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# Bayesian Multilevel Modelling of Women's Decision-Making Capacity on Intimate Partner Violence in Tanzania

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## Abstract

### Introduction

Despite the focus on gender equality and women's empowerment in the Sustainable Development Goals (SDGs), Intimate Partner Violence (IPV) remains a significant issue in Tanzania, with 38% of women experiencing IPV. This poses a challenge to achieving SDG targets by 2030. The power imbalance in family decision-making is a major risk factor for IPV, yet the relationship between women's empowerment and IPV remains unclear. This study centres on addressing the question of how women's decision-making capacity influences IPV.

### Methods

Bayesian Multilevel mixed effects generalized linear models were used to analyse the influence of women's decision-making capacity on IPV using the Tanzania Demographic and Health Survey (TDHS) 2015/16.

### Results

Compared to women not involved in decision-making, those who participated in household purchases exhibited a 13% (95% CI: 0.767, 0.978) lower likelihood of experiencing physical IPV. Similarly, women who decided on social visits were 7 % (95% CI: 0.873, 0.985) less likely to experience physical IPV. Women who decided on their health had a 15% (95% CI: 0.734, 0.979) lower risk of experiencing sexual violence. Women decision-making capacity on health was associated with a 10% (95% CI: 0.843, 0.951) reduction in emotional IPV. Women who decided on household purchase had a 26% (95% CI: 0.669, 0.820) lower risk of experiencing emotion IPV and 44% (95% CI: 0.473, 0.672) decrease in sexual IPV. Regional variations in IPV prevalence were also observed, with significant differences in physical (4.5%, BPOR - 0.045), sexual (9.7%, BPOR - 0.097), and emotional IPV (13.3%, BPOR - 0.133) odds at the regional level.

### Conclusion

The findings suggest that improving awareness of women's decision-making capacity is crucial. This is especially important because effective interventions in this field appear to face inherent challenges.

**Keywords:** *Bayesian Multilevel model, Decision-making, Intimate Partner Violence, Tanzania, Women's decision-making capacity*

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## INTRODUCTION

Violence against women, particularly perpetrated by intimate partners, constitutes a pressing national and global concern. Intimate Partner Violence (IPV) encompasses a range of harmful behaviours within intimate relationships such as physical, psychological, and sexual abuse, and controlling conduct by one partner over the other (WHO, 2012). Globally, one in three women experienced physical and sexual IPV at some point in their lives, with 13% encountering this form of violence in 2020 (Devries et al., 2013; UN, 2021; WHO, 2021). Women in low and lower-middle-income countries are particularly vulnerable, with an estimated 22% experiencing IPV (WHO, 2021).

The World Health Organisation (WHO) reported that IPV prevalence rates vary across regions, notably high in the WHO Africa region and South-East Asia region at 33%, followed by the WHO Eastern Mediterranean region at 31%. In the other areas, IPV ranges from 20% in the Western Pacific and 22%in high-income countries and Europe to 25% in the WHO regions of the Americas (Devries et al., 2013; WHO, 2021). It is estimated that in Africa, 12% of sexual assaults and 46% of lifetime IPV victims are women (McCloskey et al., 2016) being notably high (36% prevalence in Sub-Saharan Africa and 38% in East Africa) compared to the global rate (Durevall & Lindskog, 2015; WHO, 2021). The Democratic Republic of Congo tops the list with 47 %, followed by Uganda at 45 % and South Sudan at 41 %. Burundi follows closely at 40 %, with Kenya, Tanzania, and Rwanda at 38 %, while Ethiopia is at 37 % (Asmamaw et al. 2023).

In Tanzania, nearly 38% of women aged 15-49 experience IPV at some point in their lives, which is higher than the global average (Tanzania Bureau of Statistics, 2016). Additionally, it has been noted that about 27%, 10%, and 28% of ever-married women have experienced physical, sexual, and emotional IPV respectively (MoHCDGEC et al., 2016). Regionally in Tanzania, the incidence of physical, sexual, or emotional violence inflicted by their current or most recent husband/intimate partner is least prevalent in Kaskazini Unguja and Kusini Pemba (9%), and most prevalent in Mara (66%) (MoHCDGEC, 2022).

Studies on the link between IPV to major health problems have highlighted such as poor health, diseases, emotional distress, and postnatal depression in pregnant women (Mueller & Tronick, 2019; WHO, 2022). Considering the highlighted effects of IPV, various interventions have been implemented to combat IPV, aligning with global initiatives such as the UN's goal of ending violence against women and the SDGs (UN, 2018). Target 5.2 under SDGs 5 focuses on IPV specifically through women empowerment and gender equality. Tanzania initiatives such as the Five-year National Plan on Actions to End Violence Against Women and Children (NPA-VAWC 2017/18 – 2021/22) and women empowerment programs, including "Together to End Violence Against Women" (TEVAW) and microfinance schemes, aim to address IPV (Said et.al, 2019; Halim et.al, 2019). Despite these interventions, the IPV rate in Tanzania is still high.

Existing research on IPV used classical regression models, such as logistic, Poisson, and linear regression which cannot be empowered to answer if there were geographical variations or not (Bahati et al., 2022; Kebede et al., 2022;). When spatial dependency exists, not accounting for it in data analysis can lead to inaccurate conclusions. To address this limitation, this study adopts a Multilevel Generalized Linear model, which incorporates regional dependence patterns and unmeasurable elements (Jhanpour et al., 2022). Moreover, the Bayesian approach was employed because of its flexibility, robustness, and ability to provide comprehensive estimates of uncertainty, particularly in the context of hierarchical data structures where traditional frequentist approaches may be limited. Using the Bayesian Multilevel analysis, this study aimed to elucidate the association between women's decision-making capacity and IPV among women aged 19-49 in Tanzania.

## LITERATURE REVIEW

The study adopts Heise's (1998) Ecological Framework to explore the link between IPV and women's decision-making capacity. This framework integrates various levels of social ecology—individual, situational, and sociocultural factors—to examine how different social systems influence IPV. It employs four interconnected circles representing personal history, microsystem, ecosystem, and macrosystem, illustrating societal influence on partner interactions. Life experiences and societal values can predispose individuals to violence. For instance, children exposed to IPV, and unsupported parental figures may perpetuate violence in their relationships as adults, a phenomenon known as intergenerational transmission (Friedemann-Sánchez & Lovatón, 2012). Other factors within this paradigm include immediate environmental influences such as male dominance, financial control by men, and alcohol and substance abuse. Conversely, collaborative decision-making

between partners contrasts with situations where men exert sole control over household matters, significantly contributing to IPV. Women are highly empowered if given the ability to make major home choices, which traditionally are within the control of men (Johnson, 2016). Women only have decisions on small expenditures such as food, kitchen-based utensils (Chandradasa et al., 2021; Mtae, 2021). However, one of the most visible impediments to women's empowerment is men's domineering behaviour toward their wives (Dutt et al., 2016)The traditional role of men as primary earners and providers is threatened by the woman's income, a shift that highlights broader power dynamics in relationships, especially where financial control plays a key role.

