Congo Research Papers
Volume 6, numéro 1. (2025).
https://doi.org/10.59937/LOZM7291
ISSN : 2957-465X
e-ISSN : 2957-4668

RESEARCH OPEN ACCESS

Modelling women's education and intimate partner violence — Methodological challenges and pitfalls: Evidence from Demographic and Health Surveys in Central Africa

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Date de réception : 24.05.2025 | Date d'acceptation : 15.06.2025 | Date de publication : 31.08.2025

Keywords

Intimate partner violence, Physical violence, Emotional violence, Sexual violence, Women's education.

Abstract

Intimate partner violence (IPV) is now recognized as a serious threat against girls and women, and it has health and socioeconomic consequences for women and the whole nations. As such, it has received increasing attention during the last three decades and the international political and research agenda. Scholars devoted much time to determine the correlates of intimate partner violence to devise more effective interventions, especially in sub-Saharan Africa recording higher prevalence of IPV. Despite these efforts, findings are still inconclusive partly due to lack of a unified approach in operationalizing IPV and modelling strategies. Using 2013-14 Demographic and Health Survey in the Democratic Republic of the Congo, this paper estimated the net effects of women's education using different modelling strategies (linear regression, logistic regression, Poisson model and its variants, multivariate—linear/probit regression). Findings indicated that there is no clear evidence of the associations between women's education even though some estimates reached statistical evidence (e.g., women's education and emotional violence). Yet, previous studies found that higher education was protective against IPV. Indeed, as women's education increased, the risks of emotional violence decreased. This was not evident for physical violence and sexual violence even though the estimates went in the expected direction. Scholars should weigh between various estimation techniques to provide robust findings which could be very helpful to devise more effective IPV—interventions in sub-Saharan Africa and worldwide.

Mots-clés

Violence entre partenaires intimes, Violence physique, Violence émotionnelle, Violence sexuelle, Education des femmes

Résumé

La violence conjugale est désormais reconnue comme une menace grave pour les filles et les femmes, et elle a des conséquences sanitaires et socio-économiques pour les femmes et les nations tout entières. À ce titre, elle a fait l'objet d'une attention croissante au cours des trois dernières décennies et dans l'agenda politique et de recherche international. Les chercheurs ont consacré beaucoup de temps à déterminer les corrélats de la violence conjugale afin de concevoir des interventions plus efficaces, en particulier en Afrique subsaharienne, où la prévalence de la violence conjugale est plus élevée. Malgré ces efforts, les résultats ne sont toujours pas concluants, en partie à cause de l'absence d'une approche unifiée pour opérationnaliser la violence conjugale et modéliser les stratégies. À partir de l'enquête démographique et sanitaire 2013-2014 en République démocratique du Congo, cet article a estimé les effets nets de

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l'éducation des femmes à l'aide de différentes stratégies de modélisation (régression linéaire, régression logistique, modèle de Poisson et ses variantes, régression multivariée linéaire/probit). Les résultats indiquent qu'il n'existe aucune preuve claire d'un lien entre l'éducation des femmes et la violence conjugale, même si certaines estimations ont atteint un niveau statistique significatif (par exemple, l'éducation des femmes et la violence émotionnelle). Pourtant, des études antérieures ont montré qu'un niveau d'éducation plus élevé protégeait contre la violence conjugale. En effet, à mesure que le niveau d'éducation des femmes augmentait, les risques de violence émotionnelle diminuaient. Cela n'était pas évident pour la violence physique et la violence sexuelle, même si les estimations allaient dans le sens attendu. Les chercheurs devraient évaluer différentes techniques d'estimation afin de fournir des résultats solides qui pourraient être très utiles pour concevoir des interventions plus efficaces contre la violence entre partenaires intimes en Afrique subsaharienne et dans le monde entier.

INTRODUCTION

Intimate partner violence encompasses harmful behaviours such as physical violence, psychological/emotional abuse, sexual coercion, and controlling behaviours committed in an intimate relationship (World Health Organization, 2021). The last three decades have cumulated substantial evidence showing that intimate partner violence (IPV) is a violation of human rights for girls and women worldwide (García-Moreno and Amin, 2016; World Health Organization, 2013). Empirical studies found that approximately one in three women had suffered from IPV in their lifetime (World Health Organization, 2013). Sub-Saharan Africa (SSA) recorded the highest prevalence of IPV (McCloskey et al., 2016).

