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THE IMPACT AND COST OF CHILD MARRIAGE PREVENTION IN THREE AFRICAN SETTINGS

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The Population Council confronts critical health and development issues—from stopping the spread of HIV to improving reproductive health and ensuring that young people lead full and productive lives. Through biomedical, social science, and public health research in 50 countries, we work with our partners to deliver solutions that lead to more effective policies, programs, and technologies that improve lives around the world. Established in 1952 and headquartered in New York, the Council is a nongovernmental, nonprofit organization governed by an international board of trustees.

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The Impact and Cost of Child Marriage Prevention in Three African Settings. Visit <http://www.popcouncil.org/ChildMarriageAfrica> for a report and brief and also country reports on Burkina Faso, Ethiopia, and Tanzania.

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Summary

Child marriage affects a significant proportion of girls in developing countries. Girls in sub-Saharan Africa are disproportionately affected; by 2050, half of the girls married during childhood will reside in Africa (UNICEF, 2015). The negative consequences of the practice are both numerous and powerful, spanning health, welfare, development, and demographic domains. Yet, there is limited evidence on what works to delay child marriage in different cultural contexts and even less information on programmatic cost. This study develops and tests the most effective and minimum basic package approaches to delay marriage among older and younger adolescent girls in different African settings. In each study country, we tested four approaches: 1) community sensitization to address social norms, 2) provision of school supplies to encourage retention in school, 3) a conditional asset transfer to girls and their families, and 4) one study area that included all the approaches. The study was undertaken in rural areas of Burkina Faso, Ethiopia, and Tanzania and evaluated using separate cross-sectional studies among girls aged 12 to 17 and parents in the study areas. The study also estimates the cost to implement different approaches, as well as cost-effectiveness. The study aims to provide information on how best to design programs that are scalable and sustainable within poor settings, and which can provide support for the millions of girls in developing countries at risk of child marriage.

Background

Child marriage—defined as marriage before age 18—is prevalent in rural locations (as opposed to urban areas) which are characterized by high rates of poverty, low levels of development, and limited school and work opportunities (UNICEF, 2001, Lloyd, 2005). It is estimated that over 100 million girls will be married during their childhood or adolescence in the next decade, and roughly 14 million will be married by age 15 (Bruce, 2005).

The impact of child marriage is far-reaching and varied. Child marriage is associated with increased total fertility and contributes significantly to population momentum (Raj et. al, 2009, Bruce and Bongaarts, 2009). A review of data from Demographic and Health Surveys (DHS) from 51 countries found that 90 percent of first births to mothers under age 18 took place within the context of marriage, and not to unwed mothers, as is often assumed (Haberland et. al, 2005). Childbearing frequently follows child marriage, with early first births being the most risky. Pregnancy and delivery complications are the main reasons for death among girls aged 15–19. Girls who bear children before the age of 15 are five times more likely to die of pregnancy-related causes compared to older mothers (Murphy and Carr, 2007). Studies in some settings in sub-Saharan Africa suggest that girls who marry early have substantially increased risk of HIV infection, compared to their unmarried sexually active peers (Clark, 2004), with the excess risk related to frequent intercourse, limited condom use, and husbands who are significantly older and more likely to be HIV positive compared with boyfriends of unmarried girls (Clark et. al, 2006).

Girls married early usually enter marriage with low levels of education and limited knowledge and skills needed to negotiate marital roles (UNICEF, 2011). They also tend to have larger age differences with their husbands than those married later, which compromises their power within the marriage, including decisions related to family planning (FP), childbearing, and maternal, newborn and child health (MNCH) services (Mensch, Bruce and Greene, 1998). Evidence is also emerging that such girls are more likely to be victims of intimate partner violence (IPV) than women who marry later (Erulkar, 2013, Santhya et. al, 2010, Santhya et. al, 2007).

In most of the developing world, including sub-Saharan Africa, young people are increasingly marrying at later ages (Garenne, 2014). Among young women in sub-Saharan Africa, educational expansion has a relatively strong link to delay in marriage, while the link with urbanization is unclear (Mensch, Singh, and Casterline, 2005). Despite an overall trend to later age at marriage, certain social, political, economic or environmental shocks can be associated with reversals of this trend. For example, rates of child marriage among Syrian refugees in Jordan were found to be increasing, perhaps as a household strategy to ensure the safety of girls or alleviate household economic stresses (UNICEF, 2014).

The state of the evidence on child marriage prevention programs

Most child marriage prevention programs remain at a small-scale and unevaluated. In 2012, Lee-Rife and colleagues undertook a systematic review of evaluated child marriage interventions in developing countries. Among the 23 evaluated programs, only four focused on preventing child marriage as the primary objective and only five studies were undertaken in sub-Saharan Africa. While evidence was limited, the review found that the most effective approaches in delaying child marriage were those that offered incentives and those that were directed at and empower girls directly. More recent reviews by Hindin and Fatusi (2014) and Kalamar, Lee-Rife and Hindin (2016) explored both published and grey literature evaluations of child marriage prevention. Both reviews found most of the successful programs included a conditional cash transfer or other provisions to allay the cost of schooling such as provision of school supplies, findings which essentially support those of the earlier review (Hindin and Fatusi, 2014, Kalamar, Lee-Rife and Hindin, 2016).

Conversely, a more recent study in Haryana State, India, evaluated a cash transfer program entitled *Apni Beti Apni Dhan* (Our Daughters, Our Wealth). Through a government scheme implemented in the 1990s, mothers were given a small cash disbursement at the birth of a daughter, and promised a savings bond in the name of the girl when she turned 18, totaling US\$380, on the condition that she

was unmarried on her 18th birthday. The evaluation of the program showed no impact on the probability of girls being married before the age of 18. However, results suggested that beneficiaries were more likely to marry at the exact age of 18, perhaps using the cash payout to support their marriage payments (Nanda et. al, 2016). The absence of impact may also be attributed to the absence of messaging intentionally related to social norms change and the value of girls in the context of the cash transfer program. Poor implementation of the scheme could also have contributed to the lack of impact, with some final payouts falling short of the amount initially promised to beneficiaries.

In recent years, programs other than cash transfer schemes have also shown promise. In Bangladesh, a randomized evaluation of the BALIKA program (Bangladeshi Association for Life Skills, Income, and Knowledge for Adolescents) that tested the impact of educational support, gender training, and livelihoods training showed that girls residing in BALIKA communities were one-third less likely to be married and more likely to be attending school (Amin et. al. 2016). Findings suggest that providing girls with education, life-skills training, or livelihoods trainings can be effective in delaying the age at marriage after just 18 months of intervention.

Berhane Hewan Ethiopia

One of the evaluations featured in the systematic review (Lee-Rife et. al, 2012) is the *Berhane Hewan* program in the Amhara region of Ethiopia. Meaning “Light for Eve” in Amharic, the *Berhane Hewan* program was a collaboration between the Population Council and the Ethiopia Ministry of Youth and Sports. The program was designed both to support married girls and prevent child marriage and was based on formative research and discussions with commu-

nity members and other stakeholders. This was a multi-component package that included 1) community conversations to address social norms related to child marriage, 2) provision of school supplies to encourage school enrollment and thereby protect girls from marriage, 3) a conditional asset transfer, promising girls and their families a goat if the girl remains unmarried and in school, and 4) girls’ groups led by adult female mentors. Most of the beneficiaries in the girls’ groups were married girls who learned about life skills, family planning, and other reproductive health topics. The program had a quasi-experimental research design. After two years of intervention, girls aged 10 to 14 in the Berhane Hewan site were one-tenth as likely to be married and three times more likely to be in school, compared to girls residing in the control area. There was no impact of the program on marriage age among girls aged 15 to 19. However, married girls were three times more likely to be using family planning, compared to their counterparts in the control area (Erulkar and Muthengi, 2009).

Given the success of Berhane Hewan in delaying marriage age, it was anticipated that partners would scale-up the approach to other locations in Ethiopia where child marriage was prevalent. However, partners questioned the feasibility of upscaling the project, given its multi-component design and wanted more information about the costs associated with scaling-up the program over larger populations (Muthengi and Erulkar, 2011). In fact, most impact evaluations of community-based programs lack rigorous costing data. This is a particular weakness of cash transfer schemes as programmatic cost would affect the ability to scale-up successful interventions for large populations. For example, despite the successful impact of Berhane Hewan, there were lingering doubts about the scalability of providing a \$25 goat to families (amounting to \$1 per month for the two-year pilot), an amount which could not be justified in the absence of rigorous costing data. Interventions such as the Zomba scheme in Malawi offered households a conditional cash transfer of between \$4 to \$10 per month and girls between \$1 to \$5 dollars per month (Baird et. al, 2012). While Zomba was found to reduce school drop-out by roughly 40 percent, it is unclear if such schemes can be feasibly scaled-up to large populations in poor countries, given the monthly expense and the magnitude of payments.

As a result, the Population Council and our partners designed a second generation of research related to child marriage prevention. We sought to examine if simplified interventions could be effective in delaying marriage in

sub-Saharan African locations where child marriage was prevalent. In this phase, we adapted the interventions used in the original Berhane Hewan project, but implemented them separately in different geographical areas, with the intention of isolating the specific impact of minimum-basic package interventions. During this iteration of the research, costing data was collected on all interventions, and the program was expanded to other locations in sub-Saharan Africa where child marriage is prevalent: Amhara region, Ethiopia, Tabora region, Tanzania, and Cascades province, Burkina Faso. This report outlines the results of the research in all three countries.

Study Locations

The study took place in rural areas of Burkina Faso, Ethiopia, and Tanzania. These countries were selected to represent the range of geographies, patterns of marriage, and cultural practices in Africa.