Recent research has shown that women are less likely to experience IPV when they decide on major household purchases on their own or with their partner (Bahati et al., 2022; Bengesai & Kebede et al., 2022). However, it has been further discovered a positive association between women's decisions about major purchases at the individual level and physical and/or emotional IPV (Ali, 2021; Anik et al., 2021) although, few studies found no statistical association between IPV and decisions on a large purchase (Forty, 2022).

Women's autonomy in making decisions about their health ensures that they are not subjected to coercion, IPV, or any other forms of intimidation (UNFPA, 2021). It comprises having the freedom to decide whether, when and with whom to have sex and when to get pregnant, as well as the freedom to visit a doctor whenever necessary. Women's status in society severely restricts their ability to make decisions about their own lives in developing countries (Masawe et al., 2020). Women who reported making decisions about healthcare either alone or with their partners/husbands were more likely to have experienced physical and/or sexual IPV in the past year (Ranganathan et al., 2019). Studies done in developing countries found that when women made decisions on their own health, the possibility of experiencing IPV (Bahati et al., 2022; Kebede et al., 2022;), while few studies reported that there is no association ( Bengesai & Khan, 2020).

Women may have considerable control over some aspects of family life, such as decisions about having children, but may have very little control over which friends or relatives to see or when (Rezapour & Ansari, 2014). According to a survey conducted in the Kishapu district in Tanzania, a large number of respondents had limited decision-making authority over whether or not to visit their families and relatives (Mtae, 2021). Instead, they could only see their families and friends with their husband's permission.

A multi-country study including eleven countries from East Africa reported that women's decisions on family visits increase the odds of experiencing IPV (Kebede1 et al., 2022; Mavisakalyan & Rammohan, 2021). Another study done in Rwanda, found that women who made decision about family visits are less likely to experience IPV as compared to those who do not participate in decision-making (Bahati et al., 2022).

According to studies done in Ethiopia, South Africa, and Uganda, women who make decisions alone or together with their husband/partner have a considerably decreased likelihood of experiencing physical or sexual violence from their partners (Ebrahim & Atteraya, 2019; Zegenhagen et al., 2019). In addition (Hatcher et al., 2014) found that when spouses make decisions together, their relationship improves. A study conducted in sub-Saharan Africa showed that women with decision-making capacity were more likely to experience IPV (Ahinkorah et al., 2018; Fuseini et al., 2019). Other studies from Pakistan, Bangladesh, Columbia, Ethiopia, and Nigeria, reported that women who participate in decision-making put themselves at higher risk of being violated ( Anik et al., 2021; Inamdar et al., 2022; ; Sunmola et al., 2021).

While much of the focus on IPV has historically been on women as victims, men also experience IPV, although they may face unique barriers in seeking help due to societal stigma, gender norms, and lack of awareness. The reliance on self-reported measurements may lead to an underestimation of men's IPV occurrences. Two studies examining the prevalence rates of males experiencing IPV in Tanzania suggest that a significant proportion of men have been physically abused, with prevalence estimated at 19% and 34% (Norris et al., 2017; Mulawa et al., 2018). This study considers only women who experience IPV and neglects men due to the limitation of data as men rarely report violent incidents from their female partners.

Studies found that other individual, interpersonal, and social drivers may make women more likely to experience IPV. Women's levels of education (Adu et al., 2022; Kebede1 et al., 2022). The male behaviour of alcohol consumption, wealth index, and partner age were also mentioned (Ahinkorah et al., 2018; Forty, 2022; Kabir et al., 2021). Women living in rural areas, with large numbers of children and in extended families are more likely to face IPV than their counterfeit ( Getinet et al., 2022; Kinyondo et al., 2021).

## METHODS

### Data source

The study used secondary data from the demographic and health survey (DHS) in Tanzania 2015/16 collected under a

cross-sectional design. The data may be accessed from the official database of the DHS program at http://www.dhsprogram.com/data/dataset_admin/login_main.cfm. The study did not incorporate the most recent TDHS 2022 data, as the analysis was conducted before its release. The study analysed 8,581 Tanzanian women aged 19-45 from TDHS, and the aspects of sampling, population, and numeration areas are well explained in the recent TDHS reports ((MoHCDGEC, 2022).

The outcome of interest of this study was IPV, defined as "Any behaviour within an intimate relationship that causes physical, psychological, sexual harm, and emotional" (WHO, 2012; UN, 1993). IPV was presented as a binary variable defined as 0 "Not experience IPV", 1 "if experience any IPV" (Tiruneh, 2023; Tiruye, 2020). Those ever-married women were considered to have experienced IPV if they ever experienced one or more violent incidents (physical, sexual, and/or emotional) from their husbands or partners.

Women's decision-making capacity was the main explanatory variable. It was chosen as it is intimately associated with matters about women's health. Research indicates that women's capacity for making important decisions like large household purchases or their health care is necessary for them to engage in family life and fight for their rights (Tiruneh et al., 2017). The DHS asks three questions to assess women's decision-making abilities. These are "Who usually decides about the household purchase?", "Who usually decides when to visit family or relatives?", "Who usually decides on the respondent's healthcare?".

The summated score technique was used to create the women's decision-making capacity. It was quantified by counting the number of decisions a woman participates in. She scores 1 for each decision she participates in and zero otherwise. The index ranges from 0 (not participating) to 3 (participating in all decisions). Women who score 0 or 1 are not capacitated, but those who score 2 or 3 are capacitated. Other explanatory variables will be selected based on the literature review and their availability in the TDHS dataset (Table 1).

**Table 1: Variable description**

| Variable type | Scale of measurement | Description |
|---|---|---|
| *Dependent variable | | |
| Access to media | Categorical | 0 "No" 1 "Less than once a week" 2 "At least once a week" |
| Husband controlling behavior | Dummy | 0 "No" 1 "Yes" |
| Ownership of land | Categorical | 0 "No" 1 "Alone" 2 "Jointly" 3 "Both alone and jointly" |
| Ownership of house | Categorical | 0 "No" 1 "Alone" 2 "Jointly" 3 "Both alone and jointly" |
| Husband's age | Dummy | 0 "17 – 24", 1 "25 – 55", 2 "56 – 64", 3 "65+" |
| Husband's education level | Categorical | 0 "None" 1 "Primary" 2 "Secondary" 3 "Higher" |
| Alcohol consumption | Categorical | 0 "No", 1 "never drunk", 2 "often get drunk", 3 "sometimes get drunk" |
| Presence of other wives | Dummy | 0 "No", 1 "Yes" |
| Distance to the market | Continuous | Distance in km |
| Distance to the health facility | Continuous | Distance in km |

**Data analysis and statistical modelling**

This secondary data study used ever-partnered Tanzanian women between the ages of 15 and 49 who were living in Tanzania. The DHS uses various recode datasets to store gathered data such as individual, women, households, births, and men datasets. The women, household, and individual datasets were merged for this study. Next, there was data cleaning, coding, and recording. Both descriptive and inferential analyses were conducted.

