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Assessment of HIV Status and Fertility preferences in Zambia: a cross-sectional study design, 2009-2010.

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Abstract

Background/Objective: Studies on fertility preferences (child desire) among women in sub-Saharan countries, regardless of HIV status, have shown different outcomes, suggesting that the relationship between HIV status and fertility preferences is very complex. The aim of this study is to assess whether there is an association between HIV status and fertility preferences among women in Zambia.

Methods: The 2007 Zambia Demographic and Health Survey is a cross-sectional survey design that was conducted as a community-based survey in 2009 and 2010. Sample characteristics were obtained to understand prevalence of diverse factors in the population. In bivariable analyses, cross-tabulations and chi-square test were used to determine significant associations. In multiple regression analyses, logistic regression was used to obtain odds ratios, adjusted odds ratios and 95% confidence intervals. R software was used to complete all analyses.

Results: Although HIV status was not significant, the odds of child desire were 1.09 times greater among HIV-positive women compared to women who were HIV-negative. Living in the Northern or Southern provinces is significantly associated with fertility preferences; in the unadjusted model, the odds of child desire among women who lived in the Northern and Southern provinces were 2 times and 1.3 times the odds of child desire among women who lived in the Lusaka province respectively.

Discussion/Conclusion: There is no association between HIV status and fertility preferences. However, fertility preferences are higher among women who live in the Northern and Southern provinces.

Keywords: fertility preferences; HIV status

Introduction

In sub-Saharan Africa (SSA), HIV continues to be one of the major epidemics of our time, especially among women and children. According to UNAIDS, in 2011, about 70% of the 34 million seropositive individuals around the world resided in the sub-Saharan African region, with women comprising 58% of persons infected with the virus.[1] This study will focus on Zambia. Zambian women are disproportionally affected by HIV, as in most parts of the sub-Saharan African region: of the 1,200,000 adults living with HIV in Zambia, 700 000 (58.33%) were women.[2]

In most sub-Saharan African countries, young women who are at that age of bearing a child, have a desire to become pregnant and are prone to HIV infections. Studies on fertility preferences (defined in the study as child desire) among women in sub-Saharan countries, regardless of HIV status, have shown different outcomes, suggesting that the relationship between HIV status and fertility is very complex. For example, in Guinea, seropositive women of their HIV status reported interest in having more children compared to women who were seronegative of their HIV status. These results were not consistent for seropositive women in Malawi or Zimbabwe, where women preferred to no longer procreate compared to seronegative women. These two countries have relatively high HIV prevalence rates among women aged 15–49 years, which ranged from 13% in Malawi to 18% in Zimbabwe.[3,4] On the other hand, countries like Kenya and Cameroon, with similar rates of HIV infection, showed a rather different pattern in fertility desires based on HIV status: all women, regardless of HIV status, portrayed the same fertility preferences behavior.

Bankole *et al*.[5], in their study using one round of Demographic and Health Surveys (DHS) surveys in 10 sub-Saharan African countries, argue that fertility desires and behavior of seropositive individuals are influenced by both their HIV status and their awareness of the said status. According to the World Health Organization (WHO), although HIV testing has become available over the years in many sub-Saharan African countries, levels of HIV testing still remain relatively low in many countries.[6] Therefore, the fertility desires and behavior of HIV-positive women differs compared with that of HIV-negative women only when these women know their HIV status.

A literature review shows that the comparison in ART use falls into two different categories: fertility differences between seronegative and seropositive women and fertility of HIV-positive women on ART relative to those who are not on ART. Although much is known about the relationship between HIV and fertility in SSA in the absence of ART, it remains unclear how the expansion and availability of this treatment throughout the SSA region has affected this important relationship. Many of the reviewed studies were comprised of women from various age groups, although some studies[8-11], made use of age in their analyses more thoroughly than others. Only three studies[8-10] had a purposefully selected HIV-negative comparison group. Gregson *et al*[8] found that in a period during which access to ART in Zimbabwe (2009–2011) was improved, the age-adjusted prevalence of pregnancy among HIV-positive women (not all of whom were aware of their status) was 25% lower than that of HIV-negative women, with the exception of the youngest age group[12] in which fertility did not differ by HIV status. HIV-positive women had substantially lower pregnancy prevalence regardless of ART use. In addition, based on their data analysis from four demographic and HIV surveillance sites in Uganda, Tanzania and South Africa, Marston and his colleagues[9] found that the gap between the age-specific fertility rates of HIV-positive and HIV-negative women became less significant in the post-ART period. There was inconsistency between studies about the fertility