Burkina Faso is a francophone West African country where the prevalence of child marriage is the 8th highest in the world (52 percent married by age 18) (UNICEF, 2013). Polygamous unions are not uncommon and age differences between married girls and their husbands can be significant. The Cascades Region is one of 13 administrative regions in Burkina Faso and borders Cote d'Ivoire and Mali. The region has a population of nearly 525,000, is largely agricultural, and has cotton as a major economic activity. According to the 2010 Demographic and Health Survey (DHS) for Burkina Faso, 58 percent of girls in Cascades region were married by their 18th birthday and 10 percent were married by age 15.¹ Sixty-four percent of girls in Cascades Region have never been to school and only 15 percent attain the secondary level. The Population Council partnered with the Association Munyu des Femmes de la Comoé, a local nongovernmental organization, to implement the interventions at the community level. Association Munyu's mission is to contribute to improving the status of women and the welfare of mothers and children.

Ethiopia, in the horn of Africa, is the country with the 18th highest level of child marriage, globally. Until recently, arranged marriage had been nearly universal, and there are very high levels of very early child marriage, before the age of 15. The Amhara region in Ethiopia is the second largest region in the country with an estimated population of 21 million. The region is 88 percent rural and largely relies on agriculture, producing cereals such as teff, barley, wheat, and maize. The region is dominated by ethnic Amhara and is overwhelmingly Orthodox Christian. Overpopulation leading to shortage of land, land degradation, and drought are recurrent problems in the region. Based on tabulations of 2011 Ethiopia DHS, 60 percent of Amhara girls were married by age 18 and 34 percent were married by age 15.

Among girls aged 20 to 24, 64 percent have never been to school and only 7 percent have attained the secondary level. In the Amhara region, we partnered with the Amhara Regional Bureau of Women, Children and Youth Affairs, which is the regional bureau of the Ethiopian Ministry bearing the same name.

In East Africa, child marriage in Tanzania represents a mix of both arranged and chosen marriage, and takes place in settings of significant HIV prevalence and levels of gender-based violence. Tabora region is located in central-western Tanzania and is one of the country's 30 regions. It has a population of over 2.2 million and is one of the largest geographical regions in the country. Tabora households have an average of 6 members, the third highest in the country. Tabora is largely agricultural, with crops including groundnuts, cotton, and tobacco. Tobacco is a major economic activity in the region, with large proportions of farmers engaged in production. Tobacco growing is also said

¹ Among females 20 to 24.

to be harmful to the environment (Mangora, 2012). Based on the 2010 Tanzania DHS, 63 percent of Tabora girls are married by age 18 and 16 percent are married by age 15. Among girls 20 to 24, 42 percent have never been to school and only 9 percent have reached the secondary level. In Tabora, we partnered with Tabora Development Foundation Trust (TDFT) for implementation, an NGO founded in 2001 with expertise in working with rural populations including addressing child labor in the tobacco industry, prevention of HIV/AIDS and malaria, water, sanitation, and hygiene promotion, and advocacy programs on child rights and support to most vulnerable children. We also partnered on the research with the National Institute of Medical Research (NIMR) in Tabora region.

Trends in the levels of child marriage in study countries vary considerably. Analysis of the two most recent Demographic and Health Surveys (DHS) for all three countries suggests a strong decline in child marriage in the Amhara region of Ethiopia, compared to an increase in the practice in both Cascades, Burkina Faso and Tabora, Tanzania (Table 1). Marriage to girls under 15 declined dramatically in Amhara between 2005 and 2011, by 32 percent; likewise, mar-

riage to girls under 18 declined by 26 percent. Conversely, between the last two DHSs, marriage to girls under 15 in Cascades, Burkina Faso more than tripled, from 2 to 10 percent; and marriage to girls under 15 in Tabora, Tanzania more than doubled, from 7 to 16 percent. This is suggestive of worsening conditions for girls in these two locations, compared to girls in the Amhara region, particularly for the youngest adolescents below the age of 15. Likewise, between the last two DHS surveys, mean age at marriage among girls in Ethiopia increased slightly, but declined in both Burkina Faso and Tanzania. At the same time, the more recent DHS for Tanzania (2015-16) suggests a decline in child marriage in Tabora region. While sample sizes are low (roughly 100 Tabora respondents aged 20 to 24), according to the most recent DHS, 46 percent of young women in Tabora were married by age 18 and 9 percent by age 15.

TABLE 1: Percent of females 20 to 24 who are married by age 15 and by age 18, and mean age at marriage, in Cascades, Burkina Faso, Amhara, Ethiopia, and Tabora, Tanzania, by DHS survey

Cascades region, Burkina Faso	BFDHS (2003)	BFDHS (2010)	Percent change
Married by age 15	2.4	9.9	+313%
Married by age 18	48.2	57.7	+20%
Mean age at marriage	17.2	17.0	–
Amhara region, Ethiopia	EDHS (2005)	EDHS (2011)	Percent change
Married by age 15	49.7	33.9	–32%
Married by age 18	80.1	59.5	–26%
Mean age at marriage	16.3	16.6	–
Tabora region, Tanzania	TDHS (2004)	TDHS (2010)	Percent change
Married by age 15	7.4	15.7	+112%
Married by age 18	60.6	62.7	+3%
Mean age at marriage	17.5	17.3	–

Methodology

This study tested and costed minimum-package interventions to delay the age at marriage in three rural African settings. The study aimed to identify the most simple and minimum package needed to prevent child marriage in sub-Saharan Africa and with the potential to be scaled-up to large populations and geographical areas. We implemented different child marriage prevention strategies derived from the earlier Berhane Hewan program, in different geographical areas of the study regions of the three countries. In each country, one approach addressed social norms change related to child marriage through community dialogue from meetings and discussions about the practice. Another intervention provided unmarried girls aged 12 to 17 with school materials, on the conditions that they remained unmarried and in school to encourage school attendance. The third intervention was a conditional asset transfer in the form of livestock, offered in another geographical area, conditional on the 12-to-17-year-old girl remaining unmarried and in school. A fourth area offered all components: community meetings and discussions, school supplies, and an asset transfer, while a fifth area served as the control area where no intervention took place.

This was a quasi-experimental study design with cross-sectional baseline and endline surveys undertaken among girls aged 12 to 17 and a smaller sample of parents before the interventions and after roughly two years of implementation. These surveys were used to measure population-level changes in child marriage and school attendance associated with the interventions, using the control to measure changes that would have taken place without the interventions. In addition, qualitative assessments and routine monitoring data in each country was conducted to understand contextual factors around implementation. Table 2 provides an overview of the intervention and study design.

TABLE 2: Summary of research and intervention design, by country

	BURKINA FASO	ETHIOPIA	TANZANIA
Location	Cascades region	Amhara region	Tabora region
Interventions tested			
Community dialogue/sensitization	Discussion groups with a cross section of men, women, adolescent males and females. Groups of 30 met for 16 weeks to discuss child marriage and devise strategies to address it. Groups were led by a trained facilitator using a set manual.	Discussion groups with a cross section of men, women, adolescent males and females. Groups of 70 met for 16 weeks to discuss child marriage and devise strategies to address it. Groups were led by a trained facilitator using a set manual.	Local community and religious leaders were trained on issues related to child marriage. Trained leaders included messages about child marriage in weekly talks. Leaders used a set manual to guide content.
Promotion of schooling	Girls receive school supplies and fees on the condition that they remain unmarried and in school during the intervention. Girls are provided with 8 notebooks, 2 pens, 1 pencil, angle bracket, ruler, and compass, and \$3.50 in school fees. Materials and fees can be applied to formal or nonformal schooling. Given once per year at the beginning of the school year.	Girls receive school supplies on the condition that they remain unmarried and in school during the intervention. Girls are provided with 12 notebooks and 2 pens. Materials are used for formal schooling. Given twice per year at the beginning of each semester.	Girls receive school supplies or a school uniform on the condition that they remain unmarried and in school during the intervention. Girls are provided either with a uniform or with 8 notebooks, 3 pens, 1 pencil, and 1 mathematical set. Materials can be applied to formal or nonformal schooling. Given once per year at the beginning of the year. Girls are encouraged to attend Smart Girls' Clubs, for in-school life skills and tutoring.
Conditional asset transfer	Girls and their families are offered a goat on the condition that they remain unmarried and in school during the intervention. Award is made at the end of the intervention.	Girls are offered chickens on the condition that they remain unmarried and in school during the intervention. Two chickens are awarded after year 1 and, again, after year 2.	Girls and their families are offered a goat on the condition that they remain unmarried and in school during the intervention. Award is made at the end of the intervention.
Comprehensive model	All interventions above	All interventions above	All interventions above
Control	No intervention	No intervention	No intervention
Intervention areas	Commune	Woreda/district	Ward
Period of intervention	27 months	28 months	28 months
Research and evaluation			
Impact evaluation	Population-based baseline and endline surveys of girls 12 to 17 and parents of girls. Study undertaken in five study cells at each round of survey. 500 girls sampled in each cell.	Population-based baseline and endline surveys of girls 12 to 17 and parents of girls. Study undertaken in five study cells at each round of survey. 500 girls sampled in each cell.	Population-based baseline and endline surveys of girls 12 to 17 and parents of girls. Study undertaken in five study cells at each round of survey. 500 girls sampled in each cell.
Costing study	Intervention costs documented and tracked prospectively.	Intervention costs documented and tracked prospectively.	Intervention costs documented and tracked prospectively.
Other studies	In-depth interviews among girls to understand experience of child marriage.	In-depth interviews among girls to understand experience of child marriage.	In-depth interviews among girls to understand experience of child marriage.
	Rapid qualitative studies during supervisory visits.	Mid-term qualitative study among girls, mentors, and parents to understand project perceptions.	Endline focus groups among girls and parents to understand perceptions of the project.
	Management information system of registered girls.	Management information system of registered girls.	Management information system of registered girls.

Interventions tested

Three different interventions were tested to delay the age at marriage among unmarried girls: community dialogue or sensitization, promotion of schooling, and a conditional asset transfer. In each country, these interventions were implemented in different geographical locations. In a fourth location, all three interventions were implemented and in the fifth location, no intervention was implemented to serve as a control site. The interventions were similar from country to country, but were not identical. Modifications were made based on the experiences and preferences of implementing partners as well as local circumstances.

