



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

Olalekan Abdulrahman Uthman^{a,b,c,*}, Tahereh Moradi^a, Stephen Lawoko^a

^a Department of Public Health Sciences, Division of Social Medicine, Epidemiology, Karolinska Institutet, Stockholm, Sweden

^b Department of Public Health, Epidemiology & Biostatistics, University of Birmingham, Birmingham, UK

^c Center for Evidence-Based Global Health, Ilorin, Kwara State, Nigeria

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ABSTRACT

We examined associations between country, neighbourhood, and individual socioeconomic position (SEP) and attitudes towards intimate partner violence against women (IPVAW). We applied multivariable multilevel logistic regression analysis on Demographic and Health Survey data for 165,983 women and 68,501 men nested within 7465 communities from 17 countries in sub-Saharan Africa collected between 2003 and 2007. Contrary to expectation women were 34% more likely to justify IPVAW than men. We found that sex moderates associations of individual-, neighbourhood-, and country-level SEP with attitudes towards IPVAW. There was a significant positive interaction effect between sex and education attainment; women with no education were more likely to justify IPVAW than men with no education. Negative sex interaction with household wealth status indicates that differences in attitude are less pronounced among women. Unemployed men were more likely to justify IPVAW. Interaction effects indicate that the association of neighbourhood socioeconomic disadvantage with attitudes was more pronounced among women than among men. The association of country-level SEP with attitudes towards IPVAW was inconclusive. There was some evidence that neighbourhood modified the association between individual SEP and attitudes towards IPV. Also, there was cross-level interaction between country and neighbourhood SEP. Neighbourhood and individual SEP were independently associated with attitudes towards IPVAW. The relationship with country-level SEP was inconclusive. The findings underscore the need to implement public health prevention/intervention strategies not only at the level of individual SEP but also at the neighbourhood level.

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Background

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 (Afifi et al., 2008; Cleary, Keniston, Havranek, & Albert, 2008; Dunkle et al., 2006; Fonck, Leye, Kidula, Ndinya-Achola, & Temmerman, 2005; R. Jewkes et al., 2006; Krishnan et al., 2008; Sarkar, 2008; Shuman et al., 2008; Silverman, Decker, Saggurti, Balaiah, & Raj, 2008). Researchers and policy makers have increasingly cited gender-based violence as essential determinants of women's

health. IPVAW exposure has often been associated with increased vulnerability to HIV (Rani, Bonu, & Diop-Sidibe, 2004) and negative reproductive health outcomes (Emenike, Lawoko, & Dalal, 2008) both worldwide (Garcia-Moreno & Watts, 2000; Maman, Campbell, Sweat, & Gielen, 2000; Zierler & Krieger, 1997) and in sub-Saharan Africa (R.K. Jewkes, Levin, & Penn-Kekana, 2003; Maman et al., 2002; van der Straten et al., 1998). A myriad of studies have been undertaken to understand factors associated with IPVAW. It has been suggested that demographic, social, empowerment and behavioural factors may account for variations in vulnerability to IPVAW among women and men (Lawoko, 2006, 2008b). One factor that has recently been acknowledged as one of the strongest predictors, however, is attitudes towards IPVAW. Women who bear tolerant attitudes experience IPVAW to a higher degree than their intolerant peers far and beyond the contribution of demographic, social and empowerment indicators (Faramarzi, Esmailzadeh,

* Corresponding author. Tel.: +447949089167.

E-mail address: olalekan.uthman@ki.se (O.A. Uthman).

& Mosavi, 2005). 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 (Lawoko, 2006, 2008b). Researchers have connected attitudes towards IPVAV with individual socio-demographic variables such as age, education, occupation, marital status, and place of residence (Hindin, 2003; Lawoko, 2006, 2008a, 2008b; Oyediran & Isiugo-Abanihe, 2005; Rani et al., 2004). 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 (Benson, Greer, DeMaris, & Van Wyk, 2003; Browning, 2002; Cunradi, Caetano, Clark, & Schafer, 2000; Koenig, Ahmed, Hossain, & Khorshed Alam Mozumder, 2003; McQuestion, 2003; O'Campo et al., 1995). These findings suggest that community-level SEP measures capture information above and beyond those at the individual levels and do not serve simply as proxies for individual-level SEP. A recent study has shown a positive association between individual, locality, and country-level variables using data from 13,457 people nested within 212 cities, nested within 15 countries of the European Union at the time of the Euro barometer 51.0 survey in 1990s (Gracia & Herrero, 2006). To the best of our knowledge, there has been no multilevel study performed to date that examined the separate and independent association of individual, neighbourhood, and country SEP with attitudes towards IPVAV against women in sub-Saharan Africa. An understanding of determinants of attitude towards IPVAV beyond individual characteristics (i.e. at community and country levels) is necessary for the development of appropriate intervention of benefit to the community at large.

