

Thesis for doctoral degree (Ph.D.)  
2011

# Attitudes Towards and Exposure to Intimate Partner Violence Against Women in Sub-Saharan Africa: Contextual Effects, Neighbourhood Variations and Individual Risk Factors



Olalekan A. Uthman



**Karolinska  
Institutet**

From Division of Social Medicine, Public Health Sciences  
Karolinska Institutet, Stockholm, Sweden

**ATTITUDES TOWARDS AND EXPOSURE TO  
INTIMATE PARTNER VIOLENCE AGAINST  
WOMEN IN SUB-SAHARAN AFRICA:  
CONTEXTUAL EFFECTS, NEIGHBOURHOOD  
VARIATIONS AND INDIVIDUAL RISK  
FACTORS**

Olalekan A. Uthman



**Karolinska  
Institutet**

Stockholm 2011

All previously published papers were reproduced with permission from the publisher.

Published by Karolinska Institutet. Printed by Universitetservice US-AB

© Uthman, 2011

ISBN 978-91-7457-310-7

*There is little difference in people, but that little difference makes a big difference. That little difference is attitude. The big difference is whether it is positive or negative.*  
- W. Clement stone

## ABSTRACT

**Background:** Intimate partner violence against women (IPVAW) is a serious public health issue, conferring immediate and long-term threats to women's health. IPVAW exposure has often been associated with increased vulnerability to human immunodeficiency virus (HIV) and negative reproductive health outcomes. One factor that has recently been acknowledged as one of the strongest predictors, however, is attitudes towards IPVAW. Despite the growing evidence supporting a link between neighborhood context and health and health behavior, only a limited number of studies have investigated the relationship between neighborhood characteristics and IPVAW net of individual-level characteristics. Much research has focused on individual-level factors. Beyond the communities, individuals will be influenced by national policies which affect the proximate determinants of health and health behaviour and attitudes.

**Aims:** We described and compared attitudes toward intimate partner violence and associated socio-demographic, structural, and attitudinal factors among men and women from sub-Saharan Africa (SSA) (Study I) and explored plausible gender differences to examine societal level factors associated with it (Study II). We also examined if there are any evidence for area- and societal-level social inequalities on women's attitudes toward IPVAW to further understand the pathway by which the broader social environment could influence the individual attitude (Study III). We further studied the association between gender inequality and exposure to IPVAW (Study IV) and examined whether men's and women's attitudes (i.e. believing that IPVAW is justified) are directly linked to exposure and perpetuation of violence (Study V)

**Methods:** We utilised data from 17 Demographic and Health Surveys (DHS) conducted between 2003 and 2007 among 165,983 women and 68,501 men nested within 7465 communities from 17 countries in SSA. We used multiple logistic regression models estimated by likelihood ratio test to explore factors associated with attitudes towards IPVAW (Study I). In Study II, we used meta-analytic methods to examine relationship between societal-level measures of socioeconomic position (SEP) and gender differences in attitude towards IPVAW. In Study III, We applied multivariable multilevel logistic regression analysis and considered three measures of individual SEP: wealth status, educational attainment, and employment status among 165,983 women and 68,501 men. Neighbourhood socioeconomic disadvantage was operationalized with a principal component comprised of the proportion of respondents with no education, unemployed, rural resident, and living below the poverty level. At country level, we included adult illiteracy rate, unemployment rate, and poverty rate. In Study IV, we applied multivariable multilevel logistic regression analysis to explain the role of proximal and distal gender inequalities in forming women's attitudes toward IPVAW among 120,467 women where we adopted an ecological framework in which the propensity to justify IPVAW was a function of individual-, community-, and societal-level variables. In study V, we used multilevel structural equation modelling.

**Results:** We found that IPVAW was widely accepted under certain circumstances by men and women in all the countries studied (Study I).

Women were more likely to justify IPVAW than men (Studies I, II & III). “Neglecting the children” was the most common reason agreed to by both women and men for justifying IPVAW followed by “going out without informing husband” and “arguing back with the husband” (Study I). Increasing wealth status, education attainment, urbanization, access to media, and joint decision making were associated with decreased odds of justifying IPVAW in most countries (Study I). The magnitude in gender disparity in attitudes towards IPVAW increased with increasing percentage of men practicing polygamy in each country (Study II). Furthermore, magnitude in gender disparity in attitudes towards IPVAW decreased monotonically with increasing adult male and female literacy rate, gender development index, gross domestic product and human development index (Study II). There was a significant variation in the odds of justifying IPVAW across the communities and across the countries (Study III & IV). Thus, there was evidence neighborhood and country contextual phenomena shaping individual attitudes towards IPVAW. Men and women living in disadvantaged communities had higher rates of justifying IPVAW compared with their counterparts residing in the most advantaged communities after adjustment for individual SEP (Study III). In addition, women whose husband had higher education and women whose husband had more than one wife were more likely to accept IPVAW than other women (Study IV). Unemployed women with an unemployed partner were more likely to justify IPVAW than employed women with working partners. Both community and societal measures of gender inequality were associated with women’s attitudes toward IPVAW, even after controlling for gender inequality at the individual level (Study IV). Women who with positive attitudes towards IPVAW and those that had witnessed IPVAW were more likely to have reported spousal abuse (Study V). The odds of reporting spousal abuse increased with increasing percentage of women and men that justified IPVAW and percentage of women witnessed IPVAW. There is moderate positive correlation between community and individual variations in spousal physical violence, spousal sexual abuse and spousal emotional abuse (Study V).

**Conclusions:** This large comparative analysis has provided evidence that IPVAW was widely acceptable under certain circumstances and more such among women, younger people, less educated, poorest, those living in rural areas, those with less access to media and single decision makers. Drawing upon multilevel perspectives, we have offered an alternative to more traditional ways of thinking about the factors associated with attitudes towards IPVAW. We found that individual, community and societal context in which people live is associated with attitudes towards IPVAW. There is a need for proactive efforts to break the norms that sustain women's vulnerability in the society besides socio-economic development as well as promotion of higher education among men and women. Direct concerted efforts from the government, non-governmental organisations and enlightened men and women within the society are necessary to raise awareness about the issue as well as questioning the social norms. Given the societal factors that shape the behaviour of communities and individuals, we believe that structural interventions hold great promise for significant achievements in the prevention of IPVAW.

## LIST OF PUBLICATIONS

- I. UTHMAN, O. A., LAWOKO, S. & MORADI, T. 2009. Factors associated with attitudes towards intimate partner violence against women: a comparative analysis of 17 sub-Saharan countries. *BMC Int Health Hum Rights*, 9, 14.
- II. UTHMAN, O. A., LAWOKO, S. & MORADI, T. 2010. Sex disparities in attitudes towards intimate partner violence against women in sub-Saharan Africa: a socio-ecological analysis. *BMC Public Health*, 10, 223
- III. UTHMAN, O. A., MORADI, T. & LAWOKO, S. 2009. The independent contribution of individual-, neighbourhood-, and country-level socioeconomic position on attitudes towards intimate partner violence against women in sub-Saharan Africa: a multilevel model of direct and moderating effects. *Soc Sci Med*, 68, 1801-9.
- IV. UTHMAN, O. A., LAWOKO, S. & MORADI, T. 2010. The role of individual, community, and societal gender inequality in forming women's attitudes towards intimate partner violence against women: a multilevel analysis. *World Health and Population*, 12(2): 5-17
- V. UTHMAN, O. A., MORADI, T. & LAWOKO, S. Are individual and community acceptance and witnessing of intimate partner violence against women related to its occurrence? A multilevel structural equation model [SUBMITTED]

Study I & II © Uthman et al.; licensee BioMed Central Ltd. This is an Open Access articles distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/2.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Study III reprinted with permission from Elsevier

Study IV reprinted with permission from Longwoods publishing

## CONTENTS

1	INTRODUCTION.....	8
2	BACKGROUND.....	9
	2.1 The consequences of intimate partner violence.....	10
	2.2 Theoretical models / Conceptual framework.....	12
	2.3 Rationale for contextual and cross-country .....	14
3	AIMS AND HYPOTHESIS .....	16
	3.1 Overall aim.....	16
	3.2 Specific objectives:.....	16
	3.3 Hypotheses.....	16
4	MATERIALS AND METHODS .....	17
	4.1 Data sources .....	17
	4.2 Ethical considerations.....	18
	4.3 Outcome variables .....	18
	4.4 Determinant variables.....	19
	4.5 Statistical analysis.....	21
5	RESULTS .....	27
	5.1 Comparative analyses.....	27
	5.2 Gender disparities in attitudes towards ipvaw .....	34
	5.3 Individual and contextual socioeconomic position.....	38
	5.4 Roles of gender inequalities in forming attitudes .....	44
	5.5 Linking attitudes to occurrence of partner abuse.....	46
6	DISCUSSION.....	50
	6.1 Main findings.....	50
	6.2 Study limitations and methodological considerations .....	54
	6.3 Study Strengths .....	55
	6.4 Study implications and recommendations .....	57
	6.5 Future researches .....	59
7	CONCLUSIONS .....	60
8	ACKNOWLEDGEMENTS.....	61
9	REFERENCES .....	62



## LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrom
CFI	Comparative Fit Index
CI	Confidence Interval
DHS	Demographic Health Survey
HDI	Human Development Index
HIV	Human Immunodeficiency virus
ICC	Intra-Class Correlation
IOR	Interval Odds Ratio
IPVAW	Intimate Partner Violence Against Women
IQR	Inter Quartile Range
MOR	Median Odds Ratio
OR	Odds Ratio
PCA	Principal Component Analysis
PCV	Proportion Change in Variance
PQL	Penalized Quasi-Likelihood
RMSEA	Root Mean Square Error of Approximation
SE	Standard Error
SEP	Socio-Economic Position
SSA	Sub-Saharan Africa
STI	Sexual Transmitted Infection
TLI	Tucker-Lewis Index
UNDP	United Nation Development Project
VIF	Variance Inflation Factor
WHO	World Health Organization
WLSMV	Weighted Least-Squares estimation with robust standard errors and adjusted Means and Variances

## AN OVERVIEW OF THE FIVE STUDIES

Study	Short title	Data source	Study design	Outcome	Statistical method	Level of analysis
Study I	Comparative analyses	DHS	Cross-sectional	Attitudes towards IPVAW	Multivariable logistic regression	Individual
Study II	Gender differences in attitudes	DHS	Cross-sectional	Attitudes towards IPVAW	Meta-analysis and meta-regression	Country
Study III	Individual and contextual SEP	DHS	Cross-sectional	Attitudes towards IPVAW	Multilevel logistic regression	Individual, community and country
Study IV	Roles of gender inequalities	DHS	Cross-sectional	Attitudes towards IPVAW	Multilevel logistic regression	Individual, community and country
Study V	Linking attitudes to occurrence of IPVAW	DHS	Cross-sectional	IPVAW	Multilevel structural equation	Individual and community

# 1 INTRODUCTION

Intimate partner violence against women (IPVAW) is deep-rooted in many African societies, where it is considered a prerogative of men<sup>1,2</sup> and a purely domestic matter in the society<sup>3,4</sup>. IPVAW is one of the greatest barriers to ending the subordination of women. Women, for fear of violence, are unable to refuse sex or negotiate safer sexual practices, thus increasing their vulnerability to Human immunodeficiency virus (HIV) if their husband is unfaithful<sup>5,6</sup>. Violence against women, especially by intimate partners, is a serious public health problem that is associated with physical, reproductive and mental health consequences<sup>7-10</sup>. Even though most societies proscribe violence against women, the reality is that violations against women's rights are often sanctioned under the garb of cultural practices and norms, or through misinterpretation of religious tenets. Moreover, when violation takes place within the home, as it is often the case, the abuse is effectively ignored by the tacit silence and the passivity displayed by the state and the law-enforcing machinery. The global dimensions of this violence are alarming as highlighted by numerous studies<sup>2,7,8,11-25</sup>.

A troubling aspect of IPVAW is its benign social and cultural acceptance of physical chastisement of women and is the husband's right to "correct" an erring wife<sup>26</sup>. Women's susceptibility to IPVAW has been shown to be greatest in societies where the use of violence in many situations is a socially accepted norm<sup>27</sup>. Studies have shown that attitude towards IPVAW is one of the most prominent predictors of IPVAW, when contrasted with other potential predictors including social and empowerment factors<sup>28,29,30</sup>. As it has been emphasised by a number of scholars<sup>31,32,33</sup>, without a fundamental change in the social attitudes that foster, condone, and perpetuate IPVAW we will not be able to respond effectively to this problem, by substantially reducing its alarming rates. Women's own condemnation of this behaviour may, therefore, be an important element in changing it. Most of the studies in the low- and middle-income countries on IPVAW have focused on actual prevalence of IPVAW and its determinants<sup>2,7,8,11-25</sup> and less focus has been on the underlying attitudes towards IPVAW<sup>5,34-38</sup>. Though attitudes do not directly translate into action, attitudes towards IPVAW could reflect underlying capability of inflicting harm (among men) and taking abuse (among women). It is therefore an important outcome measure on its own right and, particularly in societies where disclosure of actual IPVAW is under-estimated<sup>39</sup>. Knowing the extent and reasons for justification of IPVAW in a particular setting is important for different reasons<sup>35</sup>. First, unfettered social and cultural acceptance of IPVAW may not only lead to abetting such practices, but may also create major obstacles toward altering such practices. Hence, understanding the underlying factors related to positive attitude towards IPVAW may be fundamental for designing effective programmes to address the issue. Second, acceptance of IPVAW can be considered as an indicator of the status of women in a specific social and cultural setting. Levels of acceptance of IPVAW can provide insights into the stage of social, cultural and behavioural transformation of a specific society in its evolution towards a more gender egalitarian society. Thus, this thesis attempts to identify individual and contextual factors associated with attitudes towards and exposure to IPVAW in sub-Saharan Africa.

## 2 BACKGROUND

Intimate partner violence against women (IPVAW) is defined as threatened, attempted, or completed physical or sexual violence or emotional abuse by a current or former intimate partner<sup>40</sup>. IPVAW can be committed by a spouse, an ex-spouse, a current or former boyfriend or girlfriend, or a dating partner<sup>40</sup>. Intimate partner violence against women are serious and widespread problems worldwide<sup>41</sup>. Apart from being violations of human rights, they profoundly damage the physical, sexual, reproductive, emotional, mental and social well-being of individuals and families<sup>41</sup>. The immediate and long-term health outcomes that have been linked to these types of violence include physical injury, unwanted pregnancy, abortion, gynaecological complications, sexually transmitted infections (including human immunodeficiency virus), posttraumatic stress disorder and depression, among others<sup>41</sup>. The World Health Organization (WHO) Multi-country study on women's health and domestic violence against women indicated that 15–71% of women experience physical and/or sexual violence by an intimate partner at some point in their lives<sup>42</sup>.

Intimate partner violence against women (IPVAW) is present in almost all societies<sup>43</sup><sup>44</sup> and is associated with considerable mortality<sup>7</sup><sup>43</sup>. IPVAW has been linked to numerous kinds of immediate and long term physical and psychological injury in women<sup>45</sup>. IPVAW is integrally linked to ideas of male superiority over women<sup>27</sup>. These are manifest in different ways in different societies. Violence is one way to create and enforce gender hierarchy and punish transgression<sup>46</sup>, to resolve relationship conflict and to seek resolution of crisis of masculinity by providing a sense of power<sup>46</sup>. Different factors influence the status of women and men in a society and thus, influence these processes<sup>46</sup>. These factors include social and demographic characteristics of the women and men, their economic circumstances, and the characteristics of their relationship<sup>47-53</sup>. Among other potential risk factors, attitude towards IPVAW has been suggested as one prominent predictors of IPVAW<sup>28</sup><sup>29</sup><sup>54</sup>. Attitudes that support IPVAW may be an indication of deeper malaise in the society<sup>5</sup>. High acceptance of IPVAW may suggest high levels of acceptance of violence to resolve any conflict and acceptance of violence as an instrument to retribution<sup>5</sup>. This may in turn suggest that IPVAW may be more common in these societies<sup>5</sup>.

Intimate-partner violence against women (IPVAW) appears to have occurred from the beginning of societies<sup>55</sup>. A recent study by the WHO confirmed that IPVAW is widespread and a serious form of human rights abuse as well as a public health issue<sup>11</sup><sup>56</sup>. Violence places a serious health burden on women and their children, and its role is amplified through its connection to the rising tide of HIV<sup>57</sup><sup>58</sup>. Establishing risk factors for IPVAW is crucial for addressing women's health and development. A consensus is emerging that a combination of personal, economic, social and cultural factors may be associated with IPVAW<sup>59</sup>. Despite this consensus, most studies of IPVAW explore individual-level factors, whereas community or societal factors remain generally unexplored<sup>59</sup>. Acceptance of IPVAW is a factor that has been suggested as one of the strongest predictors of IPVAW<sup>28</sup>. A troubling aspect of IPVAW is its benign social and cultural acceptance in several parts of the world as a means of physically chastising women – the husband's right to “correct” an erring wife<sup>26</sup><sup>60</sup>.

Available research suggests that women's susceptibility to IPVAV is greatest in societies where the use of violence in many situations is a socially accepted norm<sup>27</sup>. A large proportion of women in these societies considered "arguing with husband" and "refusing sex" as valid reasons for wife beating<sup>61</sup>. Women's own condemnation of this behaviour may, therefore, be an important element in changing it<sup>62</sup>. If women do not confront men because of the threat of domestic violence, the widespread acceptance of IPVAV may also become a major hurdle to the success of other initiatives. These include reproductive health programs (i.e., family planning), care seeking for sexually transmitted diseases or voluntary testing and counselling for HIV, and condom use for prevention of HIV/AIDS.

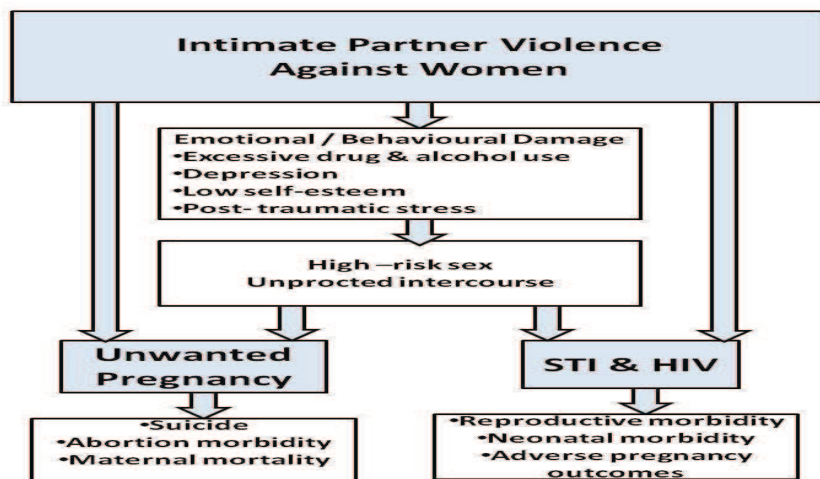
A myriad of studies have been undertaken to understand factors associated with IPVAV. It has been suggested that demographic, social, empowerment and behavioural factors may account for variations in vulnerability to IPVAV among women and men<sup>36 37</sup>. One factor that has recently been acknowledged as one of the strongest predictors, however, is attitudes towards IPVAV. Women who bear tolerant attitudes experience IPV to a higher degree than their intolerant peers far and beyond the contribution of demographic, social and empowerment indicators<sup>28 63</sup>. These findings have prompted increased interest to further investigate determinants of attitudes towards IPVAV in a bid to guide intervention work to eventually manage IPVAV itself<sup>36 37</sup>. Researchers have connected attitudes towards IPVAV with individual socio-demographic variables such as age, education, occupation, marital status, and place of residence<sup>5 35-38 54</sup>. Similarly, structural information and a low level of autonomy have shown to be associated with an increased likelihood of tolerating IPVAV among women. A small number of studies utilising multilevel analyses have shown that social and community level factors such as neighbourhood poverty and disadvantage are related to higher rates of IPVAV against women<sup>64-69</sup>. These findings suggest that community-level SEP capture information above and beyond those at the individual levels and do not serve simply as proxies for individual-level SEP.

## 2.1 THE CONSEQUENCES OF INTIMATE PARTNER VIOLENCE

Studies from Africa and rest of the world document intimate partner violence against women (IPVAW) as a serious public health issue, conferring immediate and long-term threats to women's health<sup>55 70-77</sup>. Researchers and policy makers have increasingly cited gender-based violence as essential determinants of women's health. IPVAV exposure has often been associated with increased vulnerability to HIV<sup>35</sup> and negative reproductive health outcomes<sup>12</sup> both worldwide<sup>58 78 79</sup> and in sub-Saharan Africa<sup>80-82</sup>.

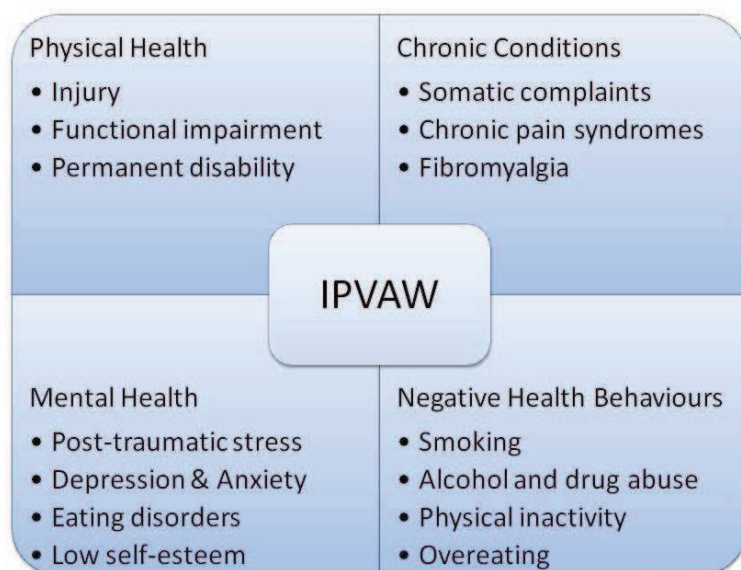
**IPVAW operates through multiple pathways to affect women's sexual and reproductive health (see Figure 1)**<sup>83</sup>. Physical violence and sexual abuse can put women at risk of infection and unwanted pregnancies *directly*, if women are forced to have sex, for example, or fear using contraception or condoms because of their partners' reaction<sup>83</sup>.