Addressing social norms change through community dialogue and sensitization

Approaches to community engagement differed in Burkina Faso and Ethiopia compared to Tanzania. The approaches used in Burkina Faso and Ethiopia were relatively more systematic compared to what was implemented in Tanzania. For this reason, we refer to the approach used in Burkina Faso and Ethiopia as community dialogue, whereas that used in Tanzania as community sensitization.

In Burkina Faso and Ethiopia, community facilitators were recruited from the project communities, in collaboration with the local implementing partners. Facilitators were trained for five days using a facilitation manual. The manual contained information on facilitation techniques as well as on child marriage and girls' education. After training, facilitators mobilized community discussion groups composed of a cross-section of the community: adult males, adult females, adolescent males, and adolescent females. In Burkina Faso, the community groups were composed of about 30 members; in Ethiopia, groups were composed of about 70 members.² Community groups were taken through a 16-week curriculum that included both educational and action-oriented sessions. Educational sessions provided information on the negative impact of early marriage and the value of girls' education. The action-oriented sessions provided a space for group members to devise homegrown solutions to child marriage and develop strategies to address it. Strategies could include house-to-house campaigns or systems of punishment or reward for community

members. Following the completion of the four-month period, groups could continue to meet on their own, if they so wished. However, facilitators move to additional areas to form new discussion groups.

In the community sensitization locations in Tanzania, community and religious leaders were trained for two days on the range of benefits of delaying marriage and promoting girls' education. A facilitator's guide was used to guide training and the delivery of messages. Leaders were trained on how to facilitate discussions and deliver messages on child marriage during village meetings or religious services. Local leaders delivered weekly messages in their villages or places of worship. As well, during market days, project staff from the local NGO partner, TDFT, disseminated information on the benefits of delaying marriage. In contrast to the approach in Burkina Faso and Ethiopia, the community sensitization did not include sustained and systematic contact with community members, but rather ad hoc contact with community members who attended community or religious meetings.

Promoting schooling and provision of school supplies

Unmarried girls aged 12 to 17 were eligible to register for schooling promotion. Both in-school and out-of-school girls were eligible, with out-of-school girls encouraged to return to school or join nonformal education, where available. In school promotion locations of study countries, community-based mentors who were recruited and trained by the proj-

² The community sensitization in Burkina Faso and Ethiopia was loosely based on the “community conversation” technique developed in Ethiopia to address social norms related to FGM and HIV/AIDS. This technique’s design includes 70 community members in the groups. See, for example, HAPCO/MOH (2007).

ect identified eligible girls by going house-to-house. Once identified, project staff explained the scheme to girls and parents/guardians in the household and invited them to register for the scheme at a central location on a designated day. These explanations of the scheme were scripted so that information about the school promotion scheme was complete and standard across households. On the designated day of registration, both the registering girl and her parent/guardian would sign the registration form, taking school materials with the agreement that the girl would remain unmarried and in school for the duration of the pilot. Girls were expected to attend at least 80 percent of school days—or an average of at least four out of five school days in a week. Enrolled girls and their families agreed that the project could review attendance records of enrollees. Once it was confirmed that a girl had attended a minimum of 80 percent of school days and remained unmarried, she was given her subsequent allocation of supplies.

The material support and frequency of support differed by country. In Ethiopia, girls received 12 notebooks—1 for each subject—and 2 pens, twice per year. In Burkina Faso and Tanzania, girls were supplied only once per year, at the beginning of the school year. In Burkina Faso, registered girls received 8 notebooks, 2 pens, and 1 pencil, an angle bracket, a ruler, and a compass. In addition, they received a subsidy for school fees equivalent to \$3.50. In Tanzania, girls were given the choice of receiving a school uniform or school supplies. The school supplies included 8 exercise books, 3 pens, 1 pencil, and 1 mathematical set.

In addition, in Tanzania, school-going girls were encouraged to attend “Smart Girls’ Clubs,” which were set up by the project. Two female teachers per school—one of which was in charge of guidance and counselling—were trained to be “Smart Girls’ Clubs” facilitators. Club meetings were held twice per month and members covered topics such as self-esteem and communication, boy–girl relationships and risky situations, HIV/AIDS, family planning, menstruation, gender issues, and financial literacy. The clubs were also used as a place to do homework and receive additional tutoring from teachers.

Conditional asset transfer

As in the schooling arm of the study, girls were recruited for the conditional asset transfer through community-based mentors going house-to-house to identify unmarried girls aged 12 to 17. Girls and their parents/guardians were sensitized on the scheme through a scripted narrative and asked

to come to a central registration site on a specified day, if they wanted to enroll.

The type of asset offered and the frequency of reward varied by country. In Burkina Faso and Tanzania, families and girls were provided with a goat if the registered girls remained unmarried and in school throughout the intervention period. A goat was preferred because project partners perceived that such an asset would be sufficiently motivating to influence behavior change in project communities. In Ethiopia, the conditional transfer offered to girls was two high-yield chickens provided each year on the condition that the girl remained unmarried and in school during the previous year. Chickens were chosen for two reasons. During the previous project in Ethiopia, Berhane Hewan, a goat was provided but seen by partners in the project to be too costly to be scalable. In addition, partners preferred to provide an asset that was traditionally reared and controlled by girls and that was easier to procure and transport at the time of award. In addition to the award of chickens, girls received training from the local agricultural extension workers on how to rear chickens. In all three countries, girls were awarded their livestock in a public ceremony, drawing all the community members and local officials.

Comprehensive, multi-component model and control site

In all countries, one location included all the project components. Similar to the initial Berhane Hewan project, in this location, all interventions were implemented including community sensitization, school promotion, and a conditional asset transfer. Each of the countries also had a control area where no interventions took place. Interventions were implemented for 28 months in both Ethiopia and Tanzania and 27 months in Burkina Faso.

Research design

Impact evaluation

This was a quasi-experimental research design with interventions implemented in different geographical areas for just over two years. Separate, cross-sectional baseline and endline surveys were undertaken before the interventions were established and after 27 to 28 months of intervention. The sample size was calculated to detect a 10 percent-age point change in the prevalence of child marriage and adjusts for nonresponse and design effect. In each country, 2,500 girls aged 12 to 17 were sampled, 500 per intervention area, at each round of survey. In addition, a subset of

parents of adolescent girls were interviewed, 100 per area per round of survey. We interviewed parents of girls aged 10 to 17 in order to represent the views of parents toward very young adolescents, aged 10 to 12. In each study commune (Burkina Faso), woreda (Ethiopia) and ward (Tanzania), 17 enumeration areas (EAs) from the existing national sampling frame were randomly selected. Each selected EA underwent a household listing in order to establish a sampling frame. All members of the household were listed, along with basic demographic details. Once listed, all households with eligible respondents (girls aged 12 to 17 or parents of adolescent girls aged 10 to 17) were serialized and ordered. Using the random number function in SPSS, we selected 30 girls aged 12 to 17 per EA as well as six parents of adolescent girls per EA. Only one respondent was interviewed per household. Where there was more than one eligible respondent per household, we used a Kish grid to select just one respondent.

Female interviewers approached sampled respondents for a one-on-one interview. Like in the Demographic and Health Surveys, interviewers pay up to three visits to the household to locate and interview the sampled respondent. There was no replacement if the sampled respondent could not be located. The interview is conducted in a private place, out of earshot of other family members or household residents. Informed consent for the interviews was obtained from the parent or guardian of the sampled adolescent and informed assent was obtained from the adolescent girl. Where a girl was married, it was considered that she is an emancipated minor and can provide her own consent.

The questionnaire used in the study was a structured instrument covering areas such as demographic characteristics and living conditions, education, families and parent–child relationships, livelihoods, attitudes toward marriage and the experience of marriage, sexual experience, family planning, maternal and child health, and HIV and AIDS. A separate, abbreviated questionnaire was administered to younger respondents aged 12 to 14. This questionnaire omitted especially sensitive or potentially upsetting questions such as those related to violence or sexual coercion. The questionnaires were the same across countries at baseline and endline, except for country-specific modifications such as response codes for ethnic groups or religion. However, at endline, an additional section was added at the end to measure exposure to the interventions. Questionnaires for Ethiopia and Tanzania were translated into Amharic and Kiswahili, respectively, and pretested at baseline. Because

it is not common to read local languages in Burkina Faso, the questionnaire remained in French, and interviewer training included extensive time to discuss and agree upon local language translation of all items.

Completed questionnaires were transported for data entry to Population Council offices in Burkina Faso and Ethiopia and to the offices of our research partner in Tanzania, the National Institute of Medical Research (NIMR). Data entry screens were designed in Epi-data and data was transferred to SPSS for analysis. The study received ethical clearance from the Population Council's institutional review board as well as local review boards in each of the study countries.

Measures

The main outcome indicators measuring the impact of interventions was the percent of girls who had ever been married and the percent of girls in school in the current or previous year. Marriage was measured by asking the question “Have you ever been married or lived with a person as married?” followed by the follow-up confirmatory question “Have you ever been married but later divorced?” Girls who answered “yes” to either of these questions were coded as having been married and were asked a series of follow-up questions related to the timing and nature of their marriage, as well as their husband.

To indicate whether girls had attended school in the last year, we asked respondents if they had ever been to school; if they were currently in school and, if not, the age at which they left school. We used these three variables as well as the respondent's current age to construct a dichotomous variable reflecting school attendance in the previous year. We considered not only girls who were currently in school but also those who recently dropped out of school. This was because, in two of the countries—Burkina Faso and Tanzania—school supplies were only provided once per year at the beginning of the school year. Anecdotal evidence suggested that some girls in the two project countries dropped out of school in the second year of implementation after receiving their supplies and because they knew no further supplies were forthcoming. In contrast, school supplies in Ethiopia were supplied twice per year.

