Sex Composition of Children and Spousal Sexual Violence in Sub-Saharan Africa

Felix M. Muchomba[1]

Abstract

Objective In societies with a cultural preference for sons over daughters, women who do not bear sons may be at increased risk for spousal violence. This study examined whether women with daughters only are at an elevated risk for spousal sexual violence compared to women with sons only in Sub-Saharan Africa. The study tested the hypothesis that the association between sex composition of children and spousal sexual violence would be observed only in large families. *Methods* Data were from the most recent (as at February, 2016) Demographic and Health Surveys conducted in 22 Sub-Saharan African countries for 37,915 women. Odds ratios comparing experience of spousal sexual violence of women with sons only to those with daughters only were estimated, separately for women with three or fewer children and those with four or more children, controlling for age, age at first cohabitation, age at first birth, educational attainment, urban residence, and household wealth. *Results* Having daughters only was associated with a greater likelihood of spousal sexual violence among women with many children (adjusted odds ratio [AOR] = 1.53; 95% CI 1.02–2.30) but not among those with few children (AOR = 0.92; 95% CI 0.82–1.04). *Conclusions for Practice* A higher risk of sexual violence for women without sons suggests that son preference may have implications on women's health and wellbeing. Efforts to further understand and address increased risk of sexual violence for women without sons should consider son preference and intra-couple conflict concerning fertility intentions.

Keywords Sub-Saharan Africa · Intimate partner violence · Son preference · Fertility

Significance Statement

The influence of sex composition of children on women's risk of sexual violence remains understudied. Previous research is based on a population with evidence of sex-selective abortion. Thus the association between the sex composition of children and sexual violence may be underestimated in extant literature. The present study addresses this limitation by examining the relationship between the sex composition of children and experience of sexual violence in Sub-Saharan Africa, a region with no evidence of sex-selective abortion.

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Introduction

The World Health Assembly declared sexual violence against women a leading public health problem in 1996 and has since adopted a series of resolutions to address the problem (World Health Organization 2014). Two factors make sexual violence against women by their husbands a pressing public health problem. First, spousal sexual violence is widespread and it affects women throughout the world (Garcia-Moreno et al. 2006; World Health Organization 2013). Sub-Saharan Africa has one of the world's highest prevalence of spousal sexual violence with 12% of ever-married women and, in some areas in the region, up to 58.6%, reporting having experienced spousal sexual violence (Garcia-Moreno et al. 2006; ICF International 2019). Second, sexual violence is thought to have severe consequences on the reproductive, mental, and physical health of victims (Campbell 2002; Ellsberg et al. 2008). However, the causes of sexual violence within intimate relationships are not clearly understood which hinders efforts to mount effective prevention campaigns.

Exposure to sexual violence is associated with women's reproductive outcomes, including increased fertility, decreased use of contraception, increased risk of unintended pregnancy, and reduced birth spacing, in research conducted in Sub-Saharan Africa and other settings (Hung et al. 2012; Kacanek et al. 2013; Maxwell et al. 2015; Maxwell et al. 2018; Odimegwu et al. 2015; Pallitto et al. 2013). In addition, certain forms of sexual violence, e.g., forced sex and contraceptive sabotage, are used to directly control women's reproductive outcomes (Maxwell et al. 2015; Maxwell et al. 2018). This research suggests that sexual violence may be a result of conflicting fertility preferences among couples. A systematic review of the global literature found that men often desire larger families than women, particularly in Sub-Saharan Africa where the largest gender differences in fertility preferences were observed (Moya et al. 2016). Such differences in fertility preferences among couples can lead to men's reproductive control or reproductive coercion (Ibisomi and Odimegwu 2011; Mulder 2009; Salem 2004). In some cases, men can threaten and follow through on obtaining additional wives if the woman does not agree with his desire to have more children (Ibisomi and Odimegwu 2011).

In addition to preferences concerning the number and timing of births, parents may also have preferences regarding the sex composition of their children. In Sub-Saharan Africa, a preference for sons has been linked to cultural norms that relegate daughters to a lower status than sons. For instance, family lineage is traced through male offspring in patrilineal societies (Frempong and Codjoe 2017; Mwageni et al. 2001). Cultural practices also add an economic incentive for favoring sons over daughters. Patrilocal residence, for instance, involves daughters departing to join their husband's family after marriage and thus returns on any investments in daughters are unlikely to be reaped by their parents. Additionally, because women are often economically dependent on men, unmarried daughters and grandchildren borne to unmarried daughters are viewed as a financial burden on families (Mwageni et al. 2001). Further, because of lack of institutions for elderly care in developing countries, sons are considered the primary support in old age and therefore investments in sons have payoffs in old age (Hesketh and Xing 2006). Limited formal employment opportunities for women also support a preference for sons over daughters (Hesketh and Xing 2006).