**Figure 1: Reproductive health complications associated IPVAW (Adapted from Heise<sup>83</sup>)**



The negative consequences of abuse extend beyond women's sexual and reproductive health to their overall health, the welfare of their children, and even the economic and social fabric of nations<sup>83</sup>. By sapping women's energy, undermining their confidence, and compromising their health, IPVAW deprives society of women's full participation. IPVAW has been linked to many serious health problems. These include physical health problems, such as injury, chronic pain syndromes, and gastrointestinal disorders, and a range of mental health problems, including anxiety and depression. Violence also undermines health by increasing a variety of negative behaviours, such as smoking and alcohol and drug abuse (see Figure 2)<sup>83</sup>.

**Figure 2: Health outcomes of IPVAW**



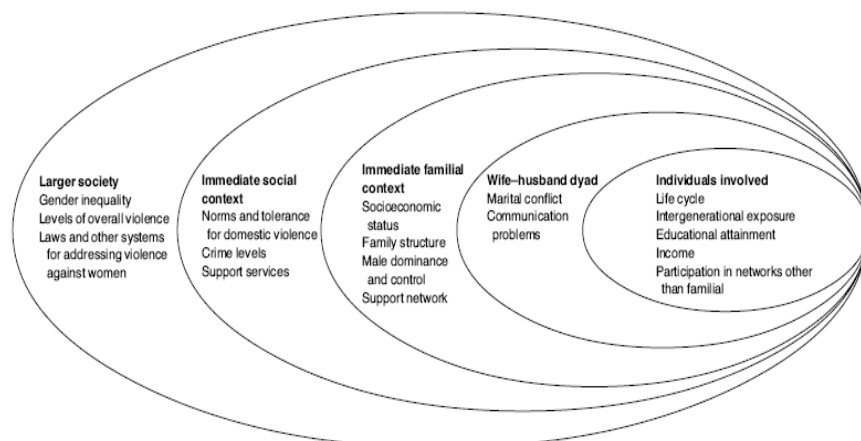
## 2.2 THEORETICAL MODELS / CONCEPTUAL FRAMEWORK

In this thesis, we used the following models / theories to explore factors associated with attitudes towards and exposure to IPVAW: ecological model, theory of planned behaviour, Bandura's social learning theory, social disorganization and imbalance theory of resource and power.

### 2.2.1 Ecological model

Family violence researchers often draw upon an ecological perspective to understand partner abuse (Figure 3) <sup>84 85</sup>. This framework conceptualizes violence as a multifaceted phenomenon grounded in an interplay of individual, family, community, and societal factors<sup>85</sup>. The framework takes into account the different levels of societal organization and their role in influencing attitudes towards IPVAW. An individual resides in a household unit, which in turn is situated within a community, which will operate under the policies of a state or national government. Each level within the societal hierarchy has the potential to influence individual attitudes towards IPVAW. Ecological framework has been used widely by researchers to understand the interplay of personal, situational and socio-cultural factors that combine to cause IPVAW<sup>85</sup>. This model postulates that IPVAW results from the interaction of factors at different levels of social environment. Ecological model allows for the inclusion of risk factors from multiple domains of influence (such as individual, relationship, community and society level). Building such a model offers a framework for understanding the complex interplay of all the factors that influence IPVAW, and can therefore provide key points for prevention and intervention <sup>86</sup>. The ecological model also supports a comprehensive public health approach that not only addresses an individual's risk of becoming a victim or perpetrator of violence, but also the norms, beliefs and social and economic systems that create the conditions for IPVAW to occur<sup>41</sup>.

Figure 3: Ecological model (Adapted from Heise (1998)<sup>85</sup>)



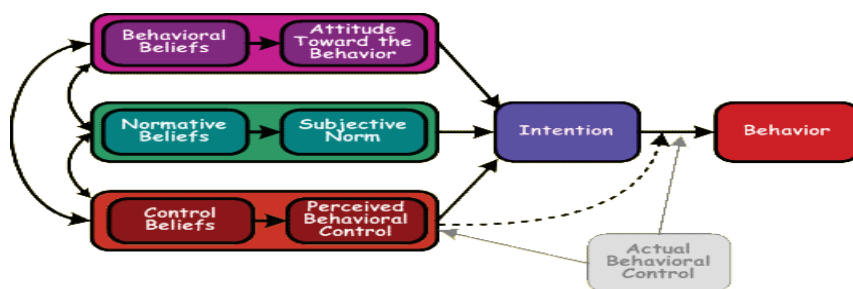
### 2.2.2 Bandura's social learning theory

Social learning theory postulates that individuals learn how to behave by observing and re-enacting the behaviour of role models<sup>87-88</sup>. Social norms and gender roles in a patriarchal society are learned within a social group and transmitted from generation to generation. The myth of male superiority is maintained in many societies through rigid gender norms and social practices. Factors that will promote intolerant attitudes towards IPVAV will operate mainly via three mechanisms<sup>35</sup>: by producing a conflict between reality and myth of male superiority; by exposing people to more egalitarian social networks and authority structures other than kin-based ones; and by exposing to non-conformist ideas through modern media. Wealth defines class, which may be characterised by different social networks. Since poverty may increase chances of conflict over resources, it is likely that individuals growing up in poor households and neighbourhoods are often exposed to violence both within and outside the family resulting in high acceptance of violence to resolve conflicts. Furthermore, education and urbanisation may have a greater inverse effect on acceptance of IPVAV among women than among men.

### 2.2.3 Theory of planned behaviour

The theory of planned behavior is a theory about the link between attitudes and behavior<sup>89-92</sup>. It was proposed by Icek Ajzen as an extension of the theory of reasoned action. It is one of the most predictive persuasion theories. The Figure 4 is a schematic representation of the theory According to the theory, human behavior is guided by three kinds of considerations: beliefs about the likely outcomes of the behavior and the evaluations of these outcomes (behavioral beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors (control beliefs)<sup>89-92</sup>. In combination, "attitude toward the behavior," "subjective norm," and "perceived behavioral control" lead to the formation of a "behavioral intention". In particular, "perceived behavioral control" is presumed to not only affect actual behavior directly, but also affect it indirectly through behavioral intention. As a general rule, the more favorable the attitude toward behavior and subjective norm, and the greater the perceived behavioral control, the stronger the person's intention to perform the behavior in question should be. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises<sup>89-92</sup>.

Figure 4: Theory of planned behaviour (Ajzen 2006<sup>93</sup>)





In its simplest form, the theory of planned behaviour can be expressed as the following mathematical function:

$$BI = (W_1)AB[(b) + (e)] + (W_2)SN[(n) + (m)] + (W_3)PBC[(c) + (p)]$$

where  $BI$  = Behavioral intention;  $AB$  = Attitude toward behavior;  $(b)$  = the strength of each belief;  $(e)$  = the evaluation of the outcome or attribute;  $SN$  = social norm;  $(n)$  = the strength of each normative belief;  $(m)$  = the motivation to comply with the referent;  $PBC$  = Perceived Behavioral Control;  $(c)$  = the strength of each control belief;  $(p)$  = the perceived power of the control factor;  $W$  = empirically derived weight/coefficient

#### **2.2.4 Social disorganization**

We adopted the concept of social disorganization referring to the inability of a community to realize common goals and solve chronic problems to explain attitudes towards IPV<sup>94</sup>. According to the theory, poverty, residential mobility, ethnic heterogeneity, and weak social networks decrease a neighbourhood's capacity to control the behaviour of people and hence increase the likelihood of crime or violence<sup>94</sup>. In general, poverty has been found to have the greatest explanatory power<sup>95</sup>. Poverty diminishes the resources necessary to sustain basic institution like the family, schools, and voluntary organizations in urban neighbourhoods<sup>65</sup>. We therefore hypothesized that societal and neighbourhood socioeconomic disadvantage will negatively influence attitudes towards IPV<sup>AW</sup>.

#### **2.2.5 Imbalance theory of resources and power**

Drawing largely on feminist theory<sup>96 97</sup> and imbalance theory of resources and power<sup>20 98 99</sup>, we developed a working conceptual framework to help choose variables for exploring the role of proximate and distal gender inequalities in forming women's attitudes toward IPV<sup>AW</sup>. Variables included here relate to the larger society, immediate social context, immediate family context, spousal relation factors and individual factors concerning both partners. Our approach to understanding the origins of women's attitudes toward IPV<sup>AW</sup> focused on the dynamics of men's and women's behaviours and the resources that each partner brings to the conjugal union. We identified five general domains that reflect underlying power disparities or restrictions on women's options within unions: (1) age, (2) education, (3) occupation, (4) decision-making autonomy, and (5) household stressors. Within these five domains, gender inequality in marriages or societies may create the terms for the kind of "sexual contract" that places women at a disadvantage<sup>17 57</sup>, setting the stage for acceptance of IPV<sup>AW</sup>.

### **2.3 RATIONALE FOR CONTEXTUAL AND CROSS-COUNTRY**

The study of IPV<sup>AW</sup> using nationally representative data has become possible in many developing countries owing to the availability of domestic violence data collected by the Demographic and Health Surveys program. The wide-scale achievement in data collection has facilitated comparisons of data in diversity contexts across continents.

However, despite the growing evidence supporting a link between neighborhood context and health and health behavior, only a limited number of studies have investigated the relationship between neighborhood characteristics attitudes towards and exposure to IPVAW<sup>30 66 100</sup>, net of individual-level characteristics.

Much research has focused on individual-level socio-demographic factors associated with attitudes towards and exposure to IPVAW<sup>12-16 19 36 38 48 57 80 101-104</sup>. Yet, theories suggest that distribution and determinants of population health and social risk behaviours (e.g. violence) is epistemologically multilevel<sup>105-108</sup>. Focusing only at one level—either the micro individual level or the macro scale of contexts—generates conceptual and practical problems<sup>109</sup>. Therefore, to expand our understanding of the risk factors associated with attitudes towards and exposure to IPVAW, we considered an additional risk factor, the characteristics of the communities in which women live. There are advantages to studying the predictors of health outcomes using multilevel approach<sup>110</sup>; community and household level analyses identify the social, cultural, and economic context in which an individual experience IPV. Beyond the communities, individuals will be influenced by national policies which affect the proximate determinants of health and health behaviour and attitudes<sup>111-114</sup>. Therefore by using a cross-region methodology, we will be able to study the effects of different levels of societal organization, to provide more robust evidence of the factors associated with attitudes towards and exposure to IPVAW.

Neighbourhoods constitute a key determinant of socio-economic disparities in health, as they shape individual opportunities and expose residents to multiple risks and resources over the life course<sup>115 116</sup>. Focusing only at one level – either the micro individual level or the macro scale of contexts – generates conceptual and practical problems<sup>109</sup>. Socio-economic inequalities can be analysed from the individual to urban neighbourhoods up to cities and across countries. Thus, the contextual aspect of attitudes toward IPVAW needs to be explored to understand a more complete process.

### **3 AIMS AND HYPOTHESIS**

#### **3.1 OVERALL AIM**

The main aim of this thesis is to improve our understanding of the individual, familial, neighbourhood, and societal-level factors associated with attitudes towards and exposure to IPVAV both from a victim and perpetrator perspective using the sub-Saharan Africa context. This aims to explore and draw attention to the effects of a large unexplored body of contextual factors. The underlying motivation is to account for some of portion of the variance that has not been explained by the traditional set of individual socio-demographic factors.

#### **3.2 SPECIFIC OBJECTIVES:**

- To describe and compare attitudes toward intimate partner violence and associated socio-demographic, structural, and attitudinal factors among men and women from sub-Saharan Africa (Study I)
- To explore sex differences in attitudes toward IPVAV in SSA and to examine societal level factors associated with it. (Study II)
- To examine the evidence for area- and societal-level social economic position (SEP) inequalities on women' attitudes toward intimate partner violence, to further understand the pathway by which the broader social environment could influence the individual attitude (Study III)
- To role of individual and contextual measures of gender inequalities in forming attitudes towards IPVAV (Study IV)
- To examine whether men's and women's attitudes (i.e. believing that IPVAV is justified) are directly linked to perpetuation and exposure of IPVAV respectively (Study V)

#### **3.3 HYPOTHESES**

- Based on social-ecological model of violence <sup>85 117</sup> it is hypothesized that differences in individual, neighbourhood, and societal will explain variations in women's and men's attitudes towards IPVAV.
- Women who had witnessed IPVAV in childhood were more likely to have tolerant attitudes towards IPVAV
- Women with tolerant attitudes towards IPVAV; women with husband with tolerant attitudes towards IPVAV were more likely to experience IPVAV.
- Increasing tolerance of IPVAV among women and women at the community level will be positively associated with exposure to IPVAV

## 4 MATERIALS AND METHODS

### 4.1 DATA SOURCES

#### 4.1.1 Individual-level data

This thesis used data from Demographic and Health Surveys (DHS) conducted between 2003 and 2007 in sub-Saharan Africa available. DHS surveys were implemented by respective national institutions and ICF Macro International Inc. with financial support from the US Agency for International Development. Methods and data collection procedures have been published elsewhere<sup>118</sup>. Briefly, DHS data are nationally representative, cross-sectional, household sample surveys with large sample sizes, typically between 5,000 and 15,000 households. The sampling design typically involves selecting and interviewing separately nationally representative probability samples of women aged 15-49 years and men aged 15-59 years based on multi-stage cluster sampling, using strata for rural and urban areas and for different regions of the countries. A standardized questionnaire was administered by interviewers to participants in each country. The survey's questionnaires were similar across countries yielding inter-country comparable data. Only countries with available data on attitudes towards IPVAV were included in this study. This resulted in inclusion of the following 17 participating countries in DHS (see Figure 5): Benin, Burkina Faso, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Swaziland, Tanzania, Uganda and Zimbabwe.

**Figure 5: Study countries**



#### **4.1.2 Community-level data**

We used the term community to describe clustering within the same geographical living environment. Communities were based on sharing a common primary sample unit (PSU) within the DHS data. The sampling frame for identifying PSU in the DHS is usually the most recent census. In urban areas, this results in census enumeration blocks being identified for sampling purposes. In rural areas villages areas are normally used to identify a PSU. Where a village is identified as having less than 50 households, it is normally joined with a larger neighbouring village to ensure there are at least 50 households in each PSU. If a village has more than 500 households, it is normally still only viewed as one PSU, although it will be segmented, with a sub-sample of segments being selected for household listing and interviewing. The unit of analysis was chosen for two reasons. First, PSU is the most consistent measure of community across all the surveys<sup>110</sup>, and thus the most appropriate identifier of community for this cross-region comparison. Second, it has been shown that for most of the DHS conducted, the sample size per cluster met the optimum size with a tolerable precision loss<sup>119</sup> (The bias introduced by using cluster averages based on about 25 women as a proxy for the PSU population averages is very small – only about 4%<sup>120</sup>). We also used the terms neighbourhood and community interchangeably in this study

#### **4.1.3 Country-level data**

We gathered country-level data matched within the same time frame when DHS were conducted from the reports published by the United Nations Development Programs<sup>121</sup> and World Bank<sup>122</sup>.

### **4.2 ETHICAL CONSIDERATIONS**

This thesis is based on an analysis of existing survey data with all identifier information removed. The survey was approved by the Ethics Committee of the ORC Macro at Calverton in the USA and by the National Ethics Committee in the respective country. All study participants gave informed consent before participation and all information was collected confidentially.

### **4.3 OUTCOME VARIABLES**

#### **4.3.1 Intimate Partner Violence Against Women (IPVAW)**

IPVAW (spousal physical, sexual and emotional abuse) were assessed using a modified and previously validated version of the Conflict Tactic Scale<sup>123</sup>, where IPVAW is defined as exposure to one or several of the following experiences perpetrated by a husband/partner ever. IPVAW Six variables were used to measure physical abuse: spouse ever pushed, shook or threw something; spouse ever slapped; spouse ever punched with fist or something harmful; spouse ever kicked or dragged; spouse ever tried to strangle or burn; and spouse ever threatened with knife/gun or other weapon. Two variables were used to measure sexual abuse: forced sexual intercourse and other sexual act when undesired. Three variables were used to measure emotional abuse: spouse ever humiliated her in public; spouse ever threatened her with harm; and spouse ever insult or make feel bad.

### 4.3.2 Attitudes towards IPVAW

To assess the degree of acceptance of IPVAW by women and men, respondents were asked the following question: “Sometimes a husband is annoyed or angered by things which his wife does. In your opinion, is a husband justified in hitting or beating his wife in the following situations?” The five scenarios presented to the respondents for their opinions were: 1. “if wife burns the food,” 2. “if wife argues with the husband,” 3. “if wife goes out without informing the husband,” 4. “if wife neglects the children,” and 5. “if the wife refuses to have sexual relations with the husband”. Information was collected from all women and men irrespective of their marital status. A binary outcome variable was created for acceptance of IPVAW, coded as ‘0’ if the respondent did not agree with any of the situations when a husband is justified in beating the wife or did not have any opinion on the issue and coded as ‘1’ if the respondent agreed with at least one situation where the husband is justified in beating the wife.

## 4.4 DETERMINANT VARIABLES

### 4.4.1 Individual-level factors

To assure consistency, we selected determinant variables based upon previous studies that investigated factors associated with attitudes towards IPVAW:

*Demographic /social position* was assessed using the following indicators: Sex of respondent was defined as men or women; age (15-24, 25-24, 35+ years), place of residence (urban or rural area), occupation (working or not working), education (no education, primary, secondary or higher), marital status (never-, currently-, or formerly married). DHS did not collect direct information on household income and expenditure. We, therefore, used a household wealth index, estimated from asset variables using principal components analysis (PCA)<sup>124-128</sup>, as a proxy indicator for household economic position in the analysis. Ownership of consumer items such as a radio or car as well as characteristics of the dwelling such as floor or roof type, toilet facilities and water sources were items that measured the concept of poverty in these settings. For analytic purposes, we divided the weighted scores into quintiles: poorest, poor, middle, rich, and richest.

*Media access* was assessed using the following indicators: access to information measured via frequency of watching television, listening to radio, and reading newspapers/magazine. To allow meaningful statistical analysis, we dichotomized the response levels “less than one week”, “at least once a week”, and “almost every day” as one group and the response level “not at all” as the other group.

*Decision making power*: Respondents’ decision autonomy were assessed by inquiring about who bore the responsibility of making decisions on household purchases including small and large ones, visiting relatives and friends, spending the wife’s earnings, and the number of children to have. For these variables, response options were “husband,” “wife,” or “both husband and wife”. We created set of additive scale (from 0 to 5) that counted the number of domains in which each (husband/partner alone, wife alone, and couple) had the final word.

Seven variables characterizing individual-level measures of gender inequality were included. They were (1) spouses’ relative education, (2) spousal age gap, (3) employment discrepancy, (4) polygamy, (5) parity, (6) early marriage, and (7) decision-making power.

Birth cohort was included as a partial control for a period trend to control for effects of unknown factors that may have been introduced due to different timing of surveys across countries.

Witnessed IPVAW in childhood: Whether respondents witnessed IPVAW or not during their childhood were assessed by inquiring whether their father ever beat her mother?

#### **4.4.2 Community-level**

We considered neighbourhood socioeconomic disadvantage for the community-level variable in this study. Neighbourhood socioeconomic disadvantage was operationalized with a principal component comprised of the proportion of respondents with: no education (illiterate), unemployed, rural resident, and living below the poverty level (asset index below 20% poorest quintile). A standardized score with mean 0 and standard deviation 1 was generated from this index; with higher scores indicative of lower SEP. We divided the resultant scores into five quintiles to allow for nonlinear effects and provide results that were more readily interpretable in the policy arena. To avoid overlap of measures between the two levels of analysis, community-level variables were derived using non-self means or proportions. Each respondent was assigned a value representing the average of all other respondents (excluding those of the respondent) in their cluster.

In terms of community-level measures of gender inequality, we considered (1) community median age of marriage, (2) average household size, (3) average spousal age gap, and (4) ratio of educated and employed men to women in the community. Place of residence was also included as a control variable at the community level.

Percentage of respondents with tolerant attitudes towards IPVAW and percentage of respondents that witnessed IPVAW in childhood were derived from the DHS at community-level.

#### **4.4.3 Country-level**

The country-level characteristics included in this study were percent of men practicing polygamy, gross domestic product per capita, adult male and female literacy rate, gender-related development index (GDI) <sup>129 130</sup>, and human development index (HDI) <sup>129 131</sup>.

We used World Bank poverty threshold, proportion of people living below \$1 a day. The poverty threshold, or poverty line, is the minimum level of income deemed necessary to achieve an adequate standard of living in a given country. Unemployment rate is defined as the percentage of those in labour force who are unemployed. Illiteracy rate is defined by the United Nations Educational, Scientific and Cultural Organization (UNESCO) percentage of those with inability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts. We categorized country-level poverty, unemployment, and adult illiteracy rates into two categories (low and high) to allow for nonlinear effects and provide results that were more readily interpretable in the policy arena. Median values served as the reference group for comparison.

HDI is a composite index that measures a country's average achievements in three basic aspects of human development: health, knowledge and a decent standard of living. GDI measures achievement in the same basic capabilities as the HDI does, but takes note of inequality in achievement between women and men. The methodology used imposes a penalty for inequality such as falling the GDI when the achievement levels of both women and men in a country go down or when the disparity between their achievements increases. The greater the gender disparity in basic capabilities, the lower a country's GDI compared with its HDI. The GDI is simply the HDI discounted, or adjusted downwards, for gender inequality. The Gender-related Development Index (GDI), which reflects gender disparities in basic human capabilities, was used as a measure of societal-level gender inequality. Measures gender disparities in the areas of life expectancy at birth; education, by adult literacy rate combined with the primary, secondary, and tertiary gross enrolment ratio; and estimated earned income (purchasing power, parity of US dollars). These areas of measurement refer to the “gendered gap” that exists between men and women in their access to economic and social resources and services due to women’s disadvantaged position in society. To provide results that were more readily interpretable in the policy arena, we divided GDI and HDI into low, medium and high categories based on tiers.