Multivariate models for Burkina Faso and Tanzania controlled for age, ethnicity, household assets as a reflection of socioeconomic status, and religion. Religion was not included in the Ethiopia models because the study population was nearly entirely Orthodox Christian. Household

socioeconomic status of respondents was measured based on ownership of a list of assets, derived from DHS surveys. Assets included clock or watch, radio, television, telephone (landline), mobile phone, refrigerator, solar panel, bicycle, motorcycle/scooter, animal-drawn cart, car/truck, table, chair, bed. Mattress was included as an asset in Ethiopia and Tanzania. Each of these assets were given weights varying from 1 to 5, with the larger weight indicating greater value of the asset. Hence, car/truck was given a weight of 5; motorcycle/scooter was given a weight of 4; television, refrigerator, bicycle, animal-drawn cart were given weights of 3; clock or watch, radio, telephone, mobile phone, solar panel, were given weights of 2; and table, chair, bed, and mattress were given a weight of 1. In each country, a weighted asset score was calculated after which respondents were scored as low, middle, or high economic status. For religion, a dichotomous variable was created to reflect if the respondent was a Muslim or another religion, in Burkina Faso and Tanzania.

Exposure to the interventions was measured by asking respondents, in separate questionnaire items, if they had heard of a project offering 1) community discussions, 2) school supplies, or 3) a goat/chicken. To measure exposure to schooling promotion and the conditional asset transfer, those who had heard of and reported participation were coded as having been exposed to the project. Because the community dialogue/ sensitization arm includes interventions that are targeted to both girls and the community-at-large, respondents who had either heard of or participated in community sensitization were coded as having been exposed to the project. As the intervention was targeted to the community and not necessarily intended for the girl, it is assumed that those who heard of the community dialogue/ sensitization had family and community members who had been exposed to its messages. To measure exposure to the comprehensive model, we considered only residents of the study cell who had been exposed to all three project components as having been exposed to the comprehensive model. Those who had not been exposed to all three project components were considered unexposed to the comprehensive model. Follow-up questions were asked to assess levels of exposure to the interventions such as how many times they received school materials and how many community meetings they attended.

Analysis

The analysis of the demographic characteristics is based on the unweighted sample. All other analyses were adjusted for the number of eligible females in the household to compensate for unequal probabilities of selection. Weighted numbers are reported in these tables.

Exposure to the interventions is reported for each of the respective project sites at endline. In each of the countries, one study area was engaged for each model tested, due to logistical constraints. We undertook tests of equivalence using a confidence interval approach to understand the comparability of the study cells in each country (Rusticus and Lovato 2011, Rogers, Howard and Vessey 1993). Through this approach, one assesses if intervention sites are within ± 20 percent of the control site, on various background measures. In cases where estimates fall within ± 20 percent of the estimate in the control site, sites are considered to be equivalent in terms of that characteristic. We highlight areas in which experimental sites are either equivalent or nonequivalent to the control site and control for all characteristics in the multivariate models (Appendix Tables A–C).

To estimate the impact of the interventions, we use Poisson regression to model risk ratios (RR) of having been married and having attended school in the last year, controlling for age, religion, ethnicity, and low, middle, or high socioeconomic status. We stratify analysis by younger (age 12 to 14) versus older (age 15 to 17) adolescents, given that the earlier Berhane Hewan study demonstrated that interventions may operate differently among younger versus older adolescents.

In Burkina Faso and Tanzania, separate models are presented for each intervention site, with reference to the control site. For these two countries, we present RRs and 95% confidence intervals for residence in the intervention sites versus the control site, at endline. For Ethiopia, it was necessary to eliminate the control site. Unfortunately, the control site proved to be significantly different from the interventions sites because it was a resettlement area for people from other parts of the country. As a result, the population in this area was frequently unfamiliar to each other. Marriage arrangements in Ethiopia are rooted in family ties and the desire to strengthen bonds between families who are essentially known to each other and/or neighbors. The control site included a resettled population, many of whom were strangers to each other or from different religions, inherent differences that could not be captured in the survey.

As such, the marriage market in this area was compromised and rates of marriage were extremely low and uncharacteristic of the region. These differences in the control site in Ethiopia, ascertained from qualitative assessments and in-depth interviews, were not adequately accounted for by measured variables of religion and socioeconomic status (SES) as shown in Table 5 and Appendix Table B. As a result, we model the RR of being married at endline in each of the sites, with reference to the baseline. In addition, we did not assess the child marriage outcome for girls aged 12 to 14 in Burkina Faso, due to too few cases of marriage among this age group at both baseline and endline.

In order to further investigate the effect of each of the interventions on marriage age, we also calculated RRs among girls who reported exposure to the interventions at endline. In this analysis, girls who reported not being exposed were coded as missing. This approach certainly has limitations. Those who participated in the interventions were likely to be selective of all girls in the study areas; they were probably more motivated to take part in the schemes and came from families who were more willing to delay their marriages, compared to nonparticipants. Nonetheless, the analysis can reflect the strength of our results and the confidence we should have in them.

Costing study

At the beginning of the study, an Excel spreadsheet was developed by a costing consultant to enable systematic compilation of all project costs. Cost categories included staff time, office expenditures, training and meeting costs, travel expenditure, and purchase of commodities. Costs associated with evaluation were not included. Cost data was updated in the spreadsheet on a monthly basis by Population Council staff and our in-country partners. On a yearly basis, costing data was validated by the costing consultant.

At the end of the intervention, total costs were calculated by country and model. Using data from the management information system on the number of girls served per model, we calculated the cost per girl served, per year. Cost-effectiveness was estimated by further analyzing interventions that proved to be effective in the impact evaluation. Using the risk ratio at endline, we estimated the number of marriages averted in the population served by the intervention. We divided the total cost of the intervention by the number of marriages averted to arrive at cost per marriage averted. We also estimated the cost per marriage averted for locations with a higher prevalence of child marriage, assuming the

same impact would be achieved by the intervention.

Other studies

Before starting the interventions, we conducted in-depth interviews among girls in the project sites to understand the experience of marriage in their communities. We interviewed married and unmarried girls, ranging from different levels of schooling, to create a picture of marriage in the study communities. The information helped to inform the final design of the study questionnaires.

Rapid qualitative studies were undertaken in the three countries to track community perceptions of the interventions. The timing of the studies and methodology varied in each country. In Ethiopia, a short, open-ended questionnaire was administered to girls and their parents after the first year of the project. Female interviewers conducted the face-to-face interviews in each of the project communities. Responses were recorded verbatim on the questionnaire and translated into English. In Tanzania, informal focus group discussions (FGDs) were held with parents and girls following the end of the interventions. The FGDs were held to understand the challenges and opportunities in implementing the interventions. In Burkina Faso, informal qualitative studies and field notes were taken in the course of supervision visits. Direct quotes were collected from community members in discussing the interventions.

Management information systems (MIS) in each of the countries tracked information on girls' participation in each of the study arms. When registering, basic demographic information about each girl was entered into the database, including age, school attendance, and highest year of education attained. Unfortunately, girls participating in the community sensitization arm were not registered in either Ethiopia or Tanzania. In Ethiopia, no participation records were kept related to this arm of the study; in Tanzania, community sensitization was undertaken by community leaders opportunistically, in the course of existing community meetings or religious services. MIS data was entered in each country in an Epi-data file and converted to SPSS for analysis.

Results

Participation in the interventions

Based on data from the project's MIS, more than 12,000 girls registered for the projects across the three countries. Table 3 shows the number of girls registered in each arm of the project, by country. As noted, data for community dialogue/ sensitization was not collected in Ethiopia or Tanzania, which underestimates the involvement of girls in these two countries.

In all three countries, girls aged 12 to 14 were more likely to register for the schemes compared to girls aged 15 to 17. The age imbalance in registrants was particularly pronounced in Tanzania where only 20 percent of project registrants were from the 15-to-17-year-old age group. In both Ethiopia and Tanzania, girls aged 15 to 17 were significantly less likely to register for school promotion, compared to the other arms of the study. Only 16 percent of registrants in the Tanzania schooling arm and 27 percent of registrants in the Ethiopia schooling arm were girls aged 15 to 17.

The lower participation of girls aged 15 to 17 in all countries could be related to a number of factors. First, there may be fewer eligible girls aged 15 to 17 in these rural communities compared to girls aged 12 to 14 due to the age distribution of the population. In addition, some older girls may have migrated to urban areas in search of opportunities or may be ineligible due to their marital status. Finally, families might be more reluctant to register their older adolescent girls if they are considering a marriage for them in the near future. The lower participation in the schooling promotion arms of the study may reflect that there are no schools in the vicinity for older girls to attend or that they are not seen to be of school-going age.

Sample characteristics

Tables 4, 5, and 6 show the demographic characteristics of girls interviewed at baseline in the three study countries, by study cell. Across all countries, there were significantly more respondents in the younger age group, age 12 to 14, compared to those 15 to 17, which probably reflects the true distribution in the population based on analysis of the household listings from the DHS. The vast majority of girls in

Ethiopia were in school at baseline (82 percent), compared to only 57 percent of Tanzanian girls and 47 percent of Burkinabe girls. Religious composition varied considerably between countries. The study population in Burkina Faso was predominantly Muslim (85 percent), while those in Ethiopia were overwhelmingly Christian (98 percent). There was a greater religious mix in Tanzania with about half (55 percent) being Muslim, 37 percent Christian, and 8 percent another religion.

Girls in Burkina Faso reported the highest levels of marriage and parenthood. At baseline, 18 percent of Burkinabe girls had ever been married and 9 percent already had children or were pregnant at the time of the survey. Of note, compared to the other countries, Ethiopia had a very high rate of separation or divorce (6 percent of all girls) and a very low level of parenthood (1 percent had a child or were pregnant). Tables 4 to 6 indicate background characteristics of girls surveyed at baseline in the three countries. For characteristics for which groups were not comparable, these variables were adjusted for in regression models. Equivalence testing is shown in Appendix tables A, B, and C. Appendix Tables A, B, and C detail estimates for measures of equivalence of the study sites with reference to the control site in each of the countries. Sites that were considered not comparable on specific factors were marked with an asterisk in Tables 4, 5, and 6. As a result, several factors were used in the multivariate models to control for differences between sites. Differences in the control site in Ethiopia, ascertained from qualitative assessments and in-depth interviews, were not adequately accounted for by measured variables of religion and SES as shown in Tables 5 and Appendix Table B.

