physical violence. In terms of household level factors, the highest prevalence of spousal physical violence was found among women in urban areas (21.2%) and those in the poor wealth quintile (22.9%). The chi-square test of independence results revealed that apart from residence and woman's employment status, all the independent correlates were statistically associated with experience of spousal physical violence among women.

### Determinants of experience of spousal physical violence among ever-married women

The study found statistically significant associations between individual and community-level factors of experiencing spousal physical violence. Specifically, women in the age group 15–19 years [aOR=2.36, 95% CI=1.34–4.14] and 20–24 years [aOR=2.11, 95% CI=1.38–3.22] had higher odds of experiencing spousal physical violence compared to older women in the age group 45–49 years. Although not significant, women who had tertiary level education [aOR=1.08, 95% CI=0.52–2.23] were less likely to experience spousal physical violence compare to those with no education. Further, results show that women who did not own mobile phones [aOR=1.36, 95% CI=1.10–1.69] had higher odds of experiencing spousal physical violence compared to those with mobile phones. Women who had low decision making autonomy [aOR=1.24, 95% CI=1.01–1.54] were equally more likely to experience spousal physical violence compared to those with high decision making autonomy. Women whose partners drank alcohol [aOR=2.82, 95% CI=2.30–3.45] or whose partners had more than one wife [aOR=1.50, 95% CI=1.18–1.90] or whose partners' were jealous [aOR=2.38, 95% CI=1.88–3.02] had higher odds of experiencing spousal physical violence. Similarly, women whose partner's accused them of being unfaithful [aOR=2.63, 95% CI=2.18–3.22] were more likely to experience spousal physical violence compared to their defined counterparts (Table 3).

Regarding to the influence of the community-level factors on experience of spousal violence against women, the findings indicate that ever-married women who belonged to communities that had a high percentage of women who had low decision making autonomy [aOR=1.66, 95% CI=1.26–2.19] were more likely to experience spousal physical violence compared to those from communities with low proportion of women with decision making autonomy. Although not statistically significant, communities with high proportion of working women [aOR=0.90, 95% CI=0.70–1.16] were less likely to experience spousal physical violence compared to communities with low proportion of employed women. Conversely, communities with a high proportion of women who were married at a young age [aOR=1.24, 95% CI=0.96–1.59] were more likely to experience spousal physical violence compared to those from communities with low proportion of women marrying at a young age (Table 3).

Measures of variation for experience of spousal physical violence are presented in Table 3. In the null model, the use of multilevel modelling was justified by the significant variation in prevalence of experience of physical spousal violence ( $\sigma^2=0.27$ , 95% CI 0.19–0.38). Model 0 showed that 7.6% of the total variation in experience of

**Table 2** Percent distribution of experience of spousal physical violence among ever-women (15–49 years) by background characteristics, 2018 DHS, Zambia

Background Characteristics	DHS 2018 (N = 7,358)		p-value
	Experienced spousal physical violence	Did not experience spousal physical violence	
<b>Age</b>			p < 0.05*
15–19	73 (22.9)	245 (77.1)	
20–24	283 (24.4)	876 (75.6)	
25–29	291 (22.3)	1015 (77.7)	
30–34	269 (22.2)	939 (77.7)	
35–39	219 (19.2)	924 (80.8)	
40–44	152 (18.2)	682 (81.8)	
45–49	102 (16.4)	521 (83.6)	
<b>Residence</b>			p > 0.05
Urban	581 (21.2)	2158 (78.8)	
Rural	810 (21.0)	3047 (79.0)	
<b>Education level</b>			P < 0.01**
None	144 (21.5)	528 (78.5)	
Primary	762 (22.9)	2571 (77.1)	
Secondary	452 (20.0)	1806 (80.0)	
Higher	32 (9.8)	299 (90.2)	
<b>Wealth status</b>			p < 0.01**
Poor	605 (22.9)	2036 (77.1)	
Middle	285 (22.5)	983 (77.5)	
Rich	501 (18.7)	2185 (81.3)	
<b>Age at first marriage</b>			p < 0.01**
Less than 15	147 (22.5)	508 (77.5)	
15–19	864 (22.6)	2967 (77.4)	
20+	379 (18.0)	1730 (82.0)	
<b>Woman's employment status</b>			p > 0.05
Not working	540 (21.5)	1975 (78.5)	
Working	851 (20.9)	3221 (79.1)	
<b>Ownership of mobile phone</b>			p < 0.001***
No	746 (24.4)	2311 (75.6)	
Yes	645 (18.2)	2894 (81.8)	
<b>Exposure to media</b>			p < 0.05*
No	597 (23.0)	2000 (77.0)	
Yes	795 (19.8)	3206 (80.1)	
<b>Woman decision autonomy</b>			p < 0.001***
No	840 (24.4)	2605 (75.6)	
Yes	551 (17.5)	2600 (82.5)	
<b>Partner drinks alcohol</b>			p < 0.001***
No	551 (13.4)	3556 (86.6)	
Yes	840 (33.8)	1649 (66.2)	
<b>Partner has more than one wife</b>			p < 0.000***
No	934 (19.8)	3780 (80.2)	
Yes	181 (29.7)	431 (70.3)	
<b>Partner jealous</b>			p < 0.000***
No	262 (9.5)	2509 (90.5)	
Yes	1121 (29.7)	2659 (70.3)	
<b>Partner accuses wife of being unfaithful</b>			p < 0.001***
No	623 (13.7)	3942 (86.3)	
Yes	759 (37.8)	1247 (62.2)	
<b>Total</b>	<b>21.1</b>	<b>78.9</b>	