## 4.5 STATISTICAL ANALYSIS

### 4.5.1 Study I

In the descriptive statistics the distribution of respondents by the key variables were expressed as percentages. We used Pearson's chi-squared test for analyzing contingency tables. All cases in the DHS data were given weights to adjust for differences in probability of selection and to adjust for non-response. Individual weights were used for descriptive statistics in this study. We used multiple logistic regressions to examine factors associated with attitudes towards IPVAV. We entered all covariates simultaneously in the multiple regression models. Results were presented in the form of odds ratio (ORs) with significance levels and 99% confidence intervals (99% CIs). We performed random-effects estimates models as described by DerSimonian and Laird<sup>132</sup> to incorporate between-country heterogeneity in addition to sampling variation for the calculation of summary OR estimates and corresponding 99% CIs. Between countries heterogeneity was assessed using the Cochran Q test<sup>133</sup> and the  $I^2$  statistic<sup>134</sup>, which describes the percentage of total variation across countries that is the result of heterogeneity rather than chance.  $I^2$  was calculated based on the formula  $I^2 = 100\% \times (Q - \text{degree of freedom})/Q$ .

Regression diagnostics were used to judge the goodness-of-fit of the model. They included the tolerance test for multicollinearity, its reciprocal variance inflation factors (VIF), presence of outliers and estimates of adjusted R square of the regression model. The largest VIF less than 10 or the mean VIF less than 6 represent acceptable fit of the models<sup>135 136</sup>. Statistical methods for complex survey data, Stata, release 10.0 (Stata Corp., College Station, TX, USA) were used to account for stratification, clustered sampling and weighing to estimate efficient regression coefficients and robust standard errors. All tests were two tailed. Since due to the large sample size, small differences in attitudes between groups may easily reach the conventional 0.05 statistical significance, we reduced the condition for significance to 0.01 to account for this effect.



### 4.5.2 Study II

*Meta-analysis:* We calculated Odds ratios (OR) for the association between sex of the respondent and acceptance of IPVAW for each country. We used DerSimonian-Laird method (random-effects model)<sup>132</sup> to calculate pooled OR across countries. We evaluated the homogeneity of the results through Cochran's Q test<sup>133</sup>. The quantity  $I^2$  describes the percentage variation across studies that have heterogeneity<sup>134 137</sup>. Negative values of  $I^2$  were adjusted to zero (no heterogeneity) to give an  $I^2$  between 0 and 100%, where larger values show increasing heterogeneity. We performed leave-one-country-out sensitivity analysis to determine the stability of the results. This analysis evaluated the influence of individual countries by estimated the weighted average OR in the absence of each country.

*Meta-regression analysis:* We investigated the impact of various country characteristics on OR estimates through an inverse-weighted linear meta-regression analysis. The independent variable was the natural logarithm of the OR. The explanatory factors included the country characteristics (listed above), sample size, sub-region and the calendar year of the survey. This analysis accounted for aspects such as effect modifications of the explanatory factors by performing univariable linear regression analyses for each factor. All tests were two sided and  $p < 0.05$  was considered significant. Stata 10 (Stata Corp, College Station, TX, USA) software was used for analysis.

### 4.5.3 Study III

We examined univariable associations between attitudes toward IPV against women using cross-tabulations and Pearson's chi-squared test. We used multivariable logistic multilevel to analyse the association between attitudes towards IPV and SEP. We specified a 3-level model for binary response  $y$ , reporting affirmative attitude toward IPV or not, for individuals  $i$  living in neighbourhood  $j$  from country  $k$  of the form:

$$\pi_{ijk} : y_{ijk} \sim \text{Bernoulli}(1, \pi_{ijk})$$

Probability was related to a set of categorical predictor  $X$  and a random effect for each level by a logit-link function as

$$\text{logit}(\pi_{ijk}) = \log[\pi_{ijk} / (1 - \pi_{ijk})] = \beta_0 + \beta_1 X_{ijk} + \beta_2 X_{jk} + \beta_3 X_k + u_{0jk} + v_{0k}$$

The linear predictor on the right-hand side of the equation consisted of a fixed part ( $\beta_0 + \beta_1 X_{ijk} + \beta_2 X_{jk} + \beta_3 X_k$ ) estimating the conditional coefficients for the exposure variables and two random intercepts attributable to neighbourhoods ( $u_{0jk}$ ) and country ( $v_{0k}$ ), with each assumed to have an independent and identical distribution and variance estimated at each level

#### *Modelling:*

We constructed six models. The first model, an empty model, was without any exposure variables i.e., simple component of variance analysis. The second model contained birth cohort and individual-level SEP consisted of gender, level of education, occupational status, and wealth status. The third model was extended to include neighbourhood socio-economic contextual variable. The fourth model additionally contained country-level human poverty index. We fitted fifth model to analyze cross-level interaction by letting the slopes of the associations between the individual socio-economic variables and attitudes towards IPV vary at the community level.

Similarly, we allow the slopes of the associations between neighbourhood socioeconomic variable and attitudes toward IPV vary at the country level.

Finally, we added two-way interaction terms of gender on individual-, community-, and country-level socioeconomic factors. This was added to test whether the effects of individual-, community-, and country-level socioeconomic factors on attitudes towards IPV against women were modified by gender. Finally,

*Fixed effects (measures of association)*

The association between attitudes towards IPV against women and SEP were shown as odds ratios (ORs) with 95% confidence intervals (CIs).

*Random effects (measures of variation)*

The intraclass correlation (ICC) and proportional change in variance

The possible contextual effect was measured by the intraclass correlation (ICC). The ICC represents the percentage of the total variance in the probability of the individual outcome is related to the community and country level. It is also used as a measure of clustering of attitudes toward IPV in the communities and countries. The ICC was calculated by the linear threshold (latent variable method) according to the formula used by<sup>138</sup> as follows:

Proportion variance due to differences between countries  
 = similarity of respondents in the same country  
 = intra-country correlation ( $ICC_c$ )

$$= \frac{V_c}{V_n + V_c + \left(\frac{\pi^2}{3}\right)}$$

Proportion variance due to differences between neighbourhoods  
 = similarity of respondents in the same community, in same the country  
 = intra-community correlation ( $ICC_n$ )

$$= \frac{V_n + V_c}{V_n + V_c + \left(\frac{\pi^2}{3}\right)}$$

Where  $V_n$  is the neighbourhood (community) variance and  $V_c$  the country variance. A high ICC in the empty model indicates high clustering of attitudes towards IPV in the community and thus a strong community and country effect on attitudes toward IPV. A low ICC, on the hand, expresses the existence of a weak community and country influence on attitudes toward IPVAW.

The proportion change in variance, i.e. variance explained by different variables was calculated as:

$$PCV = \left\{ \frac{V_{initial} - V_{after}}{V_{initial}} \right\} \times 100$$

Where  $V_{initial}$  is the variance in the empty model and  $V_{after}$  is variance in the different models.

### The Median odds ratio (MOR)

Following the ideas of Larsen et. al.<sup>139 140</sup> on neighbourhood effects, we reported the random effects in terms of odds. The MOR measures the second or third level (neighbourhood or country) variance as odds ratio and estimates the probability of attitudes toward IPV that can be attributed to neighbourhood and country context. MOR equal to one indicates no neighbourhood or country variance. Conversely, the higher the MOR, the more important are the contextual effects for understanding the probability of justifying IPV. The MOR directly depends on the neighbourhood level variance and can be computed with the following formula:

$$MOR = e^{(\sqrt{2V_n} \times 0.6745)} \approx e^{0.95\sqrt{V_n}}$$

where  $V_n$  is the second or third level (neighbourhood or country) variance and 0.6745 is the 75<sup>th</sup> percentile of the standard normal distribution with mean zero and variance one.

### The Interval odds ratio (IOR)

The IOR integrates random effects (i.e. the community variance) in the measurement of fixed effects (i.e. the community variable). The 80% IOR is an interval around the odds ratio for the community variable, covering the mid 80% of the pairwise odds ratios. The lower and upper limits of the 80% IOR can be computed with the following formula:

$$IOR_{lower} = e^{(\beta - 1.2816\sqrt{2V_n})} \approx e^{(\beta - 1.81\sqrt{V_n})}$$

$$IOR_{upper} = e^{(\beta + 1.2816\sqrt{2V_n})} \approx e^{(\beta + 1.81\sqrt{V_n})}$$

where  $V_n$  is the second or third level (neighbourhood or country) variance, and  $-1.2816$  and  $1.2816$  are the 10th and 90th percentiles of the standard normal distribution with mean 0 and variance 1.

The IOR is narrow when the between-community variance is small, and it is wide when the between-community variance is large. If the IOR contains one, the remaining unexplained community variance is large compared with the effect of the community variable. If the IOR does not contain one, the effect of the community variable is large compared with the unexplained variance between communities.

### Random slope variance

Random slope variance indicates whether association between exposure variable and attitudes toward IPV is different in different communities, and whether the community level modifies associations between individual level variables.

### Model fit and specifications

We checked for multicollinearity problems among exposure variables examining the variance inflation factor (VIF)<sup>141 142</sup>, all diagonal elements in the variance-covariance ( $\tau$ ) matrix for correlation between -1 and 1, and diagonal elements for any elements close to zero. analyses included calculation of the variance inflation factor (VIF) for each explanatory variable<sup>142</sup>. None of the results of the tests provided reasons for concern. The stability of model estimates for differing subsets of covariates was also observed<sup>142</sup>. There was no reversal of the relationship between any independent variable and outcome variable when other covariates were added to the models, which again suggests that assumptions about multicollinearity were met<sup>142</sup>. Regression estimates were calculated by means of the reweighted iterative generalised least square algorithm using MLwiN 2.10<sup>40</sup>.

In the multilevel logistic regression models, second order PQL estimation was used<sup>143</sup>. The statistical significance of individual parameters was calculated using the Wald test<sup>40</sup>. The statistical significance of area deprivation was calculated using the likelihood ratio test for the outcome 'number of sound teeth'. For the binary outcomes, the significance of area deprivation was assessed using the Wald test, which is appropriate for testing two or more estimates simultaneously<sup>143</sup>. All significance tests were two-tailed and statistical significance was defined at the 5% alpha level.

#### 4.5.4 Study IV

We used multilevel multivariable logistic regression to analyze the association between attitudes toward IPVAV and proximal and distal measures of gender inequality. We specified a 3-level model for binary response reporting acceptance of IPVAV or not, for individuals (Level 1), living in a community (Level 2), from a country (Level 3). We fitted a model that included individual, community and societal gender inequality measures (the “full model”). Prior to examining the full model, an unconditional model (i.e., an “empty model”) was specified to decompose the amount of variance between community and country levels. Measures of random effects included intraclass correlation (ICC).

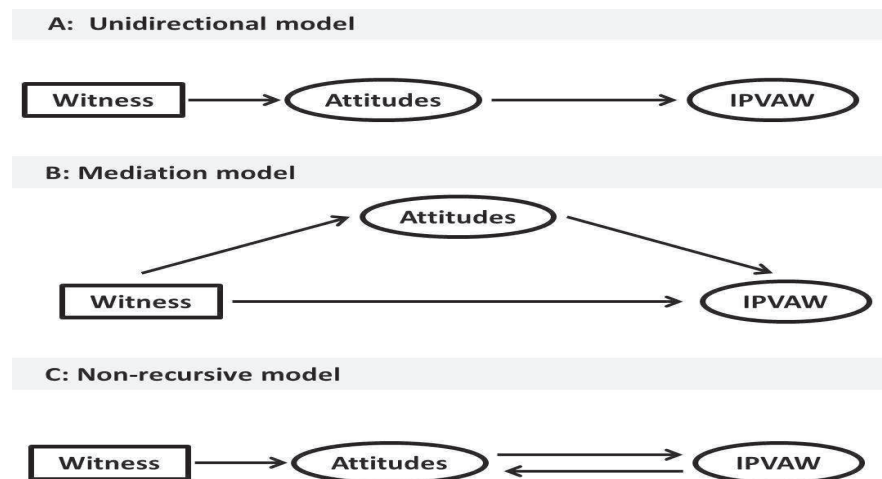
The ICC was calculated by the linear threshold according to the formula used by Snijders and Bosker<sup>138</sup>. We checked for multi-collinearity among exposure variables examining the variance inflation factor (VIF)<sup>141 142</sup>. Regression estimates were calculated by means of the reweighted iterative generalized least square algorithm using MLwiN 2.10<sup>40</sup>. In the multilevel logistic regression models, second-order penalized quasi-likelihood (PQL) estimation was used<sup>143</sup>. The statistical significance of covariates was calculated using the Wald test<sup>40</sup>. All significance tests were two-tailed, and statistical significance was defined at the 5% alpha level.

#### 4.5.5 Study V

Following a two-step approach recommended by Anderson and Gerbing<sup>144 145</sup>, the first step involved a confirmatory factor analysis to develop an acceptable measurement model. The measurement model defined the observed variables in terms of "true" latent variables (endogenous or exogenous) and a measurement error term. At this stage, each latent variable was allowed to correlate freely with every other latent variable. In step two, the measurement model was modified to represent the postulated causal model framework. This theoretical model was then tested and revised until a theoretically meaningful and statistically acceptable model was found.

Figure 6 show three hypothesized association between witnessing IPVAV, women tolerant attitudes and exposure to IPVAV. Prior to testing the final multilevel structural equation model, we examined three alternative models, whether unidirectional, moderation and reciprocal models would better fit the data. Unidirectional model assumes that women who had witnessed IPVAV will develop tolerant attitudes towards and their tolerant attitudes will be associated with experience of IPVAV (Figure 6A). Moderating model assumes that women tolerant attitudes towards IPVAV will mediate association between witnessing IPVAV and exposure to IPVAV (Figure 6B). Reciprocal model assumes that association will be observed from tolerant attitudes to exposure to IPVAV and also exposure to IPVAV and tolerant attitudes (Figure 6C).

**Figure 6: Alternative hypotheses for the association between tolerant attitudes towards IPVAV, witnessing IPVAV and experience of IPVAV**



Model fit diagnosis

We conducted model testing with the Mplus analytic program<sup>146</sup> using weighted least-squares estimation with robust standard errors and adjusted means and variances (WLSMV)<sup>147</sup>. The WLSMV is recommended for confirmatory factor analytic models with binary data with nonnormality<sup>147</sup>. We evaluated model fit by examining the following fit indicators, using criteria suggested by Hu and Bentler<sup>148</sup>. These include examination of chi-square statistics, a comparative fit index (CFI), a Tucker-Lewis index (TLI) and a root mean square error of approximation (RMSEA). The chi-square statistics indicate the corresponding between the proposed model and data.

The RMSEA is a measure of the error of approximation between hypothesized model-implied covariance matrix in the sample and the population covariance matrix. The CFI assessed the improvement in fit of the hypothesized model compared with a baseline model (i.e. null model), when covariances among the population are assumed to be zero. The TLI corrects for model complexity, favouring parsimonious models over more complex ones. Values for the RMSEA ranging from 0 to 0.05 and for CFI and TLI above 0.90 and 0.95, respectively, represent acceptable fit of the model.

## 5 RESULTS

### 5.1 COMPARATIVE ANALYSES

#### Factors associated with attitudes towards intimate partner violence against women: a comparative analysis of 17 sub-Saharan countries (STUDY I)

##### 5.1.1 Description of included countries

Table 1 shows the countries, years of data collection, and sample sizes. It also illustrates the demographic and economic diversity of the selected countries. All the 17 countries were low-income countries. As for gross domestic product (GDP) per capita, Swaziland and Namibia emerged as the most affluent countries with values higher than United States dollar (US\$)2000 per capita, whilst by contrast Ethiopia, Malawi and Rwanda were the most deprived with values less than US\$250 per capita. Nigeria was the most and Lesotho was the least populated country among the countries studied. The percentage of literacy among women was highest in Lesotho (90%) and lowest in Burkina Faso (17%).

**Table 1: Selected social, economic, and demographic characteristics of 17 countries in Sub-Saharan Africa by year of survey.**

Country	Year	Sample size		Polygamy (%)	GDP (US\$ 2005)	Adult literacy rate		GDI	HDI
		Men	Women			Men	Women		
Benin	2006	6000	18000	11.6	508	47.9	23.3	0.422	Low
Burk Faso	2003	3605	12477	18.9	391	31.4	16.6	0.364	Low
Ethiopia	2005	6033	14070	5	157	50	22.8	0.393	Low
Ghana	2003	5015	5691	13.8	485	66.4	49.8	0.549	Medium
Kenya	2003	3578	8195	4.6	547	77.7	70.2	0.521	Medium
Lesotho	2004	2797	7095	na	808	73.7	90.3	0.541	Medium
Liberia	2007	6009	7092	3	167	58.3	45.7	Na	na
Madagascar	2004	2432	7949	2.6	271	76.5	65.3	0.53	Medium
Malawi	2004	3261	11698	3.2	161	74.9	54	0.432	Low
Mozambique	2003	2900	12418	7.4	335	54.8	25	0.373	Low
Namibia	2007	3915	9804	1.1	3016	86.8	83.5	0.645	Medium
Nigeria	2003	2346	7620	33.3	752	78.2	60.1	0.456	Low
Rwanda	2005	4820	11321	10.2	238	71.4	59.8	0.45	Low
Swaziland	2006	4156	4987	6.2	2414	80.9	78.3	0.529	Medium
Tanzania	2004	2635	10329	4.9	316	77.5	62.2	0.464	Low
Uganda	2006	2503	8531	7.6	303	76.8	57.7	0.501	Medium
Zimbabwe	2006*	7175	8907	4.2	259	92.7	86.2	0.505	Medium

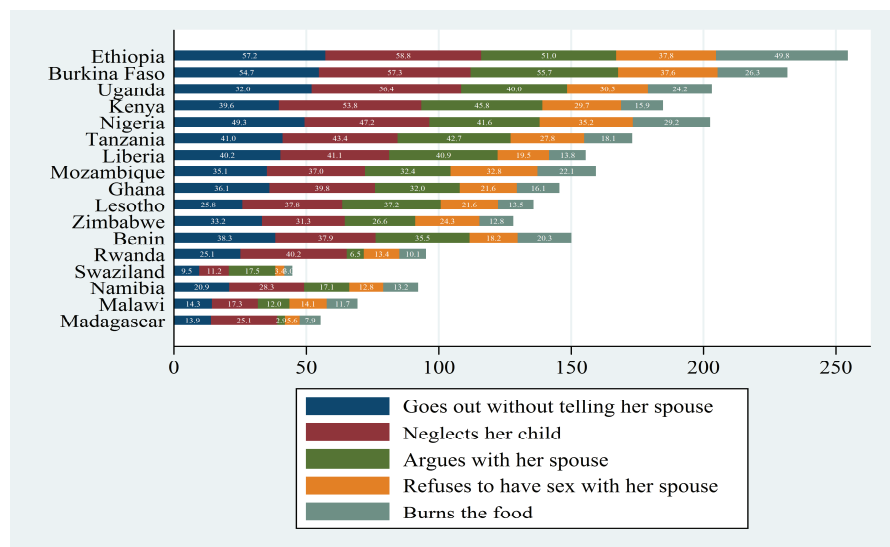
GDP: gross domestic product, HDI: human development index, GDI: gender-related development index; na: not available

Most of the respondents were female. The percentage of female ranged from 53% in Ghana to 81% in Mozambique. Most of the respondents (34% to 48%) were aged 15-24. The percentage of respondents with no education varies across the country. The percentage of respondents with no education was lowest in Zimbabwe (3%) and highest in Burkina Faso (76%). With the exception of Lesotho (44%), more than 50% of the respondents were currently working. The percentage of respondents that are currently married ranged from 35% in Namibia to 73% in Benin. Respondents were fairly evenly distributed across the wealth status strata. In most countries, most of the respondents were living in the rural areas. Burkina Faso (11%) had least number of respondents with access to newspaper; Swaziland (68%) had the highest. In all countries studied, more than 50% had access to radio. The percentage of respondents with access to television ranged from 17% in Malawi to 59% in Ghana.

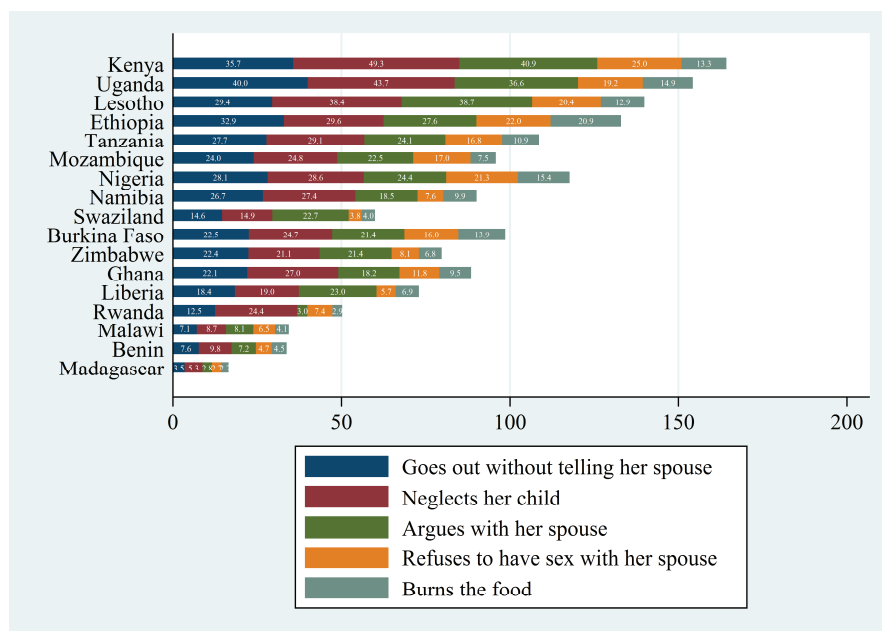
### 5.1.2 Justification of IPVAW by gender norm transgressed

“Neglecting the children” was the most common reason agreed by both women (Figure 7) and men (Figure 8) for justifying IPVAW followed by going out without informing husband and arguing back with the husband. The proportion of respondents who agreed with the statement that IPVAW is justified for “neglecting the children” ranged from 5% in Madagascar to 49% in Kenya among men and from 11% in Swaziland to 59% in Ethiopia among women. The justification for IPVAW was relatively low for “refusing sexual relations” among scenarios presented. Women were consistently more likely to justify IPVAW than men in all the countries, with the exception of Lesotho, Swaziland and Kenya (Figure 9). The percentage of women who justified IPVAW was lowest in Madagascar (28%) and highest in Ethiopia (74%). Madagascar had also the lowest percentage (8%) of men who justified IPVAW and Kenya the highest (62%).