TABLE 3: Number of girls registered for child marriage prevention interventions, by model, and age distribution of registrants, by country

MODEL	BURKINA FASO	ETHIOPIA	TANZANIA
Total girls registered	3,235	5,167	4,154
Community dialogue/sensitization	495	a	a
School promotion	1,055	2,020	1,617
Conditional asset transfer	732	1,353	805
Comprehensive model	953	1,794	1,732
NUMBER OF GIRLS REGISTERED BY AGE			
Age 12 to 14	2,236	3,540	3,271
Age 15 to 17	999	1,627	852

Source: Management information systems

Note: There are 31 missing cases for age, Tanzania

a = Data not available

TABLE 4: Percent distribution of girls 12 to 17 surveyed at baseline in Burkina Faso, by study cell and selected characteristics

	Control (n=504)	Community dialogue (n=321)	Education promotion (n=509)	Asset transfer (n=488)	Comprehen- sive model (n=599)	Total (n=2,421)
Age						
12 to 14	56.6	62.6*	55.4	49.4*	67.1*	58.3
15 to 17	43.4	37.4*	44.6	50.6*	32.9*	41.7
School Status						
In school	50.1	59.1*	50.8	33.0*	47.1	47.2
Out of school	49.9	40.9*	49.2	67.0*	59.9	52.8
Mean years of schooling (S.D.)	3.3 (3.8)	4.1* (3.2)	3.4 (3.1)	2.1* (2.7)	2.9* (3.1)	3.1 (3.3)
Years of schooling						
None	39.5	32.4*	41.9*	60.1*	49.0*	45.6
1 to 4	17.0	11.2*	12.5*	12.5*	9.6*	12.6
5 to 8	41.7	52.0*	42.3	26.8*	38.2	39.3
9+	1.8	4.4*	3.3*	0.6*	3.2*	2.5
Religion						
Christian	4.8	6.5*	3.7	3.3	3.5	4.2
Muslim	91.2	61.7*	92.7	87.5	82.1	84.6
Other ¹	4.0	31.8*	3.6	9.2	14.4	11.2
Ethnicity (% Senoufo)	62.6	65.4	36.1*	89.1*	83.1*	67.9
Marital status						
Never married	84.1	88.2*	80.7*	66.9*	90.9*	82.2
Currently married	15.7	11.5*	19.3*	32.9*	9.1*	17.7
Formerly married	0.2	0.3*	0.0*	0.2*	0.0*	0.1
Ever given birth or currently pregnant	9.0	6.2*	10.4*	15.8*	5.3*	9.4
Asset-based SES						
Low	51.8	28.7*	43.9*	12.5*	39.5*	36.1
Middle	29.4	38.9*	36.2*	36.1*	43.5*	36.9
High	18.8	32.4*	19.9*	51.4*	17.0*	27.0

Note: Unweighted data * = Measures as not equivalent using confidence interval tests of equivalence (Appendix Tables A, B, C)

¹ No religion or other/traditional religion

Patterns of child marriage

Table 7 shows patterns of child marriage in each of the study countries among girls who were married at baseline. The vast majority of child marriages were arranged in Burkina Faso (88 percent) and Ethiopia (93 percent). Over one-quarter of child marriages in Tanzania were chosen by girls themselves (28 percent). In all countries, a significant proportion of married girls did not know about the marriage beforehand: 74 percent in Ethiopia, 49 percent in Tanzania, and 45 percent in Burkina Faso. Whether or not girls wanted to marry at the time varies between countries. Most Ethiopian girls (76 percent) did not want to get married, compared to 34 percent of Burkinabe girls and 19 percent

of Tanzanian girls. Likewise, levels of polygamy were highly variable; 21 percent of married girls in Burkina Faso were in polygamous unions compared to 11 percent of Tanzanian girls. Only 1 percent of Ethiopian girls were in polygamous marriages.

It is noteworthy that only a minority of girls were attending school at the time of their marriage. While 43 percent of Ethiopian girls were attending, only 3 percent of Burkinabe girls and <1 percent of Tanzanian girls were attending school at the time of marriage. This is contradictory to popularly held beliefs that girls are commonly made to leave school in order to marry. This also has implications for the design of child marriage prevention programs, many of

TABLE 5: Percent distribution of girls 12 to 17 surveyed at baseline in Ethiopia, by study cell and selected characteristics

	Control (n=481)	Community dialogue (n=497)	Education promotion (n=492)	Asset transfer (n=487)	Comprehen- sive model (n=487)	Total (n=2,444)
Age						
12 to 14	63.4	62.0	55.3*	64.5	60.6*	61.1
15 to 17	36.6	38.0	44.7*	35.5	39.4*	38.9
School Status						
In school	84.2	73.8	93.3	83.6	74.3	81.8
Out of school	15.8	26.2	6.7	16.4	25.7	18.2
Mean years of schooling (S.D.)	4.9 (2.6)	4.2 (2.7)	5.8* (2.4)	5.3 (2.2)	4.4 (2.5)	4.9 (2.6)
Years of schooling						
None	5.8	12.5*	1.8*	4.5*	10.3*	7.0
1 to 4	38.0	44.3*	26.8*	27.9*	40.7*	35.5
5 to 8	47.0	37.2*	58.9*	62.0*	43.7	49.8
9+	9.2	6.0*	12.4*	5.5*	5.3*	7.7
Religion						
Christian	91.1	100.0	100.0	100.0	100.0	98.2
Muslim	8.9	0.0	0.0	0.0	0.0	1.8
Other ¹	0.0	0.0	0.0	0.0	0.0	0.0
Ethnicity (Ageawi)	90.2	52.9*	6.1*	81.1	91.2	64.1
Marital status						
Never married	92.9	74.4*	92.7*	91.5*	87.6*	87.8
Currently married	3.5	12.3*	4.3*	3.9*	4.8*	5.8
Formerly married	3.5	13.3*	3.0*	4.6*	7.6*	6.4
Ever given birth or currently pregnant	1.0	2.0	1.0	0.8	1.0	1.2
Asset-based SES						
Low	41.0	57.3*	32.9*	60.8*	42.9	47.0
Middle	31.4	23.5*	32.1	21.4*	29.8	27.6
High	27.6	19.1*	35.0*	17.8*	27.3	25.4

Note: Unweighted data * = Measures as not equivalent using confidence interval tests of equivalence (Appendix Tables A, B, C)

¹ No religion or other/traditional religion

which are implemented in the school setting, where only a minority of at-risk girls are found.

Exposure to the interventions

Table 8 shows the percent of girls at endline who were exposed to the interventions in each study community, by country (using weighted data, with weighted n's presented). As the community dialogue/ sensitization intervention targeted either girls themselves or community members, exposure is measured as those who have heard of or participated in community discussions. Exposure to the interventions varied considerably between countries. In Burkina Faso, the two interventions that received the most coverage were con-

ditional asset transfer (54 percent of girls enrolled), followed by community dialogue/ sensitization (48 percent of girls either participating or hearing of meetings). In Ethiopia, the two most common interventions to which girls were exposed were the schooling promotion (88 percent), followed by the conditional asset transfer (83 percent). Schooling promotion received the most coverage in Tanzania (91 percent), followed by community sensitization (89 percent). Across all countries, the model that achieved the lowest coverage was the comprehensive model. Girls were considered to have been exposed to the comprehensive model if they took part in all aspects of the program, while those who participated in only one or two activities were coded as unexposed. That a much lower proportion of girls were exposed to all

TABLE 6: Percent distribution of girls 12 to 17 surveyed at baseline in Tanzania, by study cell and selected characteristics

	Control (n=414)	Community sensitization (n=398)	Education program (n=483)	Asset transfer (n=408)	Comprehen- sive model (n=430)	Total (n=2,133)
Age						
12 to 14	57.0	64.6*	63.2*	58.8	63.3*	61.4
15 to 17	43.0	35.4*	36.8*	41.2	36.7*	38.6
School Status						
In school	47.8	63.0*	53.1*	59.3*	60.8*	56.7
Out of school	52.2	37.0*	46.9*	40.7*	39.2*	43.3
Mean years of schooling (S.D.)	4.3 (2.9)	5.0* (2.5)	5.1* (2.5)	4.6 (2.7)	4.7 (2.7)	4.8 (2.7)
Years of schooling						
None	23.2	12.8*	17.6*	16.0*	23.2*	16.3
1 to 4	22.4	22.9*	22.1*	25.1*	22.5*	22.4
5 to 8	50.5	60.0*	55.9*	54.0*	50.5	57.7
9+	3.9	3.3*	4.4*	4.9*	3.8*	3.6
Religion						
Christian	58.4	30.1*	30.2*	39.6*	26.5*	36.7
Muslim	17.9	64.1*	64.6*	57.0*	71.2*	55.3
Other ¹	23.7	5.8*	5.2*	3.4*	2.3*	8.0
Ethnicity (% Mnamezi)	31.9	59.5*	59.0*	59.9*	60.7*	54.3
Marital status						
Never married	88.4	91.7*	93.4*	91.8*	93.7*	91.9
Currently married	10.4	7.5*	5.8*	6.7*	6.1*	7.2
Formerly married	1.2	0.8*	0.8*	1.5*	0.2*	0.9
Ever given birth or currently pregnant	7.7	7.8*	7.3*	7.4*	6.3*	7.3
Asset-based SES						
Low	54.6	39.7*	42.4*	39.0*	44.9*	44.1
Middle	23.2	30.7*	31.9*	27.2*	30.5*	28.8
High	22.2	29.6*	25.7*	33.8*	24.6*	27.1

Note: Unweighted data * = Measures as not equivalent using confidence interval tests of equivalence (Appendix Tables A, B, C)

¹ No religion or other/traditional religion

program components in the comprehensive model is a reflection of the increased difficulty in implementing complex programs, resulting in difficulties in attaining significant coverage of complex interventions.

