

## Bivariate mapping of intimate partner violence prevalence and its correlates in Liberia by county: Results from the 2019-2020 Demographic and Health Survey

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### Abstract

Intimate partner violence (IPV) is a global public health concern and requires nuanced health policy response for effective addressal at the subnational level. Using the nationally and county level representative data from the 2019-20 Demographic and Health Survey of Liberia, the prevalence of IPV was computed for each of the sixteen Liberian counties in 15 - 49-year-old women. Additionally, prevalence of IPV acceptance and having parental IPV were also computed. Prevalence of each of the three metrics were mapped by county, in addition to bivariate mapping of the three attributes. Results demonstrate wide chasms in prevalence at the county level. Several countries with high prevalence of one metric were correlated with the high prevalence of the other two metrics, and vice versa. Albeit nuanced differences in associations at the county level were also observed. Findings auger for nuanced health policy measures to address IPV more effectively in Liberia.

**Keywords:** Prevalence, Liberia, Benchmarking, Intimate Partner, Violence.

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### Introduction

Intimate partner violence (IPV) against women perpetrated by male intimate partners is a global public health opprobrium and requires health policy response that is locally relevant with focused interventions to remediate it. According to the World Health Organization (WHO), the prevalence of physical and/or sexual IPV is about 27% globally, in 15-49 years old women; with deleterious effects on health of women.<sup>1</sup> The 27% prevalence was also recently reported for the western sub-Saharan Africa as well.<sup>2</sup>

Several studies have reported the association of IPV with women having ever witnessed their father physically beat

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their mother and women's acceptance of IPV.<sup>3-6</sup> A study using the most recent Liberian Demographic and Health Survey conducted in 2019-2020 reported the lifetime IPV prevalence of 55.29% aged 15-49 years in Liberia.<sup>3</sup> However, national estimates tend to mask the subnational disparities.

Bivariate mapping entails depiction of association between two attributes on the same map. Such mapping for IPV and its associated attributes have been previously reported<sup>5</sup>. In this study the extant association of IPV, having witnessed parental IPV, and acceptance of IPV by women is reported using the 2-19-20 Liberian Demographic and Health Survey data. These associations are depicted using two and three classes of each attribute i.e. IPV, parental IPV, and IPV acceptance to more clearly bring out the nuanced associations at the county level in Liberia.

### Methods and Results

Approval for this study was obtained from the DHS programme through their website;<sup>7</sup> the Demographic and Health Survey of Liberia 2019-20 (LDHS2019-20) data was downloaded in the Stata format. Considering the complex sampling design, proportions (expressed as percentages) were calculated for the IPV, attitudinal acceptance of IPV, and parental IPV, using survey procedures in Stata 17; while bivariate maps were created using R version 4.1.3.

The intimate partner violence (IPV) questionnaire was completed by 2,331 women aged 15-49 years, for the LDHS 2019-20. IPV questions asked about emotional, physical, and/or sexual violence committed by either current husband or the most recent husband for widowed/separated women. The dichotomous coding scheme used for the IPV, acceptance of IPV, and having ever witnessed father physically beat mother, has been described previously.<sup>3</sup> Briefly, IPV was coded as yes, if the respondent reported any subtype of either emotional, physical or sexual violence; similarly, attitudinal acceptance of IPV was coded as yes if affirmative reply was given to any of the scenario described that was deemed justifiable by the respondent for the husband to be physically violent towards his wife; having witnessed