incidence of HIV-positive women on ART compared to HIV-positive women engaged in care but not yet on ART. Two studies found no difference in fertility incidence by ART[13,14] and one found higher fertility incidence among women not yet on ART than among those on ART[12], but these studies did not adjust for socioeconomic or health factors between the groups. However, the current evidence is insufficient to be confident in these conclusions. Fertility of HIV-positive women vs. HIV-negative women, appropriately accounting for age and ART use, is the standard comparison and what is required for solid answers to these questions. Unfortunately, only Gregson's study included a purposely selected HIV-negative comparison population and data on ART use that was self-reported and information about timing of ART initiation was not available[8].

The purpose of my research was to assess whether there is an association between HIV status and fertility preferences among women in Zambia. The hypothesis was that HIV-positive women are less likely to want a/another child after HIV diagnosis or want no children at all if they never had any, compared to women who are HIV-negative. There is not much literature about this topic conducted in Zambia and it is important as the relationship between HIV status and fertility preferences yields different outcomes in different countries. Potential factors that have not been consistently included in previous studies were examined.

Methods

Data Source and Study design

The data in this study come from one of eight surveys conducted in Zambia and Nigeria and administered by The Guttmacher Institute. This is a cross-sectional survey design that collected data from 1,441 Zambian women aged 18–49 in 2009 and 2010. This survey was conducted in the Southern and Northern provinces and Lusaka, in Zambia. The goal of selecting the three provinces was to include urban and rural diversity and capture regional or ethnic variation. A target sample of 2,600 respondents (aged 18–49 years) of reproductive age was selected. This figure represents the combined samples for men and women. In Zambia there were 1,363 male respondents and 1,441 female respondents, yielding a total of 2,804 responses, well over the target.

The goal of the parent study was to explore how HIV status relates to attitudinal and behavioral measures regarding HIV services and fertility preferences. The final data file contains 665 variables. The goal of the proposed study is to determine the association between HIV status and fertility preferences, controlling for potentially important confounders and effect modifiers. The dataset from the Guttmacher Institute did not specify if there was an IRB approval process.

Participants and Procedures (Data Collection)

The three aforementioned provinces were selected based on the levels of HIV, fertility and contraceptive use reported in the 2007 Zambia Demographic and Health Survey (ZDHS). Although women aged 18-49 years were initially targeted, younger women of at least 15 years of age were eventually considered, as long as they were able to bear a child. The sample was indirectly selected by first selecting households in each of the three provinces. The questionnaires were designed in English and few local languages for those who did not have any knowledge of English. Prior to the interview, informed consent was obtained from all respondents. Included in the questionnaires was a range of topics from demographic and socioeconomic characteristics of the respondent, to sexual behavior, union status, contraceptive use, fertility preferences, or pregnancy history (including live births, miscarriages and induced abortions) among many others. Survey takers were asked about their perception of risk for HIV

infection and HIV status awareness. Those who were aware of their HIV status were asked additional questions, including how and when they first found out about their status. The analytic sample for this analysis included women aged 18-49 years who were aware of their HIV status. The initial sample had 1,441 participants but later contained only 665 participants after data cleaning during which missing variables were dropped.

Measures

      For my study, the exposure is HIV status, a categorical variable; it included three categories (positive, negative, unknown) but it was dichotomized to positive and negative. The outcome variable that was used to measure fertility preferences was child desire, another categorical variable. Control variables such as age (numeric), type of place of residence (urban or rural), region of residence or province (Lusaka, Northern, Southern), native language (English, Bemba, Tonga, other, Nyanja), education attainment (none, primary, secondary, higher), marital status (yes, married; yes, living with a man, not in a union), age group (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49), religion (Catholic, Protestant, Pentecostal/Charismatic, Other Christian, Muslim, Traditional Religion, Other), importance of religion (very important, somewhat important) and child death (yes, no) were also taken into consideration. The outcome variable (How likely do you think it will be that you will have (a/another) child?) had three possible values (very likely, somewhat likely and not likely at all), but it was recoded to a dichotomous variable for easier analysis.

Statistical Analysis

Univariate analysis

The continuous variable, age, was summarized to get information about its mean and standard deviation. Frequency distributions and percentages for the other covariates were used to describe the sample characteristics.

Bivariate analysis

This analysis was conducted to determine if there was any association between the outcome and exposure and the covariates using the chi-square test and the generated p-values.