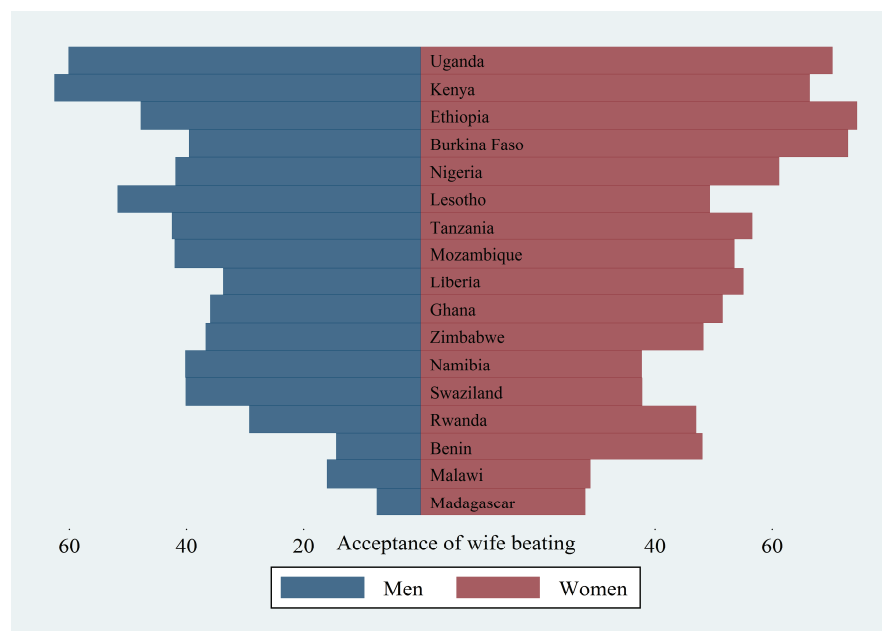
**Figure 7: Percentage of women who believe that IPVAW is justified, by different scenarios**



**Figure 8: Percentage of men who believe that IPVAW is justified, by different scenarios**



**Figure 9: Sex-difference in attitudes towards IPVAW of 17 sub-Saharan countries**





### **5.1.3 Factors associated with attitudes towards IPVAW**

Table 2 presents the adjusted OR for justification of IPVAW. Women were significantly more likely to justify IPVAW than men in all countries studied with the exception of Lesotho. Women were 29% less likely to justify IPVAW than men in Lesotho (OR=0.71, 99% CI 0.60 – 0.84). The association between sex and justification of IPVAW became non-significant in Namibia, Kenya, and Swaziland after controlling for respondents' socio-demographic factors, decision making autonomy, and access to media. Compared to respondent aged 35 and older, respondent aged 15-24 were consistently and significantly more likely to justify IPVAW in all countries except for Benin and Burkina Faso. Lower educational attainment was positively associated with acceptance of IPVAW. Respondents with no education or primary education were more likely to justify IPVAW compared with those with secondary or higher education in all countries but Liberia, Madagascar, and Nigeria. Relationship between occupation and acceptance of IPVAW was mixed. Respondents not in working force from Burkina Faso, Mozambique and Rwanda were at 20% statistically increased risk of justifying IPVAW. Currently not working respondents from Benin, Liberia, Madagascar, Malawi, Tanzania, and Zimbabwe were less likely to justify IPVAW. The association was not significant in other seven countries.



Variable	Benin		Burkina Faso		Ethiopia		Ghana		Kenya		Lesotho		Liberia		Madagascar		Malawi		Mozambique		Namibia		Nigeria		Rwanda		Swaziland		Tanzania		Uganda		Zimbabwe	
	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR			
Respondent alone (0-5)	0.92	0.95	1.22	ns	1.12	ns	1.38	ns	1.11	ns	1.11	ns	1.38	ns	1.11	ns	1.11	ns	0.95	1.12	1.12	1.12	1.12	ns	1.10	ns	1.08	1.08	1.08	1.08	1.13			
Husband/Partner alone (0-5)	1.06	ns	1.21	ns	1.11	ns	1.36	ns	1.13	ns	1.09	ns	1.36	ns	1.13	ns	1.14	ns	1.12	1.20	1.20	1.20	1.21	1.11	1.10	ns	ns	1.23	1.23	1.15	1.15			
Husband-wife (0-5)	0.92	0.88	ns	0.91	0.88	0.81	1.18	0.90	0.92	0.90	0.81	0.90	1.18	0.90	0.92	na	na	na	na	na	na	0.93	ns	ns	ns	0.91	0.91	ns	ns	1.08	1.08			
<b>Media access</b>																																		
Read newspaper	0.84	0.77	0.79	0.81	0.80	0.82	0.85	ns	1.20	ns	0.82	0.82	0.85	ns	1.20	ns	ns	0.81	0.75	0.88	0.88	0.75	0.88	ns	ns	ns	ns	ns	ns	0.74	0.74			
Listen to radio	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	1.23	1.23		
Watch television	ns	ns	0.85	0.85	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	1.22	1.26	1.26	ns	ns	ns	ns	ns	1.18	1.18	ns	ns	ns	ns		

Abbreviations: OR: odds ratio; ns: not significant; na: not available

\*Shown are odds ratio that are significant at p=0.01

Reference group: Age- 35 or older; Education – secondary or more; occupation – working; marital status – never married; wealth status - richest

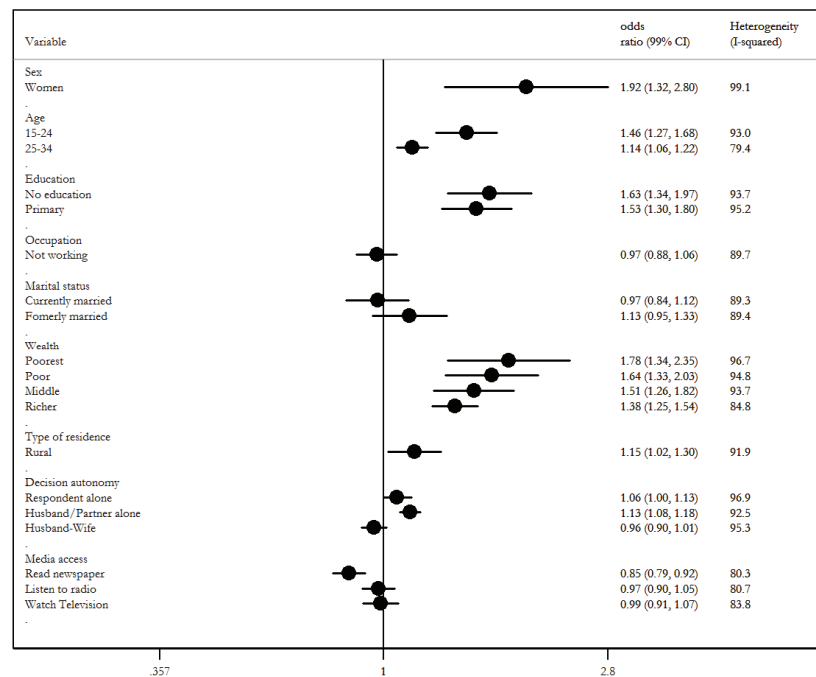
Compared with those never married, respondents that were currently married from Benin (OR=1.44, 99% CI 1.19 - 1.75), Kenya (OR=1.46, 99% CI 1.21 - 1.77), and Madagascar (OR=1.35, 99% CI 1.02 - 1.77) were more likely to justify IPVAW. While, those currently married from Malawi, Namibia, Rwanda, and Zimbabwe were less likely to justify IPVAW than those never married. In some countries, such as Benin, Burkina Faso, Ethiopia, Kenya, and Liberia those formerly married were more likely to justify IPVAW. In other countries, such Malawi (OR=0.56, 99% CI 0.43 - 0.72), Rwanda (OR=0.78, 99% CI 0.64 - 0.96), and Tanzania (OR=0.78, 99% CI 0.63 - 0.97) those formerly married were less likely to justify IPVAW than never married. The odds of justifying IPVAW increased with decreasing wealth status in all countries. Living in rural areas increased the odds of justifying IPVAW in most of the countries. However, those living in rural areas in Madagascar (OR=0.73, 99% CI 0.62 - 0.86) were less likely to justify IPVAW than their counterparts from urban areas. Association of justifying IPVAW with decision making indices were not consistent across the countries studied. Respondents who reported final say in more household decisions than their partners were more likely to justify IPVAW in nine countries and less likely to justify IPVAW in Benin, Burkina Faso, and Mozambique. Respondents were more likely to justify IPVAW in most countries when their partners alone had the final say in more household decisions than they did. When respondents reported more decisions being made jointly than individually, they were significantly less likely to justify IPVAW in most countries.

Access to newspaper reduced the odds of justifying IPVAW in all countries with the exception of Malawi (OR=1.20, 99% CI 1.06 - 1.37). The association between listening to radio and acceptance of IPVAW was significant in only three countries. As expected, listening to radio reduced the odds of justifying IPVAW in Madagascar (OR=0.83, 99% CI 0.70 - 0.99) and Rwanda (OR=0.80, 99% CI 0.72 - 0.90). Counter intuitively, access to radio increased the likelihood of justifying IPVAW in Zimbabwe (OR=1.23, 99% CI 1.10 - 1.37). The association between watching television and odds of justifying IPVAW was not consistent across countries. In some countries, such as Ethiopia, Ghana, and Madagascar watching television reduced the likelihood of justifying IPVAW. In other countries, such as Mozambique, Namibia and Tanzania watching television increased the odds of justifying IPVAW.

Figure 10 shows the results of pooled odds ratios (weight average) of the determinants of attitudes towards IPVAW. The results of meta-analyses confirmed that sex, age, education attainment, wealth status, when partner alone had the final say in household decisions, and access to newspaper were associated with attitudes towards IPVAW in the pooled analyses. Random effect model meta-analysis showed that women were more likely to justify IPVAW than men (pooled OR=1.98, 99% CI 1.32 to 2.80). The results from the pooled analyses also confirmed that odds of justifying IPVAW increase with decreasing age, decreasing education attainment, decreasing wealth status. Compared those living in the urban areas, those from rural were more likely to justify IPVAW (pooled OR = 1.15, 99% CI 1.02 to 1.30). Random effect model meta-analysis showed respondent were more likely to justify IPVAW when their partners alone had the final say in more household decision that they did (pooled weighted average OR=1.13, 99% CI 1.08 to 1.18). The pooled OR for the effect of access to newspaper was 0.85 (99% 0.79 to 0.92). The results of pooled analyses for occupation, marital status, when respondents reported more final say in more, when respondents reported more decisions being made jointly, access to radio and television were not significant. Figure 10 also shows magnitude of cross countries variability in the determinants of attitudes towards IPVAW.

The Cochran Q's test for heterogeneity for all variables gave p-values which were highly significant ( $p < .0001$ ). Higgins and Thompson statistics suggested that 79% to 99% of the total variation in the estimated effect of determinants was due to heterogeneity between countries, thus suggesting that between countries heterogeneity were almost certain present.

**Figure 10: Forest plot showing pooled odds ratio and 99% confidence interval for socio-demographic factors**



## 5.2 GENDER DISPARITIES IN ATTITUDES TOWARDS IPVAV

### Sex disparities in attitudes towards intimate partner violence against women in sub-Saharan Africa: a socio-ecological analysis (STUDY II)

Table 1 shows years of data collection, and sample sizes by selected demographic and economic diversity across 17 countries in sub-Saharan Africa (SSA). All the 17 countries are low-income countries. As for gross domestic product (GDP) per capita, Swaziland and Namibia emerged as the most affluent country with values higher than US\$2000, whilst by contrast Ethiopia, Malawi, and Rwanda were the most deprived with values less than US\$250. The adult female literacy rate ranged from as low as 17% in Burkina Faso to as much as 90% in Lesotho. The adult male literacy rate ranged from 31% in Burkina Faso to as much as 93% in Zimbabwe. The percentage of men with more than one wife ranged from about 3% in Liberia and Madagascar to 33% in Nigeria. Seven countries had low human development index (HDI) and ten countries had medium HDI.

As shown in Figure 11, the percentage of women who justified IPVAV ranged from 28% in Madagascar to as much as 74% in Ethiopia. The percentage of men who justified IPVAV ranged from 8% in Madagascar to 62% in Kenya.

**Figure 11: Forest plot of weighted gender-difference in attitude toward intimate partner violence against women of 17 countries in sub-Saharan Africa.**

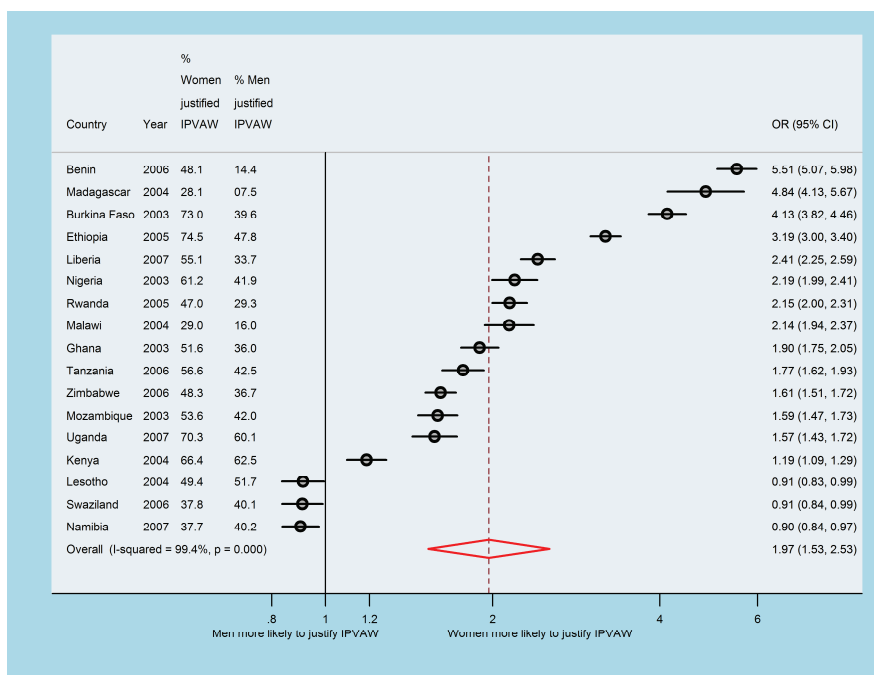


Figure 11 also illustrates the odds ratio (OR) and 95% confidence interval (CI) from individual countries and pooled result. Except for Lesotho, Swaziland and Namibia, women were consistently more likely to justify IPVAV than men in most of the countries studied than men (Figure 11). The calculated pooled effect estimates were identical, assuming either a fixed- or a random-effects model (OR = 1.98; 95% CI 1.94 – 2.02) and (OR = 1.97; 95% CI 1.53-2.53), respectively. The Cochran's Q test ( $Q=2617.72$ ;  $p=0.001$ ) and the corresponding  $I^2$  (99%) indicated statistically significant heterogeneity. In the leave-one-country-out sensitivity analysis the CIs did not change materially with exclusion of any of the countries, which remains within 95% confidence interval of the overall estimate for all countries (Figure 12). This analysis confirmed the stability of the results.

**Figure 12: Plot indicating the influence of each country on the overall pooled result- "leave-one-country-out" sensitivity analysis.**

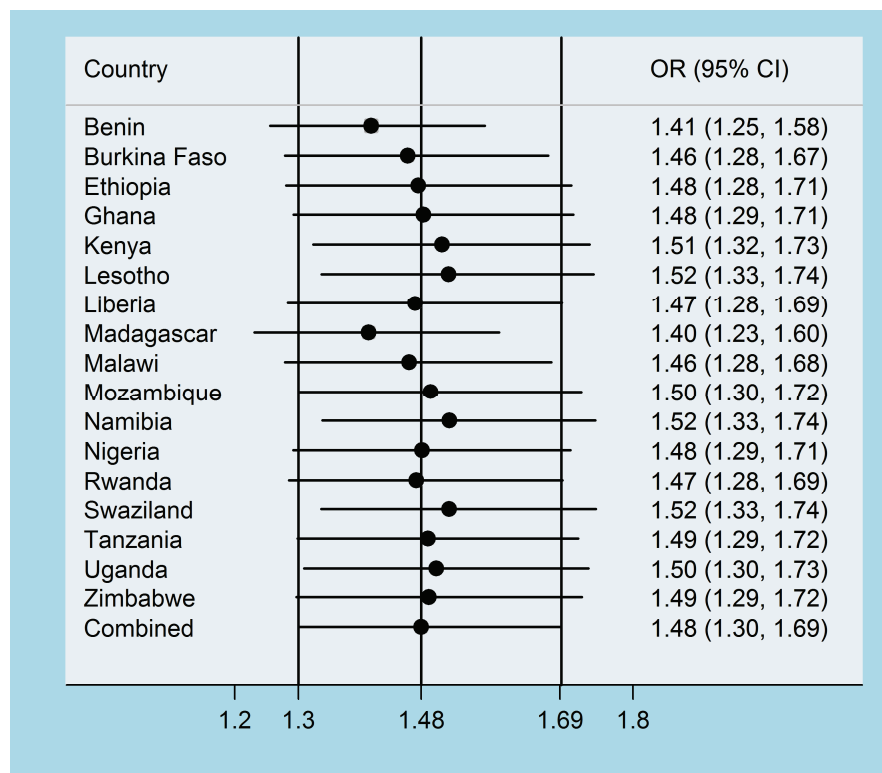


Table 3 shows the univariable inverse-weighted linear meta-regression results. On meta-regression, the geographical sub-region where the study was conducted was a significant predictor of heterogeneity in sex differences in attitudes toward IPVAV. Both the sample size and the calendar year when the survey was conducted was significantly associated with odds of women justifying IPVAV than men. The odds of women justifying IPVAV than men increased with increasing percentage of men practicing polygamy in each country. Furthermore, the odds of women justifying IPVAV than men decreased monotonically with increasing adult male and female literacy rate, gender development index, gross domestic product and human development index.

**Table 3: Univariable meta-regression of attitudes towards intimate partner violence using study and country-specific characteristics as explanatory factors**

<i>Variable</i>	<i>Ratio of OR (95% CI)</i>
<b>Study characteristics</b>	
Calendar year	
2003 – 2004	1 (reference)
2005 – 2006	1.42 (1.36, 1.49)
2007	0.62 (0.58, 0.65)
Sample size (per 10,000)	
9000 – 11000	1 (reference)
11000 – 15900	0.98 (0.93, 1.03)
>16000	4.15 (3.95, 4.36)
<b>Country-covariates*</b>	
Polygamous (%)	
Low	1 (reference)
Average	1.26 (1.20, 1.32)
High	3.96 (3.77, 4.16)
Gross domestic product per capita	
Low	1 (reference)
Average	1.47 (1.40, 1.54)
High	0.28 (0.27, 0.30)
Adult male literacy rate (%)	
Low	1 (reference)
Average	0.30 (0.29, 0.32)
High	0.17 (0.16, 0.18)
Female adult literacy rate (%)	
Low	1 (reference)
Average	0.39 (0.37, 0.40)
High	0.15 (0.14, 0.16)
Gender development index	
Low	1 (reference)
Average	0.22 (0.21, 0.23)
High	0.17 (0.16, 0.18)
Human development index	
Low	1 (reference)
Medium	0.23 (0.22, 0.24)
Region	
Southern Africa	1 (reference)
Eastern Africa	0.32 (0.30, 0.33)
Western Africa	0.10 (0.09, 0.11)



### 5.3 INDIVIDUAL AND CONTEXTUAL SOCIOECONOMIC POSITION

#### The independent contribution of individual-, neighbourhood-, and country-level socioeconomic position on attitudes towards intimate partner violence against women in sub-Saharan Africa: a multilevel model of direct and moderating effects (STUDY III)

##### 5.3.1 Sample characteristics

The median number of communities sampled was 405 ranging from 275 in Swaziland to 750 in Benin. The median number of respondents per community varied from 24 in Lesotho to 44 in Liberia. The percentage of respondents endorsing IPVAW in at least one situation varied across countries and sex. Women were more likely to justify IPV against themselves than men in all countries with the exception of Lesotho where higher percentage of men (52%) had a positive attitude toward IPVAW than in women (49%). Among women, this percentage varied from 24% in Swaziland to as much as 74% in Ethiopia. Among men, this percentage varied from 8% in Madagascar to 63% in Kenya. Response rates expressed as the number of completed interviews relative to the number of effective contacts was close to 100% in all countries.

Table 4 presents the number and percentage of affirmative attitudes toward IPVAW by individual, community and country level covariates for the final pooled sample. A sample of 234, 484 individuals (68, 501 men and 165, 983 women) (level 1) nested within 7,465 communities (level 2) from 17 countries (level 3) in sub-Saharan Africa were analysed in this study. The overall percentage of respondents endorsing attitude toward IPVAW was 48%. More than one third (36%) of the respondents were born between 1976 and 1985. Women outnumbered men in the final pooled sample (71% versus 29%). Only 31% of the respondents had secondary or higher education. Respondents were fairly equally distributed across the wealth status and neighbourhood socio-economic disadvantage quintiles.