Descriptively, the mean and standard deviation (SD) were utilised to summarise continuous variables, while frequency and percentages were employed to characterise categorical/dummy variables. The chi-square test was used to test the association between the dependent variable and each categorical independent variable. It can also be used to test the significance of differences between expected and observed data, helping to determine whether or not they are due to chance (McHugh, 2013).

Bayesian multilevel generalized linear mixed-effects models were employed to explore the influence of women's decision-making capacity on IPV. This model's superiority is mainly due to its capacity to integrate prior information and likelihood functions, enhancing its informativeness and robustness (Muthén, 1994). Moreover, Bayesian approaches

have demonstrated efficacy in modelling intricate multilevel data structures and accommodating constraints imposed by limited sample sizes across various spatial scales (Asparouhov & Muthén, 2012).

The analytical framework encompassed both univariate analyses between IPV and independent variables and multivariable analyses, with a focus on reporting results derived from the latter. Model comparison was guided by the evaluation of 95% Credible Confidence Intervals (CCI) and the Deviance Information Criterion (DIC), with preference accorded to models exhibiting lower DIC values ( Perkins & Taylor, R.B., 1996; Li et al., 2017). Subsequently, the introduction of one independent variable at a time allowed for a meticulous assessment of model improvement, with variables retained in the model if associated with lower DIC values (Shriner & Yi, 2009).

The study embraced Bayesian statistical principles, leveraging prior knowledge and likelihood functions to update uncertainty judiciously. The Bayesian framework embodies a synthesis of prior beliefs and data-derived insights, culminating in posterior distributions that encapsulate updated probabilities (Falconer et al., 2021). The prior distribution may be classified as non-informative if no such prior information or beliefs are available or informative if it is generated based on known information and beliefs (Falconer et al., 2021; Lemoine, 2019). While non-informative priors are not ubiquitously synonymous with flat distributions, one common approach recommended in the literature involves the utilisation of flat uniform prior distributions, albeit with caution due to their potential for divergence in model evidence (Soch et al., 2016; Musheiguza et al., 2023).

However, the improper priors, the non-informative prior can result in accurate posteriors and do not influence the posterior hyper-parameters (Soch et al., 2016). The study opted for non-informative (flat diffuse) priors, adhering to established guidelines. Specifically, for fixed effect estimates, a non-informative prior distribution with parameters [β0, β1] ~ $\mathcal{NN}$ (0, 10,000), was employed, while for higher hierarchical orders, the inverse gamma distribution $\sigma yy$ ~ InvGamma (0.01, 0.01) was utilised. These distributions serve to temper extreme posterior statements and mitigate undue influence from extreme assumptions, thereby fostering more reliable inferences (Kerman, 2011). To facilitate the updating of posterior distributions, 10,000 simulations were executed for each model, preceded by a burn-in period of 2,500 iterations.

From the Bayes theory ( Bové H, 2014).
If x represents a random variable (IPV) with the density function f (x|θ ), the prior distribution with the density function f (θ ); the density function f (θ|x) of the posterior distribution using Bayes theorem as adopted (Bové H, 2014) may be computed as

$$f(\theta|x) = \frac{f(x|\theta)f(\theta)}{\sum f(x|\theta)f(\theta)d\theta}$$

Where: $f(x|\theta)$ is the likelihood function
Therefore, the posterior distribution is $f(\theta|x) = L(\theta)f(\theta)$ where $L(\theta)$the likelihood is and $f(\theta)$ is the density of the prior distribution. Because IPV follows the binomial distribution, the log link function was used to estimate its odds. Bayesian Multilevel Generalize Linear Mixed Model was used to determine the influence of women's decision-making capacity and IPV. Multilevel Bayesian modelling was used because the collected data have been characterised by a hierarchical structure. Women were nested in enumeration areas, while enumeration areas were nested in regions. Women dwelling in the same cluster (enumeration area) or the same region tend to have the same characteristics due to unobserved factors in those geographical areas. Therefore, three models were estimated and compared on the extent to which can predict the IPV. Those models are standard logistic regression, the random effect, and the nested random effects (Jahanpour et al, 2022)

Classcal logistic model: $h(p_{ij}) = log\left[\frac{p_{ij}}{1-p_{ij}}\right] = \beta_0 + \beta X$ …. Model 1

Random effect model: $h(p_{ij}) = log\left[\frac{p_{ij}}{1-p_{ij}}\right] = \beta_0 + \beta X + \mu_i$ …Model 2

Nested random effect model $h(p_{ijk}) = log\left[\frac{p_{ijk}}{1-p_{ijk}}\right] = X\beta_{k|ij} + X\beta_{ij} + \mu_{k|i} + \mu_i$ … Model 3

Where:
$h(p_{ij})$ is the logit function describing the log odds of IPV for woman $i$ living in region $j$
$h(p_{ijk})$ is the logit function describing the log odds of IPV for woman $i$ living in region $j$ and enumeration area $k$
$\beta's$ : are the regression coefficients
$X's$ : are the covariates.
$\mu_i$ : is the region-specific random effects
$\mu_{k|i}$ : is the random effects capturing the variation due to different enumeration areas within a common region
$X\beta_{k|ij}$ : is the effect of enumeration area given a woman in a region
$X\beta_{ij}$ : is the regression coefficient for children in the region
The adopted model demonstrates the association between IPV and women's decision-making capacity and other variables, grounded in Heise's (1998) Ecological Framework.

## RESULTS

### Distribution of participant's demographic characteristics

The results indicated that 2,639 (53%) individuals reported no

experience of IPV, and 6,212 (71%) individuals fell within the age range of 25 to 49 years. In view of educational attainment, 5,138 (65%) individuals had attained primary-level education. Furthermore, 7,165 (78%) individuals resided in nuclear family setups. Economically, a notable portion of respondents, comprising 2,058 (26%) individuals, were classified under the poorest wealth index category. Geographically,6,725 (75%) individuals resided in rural areas (Table 2).