Previous research has devoted much time to determine sociodemographic and cultural factors associated with IPV at both micro and macro levels in developing and developed countries (Ahinkorah, 2021a, 2021b; Ahinkorah, Dickson, and Seidu., 2018; Bolarinwa et al., 2022; Cho, Crenshaw and Mccall., 2013; McCloskey et al., 2016; Miller and McCaw., 2019; Seidu et al., 2021). These include socio-cultural norms justifying wife beating, or promoting male dominance over women's conduct, and limited access to wealth (Heise and Kotsadam, 2015). Other factors include unemployment, primary infertility, polygamous unions (Aduloju et al., 2015), lower educational attainment, high parity (Bolarinwa et al., 2022), rural residence (Gao et al., 2021), abuse during childhood, childhood exposure to IPV, social isolation (Capaldi et al., 2012), alcohol problems, and drug use (Stuart et al., 2008). Additionally, evidence suggests that IPV increases women's risk for HIV infections (Durevall and Lindskog, 2015; Kouyoumdjian et al., 2013; Kuchukhidze et al., 2023; Li et al., 2014; Siemieniuk, Krentz, and Gill, 2013), sexual transmitted infections (Hess et al., 2012; McClintock and Dulak, 2021; Patrikar et al., 2017), injuries (Kwako et al., 2011; Sabri et al., 2014; St. Ivany and Schminkey, 2016), depression (Herbert et al., 2022), induced abortion (Alio et al., 2011; Silverman et al., 2007; Stöckl et al., 2012), premature birth and low birth weight (Berhanie et al., 2019; Hill et al., 2016; Sanchez et al., 2013; Sigalla et al., 2017), alcohol use (Klostermann and Fals-Stewart, 2006; Steele et al., 2022; Weinsheimer et al., 2005), and homicide-related deaths (Cullen et al., 2021; Graham et al., 2022; Stöckl et al., 2013).

Intimate partner violence: A composite concept

Nowadays, IPV has become a very popular concept among academics, health practitioners and policymakers. Back in 1970, the feminist movement increased the awareness of violence against girls and women (Nicolaidis and Paranjape, n.d.). Since this period, terms such as "wife battering", "spouse abuse", and "coerced sex" were adopted in international agendas to label an issue which was previously ignored by the scientific community, policymakers, criminal justice system, and public health experts. Evidence also highlighted that violence against women was not limited to married couples (Nicolaidis and Paranjape, n.d.); therefore these terms were replaced by "domestic violence", a more generic term widely used now in lay public and advocacy communities. Two decades later, the Centers for Disease Control (CDC) proposed the term "intimate partner violence" to differentiate from all other forms of violence which can occur in family settings. In the Demographic and Health Surveys, a specific module entitled "domestic violence module (DVM)" was administrated to a sub-sample of women of reproductive ages. This module (Table 1 below) included seven items on physical violence, three items on emotional violence and three items on sexual violence. Measurement and limitations of intimate partner violence is discussed in the Methods Section.

The present study

Previous studies used different approaches to define and operationalize intimate partner violence using Demographic and Health Surveys. As such, evidence and conclusions resulting from those studies are contingent to outcome measurement. The most common approach to measure IPV consists of collapsing the thirteen items (13) into a single outcome combining the three components and thereafter define a binary variable which indicated whether a married/cohabiting woman experienced IPV in the last 12 months. These studies provided insights on prevalence of, and factors associated with IPV. The pitfalls of this approach are that the roots of the three components (physical, emotional, and sexual violence) of IPV might be different and therefore this approach masks differences which might be of paramount importance from a policy and programmatic perspective.

There are some exceptions (Tlapek, 2015), modelling the components of IPV separately. However, they are later trapped into the same paths, using logistic regression to determine factors associated with IPV. This study fills this gap in digging the associations between women's education and IPV, using different statistical techniques, while controlling for putative factors. First, the "naïve" approach is used putting all items in the same basket and determine the strength of the relationship between women's education and IPV at national and sub-national levels in Central Africa. Second, a Poisson modelling (Izugbara et al., 2020) is used to account for the fact that the exposure to IPV might vary among women, and across provinces/regions. Third, to account for potential correlations between the three forms of IPV, a multivariate modelling between women's education and IPV is used relaxing (e.g., modelling as it is observed in the datasets) the distribution of IPV components.