Neighbourhoods constitute a key determinant of socioeconomic disparities in health, as they shape individual opportunities and expose residents to multiple risks and resources over the life course (Leventhal & Brooks-Gunn, 2000; Sampson, 2003). Focusing only at one level—either the micro individual level or the macro scale of contexts—generates conceptual and practical problems (Bawdekar & Ladusingh, 2008). Socioeconomic inequalities can be analysed at different levels ranging from the individual to urban neighbourhoods up to cities and across countries. Thus, the contextual aspect of attitudes towards IPVAV needs to be explored to understand a more complete process.

Conceptual framework

Family violence researchers often draw upon an ecological perspective to understand partner abuse (Belsky, 1980; Heise, 1998). This framework conceptualizes violence as a multifaceted phenomenon grounded in an interplay of individual, family, community, and societal factors (Heise, 1998). The framework takes into account the different levels of societal organization and their role in influencing attitudes towards IPVAV. 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 IPVAV. 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 IPVAV (Shaw & McKay, 1942). 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 (Shaw & McKay, 1942). In general, poverty has been found to have the greatest explanatory

power (Harries, 1995). Poverty diminishes the resources necessary to sustain basic institutions like the family, schools, and voluntary organizations in urban neighbourhoods (Browning, 2002).

We therefore hypothesized that societal and neighbourhood socioeconomic disadvantage will negatively influence attitudes towards IPVAV. Bandura (1986, 2001) argues that environmental conditions indirectly influence behaviour through psychological mechanisms and that environmental influences differ by sex of respondent. In keeping with this idea, our model hypothesizes that sex will moderate associations of individual-, community-, and country-level SEP with attitudes towards IPVAV. Therefore in this paper we developed and tested models of attitudes towards IPVAV that includes individual-level SEP along with contextual characteristics defined at the community- and country-level. The specific analytic goals were to investigate whether:

- (1) any of the individual SEP measures such as education level, occupational and wealth status are associated with attitudes towards IPVAV; and whether this association is modified by community of residence;
- (2) neighbourhood SEP is significantly associated with attitudes towards IPVAV, net of individual-level SEP; and whether this possible association is modified by country of residence;
- (3) people living in the same community and same country share a similar probability of justifying IPVAV, and if so, to estimate the size of this contextual phenomenon; and
- (4) sex moderates relationship of individual-, community-, and country-level SEP to attitudes towards IPVAV.

Subjects and methods

Data

This study used data from 17 Demographic and Health Surveys (DHS) conducted between 2003 and 2007 in sub-Saharan Africa (Benin, Burkina Faso, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Swaziland, Tanzania, Uganda and Zimbabwe) available as of November 2008. Methods and data collection procedures have been published elsewhere (DHS, 2008). Briefly, DHS surveys are implemented by respective national institutions and Macro International Inc., with financial support from the US Agency for International Development. Selection of the countries in this study was determined by availability of comparable data on attitudes towards wife-beating. DHS data are nationally representative, cross-sectional, household sample surveys with large sample sizes, typically between 5000 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 instruments household questionnaire, women's questionnaire and men's questionnaire are comparable across countries, yielding inter-country comparable data.

Country-level data were collected from the reports published by the United Nations Development Programs (UNDP, 2008) and United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS).

Community/neighbourhood definitions

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 village 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 (Griffiths, Madise, Whitworth, & Matthews, 2004), 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 (Kravdal, 2006) (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%; Aliga & Ren, 2006). We also used the terms neighbourhood and community interchangeably in this study

Ethical consideration

This study 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.

Variables

Outcome variable

To assess the degree of acceptance of wife-beating 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 wife-beating, 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.

Exposure variables

Individual-level. In this study we considered three measures of individual SEP: wealth status, educational attainment, and occupation. 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) (Filmer & Pritchett, 2001; Montgomery, Gragnolati, Burke, & Paredes, 2000; ORC Macro & World Bank, 2002; Rutstein, Oscar, & Johnson, 2004; Vyas & Kumaranayake, 2006), 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. The level of education attained was defined as never been to school, primary, and secondary or higher education. Respondents' current occupation was dichotomised into two levels whether the respondent is currently participating in the labour force or not (yes or no). Birth cohort and sex were included as control variables. We categorized the years of birth into six 10-year intervals: 1936–1945, 1946–1955, 1956–1965, 1966–1975, 1976–1985, and 1986–1995. Sex of respondent was defined as men or women.