**Table 2: Description of participant characteristics**

| Variables | Frequency | Percentage |
|---|---|---|
| IPV | | |
| No | 2639 | 53.35 |
| Yes | 2482 | 46.65 |
| Decision-making capacity | | |
| not capacitated | 1602 | 19.7 |
| Capacitated | 6979 | 80.3 |
| Respondent Age | | |
| 15-24 | 2369 | 28.66 |
| 25-49 | 6212 | 71.34 |
| Occupation | | |
| Non-occupants | 1544 | 16.84 |
| Occupants | 7037 | 83.16 |
| Wealth index | | |
| Poorest | 2058 | 25.59 |
| Poorer | 1782 | 21.61 |
| Middle | 1652 | 19.09 |
| Richer | 1700 | 17.5 |
| Richest | 1389 | 16.21 |
| Education level | | |
| None | 1964 | 22.35 |
| Primary | 5138 | 64.83 |
| Secondary | 1402 | 11.86 |
| Higher | 77 | 0.95 |
| Husband Education level | | |
| Non | 1284 | 14.32 |
| Primary | 5579 | 69.26 |
| Secondary | 1521 | 14.05 |
| Higher | 197 | 2.372 |
| Husband Occupation | | |
| Non-occupants | 73 | 0.94 |
| Occupants | 8492 | 99.06 |
| Husband Age | | |
| 17-24 | 555 | 6.86 |
| 25-55 | 7698 | 89.38 |
| 56-64 | 240 | 2.73 |
| 65+ | 87 | 1.03 |
| Family structure | | |
| Nuclear | 7165 | 83.68 |
| Extended | 1416 | 16.32 |
| Area of Residence | | |
| Urban | 1856 | 25.06 |
| Rural | 6725 | 74.94 |
| Partner/husband alcohol consumption | | |
| No | 3329 | 66.74 |
| Never get drunk | 160 | 3.042 |
| Drunk often | 706 | 13.9 |
| Drunk sometimes | 926 | 16.32 |
| Witnessing violence | | |
| No | 3433 | 63.2 |
| Yes | 2228 | 36.8 |
| Husband controlling behaviour | | |
| No | 1376 | 27.17 |
| Yes | 3742 | 72.83 |
| Wife beating justification | | |
| No | 3507 | 37.77 |
| Yes | 5050 | 62.23 |
| Presence of other wives | | |
| No | 6823 | 81.26 |
| Yes | 1701 | 18.74 |
| Access to media | | |
| Not at all | 1773 | 20.17 |
| Less than once a week | 2833 | 33.16 |
| At least once a week | 3975 | 46.68 |
| Ownership of land | | |
| Does not | 4806 | 51.85 |
| Alone only | 403 | 5.39 |
| Jointly only | 3244 | 41.19 |
| Both alone and jointly | 128 | 1.57 |
| Ownership of house | | |
| Does not | 4376 | 45.82 |
| Alone only | 350 | 4.729 |
| Jointly only | 3693 | 47.55 |
| Both alone and jointly | 162 | 1.904 |
| | Mean | Std. Dev |
| Distance to the market(km) | 28.61 | 27.64 |
| Distance to the health facility(km) | 2.84 | 3.93 |

**Description of participant's characteristics based on IPV status**

Based on the distribution of IPV (physical, sexual, and emotional) across the selected socioeconomic variables, the

study revealed that the majority were 1,568 [39.2%], 517[12.9%], and 1,411[35.3%] among children living in rural areas for the physical, sexual and emotional IPV respectively. The majority of women who experienced IPV were 484 [40.5%], 378 [44.3%], and 438 [36.7] among women living in the poorest, richest, and poorest wealth quintile households for physical, sexual, and emotional IPV, respectively. Furthermore, the study revealed that in all forms of IPV, the majority of women were 1,578[37.9%], 531[12.8%] and 1,424[34.2%] among capacitated women. A statistically significance difference between groups was observed for the husband's drinking behaviour, witnessing violence, husband controlling behaviour and access to media in all forms of IPV (Table 3).

**Table 3: Participant's characteristics based on IPV status**

| Variable | Physical IPV – Yes | p-value | Sexual IPV -Yes | p-value | Emotional IPV – Yes | p-value |
|---|---|---|---|---|---|---|
| Decision-Making Capacity | | | | | | |
| Not Capacitated | 390[40.8] | | 121[12.7] | | 349[36.5] | |
| Capacitated | 1,578[37.9] | 0.096 | 531[12.8] | 0.939 | 1,424[34.2] | 0.175 |
| Husband drinking behaviour | | | | | | |
| Do not drink | 980[29.4] | | 297[8.9] | | 926[27.8] | |
| Never drunk | 34[21.3] | | 12[7.5] | | 41[25.6] | |
| Often | 493[69.8] | | 197[27.9] | | 418[59.2] | |
| Sometimes | 461[49.78] | <0.001 | 146[15.8] | <0.001 | 388[41.9] | <0.001 |
| Witnessing violence | | | | | | |
| No | 820[29.9] | | 242[8.81] | | 749[27.3] | |
| Yes | 955[49.9] | <0.001 | 345[18.0} | <0.001 | 854[44.6] | <0.001 |
| Husband controlling behaviour | | | | | | |
| No | 249[18.1] | | 58[4.22] | | 216[15.7] | |
| Yes | 1,719[45.9] | <0.001 | 594[15.9] | <0.001 | 1,557[34.6] | <0.001 |
| Wife beating justification | | | | | | |
| No | 761[36.96] | | 266{12.9] | | 693[33.7] | |
| Yes | 1,204[39.5] | 0.068 | 386[12.7] | 0.786 | 1,076[34.6] | 0.229 |
| Wealth Index | | | | | | |
| Poorest | 484[40.5] | | 169[14.1] | | 438[36.7] | |
| Poorer | 407[38.4] | | 130[12.3] | | 356[33.6] | |
| Middle | 387[38.9] | | 135[13.6] | | 365[36.7] | |
| Richer | 404[39.7] | | 96[11.2] | | 356[35] | |
| Richest | 286[33.5] | 0.019 | 378[44.3] | 0.269 | 258[30.1] | 0.018 |
| Presence of other wives | | | | | | |
| No | 1,575[38.6] | | 522[12.8] | | 1,436[35.2] | |
| Yes | 383[37.9] | 0.686 | 125[12.4] | 0.719 | 328[32.4] | 0.103 |
| Level of Education | | | | | | |
| No education | 470[39.9] | | 159[13.5] | | 421[35.8] | |
| Primary | 1,172[38.6] | | 388[12.8] | | 1,065[35.1] | |
| Secondary | 313[36'31] | | 101[11.7] | | 275[31.9] | |
| Higher | 13[28.9] | 0.206 | 4[8.89] | 0.560 | 12[26.7] | 0.168 |
| Occupational status | | | | | | |
| Non-occupants | 329[37.2] | | 113[12.8] | | 304[34.4] | |
| Occupants | 1,639[38.4] | 0.399 | 539[12.7] | 0.971 | 1,469[34.7] | 0.852 |
| Family structure | | | | | | |
| Nuclear | 1,622[38.22] | | 521[12.3] | | 1,454[34.3] | |
| Extended | 346[39.5] | 0.494 | 131[14.9] | 0.031 | 319[36.4] | 0.231 |
| Age | | | | | | |
| 15-24 | 554[39.1} | | 182[12.9] | | 504[35.6] | |
| 25-34 | 868[37.9] | | 295[12.9] | | 787[34.1] | |
| 35-49 | 546[38.6] | 0.783 | 175[12.4] | 0.900 | 482[34.1] | 0.659 |
| Family size | | | | | | |
| 1 to 4 | 393.34.6] | | 124[10.9] | | 357[31.4] | |
| 5 to 8 | 990[37.7] | | 339[12.9] | | 913[34.8] | |
| 9+ | 585[43.1] | <0.001 | 189[13.9] | 0.077 | 503[37] | 0.014 |
| Access to Media | | | | | | |
| | 466[43.8] | | 160[15] | | 419[39.3] | |
| Less than once a week | 611[38] | | 212[13.2] | | 544[33.9] | |
| At least once a week | 891[36.4] | <0.001 | 280[11.4] | 0.011 | 810[33.1] | 0.001 |
| Own Land | | | | | | |
| Does not own | 1,115[38.6] | | 371[12.9] | | 1,000[34.6] | |
| Alone only | 82[34.6] | | 27[11.4] | | 68[28.7] | |
| Jointly only | 749[38.9] | | 243[12.6] | | 688[35.7] | |
| Both alone and jointly | 22[31.9] | 0.406 | 11[15.9] | 0.780 | 17[24.6] | 0.053 |
| Own House | | | | | | |
| Does not own | 1,012[38.4] | | 337[12.78] | | 905[34.3] | |
| Alone only | 79[36.7] | | 31[14.4] | | 63[29.3] | 0.771 |
| Jointly only | 846[38.9] | | 271[12.5] | | 777[35.7] | 0.891 |
| Both alone and jointly | 31[33] | 0.654 | 13[13.8] | 0.847 | 28[29.8] | 0.180 |
| Area of residence | | | | | | |
| Urban | 400[35.6] | | 135[12] | | 362[32.2] | |
| Rural | 1,568[39.2] | 0.028 | 517[12.9] | 0.419 | 1,411[35.3] | 0.057 |