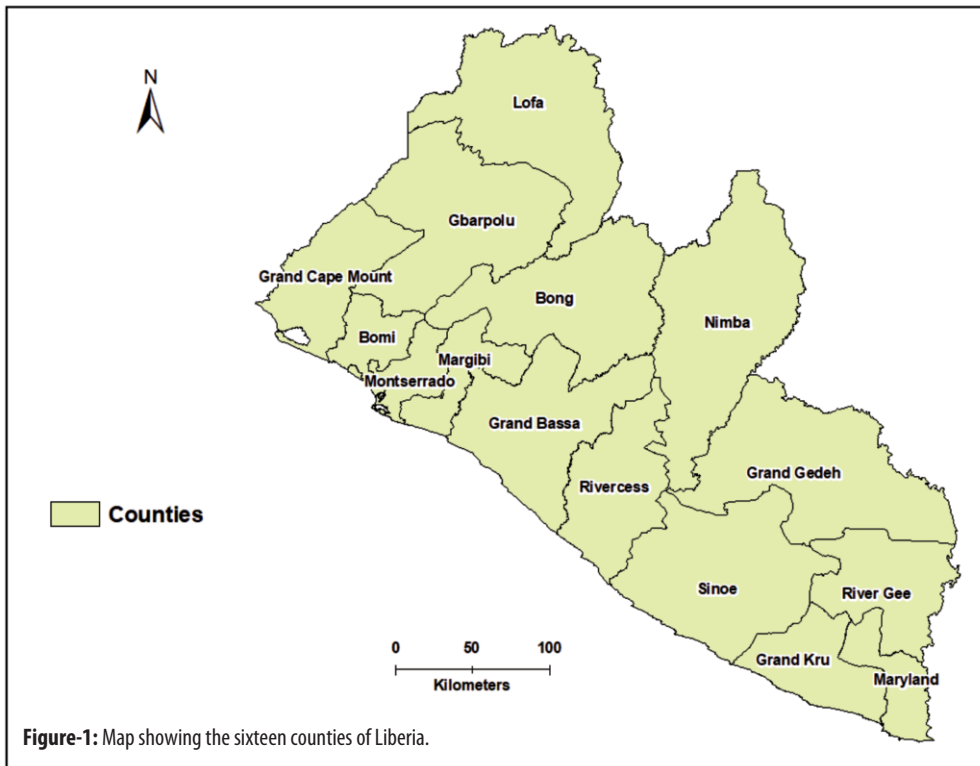


Figure-1: Map showing the sixteen counties of Liberia.

one's father physically beat mother was coded as yes, while the 'don't know' answer was coded as not having witnessed parental IPV.

Map 1 shows all the 15 counties of Liberia, while map 2 depicts the prevalence of IPV, IPV acceptance, and having ever witnessed ones' father physically beat one's mother, by county. The quantile classification method was used for mapping the percentages of each attribute by counties in the ArcGIS 10.8. The prevalence of IPV ranged from 36.16% in Rivercess county to 72.39% in Sinoe county; prevalence of having ever witnessed ones' father physically beat one's mother was lowest in Lofa (9.68%) and highest in Grand Kru (52.28); while the acceptance of IPV among respondents was lowest in Bomi (22.73%), and highest in River Gee (61.23%).

