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Proximate context of gender-unequal norms and women's HIV risk in sub-Saharan Africa

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Abstract

Objective—To determine whether the proximate context of gender-unequal norms about violence against women undermines women's ability to negotiate condom use in sexual relationships.

Design—Secondary analysis of cross-sectional data pooled from 22 Demographic and Health Surveys conducted in sub-Saharan Africa.

Methods—Each of the 22 surveys employed a multistage stratified design with probabilistic sampling and was designed to be nationally-representative of reproductive-age women. The outcome was self-reported condom use at last sexual intercourse. The primary explanatory variable of interest was a scale consisting of five questions about whether the respondent agreed on the appropriateness of wife beating under five different scenarios. To measure the proximate context of norms about violence against women, this scale was aggregated to the level of the primary sampling unit. We fit logistic regression models with cluster-correlated robust standard errors and adjustment for country-level fixed effects and socio-demographic characteristics.

Results—Our analysis sample included data from 198,806 sexually active women living in 22 sub-Saharan African countries. The wife-beating scale was internally consistent (Cronbach's $\alpha=0.84$), and factor analysis confirmed the presence of a single factor. Condom use was associated with gender-unequal contextual norms about violence against women (AOR=0.88; 95% CI, 0.85–0.92; $P<0.001$). The estimated association was robust to adjustment for socio-demographic characteristics and several sensitivity analyses.

Conclusions—The proximate context of gender-unequal norms about violence against women is associated with lack of condom use among women in sub-Saharan Africa.

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INTRODUCTION

Structural violence, including unequal gender relations and gendered structural constraints, has been recognized as a major factor compromising women's health and facilitating the spread of HIV among women [1–6]. This body of work suggests that the proximate context of violence against women and unequal gender-based norms about violence in the context of intimate relationships creates a “culture of fear” [7] or a “culture of terror” [8] that undermines women's ability to engage in HIV risk reduction behaviors such as negotiating condom use in sexual relationships. However, previous studies have measured violence against women at the *individual* level [9–13], somewhat limiting their interpretation as providing evidence of contextual effects. Few studies have examined how the *proximate context* of violence against women or norms about violence against women constrains their ability to negotiate condom use in sexual relationships [14, 15]. We undertook this study to determine whether the proximate context of norms about violence against women is associated with lack of condom use among sexually active women in sub-Saharan Africa.

METHODS

For this analysis we used data from 22 Demographic and Health Surveys (DHS) conducted between 2003–09 that were administered in continental sub-Saharan Africa (Table S1). Details on staff training, pretesting, and other survey procedures are detailed in the DHS final reports for each country, which are publicly available from the ICF Macro web site (<http://www.measuredhs.com>). The primary outcome of interest was self-reported condom use at last sexual intercourse, which was only obtained from participants who reported that they were sexually active. We therefore further restricted our analyses to sexually active women only. To measure individual beliefs about violence against women, we created a scale consisting of five questions about whether the respondent agreed with the appropriateness of a husband beating his wife under five different hypothetical scenarios (Table S2). Responses were summed across the five questions to generate an ordinal scale ranging from zero (wife-beating not appropriate in any scenario) to five (wife-beating appropriate in all scenarios). We employed exploratory factor analysis to identify the number of factors. Internal consistency was estimated using the Cronbach's α statistic in the pooled sample and for each country separately. To measure the proximate context of norms about violence against women, we created a derived variable at the level of the primary sampling unit (PSU) by averaging the absolute value of the scale across all women in the PSU.

To estimate the association between condom use and our explanatory variables of interest, we fit a multivariable logistic regression model to the pooled data, with country-level fixed effects and cluster-correlated robust estimates of variance [16–18]. This modeling approach appropriately recognizes that variables measured at the PSU-level have a smaller effective sample size, correcting the standard errors for potential correlations between participants who live in the same PSU while maintaining the population average interpretation [19, 20]. Our estimates of association were adjusted for potential confounding by the following socio-demographic variables: age, domestic partnership status, household headship, fertility preferences, urban residence, professional occupation status [15], educational attainment,

within-country quintiles of household asset wealth [21], and religion. A Wald-type F-test was used to test the joint statistical significance of the country-level fixed effects. Multivariable regression models were re-fit to the data from each country sample separately. All analyses were conducted using the Stata statistical software package (version 11.0, StataCorp L.P., College Station, Tex.).