METHODS

Data sources

This study utilizes data from the Demographic and Health Surveys (DHSs) conducted in the Democratic Republic of the Congo. The DHSs employs a nationally representative two-stage sampling design, selecting clusters systematically with probability proportional to size, followed by random household selection within clusters. The analysis focuses on married and cohabiting women eligible for the domestic violence module.

Variables measurement

The primary outcome is intimate partner violence (IPV), encompassing physical, emotional, and sexual violence (Ahinkorah, 2021b; Tenkorang, 2019), measured over the past 12 months using the DHS domestic violence module based on a modified conflict tactics scale. Responses were dichotomized to indicate the presence or absence of violence. Questions for each sub-component and responses are summarized in Table 1 below.

Table 1. Questions and responses about intimate partner violence

Components of IPV and questions	Responses	Operational definition
Physical violence (7 items)		
Husband ever pushed, shook, or threw something at you Husband slapped you Husband punched you with his fist or something harmful at you Husband kicked or dragged you Husband strangled or burnt you on purpose Husband threatened you with a knife, gun, or other weapons Husband twisted your arm or pulled your hair	Responses included 0 "Never"; 1 "Often"; 2 "Sometimes"; and 3 "Yes, but not in the last 12 months"	The item was recorded 0 "NO" if wife reported "Never" or "Yes, but not in the last 12 months" and 1 if wife reported "Often" or "Sometimes". The new variable ranged from 0 to 7
Emotional violence (3 items)		
Husband humiliated you in front of others? Husband threatened to harm you Husband insulted you or made you feel bad	Responses included 0 "Never"; 1 "Often"; 2 "Sometimes"; and 3 "Yes, but not in the last 12 months"	The item was recorded 0 "NO" if wife reported "Never" or "Yes, but not in the last 12 months" and 1 if wife reported "Often" or "Sometimes". The new variable ranged from 0 to 3
Sexual violence (3 items)		
Husband ever physically forced you into unwanted sex Husband ever forced you into other unwanted sexual acts Respondent has been physically forced you to perform sexual acts you didn't want to	Responses included 0 "Never"; 1 "Often"; 2 "Sometimes"; and 3 "Yes, but not in the last 12 months"	The item was recorded 0 "NO" if wife reported "Never" or "Yes, but not in the last 12 months" and 1 if wife reported "Often" or "Sometimes". The new variable ranged from 0 to 3

Key independent variables

The key independent variable is women's education, measured in completed years to capture within-group variation (Ackerson et al., 2008; Nabaggala, Reddy, and Manda., 2021; Okeke-Ihejirika et al., 2020; Oluwagbemiga, Johnson, and Olaniyi., 2023).

Control variables

Control variables include household wealth index (poor, middle, rich) (Deyessa et al., 2010; Bellows et al., 2020; Rustein and Staveteig, 2014), media exposure, polygyny, urban residence, and attitudes justifying wife beating. Wealth was recoded into Poor (bottom 40%, coded 1), Middle (20%, coded 2), and Rich (top 40%, coded 3). Media exposure combined frequency of TV, radio, and newspaper use, dichotomized into none (0) or some exposure (1). Polygyny, correlated with IPV (Ahinkorah, 2021b; Anjorin et al., 2020; Smith-Greenaway and Trinitapoli, 2014), was coded 1 if the husband had other wives, 0 otherwise. Urban residence, linked to higher education and lower IPV (Owoo et al., 2021; Izugbara et al., 2020; Nabaggala et al., 2021), was coded 1 for urban, 0 for rural. Attitudes justifying wife beating, associated with IPV (Amo-Adjei and Tuoyire, 2016; Copp et al., 2019; Ferrer-Perez et al., 2020; Tran et al., 2016; Wang, 2016), were coded 1 if women agreed with any of five reasons, 0 if none.