\*\*\* p &lt; 0.001; \*\* = p &lt; 0.01; \* = p &lt; 0.05

**Table 3** Multilevel parameter estimates and odds of experience of spousal physical violence among ever-married women aged [15–49] by individual and community level characteristics, ZDHS 2018 (N = 7,358)

Variables	Model 0	Model I aOR (95%CI)	Model II aOR (95%CI)	Model III aOR (95%CI)
<b>Individual level factors</b>				
<b>Age</b>				
15–19		2.35** [1.33, 4.14]		2.36** [1.34, 4.14]
20–24		2.17*** [1.42, 3.30]		2.11** [1.38, 3.22]
25–29		1.81** [1.21, 2.70]		1.78* [1.19, 2.66]
30–34		1.79* [1.19, 2.70]		1.74* [1.15, 2.63]
35–39		1.34 [0.86, 2.09]		1.32 [0.84, 2.01]
40–44		1.43 [0.88, 2.31]		1.43 [0.88, 2.32]
45–49		<b>1</b>		<b>1</b>
<b>Education level</b>				
None		<b>1</b>		<b>1</b>
Primary		1.15 [0.85, 1.56]		1.18 [0.88, 1.60]
Secondary		1.21 [0.83, 1.76]		1.23 [0.84, 1.79]
Higher		0.98 [0.48, 2.03]		1.08 [0.52, 2.23]
<b>Partner's education</b>				
None		<b>1</b>		<b>1</b>
Primary		1.02 [0.73, 1.42]		1.02 [0.73, 1.42]
Secondary		0.87 [0.62, 1.23]		0.86 [0.61, 1.22]
Higher		0.62 [0.33, 1.15]		0.63 [0.34, 1.18]
<b>Household wealth status</b>				
Poor		<b>1</b>		<b>1</b>
Middle		1.09 [0.86, 1.37]		0.93 [0.72, 1.19]
Rich		1.09 [0.82, 1.45]		0.82 [0.56, 1.20]
<b>Age at first marriage</b>				
Less than 15		<b>1</b>		<b>1</b>
15–19		1.18 [0.88, 1.58]		1.20 [0.90, 1.61]
20+		1.18 [0.87, 1.60]		1.22 [0.90, 1.165]
<b>Employment status</b>				
Not working		<b>1</b>		<b>1</b>
Working		0.92 [0.74, 1.13]		0.93 [0.74, 1.17]
<b>Ownership of mobile phone</b>				
No		1.34* [1.07, 1.67]		1.36* [1.10, 1.69]
Yes		<b>1</b>		<b>1</b>
<b>Exposure to media</b>				
No		0.98 [0.78, 1.23]		0.98 [0.78, 1.24]
Yes		<b>1</b>		<b>1</b>
<b>Woman decision making autonomy</b>				
Low		1.37** [1.13, 1.65]		1.24* [1.01, 1.54]
High		<b>1</b>		<b>1</b>
<b>Partner drinks alcohol</b>				
No		<b>1</b>		<b>1</b>
Yes		2.83*** [2.31, 3.47]		2.82*** [2.30, 3.45]
<b>Partner has more than one wife</b>				
No		<b>1</b>		<b>1</b>
Yes		1.48** [1.16, 1.88]		1.50** [1.18, 1.90]
<b>Partner jealous</b>				
No		<b>1</b>		<b>1</b>
Yes		2.40*** [1.89, 3.05]		2.38*** [1.88, 3.02]
<b>Partner accuses wife of being unfaithful</b>				
No		<b>1</b>		<b>1</b>
Yes		2.65*** [2.18, 3.22]		2.65*** [2.18, 3.22]