**Table 4: Descriptive statistics of positive attitudes towards intimate partner violence against women and selected socioeconomic variables**

<i>Variable</i>	<i>Total Number (%)</i>	<i>Yes (%)</i>	<i>No (%)</i>
Positive attitude toward IPV	N=234,484 (100)	113,360 (48.3)	121,124 (51.7)
<b>Level 1: Individuals</b>			
Individual level exposures			
Birth cohorts			
1936 – 1945	870 (0.4)	344 (39.5)	526 (60.5)
1946 – 1955	8,534 (3.6)	3,930 (46.0)	4,604 (54.0)
1956 – 1965	39,472 (16.8)	18,594 (47.1)	20,878 (52.9)
1966 – 1975	60,033 (25.6)	28,635 (47.7)	20,878 (52.7)
1976 – 1985	84,694 (36.1)	41,598 (49.1)	43,096 (50.9)
1986 – 1995	40,881 (17.4)	20,259 (49.6)	20,622 (50.4)
Sex of respondent			
Men	68,501 (29.2)	25,405 (37.1)	43,096 (62.9)
Women	165,983 (70.8)	87,955 (53.0)	78,028 (43)

<i>Variable</i>	<i>Total Number (%)</i>	<i>Yes (%)</i>	<i>No (%)</i>
Education			
No education	69,615 (29.7)	41,900 (60.2)	27,715 (39.8)
Primary	92,705 (39.5)	46,880 (50.6)	45,825 (49.4)
Secondary or higher	72,154 (30.8)	24,575 (34.1)	47,579 (65.9)
Unemployed			
No	166,526 (71.0)	79,784 (47.9)	86,742 (52.1)
Yes	67,958 (29.0)	33,576 (49.4)	34,382 (50.6)
Wealth index			
Poorest	42,322 (18.0)	24,697 (58.4)	17,625 (41.6)
Poorer	41,382 (17.6)	22,582 (54.6)	18,800 (45.4)
Middle	43,818 (18.7)	22,708 (51.8)	21,110 (48.2)
Richer	47,050 (20.1)	21,548 (46.4)	25,225 (53.6)
Richest	59,912 (25.6)	21,548 (36.0)	38,364 (64.0)
<b>Level 2: Communities</b>	N = 7465 (100)		
Neighbourhood disadvantage			
Quantile 1 (least disadvantaged)	52,101 (22.2)	17,370 (33.3)	34,731 (66.7)
Quantile 2	41,662 (17.8)	18,495 (44.4)	23,167 (55.6)
Quantile 3	46,884 (20.0)	23,152 (49.4)	23,732 (50.6)
Quantile 4	46,861 (20.0)	25,432 (54.3)	21,429 (45.7)
Quantile 5 (most disadvantaged)	46,875 (20.0)	28,880 (61.6)	17,995 (38.4)
<b>Level 3: Countries</b>	N=17 (100)		
Poverty rate			
Low	171,931 (73.3)	85,655 (49.8)	86,276 (50.2)
High	62,553 (26.7)	27,705 (44.3)	34,848 (55.7)
Adult illiterate rate			
Low	146,765 (62.6)	66,325 (45.2)	80,440 (54.8)
High	87,719 (37.4)	47,035 (53.6)	40,684 (46.8)
Unemployment rate			
Low	159,224 (67.9)	71,636 (45.0)	87,588 (55.0)
High	75,260 (32.1)	41,724 (55.4)	33,536 (44.6)

Respondents from countries with high adult illiteracy rate were more likely to justify IPVAW than those from low adult illiteracy rate (54% versus 45%). Similarly, those from countries with high unemployment rate were more likely to justify IPVAW than those from low unemployment rate (55% versus 45%).

### 5.3.2 Measures of variations (random-effects)

As shown in Table 5, Model 1 (the null model), there was a significant variation in the log odds of justifying IPVAW across the communities ( $\tau=0.678$ ,  $p<.001$ ) and across the countries ( $\tau=0.406$ ,  $p<.01$ ). According to the intra-country and intra-community correlation coefficient implied by the estimated intercept component variance, 9% and 16% of the variance in the attitudes towards IPVAW could be attributed to the country- and community-level factors respectively. The variations across communities and countries remained statistically significant, even after controlling for individual-level

factors (Model 2), individual- and community-level factors (Model 3), and individual-, community-, and country-level factors (Model 4).

As judged by proportional change in variance, only 2% and 19% of the variance in the log odds of justifying IPVAW, across countries and communities respectively, were explained by individual level factors (model 2). The full model (Model 4) was accounted for 32% and 43% of the variance in the log odds of justifying IPVAW across the countries and communities.

**Table 5: Results from random intercept model – measures of variation**

	Model 1 <sup>a</sup>	Model 2 <sup>b</sup>	Model 3 <sup>c</sup>	Model 4 <sup>d</sup>
<b>Measures of variation</b>				
Country –level				
Variance (SE)	0.406 (0.140)*	0.398 (0.137)*	0.383 (0.132)*	0.277 (0.096)**
Explained variation (%)	Reference	2.0	5.7	31.8
ICC (%)	9.3	9.4	9.1	7.0
MOR	1.83	1.82	1.80	1.65
Community –level				
Variance (SE)	0.678 (0.014)**	0.550 (0.012)**	0.536 (0.012)**	0.385 (0.009)**
Explained variation (%)	Reference	18.9	20.9	43.2
ICC (%)	15.5	13.0	12.7	9.7
MOR	2.19	2.02	2.00	1.80

\* p<0.01, \*\*p<0.001

<sup>a</sup>Model 1 is null model, baseline model without any exposure variable

<sup>b</sup>Model 2 is adjusted for birth cohorts, sex of respondent, education, wealth index, and occupation

<sup>c</sup>Model 3 is additionally adjusted for neighbourhood socio-economic disadvantage

<sup>d</sup>Model 4 is additionally adjusted for country-level socioeconomic position

Abbreviations: SE: standard error, ICC: intraclass correlation, MOR: median odds ratio

Results from the MOR also confirmed evidence of neighbourhood and country contextual phenomenon shaping individual attitudes towards IPVAW. The high MOR (2.19) in Model 1 between persons with a higher and lower propensity of justifying IPVAW in a community suggests that the neighbourhood heterogeneity is substantial. Including individual-level SEP reduces the unexplained heterogeneity between neighbourhoods to an MOR of 2.02, In model 2, for two persons with the same individual-level SEP, the MOR between persons living in a country with higher compared with lower propensity of justifying IPVAW was 1.83. This relatively low odds ratio suggests that the clustering effect is moderate. The unexplained country heterogeneity decreased, yielding a low MOR of 1.65, when individual-, community-, and country-level SEP was added (model 4) in Table 5. Thus, there are very little variations between countries in the propensity for justifying IPVAW.

The IOR-80 for neighbourhood SEP was fairly wide and included the value one (Table 6). In other words, in comparison with residual area level variations, the neighbourhood socio-economic disadvantage variable was not that important for understanding

community-level variations in attitudes towards IPVAW. Similarly, the IOR-80 for country-level SEP was fairly wide and included the value of one.

The random slope analysis suggested that the neighbourhood modified the association between individual level SEP and attitudes toward IPVAW (Table 6). The strength of association was strong among residents from poorest and poorer households. The association was not significant for birth cohort. Similarly, there was evidence that there were country differences in the association between neighbourhood socio-economic status and attitudes toward IPV (Table 6). The strength of association was, however, different for different quintiles of neighbourhood socio-economic status.

**Table 6: Interval odds ratio (IOR), neighbourhood and country slope variance from Model 5 for individual, neighbourhood, and country variables regarding attitudes toward IPV against women among men and women residing in 17 countries from sub-Saharan Africa**

Model 5	Neighbourhood slope variance (SE)	80% IOR
Level 1: Individuals		
Birth cohorts		
1936 – 1945	Reference	
1946 – 1955	0	
1956 – 1965	0	
1966 – 1975	0	
1976 – 1985	0	
1986 – 1995	0	
Women (vs men)	0.690 (0.025)***	
Education		
No education	0.085 (0.028)**	
Primary	0.047 (0.017)**	
Secondary+	Reference	
Wealth index		
Poorest	0.144 (0.066)*	
Poorer	0.070 (0.050)	
Middle	0.057(0.038)	
Richer	0.029 (0.023)	
Richest	Reference	
Unemployed (vs employed)	0.056 (0.015)***	
Level 2: Communities		
Neighbourhood disadvantage	Country slope variance (SE)	
Quantile 1 (least)	Reference	
Quantile 2	0.025 (0.012)*	(0.39, 3.90)
Quantile 3	0.068 (0.027)*	(0.37, 3.72)
Quantile 4	0.106 (0.040)**	(0.40, 4.07)
Quantile 5 (most)	0.178 (0.066)**	(0.40, 4.00)
Level 3: Countries		
High (vs low) poverty rate		(0.25, 1.70)
High (vs low) adult illiteracy rate		(0.28, 1.89)
High (vs low) unemployment rate		(0.55, 3.73)

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001, SE: standard error

### 5.3.3 Measures of associations (fixed effects)

The main associations of inclusion of individual-, community-, and country-level variables appear in Table 7 (Model 6). Beyond the main associations, Table 5 also presents moderator associations of sex on individual-, community-, and country-level SEP. Women were 34% more likely to justify IPVAW compared to men. Significant interactions of sex on individual-, community-, and country-level SEP were found. Respondents with no education were more likely to justify IPVAW than those with secondary or higher education. The association was significantly stronger when the respondent is a woman than when respondent is a man. The odds of justifying IPVAW decreased with increasing household wealth status. Negative sex interaction associations on household wealth status indicate that the association between household wealth status and attitudes towards IPVAW is less pronounced among women. Unemployment increased the odds of justifying IPVAW. As expected the association between unemployment and odds of justifying IPVAW was significantly stronger among men. Unemployed men were 1.19 times more likely to justify IPVAW than those currently employed. After controlling for the individual-level SEP, the odds of justifying IPVAW increased with increasing neighbourhood socio-economic disadvantages. Respondents from most disadvantaged neighbourhoods were more likely to justify IPVAW than those from least disadvantaged neighbourhood. Interaction term of sex indicates that the association between neighbourhood socio-economic disadvantages and attitudes towards IPVAW was more pronounced among women than among men. The main associations of country-level SEP with attitudes towards IPVAW did not reach statistical significance at the  $p < 0.05$  level when all the covariates were adjusted for. However, there was positive interaction association of sex with country's poverty and adult illiteracy rate.

**Table 7: Individual compositional, community-, and country-level socio-economic position associated with attitudes toward IPV against women and their interaction with sex of respondent identified by multivariable multilevel logistic regression and estimated by Odds Ratios (OR) and 95% confidence intervals (95% CI), sub-Saharan Africa**

Model 6	Coefficient (SE)	OR (95% CI)
MAIN EFFECTS		
Level 1: Individuals		
Birth cohorts		
1936 – 1945	-0.374 (0.077)	0.69 (0.59, 0.80)*
1946 – 1955	-0.453 (0.029)	0.64 (0.60, 0.67)*
1956 – 1965	-0.366 (0.017)	0.69 (0.67, 0.72)*
1966 – 1975	-0.272 (0.015)	0.76 (0.74, 0.78)*
1976 – 1985	-0.131 (0.014)	0.88 (0.85, 0.90)*
1986 – 1995	Reference	Reference
Women (vs men)	0.289 (0.031)	1.34 (1.26, 1.42)*
Education		
No education	0.397 (0.029)	1.49 (1.41, 1.57)*
Primary	0.468 (0.022)	1.60 (1.53, 1.67)*
Secondary+	Reference	Reference

Model 6	Coefficient (SE)	OR (95% CI)
Wealth index		
Poorest	0.530 (0.038)	1.70 (1.58, 1.83)*
Poorer	0.415 (0.035)	1.51 (1.41, 1.62)*
Middle	0.326 (0.039)	1.39 (1.28, 1.50)*
Richer	0.219 (0.029)	1.24 (1.18, 1.32)*
Richest	Reference	Reference
Unemployed (vs employed)	0.177 (0.022)	1.19 (1.14, 1.25)*
Level 2: Communities		
Neighborhourd disadvantage		
Quantile 1 (least)	Reference	Reference
Quantile 2	0.207 (0.034)	1.23 (1.15, 1.31)*
Quantile 3	0.216 (0.035)	1.24 (1.16, 1.33)*
Quantile 4	0.249 (0.039)	1.28 (1.19, 1.38)*
Quantile 5 (most)	0.279 (0.043)	1.32 (1.21, 1.44)*
Level 3: Countries		
High (vs low) poverty rate	-0.424 (0.287)	0.65 (0.37, 1.15)
High (vs low) adult illiteracy rate	-0.322 (0.315)	0.72 (0.39, 1.34)
High (vs low) unemployment rate	0.359 (0.315)	1.43 (0.77, 2.65)
INTERACTION EFFECTS		
Education		
No education X sex	0.254 (0.033)	1.29 (1.21, 1.38)*
Primary X sex	-0.008 (0.026)	0.99 (0.94, 1.04)
Secondary+	Reference	Reference
Wealth index		
Poorest X sex	-0.282 (0.043)	0.75 (0.69, 0.82)*
Poorer X sex	-0.166 (0.040)	0.85 (0.78, 0.92)*
Middle X sex	-0.093 (0.037)	0.91 (0.85, 0.98)
Richer X sex	-0.036 (0.034)	0.96 (0.90, 1.03)
Richest	Reference	Reference
Unemployed X sex of respondent	-0.200 (0.025)	0.82 (0.78, 0.86)*
Level 2: Communities		
Neighborhourd disadvantage		
Quantile 1 (least)	Reference	Reference
Quantile 2 X sex	0.002 (0.038)	1.00 (0.93, 1.08)
Quantile 3 X sex	0.250 (0.039)	1.28 (1.19, 1.39)*
Quantile 4 X sex	0.248 (0.042)	1.28 (1.18, 1.39)*
Quantile 5 (most) X sex	0.321 (0.047)	1.38 (1.26, 1.51)*
Level 3: Countries		
High (vs low) poverty rate X sex	0.337 (0.027)	1.40 (1.33, 1.48)*
High (vs low) adult illiteracy rate X sex	0.462 (0.029)	1.59 (1.50, 1.68)*
High (vs low) unemployment rate X sex	0.038 (0.026)	1.04 (0.99, 1.09)

\* p<0.001

## 5.4 ROLES OF GENDER INEQUALITIES IN FORMING ATTITUDES

The role of individual, community, and societal gender inequality in forming women's attitudes towards intimate partner violence against women: a multilevel analysis (STUDY IV)

### 5.4.1 Sample Characteristics

The median number of communities sampled was 405, ranging from 274 in Swaziland to 750 in Benin. The percentage of women with acceptance of IPVAV in at least one situation varied across countries, from 20% in Swaziland to almost 80% in Ethiopia. **Error! Reference source not found.** presents descriptive statistics for the final pooled sample. For this analysis, information on 120,467 women (Level 1) nested within 7463 communities (Level 2) from 17 countries (Level 3) in sub-Saharan Africa was pooled into one data set. The overall percentage of women with a positive attitude toward IPVAV was 55%. Only 10% of the women had more education than their partners. The median spousal age gap was 6 years (interquartile range 7). About 40% of women's husbands had another wife. Half of the women had married before the age of 18 years.

### 5.4.2 Measures of Variations (Random Effects)

The results of the unconditional model showed that approximately 20% and 14% of the variance in the log odds of justifying IPVAV could be attributed to the community ( $\tau = 0.695$ ;  $p = .004$ ) and country levels ( $\tau = 0.989$ ;  $p < .0001$ ), respectively. Variations across communities and countries remained statistically significant, even after controlling for individual-, community-, and country-level factors (Table 8), thereby lending support for the use of multilevel modelling to account for community and country variations.

**Table 8: Individual-, community- and country-level gender inequality associated with attitudes toward intimate-partner violence against women (IPVAW) identified by multivariable multilevel logistic regression, sub-Saharan Africa**

Variable	Empty Model <sup>a</sup>	Full model <sup>b</sup> OR (95% CI)
<b>Level 1: Individuals</b>		
Birth cohorts		0.66 (0.62, 0.72)***
1936–1945		0.69 (0.64, 0.73)***
1946–1955		0.76 (0.71, 0.80)***
1956–1965		0.84 (0.80, 0.89)***
1966–1975		1 (reference)
Spouses' relative education		
Wife has same		1 (reference)
Husband has more		1.06 (1.02, 1.10)**
Wife has more		1.00 (0.95, 1.05)
Both uneducated		1.24 (1.17, 1.31)***
Spousal age gap (years)		1.00 (0.94, 1.11)
Employment discrepancy		
Both working		1 (reference)

Variable	Empty Model <sup>a</sup>	Full model <sup>b</sup>
		OR (95% CI)
Only man working		1.02 (0.98, 1.07)
Only woman working		0.97 (0.77, 1.21)
Both not working		1.32 (1.08, 1.61)**
Polygyny		1.14 (1.09, 1.19)***
Decision-making indices		
Women alone (0–5)		0.97 (0.95, 0.99)*
Husband–wife (0–5)		0.93 (0.91, 0.96)***
Husband/partner alone (0–5)		1.04 (1.02, 1.06)**
Number of children		1.03 (1.02, 1.04)***
Early marriage		1.12 (1.08, 1.16)***
<b>Level 2: Communities</b>		
Rural (versus urban)		1.56 (1.47, 1.66)***
Median age of marriage		0.89 (0.88, 0.91)***
Average household size		1.08 (1.06, 1.10)***
Average spousal age gap		1.01 (1.00, 1.02)
Ratio of educated men to women		0.98 (0.96, 1.00)
Ratio of employed men to women		1.00 (1.00, 1.01)
<b>Level 3: Countries</b>		
GDI		
Low		1.62 (0.81, 3.23)
Medium		2.39 (1.16, 4.93)*
High		1 (reference)
<b>Measures of variation</b>		
Country level		
Variance (standard error)	0.695 (0.239)	0.337 (0.120)
Intra-class correlation (%)	14.0	7.9
Community level		
Variance (standard error)	0.989 (0.022)	0.665 (0.019)
Intra-class correlation (%)	19.9	15.5

GDI = Gender Development Index; OR = Odds Ratio; CI = Confidence Interval

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

<sup>a</sup>Empty model – null model; baseline model without any exposure variable.

<sup>b</sup>Full model – adjusted for individual, community and societal-level measures of gender inequality.

### 5.4.3 Measures of Associations (Fixed Effects)

The results of fitting the model including individual-, community-, and country-level gender inequality appear in Table 4 (full model). Birth cohorts had a statistically significant association with odds of justifying IPVAV. Older women were less likely to justify IPVAV than younger women (odds ratio [OR] = 0.66; 95% confidence interval [CI] 0.62 to 0.72). Women whose husband had higher education were more likely to justify IPVAV than women with the same level of education as their partner (OR = 1.06; 95% CI 1.02 to 1.10).



Similarly, uneducated women with uneducated partners were more likely to justify IPVAW than women with some education and the same level of education as their partner (OR = 1.24; 95% CI 1.17 to 1.31). There was no association between spousal age gap and odds of justifying IPVAW. Compared to working women with working partners, unemployed women with unemployed partners were more likely to justify IPVAW (OR = 1.32; 95% CI 1.08 to 1.61). Women in polygamous families were 14% more likely to justify IPVAW than women in monogamous families. Women who reported having the final say in most household decisions were 3% less likely to justify IPVAW.

Similarly, women reporting joint decision making with their partners were significantly less likely to justify IPVAW than women reporting individual decision making (OR = 0.93; 95% CI 0.91 to 0.96). Women were 4% more likely to justify IPVAW if their partner alone had the final say in more household decisions than they did. An increase in the number of children ever born increased the odds of justifying IPVAW by 3%. Women who married early (younger than 18 years of age) were 12% more likely to justify IPVAW than those who did not marry early.

Three significant community-level associations were identified. Women from rural areas were 56% more likely to justify IPVAW than their urban counterparts. Justification of IPVAW decreased as the median age of marriage increased above the community median age of marriage. An increase in the number of people living in a household above the community average household size was associated with an 8% increase in women justifying IPVAW. After controlling for the associations of individual- and community-level gender inequality, country-level gender inequality was statistically significantly associated with odds of justifying IPVAW. Women from countries with high GDI were 139% more likely to justify IPVAW (OR = 2.39; 95% CI 1.16 to 4.93) than those from countries with low GDI.

## **5.5 LINKING ATTITUDES TO OCCURRENCE OF PARTNER ABUSE**

### **Are individual and community acceptance and witnessing of intimate partner violence against women related to its occurrence? A multilevel structural equation model (STUDY V)**

#### **5.5.1 Characteristics of the couples**

The study analysed 8731 couples living in 883 communities in Nigerian DHS 2008. About 10% of the women reported spousal physical abuse and 14% reported emotional abuse by their partner. Only 2% reported spousal sexual abuse. Among couples, about 37% of husband and wife did not justify wife beating. About 13% of husband alone justify wife beating, while 32% of wives alone justified wife beating for transgressing certain gender roles. Nearly one-fifth (17%) of both husband and wife justified wife beating. Less than one-tenth (8%) of the respondents witnessed abuse in their childhood.

#### **5.5.2 Measurement model**

Figure 13 shows the IPVAW measurement model, which has acceptable practical fit indices. All sub-constructs had factor loadings above 0.8. The composite reliability shows the excellent consistency of the indicators in measuring the three latent variables: spousal physical, sexual and emotional abuse.

The validity of the constructs is also supported by the  $\chi^2$  difference test and the variance extracted test. Combined, these findings support the reliability and validity of the three constructs and their indicators and indicated that items loaded on appropriate latent variables.