Multiple regression analysis

The logistic regression model was used to assess the relationship between pregnancy preferences and HIV status by adjusting for control variables mentioned above. Odds ratios and 95% confidence intervals were also be reported for all logistic regression analyses.

Results

      Table 1 provides descriptive statistics on women child desire, age, race, education attainment and that of their partner, native language, type of place of residence, region of residence, HIV testing and status, marital status, religious practice and its importance, and child loss in Zambia in 2009-2010. The mean age (in years) of women in the study is 31. This table shows that among all women in the study, about 76% of them were likely to want a child or more children. It also shows that most participants in the sample were HIV negative (88%). In addition, in terms of demographics, most of the participants (418) were between 20 and 34 years of age and accounted for 63% of the entire sample. About 52% of these participants have a primary education level compared to 37% who have a high school level or obtained a high school degree. A small proportion either had no education at all (6%) or a college degree (5%). Furthermore, almost none of these participants spoke English (1%). The majority spoke local languages, with Bemba and Tonga being the most used languages. Other languages, though not specified, were also used by about 47% of the participants. Participants were evenly dispersed in

the regions selected; they were evenly located in either rural or urban areas and there was also an even dispersion of the populations in the Lusaka, Southern and Northern provinces. The majority of participants were married and represented 75% of the sample compared to 25% group that was single. It is important to note that, among the married group, 99% did not live with a man. Religion was of extreme importance to the participants as 97% responded that religion was very important compared to only 3% that said it was somewhat important. Finally, the table shows that about one third of the participants lost a child after birth.

Table 2 summarizes the bivariate analyses conducted for each predictor against fertility preferences. Cross tabulations and chi-square tests were conducted between fertility preferences (child desire) other covariates. Out of 1441 participants who responded to the survey, only 665 were included in the analysis. None of the predictors was significantly associated with fertility preferences, besides the *province* variable (p<0.01).

The study found that HIV status was not significantly associated with child desire (p=0.95). The majority (76.2%) of HIV-negative women were likely to have a/another child while 74.7% of HIV-positive women were likely to have another child. Age group was another insignificant factor to child desire. 85% of women in the age group 45-49 preferred having children while 71% and 79% were in the age groups 30-34 and 15-19 respectively.

The analysis shows that *province* emerged as a significant factor for child desire (p<0.01). 81% of women in Lusaka had a desire to have children while 68% and 76% of women in the Northern and Southern provinces, respectively, were likely to have children.

Child desire was not significantly associated with child loss (p=0.90). Among women who lost a child in the past, 77% were likely to have another child. This same result was also observed among women who never lost a child.

Table 3 shows the odds ratios (OR), 95% confidence intervals (CI) and p-values, for both the unadjusted and adjusted models, from a multiple logistic regression predicting fertility preferences. The adjusted model was adjusted for age, level of education, native language, urban/rural location, state/province, importance of religion and child loss. Out of all covariates in the regression model, only *province* was significant. In the unadjusted model, the crude ORs of child desire among women who lived in the Northern and Southern provinces were 2 and 1.3 respectively. In the adjusted model, the crude ORs of child desire among women who lived in the Northern and Southern provinces increased to 2.5 and 2.1 respectively.

Discussion

The goal of the study is to examine HIV status as a potential predictor of fertility preferences among women in Zambia. Following the analyses, there was no association between HIV status and fertility preferences. Based on the analysis in this study, it was found that province was the only significant predictor of child desire. The crude ORs of child desire among women who lived in the Northern and Southern provinces were 2 and 1.3 respectively, indicating that the odds of wanting children among women who lived in the Northern and Southern provinces were 2 times and 1.3 times the odds of wanting children among who lived in the Lusaka province respectively (95% CI 1.27, 3.16 and 1.12, 2.05 respectively). The other covariates were also found to be insignificant in this study.

The results for the factor *province* from the multiple regression analysis are contradictory from those from the bivariate analysis. The latter showed a higher proportion of wanting children among women in Lusaka followed by those in the Southern province and then by those in the Northern province. Meanwhile, the logistic regression showed that the odds were rather two

times and 1.3 times higher in the Northern and Southern provinces respectively compared to Lusaka. In addition, the insignificance of some of the other covariates is not consistent with earlier studies. In a study conducted, Weinberger (1987) found out that fertility and education attainment are inversely proportional; the higher the education level attained, the lower the likelihood to have children. The differences in fertility between women with no education and those with higher education tend to be small in sub-Saharan Africa compared to other parts of the world. Another study conducted in Ghana showed a significant association between the type of place of residence and fertility. Agyei-Mensah & Owoo (2015) found out that women who reside in urban areas tend to have lower fertility levels compared to women in rural areas; this is due to the higher cost of living to raise children in urban areas.

