

Preventing HIV by providing support for orphan girls to stay in school: does religion matter?

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Objective. The paper examines the influence of religion on attitudes, behaviors, and HIV infection among rural adolescent women in Zimbabwe.

Design. We analyzed data from a 2007 to 2010 randomized controlled trial in rural eastern Zimbabwe testing whether school support can prevent HIV risk behaviors and related attitudes among rural adolescent orphan girls; supplementary data from the 2006 Zimbabwe Demographic and Health Survey (ZDHS) were also analyzed. The present study design is largely cross-sectional, using the most recent available survey data from the clinical trial to examine the association between religious affiliation and religiosity on school dropout, marriage, and related attitudes, controlling for intervention condition, age and orphan type. The ZDHS data examined the effect of religious denomination on marriage and HIV status among young rural women, controlling for age.

Results. Apostolic Church affiliation greatly increased the likelihood of early marriage compared to reference Methodist Church affiliation (odds ratio = 4.5). Greater religiosity independently reduced the likelihood of school dropout, increased gender equity attitudes and disagreement with early sex, and marginally reduced early marriage. Young rural Apostolic women in the ZDHS were nearly four times as likely to marry as teenagers compared to Protestants, and marriage doubled the likelihood of HIV infection.

Conclusions. Findings contradict an earlier seminal study that Apostolics are relatively protected from HIV compared to other Christian denominations. Young Apostolic women are at increased risk of HIV infection through early marriage. The Apostolic Church is a large and growing denomination in sub-Saharan Africa and many Apostolic sects discourage medical testing and treatment in favor of faith healing. Since this can increase the risk of undiagnosed HIV infection for young married women and their infants in high prevalence areas, further study is urgently needed to confirm this emerging public health problem, particularly among orphan girls. Although empirical evidence suggests that keeping orphan girls in school can reduce HIV risk factors, further study of the religious context and the implications for prevention are needed.

Keywords: religion; adolescent orphan health; Zimbabwe

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Introduction

Religion is a powerful force in southern Africa, affecting all aspects of daily life and health (Anderson 2001, Chitando 2007a), particularly among rural women (Agadjanian 2005). Rural churches are a center for informal social interaction, shaping attitudes and behaviors of its members (Agadjanian and Menjivar 2008). Yet, the role of religion in the sub-Saharan HIV epidemic has received limited attention in the literature. Few studies (e.g., Gregson *et al.* 1999, Garner 2000, Agadjanian and Menjivar 2008, Mpofu *et al.* 2011) have probed the mechanisms through which religious affiliation might affect HIV-related risk factors in sub-Saharan Africa. At the same time, there is a growing scientific consensus about the importance of structural and social contextual factors that shape HIV-related attitudes, behaviors, and outcomes (Gupta *et al.* 2008, Amon and Kasambala 2009).

The purpose of this paper is to examine the influence of religion on HIV-related behaviors and attitudes among orphan adolescent girls participating in a randomized controlled prevention trial (RCT) in rural Zimbabwe. The RCT sought to test the notion that a structural intervention – providing school fees and other support for orphan girls to stay in school – can help reduce HIV risk behaviors and attitudes. After two years, the intervention reduced school dropout by 82% and early marriage by 63% compared to controls, and showed a trend toward more equitable gender attitudes and more protective attitudes about future expectations and delayed sex (Hallfors *et al.* 2011). In the present study, we examine the influence of religion, controlling for intervention effects.

Early in the study, we observed that the influence of the Apostolic Church was widespread and increased the likelihood of girls dropping out of school to marry. Despite a strong and growing presence in southern Africa, we found very little in the published peer-reviewed literature about the Apostolic Church, and no studies comparing HIV biomarker data between Apostolics and other religious denominations. Because our study did not include HIV biomarker data, we used population-based data from the latest Zimbabwe Demographic and Health Survey (2006 ZDHS) as a supplementary source to further examine the relationship between religion, marriage, and HIV infection among young rural women.

