



**A MIXED METHODS
EVALUATION OF A
SOCIAL AND ECONOMIC
EMPOWERMENT
INTERVENTION TO
REDUCE ADOLESCENT
GIRLS' VULNERABILITY
TO HIV IN ZAMBÉZIA
PROVINCE, MOZAMBIQUE**



Final Report: A mixed methods evaluation of a social and economic empowerment intervention to reduce adolescent girls' vulnerability to HIV in Zambézia Province, Mozambique

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INTRODUCTION

Background and Rationale

In 2009, World Vision International was awarded a United States Agency for International Development (USAID) grant, called Strengthening Communities through Integrated Programming (SCIP), for a 5-year multi-sector program aimed at improving the health and livelihoods of children, women, and families in Zambézia Province, Mozambique. The broad goals of the five-year project were to: 1) reduce poverty in Zambézia Province by pursuing the consolidation of an integrated, innovative, and sustainable community-based program in the province; and 2) integrate current and future United States Government (USG) investments in Zambézia Province in the areas of health, HIV/AIDS, water and sanitation, income generation, and institutional capacity building.¹⁻⁶

In 2016, Mozambique ranked 181 of 187 nations on the United Nations Development Program (UNDP)'s Human Development Index (HDI), and the gross national income was estimated at US \$1,098 per capita, with a life expectancy of 55 years.⁷ Although Mozambique's health expenditure has risen substantially over the past 10 years, as a proportion of total GDP it was only 6.6 percent in 2011 (US \$66 per capita).⁸ Mozambique is one of the sub-Saharan African countries most affected by the HIV/AIDS epidemic, with a national HIV prevalence of 15.1 percent in 2015 for adults between 15-49 years old.⁹

The magnitude of poverty is especially evident in Zambézia Province, Mozambique's second largest province and home to about 4 million persons.^{3, 10} While Mozambique ranks among the poorest of the poor nations, Zambézia consistently ranks among Mozambique's lowest performing provinces with low literacy rates, poor maternal and child health (MCH) indices, high rates of tuberculosis and malaria infections, and high levels of malnutrition.⁶ Zambézia Province is overwhelmingly rural and depends almost entirely on subsistence farming and fishing. The province has the highest estimated number of persons living with HIV in the country (~275,000 or nearly 20 percent of Mozambique's HIV-infected population) as of 2009.¹¹ Finally, Zambézia Province housed much of the armed conflict in Mozambique's 16-year civil war (1976–1992) and suffered disproportionately in destruction of its healthcare infrastructure.¹²

Adolescent girls and young women are disproportionately affected by the HIV epidemic. This is especially true in Zambézia Province, Mozambique where, in 2015, the HIV prevalence among girls aged 15-24 was estimated to be 14 percent – more than triple the proportion of boys the same age.⁹ According to the 2011 Mozambique Demographic and Health Survey (DHS), 23

percent of girls 15-17 have experienced physical or sexual violence at any time in their life and 8 percent had sex with at least one man 10 or more years older than them within the last 12 months.¹³ These disparities are due to prevailing gender norms and inequalities that increase girls' vulnerability to HIV, such as limited ability to negotiate condoms, transactional sex, and fear and experiences with violence and abandonment.¹⁴

Many factors increase girls' vulnerability to HIV. These factors include high rates of poverty¹⁵⁻¹⁷ and cultural norms,¹⁸ as well as individual behaviors that include early sexual debut, multiple partners and low condom use.¹⁹⁻²¹ A parent's inability or unwillingness to provide emotional support, material goods and information about sexual and reproductive health also influences adolescents' sexual behaviors.²²

Economic interventions can help address the structural factors that increase vulnerability to HIV among girls. These interventions include microfinance, cash transfers, income generating activities, and vocational or business training. The Hunger Project in Uganda, an economic intervention including a business training component, noted positive material changes (income, health, education, water), perceptual changes (self-esteem, self-confidence, vision for the future) and relational changes (increased role in family decision making, increased self-reliance) in study participants as a result of the intervention.²³ Economic interventions such as IMAGE (Intervention with Microfinance for AIDS and Gender Equity) demonstrated a decrease in domestic violence for women in South Africa,²⁴ and TRY (Tap and Reposition Youth) in Tanzania demonstrated an increase in youth's condom use and refusal of sex.²⁵

Social-level interventions recognize that social forces impact HIV transmission by influencing practices that can lead to infection, and such interventions identify points of entry at the societal level by altering practices in the context in which they occur. Go Girls! was a social empowerment research activity in Botswana, Malawi, and Mozambique that demonstrated an increase in legal literacy, improvement in relationships between girls and their parents, and an increase in HIV knowledge.^{21, 26-27} An HIV training and communication intervention for adult women in South Africa showed increased HIV knowledge (including discussion of sexual matters and HIV, which were formerly taboo in many households) and increased rates of voluntary counseling and testing for HIV—motivating both the participant and others to go for these services.²⁸ Social interventions in South Africa²⁹ and Tanzania³⁰ showed an increase in HIV voluntary counseling and testing and a large reduction in gender-based violence (GBV) in Tanzania.^{30, 31}

Given that economic and social empowerment interventions independently reduce HIV vulnerability, will combining these two intervention strategies have a synergistic effect? Some research results suggest that combining economic and social components builds skills to improve financial well-being, women's empowerment and gender equity, and thus reduces vulnerabilities to HIV.^{24, 32-33} Research from the IMAGE project in South Africa, for example, compared the benefits of an economic intervention, a behavioral intervention and a combined intervention.³⁴ In that study, communities that received the economic intervention and the

combined intervention showed improvement in economic indicators compared to control communities. Furthermore, the combined intervention showed improvement in indicators of women's empowerment, reduced levels of intimate partner violence in past-year experience, and reduced HIV risk behavior.

Based on evidence that increased economic opportunities for women and girls can reduce HIV risk behaviors, our goal was to determine whether a combined economic and social intervention called "Women First" being implemented in Zambézia Province, Mozambique had the desired effect of reducing adolescent girls' vulnerability to HIV.

Description of the Intervention

World Vision's Strengthening Communities through Integrated Programming (SCIP) program, locally called Ogumaniha, was a USAID-funded project that aimed to improve the health and livelihood of children, women and families in Zambézia Province. SCIP scaled up Women First (WF), an economic and health intervention that trains women to sell appropriate and in-demand products door-to-door in their communities. The intervention also included Accumulated Savings & Credit Associations (ASCAs), which SCIP introduced into the WF communities to encourage individual saving and to provide access to loans, especially as business capital for WF participants. Adult women were the initial primary focus of WF and the ASCAs. However, over time, SCIP encouraged adolescent girls aged 13-17 years to join the intervention, with emphasis on targeting orphans and vulnerable children (OVC).

The WF intervention with adolescent girls used the Go Girls! curriculum from the Go Girls! Initiative. The Go Girls! Initiative was designed to reduce adolescent girls' vulnerability to HIV transmission in four communities in Botswana and Malawi, and eight communities in Mozambique.³⁵ WF implemented the full Go Girls! curriculum with enhanced emphasis on GBV prevention to encourage social empowerment and reduce adolescent girl participants' vulnerability to HIV. The intervention also had the goal of encouraging girls to stay in school. As such, with its various components, WF can be seen as a combined economic and social empowerment intervention. From this point forward, when we refer to WF, we will be referring to the adolescent girl component.