## Influence of Women's decision-making capacity on types of IPV

The findings indicate that there is a statistically significant association between women's decision-making capacity and physical IPV, while no such association was found with sexual or emotional IPV. The results indicated that on average a 1 unit increase in decision-making, a 1 unit increase in decision-making capacity is associated with an approximate 9% (95% CI: 0.833, 0.978) decrease in IPV. Therefore, engagement in decision-making processes lowers the likelihood of experiencing physical IPV compared to women not involved in decision-making. These results are consistent with (Ebrahim &Atteraya, 2019), contrary to earlier findings (Bengesai & Khan, 2020). Conversely, on average, a unit increase in husband controlling behaviour is associated with approximately 130% (95% CI: 2.087, 2.585), 239% (95% CI: 2.7934, 4.0965), and 150% (95% CI: 2.1545, 2.8005) increase in physical, sexual and emotional IPV respectively. This means that women whose partners exerted control over them were at significantly higher risk of experiencing all forms of IPV, consistent with research in other regions (Nasser &Madhu, 2019) (Table 4). Furthermore, the study revealed significant regional variations in IPV prevalence. The findings indicated a variance of 4.5% (BPOR - 0.045, 95% CI 0.016, 0.094), 9.7% (BPOR - 0.097, 95% CI 0.026, 0.221), and 13.3% (BPOR - 0.133, 95% CI 0.067, 0.245) in physical, sexual, and emotional IPV odds at the regional level, respectively. This emphasises the importance of considering regional dynamics in understanding and addressing IPV.

**Table 4: Bayesian Multilevel mixed effects generalized linear Estimates by IPV**

| Variables | Physical IPV | | | Sexual IPV | | | Emotional IPV | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimates | 95% CI | | Estimates | 95% CI | | Estimates | 95% CI | |
| A: Fixed Factors | | | | | | | | | |
| Decision-Making Capacity | | | | | | | | | |
| Capacitated | 0.909** | 0.833 | 0.978 | 0.986 | 0.905 | 1.084 | 0.971 | 0.880 | 1.062 |
| Husband drinking behaviour | | | | | | | | | |
| Never drunk | 0.690** | 0.651 | 0.724 | 0.784 | 0.538 | 1.091 | 1.036 | 0.920 | 1.181 |
| Often | 2.093 | 1.968 | 2.215 | 2.58** | 2.203 | 2.974 | 1.890 | 1.713 | 2.083 |
| Sometimes | 1.546 | 1.466 | 1.626 | 1.554 | 1.404 | 1.715 | 1.289 | 1.169 | 1.406 |
| Witnessing violence | 1.432 | 1.383 | 1.483 | 3.282 | 2.744 | 3.931 | 1.379 | 1.263 | 1.505 |
| Husband controlling behaviour | 2.305** | 2.087 | 2.585 | 3.392** | 2.793 | 4.097 | 2.497** | 2.155 | 2.801 |
| Wife beating justification | 1.005 | 0.974 | 1.166 | 0.936 | 0.824 | 1.069 | 1.029 | 0.960 | 1.102 |
| Wealth Index | | | | | | | | | |
| Poorer | 1.016 | 0.928 | 1.126 | 0.983 | 0.856 | 1.121 | 0.916** | 0.856 | 0.998 |
| Middle | 0.996 | 0.919 | 1.078 | 0.995 | 0.958 | 1.028 | 1.007 | 0.886 | 1.158 |
| Richer | 1.065 | 0.953 | 1.177 | 0.898 | 0.770 | 1.050 | 0.971 | 0.869 | 1.085 |
| Richest | 0.936 | 0.812 | 1.077 | 0.966 | 0.704 | 1.250 | 0.817** | 0.718 | 0.936 |
| Presence of other wives | 0.955 | 0.861 | 1.055 | 0.991 | 0.844 | 1.152 | 0.893** | 0.795 | 0.993 |
| Level of Education | | | | | | | | | |
| Primary | 1.05 | 0.962 | 1.141 | 1.054 | 0.954 | 1.150 | 1.184 | 1.072 | 1.360 |
| Secondary | 1.09 | 0.912 | 1.264 | 0.989 | 0.866 | 1.106 | 1.373 | 1.151 | 1.608 |
| Higher | 0.797** | 0.66 | 0.978 | 0.778 | 0.600 | 0.998 | 1.617 | 1.214 | 2.002 |
| Husband Education | | | | | | | | | |
| Primary | 0.983 | 0.932 | 1.042 | 0.825 | 0.748 | 0.920 | 0.750** | 0.703 | 0.797 |
| Secondary | 1.041 | 0.904 | 1.192 | 0.945 | 0.805 | 0.805 | 0.709** | 0.646 | 0.801 |
| Higher | 0.955 | 0.835 | 1.062 | 1.073 | 0.771 | 1.596 | 0.674** | 0.505 | 0.800 |
| Occupational status | | | | | | | | | |
| Occupants | 0.955 | 0.902 | 1.015 | 0.935 | 0.805 | 1.123 | 1.559 | 1.258 | 1.951 |
| Husband Occupation | 1.147 | 1.0215 | 1.2991 | 1.457 | 1.196 | 1.807 | 1.017 | 0.834 | 1.160 |
| Occupants | 1.147 | 1.022 | 1.299 | 1.457 | 1.196 | 1.807 | 1.017 | 0.834 | 1.160 |
| Family structure | | | | | | | | | |
| Extended | 0.890** | 0.861 | 0.920 | 1.180 | 0.925 | 1.499 | 1.014 | 0.900 | 1.141 |
| Husband age | | | | | | | | | |
| 25 -55 | 0.935** | 0.892 | 0.984 | 0.916 | 0.770 | 1.073 | 1.112 | 1.014 | 1.233 |
| 56 – 64 | 0.838** | 0.739 | 0.938 | 1.077 | 0.845 | 1.332 | 1.232 | 0.961 | 1.518 |
| 65+ | 0.728** | 0.635 | 0.866 | 0.725 | 0.642 | 0.817 | 0.627** | 0.540 | 0.712 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Family size | | | | | | | | | |
| 5 to 8 | 1.117 | 1.014 | 1.228 | 1.153 | 1.083 | 1.213 | 1.062 | 0.990 | 1.153 |
| 9+ | 1.239 | 1.135 | 1.365 | 1.092 | 0.919 | 1.338 | 1.063 | 0.951 | 1.223 |
| Access to Media | | | | | | | | | |
| Less than once a week | 0.889** | 0.819 | 0.962 | 0.875 | 0.764 | 0.992 | 0.927** | 0.853 | 0.996 |
| At least once a week | 0.852** | 0.831 | 0.874 | 0.792 | 0.749 | 0.841 | 0.922 | 0.845 | 1.001 |
| Distance to the market | 0.999 | 0.998 | 1.001 | 1.000 | 0.997 | 1.004 | 1.002 | 0.999 | 1.004 |
| Distance to a health facility | 0.997 | 0.986 | 1.007 | 0.999 | 0.978 | 1.019 | 0.993 | 0.977 | 1.009 |
| Own Land | | | | | | | | | |
| Alone only | 0.969 | 0.902 | 1.037 | 0.873 | 0.783 | 0.975 | 0.912** | 0.841 | 0.985 |
| Jointly only | 0.984 | 0.935 | 1.038 | 1.007 | 0.823 | 1.202 | 1.020 | 0.915 | 1.125 |
| Both alone and jointly | 0.885** | 0.806 | 0.966 | 1.348 | 1.196 | 1.511 | 0.636** | 0.571 | 0.722 |
| Own House | | | | | | | | | |
| Alone only | 0.954** | 0.911 | 0.996 | 1.303 | 0.934 | 1.775 | 0.905** | 0.844 | 0.963 |
| Jointly only | 1.0004 | 0.966 | 1.046 | 1.008 | 0.842 | 1.180 | 0.959 | 0.907 | 1.030 |
| Both alone and jointly | 0.813** | 0.724 | 0.927 | 0.950 | 0.723 | 1.174 | 1.205 | 0.944 | 1.408 |
| Area of residence | 0.986 | 0.935 | 1.055 | 0.996 | 0.893 | 1.089 | 1.032 | 0.910 | 1.172 |
| Constant | 0.134** | 0.104 | 0.174 | 0.025 | 0.017 | 0.033 | 0.084** | 0.060 | 0.115 |
| Random Factors | | | | | | | | | |
| Variance(region) | 0.045** | 0.016 | 0.094 | 0.097 | 0.026 | 0.221 | 0.133** | 0.067 | 0.245 |
| **P Value > 5% | | | | | | | | | |