Orphan girl vulnerability

Orphan girls are particularly susceptible to HIV infection in sub-Saharan Africa (Jukes *et al.* 2008). In 2006, orphan Zimbabwe girls aged 15–17 years were more than twice as likely to be HIV infected compared to non-orphan girls (5.3 vs. 2.3%; $p = 0.01$; CSO/Macro 2007). Orphan prevalence in Zimbabwe is among the highest in the world; among youth aged 15–17 years, 36% are orphans (CSO/Macro 2007, UNICEF 2010). Orphan girls are vulnerable to school dropout, early sex (Thurman *et al.* 2006, Jukes *et al.* 2008), sexually transmitted infections, early marriage and pregnancy, as well as HIV (Gregson *et al.* 2005, Birdthistle *et al.* 2008). Studies of youth show consistent evidence that adolescents who stay in school have a lower likelihood of early sexual debut and other HIV-related risk behaviors (Erulkar *et al.* 2004, Were 2007, Hargreaves *et al.* 2008).

Early marriage is a significant HIV risk factor in Zimbabwe that affects girls disproportionately. Among a representative sample of 20–24-year-old Zimbabweans,

34% of women were married by age 18 years compared to 2% of men (CSO/Macro 2007). HIV prevalence was more than twice as high among Zimbabwe married women aged 15–24 years (14.7%) compared to those who never married (6.2%) (CSO/Macro 2007). In a study of 15–19-year-old girls in a Harare suburb, 18% of the married were HIV infected compared to 6.3% of the unmarried; 42% of the married were HSV-2 (genital herpes) infected compared to 5.9% of the unmarried (Birdthistle *et al.* 2008).

Married adolescent girls tend to have much older husbands who sometimes have multiple wives (Clark *et al.* 2006). Girls also have less bargaining power within marriage and receive less formal education compared to their husbands (Nour 2009). Many researchers have suggested that male dominance and the lack of gender equity attitudes and policies help fuel higher HIV incidence among women (Varga 2003, Wechsberg *et al.* 2008, Niens and Lowery 2009).

Religious affiliation and HIV risk

As in other southern African countries, the great majority of people in Zimbabwe affiliate with Christian churches. According to the latest ZDHS, 10% reported being Roman Catholic, 15% Pentecostal, 22% Protestant, 26% Apostolic, 5% ‘other’ Christian religions, and 1% Muslim. Six percent reported Traditional beliefs and 15% no religious affiliation (CSO/Macro 2007).

Catholic and Protestant churches came to Zimbabwe during the colonial era with western missionaries who also built schools and hospitals (Gregson *et al.* 1999). The Shona people found the Old Testament of the bible to be highly compatible with traditional monotheistic beliefs and many traditional patriarchal practices, such as *lobola* or ‘bride price,’ polygamy, and honor given to ancestors (Anderson 2001, Chitando 2007b). Mission churches, however, emphasized the New Testament, monogamy, and western ideals, such as equal education for boys and girls.

Although mission churches are now almost exclusively led by black Africans, colonial missionaries largely upheld the practice of treating Africans as second-class citizens, engendering frustration and conflicts and giving rise to African-initiated ‘Spirit-led’ churches (Daneel 1987, Gregson *et al.* 1999). One of the largest of these is the African Apostolic Church of John Marange; established in 1932, it is now among the largest denominations in Zimbabwe (Anderson 2001). Although, Marange renounced traditional ritual practice and witchcraft and emphasized the workings of the Holy Spirit in healing and leading the people, he promoted Old Testament laws and practices that mirrored traditional African indigenous religions, including male dominance (Anderson 2001, Chitando 2007b). Many additional Apostolic sects have since been founded in Zimbabwe, often led by a charismatic healer and prophet (Daneel 1987).