WF was implemented at the community level. SCIP used the following criteria when deciding in which communities to introduce the WF intervention. Communities needed to:

- Be part of the larger SCIP project,
- Have an existing women's group,
- Be located along a transport corridor, and
- Have a maximum travel time of 30 minutes' walk for participants to attend meetings.

Once a community was approached with the intervention, adolescent girls were invited to participate in the intervention by community leaders, in conjunction with SCIP program staff and current WF adult participants. They specifically targeted vulnerable girls defined as: having lost

one or both parents, living in a child-headed household, engaging in transactional sex or other HIV risk behaviors. According to SCIP implementers, once invited, individual refusal rates of the intervention were near zero. Indeed, more girls wanted to participate than there were spots available.

The WF intervention was implemented in communities over the course of a five-year period (2010-2015). The start date of the intervention varied between and within the communities. However, once begun in a particular community, the intervention operated continuously until the end of the SCIP program (September 2015). Implementation of the intervention components also varied between communities and some components occurred sporadically or just one time.

OBJECTIVES

The objectives of this evaluation were:

1. To determine whether adolescent girls who participate in Women First have less vulnerability to HIV than girls who do not participate
2. To describe the causal pathways of economic and social empowerment on reducing adolescent girls' vulnerability to HIV

Regarding the first objective, USAID and SCIP program implementers defined HIV vulnerability for adolescent girls as engaging in intergenerational or transactional sex, lacking knowledge about HIV transmission, lacking knowledge about gender-based violence (including laws, available services and safe spaces), or unwillingness to report gender-based violence and access HIV prevention services.

Based on this definition of vulnerability, the primary outcomes for this evaluation were:

1. Willingness to seek medical help for GBV
2. Willingness to report GBV
3. Knowledge related to GBV
4. HIV knowledge
5. Self-reported six-month incidence of transactional sex
6. Self-reported six-month incidence of intergenerational sex
7. School attendance

Regarding the second objective, reflecting over their experience implementing SCIP in Zambézia, USAID and SCIP staff prioritized the following causal pathways to explore in the evaluation:

- Was the intervention implemented as designed (fidelity)?
- What do girl participants do with the money they earn?
- What influence do family members have on how girls' money is spent?

- How does participation influence girls' relationships with other adults?
- How does participation influence girls' community participation, including social capital (the network of social connections that exist between people and their shared values and norms of behavior, which enable and encourage mutually advantageous social cooperation), networks and support?
- What influence has participation had on girls' attitudes on courtship or pre-marital relationships (including intergenerational and transactional sex), marriage, child bearing and family planning?
- What influence has participation had on girls' self-confidence, future goals and aspirations?

METHODS

We conducted a mixed methods evaluation with two rounds of quantitative and two rounds of qualitative data collection. The below figure (Fig. 1) shows the overall study timeline and illustrates that there was substantial variation in when girls participated in the intervention compared to when data collection activities occurred. It is important to note that some girls had finished participating in the intervention by the time of the first quantitative survey and that most girls had finished the intervention by the time of the first round of qualitative data collection.

Figure 1: Data collection timeline



Quantitative Methods

Study Setting

The study was conducted in communities located within six districts of Zambézia Province, Mozambique: Gurué, Alto Mólocuè, Ilê, Mopeia, Mocuba, and Morrumbala. The figure below (Fig. 2) shows a map of the districts and communities included in the study. Also, the locations of each district capital are depicted as yellow triangles. We use the distance of each community from the district capital as a proxy for the level of social/economic isolation.

Figure 2. Map of the districts and communities included in the study



Study Design

This was a clustered, non-equivalent (two-stage) cohort trial that involved two rounds of quantitative interviews with adolescent girls who participated in the WF intervention and a

sample of girls who did not. There were several programmatic and logistical constraints to designing a rigorous evaluation of the SCIP WF intervention. First, we were asked to evaluate the intervention using a *prospective* design with quantitative measures *after* the intervention had already begun in most communities. The second constraint was the purposive, non-probability sampling of intervention communities and intervention participants within communities. Third, the sample size of the intervention group was fixed and small. We were told there would be 300 adolescent girl participants at the very most. Additionally, as mentioned above, the start date of the intervention varied between and within the communities, and implementation of the intervention components varied between the communities. We selected the most rigorous design possible within these constraints.

Furthermore, this evaluation was conducted as a confirmatory study meaning that we are not allowed to change our minds after we see the results. Our analytic process began with writing a statistical analysis plan which was internally reviewed by senior staff and pre-registered at the 3ie online registry prior to performing any analysis that tested our hypotheses. Next, we conducted a data cleaning process that involved going back and forth with the field and resolving discrepancies and documenting solutions. We then created the analytical data sets with study measures constructed per the statistical analysis plan. All data sets were independently verified by another statistician and any discrepancies resolved. Next, we conducted preliminary analyses blinded to the treatment status to assess the validity and reliability of the outcomes measures. This was our last chance to modify the statistical analysis plan—once the primary hypotheses are tested, all results are reported. This process means that when we conduct a statistical test, we are not only transparent about the conditions under which we will carry it out, but we are also transparent about whether we think that a test has crossed a threshold with respect to its prospective evidentiary value—that it is worth doing.

Sampling Strategy

The data used to evaluate the efficacy of this intervention came from a purposive (non-probability) selection of communities distributed across six districts in Zambézia Province for participation in the WF intervention. All 22 intervention communities in which SCIP conducted the intervention were included in the evaluation.

The selection of girls for participation in the intervention within these communities was also purposive and largely unobserved – resulting in a second-stage of purposive (non-probability) sample selection. All adolescent girls who participated in the WF intervention and met the study eligibility criteria (described below) were invited to join the evaluation. SCIP staff introduced the study to its WF girl participants in the study communities and asked if SCIP could share the girl participants' names and contact information with study staff.

Comparison Cohort

To support valid causal inference with regards to the impact of the intervention, during the design phase of the evaluation (November 2015), we asked SCIP to produce a list of communities in the same six districts which might have received the intervention over the same

time period but did not due to time and program resource constraints. This created a list of 158 potential comparison communities; this list was used as the sampling frame. To reduce data collection costs, we excluded communities further than 80km from the district capital.

In the interest of producing adjusted comparisons, the initial plan was to sample three times as many comparison communities and prospectively match the comparison communities to the intervention communities with respect to the observed distribution of intervention communities across the six districts. However, we found that the sample frame contained an insufficient number of comparison communities in some districts and so we decided to take a simple, uniform random sample of 65 comparison communities.

The random sampling of comparison communities was followed by systematic sampling of girls within each of the randomly selected comparison communities. The sampling of the comparison girls began with data collectors working with the village chief to draw a map of the community, showing the boundaries and the center of the community. Starting at the center landmark, the data collector spun a bottle or ink pen and walked in the direction indicated to the boundary of the community. She counted the houses along the route from left to right through the community stopping at the boundary of the community. The data collector calculated the sampling interval by dividing the number of households she counted by 10 and the random start by multiplying the household count by a random number drawn for the community by the study statistician. The data collector then walked to the house corresponding to the random start value and conducted the first interview for that route. The data collector attempted to interview every n th household (n = sampling interval calculated for that route). If a selected household was not available, the data collector returned to this selected household six separate times to attempt to assess eligibility. Once the data collector was successful at introducing the study to the selected household, she asked how many girls aged 13-19 years lived in the household. Only one girl per household could be interviewed so when more than one eligible girl was in the household, the data collector wrote the girls' names on separate papers and had a household member select one name out of a hat without looking and this was the girl recruited. The data collector attempted to recruit the selected girl into the study six times. If the selected girl refused to participate, or could not be reached after six attempts, then another girl from that household was randomly selected, and so on. After completing an interview with an eligible girl, the data collector then moved to the n th household until she succeeded in interviewing girls from 10 different households in the community. If a household did not have any eligible girls or could not be reached after six attempts, the data collector moved on to the adjacent house.