The extent of son preference can be inferred from examining individuals' own report of their preferences, parents' fertility behavior, and differences in parental investments between sons and daughters. Studies based on Demographic and Health Surveys (DHS) conducted in Sub-Saharan Africa find that adults in most countries desire to have more sons than daughters (Bongaarts 2013; Frempong and Codjoe 2017; Palmuleni 2014). Additionally, daughters are more likely to be born of a

gender undesired by their mother than sons (Flatø 2018). Research on fertility behavior shows that women in Ghana, Kenya, Nigeria, and Senegal whose surviving children are all girls are more likely to have a subsequent birth than those whose surviving children are all boys (Fayehun et al. 2011; Gyimah and Fernando 2004; Jones 2014; Milazzo 2014). Additionally, Senegalese households with all-male children are more likely to immunize the children than those with all-female children, which suggests that parents invest less in girls (Jones 2014). During the 2008–2009 global financial crisis, excess female infant mortality was documented across Sub-Saharan Africa further highlighting the dire consequences of parental underinvestment in girls during periods of crisis (Friedman and Schady 2013).

Although a preference for sons exists in Sub-Saharan African countries, no evidence of sex-selective abortion has been observed (Basu and De Jong 2010; Bongaarts 2013; Campbell 1991; Kiriti and Tisdell 2005; Mace and Sear 1997; Mace 1996; Mwageni et al. 2001; Rossi and Rouanet 2015; Short and Kiros 2002). The lack of sex-selective abortion may be due to the limited access to prenatal care, including ultrasound technologies, which precludes most women from accessing sex-selective technologies (Institute for Health Metrics and Evaluation (IHME) 2014a, b, c). Further, the major religions in Sub-Saharan Africa are Christianity and Islam, which forbid abortion and infanticide and thereby sex selection (Bongaarts 2013; Minnesota Population Center 2017; Stark 1997).

However, we can expect that as the number of daughters increases parents with a preference for sons but who do not have any will desire a son even more. Numerous studies have tested this expectation using data from Asia and the Asian diaspora and find that discrimination against girls is most visible in families with three or more daughters and no living sons [e.g., (Abrevaya 2009; Almond et al. 2013; Ebenstein 2011; Mishra et al. 2004)]. However, the association between number of children and son preference in Sub-Saharan Africa remains understudied. One study in Tanzania finds that number of daughters is positively associated with a preference for sons (Mwageni et al. 2001); and a study using DHS data from Nigeria finds that number of children ever born is associated with whether a woman has a child gender preference (Adebowale et al. 2014).

Because continuation of family lineage has been proposed as one reason for son preference, we can also expect that son preference will be stronger in wealthier households, for whom continuity of family lineage may be more important. However, the research on the association between son preference and wealth in Sub-Saharan Africa is scant. An exception is Adebowale et al. (2014) who find that the strongest preference for sons in Nigeria is among the wealthiest households.

Women's preference for more sons may be weaker than men's for at least two reasons. First, daughters are more likely to help their mothers with household chores than sons (Short and Kiros 2002). Second, women face higher costs associated with childbearing and rearing than men, which results in women desiring fewer children, both male and female (Bongaarts 2001; Dodoo and Van Landewijk 1996; Mulder 2009; Root and Johnson-Hanks, 2016). In a study of 61 mostly sub-Saharan African countries Bongaarts (2013) finds on average married men preferred to have 118 sons for every 100 daughters, while married women thought 105 sons to 100 daughters was the ideal sex ratio at birth. Frempong and Codjoe (2017) also find that men are more likely to prefer sons compared to women using data from the Ghana DHS.