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.

Country level. At country level, we included adult illiteracy rate, unemployment rate, and poverty rate. 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.

Statistical analyses

We used multivariable logistic multilevel regression to analyze the association between attitudes towards IPVAW and SEP. We specified a three-level model for binary response reporting affirmative attitude towards IPVAW or not, for individuals living in neighbourhood from country.

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 sex, level of education, occupational status, and wealth status. The third model was extended to include neighbourhood socioeconomic contextual variable. The fourth model additionally contained country-level SEP. We fitted fifth model to analyze cross-level interaction by letting the slopes of the associations between the individual socioeconomic variables and attitudes towards IPVAW vary at the community level. Similarly, we allow the slopes of the associations between neighbourhood socioeconomic variable and attitudes towards IPVAW vary at the country level.

Finally, we added two-way interaction terms of sex on individual-, community-, and country-level socioeconomic factors. This was added to test whether the associations of individual-, community-, and country-level socioeconomic factors with attitudes towards IPVAV were modified by sex.

Fixed effects (measures of association)

The association between attitudes towards IPVAV and SEP was shown as odds ratios (ORs) with their 95% confidence intervals (CIs).

Random effects (measures of variation)

Measures of random effects included in intra-cluster correlation (ICC), median odds ratio (MOR), 80% interval odds ratio (IOR-80), and random slope variance. The ICC was calculated by the linear threshold according to the formula used by Snijders and Bosker (1999).

Median odds ratio is a measure of unexplained cluster heterogeneity, while IOR-80 integrates random effects in the measurement of fixed effects. Methods used for calculating MOR and IOR-80 have been described elsewhere (Larsen & Merlo, 2005; Larsen, Petersen, Budtz-Jorgensen, & Endahl, 2000). Random slope variance indicates whether contextual phenomenon differs in magnitude for different groups of people, and whether the community level modifies associations between individual-level exposures.

Model fit and specifications

We checked for multicollinearity among exposure variables examining the variance inflation factor (VIF) (Tu, Clerehugh, & Gilthorpe, 2004; Tu, Kellett, Clerehugh, & Gilthorpe, 2005), all diagonal elements in the variance-covariance (τ) matrix for correlation between -1 and 1 , and diagonal elements for any elements close to zero. The stability of model estimates for differing subsets of covariates was also observed (Tu et al., 2005). 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 (Tu et al., 2005). Regression

estimates were calculated by means of the reweighted iterative generalised least square algorithm using MLwiN 2.10 (Rasbash, Steele, Browne, & Prosser, 2008). In the multilevel logistic regression models, second order penalized quasi-likelihood (PQL) estimation was used (Goldstein, 2003). The statistical significance of covariates were calculated using the Wald test (Rasbash et al., 2008). All significance tests were two-tailed and statistical significance was defined at the 5% alpha level.

Results

Sample characteristics

The countries, year of data collection, final sample and number of communities sampled per country, and average number of respondents per communities are listed in Table 1. 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 IPVAV 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 towards IPVAV 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 2 presents the number and percentage of affirmative attitudes towards IPVAV 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 7465 communities (level 2) from 17 countries (level 3) in sub-Saharan Africa were analysed in this study. More than one-third (36%) of the respondents were born between 1976 and 1985. Women outnumbered men in the final pooled sample (71% vs 29%). Only 31% of the respondents had secondary or higher education. Respondents were fairly equally distributed across the wealth status and neighbourhood socioeconomic disadvantage quintiles.

Table 1
Description of Demographic and Health Surveys data 2003–2007 in sub-Saharan Africa among men and women by country, survey year, sample size, response rates and attitudes towards intimate partner violence against women.