To select comparison communities for this evaluation, SCIP tried to replicate the selection criteria used in the selection of intervention communities; however, the criteria used was never formalized or assessed in either group of communities. We therefore consider the two populations of communities to be non-equivalent such that direct or unadjusted comparisons of outcome means do not provide valid estimates of the causal effect of the intervention.

Eligibility Criteria

Girls had to meet the following criteria to be enrolled into the study:

- Participated in the WF intervention in a study community **or** reside in a comparison community
- Aged 13-19 years (aged 13-17 years when they started the intervention)
- Parental or guardian permission to participant (for participants 13-17 years)
- Willing to sign or make their mark on an informed assent or consent form (depending on age)
- Willing to provide contact information

Primary Outcome Variables

As mentioned above, USAID and SCIP program implementers defined HIV vulnerability for adolescent girls as engaging in intergenerational or transactional sex, lacking knowledge about HIV transmission, lacking knowledge about GBV (including laws, available services and safe spaces), or unwillingness to report gender-based violence and access HIV prevention services. Based on this definition of vulnerability, the original plan for this evaluation was to examine the impacts on the following outcomes:

- Willingness to seek medical help for GBV
- Willingness to report GBV
- Knowledge related to GBV
- HIV knowledge
- Self-reported six-month incidence of transactional sex
- Self-reported six-month incidence of intergenerational sex
- School attendance

Data Collection

Two rounds of quantitative data were collected from a sample of girls aged 13-19 years who participated in the intervention and a sample that did not. From April to May 2015 we interviewed 885 girls (266 who participated in the intervention from 22 communities, and 619 who did not participate in the intervention from 65 communities). Approximately six months later, from October to December, 2015, we interviewed 774 of the girls again (232 from the intervention group and 542 from the comparison group), representing approximately 87 percent retention.

Female data collectors, fluent in Portuguese and at least one local language required for the study and trained on research ethics and the study protocol, contacted potential study participants through phone or in-person visits in the community using the contact information supplied by SCIP staff (in intervention communities) or from the sampling exercise (in comparison communities). After receiving informed consent/assent, data collectors conducted the survey one-on-one in the local language (Portuguese, Lomué, Sena and/or Chuabo) preferred by the participant. (See Appendix 1 for quantitative surveys)

A proprietary mobile data collection software, Android Data Gathering System (Adgys), was used for developing the survey forms, gathering data on mobile devices, and securely sending the data to a server. Survey data was directly entered into mobile devices in the field by the data collectors. The electronic forms were automatically validated before transmission to the server to ensure that only complete forms were accepted for submission. The input fields had 'valid range' whenever appropriate to enable the automatic rejection of data entries outside of the acceptable range. Skip logic was built into the design of the forms so that only relevant questions were displayed, based on data entered to previous questions. Data were transmitted securely to the server over the cellular network or Wi-Fi. Data sets from the server were exported into SPSS version 23,³⁶ processed in Stata version 13³⁷ and converted using StatTransfer 6.1³⁸ into SAS/STAT version 9.3³⁹ and SAS EG 7.1⁴⁰ for analysis.

Data collectors made a maximum of six attempts to complete the data collection with each study participant at each measurement occasion. The number of attempts was recorded in the field logs. Field supervisors regularly monitored compliance with the recruitment procedure and the study protocol.

Matching

We employed exact matching and post-stratification weighting in order to deal with observed sources of non-equivalence across the two groups produced by our two-staged sampling strategy. The matching of the samples at the first stage of selection was based on a two-way, cross-classification of region and distance from the district capital in kilometers. The regions were created by grouping the six districts into three categories based on geographic proximity as well as language and cultural similarities. For the purposes of making causal inferences regarding the impact of the intervention, the communities from different districts within a region were assumed to be equivalent.

To balance the two samples on the level of social/economic isolation we also classified the communities into three categories based on the natural log of distance from the district capital. The 33rd and 66th percentiles of the empirical distribution of this variable was used to create categories of roughly equivalent sizes: < 30 km (20.7 percent); 30-50 km (44.87 percent); > 50 km (34.5 percent).

The cross classification of region and the categorical distance from the capital measure produced nine strata. Table 1 shows the distribution of intervention and comparison communities within each of these strata and the post-stratification weights that were used to match the distribution of comparison communities across the strata to the distribution observed in the intervention communities. These weights were only applied to the comparison communities. All intervention communities received a weight of one.

Table 1. Distribution of study sites and their weights, by region and distance from the district capital

Region	District	Distance from Capital	#Comparison <i>m</i>	#Intervention <i>n</i>	Community Weights <i>n/m</i>
North	Alto Mólucùè,	< 30 km	4	4	1
		Gurué	30 – 50 km	16	5
	Ilê	> 50 km	9	1	0.111111
Central	Mocuba	< 30 km	3	0	NA ¹
		30 – 50 km	12	1	0.083333
		> 50 km	14	2	0.142857
South	Mopeia	< 30 km	3	4	1.333333
	Morrumbala	30 – 50 km	3	2	0.666667
		> 50 km	1	3	3

The sample of girls within each of the randomly selected comparison communities was based on a uniform and systematic random sample of households within each community. In contrast, the sampling of intervention girls within each intervention community was purposive. Therefore, to adjust for observed sources of non-equivalence across the two samples at the individual level, we employed a similar strategy as described above. Specifically, the two samples were matched on a seven-category age/menarche classification variable, a binary orphan status indicator, and a binary measure indicating whether the girl resides in a female- or child-headed household. This produced $7 \times 2 \times 2 = 28$ strata at the individual level. The matching of the two samples and the derivation of the post-stratification weights was conducted within each of the nine-category community-level strata. This allowed for the selection process into the intervention to vary discretely over region and distance from the district capital and produced a sample that is matched on the full, joint distribution of both community-level and individual-level confounders. However, it also resulted in a considerable loss of cases from the sample, as girls from strata that did not contain at least one intervention girl and one comparison girl were dropped from the analysis. In the language of propensity score analysis, such cases lie outside the region of common support. Of the 589 girls from the comparison group with complete data on the matching variables, a total of 266 (45 percent) were dropped from the sample, giving us a reduced comparison group total of 323 girls. Of the 233 girls from the intervention group with complete data on the matching variables, 59 (25 percent) were dropped, giving us a reduced intervention group total of 174 girls.

Table 2 shows that the intervention girls are more or less uniformly distributed across the age/menarche classifications.

¹ Because there were no intervention communities within 30 km of the district capital in the central region, all data from the three comparison communities in these strata were dropped from the analysis.

Table 2. Age/menarche categories for the reduced (final) sample of intervention girls

	Frequency	Percent
< 14 years (Not reached menarche)	18	10.34
< 14 years (Reached menarche)	12	6.9
14 years (Not reached menarche)	8	4.6
14 years (Reached menarche)	21	12.07
15 years	22	12.64
16-17 years	57	32.76
18+ years	36	20.69
Total	174	100

Table 3 reveals that 80 percent of the girls in the intervention group are either orphans or reside in a child-headed or female-headed household – the majority are both.