**Table 3 (continued)**

Variables	Model 0	Model I aOR (95%CI)	Model II aOR (95%CI)	Model III aOR (95%CI)
<b>Contextual variables</b>				
<b>Place of residence</b>				
Urban			1	1
Rural			0.64** [0.48, 0.84]	0.83 [0.59, 1.15]
<b>Community education</b>				
Low			0.93 [0.69, 1.26]	0.83 [0.53, 1.20]
Moderate			1.16 [0.91, 1.48]	1.13 [0.83, 1.50]
High			1	1
<b>Community wealth status</b>				
Low			1	1
Moderate			0.88 [0.68, 1.13]	1.34 [0.99, 1.81]
High			0.67* [0.47, 0.95]	1.20 [0.78, 1.87]
<b>Community employment</b>				
Low			1	1
Moderate			0.96 [0.81, 1.15]	1.12 [0.91, 1.38]
High			0.95 [0.78, 1.17]	0.90 [0.70, 1.16]
<b>Community woman autonomy status</b>				
Low			1.96*** [1.58, 2.41]	1.66*** [1.26, 2.19]
Moderate			1.70*** [1.34, 2.15]	1.61** [1.23, 2.10]
High			1	1
<b>Community young age at first marriage</b>				
Low			1	1
Moderate			1.14 [0.94, 1.38]	1.06 [0.85, 1.31]
High			1.30* [1.06, 1.60]	1.24 [0.96, 1.59]
<b>Random effects</b>				
Variance (CI)	0.27 [0.19– 0.38]	0.21 [0.12–0.36]	0.19 [0.12–0.29]	0.14 [0.07–0.28]
ICC (%)	7.6	5.9	5.5	4.1
PCV (%)	Ref	22.2	29.6	48.1
Wald chi-square	Ref	484.28***	66.31***	541.28***
<b>Model fitness</b>				
Log-likelihood	-3360.8	-2187.3	-3327.8	-2167.4
AIC	6725.6	4426.6	6681.6	4408.8
BIC	6739.4	4599.8	6771.3	4655.3
<b>N</b>	<b>7,358</b>	<b>7,358</b>	<b>7,358</b>	<b>7,358</b>

\*\*\*  $p < 0.001$ ; \*\* =  $p < 0.01$ ; \* =  $p < 0.05$ ; 1=Reference Category; Model 0 contains no explanatory variables; Model I includes individual-level factors only; Model II includes both individual-level and community-level factors; Model III includes community-level factors only aOR adjusted odds ratio, CI confidence interval, ICC intraclass correlation coefficient, PCV Proportional change in variance, AIC Akaike information criterion, BIC Bayesian Information Criterion

spousal physical violence was attributed to the variance between clusters (ICC=0.076). The between-cluster variance showed a decrease from 7.6 to 5.9% from Model 0 to Model 1 (individual level factors only). From Model I, the ICC further reduced to 5.4% in Model II (model with community level factors only), and decreased further to 4.1% in the full model (Model III), where all the independent correlates and community level factors were considered. Additionally, 48.1% of the variance in the odds of experiencing spousal violence across communities were explained by both individual and community-level factors, as indicated by the Proportional Change in

Variance (PCV) in model IV. Model III which had a lower AIC was considered as the model of best fit (Log-likelihood=-2167.4, AIC=4408.8).

## Discussion

This study sought to analyse the influence of individual and community-level factors that explain the experience of spousal physical among ever-married violence in Zambia. The study applied a multilevel logistic regression models on the recent Zambia Demographic and Health Survey conducted in 2018. Disparities in experience of spousal violence have been observed among different



sociodemographic strata and a further understanding of these factors has a significant implication on strengthening strategies and programmes aimed at further reducing the prevalence of spousal violence in the country.