While the peer-reviewed literature on the Apostolic Church is sparse, Gregson and colleagues (1999) concluded that lower death rates in the 1990s among Apostolic compared to mission church Christians were a function of stronger restrictions on sexual relationships outside of marriage, leading to reduced HIV infection, despite greater acceptance of polygamy. In a qualitative study of religion in a South Africa township, however, Garner (2000) found much weaker controls on sex outside of marriage among Apostolics compared to other denominations, particularly Pentecostals. Agadjanian (2005, 2008) found that Spirit-led churches and congregants in

Mozambique were more insular, having less contact with other institutions including the medical system, compared to mission churches which he described as more ‘worldly.’ Mpofu *et al.* (2011) found insular attitudes that favored men and constrained women’s access to health-protecting resources in a Zimbabwe Apostolic sect.

We hypothesized that girls who affiliated with mission churches would hold more supportive gender equity attitudes compared to Apostolic, Traditional, and the unaffiliated (whose views are likely influenced by pervasive traditional beliefs, particularly in rural areas). Because of this, we expected that Apostolic, Traditional, and unaffiliated orphaned girls would be more likely to drop out of school and marry early compared to those affiliated with western mission churches. We expected universal agreement with sexual abstinence for unmarried girls, since Shona tradition and Christian churches both emphasize women being virgins at marriage (Chitando 2007b). We also expected that greater religiosity would foster attitudes supporting delaying sexual initiation until marriage, as found in numerous US and African studies (see e.g., Jones *et al.* 2005, Odimegwu 2005, Eggebeen and Dew 2009).

Although, the empirical literature indicates that marriage increases the risk of HIV infection among young women, the Gregson *et al.* (1999) study suggested that Apostolic Church members would have lower HIV prevalence compared to those in mission churches because of stronger restrictions on sex outside of marriage. Thus, even if Apostolic young women were more likely to be married, we did not expect to see higher HIV prevalence in our ZDHS analyses.

In summary, we examined the effects of both religious affiliation and religiosity on HIV risk factors in a sample of rural Zimbabwe orphan adolescent girls, controlling for the effects of our intervention. And we supplemented our study with data from the 2006 ZDHS to examine the association between religious affiliation and HIV infection among young rural women.

Methods

Sample

Five rural geographical clusters in the Zimbabwe province of Manicaland were identified, each with one Methodist and one secular high school. We randomized each high school’s main feeder primary schools to study condition (intervention or control). All orphan girls (one or both parents deceased) in grade 6 were invited for study participation; all agreed. A total of 328 orphan girls from 25 primary schools participated in the baseline survey (September 2007). All were majority black African Shona language speakers; language is commonly used as a proxy measure for ethnicity in Zimbabwe (Sambisa *et al.* 2010).

Intervention

Intervention students ($N = 183$) received school support (starting November 2007) including fees, exercise books, uniforms, and school supplies. Female teachers at each intervention primary school were selected and trained by research personnel to serve as ‘helpers’ who monitor attendance and help with problems related to school

absence (for more about the intervention see Hallfors *et al.* 2011). The control group ($N = 145$) received no intervention.

Human subjects protection

We obtained informed signed consent for study participation from a parent or guardian and assent from students. US and Zimbabwe institutional review boards approved all study protocols.

Design

Although participant data were collected at baseline and annually for three additional years, the design for the present study is cross-sectional. In order to include all participants, we used the most recent survey data available for each participant (85% of participants contributed data at Wave 4; 7.3% at Wave 3; 6.2% at Wave 2; and 1.5% at Wave 1). This method was especially important for including married girls who dropped out of school and rarely participated in surveys after marrying.

Measurement

Descriptions of instrument development, data collection procedures, and measures are provided elsewhere (see Hallfors *et al.* 2011 for details). Key outcome variables included: *school dropout* and *marriage*, and attitudes about *gender equity*, *waiting for sex until marriage*, and *early sex*.

Key predictor variables included *religious affiliation* based on the question: ‘What is your religion?’ (Christian, Moslem, Traditional, and No Religion); and a follow up question for Christians: ‘What is your denomination?’ Responses were re-coded as United Methodist; Catholic/Anglican; Other; Apostolic; and Traditional, which included No Religion). *Religiosity* included *religious service attendance* (‘During the past 12 months, how often did you attend religious services at a church, mosque, temple, or other place of worship?’ High attendance was ‘About once a week’ vs. other responses) and *prayer* (‘How often do you pray privately, that is, when you’re alone?’ ‘Once a day’ or ‘more than once a day’ was coded as high frequency).