The extant literature described suggests that discordance between couples in Sub-Saharan Africa combined with the high unmet need for contraception in the region may leave women who have attained their desired family size but who do not have sons vulnerable to husbands' demands to bear more children in the hopes of having a boy (Darroch and Singh 2013). However, the influence of sex composition of children on women's risk of reproductive coercion or other forms of sexual violence remains understudied. The sole study in this area finds no association between sex composition of children and spousal sexual abuse in India (Sabarwal et al. 2012). A methodological concern with the study is that it is based on a population with highly skewed child sex ratios suggesting that parents, to some extent, are manipulating the sex composition of their children, for example through sex-selective abortion (Das Gupta et al. 2009; Office of the Registrar General and Census Commissioner 2017). Thus, girls in such populations may be more likely to be found in families that want girls than in families with a strong son preference, which would yield an underestimate of the association between the gender composition of children and sexual violence. No research examining the association between sex composition of children and sexual violence has been undertaken in sub-Saharan Africa.

Further support of a link between child sex composition and women's sexual violence can be found in studies investigating whether the sex composition of a woman's children influences her health and wellbeing in societies with a strong preference for sons. However, these studies have largely been conducted in Asia and find, for instance, that women in India who have daughters only are at greater risk for anemia than women with sons only while women in China with a first-born daughter have lower nutritional intake and are more likely to be underweight than women with a first-born son (Li and Wu 2011; Sabarwal et al. 2012). In Sub-Saharan Africa studies have focused on fertility outcomes and find that women with daughters only have smaller birth intervals and higher fertility than those with sons (Fayehun et al.

2011; Gyimah and Fernando 2004; Jones 2014; Milazzo 2014). Additionally, women in Nigeria with first-born daughters are more likely to end up in a polygamous union or to be divorced than women with first-born sons, which suggests a spectrum of negative consequences, including abandonment, for women who do not bear sons (Milazzo 2014).

The current study addresses the limitation of previous research by examining the relationship between the sex composition of children and experience of sexual violence among ever married women in Sub-Saharan Africa. Among women with few children, the study tests the hypothesis that there will be no association between sex composition of children and recent experience of spousal sexual violence. Among women with more children, the study tests the following hypotheses: (1) those with daughters only will be more likely to report spousal sexual violence than those with sons only; (2) there will be an association between sex composition of children and spousal forced sexual intercourse, a form of reproductive coercion, but not between sex composition of children and other forced sexual acts, a form of sexual violence that is not an indicator of reproductive coercion; and (3) the association between sex composition of children and spousal sexual violence will be stronger in wealthier households.

Methods

Data Source

Data for this study were the most recent (as at February, 2016) DHS conducted in Sub-Saharan Africa that included a domestic violence module. DHS are household-based surveys that are nationally representative of women aged 15–49 years and their households. The sampling, recruitment, data collection, and data validation procedures for DHS are described elsewhere (Measure DHS 2012; Rutstein and Rojas 2006). In selected households, all women aged 15–49 are eligible to participate and those who give consent provide demographic and health information about themselves and children. One woman in sampled households is also randomly selected to complete a domestic violence interview, in countries that opt to incorporate a domestic violence module. DHS takes several steps to ensure the validity of the domestic violence data, which are also described elsewhere (ICF International 2007).

DHS in 22 Sub-Saharan African countries fielded a domestic violence module and were included in the study: Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Gambia, Ghana, Kenya, Malawi, Mali, Mozambique, Namibia, Nigeria, Rwanda, Sao Tome & Principe, Sierra Leone, Tanzania, Togo,

Uganda, Zambia, and Zimbabwe. The data were collected between 2008 and 2014 with majority of women interviewed 2013–2014. Because women with children of both sexes differ from those with sons only or those with daughters only on various characteristics including number of children, age, age at first birth, age at first cohabitation, educational attainment, rural residence, household wealth, and potentially other confounders, this study focuses on women with daughters only and those with sons only to obtain a cleaner comparison, and excludes women with mixed child sex compositions. Data on 37,915 ever-married women with either sons only or daughters only were obtained from the 22 DHS surveys.

Spousal sexual violence is measured using two items from a modified conflict tactics scale (Strauss 1990). Ever-married women are asked if their current or former husbands have ever "Physically forced you to have sexual intercourse even when you did not want to?" and "Forced you to perform any other sexual acts you did not want to?" Respondents who answer "yes" to either question are asked about the frequency of the act in the previous 12 months. In the current study, forced spousal sexual intercourse was defined as being physically forced to have sexual intercourse in the previous 12 months. Other forced sex act was defined as being forced to perform other sexual acts in the previous 12 months. The main outcome, spousal sexual violence, represented experiencing either spousal forced sexual intercourse or other forced sex acts.