Our study reveals that the prevalence of ever-married women who experienced spousal physical violence in the twelve months' period prior to the survey is Zambia. The prevalence of intimate partner violence found in this analysis is similar to what was previously reported in a study conducted by Marifa et al., [23], which identified a prevalence of spousal physical violence to be high in among ever-married in Uganda, Mali and Angola [23]. Angaw et al., also reported a high proportion of ever-married women in Ethiopia experienced intimate partner violence [27]. This finding of our study has significant implication for strengthening GBV policies and interventions to further reduce the prevalence of intimate partner violence against women in Zambia. If this situation is unattended to women will continue to experiencing severe physical injuries, mental disorders, unplanned pregnancies and exposure to HIV or other sexually transmitted illnesses [47]. Policy measures to eradicate GBV should thus focus on prevention strategies that promote gender equality through empowerment of women and girls through education. Furthermore, there is need to promote community initiatives that engage men and boys to participate in designing and implementation of GBV interventions.

This study has established that individual factors (age of a woman, ownership of mobile phone, woman decision making autonomy, number of wives; consumption of alcohol; partner display of jealous behaviour and accusation of infidelity) and community factors (woman decision making autonomy and age at first marriage) were significantly associated with an experience of physical spousal violence among ever-married women in Zambia.

Results showed that married women aged 15–19 years and 24–24 years had generally higher odds of experiencing physical spousal violence in the past 12 months compared with older women (aged 45–49 years). Literature show that prior studies conducted in SSA have not reported uniform findings in terms of the relationship between age of a woman and experience of intimate partner violence. However, our finding is consistent with studies that have indicated that as age of a woman increases, the experience of physical violence decreases [27, 29, 48, 49]. This finding could be explained by the fact that older women are more likely have decision making power and are able to seek support on personal strategies that prevent exposure to domestic violence compared to their young counterparts [49–51]. This finding has an implication for designing of community strategies prevent early marriages and empower young women with adequate information on how to protect themselves

from spousal violence. Strategies initiated by the World bank such as the Keeping Girls in school project which is aimed at enhancing community access to education should be rolled out to the whole country in a bid to prevent young girls from falling into the trap of early marriage [52]. Furthermore, educating boys and men about gender equality to enable them treat women as full human beings in their own right is key to reducing the prevalence of early marriages in communities. Additionally, engaging of community influential leaders is key in achieving the goal to reduce child marriages in many cultures that practice early marriage, as they have the power to affect the way social norms are practiced in small communities [53].

The study has shown that women in Zambia who own mobile phones were significantly less likely to experience spousal physical violence compared to those who did not own mobile phones. This finding indicates that having a mobile phone may facilitate the empowerment of women by exposing them to opportunities for economic and networking growth, political participation, and skill development [54], thereby reducing financial dependence of the women on their spouses [54]. This finding has significant implication on promotion of ownership of ICT devices as information tools on human rights, wellbeing and empowerment.

Our study revealed that women who had decision-making autonomy regarding household purchases, own health, and visiting to family and relative had reduced likelihood of experiencing spousal physical violence. This finding is consistent with findings reported by prior studies conducted in other settings in SSA [9, 27, 29, 55, 56]. This finding may have a number of potential explanations, one of which is that women who have autonomy in decision-making are better able to advocate for their rights and challenge some of the choices made by their spouses. This suggest that empowering women has the potential to reduce women's exposure to domestic violence in Zambia and in SSA in general.

This study established that experience of spousal physical violence was observed to be higher among women whose partners were drinking alcohol compared to women whose partners were not consuming alcohol. The studies that were carried out in Tanzania, Nigeria, Uganda, Ethiopia, Ghana, and Malawi all point to the same conclusion, which is supported by these findings [31, 57–61]. The effect of alcohol on men's cognitive capacities, reduced self-control and heightened patriarchal ideas, which in turn arouse toxic masculinities, could be one of the possible explanation of the finding of this study. Alcohol consumption can make men more aggressive and less able to negotiate a peaceful conclusion to a conflict within the partnership. Additionally, excessive drinking can lead to financial problems and

make other family concerns worse. This may lead to marital conflict and tension, which raises the possibility of violence [9, 31, 62]. The present study has also revealed that women whose partners were jealous as well as those who were being accused of being unfaithful were equally more likely to be abused by their partners. Similar results were reported in a study conducted in Zimbabwe [55].