**The Influence of different types of Women's Decision-making capacity on IPV**

The study highlights various factors that significantly influence the risk of IPV, shedding light on the complexities of interpersonal dynamics within households (Table 5).Results indicated that, women who actively engage in decisions regarding purchases and social visits found to have a lower odd of experiencing IPV compared to non-capacitated women. Specifically, women's decision-making capacity on household purchase is associated with approximate 13% (95% CI: 0.767, 0.978) decrease in IPV. These results are similar to (Kebede et al., 2022) but are contrary to (Ali, 2021; Anik et al., 2021). Similarly, women's decision-making capacity on social visits is associated with an approximate 10% (95% CI: 0.873, 0.985) decrease in IPV. The results are consistent with Alam et al. (2018), who highlighted that women's involvement in household decisions serves as a form of empowerment.

Women who participate in large purchase decisions and who make decisions on their health were found to have a lower risk of experiencing sexual IPV compared to women who do not participate in any type of decision. The results reveal that women's decision-making capacity on household purchases is associated with an approximate 44% (95% CI: 0.473, 0.672) decrease in IPV, while women's decision-making capacity on their health is associated with an approximate 15% (95% CI: 0.734, 0.979) decrease in IPV. These results are similar to Bahati et al., (2022), but are contrary to Ranganathan et al., (2019). Additionally, women who decide on large purchases and their health either alone or jointly have a low risk of experiencing emotional IPV compared to non-capacitated women. The results reveal that women's decision-making capacity on their health is associated with an approximate 10% (95% CI: 0.843 0.951) decrease in emotional IPV, while women's decision-making capacity in large household purchases is associated with an approximate 26% (95% CI: 0.669, 0.820) decrease in emotional IPV. These results are similar to Bahati et al., (2022) but contrary to Kebede1 et al., (2022; Mavisakalyan & Rammohan, 2021). Similarly, the results relate to findings by Alam et al. (2018), who found that women's involvement in household decisions serves as a form of empowerment, allowing them to exercise their rights and freedoms, thereby reducing the justification for violence against them.

Additionally, the study indicated a statistically significant of regional variations in IPV prevalence, emphasising the need for tailored interventions at the regional level. Variability in physical, sexual and emotional IPV odds at the regional level is statistically significant, with 4.5% (BPOR - 0.045, 95% CI 0.017, 0.094), 9.7% (BPOR - 0.097, 95% CI 0.031, 0.228), 12.2% (BPOR - 0.122, 95% CI 0.060, 0.230) respectively, observed in regional variance.

## DISCUSSION

This study assessed the influence of women's decision-making capacity on IPV in Tanzania using a Bayesian multilevel generalised linear mixed model. It reveals that women empowered in decision-making, either independently or jointly with their partners, exhibit a reduced likelihood of experiencing IPV. While decision-making does not have a statistical effect on sexual and emotional IPV, it has a statistical effect on physical IPV with the Bayesian posterior odds ratio 0.9 (95% CI: 0.833, 0.978). The findings are consistent with prior research findings (Ebrahim & Atteraya, 2019). However, the present findings contradict the results of other previous scholars (Sunmola et al., 2021), suggesting the influence of cultural, geographical, and methodological disparities. This could be attributed to the empowering effect of higher status within the household, enabling women to resist infringements on their rights, thereby reducing vulnerability to partner violence as supported by Groves et al., (2015).

Furthermore, the study found that women actively involved in major household purchase decisions, were less likely to experience all forms of IPV. Participation in health decisions has a statistically significant effect in decreasing emotional IPV and sexual IPV, whereas participation in social visits showed a statistical effect on the reduction of physical IPV only. When women can make decisions and have control over household resources, this strengthens the normative shifts in gender relations and the laws governing women's behaviour at the household level as well as at the community level (Jabbi et al., 2020). This empowerment contributes to a positive transformation in men's perceptions and behaviours towards women, potentially leading to decreased IPV. This suggests that promoting women's decision-making authority within households can serve as a protective factor against IPV, highlighting the importance of broader societal changes in fostering gender equality and reducing IPV against women.