To assess the robustness of the observed associations, we conducted several sensitivity analyses. First, we assessed for interactions between contextual exposures and domestic partnership status and educational attainment. Second, because of the highly negative meanings that may be attached to condom use in the context of marital or regular sexual relationships [2, 22], we disaggregated condom use by domestic partnership status and by relationship status of the last sexual partner [23]. Third, to address possible measurement error, we used a more stringently defined dependent variable, consistent condom use [24]. Fourth, we considered potential confounding by alcohol use at last sexual intercourse [25]. Fifth, to more closely compare our findings to previous research [9–13], we included a variable for personal history of intimate partner violence [26, 27]. Sixth, because norms about violence against women have been found to differ between men and women in many sub-Saharan African countries [28], we constructed an alternative contextual-level variable based on men's responses to the questions about wife beating. Seventh, we considered potential confounding by two contextual-level variables: the percentage of women who were in professional occupations [15], and the percentage of women in the PSU who had attained at least a secondary education.

Ethical review

The data collection procedures for the DHS were approved by the ICF Macro institutional review board as well as by the relevant ethical review boards in the host country for each survey. All participants provided oral informed consent. This analysis was reviewed by the Harvard School of Public Health Office on Human Research Administration and was considered exempt from full review.

RESULTS

The response rates for the country surveys ranged from 85.6% (Zimbabwe) to 97.9% (Rwanda and Lesotho) (Table S1). The number of PSUs for the country surveys ranged from 275 to 886 (Table S3). Of the 241,524 women who completed interviews, our analytic sample included data from 198,806 women (82.3%) who reported being sexually active. Among the women included in the analytic sample, 15,654 (9.4%) reported condom use during last sexual intercourse (Table S4). Exploratory factor analysis indicated a single dimension to the scale measuring beliefs about violence against women, with a single factor that had factor loadings ranging from 0.61 to 0.76. The scale was internally consistent (Cronbach's $\alpha=0.84$), and item-to-scale correlations did not suggest item redundancies. Country-specific internal consistency coefficients ranged from 0.70 (Rwanda) to 0.88 (Nigeria).

In univariable regression models fit to the pooled sample, condom use had a statistically significant association with both individual beliefs and contextual norms about violence

against women (Table 1). In the multivariable pooled regression model, however, only the effect of gender-unequal contextual norms remained statistically significant (adjusted odds ratio [AOR]=0.88; 95% confidence interval [CI], 0.85–0.92; $P<0.001$). This effect was large in magnitude: evaluated at the mean of the other covariates, as PSU-level gender-unequal norms about violence against women increased from 0.79 (25th percentile) to 2.33 (75th percentile), this was associated with a 16.5% relative decrease in the predicted probability of condom use, from 4.2% to 3.5%. A Wald-type F-test rejected the null hypothesis that the country-level fixed effects lacked joint statistical significance ($P<0.001$).

In the country-specific analyses, the unadjusted odds ratios for the association between condom use and contextual norms about violence against women were less than one in 20 of 22 countries (Table S5). Adjustment for individual-level socio-demographic characteristics reduced the statistical significance of these associations, but the adjusted odds ratios were less than one in the majority of countries (Figure 1). None of the sensitivity analyses substantively altered our primary findings (Table S6).

DISCUSSION

Using data from 198,806 sexually active women living in 22 sub-Saharan African countries, we found that women's condom use at last sexual intercourse was negatively associated with the PSU-level of agreement about the appropriateness of wife beating. The association was statistically significant, large in magnitude, and robust to statistical adjustment by known socio-demographic correlates. Further, we found evidence that these contextual effects were greatest among women with no education and among married women in the context of sexual intercourse with non-marital partners.

Prior research has shown that women's personal experience of intimate partner violence is associated with lack of condom use during sexual intercourse [9–13]. A critical limitation of these studies is that the explanatory variables used in these studies were measured at the individual level, thus limiting their interpretation as contextual effects. Two studies have shown that the contextual prevalence of intimate partner violence is associated with non-condom use and early pregnancy among South African female youth [14] and unintended pregnancy among women in Colombia [15]. We extend these findings by using data from diverse settings throughout sub-Saharan Africa to directly measure the proximate context of gender-unequal norms about violence against women, and we demonstrate that these contextual norms are negatively associated with women's condom use at last sexual intercourse. Our interpretation of these data is that community-wide norms about the acceptability of wife-beating may contribute to a pervasive sense of “everyday violence” [29] which, in turn, undermines women's self-efficacy with regards to negotiating condom use in sexual relationships [30].