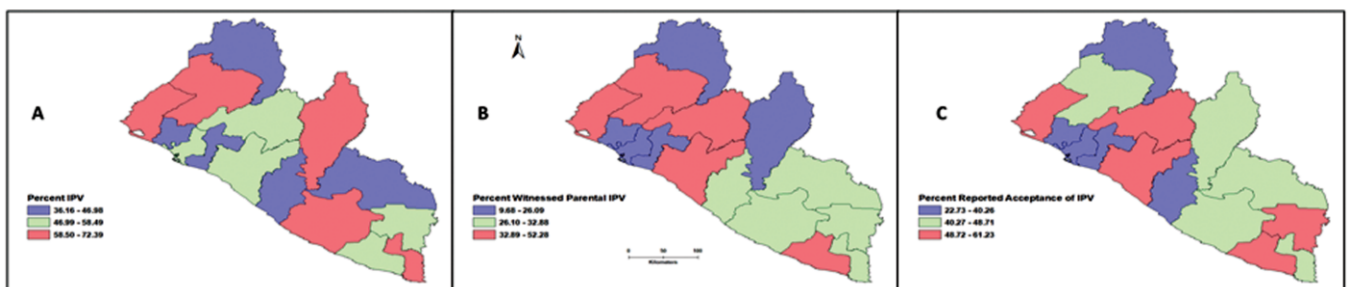
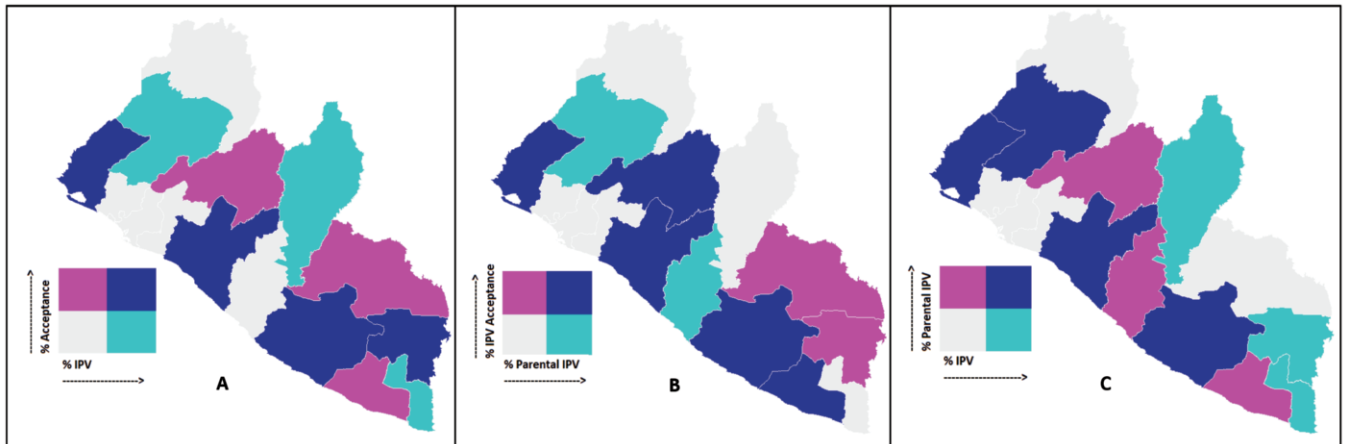


Figure-2: Maps showing prevalence of women reporting having ever experienced any form of intimate partner violence (IPV), acceptance of IPV, and parental IPV, by county in Liberia using 2019-20 Demographic and Health Survey data.

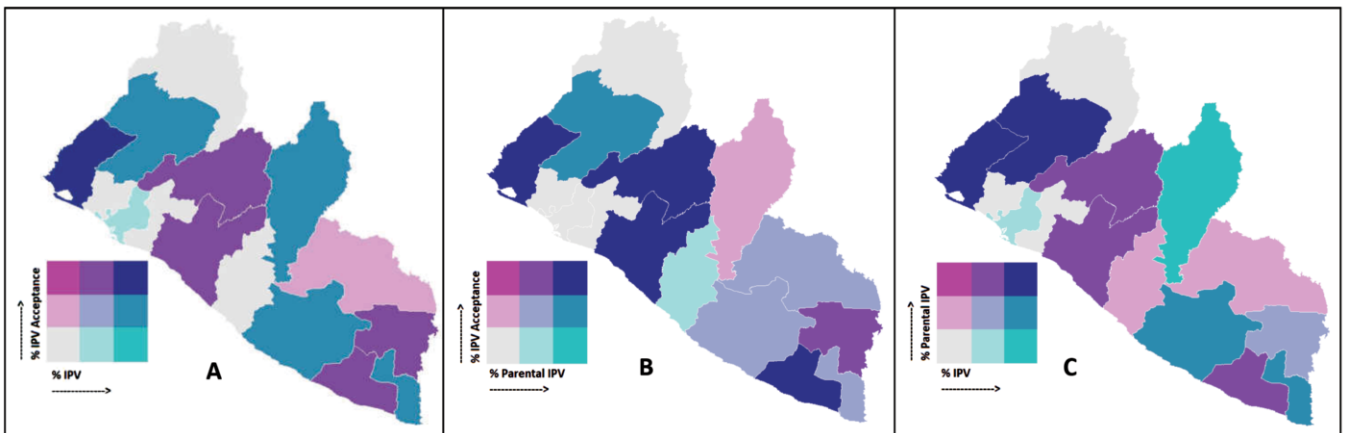
Figure-2 shows the maps, by counties of the prevalence of IPV, having ever witnessed ones' father physically beat one's mother, and the acceptance of IPV by respondents; the three classes shown in the legends were created using the quantile method. For bivariate mapping, the quantile classification method was used for mapping the percentages of IPV and the two correlates using the 'biscalle' package of R 4.1.3.