The study also found a strong link between women whose

partners exerted control over them and a significantly increased risk of experiencing all forms of IPV. The findings are consistent with previous findings (Nasser & Madhu, 2019), emphasising the pervasive influence of patriarchal family frameworks and societal norms that uphold male dominance over women. Such power imbalances contribute to an environment conducive to abuse, underscoring the urgent need for challenging and dismantling these entrenched structures to mitigate the prevalence of IPV (Shabnam, 2022). These results highlight the critical importance of addressing gender-based power differentials and promoting equitable relationships to combat IPV against women effectively. These results are in agreement with the ecological framework as explain by Heise (1998).

The analysis based on Bayesian multilevel logistic regression provided estimates for random effects variances. The estimates for each level were different, suggesting that the variance components of intimate partner violence were different at regional levels. This means that the sources of variations are regions. Furthermore, the findings suggest that improving awareness of all types of women's decision-making capacity is crucial. This is especially important because effective interventions in this field face inherent challenges. It implies that efforts to address IPV should consider these difficulties carefully. The current study has several strengths. First, it enhances the understanding of IPV experienced by women by exploring various influencing factors. Additionally, it addresses the gap in the limited application of advanced statistical methods like Bayesian analysis in analysing IPV in Tanzania. Through Bayesian multilevel analysis, the study provides more detailed insights into IPV complexities, aiding evidence-based policies and interventions for women's health and development in Tanzania.

The most important limitation lies in using cross-sectional data, restricting the study from discussing the causal relationships. Additionally, the reliance on self-reported measurements may lead to underestimating IPV occurrences. Also, the study considers only women who experience IPV and neglect men due to the limitation of data, as men rarely report violent incidents from their female partners. Encouraging men to report incidents of IPV is essential for increasing the availability of data, which will enhance research on IPV for both sexes. Nonetheless, despite these challenges, the findings remain applicable to the study population to a reasonable extent as they also apply Bayesian Multilevel Models. More work will be needed, considering that longitudinal studies will be needed to track changes in women's decision-making autonomy and its impact on IPV over time. This would provide insights into the dynamic nature of these relationships and help identify potential causal pathways. A greater focus on qualitative research could produce interesting findings that account more for individual and community-level perceptions of power dynamics, as well as attitudes towards IPV.

**Policy Implications**

According to the study's findings, some factors are strongly linked to IPV and have important policy ramifications. The results suggest that in order to reduce the risks of IPV, it is crucial to support women's autonomy in making decisions through health, education, and awareness campaigns. In order to address the issue of IPV, it is recommended that women's access to resources and employment be supported to promote economic independence. The results suggest that increasing secondary and tertiary education access, especially for women, can have protective effects against intimate partner violence. Additionally, it is advisable to support Scholars and decision-makers who are urged to delve deeper into spatial models to better understand the dispersion of IPV prevalence and pinpoint hotspot locations, thereby facilitating targeted interventions.

Furthermore, it should be noted that when attempting to combat IPV in Tanzania, policymakers and program managers should incorporate gender narratives, local culture, and context. This customised strategy will guarantee that interventions are sensitive to cultural differences and successfully address the underlying causes of intimate partner violence. Therefore, to effectively combat IPV in Tanzania, policymakers and program managers should incorporate local culture, context, and gender narratives into their efforts. Interventions will be culturally sensitive and successfully address the underlying causes of IPV thanks to this customised approach.

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**Conflicts of Interest**

The authors declare that they have no competing interests.

**Author's Contributions**

UM designed the study, obtained the dataset from the TDHS Measure website, performed statistical analysis, and wrote the manuscript. TM and JM provided guidance throughout the study design, analysis, and manuscript preparation.

**REFERENCES**

Ahinkorah, B. O., Dickson, K. S., & Seidu, A. A. (2018). Women decision-making capacity and intimate partner violence among women in sub-Saharan Africa. *Archives of Public Health*, *76*(5), 1–10. https://doi.org/10.1186/s13690-018-0253-9

Anik, A. I., Ibrahim, M., Towhid, I., & Haque, M. A. (2021). Association of spousal violence and women' s empowerment status among the rural women of sub-Saharan Africa. *Journal of Biosocial Science*, *55*(1), 55–73. https://doi.org/10.1017/S0021932021000602

Bahati C, Izabayo J, Munezero P, Niyonsenga J, Mutesa L. Trends and correlates of intimate partner violence (IPV) victimization in Rwanda: results from the 2015 and 2020 Rwanda Demographic Health Survey (RDHS 2015 and 2020). BMC Womens Health. 2022;22(1):368

Bengesai, A. V., & Derera, E. (2021). The Association Between Women Empowerment and Emotional Violence in Zimbabwe: A Cluster Analysis Approach. *SAGE Open*, *11*(2). https://doi.org/10.1177/21582440211021399

Bengesai, A. V., & Khan, H. T. A. (2020). Female autonomy and intimate partner violence: findings from the Zimbabwe demographic and health survey , 2015. *An International Journal for Research, Intervention and Care*, 1–18. https://doi.org/10.1080/13691058.2020.1743880

Devries, K. M., Mak, J. Y. T., García-Moreno, C., Petzold, M., Child, J. C., Falder, G., et al. (2013). The global prevalence of intimate partner violence against women. *Science*, *340*, 1527-1528. doi:10.1126/science.1240937

Durevall D, Lindskog A (2015). Intimate partner violence and HIV in ten subSaharan African countries: what do the Demographic and Health Surveys tell us? Lancet Glob Health, 3(1):e34–43. doi:10.1016/S2214-109X(14)70343-2

Ebrahim, N. B., & Atteraya, M. S. (2019). Women's Household Decision-Making and Intimate Partner Violence in Ethiopia. *Academic Journal of Interdisciplinary Studies*, *8*(2), 285–292. https://doi.org/10.2478/ajis-2019-0041

Friedemann-Sánchez, G., & Lovatón, R. (2012). Intimate Partner Violence in Colombia: Who Is at Risk? *Social Forces*, *91*(2), 663–688. https://doi.org/10.1093/sf/sos131

Fuseini, K., Kalule-sabiti, I., & Lwanga, C. (2019). Dynamics of Women ' s Autonomy in Household Decision-Making in Ghana. *Journal of Comparative Family Studies*, *50*(4), 293–312.

Inamdar, V., Tagat, A., & Parekh, A. (2022). *The Effect of Women's Empowerment on Intimate Partner Violence and Child Nutrition Outcomes in India, Nepal and Pakistan*.