Child marriage

We modeled the risk ratios at endline associated with being married in each of the study communities in Burkina Faso and Tanzania, with reference to the control site. In Burkina Faso, we did not examine the impact on marriage age among younger girls aged 12 to 14, as too few girls were married at both baseline (12 married girls) and endline (five married girls). In Burkina Faso, girls aged 15 to 17 residing in the community dialogue arm had over two-thirds less risk (RR = 0.33) of being married compared to those in the control site (Table 9). Those residing in the conditional asset transfer site had more than double the risk of being married at both baseline and endline (results not shown). Additional analysis demonstrated that this site was significantly different from the control site at both baseline and endline, which was impossible to control for in the multivariate models, even after controlling for background factors. Thus, the conditional asset arm was eliminated from the analysis of results from Burkina Faso.

In Tanzania, the comprehensive model was significantly associated with a delay in marriage among girls 12 to 14. Girls 12 to 14 residing in the comprehensive site had two-thirds less risk of being married compared to girls in the control site (RR = 0.33). Tanzanian girls 15 to 17 residing in the conditional asset transfer site had roughly half the risk of being married compared to girls in the control site (RR = 0.52).

We re-analyzed data to model RRs among Tanzanian and Burkinabe girls who reported that they had been exposed to the intervention at endline, with reference to the control site. While selectivity issues undoubtedly impact upon results, the results of these analyses are consistent with the findings presented above (Appendix Table D). In Burkina Faso, girls exposed to or aware of the community dialogue had three-quarters less risk of being married (RR = 0.27), compared to girls in the control site. Tanzanian girls 15 to 17 residing in the conditional asset transfer arm and the comprehensive model had 90 percent less risk of being married compared to those in the control. This analysis demonstrates similar results among the exposed compared to the intention to treat analysis design, giving us confidence in the findings from our earlier analysis.

TABLE 7: Patterns of marriage among ever married girls aged 12 to 17 at baseline, by selected characteristics and country

GIRLS AGED 12 TO 17	BURKINA FASO (n=452)	ETHIOPIA (n=382)	TANZANIA (n=234)
Marriage was arranged or chosen			
Arranged	87.8	92.6	72.1
Chosen	12.2	7.4	27.9
Knew beforehand about the marriage			
Yes	55.0	26.4	50.6
No	45.0	73.6	49.4
Length of time knew husband before marriage			
On the wedding day	21.5	75.5	17.6
Less than a year	29.1	15.3	54.5
One year or more	49.4	9.2	27.9
Whether marriage was wanted at the time			
Wanted to get married	45.5	18.2	75.1
Did not want to get married	34.1	76.3	18.9
Was undecided about marriage	20.4	5.5	6.0
Mean age difference with husband (S.D.)	9.3 (6.3)	6.5 (3.0)	6.2 (6.6)
Attending school at time of marriage (yes)	3.1	42.5	0.9
Marriage is polygamous (yes)	20.9	1.1	11.3

Note: Weighted data

Qualitative data from Burkina Faso highlights the impact of the community dialogue approach:

Before, we were giving girls in marriage when they started menstruating because we were scared that they would fall pregnant. But since we participated in the discussions, we became aware of the harmful effects of early marriage. In reality, one gains nothing in giving your daughter in marriage early.

– Traditional chief, Community dialogue cell

The “early marriage” project brought about a revolution among girls. When you come back from Cote d'Ivoire with your money to look for a wife, it's difficult now because everywhere people speak of early marriage.

– Young male, Community dialogue cell

Informal follow-up in Tanzania revealed the dire economic conditions during the study period, including tobacco farmers not being paid for an extended period of time. This may have contributed to the success of the strongly economic approaches (conditional asset transfer and comprehensive model) in that setting:

For the past 3 years, farmers have not been paid well by the tobacco companies. We have not been getting paid since 2012. The whole Milumba village was not paid for its tobacco in 2013 and 2014.

– Father of adolescent girl, Tabora

As mentioned, for the Ethiopia arm of the study, we conducted analysis with reference to baseline data, given that the control was a resettlement area and fundamentally different from the other sites (Table 10). Among girls aged 12 to 14 in Ethiopia, those residing in the community dialogue site at endline had over half the risk of being married compared to their counterparts at baseline (RR = 0.42). Girls 12 to 14 in the education promotion arm had 90 percent less risk of being married at endline compared to their counterparts at baseline (RR = 0.09). Among girls aged 15 to 17, those residing in the conditional asset transfer arm and the comprehensive model had roughly half the risk of being married at endline compared to their counterparts at baseline (RR = 0.57 for conditional asset transfer; RR = 0.38 for comprehensive model).

TABLE 8: Percentage of girls aged 12 to 17 exposed to the interventions at endline, by model and country

GIRLS AGED 12 TO 17	BURKINA FASO (n=2,655)	ETHIOPIA (n=2,312)	TANZANIA (n=2,324)
Community sensitization	47.9	69.3	89.4
School promotion	30.6	87.9	90.7
Conditional asset transfer	53.9	82.7	52.0
Comprehensive model	20.2	69.0	52.3

Note: Weighted data and weighted n's presented

TABLE 9: Adjusted¹ risk ratios (and 95% confidence intervals) for Burkinabe and Tanzanian girls having ever been married at endline, with reference to the control group, by study cell and age group

	Age 12 to 14	Age 15 to 17
BURKINA FASO		
Community dialogue	—	0.33 (0.19, 0.60)***
Education promotion	—	0.99 (0.66, 1.49)
Comprehensive model	—	0.77 (0.52, 1.15)
TANZANIA		
Community sensitization	1.13 (0.48, 2.68)	0.74 (0.43, 1.27)
Education promotion	0.70 (0.30, 1.65)	0.99 (0.64, 1.53)
Conditional asset transfer	0.41 (0.15, 1.15)	0.52 (0.30, 0.91)*
Comprehensive model	0.33 (0.11, 0.99)*	0.59 (0.34, 1.01)

Note: Weighted data ¹ Adjusted for age, religion, ethnicity, and socioeconomic status

* p < 0.05 ** p < 0.01 *** p < 0.001

Community members in Ethiopia expressed appreciation for a number of approaches:

I got the chickens through my daughter. She is 15 and unmarried and she is going to school. The two chickens have helped to support her schooling. I am separated from their father and there is no one to support me—I am poor. The sale of the eggs has helped her to buy exercise books and pens. It has also helped to buy hair lotion and shoes, so it is very good.

– Mother of girl in conditional asset transfer cell

In community conversations with my family and friends, I discuss the harm of underage marriage. Girls have to attend school just the same as the boys, and parents who are involved in underage marriage will be excluded from community support such as borrowing and lending of goods. The sanctions are very tough.

– Girl participating in comprehensive model

School attendance in the current or last year

We examined differences in the risk of girls attending school in the current and previous years. We included attendance during the current and previous year due to infrequency of school supply provision in two of the project countries, Burkina Faso and Tanzania, and anecdotal evidence that dropout increased after the second year's provision. Table 11 shows the risk ratios and 95% confidence intervals for Burkinabe and Tanzanian girls attending school during the current and previous year, with reference to girls in the control site. Similar to the findings for child marriage, the conditional asset transfer site in Burkina Faso was not comparable to the control site, even after controlling for background factors. As such, results are not presented.

Burkinabe girls aged 12 to 14 residing in the community dialogue site had a greater chance of being in school (RR = 1.2) compared to their counterparts in the control. This find-

TABLE 10: Adjusted¹ risk ratios (and 95% confidence intervals) for Ethiopian girls having ever been married at endline, with reference to the baseline, by study cell and age group

	Age 12 to 14	Age 15 to 17
ETHIOPIA		
Community dialogue	0.42 (0.25, 0.70)**	0.81 (0.60, 1.09)
Education promotion	0.09 (0.01, 0.71)*	0.78 (0.46, 1.31)
Conditional asset transfer	0.28 (0.07, 1.09)	0.57 (0.35, 0.90)*
Comprehensive model	0.36 (0.07, 1.68)	0.38 (0.23, 0.61)***

Note: Weighted data ¹ Adjusted for age, ethnicity and socioeconomic status

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

TABLE 11: Adjusted¹ risk ratios (and 95% confidence intervals) for Burkinabe and Tanzanian girls being in school in the current and previous years at endline, by age group

	Age 12 to 14	Age 15 to 17
BURKINA FASO		
Community dialogue	1.18 (1.07, 1.29)**	1.06 (0.94, 1.19)
Education promotion	0.99 (0.89, 1.09)	0.92 (0.80, 1.05)
Conditional asset transfer	1.07 (0.96, 1.18)	1.03 (0.91, 1.15)
TANZANIA		
Community sensitization	1.17 (1.04, 1.32)**	0.92 (0.68, 1.23)
Education promotion	1.21 (1.08, 1.35)**	1.30 (1.01, 1.67)*
Conditional asset transfer	1.34 (1.20, 1.48)***	1.29 (1.00, 1.68)
Comprehensive model	1.28 (1.15, 1.43)***	1.00 (0.76, 1.32)

Note: Weighted data ¹ Adjusted for age, religion, ethnicity and socioeconomic status

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

ing is consistent with the fact that girls in this site were also less at risk for child marriage, which supports the effectiveness of this intervention in Burkina Faso. In Tanzania, all the interventions tested were associated with increased risk of girls aged 12 to 14 being in school. The educational promotion arm was also associated with 30 percent increased risk of being in school among girls aged 15 to 17 (RR = 1.3)

No impact of the interventions on schooling in Ethiopia was detected (results not shown). This could be due to the increasing rates of enrollment that are due to a large and successful government re-enrollment campaign that took place during the course of the intervention.

Cost and cost effectiveness

Table 12 shows the cost per girl served per year for the different intervention models. It should be noted that this is not cost effectiveness but the cost to the program to implement the activities and support girls through various approaches. Because the community dialogue/sensitization

model did not target girls alone, we estimated the population reached using population estimates and the percent of girls at endline hearing about or participating in the social norms change activities.