Figure-3 shows the bivariate maps by counties, using two classes for each variable based on quantile method; with the legend showing four possible classes; depicting the associations between IPV acceptance and IPV prevalence, IPV acceptance and having ever witnessed ones' father physically beat one's mother (parental IPV), and having ever witnessed ones' father physically one's mother (parental IPV) and IPV prevalence. The two classes ranged from: 36.16 to 57.29 and 57.30 to 72.39 for IPV; for parental IPV from 9.68 to 30.94 and 30.95 to 52.28; for IPV acceptance from 22.73 to 43.86 and 43.87 to 61.23.

Figure-4 shows the bivariate maps by counties, using three classes for each variable based on quantile method; with the legend showing nine possible classes; depicting the associations between IPV acceptance and IPV prevalence, IPV acceptance and having ever witnessed ones' father physically beat one's mother (parental IPV), and having ever witnessed ones' father physically beat one's mother (parental IPV) and IPV prevalence. The three



**Figure-3:** Maps showing bivariate associations by county, between proportion of women reporting having ever experienced any form of intimate partner violence (IPV), acceptance of IPV, and parental IPV in Liberia using two classes.



**Figure-4:** Maps showing bivariate associations by county, between proportion of women reporting having ever experienced any form of intimate partner violence (IPV), acceptance of IPV, and parental IPV in Liberia using three classes.

classes ranged from: 36.16 to 46.98, 46.99 to 58.49, and 58.50 to 72.39 for IPV; for parental IPV from 9.68 to 26.09, 26.10 to 32.88, and 32.89 to 52.28; for IPV acceptance from 22.73 to 40.26, 40.27 to 48.71, and 48.72 to 61.23. Higher prevalence of IPV at the county level were associated with the higher prevalence of parental IPV and acceptance of IPV. In the similar vein, higher prevalence of IPV acceptance was associated with higher prevalence of parental IPV.

**Discussion**

This is the first study showing bivariate associations at the county level in Liberia using bivariate maps, for Intimate partner violence (IPV), having witnessed parental IPV, in terms of father physically beating mother, and acceptance of IPV in women aged 15 to 49 years, using county level representative data from the most recent Demographic and Health survey. Wide county level variations were found for all three attributes studied.

Albeit the lifetime national level IPV prevalence was reported as 55.29%;<sup>3</sup> wide variations were found at the county level as shown in Figure-2. The IPV prevalence ranged from 36.16% to 72.39%; having witnessed IPV at home ranged from 9.68% to 52.28%; and acceptance of IPV ranged from 22.73% to 61.23%.

Strong county level associations are depicted in Figures-3 and 4, using two and three classes of each attribute; reflecting the statistically significant associations between IPV and IPV acceptance, and IPV and having witnessed parental IPV in Liberia.<sup>3</sup> Figure-3-A shows that four counties with high IPV prevalence also had high IPV acceptance percentages as well, while five counties had low percentages of both. Similarly, Figure 3-C shows that 4 counties had high percentages of IPV and having witnessed father beat mother, while five counties had low percentages for both. Map 3-B shows that in five counties, high levels of IPV acceptance percentages and high percentages of having witnessed parental IPV; similarly,

five counties had low percentages of both. In counties where high and low percentages were not associated with similar high and low percentages of the other attribute, varying levels of associations were observed.

Figure-4 shows more nuanced associations between the three attributes reflected in the use of three classes and in total nine different classes. However, the strong associations between the three attributes are clearly discernible. Cumulatively, the six maps shown in Figures-3 and 4 clearly indicate that the national level estimates mask the wide variations at the county level. Hence, computation of metrics needs to be done at the lowest possible representative geographic administrative levels available for crafting effective health policy response that is locally relevant with focused interventions to emend it.

### Conclusion

Intimate partner violence and its two correlates exhibited wide variations at the county level, that were obscured by the national indices. Using bivariate maps bring out the nuanced prevalence and associations more clearly for focused health interventions to address the public health plague of intimate partner violence more effectively.

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**Conflict of Interest:** None.

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