Table 3. Orphan, and child or female-headed household (CFHH) categories for the reduced (final) sample of intervention girls

	Frequency	Percent
Not Orphan, Not CFHH	36	20.69
Orphan, Not CFHH	21	12.07
Not Orphan, CFHH	41	23.56
Orphan, CFHH	76	43.68
Total	174	100

Population of Interest

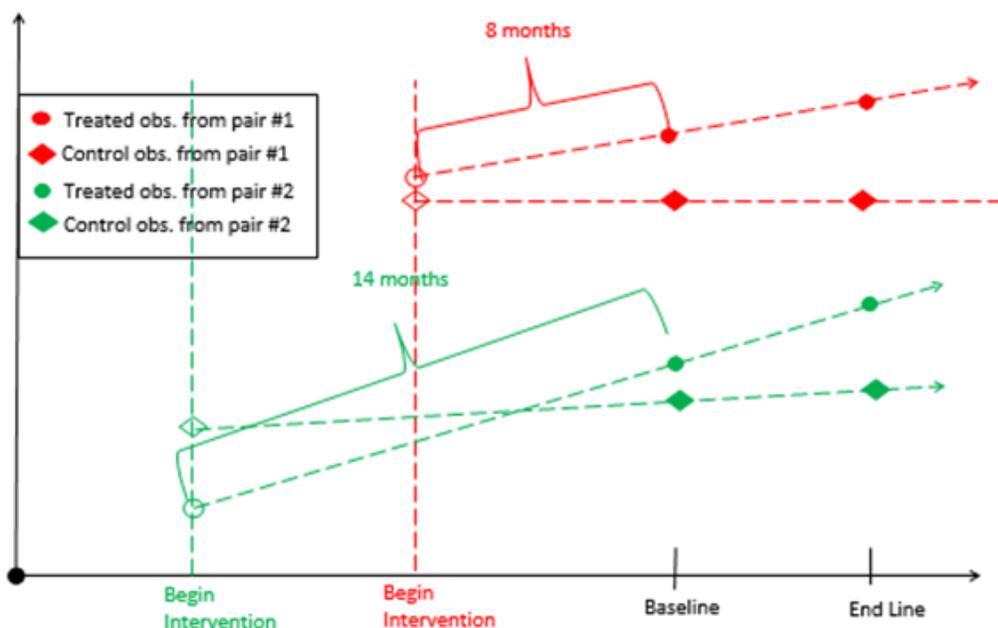
The primary population of interest consists of girls aged 13-19 years in communities in Zambézia Province, Mozambique who: 1) reside in one of the 22 intervention communities, 2) met our study's eligibility criteria, 3) participated in the intervention, and 4) fell into the region of common support (see above). Although exposure was measured at the community level, the outcomes are measured through repeated observations from a single cohort of girls from each sampled community. The within-community sample size (i.e. number of girls per community) was fixed in the comparison community: 10 girls per community. In the intervention

communities, the number included in the study varied somewhat, although the average was also around 10 per community. Since the treatment assignment unit is the community, we did not weight the individual responses to account for variation in the population size across communities. It is also important to note that the matching procedures and the post-stratification weights employed produce treatment effect estimates that have an average treatment effect on the treated (ATT) interpretation. In other words, we are estimating the impact of the intervention on the population of girls that was targeted by the WF intervention. After applying the post-stratification weights, the sample of girls from the comparison group are assumed to be sampled from an equivalent population and are no longer considered to be representative of a distinct population of interest. Moreover, we did not make any finite population size corrections in the analyses and assumed that we were sampling communities (and girls) from a “super population”⁴¹ because we sampled all the intervention communities (n=22) but only a sample of comparison communities (n=65 out of 158).

Statistical Models

We estimated the intervention’s impact using a regression-based, difference in difference (DD) approach. However, because the first measurement occasion frequently occurred a year or more after the start of the intervention, the group difference in the outcome mean at baseline was extrapolated (see Figure 3). In particular, the time variable in the DD regressions for girls in the intervention group was coded as the self-reported time (in days) since the start of the intervention at each measurement occasion. If we could not use self-report, due to problems observed in girls’ ability to conceptualize time, we used the dates of WF implementation in each community as reported by SCIP. Since the time of the start of the intervention was not observed for comparison girls, the time variable was set to equal the average of exposure times observed among the intervention girls within the same matched strata.

Figure 3. Regression-based, difference in difference (DD) approach extrapolating a baseline group mean



The design of this study required a complicated analytical approach. The complexity arose from the two-stage non-equivalent group pre/post design, the wide, within cluster variation in the length of treatment exposure among the intervention girls, and the four distinct levels of variation that results from the multi-staged and longitudinal sampling design. These levels are:

Community – level 4 (weighted)

Community by time – level 3 (omitted)

Community by girl – level 2 (weighted)

Community by girl by time – level 1

The statistical model was estimated using the GLIMMIX procedure in SAS, and depending on the measurement scale of the outcome measure – continuous, ordinal, or binary – we chose an appropriate link function and level 1 error distribution. Example syntax for a continuously scaled outcome is shown below.

```
proc glimmix data = analds3 method=quad empirical=classical;
class village subject;
model [outcome]= treat time
treat*time/
dist = gaussian link = identity solution;
random intercept / subject = village weight = village_weight;
random intercept / subject = subject*village weight =
subject_weight;
run;
```

The DD estimator is carried on the estimated coefficient for the `treat*time` term. The use of this parameter as our treatment effect estimate conditions our treatment and control comparisons on any initial differences between the two cohorts on the extrapolated baseline outcome means. The construction of `village_weight` and `subject_weight` was previously described. The `treat` and `time` are dummy variables indicating: 1) exposure to the intervention, and 2) time since the start of the intervention. Separate models were estimated for each primary outcome.

Prior to estimating the DD models described above, we created HIV and GBV knowledge composite scores from the collection of items associated with each knowledge construct. The

formation of the composite scores was informed by an exploratory factor analysis of the items under each construct (reverse coding items when necessary). The initial extraction method was principle components analysis (PCA). We determined the number of factors based on an examination of a scree plot. In order to improve interpretability, we rotated the extracted solution using an oblique rotation method. After rotation we dropped items that loaded on multiple factors. Only factors with three or more items with high loadings (> 0.4) were used in subsequent analyses. Factors with low face validity were also dropped. Composite scores representing each of the factors retained for analyses were created from items with high positive (> 0.4) or negative loadings (< -0.4) on a single factor. All items were standardized prior to averaging them into a composite score. We assessed inter-item agreement for each mean score using Cronbach's alpha and we dropped any factor with unacceptably low reliability (alpha < 0.7).

Sample Size and Statistical Power

The sample size for the intervention group was based on the total number of girls 13 to 19 years old participating in the WF intervention, which was estimated by the program to be approximately 300 girls. We evaluated the adequacy of this sample size by estimating the minimal detectable effect size (MDES) in a Monte Carlo simulation study. For our purpose, the MDES was operationalized as the percentage point difference in the likelihood of intergenerational sex between the intervention group and the comparison group. The sample size for the comparison group was not fixed by programming constraints but determined based on the desire to detect a 12.5 percentage point difference between the two groups from a baseline probability of intergenerational sex of 50 percent. At 80 percent power and type 1 error rate of 5 percent, our simulations indicated that we would need to randomly sample approximately 65 of the 263 pre-identified comparison communities while taking 10 girls from each sampled community for a total of 650 girls in the comparison group. In addition to the fixed sample size, we also assumed a moderate correlation between girls in the same community and time period (ICC = 0.166) and a slightly smaller within-community/between-time period correlation (ICC = 0.1388). Most of the residual variation in the outcome was assumed to occur at the individual level, so measurements from the same girl were assumed to be highly correlated (ICC = 0.6667).