**Figure 13: Item analysis, goodness-of-fit, reliability and validity assessment of the experience of IPVAW measurement model**

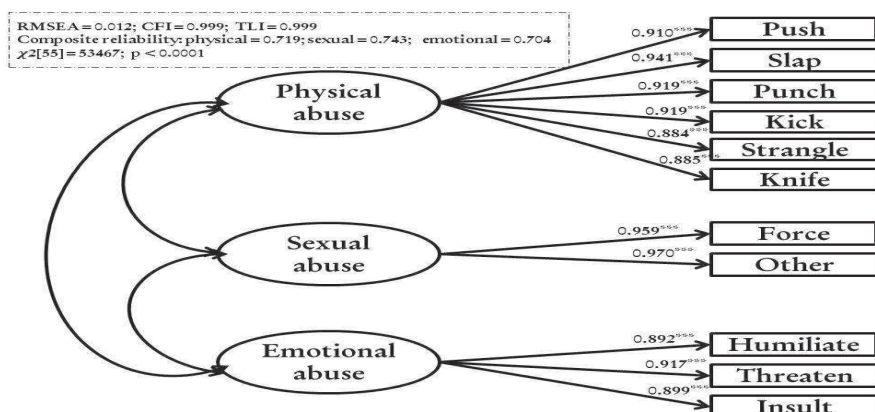
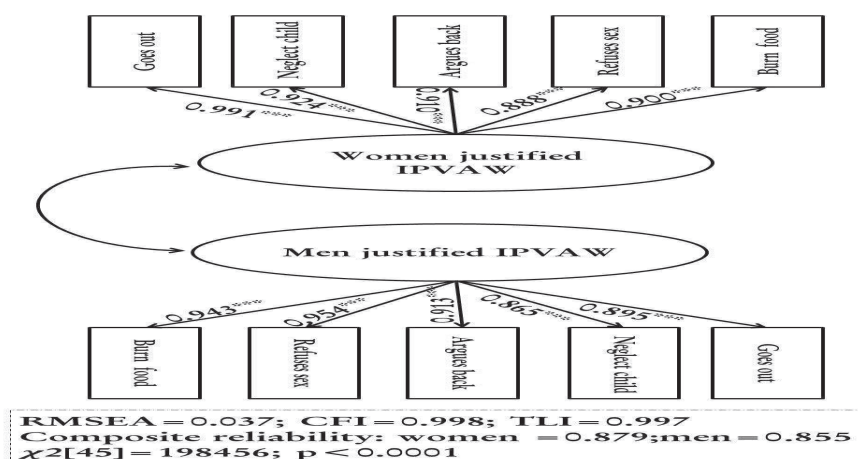


Figure 14 shows the results of tolerant attitudes towards IPVAW measurement model, which has acceptable practical fit indices. All sub-constructs had factor loadings above 0.8. The composite reliability shows the excellent consistency of the indicators in measuring both latent variables: husband and wife tolerant attitudes towards IPVAW. The validity of the constructs is also supported by the  $\chi^2$  difference test and the variance extracted test. Combined, these findings support the reliability and validity of the two constructs and their indicators and indicated that items loaded on appropriate latent variables.

**Figure 14: Item analysis, goodness-of-fit, reliability and validity assessment of the couple's tolerant attitudes towards IPVAW measurement model**



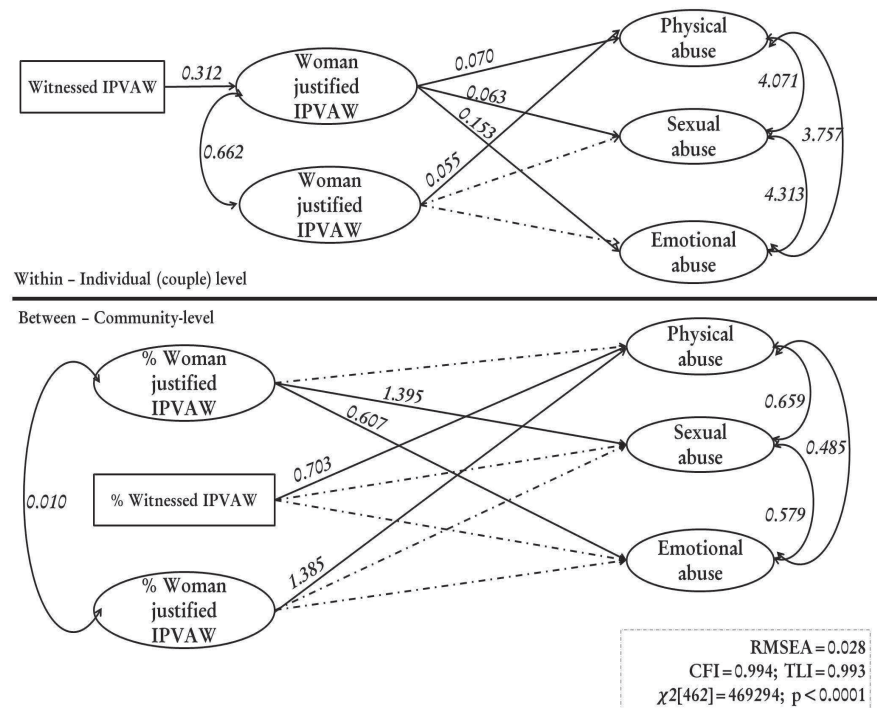
### 5.5.3 Model selection

The hypothesis that there is unidirectional association between witnessing IPVAW, tolerant attitudes and exposure to IPVAW was supported. The hypothesis suggesting that tolerant attitudes mediate association between witnessing IPVAW and experience of IPVAW was not supported. Witnessing IPVAW was not indirectly associated with exposure to IPVAW via tolerant attitudes. The indirect effect was zero. Similarly, the hypothesis suggesting that there is reciprocal association between tolerant attitudes and exposure to IPVAW was not supported.

### 5.5.4 Final model

The results of the final model are also presented in Figure 15. Only the paths that are statistically significant are shown. Standardized path coefficients appear on single-headed arrows. Correlations of the residual terms appear on curved double-headed arrows. According to goodness of fit indices, the final model provided a good fit to the data ( $\chi^2(df=462)=469294$ ,  $p<0.0001$ ,  $RMSEA=0.028$ ,  $CFI=0.994$ ,  $TLI=0.9993$ ). As shown in Figure 5, the final model revealed that those women that witnessed IPVAW were more likely to have tolerant attitudes towards IPVAW (regression coefficient  $[\beta]=0.312$ ,  $p<0.001$ ). Women with tolerant attitudes were more likely to have reported spousal physical ( $\beta=0.070$ ,  $p<0.001$ ), sexual ( $\beta=0.153$ ,  $p<0.001$ ) and emotional ( $\beta=0.063$ ,  $p<0.001$ ) abuse. However, women with husband with tolerant attitudes towards IPVAW were more likely to have reported spousal physical abuse ( $\beta=0.055$ ,  $p=0.034$ ). The association between husband tolerant attitudes and spousal sexual and emotional abuse were not significant.

Figure 15: Final model



At community level, increasing women with tolerant attitudes towards IPVAV was positively associated with spousal sexual ( $\beta= 1.395$ ,  $p=0.010$ ) and emotional abuse ( $\beta=0.607$ ,  $p=0.007$ ), but not physical abuse. Increasing men with tolerant attitudes towards IPVAV in the community was positively associated only spousal physical abuse ( $\beta=0.703$ ,  $p=0.026$ ), but not spousal sexual and emotional. Similarly, increasing women who had witnessed IPVAV in the community was positively associated only spousal physical abuse ( $\beta= 1.385$ ,  $p=0.004$ ), but not spousal sexual and emotional.

There was positive correlation between all three types of IPVAV at both individual-level (physical vs. emotional [ $\beta= 3.757$ ,  $p<0.001$ ]; physical vs. sexual [ $\beta= 4.071$ ,  $p<0.001$ ]; and sexual vs. emotional [ $\beta= 4.313$ ,  $p<0.001$ ]) and community-level (physical vs. emotional [ $\beta= 0.485$ ,  $p=0.001$ ]; physical vs. sexual [ $\beta= 0.659$ ,  $p=0.014$ ]; and sexual vs. emotional [ $\beta= 0.579$ ,  $p=0.008$ ]). For example, women who had experience physical abuse were also more likely to have experience emotional abuse, and vice versa. Similarly, communities that experienced high spousal physical violence were also more likely to have experienced high spousal sexual abuse and vice versa. In addition, there was positive correlation between husband and wife tolerant attitudes at both individual-level ( $\beta=0.662$ ,  $p<0.001$ ) and community level ( $\beta=0.010$ ,  $p<0.001$ ), such that women with tolerant attitudes were more likely to have husbands with tolerant attitudes too. However, community-level correlations between husband and wife tolerant attitudes were relatively less pronounced.

## 6 DISCUSSION

### 6.1 MAIN FINDINGS

In this large comparative study from 17 countries in sub-Saharan Africa, we found that IPVAW was widely acceptable under certain circumstances and more such among women, younger people, less educated, poorest, those living in rural areas, those with less access to media and single decision makers. Women were more likely to justify IPVAW in all countries, with exception of Lesotho even after controlling for confounding factors. This, in agreement with the result of previous study that has examined this association in seven countries in sub-Saharan Africa conducted between 1999 and 2001<sup>35</sup>. A possible explanation for the exception seen in Lesotho could be due to the fact that the adult female literacy rate is higher than adult male literacy rate. It has been reported that women are more vulnerable to abuse and exploitation in environment where there is high gender inequality, these factors may be responsible for the observed gender disparities in attitudes toward IPVAW. More sophisticated measures such as decomposition analyses are needed to explore the sources of gender disparities in attitudes towards IPVAW. Evidence from meta-analyses suggests that sex of the respondent stood out as the most important predictor of attitudes towards IPVAW. Results of meta-analyses provided evidence that wealth status and education attainment were also significantly associated with attitudes IPVAW. Access to newspaper reduced likelihood of having tolerant attitudes towards IPVAW. Some of the socio-demographic correlates we studied have been documented in literature<sup>12-20</sup>. We found that younger people are more likely to justify IPVAW. Despite the cross-sectional design in this study, comparing trend in attitude by ages indicates that the younger generation is more likely to accept IPVAW than the older one. However, there is a need for longitudinal studies to confirm this finding. Wealth status, education and urbanisation had a greater negative impact on acceptance of IPVAW in most countries in this study. The limited effects seen in primary education alone compared to those with secondary or higher education is not surprising. Having few years of education usually at young age may not expose people to new non-conformist ideas<sup>35</sup>. It may even bring conflict between reality and myth of male superiority<sup>35</sup>. In accordance with the results of previous studies<sup>5 35</sup>, we found that occupation status had minimal effect on acceptance of IPVAW. Most women in low-income countries work largely in informal sectors with low paid jobs. Women are usually exposed to the same patriarchal social structures at the work place that may further strengthen the myth of male superiority.

This first known meta-analysis on sex differences in attitudes toward IPVAW brought together evidence from 17 countries in sub-Saharan Africa. We found that women are more likely to justify IPVAW than men in most of the countries studied. This study confirm the findings of previous study that examined this association<sup>35</sup>. Sub-Saharan African countries are ethnically and religiously diverse with economic development and education levels that vary widely across these countries. As would be expected, we found highly significant heterogeneity in sex differences in attitudes towards IPVAW across countries. However, it is not assumed that the beliefs in the women lead to their abuse and battering by men or that men who accept IPVAW are more likely to be wife abusers<sup>35</sup>.

However, women who maintain these beliefs may be at a greater risk of continuous abuse than those who do not<sup>35</sup>. In addition, women's susceptibility to IPVAV is shown to be greatest in societies where the use of violence is a socially accepted norm<sup>27</sup> which leads to women's inactivity in opposing violence against themselves<sup>149</sup>. Similarly, high normative acceptance among men may make it difficult for them to realise the abuse they perpetuate<sup>35</sup>. Fear of violence for refusing sexual relations may have important implications for the efforts to stall progress of HIV/AIDS epidemic in this region<sup>35</sup>. Women condemnation of this behaviour may, therefore, be an important element in changing it. Meta-regression analyses suggests that societal level variables may be important factors associated with the observed sex differences in attitudes towards IPVAV. We found that the odds of women justifying IPVAV more than men increased with increasing country polygamy rate and decreased with increasing adult male and female literacy rate. Similarly, the likelihood of women justifying IPVAV more than men decreased monotonically with country's increasing economic status, gender development index, and human development index. These findings have some policy and programme implications. At country-level increasing adult literacy and employment rates may come a long way in modifying attitudes towards IPVAV. Given the societal factors that shape the behaviour of communities and individuals, we believe that structural interventions hold great promise for significant achievements in the prevention of IPVAV<sup>150</sup>. The structural public health intervention could include: fostering gender equality and women's empowerment and integrating IPVAV prevention into other programme areas. Direct concerted efforts from the government, non-governmental organisations and enlightened men and women within the society are necessary to raise awareness about the issue and question the social norms<sup>35</sup>.

Drawing upon multilevel perspectives, in this thesis we have offered an alternative to more traditional ways of thinking about the factors associated with attitudes toward IPVAV at the population level. In particular, we have demonstrated that individual and neighbourhood context in which people live is associated with the attitude of individuals even after taking into account individual-level SEP. As hypothesized, we found that sex moderates associations of individual-, community-, and country-level SEP with attitudes towards IPVAV. Counter intuitively, we found that women were more likely to justify IPVAV women than men. This has been reported in a previous study that has examined this association in seven countries in sub-Saharan Africa<sup>35</sup>. In contrast to this finding, the findings of a qualitative research revealed that many women strongly feel that IPVAV is wrong<sup>62</sup>. Women described IPVAV as an injustice to which they were subjected and from which they were unprotected as a result of social and economic forces beyond their condition. Men and women living in disadvantaged communities had higher rates of justifying IPVAV compared with their counterparts residing in the most advantaged communities after adjustment for individual SEP. We have shown that individual-level SEP relate to the attitudes towards IPVAV in a manner consistent with previous studies<sup>5 35 38</sup>. Men not currently employed were more likely to justify IPV than those in work. We found that compared with people with secondary or higher education, those with no education or primary education were more likely to justify IPVAV. The relationship between household wealth status and attitudes towards IPVAV found in this study is consistent with other studies that have shown higher rates of justifying IPV among people from poorest households<sup>5 35 38</sup>.



We found evidence of geographical variation in attitudes toward IPVAW. About 15% and 10% of the total individual differences in attitudes toward IPVAW were at neighbourhood and country level respectively. It is intuitive that people from the same area may be more similar to each other in relation to their attitude than to people from other areas<sup>112</sup>. Persons with similar characteristics may have different health behaviour and attitudes according to whether they live in one neighbourhood or in another because of differing cultural, economic, political, climatic, historical, and geographical contexts<sup>112</sup>. Thus, people living in the same neighbourhood tend to have similar attitudes. This is in part because people in the same neighbourhood are subject to common contextual influences. This contextual phenomenon expresses itself as clustering of individual attitudes within neighbourhood. That is, a portion of the health differences among people may be attributable to the areas in which they reside<sup>112</sup>. On these grounds, we might conclude that there is some evidence for a possible neighbourhood and country contextual phenomenon shaping a common individual attitude toward IPVAW; and that neighbourhoods are very important in understanding individual difference in attitudes toward IPVAW. This indicates that policy and public health preventive services that operate on relatively large geographical and population-based scales are potential intervention points, and should be considered in conjunction with health programs that target individual risk factors.

This thesis is the first we are aware of that examines how proximate and distal gender inequalities are associated with women's attitudes toward IPVAW. We found that community and societal measures of gender inequalities were associated with women's acceptance of IPVAW independently of individual-level inequality. Our findings provide support for the growing body of research suggesting that contextual factors are important in explaining people's perceptions. The study adds to the literature by demonstrating that community and societal forms of gender inequality factors influence women's attitudes toward IPVAW beyond individual factors. We found that choices women make are important, but the community and society factors may also impose willpower and restraints on women's attitudes to IPVAW. A few people believe that women's attitudes are of their own choosing; however, we found that women's attitudes may be depended on people around them and circumstances they found themselves in. Our novel finding of geographical clustering in women's attitudes toward IPVAW had never been reported before. Women living in the same neighbourhood tended to have similar attitudes. This is in part because women in the same neighbourhood are subject to common contextual influences that express themselves as clustering of women's attitudes within the community<sup>111-114</sup>. The results of studies in sub-Saharan Africa<sup>15-17 20 80</sup> and other parts of the world<sup>151-154</sup> have suggested that the risk of violence is higher in husband-dominated families than in egalitarian families. The reasons explaining why IPVAW continues to thrive in patriarchal societies and societies that encourage gender inequality may include the patriarchal structure of the most sub-Saharan African family, where society gives men considerable authority<sup>155 156</sup>. Firstly, men are considered to have an advantage in resources and perceived as enjoying superior personal characteristics. They supposedly possess – exclusively – skills and abilities such as intelligence, wisdom, discretion, knowledge, professional prestige and the ability to make a living. Furthermore, men are expected to dominate women. Secondly, patriarchal societies tend to encourage socialization and education for compulsive masculinity.

From a very young age, boys are educated to preserve their masculinity and are ashamed of behaviours that society perceives to be feminine or childish. Thirdly, women are subject to economic constraints and discrimination, which are usually imposed on them to a greater degree than on men, both within and outside the family. The repressive economic and occupational structure of patriarchal societies leaves women with very few alternatives. In general, the objective and perceived status of occupations and jobs open to women are inferior to those available to men. And, finally, the patriarchal, non-democratic and sexist structure poses a risk – or at least a potential risk – of fostering a negative self-image among women. This threat to the woman's self-image can be attributed largely to society's emphasis on achievements and competitiveness, which are associated more with masculinity than femininity<sup>155</sup>.

We develop social learning ecological theories to explore association between individual-, community-tolerant attitudes towards IPVAV and exposure to IPVAV. The key findings of this study are as follows. Firstly, we found that women that witnessed IPVAV were more likely to have tolerant attitudes towards IPVAV and women with tolerant attitudes were more likely to have reported spousal physical, sexual and emotional abuse. This is consistent with previous studies that found that attitude towards IPVAV is one of the most prominent predictors of IPVAV<sup>28 29 30</sup>. In addition, we found support for the hypothesis that women with husband with tolerant attitudes towards IPVAV were more likely to have reported spousal abuse. In addition, women with tolerant attitudes were more likely to have husbands with tolerant attitudes too. The hypothesis that “women who endorse cultural beliefs about husbands' right to use violence to control wives' behaviour will be more likely to experience spousal abuse” is based on assumption that women who adhere to more traditional notions of husband's rights and privileges are more likely to be married to men who raised in families in which traditional gender roles were encouraged<sup>30</sup>. Secondly, the current research extends studies that have examined association between tolerant attitudes towards IPVAV and exposure to IPVAV, by providing new evidence on contextual effects on exposure to IPVAV. We found that increasing proportion of women in the community with tolerant attitudes was significantly positively associated with spousal sexual and emotional abuse, but not significantly association with spousal physical abuse. In addition, we found that increasing proportion of men in the community with tolerant attitudes and increasing proportion of women who had witnessed IPVAV in the community was significantly positively associated with spousal physical abuse, but not significantly association with spousal sexual and emotional abuse. Thirdly, the results of measurement models (confirmatory factor analysis) suggest that the five question scenarios on gender roles appear to be a sound tool for the assessment of tolerant attitudes towards IPVAV. Fourthly, there was positive correlation between all three types of IPVAV at individual-level. This finding corroborate those of previous studies that found that physical violence in intimate relationship almost always is accompanied by emotional abuse, and in one-third to over half of cases, by sexual abuse<sup>157</sup>. Finally, more importantly, the findings uncover new evidence about the correlated nature of three components of IPVAV, spousal physical, sexual and emotion abuse, at community-level. These significant community-level factors suggest that scholars trying to understand variation in women exposure to IPVAV should pay attention to the characteristics of both individuals and places of residence. We observed different pattern of association between the community-level attitudes, men and women attitudes towards IPVAV.



It is not clear why community women attitudes was association with spousal emotional and sexual abuse; and average men attitudes in the community was only associated with spousal physical abuse. Futures should confirm studies these findings in other setting.

Our alternative hypothesis that tolerant attitudes mediate association between witnessing IPVAV and exposure to IPVAV was not supported by the data. Similarly, we found no support for the reciprocal association between tolerant attitudes and exposure to IPVAV. Khawaja and colleagues examined attitudes of men and women towards wife beating in Jordan and found that women that had been victim of IPVAV were significantly more likely to report acceptance of wife beating<sup>158</sup>. There is a need for longitudinal studies to confirm this hypothesis.

## 6.2 STUDY LIMITATIONS AND METHODOLOGICAL CONSIDERATIONS

There are a number of caveats to be considered when interpreting these results. The cross-sectional nature of the data limits ability to draw casual inferences. The thesis can be criticized for using an indirect measure of household wealth. However, due to the fact that in low- and middle-income countries, it is hard to obtain reliable income and expenditure data, an asset-based index is generally considered a good proxy for household wealth status. Another important limitation is that the reliability and validity of this instrument used for measuring attitudes towards IPVAV is yet to be established<sup>36 37</sup>. It has been documented that attitudes toward IPVAV is limited in scope to capture women's normative roles in the domestic arena<sup>37</sup>. In addition, other issues such as motivations for partner abuse because of nondomestic factors such as women's financial status, employment position, education and husband's drunkenness are not included in the measure of attitudes toward IPVAV. Apart from instrumental validity, the potential limitations of face-to-face interviews need to be acknowledged<sup>37</sup>. For example, when contrasted with self administered questionnaires, participants may tend to underreport their attitudes toward IPVAV in the presence of their interviewers. However, ethical measures such as guarantees of anonymity and administering the interviews by trained personal may have improved such reporting<sup>37</sup>.

The findings of our comparative analysis should be interpreted in the context of both intrinsic limitations of meta-analysis, and in the context of our own study-specific (subject matter) limitations. In meta-analysis, the traditional unit of analysis is each study (country in our case), thus, compared with multilevel analysis with individual-level data, the power to detect a difference in aggregate or to identify explanatory variables by meta-regression is greatly diminished. As with all ecological studies, the findings of this study cannot be considered conclusive because of the cross-sectional and ecological design and the possibility of ecological fallacy. Thus, caution should be exercised in the attribution of a casual relationship and the direction of relationship observed in the study. Another limitation is that the meta-regression analysis is based on univariable analysis, due to small sample size (number of countries included), the study could not control for potential confounders simultaneously using multivariable meta-regression analysis.

Our findings on multilevel analyses should be considered in light of the following limitations. Firstly, we did not have longitudinal neighbourhood measurements, which may generate selection bias<sup>159 160</sup>.