Analytical strategy

Descriptive analyses. Most studies on IPV analysed data on domestic violence either at national level or pooped data to increase statistical power. This paper focuses on different modelling strategies contingent upon the levels of measurement of the outcome "intimate partner violence". As mentioned above, IPV is a composite concept, and most studies dichotomized the scores on physical, emotional, and sexual violence to measure IPV. Although there is justifiable rationale behind this approach, opponents to this approach might oppose the following reasons. First, basic statistics point out loss of granularity in doing so. For instance, a married/cohabiting woman scoring 1 will be in the same category than the one who scored 10 and above. This approach fails to capture the potential influences/associations related to the distribution of the "original" IPV. Second, previous studies do not compare the associations between IPV and putative covariates to ensure that the conclusions are robust using different modelling strategies. This paper fills this gap.

Modelling strategies

Logistic regression. Most IPV-related studies used logistic regression, Equation [1] below, to find putative factors associated with IPV at national level or using pooling data to increase statistical power.

$$logit\left[\frac{p_i}{1-p_i}\right] = \beta_0 + \beta_1 X_1 + \sum_{i=1}^{n} \beta_n X_n \quad (1)$$

In Equation (1), X_1 is women's education and X_n is a vector of control variables; p_i is the probability that a married/cohabiting woman has experienced IPV in the last 12 months.

Poisson regression. This approach was criticized in previous studies which used the modified Poisson model to account for the dispersion of IPV instead, rather than throwing all women in the same basket irrespective of the number of IPV items reported in the DV module (Famoye and Singh., 2022; Izugbara et al., 2020; Tessema et al., 2023). In this case, one might be interested in quantifying exposure to IPV by counting the number of items a woman of reproductive faced in the last 12 months. In this case, the number of IPV items (Y) can be modeled with the **Poisson distribution**, where (Equation [2.1]):

$$\boldsymbol{P(Y = y) = \frac{e^{-\lambda}\lambda^{y}}{y!}} \text{ for } y = 0, 1, \ldots, \infty \tag{2.1}$$

where λ is the mean or expected count of IPV items in the last 12 months among women of reproductive ages. This probability function has $E(y) = \lambda$ and the standard deviation of Y, $SD(Y) = \sqrt{\lambda}$. In practice, Poisson distribution is modelled in taking $\log(\lambda_i)$ instead of λ_i as a function of women's education and control variables, which varies from $-\infty$ to $+\infty$. Thus, the Poisson regression model as follows (Equation [2.2]):

$$\boldsymbol{\log(\lambda_i) = \beta_0 + \beta_1 X_1 + \sum_{i=1}^{n} \beta_n X_n} \tag{2.1}$$

where the observed values of $Y_i \sim$ Poisson with $\lambda = \lambda_i$ for completed years of women's education (X_1) and X_n, a vector of control variables. In this paper, Poisson regression and its variants (negative binomial regression, zeroinflated Poisson, and zeroinflated negative binomial regression) are implemented.

Multivariate linear (probit) regression or (in)dependence of IPV components. Previous studies also revealed that physical violence is more prevalent than emotional and sexual violence (Ahinkorah, 2021b). Although there have attempts to determine correlates of IPV components in SSA (Bonnes, 2016), to the best of our knowledge, there is no research which seemingly modelled IPV components to detect the differential effects of correlates on IPV components. This study attempts to fill this gap by seemingly modelling women's education on IPV components using linear and probit regressions. Therefore, suppose there are three equations, since there are three IPV components (y_r) modelled as follows:

$$\boldsymbol{y_{ir} = x_{ir}^{T}\beta_i + \varepsilon_{ir}} \text{ for } i = 1, 2, 3 \tag{3.1}$$

In the Equation (3.1), $r = 1, 2, \ldots, R$ represents the individual observation (in this case, it is the number of married/cohabiting women (woman interviewed in the DVM for each country); and taking the transpose of the column vector x_{ir}. The number of observations should be large enough whereas the number of equations m remains fixed (three equations in this case). In practice, each IPV

component is modelled using either linear or probit regression, with women's education as the key independent variable while controlling for other variables as mentioned above, as follows:

$$\boldsymbol{y_i} = \boldsymbol{X_i\beta_i} + \boldsymbol{\varepsilon_i} \text{ for } i = 1, 2, 3 \quad (3.2)$$