Respondents are also asked to provide a complete fertility history of all children born alive including year of birth, sex of the child, whether the child was still alive, and whether the respondent resided with the child. From this information, a nominal variable representing current gender composition of children was constructed that represents four mutually exclusive categories: no living children, sons only, daughters only, and mixed (i.e., at least one son and one daughter). The focus of the current study was respondents with sons only or with daughters only. Respondents without children or with mixed sex children were excluded from the study. Two binary variables representing whether the respondent resided with any of her children or with any of her adult–children were also created.

A household member, typically the household head, also provides information about the household including the household's ownership of assets and living conditions, which DHS use to calculate wealth index scores and categorize households into wealth quintiles.

Statistical Analysis

Individual-level DHS data were analyzed using logistic regression to examine whether respondents with sons only differed from those with daughters only on pre-motherhood individual characteristics (i.e., age, age at first cohabitation, age at first birth, and educational attainment) and on household characteristics that could have changed in response to the sex composition of the children (i.e., urban residence, household wealth, co-residence of children, co-residence of adult–children, and number of children). Differences would indicate that sex composition of children is a marker for other characteristics that may influence risk for spousal sexual violence.

Next, logistic regression was used to compute odds ratios (OR) comparing odds of spousal sexual violence between respondents with sons only and those with daughters only. Similar analyses examined whether both forced sexual intercourse and other forced sexual acts were similarly associated with the sex composition of children. The postulated mechanism—that sexual violence was an avenue for husbands to attain their desired number of sons—would be supported if child sex composition was associated with forced sexual intercourse but not other forced sexual acts.
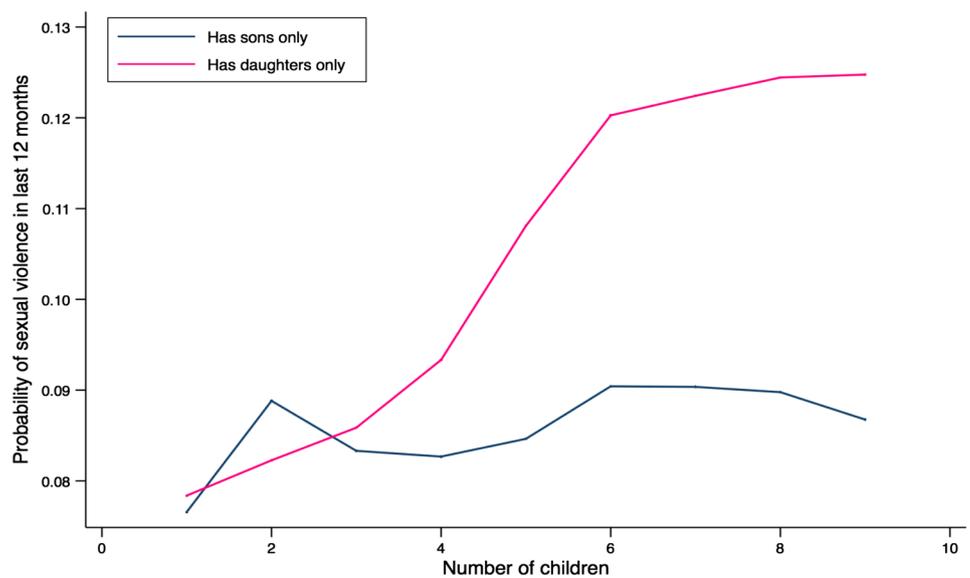
The analyses were stratified by number of children to test the hypothesized moderating effect of number of children. Specifically, analyses were conducted separately for women with fewer than four children and those with four or more children, since that was the number at which differences by child sex composition became visually apparent (Fig. 1). The analyses also controlled for preselected socio-demographic characteristics that are commonly considered as potential confounders of the relationship between fertility outcomes and violence, namely: age, age at first cohabitation, age at first birth, educational attainment, household wealth, and whether the respondent was in an urban or rural area (Kishor and Johnson 2006). Supplementary analyses examined whether results were on account of children residing in the household, who may deter their fathers from being abusive, by controlling for presence of children in the household.

Finally, the hypothesis that the association between sex composition of children and spousal sexual violence would be stronger in wealthier households was tested, first graphically, and then by conducting analysis stratified by wealth quintile in logistic regression analysis.