Study limitations

Data collection initially occurred from October 2009 through February 2010. Therefore, the response rates, that were not specified, were said to be lower than planned due to constant rain during that time frame and that they improved after follow-up interviews were conducted months later. It is important to note that the questionnaires and consent forms were initially constructed in the English language and then translated by hired translators into few native tongues (Tonga, Nyanja or Bemba) for the locals as many of them in the rural areas did not know any English. The hired translators also had to do the reverse translation back to English after information were collected. Sampling bias can be noted in this study as out of the ten provinces in the country, only three of them were selected for this study; the sample from these three provinces represent less than half of the total population and therefore cannot be used to represent the entire population of Zambia. Recall bias could also be considered as many of the participants could not remember some information about their past history.

Future research

Since the relationship between HIV status and fertility preferences varies across different countries, further studies need to be completed in order to explore the cultural factors and socioeconomic factors that could influence the relationship between HIV status and pregnancy preferences. For the cultural factors, it would be important to obtain more data on the men who the survey respondents decide to have children with because we live in a patriarchal society, especially in sub-Saharan Africa; therefore, woman's fertility preferences may be different from perceived likelihood of having another child. We should also look into stigma because being HIV-positive is also not well received in many African communities. In many sub-Saharan countries, a woman could face criticism if, at a certain age, she is not married and/or does not have children. So, many women would rather hide their HIV status from their partner just to fit the standard and take the risk to have children. Regarding the socioeconomic factors, one might look at employment status when conducting the study in Zambia. For example, in Ghana, Agyei-Mensah & Owoo (2015) found out that women who are employed or have higher social status, tend to have fewer children than unemployed women. Hoffman (1974) also came to the same findings.

Reference:

1. UNAIDS. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS (UNAIDS); 2012. Global report: UNAIDS report on the global AIDS epidemic 2012.
2. Zambia. UNAIDS. https://www.unaids.org/en/regionscountries/countries/zambia. Published May 11, 2018. Accessed December 21, 2019.
3. National Statistical Office (NSO). *2010 Malawi Demographic and Health Survey Key Findings*. 2011. https://www.dhsprogram.com/pubs/pdf/SR184/SR184.pdf
4. Zimbabwe National Statistics Agency. *National Statistical Office (NSO). 2010-2011 Zimbabwe Demographic*. https://dhsprogram.com/pubs/pdf/FR254/FR254.pdf
5. Bankole A, Biddlecom AE, Dzekedzeke K. *Women's and men's fertility preferences and contraceptive behaviors by HIV status in 10 sub-Saharan African countries*. AIDS Education and Prevention. 2011; 23: 313–28.
6. World Health Organization. *Global update on HIV treatment 2013: results, impact and opportunities*. WHO report in partnership with UNICEF and UNAIDS. 2013
7. King R, Khana K, Nakayiwa S, Katuntu D, *et al*. *'Pregnancy comes accidentally – like it did with me': reproductive decisions among women on ART and their partners in rural Uganda*. BMC Public Health. 2011; 11: 530
8. Gregson S, Dharmayat K, Pereboom M, *et al*. *Do HIV prevalence trends in antenatal clinic surveillance represent trends in the general population in the antiretroviral therapy era? The case of Manicaland, East Zimbabwe*. AIDS 2015: 29: 1845-1853
9. Marston M, Nakiyingi-Miiro J, Hosegood V, Lutalo T, Mtenga B, Zaba B. *Measuring the Impact of Antiretroviral Therapy Roll-Out on Population Level Fertility in Three African Countries*. PLoS ONE 2016: **11**: e015187.
10. Souza E, Moultrie TA. *Estimating the effect of HIV/AIDS on fertility among Malawian women using demographic and health survey data*. Afr J AIDS Res 2015: **14**: 315-321.
11. Tweya H, Feldacker C, Breeze E, *et al*. *Incidence of pregnancy among women accessing antiretroviral therapy in urban Malawi: a retrospective cohort study*. AIDS Behav 2013: **17**: 471-478.
12. Lancaster KE, Kwok C, Rinaldi A *et al*. Incident pregnancy and pregnancy outcomes among HIV-infected women in Uganda and Zimbabwe. *Int J Gynecol Obstet* 2015: **131**: 255-259.
13. Kabami J, Turyakira E, Biraro S, Bajunirwe F. Increasing incidence of pregnancy among women receiving HIV care and treatment at a large urban facility in western Uganda. *Reprod Health* 2014: **11**: 81.
14. Asiimwe-Kateera B, Veldhuijzen N, Balinda JP *et al* Combination Antiretroviral Therapy for HIV in Rwandan Adults: Clinical Outcomes and Impact on Reproductive Health up to 24 Months. *AIDS Res Treat* 2015: **2015**: 740212.
15. Weinberger MB. *International Family Planning Perspectives*. Vol. 13, No. 2 (Jun., 1987), pp. 35-46 (12 pages)
16. Agyei-Mensah S, Owoo. NS. *Journal of Population Research*. Vol. 32, No. 3/4 (2015), pp. 157-172 (16 pages)
17. Hoffman LW. *Merrill-Palmer Quarterly of Behavior and Development*. Vol. 20, No. 2 (April 1974), pp. 99-119 (21 pages)