where y_i and ε_i are $R \times 1$ vectors, X_i is a $R \times k_i$ matrix, and β_i is a $k_i \times 1$ vector. Stacking the three equations, the system takes the following form:

$$\begin{pmatrix} \boldsymbol{y_1} \\ \boldsymbol{y_2} \\ \boldsymbol{y_3} \end{pmatrix} = \begin{pmatrix} \boldsymbol{X_1} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{X_2} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{X_3} \end{pmatrix} \begin{pmatrix} \boldsymbol{\beta_1} \\ \boldsymbol{\beta_2} \\ \boldsymbol{\beta_3} \end{pmatrix} + \begin{pmatrix} \boldsymbol{\varepsilon_1} \\ \boldsymbol{\varepsilon_2} \\ \boldsymbol{\varepsilon_3} \end{pmatrix} = \boldsymbol{X\beta} + \boldsymbol{\varepsilon} \quad (3.3)$$

The error term ε_{ir} is assumed to be independent across observations but it has cross-equation correlations within observations. Therefore, it is assumed that $\boldsymbol{E[\varepsilon_{ir}\, \varepsilon_{is} \mid X] = 0}$ for $r \neq s$, whereas $\boldsymbol{E[\varepsilon_{ir}\, \varepsilon_{jr} \mid X] = \sigma_{ij}}$. Denoting $\boldsymbol{\Sigma = \sigma_{ij}}$ the $m\ x\ m$ skedasticity matrix for each observation, the covariance matrix for the stacked error terms ε is equal to $\boldsymbol{\Omega = E[\varepsilon\varepsilon^T \mid X] = \Sigma \otimes I_R}$, where I_R is the R-dimensional identity matrix and $\otimes$ is the matrix Kronecker product.

Finally, standard linear regression models are also implemented for IPV, and its components. Statistical analyses were performed using STATA version 18 *SE*.

FINDINGS AND DISCUSSION

Findings

Descriptive results

The final sample in this paper consisted of 5,023 married/cohabiting women of reproductive ages in the Democratic Republic of the Congo. This section presents the distribution of IPV and its components separately measured by the number of IPV items, and the correlations between them to provide insights regarding IPV's granularity and the loss when IPV is dichotomized. Figure 1 presents the distribution of physical violence, emotional violence, sexual violence, and intimate partner violence.

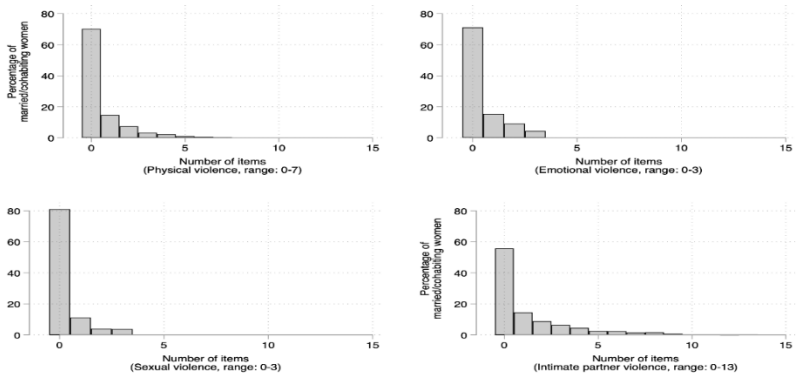

Figure 1. Percentage distribution of physical violence, emotional violence, sexual violence, and intimate partner violence among married/cohabiting women in the Democratic Republic of the Congo.

Figure 1 clearly shows excessive zeroes in IPV distribution and its components. For instance, 69.4% of surveyed married/cohabiting women didn't experience any physical violence. Likewise, 70.9% and 80.3% of those married/cohabiting women didn't experience emotional violence and sexual violence in the last 12 months, respectively. Finally, 55.4% of married/cohabiting women didn't experience any form of IPV. The remainder, 44.6% experienced some form of IPV. Further analyses revealed that, among married/cohabiting women who experienced some form of IPV, 32.9% experienced 1-4 items of IPV. Only a marginal percentage of women (11.7%) experienced 5 items or more.

Table 2 below presents the correlation matrix between IPV and its components (physical violence, emotional violence, and sexual violence).