Analyses took into account the two-stage stratified sampling design of DHS and incorporated the domestic violence module sampling weights. Countries were equally weighted in the analyses. The Hosmer–Lemeshow test was used to assess the fit of the models and variance inflation factors (VIF) was used to assess for multicollinearity. Sensitivity analyses using binomial regression models to estimate risk ratios yielded the same conclusions and therefore only results using logistic regression models are presented.

This study was reviewed by the Rutgers University institutional review board and considered exempt from full ethics review because the study is based on anonymized secondary data.

Fig. 1 Experience of recent spousal sexual violence among women in Sub-Saharan Africa, by gender composition of their children. Data from DHS in 22 Sub-Saharan African countries. Figure is a locally weighted smoothed plot using a bandwidth of 0.4 (Color figure online)

Results

Table 1 shows the characteristics of women whose data were included in the analysis, stratified by number of children. The overall prevalence for recent exposure to spousal sexual violence was 9.6%, with 8.2% of respondents reporting spousal forced sexual intercourse in the past year.

As shown in Supplemental Table 1, respondents with sons only and those with daughters only did not differ on their pre-motherhood characteristics. Sex composition of children was also not associated with the post-birth household characteristics examined, except that respondents with sons were more likely to reside with an adult child than respondents with daughters. However, the difference was small (less than one percentage point).

Table 2 presents two main results. First, among women with fewer than four children, those with daughters only had similar odds of spousal sexual violence as those with sons only (aOR 0.92 95% CI 0.82–1.04). Second, among women with more children, the adjusted odds of sexual violence for those with daughters only was 1.53 times (95% CI 1.02–2.30) that of respondents with sons only. Table 2 also shows that among the control variables, only educational attainment was associated with spousal sexual violence in adjusted models. Higher educational attainment was associated with lower odds of spousal sexual violence among both women with fewer children (adjusted p-trend = 0.011) and those with more children (adjusted p-trend = 0.002). In sensitivity analyses reported in Supplemental Table 2, controlling for either co-residence of children or co-residence of *adult* children did not affect results.

Table 3 tests whether child sex composition was associated with forced sexual intercourse but not other forced sex acts among women with four or more children. The adjusted odds of forced sexual intercourse for women with daughters only was 1.62 times (95% CI 1.06–2.46) that of those with sons only. Child sex composition was not associated with other forced sex acts.

As shown in Fig. 2, the difference in prevalence of spousal sexual violence by sex composition of children increased with household wealth as hypothesized. The adjusted odds ratios comparing respondents with daughters only to those with sons only were 0.63 (95% CI 0.29–1.34), 1.08 (95% CI 0.54–2.14), 1.65 (95% CI 0.79–3.46), 2.81 (95% CI 1.07–7.41) and 4.51 (95% CI 1.09–18.71), among respondents from the poorest, poorer, middle, richer and richest households respectively (not tabled).

The Hosmer–Lemeshow goodness-of-fit test statistics for all models were insignificant indicating good fit. VIF values were all below ten suggesting no multicollinearity.

Discussion

This study found that among women in Sub-Saharan Africa with four or more children, those with daughters only had a higher risk for spousal sexual violence than those with sons. On the other hand, sex composition of children was not associated with spousal sexual violence among women with fewer children. The results were not dependent on children residing with their mothers suggesting that the lower risk of spousal sexual violence for mothers of sons was not due to the physical presence of male children serving as a deterrent to violence. Rather, the pattern of results indicates greater conflict among couples as the size of daughters-only families increase, which is in line with previous research that finds smaller ideal family sizes and weaker son preference among