2006 ZDHS data

This nationally representative survey used stratified multi-stage cluster sampling and HIV testing of eligible participants aged 15–49 years (CSO/Macro 2007). The questionnaire included information on background characteristics, religious affiliation and marriage. The 2006 survey includes data on 1303 female adolescents aged 15–19 years residing in rural Zimbabwe. Among these, two-thirds reported affiliation with one of two religious groups: Protestant ($n = 312$) or Apostolic ($n = 497$). Other religious groups were too small for meaningful comparisons on HIV infection. About 10% of female adolescents had missing HIV data, yielding a final ZDHS sample of 730 rural female adolescents for analysis.

Analyses

We first examined the characteristics of the sample related to religious affiliation, religiosity, and demographic characteristics. Next, we conducted bivariate analyses using χ^2 and ANOVA to examine the association between religious affiliation and religiosity and our study outcomes. Next, we conducted multivariable analyses using either logistic or ordinary least squares regression. *Religious affiliation* and *religiosity* were independent variables in regression analyses; intervention condition, age, and orphan type were entered as covariates. Because study participants were nested within schools when randomized to condition, we incorporated the sample design in models using survey procedures in SAS (version 9.2). Due to modest sample size, we include differences at $p < 0.10$.

For the ZDHS analyses, we ran a series of logistic regression analyses to examine a possible pathway to HIV infection. In the first model, we regressed marriage on religious affiliation, controlling for age. We then examined independent effects of marriage and religious affiliation on HIV status in separate models, controlling for age. In the final model, we included both religious affiliation and marriage to compare their relative effects on HIV status, controlling for age. All analyses were conducted using survey commands in STATA (version 8) to account for complex sampling.

Results

Manicaland province RCT data

Approximately, 28% of participants reported affiliation with the United Methodist Church and 20% with the Apostolic Church (Table 1). Seventy-four percent attended religious services weekly while 63% prayed daily. The average age of the sample was 15.3 in 2010; 48% of the girls had lost their mother to death and 91% had lost their father.

Although religious service attendance was not associated with religious affiliation, prayer frequency was, with Methodist girls most likely and Traditional girls least likely to pray frequently (Table 2). Methodists were least likely to drop out of school while Traditional girls were most likely. Catholics/Anglicans were least likely to marry and Apostolics most likely. There were no differences on waiting to have sex until marriage; on average, orphan girls of all denominations either agreed or strongly agreed. Marginally significant differences were found on disagreement with early sex, with Methodists most likely to strongly disagree and Traditional least likely. Methodist girls were most likely to agree with gender equity attitudes while Traditional girls were least likely.

Affiliation with either the Apostolic Church or Traditional, compared to Methodist, raised the risk of school dropout by more than threefold, although associations were only marginally significant (Table 3). Religious service attendance and daily prayer greatly reduced the odds of school dropout, as did the intervention. Age, on the other hand, greatly increased the odds of dropout with each additional year.

Apostolic affiliation significantly increased the odds of marriage by more than fourfold (OR = 4.57) compared to Methodist affiliation (Table 3). Traditional or No Religion increased the odds of marriage by more than threefold but the association was only marginally significant. Daily prayer, but not religious service attendance,

Table 1. Characteristics of the sample of orphan girls in Manicaland, Zimbabwe (N = 328).