Table 2. Correlations between intimate partner violence (IPV) and its components

		Variables			
Variables		PV	EV	SV	IPV
Physical violence	PV	1.000			
Emotional violence	EV	0.627*	1.000		
Sexual violence	SV	0.410*	0.345*	1.000	
Intimate partner violence	IPV	0.897*	0.817*	0.675*	1.000

Note: Statistically significant at $p < 1\%$.

Findings showed that IPV was significantly correlated with its components as expected. However, the strength of the correlations varied from 0.987 to 0.675 for physical violence and sexual violence, respectively. Furthermore, sexual violence was moderately correlated with physical violence and emotional violence. Finally, physical violence and emotional violence are correlated ($r_{xy} = 0.27$).

Multivariate results

The first set of analyses consisted of count models and standard linear regression (Figure 2). In doing so, the analyses consider the full distribution of IPV and its components. Figure 2 was only interested on the associations between women's level of education (measured in completed years) and IPV and its components, under different modelling strategies.

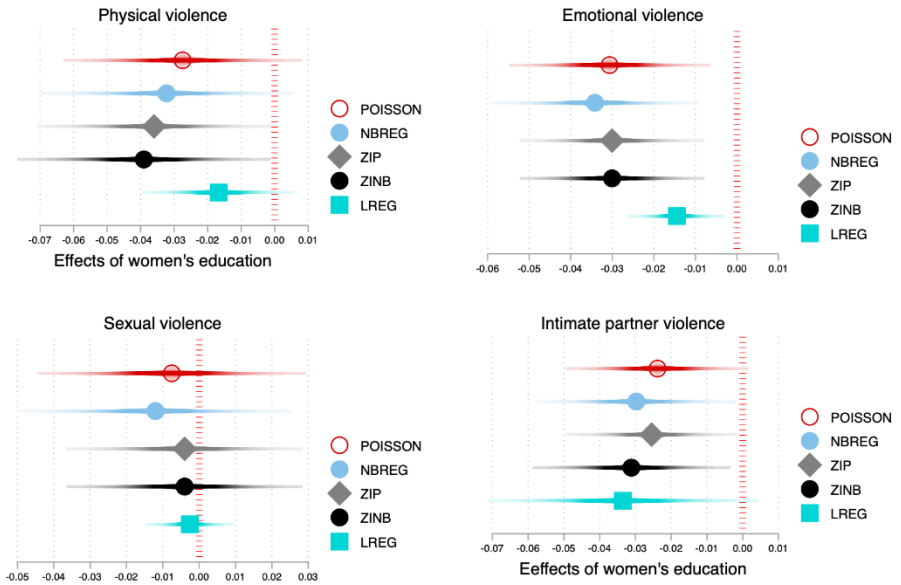

Figure 2. Linear regression—LREG and count models (Poisson; negative binomial regression—NBREG; zeroinflated Poisson—ZIP; zeroinflated negative binomial regression—ZINB) of physical violence, emotional violence, sexual violence, and intimate partner violence among married/cohabiting women in the Democratic Republic of the Congo.

Findings indicated that the associations between women's education and IPV and its components are contingent upon the modelling strategies. For instance, linear regression model overestimated the association between women's education and physical violence. In contrast, ZINB underestimated the association between women's education and physical violence. The association between women's education and physical violence reached statistical significance only in ZINB model.

Concerning emotional violence, findings indicated that all estimates of the association between women's education and emotional violence reached statistical significance. While LREG model overestimated the association between women's education and emotional violence, NBREG model underestimated this association.

As for sexual violence, findings indicated that all estimates between women's education and sexual violence didn't reach statistical violence. Similar pattern was observed like emotional violence. Indeed, LREG model overestimated the association between women's education and sexual violence, NBREG model produced underestimated effect.

Turning now to intimate partner violence (IPV) which the composite concept used in most IPV-related studies, findings showed that estimates from Poisson and LREG models did not reach statistical significance, and this latter produced underestimated association between women's education and IPV, while the former overestimated this association.

The *second set of analyses* assumed that IPV components are correlated; however, factors inducing physical violence might differ from those influencing emotional and sexual violence. To achieve this goal, IPV components are seemingly regressed on women's education while controlling for relevant factors using, specifically, trivariate linear/probit regression (Figure 3).