Appendix

Table 1. Sample characteristics of fertility preferences in women living in Zambia, 2009-2010 (N = 665).

Variable	N(%)	Variable	N(%)
Age mean (years)	**31.0**	**Province**	
Child desire		Lusaka	249 (37.4)
Likely	506 (76.1)	Southern	246 (37.0)
Not likely	159 (23.9)	Northern	170 (25.6)
Demographics		*Marriage*	
Age group (years)		**Marital status**	
15-19	38 (5.7)	Yes, currently married	500 (75.2)
20-24	123 (18.5)	Yes, currently living with a man	6 (0.9)
25-29	166 (25.0)	No, not in union	159 (23.9)
30-34	127 (19.1)	*HIV*	
35-39	98 (14.7)	**HIV test done**	
40-44	66 (9.9)	No	2 (0.3)
45-49	47 (7.1)	Yes	663 (99.7)
Education attainment		**HIV status**	
None	41 (6.2)	Positive	71 (10.7)
Primary	347 (52.2)	Negative	585 (88.0)
Secondary	243 (36.5)		
Higher	34 (5.1)	*Religious*	
Education of partner		**Belief**	
None	18 (2.7)	Catholic	162 (24.4)
Primary	183 (27.5)	Protestant	350 (52.6)
Secondary	256 (38.5)	Pentecostal/Charismatic	98 (14.7)
Higher	49 (7.4)	Other Christian	43 (6.5)
Not in union	159 (23.9)	Muslim	1 (0.2)
Native Language		Traditional Religion	11 (1.7)
English	8 (1.2)		
Bemba	136 (20.5)	**Importance**	
Nyanja	9 (1.4)	Very Important	642 (96.5)
Tonga	199 (29.9)	Somewhat important	23 (3.5)
Other	313 (47.1)	*Pregnancy*	
Type of place of residence		**Loss of a child**	
Rural	346 (52.0)	Yes	218 (32.8)
Urban	319 (48.0)	No	4497(67.2)

Table 2. Bivariate Analysis: Fertility preferences and covariates for women living in Zambia, 2009-2010 (N = 665).

	N (%) 665 (100.0)	Total Likely N (%) 506 (76.10)	pregnancy Not likely N (%) 159 (23.90)	preferences p-value
Demographics				
Age group (years)				0.29
15-19	38	30 (78.95)	8 (21.05)	
20-24	123	98 (79.67)	25 (20.33)	
25-29	166	130 (78.31)	36 (21.69)	
30-34	127	90 (70.87)	37 (29.13)	
35-39	98	72 (73.47)	26 (26.53)	
40-44	66	46 (69.70)	20 (30.30)	
45-49	47	40 (85.11)	7 (14.89)	
Education attainment				0.60
None	41	32 (78.05)	9 (21.95)	
Primary	347	263 (75.79)	84 (24.21)	
Secondary	243	182 (74.90)	61 (25.10)	
Higher	34	29 (85.29)	5 (14.71)	
Education of partner				0.59
None	18	16 (88.89)	2 (11.11)	
Primary	183	136 (74.32)	47 (25.68)	
Secondary	256	194 (75.78)	62 (24.22)	
Higher	49	40 (81.63)	9 (18.37)	
Not in union	159	120 (75.47)	39 (24.53)	
Native Language				0.51
English	8	5 (62.65)	3 (37.35)	
Bemba	136	103 (75.74)	33 (24.26)	
Nyanja	9	6 (66.67)	3 (33.33)	
Tonga	199	159 (79.90)	40 (20.10)	
Other	313	234 (74.44)	80 (25.56)	
Type of place of residence				1.00
Rural	346	263 (76.01)	83 (23.99)	
Urban	319	243 (76.18)	76 (23.82)	
Province				< 0.01
Lusaka	249	202 (81.12)	47 (18.88)	
Southern	246	188 (76.42)	54 (23.58)	
Northern	170	116 (68.24)	58 (31.76)	