We preferred adequate power for smaller effects that may be considered relevant for this program, but we were constrained by the fixed sample sizes of the intervention group as well as with the uncertainty regarding some of our assumptions. Thus, the actual MDES may be higher than our initial estimates.

Missing Data

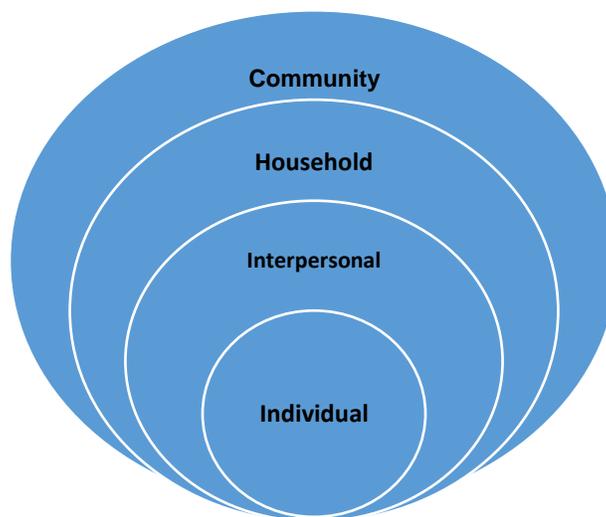
No missing data was imputed. Cases with missing values on the matching variables were dropped from the analyses. However, because the multi-level models employed in the analysis can handle data that is unbalanced within subjects (i.e. girls, communities), we retained all girls with valid observations on the primary outcome measures from at least one measurement occasion.

Qualitative Methods

Study Design

We conducted two rounds of qualitative data collection with a sample of girls who participated in the WF intervention and their household heads, influential men, and community members, guided by the Social Ecological Model (Fig. 4). The Social Ecological Model is a theory-based framework for understanding the multifaceted and interactive effects of personal and environmental factors that determine behaviors, and for identifying behavioral and organizational leverage points and intermediaries for health promotion within organizations.⁴² The most effective approaches to public health prevention and control use a combination of interventions at all levels of the model.⁴³

Figure 4. Social Ecological Model



We applied this framework to the qualitative component of this study in terms of both the design and the analysis. From a study design standpoint, in addition to girls who were in the intervention, we included girls' heads of household, men who girls identified as important in their lives, and community members who were familiar with the intervention in order to understand their perceptions of intervention impacts. Table 4 below outlines the total number of respondents planned in each category for Round 1 and Round 2, as well as the eligibility criteria.

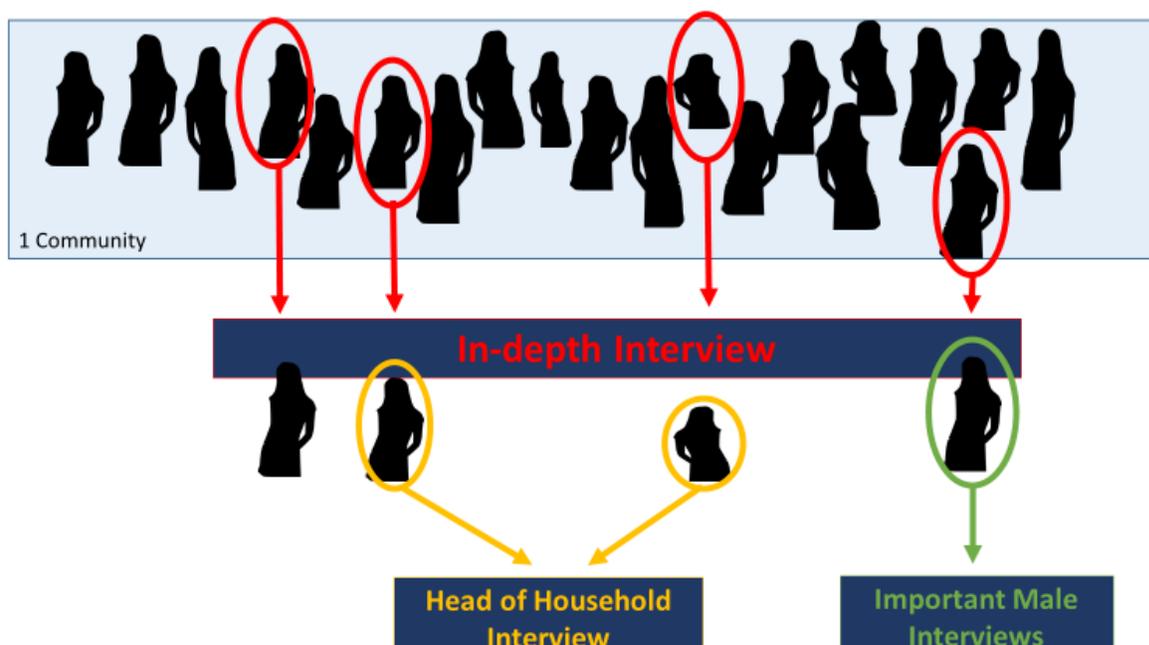
Table 4: Total number of respondents and eligibility criteria

Populations	Sample Size		Method	Eligibility Criteria
	Rd. 1	Rd. 2		
Girls	48	48	IDI	<ul style="list-style-type: none"> • 13-19 years at Round 1 • Participated in Women First (WF) intervention
Household Heads	24	24	IDI	<ul style="list-style-type: none"> • 18+ years • Identified by girl respondent as Household Head
Influential males	36	36	IDI	<ul style="list-style-type: none"> • 13+ years • Identified by girl respondent as an influential male in her life • Cannot be head of the girl participant's household
Community Members	12	12	FGD	<ul style="list-style-type: none"> • 18+ years • Knowledgeable about WF intervention and able to discuss community level effects

Sample Selection

We randomly selected two intervention communities per district for the qualitative interviews using the SURVEYSELECT command in SAS 9.3,³⁹ for a total of 12 communities selected. In each of those communities, we randomly selected four girls who had participated in the quantitative phase to participate in a qualitative interview using a random number generator of their study ID numbers that were used in the quantitative phase. Out of those four girls per community, we randomly selected two for whom we would interview their head of household and one for whom we would interview three influential men. If the selected girl was not able or willing to participate in the qualitative interview, we interviewed a pre-selected replacement girl. If the originally selected girl was one for whom we were supposed to interview her head of household or influential males, then we would attempt to interview the head of household or influential males for the replacement girl. No interviews with heads of households or influential males were conducted if the selected girl did not participate in the qualitative interview. Due to randomization, some girls were selected to invite both their head of household and influential males. See Fig. 5 below, which shows the qualitative sampling plan.

Figure 5: Qualitative respondent sampling plan



Girls selected to invite influential males to participate in an interview were asked to list five males who they felt close to and then rank them in order of importance. Girls invited three males on their list, in order of importance, to contact study staff if they were interested in participating in an interview.