Country	Survey year	Number communities sampled	Median (range) number of respondents per community	Women			Men		
				Sample size	Response rate (%)	Justified IPV (%)	Sample size	Response rate (%)	Justified IPV (%)
Benin	2006	750	29 (23–36)	17,794	99.83	48.1	5321	99.74	14.1
Burkina	2003	400	38 (22–47)	12,477	99.97	73.0	3602	99.92	39.6
Ethiopia	2005	535	37 (32–43)	14,070	99.79	74.5	6033	99.88	47.8
Ghana	2003	412	25 (20–31)	5691	99.93	51.6	5015	99.96	36.0
Kenya	2003	400	28 (23–35)	8195	99.80	66.4	3578	99.72	62.6
Lesotho	2004	405	24 (18–30)	7095	99.87	49.4	2797	99.89	51.7
Liberia	2007	298	44 (32–53)	7092	99.37	55.1	6009	99.52	33.7
Madagascar	2004	300	35 (29–40)	7949	99.92	28.1	2432	99.79	7.5
Malawi	2004	521	28 (20–37)	11,703	99.95	29.0	3261	100.00	16.0
Mozam	2003	604	24 (20–30)	12,418	99.05	53.6	2900	99.86	42.0
Namibia	2007	500	27 (21–33)	9804	99.93	37.8	3915	99.80	40.2
Nigeria	2003	362	27 (22–33)	7620	99.66	61.2	2346	100.00	41.9
Rwanda	2005	462	34 (31–39)	11,321	99.85	47.0	4820	99.89	29.3
Swaziland	2006	275	33 (26–39)	4987	99.98	23.5	4156	99.98	31.0
Tanzania	2004	475	26 (23–31)	10,329	99.92	56.6	2635	99.96	42.5
Uganda	2006	368	30 (26–34)	8531	99.94	70.3	2503	99.96	60.1
Zimbabwe	2006	398	40 (33–47)	8907	99.88	48.3	7175	99.94	36.7

Table 2

Descriptive statistics of positive attitudes towards intimate partner violence against women and selected socioeconomic variables.

Variable	Total number (%)	Yes (%)	No (%)
Positive attitude towards IPV	N = 234,484 (100)	113,360 (48.3)	121,124 (51.7)
LEVEL 1: INDIVIDUALS			
<i>Individual-level exposures</i>			
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 (47.0)
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)
LEVEL 2: COMMUNITIES N = 7465 (100)			
<i>Neighborhood disadvantage</i>			
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)
LEVEL 3: COUNTRIES N = 17 (100)			
<i>Poverty rate</i>			
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)
<i>Adult illiterate rate</i>			
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)
<i>Unemployment rate</i>			
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)

The overall percentage of respondents expressing an accepting attitude towards IPVAW was 48%.

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

Measures of variations (random effects)

As shown in Table 3, in 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

Table 3

Results from random intercept model—measures of variation.

	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^d
<i>Measures of variation</i>				
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

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

* $p < 0.01$.** $p < 0.001$.^a Model 1 is null model, baseline model without any exposure variable.^b Model 2 is adjusted for birth cohorts, sex of respondent, education, wealth index, and occupation.^c Model 3 is additionally adjusted for neighbourhood socioeconomic disadvantage.^d Model 4 is additionally adjusted for country-level socioeconomic position.

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) accounted for 32% and 43% of the variance in the log odds of justifying IPVAW across the countries and communities.

Results from the MOR also confirmed evidence of neighbourhood and country contextual phenomena 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 3. 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 4). In other words, in comparison with residual area level variations, the neighbourhood socioeconomic disadvantage variable was not very 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 towards IPVAW (Table 4). 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 socioeconomic status and attitudes towards IPVAW (Table 4). The strength of association was, however, different for different quintiles of neighbourhood socioeconomic status.

Table 4

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

MODEL 5	Neighbourhood slope variance (SE)	80% IOR
<i>Level 1: individuals</i>		
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)***	
<i>Level 2: communities</i>		
Neighborhood disadvantage		
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)
<i>Level 3: countries</i>		
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)

SE: standard error.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Measures of associations (fixed effects)

The main associations of inclusion of individual-, community-, and country-level variables appear in Table 5 (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 between sex and 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 socioeconomic disadvantages. Respondents from most disadvantaged neighbourhoods were more likely to justify IPVAW than those from least disadvantaged