The relationship between neighbourhood characteristics and attitudes toward IPVAV may be due to the non-random selection of individuals into neighbourhoods and not because of neighbourhood influences. Therefore, these relationships should be interpreted as associations only. Secondly, we did not measure the length of time that participants had spent in their neighbourhoods and the extent of their exposure to the neighbourhood environment. We were, thus, unable to determine whether associations of neighbourhood characteristics with attitudes toward IPVAV were due to cumulated effects. Thirdly, the neighbourhoods used in the analyses were administrative boundaries, which may not adequately capture the social context important for individual attitude. However, the areas used seem to be appropriate to capture social context in view of the high neighbourhood variances found. Fourth, the association between country-level SEP and attitudes towards IPVAV was inconclusive. We found that the main association did not reach statistical significance. The presence of a significant interaction indicates that there is a real association of country-level SEP in one sex or the other, but we do not have enough information to establish it. Fifth, one important limitation is that DHS surveys do not collect data on household income or expenditure, the traditional indicators used to measure wealth. The assets-based wealth index used here is only a proxy indicator for household economic status, and it does not always produce results similar to those obtained from direct measurements of income and expenditure where such data are available or can be collected reliably<sup>127 128</sup>. Finally, we used the instrumentation adapted by DHS for use in the Sub-Saharan African context was used. Though the reliability and validity of this instrument is yet to be established, several studies have indicated their ability to distinguish between groups in the expected manner<sup>54 36</sup>.

Although it is mathematically possible that structural equation modelling may be used to test reciprocal relations with cross-sectional data, the validity of such results have been questioned and debated in the literature<sup>161</sup>. Another important limitation is that the attitudes toward IPVAV may be limited in scope to capture women's normative roles in the domestic arena<sup>37</sup>. In addition, other issues such as motivations for partner abuse because of nondomestic factors such as women's financial status, employment position, education and husband's drunkenness are not included in the measure of attitudes toward IPVAV. The potential limitations of face-to-face interviews need to be acknowledged<sup>37</sup>. For example, when contrasted with self-administered questionnaires, participants may tend to underreport their attitudes toward IPVAV in the presence of their interviewers. However, ethical measures such as guarantees of anonymity and administering the interviews by trained personal may have improved such reporting<sup>37</sup>.

### **6.3 STUDY STRENGTHS**

Despite these limitations, the study strengths are significant. It is a large, population-based study with national coverage. In addition, data of the DHS are widely perceived to be of high quality, as they were based on sound sampling methodology with high response rate. DHS also adhere to stringent ethical rules in the collection of domestic violence data used. An important strength of this study is the number of included countries and geographic and socioeconomic diversities constitute a good yardstick for the region, and help to strengthen the findings from the study. The DHS have some important advantages when compared with other surveys. They are often nationally representative, allowing for conclusions that cover the entire nation. In addition, same variable is operationalized in the same way and making it possible for numerical values comparable across countries.

There are advantages to studying factors associated with attitudes towards IPVAW using a multilevel approach; country and community level analyses identify social, cultural, and economic context in which individual lives and experiences health outcomes. Beyond the communities, individuals will be influenced by national policies which affect the proximate determinants of attitudes towards IPVAW. Therefore, by using a cross-country method, we were able to study the associations of different levels of societal organization, to provide more robust evidence about individual, community, and country-level SEP associated with attitudes towards IPVAW. Understanding the relative contribution of individual, community, and societal factors is important for policymakers in order to design and target public health interventions. Overall, the number of included countries and geographic and socioeconomic diversities constitute a good yardstick for the region and help strengthen the findings from the study. A novel aspect of our paper was to empirically estimate the cross-level interaction between individual level socioeconomic status, neighbourhood and country level socioeconomic status. Our finding that the association between attitudes towards IPVAW and socioeconomic position may vary between neighbourhoods in sub-Saharan Africa gives empirical support to the existence of cross-level interactions (i.e., between community and individual) associated with health-related behaviours such as attitudes towards IPVAW. This means that attitudes towards IPVAW may be a result of the interaction between a person and his and her place of residence. This suggests that interventions to change the underlying attitudes towards IPVAW should focus on places and people.

It is increasingly recognised that, even when studying individual level risk factors, population level studies play an essential part in defining the most important public health problems to be tackled, and in generating hypotheses as to their potential causes<sup>162</sup>. An important aspect of any meta-analysis is to conduct a thorough search of published studies which should then be included in the pooled estimate<sup>163</sup>. We took a different approach in this study. While the methods of synthesizing data from various studies were formulated in the context of epidemiology and clinical trials research, these methods are applicable, with appropriate modification, to health research surveys as well<sup>164</sup>. Meta-analysis involving health survey may seem odd since they have not often meta-analysed. However, the effect size are straightforward if two conditions are met<sup>165</sup>. First, all the findings must involve the same variable operationalized in the same way or in sufficiently similar ways that the numerical values have comparable meaning across surveys<sup>165</sup>. Second, it must be possible to define effect size statistics that represents the information of interest and to determine the standard error associated with that statistic<sup>165</sup>. We directly analysed substantial number of public domain data sets instead of using results from published studies. This approach, we believe, brings with it two considerable advantages. First, not all published studies include the same or even comparable variables in their analyses. Taking raw data from DHS allow us to use the same variables and most comparable items for attitudes toward IPVAW. Second, there are many more survey data sets than there are published studies. We therefore, achieve a much greater coverage of the population of effect sizes and mitigate the ‘publication bias’ that increases the probability of Type I errors<sup>166</sup>. This is a problem that makes meta-analysis prone to overestimating effect sizes where the data are collected solely from published work<sup>167</sup>.

In the present investigation, more appropriate and recent multi-level structural equation modelling techniques were used to examine the association between tolerant attitudes towards IPVAV and exposure to IPVAV. Hierarchical data violate the independence of observation assumption. Analysing such data as individual observations (i.e., when couples from the same community are treated as independent data points and clustering within the community is ignored) can result in standard errors that are too small, *P*-values that are erroneously significant, and conclusions which may be wrong<sup>168</sup>. The structural equation model (SEM) methodology and analysis provide a comprehensive and flexible approach to research design and data analysis. It is a covariance matrix-based analytic tool that fosters diagrammatic framing of research questions and permits simultaneous evaluation of measurement constructs and the structural paths between those constructs<sup>169</sup>. This study involved a complex, comprehensive model of latent constructs affecting the women exposure to IPVAV. The SEM thus provides flexibility for working with multiple related equations simultaneously and gives a detailed picture of the possible causal relationships among key<sup>169</sup>. In addition, we adopted a multivariate analytic framework. We considered spousal physical, sexual and emotional abuse as distinct, yet related, states nested within individuals. The multivariate analytic framework offered three distinct advantages. First, it is only through a multivariate framework that comparable assessments of common individual-level tolerant attitudes towards IPVAV that affect spousal physical, sexual and emotional abuse can be made. Secondly, the multilevel framework permits an assessment of whether local communities' tolerant attitudes make a difference to women exposure to spousal physical, sexual and emotional abuse. Thirdly, the important advantage from treating three outcomes together in a multivariate multilevel structural equation statistical framework is the estimation of the "covariance" between spousal physical, sexual and emotional abuse at the individual and community-level. In addition, this study is among first to examine the construct validity of five questions used to measure attitudes towards IPVAV using confirmatory factor analysis.

#### **6.4 STUDY IMPLICATIONS AND RECOMMENDATIONS**

We have provided evidence that in most Sub-Saharan African countries studied here IPVAV is widely accepted as a response to women's transgressing gender norms, men find less justification for the practice than do women. We believe like others<sup>35</sup><sup>170</sup>, that the first step toward eliminating this practice is to "build up a substantial amount of momentum" in opposition to the use of violence in conflict resolution and that, given its widespread acceptance in these societies, the development of a "new social consensus" albeit a slow process, is crucial. A climate of tolerance of IPVAV would make it easier for perpetrators to persist in their violent behaviour and make it more difficult for women to disclose domestic violence<sup>31</sup>. In terms of IPVAV, there is a need for a social environment characterized by low tolerance and an increased sense of social and personal responsibility toward IPVAV<sup>33</sup>. This, in turn, would contribute to a social environment more effective in terms of social control of IPVAV<sup>171</sup>. Public awareness and education campaigns aiming to lowering social tolerance and to increase the sense of social and personal responsibility toward IPVAV are needed in order to reduce and prevent IPVAV.

Sub-Saharan Africa is ethnically, culturally and religiously diverse and economic development and education levels vary widely across the countries. Not unexpectedly, we found that the magnitude and directions of factors associated with attitudes towards IPVAV varies widely across the 17 countries studied. Sub-Saharan African countries have heterogeneous conditions. Understanding cross countries diversities may aid in the identification of regions that may need to be particularly targeted with education and prevention programs. Thus, multifaceted geographically differentiated intervention may represent a potentially effective approach for addressing issues related to intimate partner violence in sub-Saharan Africa with policies tailored to country-specific conditions. Furthermore, decision makers should capitalize on need-adapted interventions to meet societal conditions in a bid to change men's distorted attitudes toward IPVAV.

Potential public health programmes could include structural and gender-based interventions. Structural interventions focusing on improving the coverage and dissemination of information to the general public may be beneficial in changing men's attitudes toward IPVAV, alongside a review of the educational system, which may seem to reinforce gender inequity. It is also important to note that access to media reduced odds of acceptance of IPVAV in most countries. The widespread acceptance of IPVAV may also become a major hurdle in success of other reproductive health programs (i.e., family planning programs), care seeking for sexually transmitted diseases or voluntary testing and counselling, and condom use for prevention of HIV/AIDS if the women do not confront men because of the threat of domestic violence, as a large proportion of women in these societies considered "arguing with husband" and "refusing sex" as valid reasons for wife beating<sup>61</sup>.

Gender-based interventions, building on advocacy for shared autonomy in the domestic domain, and the provision of basal education for all may prove paramount in changing men's distorted attitudes about IPVAV, particularly among younger men and in rural settings. We found that joint decision making reduced likelihood of justifying IPVAV indicating that imbalance of power is associated with higher odds of justifying IPVAV. Interventions that promote joint decision-making might be a promising strategy for increasing women's view towards equality in marriage while promoting men's views that household disputes should be settled with negotiation and not violence. To break the norms that sustain women's vulnerability in society, there is a need for pro-active efforts toward socioeconomic development and promotion of higher education.

Given the societal and community factors that shape the attitudes of women toward IPVAV, we believe, like others<sup>150</sup>, that structural interventions hold great promise for significant achievements in the prevention of IPVAV. For nearly four decades, feminist researchers have argued that in order to stop men's use and women's experience of violence on the personal level, structures of gender inequality at the societal level must change<sup>65 154 172 173</sup>. Multi-faceted interventions tackling structural determinants of IPVAV may represent a potentially effective approach for addressing issues related to IPVAV. Program components could include socio-economic development, promotion of higher education, youth development, media campaigns, educational interventions, male involvement initiatives and legislative reform efforts. A recent cluster randomized trial provides encouraging evidence that combined microfinance and training interventions can lead to reductions in levels of IPVAV in program participants.

Structural interventions focusing on improving the coverage and dissemination of information to the general public may be beneficial in changing women's attitudes toward IPVAW, alongside a review of the educational system, which may seem to reinforce gender inequity. Building on advocacy for shared autonomy in the domestic domain, and the provision of basic education for all, may prove paramount in changing women's distorted attitudes about IPVAW.

Interventions that promote joint decision making might be a promising strategy for increasing women's view toward equality while promoting men's views that household disputes should be settled with negotiation, not violence.

## **6.5 FUTURE RESEARCHES**

Future studies should investigate other factors that may account for the unexplained neighbourhood and country variations in attitudes toward IPVAW. Future research also should address the mechanisms that connect the people and neighbourhood levels, that is, the means through which deleterious neighbourhood effects are transmitted to the individual residents. These mechanisms are crucial to the design of community-based interventions because these processes may be more amenable to change than entrenched structural properties of neighbourhoods (e.g., concentrated poverty). There is a need for well designed, adequately powered, behavioural interventions, designed to change attitudes towards IPVAW. These interventions can be directed at one or more of determinants of behaviour: attitudes, subjective norms, or perceptions of behavioural control. Changes in these factors can produce changes in behavioural intentions.

## 7 CONCLUSIONS

This large comparative analysis has provided evidence that IPVAW was widely acceptable under certain circumstances and more such among women, younger people, less educated, poorest, those living in rural areas, those with less access to media and single decision makers. The better the country economic status, adult female and male literacy rate, gender development index, human development index the higher the sex disparities in attitudes toward IPVAW. Drawing upon structural equation and multilevel perspectives, this thesis have offered an alternative to more traditional ways of thinking about the association between tolerant attitudes towards IPVAW and exposure to IPVAW at the population level. In particular, we have demonstrated that community tolerant attitudes context in which people live is associated with exposure to IPVAW even after taking into account individual tolerant attitudes. There is evidence that community and societal forms of gender inequality factors may be associated with women's attitudes toward IPVAW beyond individual factors. Choices women make are important, but community and society factors may also imposed willpower and restraint on women's attitudes toward IPVAW.

There is a need for proactive efforts to break the norms that sustain women's vulnerability in the society besides socio-economic development as well as promotion of higher education among men and women. Direct concerted efforts from the government, non-governmental organisations and enlightened men and women within the society are necessary to raise awareness about the issue as well as questioning the social norms. However, it is important to note that there was high heterogeneity in attitudes towards IPVAW across countries. Thus, suggesting that multifaceted geographically differentiated intervention may represent a potentially effective approach for addressing issues related to IPVAW in sub-Saharan Africa and policies have to be tailored to country-specific conditions. The existence of socio-economic inequalities in victims' and perpetrators' attitudes toward wife beating both at the individual and contextual levels, underscore the need to implement public health prevention strategies not only at the individual level, but also to tailor them to the SEP of the population they are aiming to protect. Thus, policies and programs aimed at reducing or eliminating IPVAW must address people, the communities and societies in which they live in order to be successful. It would also be necessary for public health prevention actions to be focused at the neighbourhood level, to modify adverse environmental conditions of deprived communities.



## 8 ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to the many people who, in different ways, have contributed to this work. In particular, I would like to thank the following: Associate Professor Lawoko Stephen, my principal supervisor, thank you for introducing me to the world of safety promotion and injury prevention. Thank you for being my teacher and mentor. Thank you for always listening to my ideas and for believing in me. You give criticism in a very positive way and you have thoughtfully pushed me forward and created invaluable opportunities for me to grow academically. Associate Professor Tahereh Moradi, my co-supervisor. It has been a great honour working with you. Your knowledge of epidemiology has been invaluable to the manuscripts in this thesis. Thank you for always taking the time to carefully review my work. Thank you for challenging me to learn more and go further in my research and for teaching me to keep research presentations simple and elegant.

My sincere thanks go to ICF Macro for providing access to the DHS and all the respondents in the Demographic and Health Surveys included in this thesis. Especially all women who voluntarily who completed the domestic violence module. Their contributions are invaluable and unforgettable.

I owe special thanks to all my fellow doctoral student, Olatunde Aremu, friends and colleagues at the division of Social Medicine whose friendly gestures gave me a special boost and an excellent working environment.

My wonderful brothers and sisters. Mrs Risikat Ayanda for all your constant support. Dr. Uthman M Babatunde for your encouragement and support. Mr Nureni Jimoh, for making me feel that I can do anything and for your support and help. Last but not the least I deeply thank my Wife Tinuke for all her love, patience and constant encouragement through this exciting doctoral adventure. I also thank my gorgeous daughters Nimat and Hamidah for bringing pure joy to my life.

Finally, I dedicate my thesis to my dear parents who undoubtedly believed in my potential. I believe that their prayers and good wishes are always with me as long as I live.



## 9 REFERENCES

1. Ofei-aboagye RO. Domestic violence in Ghana: an initial step. *Columbia J Gend Law* 1994;4(1):1-25.
2. Okemgbo CN, Omideyi AK, Odimegwu CO. Prevalence, patterns and correlates of domestic violence in selected Igbo communities of Imo State, Nigeria. *African journal of reproductive health* 2002;6(2):101-14.
3. Kiragu J. Policy review: HIV prevention and women's rights: working for one means working for both. *AIDS Captions* 1995;2(3):40-6.
4. Rivera Izabal LM. Women's legal knowledge: a case study of Mexican urban dwellers. *Gend Dev* 1995;3(2):43-8.
5. Oyediran KA, Isiugo-Abanihe U. Perceptions of Nigerian women on domestic violence: evidence from 2003 Nigeria Demographic and Health Survey. *African journal of reproductive health* 2005;9(2):38-53.
6. Watts C, Ndlovu M, Njovana E, Keogh E. Women, violence and HIV / AIDS in Zimbabwe. *Safaiids News* 1997;5(2):2-6.
7. Campbell J, Jones AS, Dienemann J, Kub J, Schollenberger J, O'Campo P, et al. Intimate partner violence and physical health consequences. *Arch Intern Med* 2002;162(10):1157-63.
8. Moore M. Reproductive health and intimate partner violence. *Fam Plann Perspect* 1999;31(6):302-6.
9. Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen SM. Drug abuse and aggression between intimate partners: a meta-analytic review. *Clin Psychol Rev* 2008;28(2):247-74.
10. Golding JM. Intimate partner violence as a risk factor for mental disorders a meta-analysis. *Journal of Family Violence* 1999;14(2):99-132.
11. Ellsberg M, Jansen HA, Heise L, Watts CH, Garcia-Moreno C. Intimate partner violence and women's physical and mental health in the WHO multi-country study on women's health and domestic violence: an observational study. *Lancet* 2008;371(9619):1165-72.
12. Emenike E, Lawoko S, Dalal K. Intimate partner violence and reproductive health of women in Kenya. *Int Nurs Rev* 2008;55(1):97-102.
13. Lawoko S, Dalal K, Jiayou L, Jansson B. Social inequalities in intimate partner violence: a study of women in Kenya. *Violence Vict* 2007;22(6):773-84.
14. Owoaje ET, Olaolorun FM. Intimate partner violence among women in a migrant community in southwest Nigeria. *Int Q Community Health Educ* 2005;25(4):337-49.
15. Karamagi CA, Tumwine JK, Tylleskar T, Heggenhougen K. Intimate partner violence against women in eastern Uganda: implications for HIV prevention. *BMC Public Health* 2006;6:284.
16. Abrahams N, Jewkes R, Laubscher R, Hoffman M. Intimate partner violence: prevalence and risk factors for men in Cape Town, South Africa. *Violence Vict* 2006;21(2):247-64.
17. McCloskey LA, Williams C, Larsen U. Gender inequality and intimate partner violence among women in Moshi, Tanzania. *Int Fam Plan Perspect* 2005;31(3):124-30.
18. Watts C, Mayhew S. Reproductive health services and intimate partner violence: shaping a pragmatic response in Sub-Saharan Africa. *Int Fam Plan Perspect* 2004;30(4):207-13.
19. Fawole OI, Aderonmu AL, Fawole AO. Intimate partner abuse: wife beating among civil servants in Ibadan, Nigeria. *African journal of reproductive health* 2005;9(2):54-64.
20. Choi SY, Ting KF. Wife beating in South Africa: an imbalance theory of resources and power. *J Interpers Violence* 2008;23(6):834-52.
21. Deyessa N, Kassaye M, Demeke B, Taffa N. Magnitude, type and outcomes of physical violence against married women in Butajira, southern Ethiopia. *Ethiop Med J* 1998;36(83-5).
22. Silverman JG, Gupta J, Decker MR, Kapur N, Raj A. Intimate partner violence and unwanted pregnancy, miscarriage, induced abortion, and stillbirth among a national sample of Bangladeshi women. *BJOG* 2007;114(10):1246-52.

23. Gupta J, Silverman JG, Hemenway D, Acevedo-Garcia D, Stein DJ, Williams DR. Physical violence against intimate partners and related exposures to violence among South African men. *CMAJ* 2008;179(6):535-41.
24. Johnson KB, Das MB. Spousal violence in Bangladesh as reported by men: prevalence and risk factors. *J Interpers Violence* 2009;24(6):977-95.
25. Silverman JG, Decker MR, Kapur NA, Gupta J, Raj A. Violence against wives, sexual risk and sexually transmitted infection among Bangladeshi men. *Sex Transm Infect* 2007;83(3):211-5.
26. Visaria L. Violence against women: a field study. *Econ Pol Wkly* 2000:1742-51.
27. Jewkes R. Intimate partner violence: causes and prevention. *Lancet* 2002;359(9315):1423-9.
28. Faramarzi M, Esmailzadeh S, Mosavi S. A comparison of abused and non-abused women's definitions of domestic violence and attitudes to acceptance of male dominance. *European journal of obstetrics, gynecology, and reproductive biology* 2005;122(2):225-31.
29. Hanson RK, Cadsky O, Harris A, Lalonde C. Correlates of battering among 997 men: family history, adjustment, and attitudinal differences. *Violence Vict* 1997;12(3):191-208.
30. Gage AJ, Hutchinson PL. Power, control, and intimate partner sexual violence in Haiti. *Arch Sex Behav* 2006;35(1):11-24.
31. Gracia E. Unreported cases of domestic violence against women: towards an epidemiology of social silence, tolerance, and inhibition. *J Epidemiol Community Health* 2004;58(7):536-7.
32. Biden JR, Jr. Violence against women. The congressional response. *Am Psychol* 1993;48(10):1059-61.
33. Gracia E, Herrero J. Acceptability of domestic violence against women in the European Union: a multilevel analysis. *J Epidemiol Community Health* 2006;60(2):123-9.
34. Uthman OA, Moradi T, Lawoko S. The independent contribution of individual-, neighbourhood-, and country-level socioeconomic position on attitudes towards intimate partner violence against women in sub-Saharan Africa: a multilevel model of direct and moderating effects. *Soc Sci Med* 2009;68(10):1801-9.
35. Rani M, Bonu S, Diop-Sidibe N. An empirical investigation of attitudes towards wife-beating among men and women in seven sub-Saharan African countries. *African journal of reproductive health* 2004;8(3):116-36.
36. Lawoko S. Factors associated with attitudes toward intimate partner violence: a study of women in Zambia. *Violence Vict* 2006;21(5):645-56.
37. Lawoko S. Predictors of attitudes toward intimate partner violence: a comparative study of men in Zambia and Kenya. *J Interpers Violence* 2008;23(8):1056-74.
38. Hindin MJ. Understanding women's attitudes towards wife beating in Zimbabwe. *Bull World Health Organ* 2003;81(7):501-8.
39. Okenwa L, Lawoko S. Social indicators and physical abuse of women by intimate partners: a study of women in Zambia. *Violence Vict* 2010;25(2):278-88.
40. Rasbash J, Steele F, Browne W, Prosser B. *A user's guide to MLwiN. Version 2.10*. London: Centre of Multilevel Modelling, Institute of Education, University of London, 2008.
41. World Health Organization, London School of Hygiene and Tropical Medicine. *Preventing intimate partner and sexual violence against women: taking action and generating evidence*. Geneva: World Health Organization, 2010.
42. Garcia-Moreno C. *WHO Multi-Country study on women's health and domestic violence against women*. Geneva: World Health Organization, 2005.
43. World Health Organization. *World report on violence and health*. Geneva: WHO, 2002.
44. Watts C, Zimmerman C. Violence against women: global scope and magnitude. *Lancet* 2002;359(9313):1232-7.
45. Bates LM, Schuler SR, Islam F, Islam K. Socioeconomic factors and processes associated with domestic violence in rural Bangladesh. *Int Fam Plan Perspect* 2004;30(4):190-9.