Recruitment of community members for participation in FGDs began with study personnel meeting with government and local leaders as well as WF warehouse staff (Armazenistas) in each of the identified communities. These meetings allowed study staff to explain the purpose of the study and to request assistance in identifying 6-10 potential participants with direct knowledge of the WF intervention in their community. Once identified, these potential candidates were invited to a specific meeting place in the community, at which time study personnel met with each potential participant individually to describe the purpose of the study and invite them to agree to participate. If they agreed, written informed consent was obtained.

In the second round of FGDs, the same procedures as above were followed. Priority participation was given to community members who had participated in the first FGD.

For the second round of data collection, girls who participated in the first round were invited to do a second interview, and the same girls whose heads of household or influential males participated in Round 1 were invited to ask their current heads of household or influential males to participate in Round 2. This meant that the heads of household and influential males could be different between the two rounds.

The sample sizes for the qualitative data collection activities are based on purposive, nonprobabilistic sampling where the size of the sample relies on the concept of saturation or the point at which no new information or themes are observed in the data. Research has shown that saturation can occur within the first 12 interviews conducted in a relatively homogeneous group when the objective of the research is to understand common perceptions and experiences.⁴⁴

Data Collection

We conducted two rounds of qualitative data collection. From August 27-October 5, 2015, we interviewed 49 adolescent girl intervention participants, 24 of these girls' household heads, and 36 influential males identified by 12 girls (one per community), and conducted 12 FGDs with community members. The co-authors developed semi-structured interview guides for girls, heads of household and influential males, which covered the following topics: girls' participation in intervention (e.g. how they and other respondents felt about it, what girls learned); girls' experience earning money and what they spent it on; whether respondents thought girls' relationships had changed, including with household and family members, community members, friends, and sexual partners; girls' changed involvement in the community; girls' thoughts on dating, pre-marital sex, marriage, age of ideal partner, condom use; and girls' future goals. FGD guides covered topics related to how the intervention was implemented in their community; thoughts on girls earning money; and changes among girls and other community members resulting from the intervention (see Appendix 2).

From August 29 to October 5, 2016, we interviewed 47 of the 49 adolescent girl participants interviewed in the first round, 24 household heads, 36 influential males, and conducted 12 FGDs. In the second round, as mentioned above, girls were asked to identify their current household head and influential males, so in some cases these people are different between the two rounds. FGD members could have also been different between the two rounds.

Based on data from the first round, we modified the interview guides for the second round to ask explicitly about causal pathways that may lead to increased or decreased GBV and HIV risk among girls, variations in community norms and intervention implementation and sustainability of intervention effects (see Appendix 2).

Data Analysis

We used the Social Ecological Model as a lens to examine the intervention's direct impact on girls (individual impacts) and their relationships with friends, household members, and community members (interpersonal impacts), as well as broader impacts on households and communities.

We audio recorded interviews with the permission of the respondents, which interviewers simultaneously translated and transcribed from local languages into Portuguese, then professional translators translated them into English. The study team then reviewed the final transcripts for accuracy and uploaded them into the qualitative data analysis software NVivo Version 11.⁴⁵ For each round of data collection, we developed initial codebooks for each

respondent type based on the interview guides, then organized codes using the Social Ecological Model (individual, interpersonal, household, community levels) as well as other larger overarching themes such as causal pathways and potential harms.

Three qualitative analysts coded the data in NVivo 11 after each round of data collection. To assess intercoder reliability, teams of two analysts independently coded 12.5 percent of the transcripts and resolved coding discrepancies through discussion. The analysts updated the codebooks based on these meetings and re-coded transcripts when necessary. We took an iterative approach to codebook development for the second round of analysis, developing codebooks based on existing codebooks with additional revisions to reduce redundancies and harmonize codebooks with the socio-ecological framework. We generated coding reports and summarized data according to levels following the Social Ecological Model and other overarching themes.

Ethical Considerations

This study was reviewed and approved by the federally-registered institutional review board of FHI 360, the Protection of Human Subjects Committee, the Vanderbilt University Institutional Review Board, and the *Comité Nacional de Bioética para a Saúde* (National Bioethics Committee for Health) in Mozambique. All respondents provided written informed consent prior to participating in the study. We obtained written parental/guardian consent for respondents under the age of 18 years. Respondents did not receive reimbursement for participating in any study activity.

RESULTS

The results section begins with a description of respondent characteristics and contextual information about how the intervention was implemented, as described by the qualitative respondents. This is followed by quantitative and qualitative results relevant to the primary outcomes described in the Objectives section. The qualitative findings include information from both rounds of data collection and from the individual, interpersonal, household and community levels. Each qualitative subsection ends with a section on perceived sustainability of the positive intervention effects. After describing the primary outcomes, there are additional subsections that focus on other impacts of the intervention that were explored in the qualitative analysis. Finally, we outline challenges and complaints noted by the respondents and potential harmful effects of the intervention.