Characteristic	N (%) or Mean (standard deviation)
<i>Religious affiliation</i>	
United Methodist	93 (28.4)
Catholic and Anglican	44 (13.4)
Anglican	28 (8.5)
Catholic	16 (4.9)
Other:	114 (34.8)
Non-specified Christians	70 (21.3)
Seventh-Day Adventist	22 (6.7)
Baptist	5 (1.5)
Pentecostal	10 (3.1)
Jehovah's witness	1 (0.3)
Muslim	6 (1.8)
Apostolic	67 (20.4)
Traditional/No religion	10 (3.1)
Traditional	7 (2.1)
No Religion	3 (0.9)
<i>Religious service attendance in the past 12 months</i>	
Never	28 (8.5)
About once a month	56 (17.1)
About once a week	244 (74.4)
<i>Prayer frequency</i>	
One or more times per day	208 (63.4)
<i>Age at 2010 survey (range 13–19 years)</i>	
	Mean = 15.3 years (SD = 0.94)
<i>Orphan status</i>	
Paternal orphan	172 (52.4)
Maternal orphan	30 (9.2)
Double-orphan	126 (38.4)

Note: Data shown in the table were primarily derived from the Wave 4 (2010) survey; however, for participants missing at Wave 4, their most recent survey data were used.

was marginally associated with a 53% decrease in the odds of marriage. The intervention also decreased the odds of marriage by almost half, but this association was no longer significant. Age more than doubled the odds of marriage with each additional year, and this association was highly significant. Orphan type showed no association with either outcome.

As shown in Table 4, there was little variation in agreement with waiting for sex until marriage. Only religious service attendance was marginally and positively associated. Traditional and 'Other' groups were less likely than Methodists to disagree with early sex. Frequent prayer increased disagreement with early sex, and this association was strongly significant. Although those in the intervention group were more likely to disagree with early sex, the association was not significant. Age and orphan type were not related to attitudes about early sex.

Frequent prayer was strongly associated with gender equity. Apostolic and Traditional affiliates were marginally less likely than Methodists to agree with gender equity attitudes.

Table 2. Frequencies and means of religiosity and study outcome measures by religious affiliation.

Religious affiliation	Religiosity measures			Outcome measures			
	Religious service attendance once a week or more	Prayer once or more per day	Dropped out of school	Ever married	Agree with waiting to have sex until marriage	Disagree with early sex	Agree with gender equity
	n (%)	n (%)	n (%)	n (%)	Mean	Mean	Mean
United Methodist	69 (74.2)	72 (77.4)	9 (9.7)	6 (6.5)	4.09	4.58	3.33
Catholic & Anglican	34 (77.3)	31 (70.5)	5 (11.4)	1 (2.3)	4.25	4.49	3.26
Other	83 (72.8)	66 (57.9)	17 (14.9)	7 (6.1)	3.82	4.41	3.03
Apostolic	53 (79.1)	36 (53.7)	22 (32.8)	21 (31.3)	3.97	4.36	2.95
Traditional/No religion	5 (50.0)	3 (30.0)	4 (40.0)	3 (30.0)	3.50	3.92	2.44
Number or average	244 (74.4)	208 (63.4)	57 (17.4)	38 (11.6)	3.98 (SD = 1.59)	4.45 (SD = 0.82)	3.11 (SD = 0.97)
χ^2 and F-test (p-value)	$\chi^2 = 4.3$ ($p = 0.37$)	$\chi^2 = 17.8$ ($p = 0.001$)***	$\chi^2 = 20.1$ ($p = 0.001$)***	$\chi^2 = 38.3$ ($p = < 0.001$)***	$F = 0.91$ ($p = 0.46$)	$F = 2.06$ ($p = 0.09$)*	$F = 3.44$ ($p < 0.01$)***

* $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$.

Table 3. Multivariable logistic regression models for school dropout and marriage.

	Dropped out of school		Ever married	
	AOR (significance)	CI	AOR (significance)	CI
<i>Religious affiliation (ref = Methodist)</i>				
Catholic, Anglican	0.63 (0.42)	0.2–2.0	0.22 (0.22)	0.0–2.6
Other	1.26 (0.64)	0.5–3.3	0.74 (0.62)	0.2–2.4
Apostolic	3.15 (0.10)*	0.8–12.7	4.57 (0.01)**	1.4–15.0
Traditional & No Religion	3.45 (0.08)*	0.8–14.4	3.66 (0.08)*	1.1–15.3
<i>Religiosity</i>				
Religious service attendance	0.45 (0.02)**	0.2–0.8	0.61 (0.26)	0.3–1.5
Prayer	0.38 (0.004)***	0.2–0.7	0.47 (0.06)*	0.2–1.0
<i>Covariates</i>				
Intervention (ref = control)	0.27 (0.002)***	0.1–0.6	0.52 (0.12)	0.2–1.2
Age	2.77 (<0.002)***	1.7–4.4	2.44 (0.002)***	1.6–3.8
Orphan type (Maternal/double vs. paternal)	1.74 (0.24)	0.7–4.1	0.92 (0.90)	0.3–2.9

AOR, adjusted odds ratios.