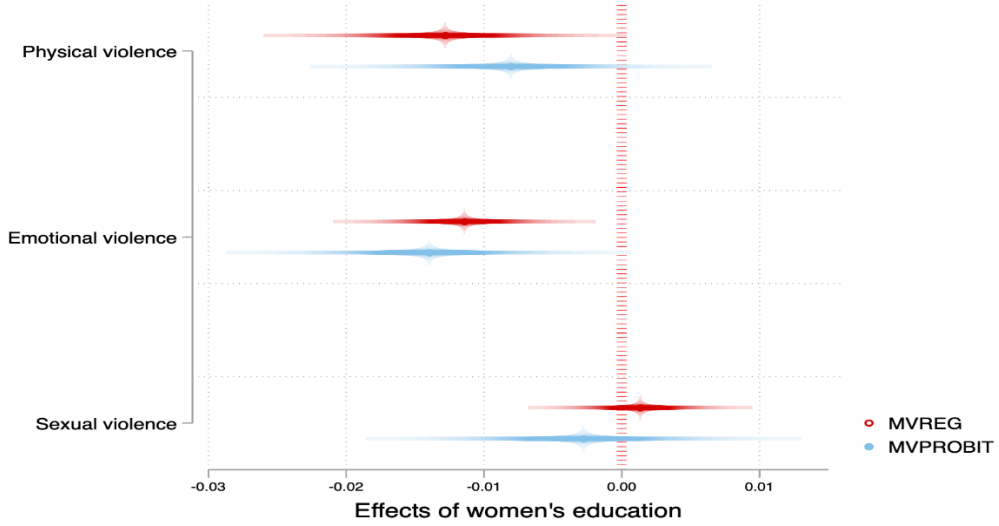

Figure 3. Multivariate linear regressions—MVREG and multivariate probit regressions—MVPROBIT of physical violence, emotional violence, sexual violence, and intimate partner violence among married/cohabiting women in the Democratic Republic of the Congo.

Findings from Figure 3 showed that the associations between women's education and IPV—components do vary depending on IPV—component of interest. Indeed, the estimates didn't reach statistical significance between women's education and physical violence and sexual violence. In contrast, estimates for emotional violence reached statistical significance even though MVREG underestimated the associations between women's education and emotional violence. From Figure 3, findings also indicated that all estimates are negative, meaning that the risks of IPV decreased as education increased. However, the estimate is positive for sexual violence from MVREG, even though it didn't reach statistical significance.

The *third set of analyses* aimed at estimating the associations between women's education and IPV and its components from the most popular approach which consists of dichotomizing the IPV and using logistic regression as modelling strategy. The paper extended this approach to IPV components (Figure 4).

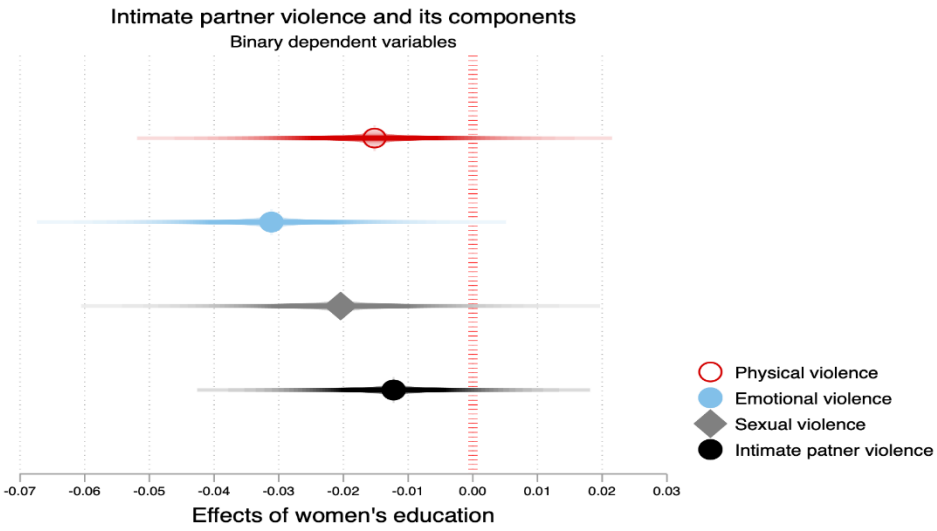

Figure 4. Estimated coefficients from Logistic regression of physical violence, emotional violence, sexual violence, and intimate partner violence among married/cohabiting women in the Democratic Republic of the Congo.