46. Burazeri G, Roshi E, Jewkes R, Jordan S, Bjegovic V, Laaser U. Factors associated with spousal physical violence in Albania: cross sectional study. *Bmj* 2005;331(7510):197-201.
47. Ellsberg MC, Pena R, Herrera A, Liljestrand J, Winkvist A. Wife abuse among women of childbearing age in Nicaragua. *Am J Public Health* 1999;89(2):241-4.
48. Jewkes R, Levin J, Penn-Kekana L. Risk factors for domestic violence: findings from a South African cross-sectional study. *Soc Sci Med* 2002;55(9):1603-17.
49. Kantor GK, Straus MA. Substance abuse as a precipitant of wife abuse victimizations. *Am J Drug Alcohol Abuse* 1989;15(2):173-89.
50. Martin SL, Kilgallen B, Tsui AO, Maitra K, Singh KK, Kupper LL. Sexual behaviors and reproductive health outcomes: associations with wife abuse in India. *Jama* 1999;282(20):1967-72.
51. Martin SL, Moracco KE, Garro J, Tsui AO, Kupper LL, Chase JL, et al. Domestic violence across generations: findings from northern India. *Int J Epidemiol* 2002;31(3):560-72.
52. Martin SL, Tsui AO, Maitra K, Marinshaw R. Domestic violence in northern India. *Am J Epidemiol* 1999;150(4):417-26.
53. Sorenson SB, Upchurch DM, Shen H. Violence and injury in marital arguments: risk patterns and gender differences. *Am J Public Health* 1996;86(1):35-40.
54. Lawoko S. Attitudes towards Wife beating: a comparative study of men and women in Kenya. *International Journal of Psychology Research* 2008;1:183-207.
55. Sarkar NN. The impact of intimate partner violence on women's reproductive health and pregnancy outcome. *J Obstet Gynaecol* 2008;28(3):266-71.
56. Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts CH. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *Lancet* 2006;368(9543):1260-9.
57. Dunkle KL, Jewkes RK, Brown HC, Gray GE, McIntyre JA, Harlow SD. Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. *Lancet* 2004;363(9419):1415-21.
58. Garcia-Moreno C, Watts C. Violence against women: its importance for HIV/AIDS. *Aids* 2000;14 Suppl 3:S253-65.
59. Naved RT, Persson LA. Factors associated with spousal physical violence against women in Bangladesh. *Studies in family planning* 2005;36(4):289-300.
60. Counts D, Brown JK, Campbell JC. *Sanctions and Sanctuary: Cultural Perspectives on the Beating of Wives*. Boulder: Westview Press, 1992.
61. Rani M, Bonu S. Attitudes toward wife beating: a cross-country study in Asia. *J Interpers Violence* 2009;24(8):1371-97.
62. Schuler SR, Islam F. Women's acceptance of intimate partner violence within marriage in rural Bangladesh. *Studies in family planning* 2008;39(1):49-58.
63. Okenwa L, Lawoko S. Social indicators and Intimate Partner Violence: a study of women in Zambia. *Violence and Victims* 2008;in press.
64. Benson ML, Greer LF, DeMaris A, Van Wyk J. Neighborhood disadvantage, individual economic distress and violence against women in intimate relationships. *Journal of Quantitative Criminology* 2003;19:207-35.
65. Browning CR. The span of collective efficacy: extending social disorganization theory to partner violence. *Journal of Marriage and Family* 2002;64:833-50.
66. Cunradi CB, Caetano R, Clark C, Schafer J. Neighborhood poverty as a predictor of intimate partner violence among White, Black, and Hispanic couples in the United States: a multilevel analysis. *Ann Epidemiol* 2000;10(5):297-308.
67. Koenig MA, Ahmed S, Hossain MB, Khorshed Alam Mozumder AB. Women's status and domestic violence in rural Bangladesh: individual- and community-level effects. *Demography* 2003;40(2):269-88.
68. McQuestion MJ. Endogenous social effects on intimate partner violence in Colombia. *Social Science Research* 2003;32:335-45.
69. O'Campo P, Gielen AC, Faden RR, Xue X, Kass N, Wang MC. Violence by male partners against women during the childbearing year: a contextual analysis. *Am J Public Health* 1995;85(8 Pt 1):1092-7.
70. Krishnan S, Dunbar MS, Minnis AM, Medlin CA, Gerdt CE, Padian NS. Poverty, gender inequities, and women's risk of human immunodeficiency virus/AIDS. *Ann N Y Acad Sci* 2008;1136:101-10.

71. Dunkle KL, Jewkes RK, Nduna M, Levin J, Jama N, Khuzwayo N, et al. Perpetration of partner violence and HIV risk behaviour among young men in the rural Eastern Cape, South Africa. *Aids* 2006;20(16):2107-14.
72. Jewkes R, Dunkle K, Nduna M, Levin J, Jama N, Khuzwayo N, et al. Factors associated with HIV sero-status in young rural South African women: connections between intimate partner violence and HIV. *Int J Epidemiol* 2006;35(6):1461-8.
73. Fonck K, Leye E, Kidula N, Ndinya-Achola J, Temmerman M. Increased risk of HIV in women experiencing physical partner violence in Nairobi, Kenya. *AIDS Behav* 2005;9(3):335-9.
74. Afifi TO, Macmillan H, Cox BJ, Asmundson GJ, Stein MB, Sareen J. Mental Health Correlates of Intimate Partner Violence in Marital Relationships in a Nationally Representative Sample of Males and Females. *J Interpers Violence* 2008.
75. Cleary BS, Keniston A, Havranek EP, Albert RK. Intimate partner violence in women hospitalized on an internal medicine service: prevalence and relationship to responses to the review of systems. *J Hosp Med* 2008;3(4):299-307.
76. Silverman JG, Decker MR, Saggurti N, Balaiah D, Raj A. Intimate partner violence and HIV infection among married Indian women. *Jama* 2008;300(6):703-10.
77. Shuman RD, Jr., McCauley J, Waltermaurer E, Roche WP, 3rd, Hollis H, Gibbons AK, et al. Understanding intimate partner violence against women in the rural South. *Violence Vict* 2008;23(3):390-405.
78. Maman S, Campbell J, Sweat MD, Gielen AC. The intersections of HIV and violence: directions for future research and interventions. *Soc Sci Med* 2000;50(4):459-78.
79. Zierler S, Krieger N. Reframing women's risk: social inequalities and HIV infection. *Annu Rev Public Health* 1997;18:401-36.
80. Jewkes RK, Levin JB, Penn-Kekana LA. Gender inequalities, intimate partner violence and HIV preventive practices: findings of a South African cross-sectional study. *Soc Sci Med* 2003;56(1):125-34.
81. Maman S, Mbwambo JK, Hogan NM, Kilonzo GP, Campbell JC, Weiss E, et al. HIV-positive women report more lifetime partner violence: findings from a voluntary counseling and testing clinic in Dar es Salaam, Tanzania. *Am J Public Health* 2002;92(8):1331-7.
82. van der Straten A, King A, Grinstead O, Vittinghoff E, Serufilira A, Allen SS. Sexual coercion, physical violence, and HIV infection among women in steady relationships in Kigali, Rwanda. *AIDS and Behavior* 1998;2:61-73.
83. Heise L, Ellsberg M, Gottmoeller M. *Ending violence against women. Population Reports No. 11*. Baltimore: Johns Hopkins University School of Public Health, 1999.
84. Belsky J. Child maltreatment: an ecological integration. *Am Psychol* 1980;35(4):320-35.
85. Heise LL. Violence against women: an integrated, ecological framework. *Violence against women* 1998;4(3):262-90.
86. Dahlberg LL, Krug EG. Violence – a global public health problem. In: Krug EG, editor. *World report on violence and health*. Geneva: World Health Organization, 2002.
87. Bandura A. *Social foundations of thought and action: a social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall, 1986.
88. Bandura A. Social cognitive theory: an agentic perspective. *Annual review of psychology* 2001;52:1-26.
89. Ajzen I, Albarracin D, Hornik R. *Prediction and change of health behavior: Applying the reasoned action approach* Mahwah, NJ: Lawrence Erlbaum Associates, 2007.
90. Ajzen I. *Attitudes, personality, and behavior*. 2nd ed. Milton-Keynes, England: Open University Press / McGraw-Hill, 2005.
91. Ajzen I, Fishbein M. *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall, 1980.
92. Fishbein M, Ajzen I. *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley, 1975.
93. Ajzen I. *Theory of Planned Behavior Diagram*. , 2006.
94. Shaw CR, McKay HD. *Juvenile Delinquency in Urban Areas*. Chicago: University of Chicago Press, 1942.



95. Harries KD. The ecology of homicide and assault: Baltimore city and country, 1989–1991. *Studies in Crime and Crime Prevention* 1995;4(44-60).
96. Lenton R. Power versus feminist theories of wife abuse. *Canadian Journal of Criminology* 1995;37:305-30.
97. Lenton R. Feminist versus interpersonal power theories of wife abuse revisited. *Canadian Journal of Criminology* 1995;37:567-74.
98. Cubbins LA, Vannoy D. Socioeconomic resources, gender traditionalism and wife abuse in urban Russian couples. *Journal of Marriage and Family* 2005;67:37-52.
99. Goode WJ. Force and violence in the family. *Journal of Marriage and Family* 1971;33:624-36.
100. Ackerson LK, Kawachi I, Barbeau EM, Subramanian SV. Effects of Individual and Proximate Educational Context on Intimate Partner Violence: A Population-Based Study of Women in India. *Am J Public Health* 2008.
101. Abrahams N, Jewkes R, Hoffman M, Laubsher R. Sexual violence against intimate partners in Cape Town: prevalence and risk factors reported by men. *Bull World Health Organ* 2004;82(5):330-7.
102. Hassan F, Sadowski LS, Bangdiwala SI, Vizcarra B, Ramiro L, De Paula CS, et al. Physical intimate partner violence in Chile, Egypt, India and the Philippines. *Inj Control Saf Promot* 2004;11(2):111-6.
103. Ilika AL, Okonkwo PI, Adogu P. Intimate partner violence among women of childbearing age in a primary health care centre in Nigeria. *Afr J Reprod Health* 2002;6(3):53-8.
104. Vizcarra B, Hassan F, Hunter WM, Munoz SR, Ramiro L, De Paula CS. Partner violence as a risk factor for mental health among women from communities in the Philippines, Egypt, Chile, and India. *Inj Control Saf Promot* 2004;11(2):125-9.
105. Durkheim E. *The rules of sociological method*. 8th ed. New York: Free Press of Glencoe, 1964.
106. Rose G. *The strategy of preventive medicine*. Oxford: Oxford University Press, 1992.
107. Schwartz S, Diez-Roux AV. Commentary: causes of incidence and causes of cases--a Durkheimian perspective on Rose. *Int J Epidemiol* 2001;30(3):435-9.
108. Snow J. *Snow on cholera. (A reprint of two papers by John Snow, MD, together with a biographical memoir by BW Richardson, MD, and an introduction by Wade Hampton Frost, MD)*. New York: The Commonwealth Fund, 1936.
109. Bawdekar M, Ladusingh L. Contextual correlates of child malnutrition in rural Maharashtra. *J Biosoc Sci* 2008;40(5):771-86.
110. Griffiths P, Madise N, Whitworth A, Matthews Z. A tale of two continents: a multilevel comparison of the determinants of child nutritional status from selected African and Indian regions. *Health Place* 2004;10(2):183-99.
111. Merlo J, Chaix B, Ohlsson H, Beckman A, Johnell K, Hjerpe P, et al. A brief conceptual tutorial of multilevel analysis in social epidemiology: using measures of clustering in multilevel logistic regression to investigate contextual phenomena. *J Epidemiol Community Health* 2006;60(4):290-7.
112. Merlo J, Chaix B, Yang M, Lynch J, Rastam L. A brief conceptual tutorial of multilevel analysis in social epidemiology: linking the statistical concept of clustering to the idea of contextual phenomenon. *J Epidemiol Community Health* 2005;59(6):443-9.
113. Merlo J, Chaix B, Yang M, Lynch J, Rastam L. A brief conceptual tutorial on multilevel analysis in social epidemiology: interpreting neighbourhood differences and the effect of neighbourhood characteristics on individual health. *J Epidemiol Community Health* 2005;59(12):1022-8.
114. Merlo J, Yang M, Chaix B, Lynch J, Rastam L. A brief conceptual tutorial on multilevel analysis in social epidemiology: investigating contextual phenomena in different groups of people. *J Epidemiol Community Health* 2005;59(9):729-36.
115. Leventhal T, Brooks-Gunn J. The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychological bulletin* 2000;126(2):309-37.
116. Sampson RJ. The neighborhood context of well-being. *Perspectives in biology and medicine* 2003;46(3 Suppl):S53-64.

117. Dahlberg LL, Krug EG. World Report on Violence and Health. In: Krug E, Dahlberg LL, Mercy JA, Zwi AB, Lozano R, editors. *Violence-a global public health problem*. Geneva, Switzerland: World Health Organization, 2002:1-56.
118. DHS M. Publications by country, 2008.
119. Kravdal O. A simulation-based assessment of the bias produced when using as contextual variables in multilevel models. *Demographic-Research* 2006;15(1):1-20.
120. Aliga A, Ren R. Cluster optimal sample size for Demographic and Health Surveys. *International Conference on Teaching Statistics, ICOTS-7*. Salvador, Bahia, Brazil, 2006.
121. UNDP. Statistics of the Human Development Report, 2008.
122. World Bank. Development Data & Statistics.
123. Strauss MA. Measuring intra-family conflict and violence: the conflict tactics (CT) scales. In: Strauss MA, Gelles RJ, editors. *Physical Violence in American Families: Risk Factors and Adaptations to Violence in 8145 Families*. New Brunswick: Transaction Publishers, 1990:29-47.
124. Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis. *Health Policy Plan* 2006;21(6):459-68.
125. ORC Macro, World Bank. Use wealth index to measure socioeconomic status. *DHS Dimensions* 2002;4(2):1-2.
126. Rutstein, Oscar S, Johnson K. *The DHS wealth index. DHS comparative reports no. 6*. . Calverton, MD: ORC Macro, 2004.
127. Filmer D, Pritchett LH. Estimating wealth effects without expenditure data-or tears: an application to educational enrollments in states of India. *Demography* 2001;38(1):115-32.
128. Montgomery MR, Gragnolati M, Burke KA, Paredes E. Measuring living standards with proxy variables. *Demography* 2000;37(2):155-74.
129. UNDP. Technical note 1: Calculating the human development indices, 2008.
130. UNDP. Measuring inequality: Gender-related Development Index (GDI) and Gender Empowerment Measure (GEM).
131. UNDP. The Human Development Index (HDI).
132. DerSimonian R, Laird N. Meta-analysis in clinical trials. *Controlled clinical trials* 1986;7(3):177-88.
133. Cochran WG. The combination of estimates from different experiments. *Biometrics* 1954;8:101-29.
134. Higgins JP, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat Med* 2002;21(11):1539-58.
135. Ender P. Ender P: Applied Categorical & Nonnormal Data Analysis: Collinearity Issues. UCLA: Academic Technology Services, Statistical Consulting Group.
136. Hocking RR. *Methods and Applications of Linear Models*. New York: Wiley, 1996.
137. Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *Bmj* 2003;327(7414):557-60.
138. Snijders T, Bosker R. *multilevel analysis – an introduction to basic and advanced multilevel modelling*. Thousand Oaks, California: SAGE publications, 1999.
139. Larsen K, Merlo J. Appropriate assessment of neighborhood effects on individual health: integrating random and fixed effects in multilevel logistic regression. *Am J Epidemiol* 2005;161(1):81-8.
140. Larsen K, Petersen JH, Budtz-Jorgensen E, Endahl L. Interpreting parameters in the logistic regression model with random effects. *Biometrics* 2000;56(3):909-14.
141. Tu YK, Clerehugh V, Gilthorpe MS. Collinearity in linear regression is a serious problem in oral health research. *European journal of oral sciences* 2004;112(5):389-97.
142. Tu YK, Kellett M, Clerehugh V, Gilthorpe MS. Problems of correlations between explanatory variables in multiple regression analyses in the dental literature. *British dental journal* 2005;199(7):457-61.
143. Goldstein H. *Multilevel statistical models*. 3rd ed. London: Hodder Arnold, 2003.
144. Anderson JC, Gerbing DW. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin* 1988;103(3):411-23.
145. Anderson JC, Gerbing DW. Assumptions and comparative strengths of the two-step approach: Comment on Fornell and Yi. *Sociological Methods & Research* 1992;20(1):321-33.

146. Muthén LK, Muthén BO. *Mplus User's Guide*. Los Angeles, CA: Muthén & Muthén, 2009.
147. Lubke GH, Muthén BO. Applying multigroup confirmatory factor models for continuous outcomes to Likert scale data complicates meaningful group comparisons. *Structural Equation Modeling* 2004;11:514-34.
148. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling* 1999;6:1-55.
149. Filmer D, Pritchett L. *Estimating wealth effects without expenditure data or tears: an application to educational enrollments in states of India*. World Bank Policy Research Working Paper No. 1994. Washington DC: Development Economics Research Group (DECRG), The World Bank, 1998.
150. Harvey A, Garcia-Moreno C, Butchart A. Primary prevention of intimate-partner violence and sexual violence: Background paper for WHO expert meeting May 2–3, 2007. Geneva: WHO, 2008.
151. Kim JY, Emery C. Marital Power, Conflict, Norm Consensus, and Marital Violence in a Nationally Representative Sample of Korean Couples. *Journal of Interpersonal Violence* 2003;18(2):197-219.
152. Pallitto CC, O'Campo P. Community level effects of gender inequality on intimate partner violence and unintended pregnancy in Colombia: testing the feminist perspective. *Soc Sci Med* 2005;60(10):2205-16.
153. Straus MA, Gelles RJ, Steinmetz SK. *Behind closed doors: Violence in the American family*. London: Sage, 1988.
154. Yodanis CL. Gender inequality, violence against women, and fear: a cross-national test of the feminist theory of violence against women. *J Interpers Violence* 2004;19(6):655-75.
155. Haj-Yahia MM. On the Characteristics of Patriarchal Societies, Gender Inequality, and Wife Abuse: The Case of Palestinian Society. *Adalah's Newsletter* 2005;20.
156. Straus MA, (pp., . Sexual inequality and wife beating. In: Straus MA, Hotelling GT, editors. *The social causes of husband-wife violence*. Minneapolis, MN: University of Minnesota Press, 1980:86-93.
157. Center for Communication Programs. *Population reports: ending violence against women. Issues in World Health. Series L, Number 11*. Baltimore, Maryland: The John Hopkins University School of Public Health, 1999.
158. Khawaja M, Linos N, El-Roueiheb Z. Attitudes of men and women towards wife beating: findings from Palestinian refugee camps in Jordan. *Journal of Family Violence* 2008;23:211-18.
159. Chuang YC, Li YS, Wu YH, Chao HJ. A multilevel analysis of neighborhood and individual effects on individual smoking and drinking in Taiwan. *BMC Public Health* 2007;7(147):151.
160. Tienda M. Poor people and poor places: deciphering neighborhood effects on poverty outcomes. In: Huber J, editor. *Macro-micro linkages in sociology*. Newbury Park, CA Sage Publication, 1991:204–12.
161. Wong C, Law KS. Testing reciprocal relations by nonrecursive structural equation models using cross-sectional data. *Organizational Research Methods* 1999;2(1):68-87.
162. Pearce N. The ecological fallacy strikes back. *J Epidemiol Community Health* 2000;54(5):326-7.
163. Wolff FM. *Meta-analysis: quantitative methods for research synthesis*. Oaks, CA: Sage publications, 1986.
164. Sowmya RR, Barry IG, Christopher HS, Sally CM, Thomas AL, Alan MZ, et al. Meta-analysis of survey data: application to health services research *Health Services and Outcomes Research Methodology* 2008;8(2):98-114.
165. Lipsey M, Wilson DB. *Practical meta-analysis*. California: Sage Publications, 2001.
166. Sterling TD, Rosenbaum WL, Weinkam JJ. Publication Decisions Revisited: The Effect of the Outcome of Statistical Tests on the Decision to Publish and Vice Versa. *The American Statistician* 1995;49(1):108-12.
167. Thornton A, Lee P. Publication bias in meta-analysis: its causes and consequences. *Journal of clinical epidemiology* 2000;53(2):207-16.

168. Bryan A, Schmiede SJ, Broaddus MR. Mediation analysis in HIV/AIDS research: estimating multivariate path analytic models in a structural equation modeling framework. *AIDS Behav* 2007;11(3):365-83.
169. Zhu B, Walter SD, Rosenbaum PL, Russell DJ, Raina P. Structural equation and log-linear modeling: a comparison of methods in the analysis of a study on caregivers' health. *BMC Med Res Methodol* 2006;6:49.
170. Gracia E, Herrero J. Perceived neighborhood social disorder and attitudes toward reporting domestic violence against women. *J Interpers Violence* 2007;22(6):737-52.
171. Sabol WJ, Coulton CJ, Korbin JE. Building community capacity for violence prevention. *J Interpers Violence* 2004;19(3):322-40.
172. Dobash RE, Dobash R. *Violence against wives: A case against the patriarchy*. London: Open Books, 1979.
173. Hester M, Kelly L, Radford J. *Women, violence, and male power: Feminist activism, research, and practice*. Buckingham, UK: Open University, 1996.







**Karolinska  
Institutet**