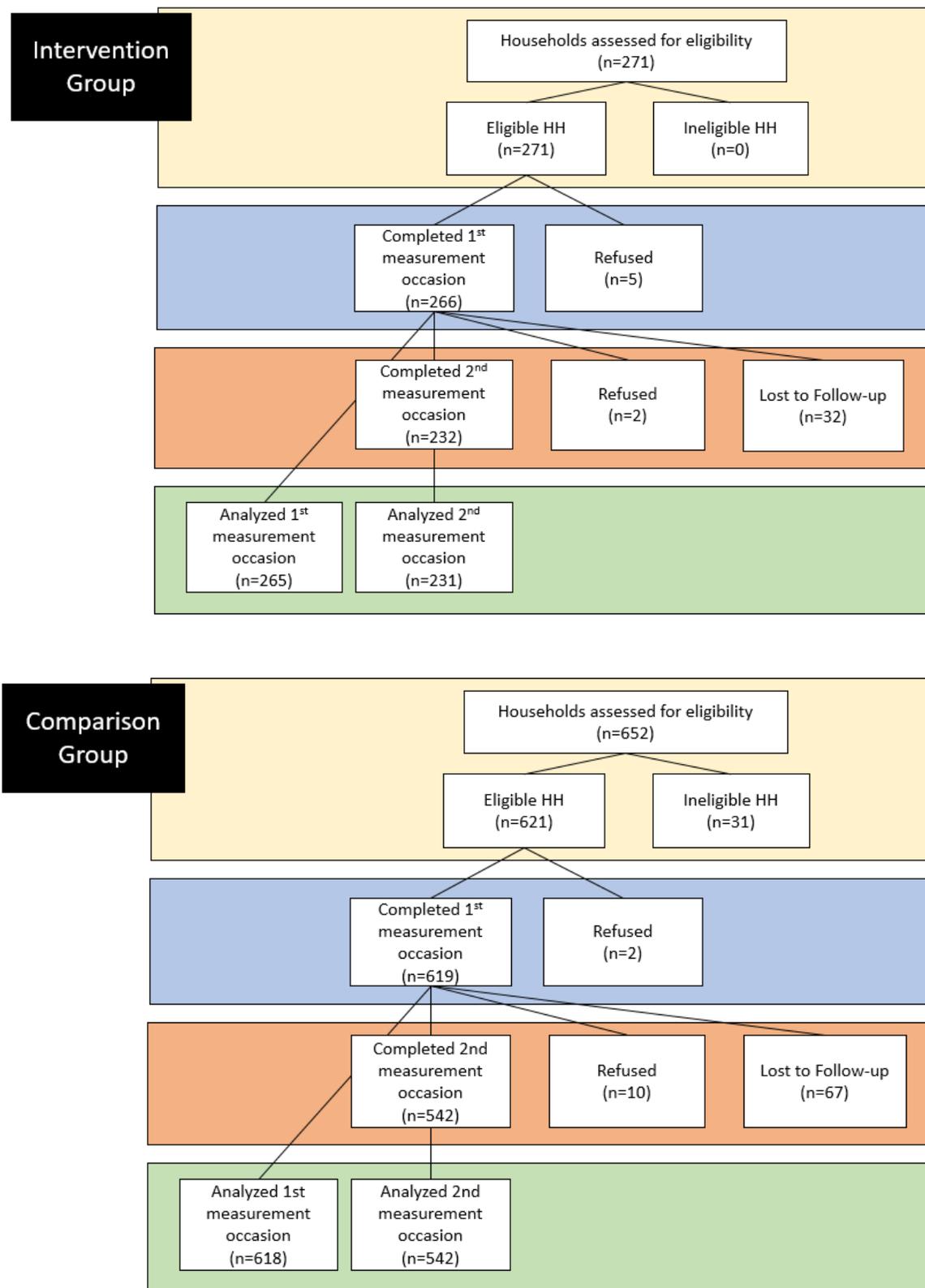
Respondent Characteristics

Quantitative Respondents

Participant Flow Diagram

Participant disposition flow for the intervention and comparison groups are shown in Figure 6, on the next page. The last row of the diagram shows the number of participants after the data were cleaned. During cleaning, we dropped two individuals: one in the intervention group for being outside of eligibility criteria and one in the comparison group at baseline for data entry errors. This resulted in a final analysis population of 265 intervention girls and 231 comparison girls for the first measurement occasion and 231 intervention girls and 542 comparison girls for the second measurement occasion.

Figure 6. Participant disposition flow charts for intervention and comparison groups



Context in Intervention Communities

In this section, we describe socio-demographic and other contextual variables at the first measurement occasion for the intervention sample. We conducted these preliminary analyses blinded to the treatment status to assess the validity and reliability of the outcomes measures. We also display the variables for the reduced intervention sample resulting from the matching procedure.

At the first measurement occasion, 249 girls had already started participating in the WF intervention; three of these had already left the intervention. Sixteen girls who were in the intervention group had not yet started intervention activities at the time of the first interview.

The median time that girls in the intervention group reported being in the WF intervention at the first measurement occasion was 365 days [mean (std) = 474 (478)]. The time in intervention was highly skewed due to one community that had implemented the intervention for five years, whereas most other communities had only implemented WF for one year. In the regression models, we dropped 32 girls from two communities with more than 377 days of exposure because these girls' start time were outliers.

The WF intervention officially ended prior to all endline interviews. At endline, all intervention girls who we re-interviewed said they participated in the WF intervention (data not shown). The median time of exposure at endline (n=231) was 570 days [mean (std) = 670 (495)].

Table 5. Length of exposure to Women First intervention

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=249*)	Reduced Sample (n=163*)
Days spent in Women First intervention		
Mean (std)	474 (478)	297 (126)
Median	365	365

*16 girls had not started WF at the first measurement occasion; 11 in the reduced sample.

Socio-Demographics

At the first measurement occasion, the mean age of the girls in the intervention group was 15.5 years. Most (85 percent) were single, 8 percent had a partner they did not live with, and 6 percent reported being married. Eighty-one percent of girls had reached menarche by the first measurement occasion.

Nearly half (49 percent) of girls had completed early primary (EP) 1 (grades 1-5) in school. The majority (84 percent) of intervention girls had lived in their community for at least the past three years. Sixteen percent of intervention girls reported ever having sex.

Table 6. Socio-demographics

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=265)	Reduced Sample (n=174)
Mean age in years	15.5	15.8
<i>std</i>	(2.0)	(2.2)
Marital Status (%)		
Single	84.9	81.6
Married / Cohabiting	5.9	5.2
Partnered/not cohabiting	8.3	11.5
Other	0.4	0.6
Missing	0.8	1.2
Reached menarche (%)		
Yes	80.8	82.8
No	19.3	17.2
Missing	0	0
Highest education (%)		
None	3.0	2.3
EP 1 (grades 1-5)	49.4	52.9
EP 2 (grades 6-7)	40.0	39.1
Basic secondary (grades 8-10)	7.6	5.8
Upper Secondary (grades 11-12)	0	0
Moved to Town in last 3 years (%)		
Yes	15.9	17.8
No	84.2	82.2
Missing	0	0
Ever had sex (%)		
Yes	15.9	19.0
No	83.4	79.9
Missing	0.8	1.1

Over half of the intervention girls (57 percent) report being a single orphan (lost one parent) and 9 percent report being a double orphan (lost both parents). The mean age of the girls' household head was 39 years. One percent of intervention girls reported living in a child-headed household. Sixty-two percent of intervention girls report living in a female-headed household.

Table 7: Family characteristics

Characteristic	First measurement occasion for Intervention group	
	Total Sample (n=265)	Reduced Sample (n=174)
Mother is deceased (%)	23.4	21.3
Father is/presumed deceased (%)	41.9	41.4
Single orphan (%)	56.6	48.9
Double orphan (%)	8.7	6.9
	<i>n</i>	
	265	174
Mean age of household head in years	39.4	38.5
	Missing	56
	<i>n</i>	37
	265	137
Child-headed household (%)		
	Yes	1.1
	No	93.2
	Missing	5.7
		4.6
Sex of household head (%)		
	Male	37.7
	Female	62.3
	Missing	0
		0
Female or child headed household (%)		
	Yes	62.6
	No	37.4
	Missing	0
		0
Relationship with mother/female adult over past year (%)		
	Worsened	1.9
	Stayed the same	50.9
	Improved	30.9
	Missing	15.2
		14.3
Relationship with father/male adult over past year (%)		
	Worsened	5.7
	Stayed the same	44.2
	Improved	21.5
		19.0

Characteristic	First measurement occasion for <u>Intervention group</u>		
	Total Sample (n=265)	Reduced Sample (n=174)	
	No response	28.7	28.1
Number of close girlfriends (%)			
	None	8.3	9.2
	One	15.5	14.9
	Two	29.1	26.4
	Three or more	43.0	44.8
	Don't know	4.2	4.6
	Missing	0	0

Qualitative Respondents

Table 8: Socio-demographics of qualitative intervention girl respondents

	Round 1 (n=49)	Round 2 (n=47)
Mean age in years, (range)	16, (13-19)	16.5, (13-25)
Married, n	6	14
Has boyfriend, n	8	7
Has living child(ren), n	7	13
In school, n	At least 24	15

The girls who participated in the qualitative interviews were about 16 years old (range 13-25 years). At Round 1, most were single and did not have children; however, by Round 2 several girls had married and had children. The information in Table 8 is based on self-report from girls, and responses sometimes varied in unexpected ways. For example, the study population had difficulties estimating their ages or they were not honest in reporting their ages. In several cases, what the girl reported about her age or marital status did not match what was said by her household head or influential males.

It should be noted that inconsistent probing across interviewers, especially in Round 1, affects the precision of the numbers shown here. For example, we did not directly ask girls whether they were attending school at Round 1, so there are 14 girls where it is unclear whether they were in school or not. Of the 15 who said they were in school at Round 2, 12 of them also said they were in school at Round 1, and it was unclear for the other three.