Table 1 Participant characteristics by number of children

	1–3 Children		4+ Children	
	n/N	(%)	n/N	(%)
Child sex composition				
Son(s) only	17,399/34,862	(50)	1570/3053	(51)
Daughter(s) only	17,463/34,862	(50)	1483/3053	(49)
Age (years), mean (SD)	27	(13)	35	(13)
Age at first cohabitation				
< 18 years	13,937/34,862	(40)	1596/3053	(52)
18–49 years	20,925/34,862	(60)	1457/3053	(48)
Age at first birth				
< 18 years	9468/34,862	(27)	1194/3053	(39)
18–45 years	25,394/34,862	(73)	1859/3053	(61)
Educational attainment				
No education	9048/34,855	(26)	1195/3053	(39)
Incomplete primary	7987/34,855	(23)	924/3053	(30)
Complete primary	4271/34,855	(12)	383/3053	(13)
Incomplete secondary	9546/34,855	(27)	422/3053	(14)
Complete secondary	2158/34,855	(6)	69/3053	(2)
Higher	1846/34,855	(5)	60/3053	(2)
Household wealth				
Poorest	5650/34,862	(16)	708/3053	(23)
Poorer	6300/34,862	(18)	606/3053	(20)
Middle	6665/34,862	(19)	612/3053	(20)
Richer	7555/34,862	(22)	633/3053	(21)
Richest	8691/34,862	(25)	495/3053	(16)
Residence				
Urban	14,889/34,862	(43)	942/3053	(31)
Rural	19,973/34,862	(57)	2111/3053	(69)
Has co-resident child (ren)				
No	3873/34,862	(11)	79/3053	(3)
Yes	30,989/34,862	(89)	2974/3053	(97)
Has co-resident adult child (ren)				
No	33,630/34,862	(96)	2546/3053	(83)
Yes	1232/34,862	(4)	507/3053	(17)
Spousal sexual violence experience in last 12 months				
No spousal sexual violence	29,689/32,829	(90)	2575/2874	(90)
Any spousal sexual violence	3140/32,829	(10)	299/2874	(10)
No spousal forced sexual intercourse	31,976/34,817	(92)	2773/3050	(91)
Spousal forced sexual intercourse	2841/34,817	(8)	277/3050	(9)
No forced other sexual acts	31,292/32,455	(96)	2738/2837	(97)
Forced other sexual acts	1163/32,455	(4)	99/2837	(3)

women compared to men in Sub-Saharan Africa (Bongaarts 2013; Frempong and Codjoe 2017).

The study results are in contrast to those of previous research that finds no association between child sex composition and sexual violence in India (Sabarwal et al. 2012). The difference in findings may be due to the high prevalence of sex selection in India. A strength of the present study is that it is based on a population with no evidence of sex selection. Not surprisingly, women with daughters only were similar to those with sons only on a range of socio-demographic characteristics suggesting that families in Sub-Saharan Africa were not manipulating the sex composition of their children.

In this study, sex composition of children was associated with spousal forced sexual intercourse but not with other forced sexual acts. While suggestive, these findings support the idea that the increased odds of sexual violence observed for women without sons arises out of men's desire

Table 2 Factors associated with experiencing spousal sexual violence

	1–3 Children		4+ Children	
	Odds ratio (95% CI)	Adjusted odds ratio (95% CI)	Odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Child sex composition				
Son(s) only	1	1	1	1
Daughter(s) only	0.92 (0.82–1.03)	0.92 (0.82–1.04)	1.54 (1.01–2.34)	1.53 (1.02–2.30)
Age (years)	0.98 (0.97–0.99)	0.99 (0.98–1.00)	0.99 (0.95–1.03)	0.98 (0.95–1.02)
Age at first cohabitation				
< 18 years	1	1	1	1
18–49 years	0.83 (0.74–0.93)	0.92 (0.80–1.07)	1.31 (0.85–2.03)	1.19 (0.79–1.81)
Age at first birth				
< 18 years	1	1	1	1
18–45 years	0.85 (0.75–0.97)	0.99 (0.85–1.15)	1.26 (0.82–1.93)	1.19 (0.80–1.77)
Educational attainment				
No education	1	1	1	1
Incomplete primary	2.25 (1.90–2.67)	2.27 (1.91–2.69)	1.60 (0.95–2.69)	1.60 (0.97–2.65)
Complete primary	2.17 (1.79–2.62)	2.27 (1.88–2.75)	1.86 (1.06–3.25)	1.86 (1.04–3.32)
Incomplete secondary	1.62 (1.36–1.94)	1.79 (1.49–2.14)	2.84 (1.33–6.06)	3.00 (1.65–5.46)
Complete secondary	0.96 (0.73–1.26)	1.13 (0.85–1.50)	0.18 (0.05–0.64)	0.21 (0.05–0.86)
Higher	0.94 (0.61–1.46)	1.18 (0.76–1.85)	0.78 (0.15–3.99)	0.95 (0.16–5.46)
Household wealth				
Poorest	1	1	1	1
Poorer	0.92 (0.77–1.10)	0.88 (0.74–1.06)	1.05 (0.64–1.73)	0.94 (0.57–1.54)
Middle	0.93 (0.77–1.11)	0.89 (0.74–1.08)	1.20 (0.69–2.07)	1.06 (0.58–1.91)
Richer	0.92 (0.77–1.10)	0.93 (0.77–1.13)	0.95 (0.50–1.81)	0.95 (0.48–1.87)
Richest	0.73 (0.60–0.88)	0.84 (0.66–1.05)	0.99 (0.34–2.84)	0.97 (0.39–2.42)
Residence				
Urban	1	1	1	1
Rural	1.21 (1.06–1.37)	1.13 (0.96–1.32)	1.28 (0.67–2.42)	1.41 (0.85–2.35)