Costs varied significantly between country and model. In all countries, community dialogue/sensitization and school promotion cost roughly the same: from \$9 to \$20 per community member served for community dialogue and from \$13 to \$20 per girl served with school supplies. That the community sensitization was much less expensive in Tanzania compared to the other two countries probably reflects the less intensive and ad hoc nature of the intervention. In Tanzania, community leaders were trained to deliver messages but were not followed up or asked to report on the number or type of messages passed. In contrast, community dialogue in the other two countries included intensive and systematic activities, using paid facilitators to take community members through four months of structured discussions. The conditional asset transfer and the full models

FIGURE 1: Estimated cost per marriage averted among girls 15 to 17 in Tanzania receiving conditional asset transfers and in Burkina Faso receiving community dialogue, by prevalence of child marriage at baseline

TABLE 12: Cost per girl/person served per year, by model and country

	BURKINA FASO (n=3,235)	ETHIOPIA (n=5,167)	TANZANIA (n=4,154)
Community sensitization	\$12	\$20	\$9
School promotion	\$13	\$20	\$18
Conditional asset transfer	\$33	\$32	\$107
Comprehensive model	\$60	\$29	\$117

were the most costly to implement. In particular, provision of livestock and the comprehensive model was expensive in Tanzania, perhaps related to elaborate logistics required to purchase, store, and transport goats and to the quality of the goats procured. Curiously, the full model in Ethiopia was cheaper to implement (\$29 per girl per year) compared to the conditional asset transfer of two chickens per girl per year. Further examination of costing data suggested that fewer girls in the comprehensive arm received chickens at all rounds of the study, perhaps reflecting their failure to meet the project's criteria or due to weaknesses in implementation on the ground.

We calculated the cost per marriage averted for two of the successful interventions: the conditional asset transfer for girls aged 15 to 17 in Tanzania and community conversations for girls 15 to 17 in Burkina Faso. Based on the numbers of girls served, the cost of the program, and the reduction in risk, the conditional asset transfer in Tanzania cost an estimated \$732 per marriage averted. For girls 15 to 17 in Burkina Faso, the community dialogue cost an estimated \$159 per marriage averted. Again, the higher cost of goats in Tanzania and challenges related to storage, transport, and delivery of this intervention impacted upon our estimate of cost of marriage averted.

At the same time, assuming the magnitude of the impact remained constant, the estimated cost per marriage averted would vary based on the prevalence of the practice. In locations where the practice is relatively more rare, the cost per marriage averted would increase, as the intervention would effectively subsidize girls who were not at risk of a forced, early marriage. Locations where the practice is more prevalent would result in a lower cost per marriage averted. Figure 1 shows the estimated cost per marriage averted for girls in the conditional asset transfer arm in Tanzania and those in the community dialogue arm in Burkina Faso.

Discussion

The study sought to answer the question of whether simple, cost-effective, and sustainable interventions could be effective in preventing child marriage, with a view to upscaling successful approaches. Developing and testing streamlined, and minimum basic interventions is critical in the context of child marriage. The practice prevails in the poorest countries with large numbers of girls affected. Interventions that have the potential to reach large numbers of rural girls at a modest cost are arguably the most promising strategy to eradicate the practice.

The study provided several valuable lessons for the design of child marriage prevention programs in sub-Saharan Africa. We outline below some of the lessons learned and steps to be taken in future child marriage prevention work.

Simple, cost-effective interventions can be effective in delaying child marriage

Interventions that prove to be effective vary across contexts and the age group of the girl. Effective interventions for younger adolescents aged 12 to 14 may differ from those that are effective for older girls 15 to 17, partly because the marriage market and community perceptions change once girls start getting older. Overall, we found that more economic interventions, such as conditional asset transfers, seemed to work for older adolescents, especially those in Tanzania and Ethiopia. Our finding that there are promising, simple interventions that can be effective in delaying child marriage is consistent with evidence from other contexts such as Bangladesh (Amin et. al, 2016). Additional research using more rigorous research methods, such as randomized controlled trials, will help to strengthen our current findings.

It is necessary to identify areas of high child marriage prevalence for intervention

Rates of child marriage are changing rapidly in some countries. In settings such as Amhara, Ethiopia the practice is declining rapidly. In other settings, such as Tabora, Tanzania that experience economic shocks or political turmoil, the practice may be on the increase. In order to maximize investments in child marriage prevention, it is advisable

to undertake initial rapid assessment to identify locations where the practice is most common. While DHS surveys may be important sources of information and guidance, we found that marriage markets are extremely localized and vary significantly at the sub-regional level, a level of estimation that DHS does not provide. As such, rapid, community-level data collection is currently being undertaken by the Population Council and partners to identify sub-regional locations with the highest prevalence of child marriage, in order to maximize investments in child marriage prevention.

More complex models make it difficult to achieve coverage and quality of implementation

Contrary to common assumptions, the more complex, comprehensive interventions addressing child marriage on a variety of levels were not necessarily more effective than the simple, single-approach models. This is partly due to the difficulty of effectively implementing complex models on the ground. While girls in the comprehensive study arms were frequently exposed to one or two aspects of the intervention, it was not common for girls to be exposed to all aspects, thereby compromising the fidelity to the model and the impact. Where less expensive, simpler approaches also prove to be effective, we recommend implementation of these streamlined approaches in order to maximize the impact of child marriage investments.

Attention to coverage of interventions at the population level

Program managers need to pay attention to coverage of interventions on the ground. This is particularly important in rural communities where many sites are remote and inaccessible. This study found that programs achieved variable coverage, which was particularly low in Burkina Faso. Interventions that did not reach a large proportion of the population were often implemented in a nonsystematic manner. For example, the low coverage of the conditional asset transfer model in Tanzania (52 percent of girls exposed) is probably related to not conducting house-to-house recruitment, as was intended, but depending on cascade methods and word-of-mouth to pass information about the program.

Social norm change approaches should be systematic and intensive, not ad hoc

Community dialogue decreased risk of marriage in Ethiopia for girls aged 12 to 14 and in Burkina Faso for girls aged 15 to 17. The approach to change social norms differed between project countries. In two countries—Burkina Faso and Ethiopia—the approach was an adapted version of the community conversations approach (developed and applied extensively in Ethiopia), whereby community members meet periodically with trained facilitators and are taken through a systematic process of problem identification and problem-solving. In Tanzania, the social norms change approach was ad hoc, with community and religious leaders trained to deliver key messages at events they might host or attend. Only the systematic and intensive method of social norms change seemed to make an impact on the practice, while informal delivery of messages did not. While much investment has been devoted to making use of existing channels of information transfer, it appears that social norms change approaches that achieve impact are those that are structured, formal and intensive through repeat contact.

Conditional asset transfers and supplies should be frequent and raise the visibility of girls

The conditional asset arm was effective at delaying marriage among older girls in Ethiopia and Tanzania, while incomparability between sites in Burkina Faso did not allow us to assess the effectiveness of this approach in that setting. Consistent with other reviews of child marriage prevention evaluations, economic interventions do seem to be effective in delaying the age of marriage, especially among older adolescents. In two of the countries, Burkina Faso and Tanzania, the asset transfer in the form of a goat was awarded once at the end of the intervention period (just over two years), while school supplies were given yearly. In Ethiopia, the livestock in the form of chickens was provided on a yearly basis and the school supplies were provided twice per year: at the beginning of the school year and at mid-term. More frequent provision of lower-cost assets seems to have the effect of sustaining interest and commitment to the program. The conditional asset transfers scheme has somewhat lower participation in Burkina Faso and Tanzania, in comparison to Ethiopia. In addition, public, community-wide award of the commodities/prizes was used as a way to bring visibility to the status of girls in the project communities. The frequency of these events may have served to encour-

age girls and their parents to abide by the conditions of the schemes. By comparison, participation in the asset transfer scheme was lower in Burkina Faso and Tanzania, despite the fact that a higher value goat was offered. The infrequency of awards may have resulted in fatigue to continue participation and contributed to dropout.

Promotion of schooling should take into account available educational infrastructure

All the interventions in Tanzania and the community dialogue in Burkina Faso were effective in increasing the likelihood of girls aged 12 to 14 attending school. However, none of the approaches were effective for older girls aged 15 to 17. This may reflect the availability of secondary schools in rural areas or the value that families place on educating girls to a higher level. For example, in Tanzania, there were 16,343 governmental and nongovernmental primary schools in the country in 2013, for a primary school population of over 8.5 million (Tanzania Prime Minister's Office, 2014). The respective figure for secondary schools was 4,576—most of which are located in urban areas—for a secondary school population of 3.8 million. This translates to one primary school for every 520 students and one secondary school for every 830 students. In Burkina Faso, in 2015, there are 13,831 primary schools and 4,030 secondary schools (Ministère de l'Éducation, 2015). In places where educational infrastructure is weak, such as in rural areas, programs need to take into account the availability of institutions, especially those at a higher level, as well as the quality of education provided.

Focus on out-of-school girls, family planning, and fertility awareness among girls who are at greatest risk of child marriage

Only a minority of girls were attending school at the time of their marriage: 43 percent in Ethiopia, 3 percent in Burkina Faso, and <1 percent in Tanzania. At the same time, many initiatives to prevent child marriage are implemented in the school environment, such as enforcement committees in the school where girls can report an impending marriage. Our data suggest that these approaches may be directed at low risk, in-school girls. In settings where adolescents are sexually active outside of marriage, family planning services and information should be accessible. In all settings, knowledge of contraceptives and family planning services,

and awareness of fertility should be promoted among adolescents. A focus on schooling, family planning, and fertility awareness can reduce vulnerabilities to child marriage.