Differences in experience of spousal physical violence were observed according to distinct individual and community-level factors. Therefore, enhancing women empowerment through access to education for female adolescents, creating employment opportunities for women and strengthening of sexual reproductive programme interventions to discourage early marriages will be key to addressing the problem of gender based violence against women in Zambia. As evidenced by the results, women who have decision making autonomy were less susceptible to spousal physical violence, suggesting that empowering women could go a long way in addressing intimate partner violence against girls and women.

There could be unobserved or unmeasured community-level factors that influenced spousal physical violence in Zambia as evidenced by the intra-class correlation coefficient in the full regression model. This suggests that there could be factors operating at the community-level, not included in this current analysis, which may be associated with experience of spousal physical violence in Zambia. These may include, but are not limited to, cultural differences between communities (that may ultimately influence intimate partner violence). Therefore, further interventions to curb intimate partner violence will require community profiling to understand the norms and cultural values that perpetuate gender based violence. Furthermore, community engagement among relevant stakeholders such as civic leaders, traditional leaders, community leaders and religious institutions can play a leading role in engaging men to participate in coming up with and implementation of community led actions aimed at preventing women from risks associated with intimate partner violence.

This study has provided useful findings that have the potential to inform strengthening of existing policies, strategies and programmes aimed at reducing GBV against women in Zambia. However, designing of context specific interventions to address the problem will require a detailed decomposition analysis of both individual and community-level factors to delineate the contribution effects of various factors to trends in GBV rates in the country.

### Study strengths and limitations

The study had a number of limitations. First, because of the cross-sectional nature of the DHS data, causality cannot be inferred from this study. Second, the outcome of interest intimate partner violence was measured for the 12 months' period prior to the survey. But the independent factors are with reference to the time when the survey was conducted, meaning that there is a possibility of a variance between some factors at the time of the event happened and those at the time of the survey. There is also a possibility of recall bias, since the DHS participants were asked to report events that happened in the past. Since the study comprised a nationally representative sample of Zambian women aged 15–49 years, the current findings can apply to the entire population of ever-married women in Zambia. The hierarchical nature of the DHS dataset allowed for exploration of community effects, which may have an influence on gender-based violence programming in the Zambian context. The study also assessed a wide range of factors to strengthen the associations observed between experience of spousal physical violence and women's individual and contextual factors.

### Conclusion

In Zambia, slightly over one-fifth of women of ever-married of reproductive age experienced spousal physical violence. A women's age, ownership of mobile phone, women's decision-making autonomy, partner's alcohol consumption status, partner's display of jealous behaviour, partner accusation of infidelity were the major determinants of spousal physical violence. Promoting access to mobile technologies would be key in enhancing access to and utilisation of information forums that may help women to prevent intimate partner violence. Further, we recommend designing and implementing of community level women's empowerment strategies through education and employment opportunities to increase the proportion of women who have decision-making autonomy at household and societal level. Effective couple counselling will be key to building trust between wife and husband. Integrating community level interventions aimed at breaking the societal tolerance towards IPV will in the long run eliminate the negative norms and culture that predispose women to IPV.

#### List of Abbreviations

CI	Confidence Interval
EA	Enumeration Area
GBV	Gender-Based Violence
IPV	Intimate Partner Violence
SDG	Sustainable Development Goal
SRH	Sexual Reproductive Health
SSA	Sub-Saharan Africa
UNFPA	United Nations Population Fund
USAID	United States Aid for International Development
WHO	World Health Organisation

ZDHS Zambia Demographic and Health Survey

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### Authors' contribution

MP developed the concept for this study, wrote background and discussion sections. SN and MP wrote the methods section and performed data analysis. MP and BS wrote the interpretation text for the manuscript. ML and PS performed overall review and editing of the manuscript for intellectual content. All authors read and approved the final version of the manuscript.

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### Data Availability

Data used in our study is publicly available at DHS program website (<https://dhsprogram.com/>).

### Declarations

#### Ethics approval and consent to participate

Because the data used in the analysis came from secondary sources that are already in the public domain, the study did not require approval from an ethics body. However, all necessary procedures and guidelines were followed to access the DHS datasets from the DHS program. The DHS protocols ensured that all ethical processes were followed before the commencement of data collection processes in Zambia. All participants older than 18 years who were enrolled in the DHS were required to give their consent during enumeration. Additionally, parents or guardians of all participants aged 15 to 17 gave consent before the legal minors were asked for their consent.

#### Consent for publication

Not applicable.

#### Competing interests

Authors declare no competing interests.

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