Spousal sexual violence was measured as either being physically forced by spouse to have sexual intercourse even when the respondent did not want to, or being forced by spouse to perform any other sexual acts the respondent did not want to, or both in the previous 12 months

to influence reproductive outcomes. These findings, indicate that a desire for male children may place women at risk of sexual violence if they are unable to fulfill that desire by bearing sons, which contributes to the literature on potential drivers of sexual violence in sub-Saharan Africa.

The increased odds of sexual violence for women with only daughters was much higher in households with greater wealth. This finding is consistent with a greater need for sons to continue the family heritage in wealthy families compared to poor families (Adebowale et al. 2014). Results from this study contribute to the literature on the link between poverty and sexual violence and indicate that whether greater wealth is accompanied by reduced risk of sexual violence may depend on the sex composition of children. However, other explanations are plausible and further research on this is needed.

In DHS data, experience of spousal sexual violence was ascertained by self-report, which raises possibilities of misreporting. Research in Nicaragua using a specialized violence survey indicates that DHS underestimates the prevalence of spousal violence (Ellsberg et al. 2000; Instituto Nacional de Estadísticas y Censos (INEC/Nicaragua) & Macro International 1999). An additional limitation is that while the sex composition of children was not associated with the pre-motherhood characteristics of the respondents, which suggests that results are not due to demographic or socioeconomic differences in respondents' backgrounds, a causal interpretation cannot be confidently drawn from this study owning to its cross-sectional and observational nature. Further, some Sub-Saharan Africa nations were excluded due to unavailability of DHS violence data, which limits generalizability of findings to the entire region, particularly if the decision to field the DHS domestic violence module was correlated with countries' prevalence of son preference and/or spousal sexual violence.

Table 3 Factors associated with experiencing two forms of spousal sexual violence among women with 4+ children

	Forced sexual intercourse		Other forced sexual acts	
	Odds ratio (95% CI)	Adjusted odds ratio (95% CI)	Odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Child sex composition				
Son(s) only	1	1	1	1
Daughter(s) only	1.64 (1.06–2.52)	1.62 (1.06–2.46)	1.30 (0.75–2.27)	1.34 (0.79–2.29)
Age (years)	1.00 (0.96–1.03)	0.99 (0.96–1.02)	0.95 (0.89–1.02)	0.96 (0.90–1.03)
Age at first cohabitation				
< 18 years	1	1	1	1
18–49 years	1.30 (0.83–2.04)	1.14 (0.74–1.75)	0.71 (0.41–1.23)	0.71 (0.29–1.72)
Age at first birth				
< 18 years	1	1	1	1
18–45 years	1.25 (0.80–1.94)	1.14 (0.75–1.73)	0.88 (0.50–1.56)	1.24 (0.60–2.56)
Educational attainment				
No education	1	1	1	1
Incomplete primary	1.63 (0.97–2.73)	1.64 (1.01–2.68)	1.88 (0.81–4.36)	2.03 (0.88–4.68)
Complete primary	1.82 (1.05–3.15)	1.85 (1.05–3.25)	1.28 (0.50–3.22)	1.44 (0.56–3.70)
Incomplete secondary	3.12 (1.48–6.59)	3.37 (1.90–5.97)	2.14 (0.81–5.65)	3.11 (1.17–8.24)
Complete secondary	0.22 (0.06–0.77)	0.25 (0.06–1.02)	0.34 (0.07–1.77)	0.80 (0.15–4.27)
Higher	0.87 (0.17–4.42)	1.04 (0.18–6.00)	0.06 (0.01–0.48)	0.16 (0.02–1.38)
Household wealth				
Poorest	1	1	1	1
Poorer	1.03 (0.62–1.71)	0.91 (0.55–1.51)	1.01 (0.46–2.21)	0.88 (0.42–1.85)
Middle	0.98 (0.58–1.68)	0.85 (0.49–1.48)	1.13 (0.45–2.87)	1.07 (0.39–2.95)
Richer	0.95 (0.50–1.83)	0.90 (0.45–1.79)	0.90 (0.38–2.12)	0.97 (0.44–2.13)
Richest	1.01 (0.35–2.91)	0.88 (0.36–2.15)	0.40 (0.13–1.26)	0.51 (0.14–1.88)
Residence				
Urban	1	1	1	1
Rural	1.17 (0.62–2.23)	1.34 (0.80–2.23)	2.03 (0.91–4.54)	1.62 (0.69–3.79)