Two-tailed test: * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$.

ZDHS data

The average age of the ZDHS sample was 16.9 years. As shown in Table 5, when we regressed marriage by religious affiliation, controlling for age, the odds of early marriage for an Apostolic young woman were almost four times that of a Protestant young woman. When we regressed HIV status by marriage, controlling for age, marriage increased the odds of HIV infection by 2.37 (CI: 1.30–4.33; $p < 0.01$; data not shown). Regressing HIV status by religious affiliation, controlling for age, we

Table 4. Multivariable ordinary least squares (OLS) models for attitude outcomes.

Religious affiliation (ref = Methodist)	Agree with waiting for sex until marriage	Disagree with early sex	Agree with gender equity
	Coefficient (significance)	Coefficient (significance)	Coefficient (significance)
Catholic & Anglican	0.20 (0.46)	0.02 (0.88)	-0.02 (0.90)
Other	-0.20 (0.48)	-0.14 (0.04)**	-0.22 (0.22)
Apostolic	-0.07 (0.84)	-0.13 (0.26)	-0.28 (0.06)*
Traditional & No Religion	-0.31 (0.54)	-0.24 (0.04)**	-0.58 (0.08)*
<i>Religiosity</i>			
Religious service attendance	0.42 (0.09)*	0.03 (0.74)	0.15 (0.22)
Prayer	0.30 (0.18)	0.41 (0.002)***	0.35 (0.006)***
<i>Covariates</i>			
Intervention	0.03 (0.84)	0.14 (0.14)	0.15 (0.20)
Age	-0.06 (0.46)	-0.03 (0.64)	-0.04 (0.26)
Orphan type (Maternal/ Double vs. Paternal)	-0.15 (0.32)	0.06 (0.54)	0.06 (0.64)

Two-tailed test: * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$.

Table 5. Multivariable logistic regressions for marriage and HIV status using ZDHS data (N = 730).

	Marriage		HIV status	
	AOR (significance)	CI	AOR (significance)	CI
<i>Religious Affiliation (ref = Protestant)</i>				
Apostolic	3.72 (0.00)***	2.09–6.61	1.88 (0.13)	0.83–4.28
<i>Marriage (ref = Never Married)</i>				
Ever married			2.01 (0.02)**	1.11–3.63
<i>Covariates</i>				
Age	2.25 (0.00)***	1.82–2.78	1.33 (0.18)	0.87–2.04

Two-tailed test: * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$.

found that Apostolic faith increased the odds of HIV infection by 2.25 (CI: 0.98–5.17; $p < 0.10$). Entering both religious affiliation and marriage into the HIV model (Table 5), the adjusted odds ratio for Apostolic religious affiliation dropped to 1.88 and was no longer significant, while the adjusted odds ratio for marriage dropped to 2.01 and remained significant ($p < 0.05$).

Discussion

Our combined analyses suggest that affiliation with the Apostolic Church greatly increases the likelihood of early marriage, and early marriage increases the risk of HIV infection for rural young women. In our clinical trial sample, Apostolic faith membership increased the risk of early marriage by more than four times that of the Methodist Church, a denomination of Christian Protestantism that is particularly common in our study area. Similarly, the ZDHS data estimated that rural Apostolic young women were almost four times as likely to marry during adolescence compared to Protestants, and that there is a strong association between early marriage and HIV infection among these two groups of rural young women. Contrary to the Gregson *et al.* (1999) study findings, the ZDHS offers little evidence to suggest that Apostolic restrictions against sex outside marriage protect young women from HIV infection, compared to Protestant denominations.