Jabbi, A., Ndow, B., Senghore, T., Sanyang, E., Kargbo, C., & Bass, P. (2020). Prevalence and factors associated with intimate partner violence against women in The Gambia: a population-based analysis. *Women & Health*. https://doi.org/10.1080/03630242.2020.1767264

Kabir, R., Haque, M., Mohammadnezhad, M., Samad, N., Mostari, S., Jabin, S., Majumder, M. A. A., & Rabbani, M. G. (2019). Domestic violence and decision-making power of married women in Myanmar: Analysis of a nationally representative sample. *Annals of Saudi Medicine*, *39*(6), 395–402. https://doi.org/10.5144/0256-4947.2019.395

Kebede1, A. A., Aklil, astewal B., Gessesse, D. N., Tsega, N. T., & Temesgan, W. Z. (2022). Nearly Half of Women Have Experienced Intimate Partner Violence During Pregnancy in Northwest Ethiopia , 2021 ; The Role of Social Support and. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.904792

Norris AH, Decker MR, Weisband YL, Hindin MJ. Reciprocal physical intimate partner violence is associated with prevalent STI/HIV among male Tanzanian migrant workers: a cross-sectional study. *Behaviour*. (2017).doi: 10.1136/sextrans-2016-052873

Mavisakalyan, A., & Rammohan, A. (2021). Female autonomy in household decision-making and intimate partner violence: evidence from Pakistan. *Review of Economics of the Household*, *19*(1), 255–280. https://doi.org/10.1007/s11150-020-09525-8

McCloskey, L. A., Boonzaier, F., Steinbrenner, S. Y., & Hunter, T. (2016). Determinants of Intimate Partner Violence in Sub-Saharan Africa: A Review of Prevention and Intervention Programs. *Partner Abuse*, *7*(3), 277–315. https://doi.org/10.1891/1946-6560.7.3.277

MoHCDGEC, MoH, NBS, OCGS, & ICF. (2016). *Tanzania 2015-16 Demographic and Health Survey and Malaria Indicator Survey Key Findings*.

MoHCDGEC, MoH, NBS, OCGS, & ICF. (2022). Tanzania Demographic and Health Survey and Malaria Indicator Survey 2022 Final Report. Dodoma, Tanzania, and Rockville, Maryland, USA: MoH, NBS, OCGS, and

ICF.

Mondal, D., & Paul, P. (2020). Children and Youth Services Review Association between intimate partner violence and child nutrition in India : Findings from recent National Family Health Survey. *Children and Youth Services Review*, *119*(July), 105493. https://doi.org/10.1016/j.childyouth.2020.105493

Mueller, I., & Tronick, E. (2019). Early Life Exposure to Violence : Developmental Consequences on Brain and Behavior. *Front. Behav. Neurosc*, *13*(July), 1–7. https://doi.org/10.3389/fnbeh.2019.00156

Mulawa M, Kajula LJ, Yamanis TJ, Balvanz P, Kilonzo MN, Maman S. Perpetration and victimization of intimate partner violence among young men and women in Dar es Salaam, Tanzania. *J Interpers Violence.* (2018) 33:2486– 511. doi: 10.1177/0886260515625910

Musheiguza, E., Mbegalo, T. & Mbukwa, J.N. (2023). Bayesian multilevel modelling of the association between socio-economic status and stunting among under-five-year children in Tanzania. *J Health Popul Nutr* **42**, 135. https://doi.org/10.1186/s41043-023-00474-3

Peterman, A., Pereira, A., Bleck, J., Palermo, T. M., & Yount, K. M. (2017). Women's Individual Asset Ownership and Experience of Intimate Partner Violence: Evidence from 28 International Surveys. American Journal of Public Health Research, 747-755.

Perkins, D.D.; Taylor, R.B. Ecological assessments of community disorder: Their relationship to fear of crime and theoretical implications. Am. J. Community Psychol. 1996, 24, 63–107

Ranganathan, M., Knight, L., Abramsky, T., Muvhango, L., Ngwato, T. P., Mbobelatsi, M., Ferrari, G., Watts, C., & Stöckl, H. (2019). Associations Between Women ' s Economic and Social Empowerment and Intimate Partner Violence : Findings From a Microfinance Plus Program in Rural North West Province , South Africa. *Journal of Interpersonal Violence*, *36*(15–16), 7747–7775. https://doi.org/10.1177/0886260519836952

Saaka, M. (2020). Women's decision-making autonomy and its relationship with child feeding practices and postnatal growth. *Journal of Nutritional Science*, *9*(38), 1–13. https://doi.org/10.1017/jns.2020.30

Sarkar NN (2008). The impact of intimate partner violence on women's reproductive health and pregnancy outcome. J Obstet Gynaecol, 28(3):266–71

Seidu, A. A., Dzantor, S., Sambah, F., Ahinkorah, B. O., & Ameyaw, E. K. (2022). Participation in household decision making and justification of wife beating: Evidence from the 2018 Mali Demographic and Health Survey. *International Health*, *14*(1), 74–83. https://doi.org/10.1093/inthealth/ihab008

Shabnam, S. (2022). Sexual Violence and Women Empowerment in India: Findings from a Nationally Representative Sample Survey. *Sexual Abuse - An Interdisciplinary Approach*, 1–22. https://doi.org/10.5772/intechopen.97456

Soch J, Allefeld C, Haynes JD (2016): "How to avoid mismodelling in GLM-based fMRI data analysis: cross-validated Bayesian model selection"; in: NeuroImage, vol. 141, pp. 469-489, eq. 15, p. 473

Sunmola, A. M., Sambo, M. N., Wb, C., & Mayungbo, O. A. (2021). Moderating Effect of Husband ' s Controlling Attitudes on the Relation Between Women ' s Household Decision- Making Autonomy and Intimate Partner Violence Experience in. *Journal of Interpersonal Violence*, *36*. https://doi.org/10.1177/0886260519888534

Srivastava, S., Kumar, K., McDougal, L., Kannaujiya K,. S., Sikarwar, A., Raj, A., Singh A. Spatial heterogeneity in intimate partner violence across the 640 districts of India: a secondary analysis of a crosssectional, population-based survey by use of model-based small-area estimation. Lancet Glob Health. 2023;11(1587-97)

Tanzania Bureau of Statistics. (2016). *Tanzania Demographic and Health Survey 2016*. Dar es Salaam, Tanzania: National Bureau of Statistics. Retrieved from https://dhsprogram.com /pubs/pdf/FR321/FR321.pdf

Tenkorang, E. Y. (2017). Women ' s Autonomy and Intimate Partner Violence in Ghana. *International Perspectives on Sexual and Reproductive Health*, *44*(2), 51–61.

UN. (2021). *Facts and figures : Ending violence against women* (Issue September 2020).

UN women. (1995). *The United Nations Fourth World Conference on Women: Action for Equality, Development and Peace*. https://www.un.org/womenwatch/daw/beijing/platform/violence.htm#object1

Vyas, S., Jansen, H. A., Heise, L., & Mbwambo, J. (2015). Exploring the association between women's access to

economic resources and intimate partner violence in Dar es Salaam and Mbeya, Tanzania. Social Science & Medicine, 307-315.

WHO. (2012). *Understanding and addressing violence against women Intimate partner violence*.

WHO. (2021). *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*. https://www.who.int/health-topics/%0Aviolence-against-women

WHO. (2022). *Violence against children Key facts*. https://www.who.int/news-room/fact-sheets/detail/violence-against-children

Zegenhagen, S., Ranganathan, M., & Buller, A. M. (2019). Household decision-making and its association with intimate partner violence: Examining differences in men's and women's perceptions in Uganda. *SSM - Population Health*, *8*(December 2018), 100442. https://doi.org/10.1016/j.ssmph.2019.100442