Limitations

While a large number of programmatic lessons were learned, there were limitations. In Ethiopia, we did not benefit from having a control site, due to the unfortunate selection of a resettlement area as the control location. In addition, in each country, only one geographic location was chosen per implementation model. At the same time, this aspect of the research limited our ability to achieve high levels of equivalence between project sites. In Burkina Faso, we found that the conditional asset transfer site was incomparable to the control at both baseline and endline, even after controlling for background factors. This meant that we were unable to draw conclusions about the asset transfer approach in this country. As well, in Burkina Faso, the local language used in the survey is not commonly written. As such, the questionnaire remained in French and interviewers discussed and agreed upon the local language equivalent to be used in the survey. This may have introduced bias as it is possible that interviewers did not always recall the agreed upon translation of questionnaire items and may have modified or distorted the translations. Finally, we calculated sample size based on our ability to detect a 10 percentage point change among the age group 12 to 17. However, analysis was stratified by younger and older adolescents (12 to 14; 15 to 17), which may have compromised our ability to detect a change within these subpopulations.

APPENDIX

TABLE A: Equivalence of Burkina Faso study areas with the control site for selected baseline characteristics

		Mean Difference (90% Confidence Interval)			
	Equivalence interval ¹	Control/ Community Dialogue	Control/ Education Promotion	Control/ Conditional Asset Transfer	Control/ Comprehensive Model
BURKINA FASO					
Age (% aged 15 to 17)	± 8.7	6.1 (0.3, 11.8)	-0.8 E (-5.9, 4.3)	-7.2 (-12.4, -2.0)	10.7 (5.9, 15.5)
School status (% out of school)	± 10.0	-9.0 (-14.8, -3.1)	-0.7 E (-5.9, 4.5)	17.1 (12.0, 22.2)	3.0 E (-1.9, 8.0)
Mean years schooling	± 0.7	-0.8 (-1.2, -3.6)	-0.1 (-0.4, 3.0)	1.2 (0.9, 1.6)	0.4 E (0.01, 0.7)
Years of schooling					
1 to 4	± 3.4	5.8 (1.8, 9.8)	4.6 (0.9, 8.2)	4.6 (0.9, 8.3)	7.4 (4.0, 10.8)
5 to 8	± 8.3	-10.4 (-16.2, -4.5)	-0.6 E (-5.7, 4.5)	14.8 (9.9, 19.7)	3.5 E (-1.4, 8.3)
9+	± 0.4	-2.6 (-4.7, -0.5)	-1.5 (-3.2, 0.1)	1.2 (0.0, 2.3)	-1.4 (-2.9, 0.2)
Marital status (% ever married)	± 3.2	4.1 (0.1, 8.1)	-3.4 (-7.3, 0.6)	-17.1 (-21.5, -12.7)	6.8 (3.5, 10.1)
Ever given birth or currently pregnant (%)	± 1.8	2.7 (-0.3, 5.8)	-1.5 (-4.5, 1.6)	-6.9 (-10.3, -3.4)	3.6 (1.0, 6.2)
Religion (% Muslim)	± 18.4	29.9 (26.0, 33.8)	0.7 E (-1.8, 3.3)	3.6 E (0.9, 6.4)	10.7 E (7.6, 13.8)
Ethnicity (% Senoufo)	± 12.6	-0.1 E (-5.2, 4.9)	28.5 (24.1, 32.9)	-26.1 (-29.9, -22.3)	-20.2 (-24.0, -16.3)
Asset-based SES					
Middle	± 5.9	-9.6 (-15.2, -4.0)	-6.9 (-11.7, -2.1)	-6.7 (-11.6, -1.8)	-14.2 (-18.9, -9.4)
High	± 3.8	-13.5 (-18.7, -8.4)	-1.0 (-5.1, 3.0)	-32.6 (-37.3, -27.9)	1.9 (-1.9, 5.7)

Note: Weighted data; ¹ Equivalence interval is ±20% of the control site. E = Equivalent with the Control

TABLE B: Equivalence of Ethiopia study areas with the control site for selected baseline characteristics

		Mean Difference (90% Confidence Interval)			
	Equivalence interval ¹	Control/ Community Dialogue	Control/ Education Promotion	Control/ Conditional Asset Transfer	Control/ Comprehensive Model
BURKINA FASO					
Age (% aged 15 to 17)	± 7.3	-1.4 E (-6.5, 3.6)	-8.1 (-13.4, -3.0)	1.1E (-4.0, 6.1)	-2.8 (-7.9, 2.3)
School status (% out of school)	± 17.7	10.4E (6.1, 14.6)	-9.1E (-12.4, 5.8)	0.6E (-3.3, 4.5)	9.9E (5.6, 14.1)
Mean years schooling	± 1.0	0.7E (0.5, 1.0)	-0.9 (-1.2, -0.7)	-0.3E (-0.6, -0.1)	0.5E (0.2, 0.8)
Years of schooling					
1 to 4	± 7.6	-6.2 (-11.4, -1.1)	11.2 (6.3, 16.1)	10.1 (5.2, 15.1)	-2.6 (-7.8, 2.6)
5 to 8	± 9.4	9.8 (4.6, 14.9)	-12.0 (-17.2, -6.7)	-15.0 (-20.2, -9.8)	3.2E (-2.0, 8.5)
9+	± 1.8	3.1 (0.3, 5.9)	-3.3 (-6.5, 0.0)	3.6 (0.8, 6.4)	3.8 (1.1, 6.5)
Marital status (% ever married)	± 1.4	-18.6 (-22.3, -14.8)	-0.3 (-3.0, 2.4)	-1.4 (-4.2, 1.4)	-5.0 (-8.5, -2.2)
Ever given birth or currently pregnant (%)	± 0.2	-1.0 (-2.3, 0.3)	0.0 (-1.0, 1.1)	0.2 (-0.1, 1.2)	0.0 (-1.0, 1.0)
Religion (% Orthodox)	± 18.2	-8.5E (-10.7, -6.3)	-8.9E (-11.1, -6.8)	-8.9E (-11.1, -6.8)	-8.9E (-11.1, -6.8)
Ethnicity (% Ageawi)	± 18.1	37.3 (33.0, 41.6)	84.1 (81.3, 87.0)	9.1E (5.4, 12.8)	-0.9E (-4.0, 2.1)
Asset-based SES					
Middle	± 6.3	7.9 (3.2, 12.5)	-0.7E (-5.6, 4.2)	10.0 (5.4, 14.7)	1.6E (-3.3, 6.5)
High	± 5.5	8.5 (4.1, 13.0)	-7.3 (-12.2, -2.4)	9.8 (5.4, 14.2)	0.3E (-4.4, 5.1)

Note: Weighted data; ¹ Equivalence interval is ±20% of the control site. E = Equivalent with the Control

TABLE C: Equivalence of Tanzania study areas with the control site for selected baseline characteristics

		Mean Difference (90% Confidence Interval)			
	Equivalence interval ¹	Control/ Community Dialogue	Control/ Education Promotion	Control/ Conditional Asset Transfer	Control/ Comprehensive Model
TANZANIA					
Age (% aged 15 to 17)	± 8.6	-7.6 (-13.2, -1.9)	-6.1 (-11.5, -0.8)	-1.8E (-7.5, 3.8)	-6.3 (-11.8, -0.7)
School status (% out of school)	± 9.6	15.2 (9.5, 20.8)	5.3 (-0.2, 10.8)	11.4 (5.7, 17.1)	13.0 (7.4, 18.6)
Mean years schooling	± 0.9	0.7 (0.4, 1.0)	0.8 (0.5, 1.1)	0.3E (0.0, 0.7)	0.5E (0.1, 0.8)
Years of schooling					
1 to 4	± 4.5	1.4 (-3.4, 6.3)	-3.4 (-7.9, 1.1)	-0.4 (-5.2, 4.4)	2.7 (-2.2, 7.4)
5 to 8	± 10.1	9.6 (3.9, 15.3)	16.2 (10.8, 21.5)	5.4 (-0.3, 11.1)	3.5E (-2.2, 9.1)
9+	± 0.8	-0.6 (-2.7, 1.5)	-1.8 (-3.7, 0.1)	0.5 (-1.7, 2.8)	1.0 (-1.3, 3.3)
Marital status (% ever married)	± 2.3	-3.3 (-6.7, 0.1)	-5.0 (-8.2, -1.8)	-3.5 (-6.8, 0.0)	-5.3 (-8.5, -2.1)
Ever given birth or currently pregnant)	± 1.5	0.1 (-3.0, 3.1)	-0.5 (-3.4, 2.4)	-0.4 (-3.4, 2.7)	-1.5 (-4.3, 1.4)
Religion (% Muslim)	± 3.6	-46.2 (41.2, 51.2)	46.7 (42.0, 51.5)	39.1 (34.0, 44.2)	53.3 (48.5, 58.0)
Ethnicity (% Mnamezi)	± 6.3	27.9 (22.4, 33.4)	26.9 (21.7, 32.2)	27.7 (22.2, 33.2)	30.0 (24.6, 35.4)
Asset-based SES					
Middle	± 4.6	7.5 (2.4, 12.6)	8.7 (3.8, 13.6)	4.0 (-1.0, 9.0)	7.3 (2.3, 12.3)
High	± 4.4	7.4 (2.4, 12.5)	4.0 (-1.0, 9.0)	-4.2 (-9.6, 1.2)	5.0 (-0.1, 10.1)

Note: Weighted data; ¹ Equivalence interval is ±20% of the control site. E = Equivalent with the Control

TABLE D: Adjusted risk ratios (and 95% confidence intervals) at endline for Burkinabe and Tanzanian girls exposed to the interventions, having ever been married, by age group

Variable	Age 12 to 14	Age 15 to 17
BURKINA FASO		
Community sensitization	—	0.27 (0.13, 0.58)**
Education promotion	—	0.67 (0.35, 1.28)
Comprehensive model	—	0.68 (0.35, 1.33)
TANZANIA		
Community sensitization	1.10 (0.45, 2.67)	0.78 (0.49, 1.25)
Education promotion	0.56 (0.23, 1.35)	0.96 (0.67, 1.39)
Conditional asset transfer	0.12 (0.01, 1.00)	0.06 (0.01, 0.47)**
Comprehensive model	0.22 (0.04, 1.17)	0.10 (0.01, 0.71)*

Note: Weighted data ¹ Adjusted for age, religion, ethnicity, and socioeconomic status

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

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