Forced sexual intercourse was measured as being physically forced by spouse to have sexual intercourse even when the respondent did not want to, in the previous 12 months. Other forced sexual acts was measured as being forced by spouse to perform any other sexual acts the respondent did not want to

Fig. 2 Experience of recent spousal sexual violence among women in Sub-Saharan Africa, across wealth quintiles. Data from DHS in 22 Sub-Saharan African countries. Sample restricted to women with more than three children (Color figure online)
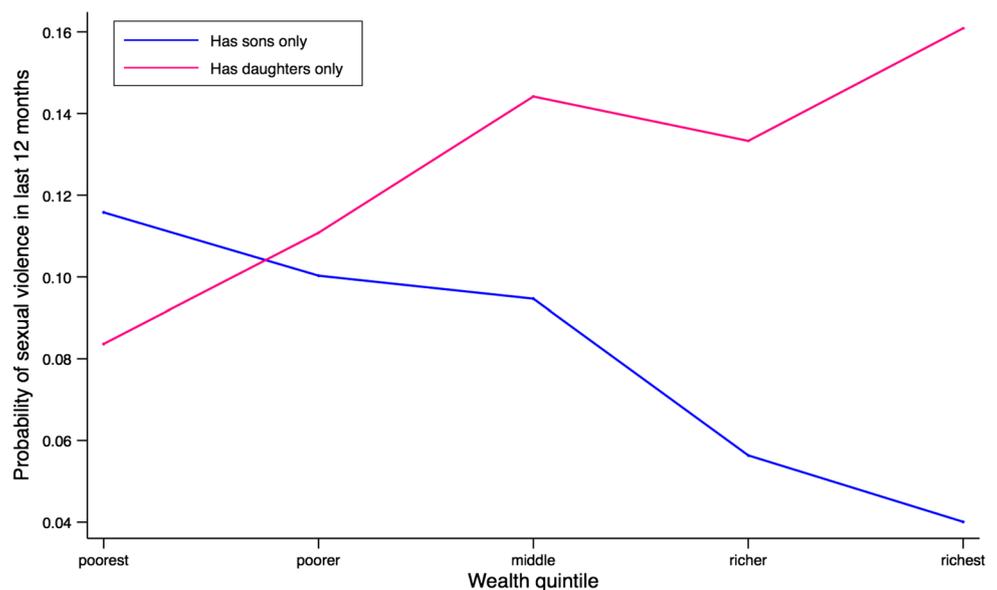
Notwithstanding these limitations, the study findings contribute to the literature on spousal sexual violence in sub-Saharan Africa. That increased risk of sexual violence for women without sons is only observed with larger family sizes is likely due to the confluence of women's lower ideal family size compared to men, women's weaker preference for sons compared to men, and a high unmet need for contraception in sub-Saharan Africa. Screening for intra-couple conflict around fertility intentions may help practitioners working with victims of sexual violence provide more effective responses. For instance, provision of contraceptives that can be used discreetly would help address women's concerns about unwanted pregnancies. Further research examining the sexual violence profile over time after the birth of an additional daughter to a woman who only has daughters would help identify the opportune moments to screen for sexual violence. Long-term solutions to address the increased risk of sexual violence documented in this research will likely require interventions to lower men's ideal family sizes, men's preference for sons, and the unmet need for contraception in Sub-Saharan Africa.

The higher risk of spousal sexual violence observed for women who do not bear sons adds to the literature indicating that son preference is an important issue in Sub-Saharan Africa. Future research and interventions to address son preference is needed as son preference may have tremendous implications for the health and wellbeing of women in the region.

Compliance with Ethical Standards

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