Findings from Figure 4 indicated that the association between women's education and IPV, and its components were negative; however, the estimates did not reach statistical significance. This means that as women's education increased, the risks of IPV (or any form of IPV) decreased as well, denoting a protective effect of women's education against violence against girls and women.

Discussion

This paper aimed at estimating the effects of women's education and domestic violence in the Democratic Republic of the Congo using a sub-sample of married/cohabiting women from 2013—14 Demographic and Health Survey. Specifically, the paper built from popular modelling strategies in previous studies in which the intimate partner violence (IPV) is often dichotomized taking the value "1" if a woman experienced at least one item of domestic violence, and "0" otherwise. First, it is well known from basic statistics that such approach yields to loss of granularity which might influence the conclusions from previous studies. In doing so, this paper suggested robustness checks by using different modelling strategies. To the best of our knowledge, this is the first paper engaging in this perspective to robustly test the effects of correlates on IPV using different modelling strategies. Exceptions used a modified Poisson regression (Izugbara et al. 2020); however, they didn't test alternative approaches and therefore fall under same criticisms. Using different modelling strategies, the paper found different statistical significance between women's education and IPV. Women's education has been presented as protective factor against IPV (Ackerson et al. 2008; Nabaggala et al. 2021; Oluwagbemiga et al. 2023; Weitzman 2018) even though these conclusions are debatable. For instance, while higher education was association with lower risks of IPV in Nigeria (Oluwagbemiga et al. 2023), another study in Nigeria using same dataset (2018 Nigeria DHS) reported that women with secondary education had higher odds of experienced any form of IPV compared with uneducated

women (Ngao Loembe 2020). Furthermore, this paper tested the associations between women's education and IPV components (physical violence, emotional violence, and sexual violence). Findings showed that women's education was significantly associated with emotional violence irrespective of the modelling strategy utilized. However, this relationship was only statistically significant with physical violence while it was not associated with sexual violence. These findings also indicate that different processes likely drive IPV components. Similar findings were reported in Nigeria (Oluwagbemiga et al. 2023).

Second, studies which examined IPV components are clear: physical violence is more prevalent, followed by emotional violence and sexual violence (Schnittker 2022). This brings to another point to further engage in different modelling strategies. Why is physical violence more prevalent than other forms of IPV, namely, emotional violence and sexual violence. On one hand, these latter two forms can be more devastating than physical violence (Dye 2019). Therefore, it is important to dig the seemingly effects of correlates on IPV components. This was achieved using multivariate (linear and probit) regressions. Findings indicated that women's education has significant and negative association with emotional violence, marginal negative association with physical violence, and non-significant negative association with sexual violence. The linkages between women's education and IPV components are certainly more complex than highlighted in these modelling strategies; however, findings provide insights on possible differences in the processes yielding to physical, emotional, and sexual violence. Previous studies pointed out towards control, power, domination, and humiliation as underlying processes to better understand incidents of sexual violence (Anderson et al. 2008).

CONCLUSION

Social events including intimate partner violence are very complex and leading processes can be difficult to unpack. Ultimately, accumulated knowledge should lead to more effective IPV—related interventions. Therefore, findings generated using a single approach or modelling strategy can be misleading. This paper provided instances of variable estimates of the relationship between women's education and IPV (and its components) in terms of magnitude and statistical significance. Researchers are urged to use different modelling strategies to provide robust findings which can be useful to inform sound policies and strategic planning to better tackle intimate partner violence in sub-Saharan Africa and worldwide.

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Academic Editor : Congo Research Papers, RDC

Citation : Zacharie TSALA DIMBUENE (2025). Modelling women's education and intimate partner violence-Methodological challenges and pitfalls : Evidence from Demographic and Health Surveys in Central Africa. *Congo Research Papers*, Volume 6, issue 2. p.4-21.

Conflict of interest : The author has no conflict of interest to declare.