As we hypothesized, Apostolic as well as Traditional/No Religion participants were less likely than Methodists to agree with gender equity attitudes, although associations were marginally significant. These findings, along with our marriage and school dropout outcomes, suggest that Apostolic faith participants share important commonalities with Traditional participants. Both groups espouse indigenous belief systems that rely on faith healing rather than medical testing and treatment (January and Sodi 2006, PEPFAR 2010). Of relevance to HIV prevention is whether young Apostolic married women are less likely to access HIV testing and treatment in pregnancy to prevent mother to child transmission.

Our data suggest that religion has high salience among rural Zimbabwean orphan teenage girls, of whom the great majority affiliated with a Christian denomination and reported regular religious practices. As expected, most girls favored waiting for sex until marriage, and these attitudes were marginally stronger among the more religious. Surprisingly, higher religiosity also increased gender

equity attitudes, and decreased early marriage and school dropout. Frequent prayer, in particular, had a protective effect on HIV-related behaviors and attitudes. Methodist, Catholic, and Anglican churches appear to foster frequent prayer more than other denominations.

Our school support intervention greatly reduced the likelihood of dropping out of school, but the association with marriage was reduced after three years and not significant (see in comparison, Hallfors *et al.* 2011). By the end of 2010, 8.7% of the intervention group and 15.2% of the control group were married. Of the married, 63% of the intervention group and 50% of the control group were Apostolic, a sect that made up just 20% of the sample. Intervention effects on marriage appeared to erode over time as Apostolic affiliation and age exerted increasingly strong influence.

Findings strongly indicate the need for further research. The ZDHS findings were particularly surprising because of the seminal paper by Gregson *et al.* (1999) and the paucity of subsequent scholarly research on HIV and the Apostolic Church in Zimbabwe. For example, little is known about differences in health and marriage practices among the many individual Apostolic sects. Such research is critical to address the potential for a new emergence of HIV risk among young women and their children in this growing and diverse group. More research is also needed on the mechanisms by which prayer might foster HIV protective attitudes and behaviors.

There are several study limitations. First, our strategy of using data from earlier survey time points to include the 15% of the sample who did not have survey data at Wave 4 may have introduced unknown bias. However, we believe the benefits of including all (and particularly all married) participants in the analyses outweighed the limitations. Second, because we lacked HIV biomarker data in our study, we used the ZDHS data meta-analytically to examine the relationship between religious affiliation and HIV prevalence among rural young women. We were not able to differentiate prevalence by orphan status because ZDHS does not specify orphan status for participants over 17 years. Given the overall higher HIV prevalence among orphan compared to non-orphan girls, these findings warrant additional investigation. Third, the 'Other Non-specified Christian' group was large and may have included some who categorized themselves as 'Other' rather than 'Apostolic' because of the particular sect's unique name. Likely diversity within the group suggests that these associations be considered with caution.

Our findings indicate that the religious context should be considered when evaluating HIV prevention interventions. The assumption that Apostolic Church members have lower HIV prevalence because of religious teachings regarding marriage must be further examined to meet the changing realities of the deadly HIV epidemic. Although keeping orphan girls in school is a very promising HIV prevention intervention, our quantitative analyses point to the urgent need for qualitative studies aimed at deeper understanding of the cultural contexts that shape behavior, along with their implications for health policy and practice.

Key messages

- Apostolic faith affiliation increased the risk of early marriage by more than fourfold for orphan girls, and overrode our school support intervention over time.

- ZDHS data confirmed that young Apostolic women are much more likely than Protestants to marry during their teen years and that marriage for both groups doubled the odds of becoming infected with HIV.
- This contradicts an earlier seminal study suggesting that Apostolics were relatively protected from HIV. Further study is urgently needed, because the Apostolic Church is a large and growing denomination and many Apostolic sects discourage medical diagnoses and treatment in favor of faith healing; this could increase the risk of undiagnosed HIV infection among young women and their children.

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