Several limitations should be considered when interpreting our findings. First, we were unable to examine measures of primary behavior change or risk avoidance as outcomes, including delay of sexual debut and/or partner reduction [31, 32]. Second, the direction of causality is generically uncertain with data of a cross-sectional nature. Furthermore, the cross-sectional design precludes exploration of richer longitudinal patterns of association

between norms and behaviors that have been described in other work [33]. Third, self-reported condom use at last sexual intercourse may have been measured with error [34]. However, random measurement error in the dependent variable would have biased our estimates towards the null. In addition, the estimated effects on consistent condom use (a variable that is likely measured with less error [24]) were qualitatively similar to the effects on condom use estimated with the full sample. Fourth, ICF Macro did not provide sampling weights for analyses restricted to sexually active women, so our estimates are not nationally-representative. However, it is the largest study of its kind to date, suggesting broad generalization across diverse socio-demographic groups and 22 countries in sub-Saharan Africa. Fifth, although our study sheds light on how gender-unequal contextual norms influence women's HIV risk at the individual level, generalizing these findings to the population level may be premature. The fact that, at the PSU level, women in Swaziland agreed with the fewest scenarios under which wife beating was appropriate yet HIV prevalence rates in Swaziland are among the highest in sub-Saharan Africa [35] suggests caution in generalizing our findings to the population level [36].

In summary, this study presents evidence from across sub-Saharan Africa that the proximate context of gender-unequal norms about violence against women is associated with lack of condom use among women. These findings suggest that interventions aimed at modifying the proximate context of gender-unequal norms may enhance women's ability to engage in HIV risk reduction behaviors [37]. However, randomized evaluations of interventions designed to address different aspects of the social construction of gender have yielded mixed results [38, 39]. Further research will be needed in order to either narrow the focus of future studies following this thread of inquiry or identify new contextual targets for intervention. Behavioral interventions targeted towards women are likely to be less than optimally effective if their proximate context is not taken into account.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Forest plot of country-specific estimates

Table 1

Pooled unadjusted and adjusted odds ratios and 95% confidence intervals (CIs) for variables associated with condom use at last sexual intercourse

	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Individual belief about the appropriateness of wife beating		
Agreed with wife beating under no scenario	Ref	Ref
Agreed with wife beating under 1 scenario	0.90 (0.85–0.96)	1.02 (0.96–1.09)
Agreed with wife beating under 2 scenarios	0.79 (0.74–0.84)	1.00 (0.93–1.07)
Agreed with wife beating under 3 scenarios	0.66 (0.61–0.71)	0.95 (0.88–1.02)
Agreed with wife beating under 4 scenarios	0.54 (0.50–0.59)	0.93 (0.85–1.01)
Agreed with wife beating under 5 scenarios	0.44 (0.40–0.48)	0.91 (0.83–1.00)
Mean level of agreement about wife-beating among women in respondent's PSU	0.59 (0.57–0.61)	0.88 (0.85–0.92)
Age, per 5 years	0.73 (0.72–0.74)	0.86 (0.85–0.87)
Married	0.10 (0.09–0.11)	0.16 (0.15–0.17)
Head of household	1.47 (1.39–1.54)	1.15 (1.09–1.22)
Preference for kids	1.49 (1.43–1.56)	0.96 (0.92–1.01)
Urban residence	3.03 (2.87–3.20)	1.33 (1.25–1.41)
Professional occupation	1.71 (1.62–1.80)	1.17 (1.10–1.24)
Educational attainment		
None	Ref	Ref
Primary	4.39 (4.04–4.76)	2.27 (2.09–2.47)
Secondary	12.54 (11.53–13.64)	3.80 (3.48–4.15)
Higher	16.66 (14.90–18.63)	4.63 (4.11–5.21)
Household asset wealth quintile		
Poorest	Ref	Ref
Poorer	1.62 (1.49–1.76)	1.38 (1.25–1.51)
Middle	2.13 (1.96–2.32)	1.45 (1.33–1.59)
Richer	3.56 (3.28–3.87)	1.78 (1.63–1.95)
Richest	6.27 (5.78–6.80)	2.13 (1.93–2.35)
Religion		
Christian	1.70 (1.59–1.81)	1.17 (1.10–1.25)
Muslim	1.12 (1.05–1.20)	1.03 (0.97–1.10)
Other	Ref	Ref
Country-level fixed effects	Yes	Yes