Table 5

Individual compositional, community-, and country-level socioeconomic 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		
<i>Level 1: individuals</i>		
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
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)*
<i>Level 2: communities</i>		
Neighborhood 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)*
<i>Level 3: countries</i>		
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 × sex	0.254 (0.033)	1.29 (1.21, 1.38)*
Primary × sex	–0.008 (0.026)	0.99 (0.94, 1.04)
Secondary+	Reference	Reference
Wealth index		
Poorest × sex	–0.282 (0.043)	0.75 (0.69, 0.82)*
Poorer × sex	–0.166 (0.040)	0.85 (0.78, 0.92)*
Middle × sex	–0.093 (0.037)	0.91 (0.85, 0.98)
Richer × sex	–0.036 (0.034)	0.96 (0.90, 1.03)
Richest	Reference	Reference
Unemployed × sex of respondent	–0.200 (0.025)	0.82 (0.78, 0.86)*
<i>Level 2: communities</i>		
Neighborhood disadvantage		
Quantile 1 (least)	Reference	Reference
Quantile 2 × sex	0.002 (0.038)	1.00 (0.93, 1.08)
Quantile 3 × sex	0.250 (0.039)	1.28 (1.19, 1.39)*
Quantile 4 × sex	0.248 (0.042)	1.28 (1.18, 1.39)*
Quantile 5 (most) × sex	0.321 (0.047)	1.38 (1.26, 1.51)*
<i>Level 3: countries</i>		
High (vs low) poverty rate × sex	0.337 (0.027)	1.40 (1.33, 1.48)*
High (vs low) adult illiteracy rate × sex	0.462 (0.029)	1.59 (1.50, 1.68)*
High (vs low) unemployment rate × sex	0.038 (0.026)	1.04 (0.99, 1.09)

* $p < 0.001$.

neighbourhoods. The interaction term for sex indicates that the association between neighbourhood socioeconomic 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 were positive interactions between sex and country-level poverty and adult illiteracy rates.

Discussion

Drawing upon multilevel perspectives, in this paper we have offered an alternative to more traditional ways of thinking about the factors associated with attitudes towards IPVAW 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 IPVAW.

Counter intuitively, we found that women were more likely to justify IPVAW women than men. This has been reported in a previous study that has examined this association in seven countries in sub-Saharan Africa (Rani et al., 2004). In contrast to this finding, the findings of a qualitative research revealed that many women strongly feel that IPVAW is wrong (Schuler & Islam, 2008). Women described IPVAW 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 IPVAW compared with their counterparts residing in the most advantaged communities after adjustment for individual SEP. We have shown that individual-level SEP relates to the attitudes towards IPVAW in a manner consistent with previous studies (Hindin, 2003; Oyediran & Isiugo-Abanihe, 2005; Rani et al., 2004). Men not currently employed were more likely to justify IPVAW 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 IPVAW. The relationship between household wealth status and attitudes towards IPVAW found in this study is consistent with other studies that have shown greater propensity to justify IPVAW among people from poorest households (Hindin, 2003; Oyediran & Isiugo-Abanihe, 2005; Rani et al., 2004).

We found evidence of geographical variation in attitudes towards IPVAW. About 15% and 10% of the total individual differences in attitudes towards IPVAW were at neighbourhood and country-level, respectively. It would theoretically be expected that people from the same area may be more similar to each other in relation to their attitude than to people from other areas (Merlo, Chaix, Yang, Lynch, & Rastam, 2005). 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 (Merlo, Chaix, Yang, Lynch, & Rastam, 2005). 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 (Merlo, Chaix, Yang, Lynch, & Rastam, 2005). On these grounds, we might conclude that there is some evidence for a possible neighbourhood and country contextual phenomenon shaping a common individual attitude towards IPVAW; and that neighbourhoods are very important in understanding individual difference in attitudes towards 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.

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 or her place of residence. This suggests that interventions to change the underlying attitudes towards IPVAW should focus on places and people.

Our findings should be considered in light of the following limitations. First, we did not have longitudinal neighbourhood measurements, which may generate selection bias (Chuang, Li, Wu, & Chao, 2007; Tienda, 1991). The relationship between neighbourhood characteristics and attitudes towards IPVAW 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. Second, 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 towards IPVAW were due to cumulated effects. Third, 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 IPVAW was inconclusive. We found that the main association did not reach statistical significance. The presence of a significant interaction suggests 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 (Filmer & Pritchett, 2001; Montgomery et al., 2000). Finally, we used the instrumentation adapted by DHS for use in the sub-Saharan African context. 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 (Lawoko, 2006, 2008a).

Despite these limitations, the study strengths are significant. It is a large, population-based study with national coverage from 17 countries with high response rates. 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 IPV/AW. Understanding the relative contribution of individual, community, and societal factors is important for policy makers 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.

The existence of socioeconomic inequalities in victims' and perpetrators' attitudes towards 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. 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. Future studies should investigate other factors that may account for the unexplained neighbourhood and country variations in attitudes towards IPV/AW. Future research also should address the mechanisms that connect the people and neighbourhood levels, that is, the means through which deleterious social attitudes 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).

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