	N (%) 665 (100.0)	Total Likely N (%) 506 (76.10)	pregnancy Not likely N (%) 159 (23.90)	preferences
HIV				
HIV test done				0.97
No	2	1 (50)	1 (50)	
Yes	663	505 (76.17)	158 (23.83)	
HIV status				0.95
Positive	71	53 (74.65)	18 (25.35)	
Negative	585	446 (76.24)	139 (23.76)	
Marriage				
Marital status				0.38
Yes, currently married	500	380 (76)	120 (24)	
Yes, currently living with a man	6	6 (100)	-	
No, not in union	159	120 (75.47)	39 (24.53)	
Religious				
Belief				0.14
Catholic	162	129 (79.63)	33 (20.37)	
Protestant	350	261 (74.57)	89 (25.43)	
Pentecostal/Charismatic	98	72 (73.47)	26 (26.53)	
Other Christian	43	37 (86.05)	6 (13.95)	
Muslim	1	-	1 (100)	
Traditional Religion	11	7 (63.64)	4 (36.36)	
Importance				0.32
Very Important	642	491 (76.48)	151 (23.52)	
Somewhat important	23	15 (65.22)	8 (34.78)	
Pregnancy				
Loss of a child				0.90
Yes	218	167 (76.61)	51 (23.39)	
No	447	339 (75.84)	108 (24.16)	

Table 3. Multiple logistic regression models predicting fertility preferences for women living in Zambia, 2009-2010 (N = 665).

	Unadjusted Model		Adjusted Model	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age group (years)				
15-19	0.96 (0.49, 4.80)	0.93	0.89 (0.41, 4.42)	0.81
20-24	0.92 (0.61, 3.89)	0.78	0.83 (0.49, 3.45)	0.53
25-29	(ref. group)			
30-34	1.48 (0.69, 4.12)	0.15	1.55 (0.63, 4.01)	0.12
35-39	1.30 (0.86, 5.54)	0.37	1.29 (0.79, 5.33)	0.40
40-44	1.57 (0.99, 6.89)	0.17	1.83 (1.07, 7.80)	0.08
45-49	0.63 (0.24, 1.26)	0.31	0.67 (0.25, 1.60)	0.38
Education level				
None	(ref. group)			
Primary	1.14 (0.54, 2.62)	0.75	0.93 (0.43, 2.20)	0.87
Secondary	1.19 (0.56, 2.78)	0.67	1.06 (0.47, 2.56)	0.90
Higher	0.61 (0.17, 1.99)	0.43	0.63 (0.17, 2.15)	0.47
Native Language				
English	(ref. group)			
Bemba	0.53 (0.12, 2.71)	0.41	0.58 (0.13, 3.05)	0.49
Nyanja	0.83 (0.11, 6.40)	0.86	1.17 (0.14, 9.78)	0.88
Tonga	0.42 (0.10, 2.11)	0.25	0.50 (0.11, 2.77)	0.39
Other	0.57 (0.14, 2.84)	0.45	0.76 (0.17, 3.93)	0.72
Type of place of residence				
Rural	(ref. group)			
Urban	0.99 (0.69, 1.42)	0.96	1.28 (0.82, 2.00)	0.28
Province				
Lusaka	(ref. group)			
Southern	1.33 (1.12, 2.05)	0.03**	2.08 (1.15, 3.75)	0.01**
Northern	2.00 (1.27, 3.16)	0.003***	2.54 (1.45, 4.49)	0.001***
HIV status				
Negative	(ref. group)			
Positive	1.09 (0.60, 1.89)	0.77	1.25 (0.67, 2.24)	0.47
Religion Importance				
Somewhat Important	(ref. group)			
Very important	0.58 (0.25, 1.46)	0.22	0.48 (0.20, 1.27)	0.12
Loss of a child				
No	(ref. group)			
Yes	0.96 (0.65, 1.40)	0.83	0.80 (0.52, 1.22)	0.30

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval

**Statistically significant (p < 0.05);

***Statistically significant (p < 0.01)

Model adjusted for age, level of education completed, native language, urban/rural location, state/province, importance of religion and child loss.