Table 9: Socio-demographics of girls' household heads

	Round 1 (n=24)	Round 2 (n=24)
Household head relationship to girl		
Mother	12	10
Father	3	5
Aunt	5	5
Grandmother	1	1
Husband	1	1
Sister	0	1
Uncle	2	1
Mean age in years, (range)	45.1 (25-79)	47.9 (26-80)

Most of household heads interviewed were female, and all were family members except one husband (for the same girl at Round 1 and Round 2). Several household heads interviewed at Round 2 were the same as those interviewed at Round 1.

Table 10: Socio-demographics of girls' influential males

	Round 1 (n=36)	Round 2 (n=36)
Influential male relationship to girl		
Uncle	17	18
Brother	6	7
Brother-in-law	0	2
Cousin	7	3
Father	2	2
Grandfather	2	1
Friend/Neighbor	1	3
Boyfriend	1	0
Mean age in years, (range)	34.8 (16-66)	35.4 (18-65)
Lives with girl	NA	9

Almost all influential males selected by girls were family members, with 'Uncle' being the most common relationship. Most influential males did not live with the girl (this was not asked at Round 1). Only one influential male invited by the girls to be interviewed at Round 1 was described as a boyfriend. Several of the influential males interviewed at Round 2 were the same as those interviewed at Round 1.

Table 11: Gender breakdown of community members who did a focus group discussion

Community members	Round 1 (n=118)	Round 2 (n=85)
Male	62	43
Female	56	42
Range of number of respondents per FGD	8-11	6-10

In FGDs, men were slightly more represented than women. About one-third fewer community members participated in FGDs at Round 2. Overall, FGDs had six to eleven community members. Several community members took part in an FGD at both data collection times.

Intervention Content and Implementation

This section describes what we learned about the WF intervention during qualitative interviews. During Round 2, FGD respondents were asked a series of questions about how the intervention was implemented in their community, including whether ASCAs were implemented in the community, how bicycles were distributed, and the number of sessions on the primary intervention components (HIV, GBV, Business, and Savings). Respondents in all interviews were asked when girls stopped receiving products, and girls were also asked when they stopped participating in the intervention. Details of how the intervention was implemented also emerged among other respondent types, typically in response to questions about what girls said about the intervention, what girls had learned about business and/or savings, and in descriptions of complaints and challenges related to the intervention.

Business Component

While there was some variation across communities and respondent types, overall, the information provided by respondents during Round 2 confirmed that dates of implementation varied across communities and that the structure of the business component included business education followed by sales of items included in a business “kit”. Respondents were not systematically asked for details of how the business component and kits operated, but respondents generally described a system whereby girls received a subsidized kit. Participants were expected to re-pay the program for the kits with a portion of their sales in order to receive the next kit, with the remainder of their revenue considered profit to be spent or saved. Respondents generally described a series of business kits that increased in value; once a girl sold her third kit, she was considered a “graduate” and was eligible to receive a bicycle. Soap and ingredients for baking cakes (flour, sugar, oil, etc.) were the most commonly described products in the kits, but some respondents also mentioned batteries, rice, biscuits, and spaghetti. Here, an FGD respondent describes “graduation”:

For someone to receive a bike, they had to sell the kits of products that were provided several times. When they completed a certain quota and paid back everything, they were given a bike as a reward. That meant she graduated and had the right to have a

bike to go further to buy her products to sell. Also, she could sell her products in a further place, like a distant market or something like that. - FGD, Round 2

However, some respondents in a few communities complained that not all girls in the community received as many products or kits as expected. One respondent in an FGD offered this explanation for why some girls received fewer kits.

Some [girls] were benefited and others were harmed. And that's because those who received products and sold it in the beginning, continued doing business to this day because they were able to sell all three kits. They finished it and received bicycles, while the others had to wait until the others returned the ASCAs money so they could be benefited. So then they sold it once or twice, and the program closed. They were not able to save money in order to continue with the business, and ended up stopping their business because the money wasn't enough. Some even stopped studying due to a lack of money. - FGD, Round 2

Additionally, in at least some cases, FGD respondents perceived that only those who finished their kits first received bicycles (*"The girls were the ones who received bicycles, which was when they returned the money that they owed during the business. But the ones who took too long did not have the right"* – FGD, Round 2), and in three communities, FGD respondents said none of the girls received bicycles. While they were not asked systematically about bicycle distribution, in one of the communities where FGD respondents said none of the girls received bicycles, heads of households and influential males provided information that seemed to confirm this problem. Meanwhile, girls and other respondents in four other communities provided information that confirmed that girls who met their sales goal received bicycles.

ASCAs

During Round 2, respondents in each FGD were asked whether their community had an ASCA, and if so, if the girls participated, if the ASCA was still operating, and if the girls were able to receive loans. According to the respondents, there was no ASCA in four communities. Among the eight communities who said they had an ASCA, it seemed in one case only adult women participated in savings, but girls were able to take loans (*"The girls didn't do savings; the adult women were the ones who did the savings and who participated in the first group."* – FGD, Round 2). Among communities with an ASCA, half mentioned a social fund or other mechanism to give money to orphans or vulnerable people (*"[The social fund] is an amount that we also save, and it is to help when people in the group are sick"* – FGD, Round 2), and six described business loans as part of the ASCA; in two communities participants clearly specified that girls could not receive loans, but could do savings.

I: Could the girls ask for a loan?

R1: No. They would only receive the goods to sell and then they would hand in the money and receive a bicycle once they had graduated.

I: Why not?

R2: Because they could do business with those products and once they had finished selling them and after they had handed in the money they would receive more products.

- FGD, Round 2

Table 12: ASCA presence and characteristics by community

Community	No ASCA	ASCA existed	Business loans available to girls	Charitable giving component
1010201 (Mopeia, Rimba)	X			
1010203 (Mopeia, Lima)	X			
1020101 (Morrumba, Cebola)		FOR WOMEN	X	X
1020201 (Morrumba, Mponha)	X			
1030101 (Mocuba-Munhiba, Muedamanga)		X	X	X
1030103 (Mocuba-Munhiba/ Mocuba, Muedamanga/ Munhiba-Muedamanga/ Muedamanga-Linda/Linda)		X	X	X
1040201 (Ile, Muliquela)		X	FOR WOMEN	
1040401 (Ile, Phalane-Vierua/ Vierua)		X	FOR WOMEN	X
1050101 (Gurue/ Alto Gurue, Muagiua)		X	X	
1050201 (Gurue, Ruace/ Ruace-Sede)		X	X	
1060101 (Alto Molucue, Mucorro/ Caiaia-Mucorro)	X			
1060201 (Alto Molucue, Chapal-Retxua/ Retxua)		X	X	

In four of the communities with an ASCA, participants said they were still operating at Round 2, but in three communities they said the ASCA had failed since the intervention ended. Here, respondents described how participants were unable to keep the ASCA going after the intervention ended.

I: Now, my dear, tell me, is there a savings program like ASCAs here in your community? It's also known as a savings group of cumulative and working capital.

R: The savings group may exist but because of the lack of money at this moment, the group is failing. It seems like the person who was managing the program is not here

anymore, so I think the participants started to save by themselves and they don't know how to manage the money, how to calculate the amounts per period, who contributed with how much, and the right dates to withdraw money. - FGD, Round 2

Table 13. Sustainability of ASCAs by community

Participant	ASCA existed	ASCA still operating	ASCA no longer operating	Not asked
1020101 (Morrumba, Cebola)	X (ADULT ONLY?)	X		
1030101 (Mocuba-Munhiba, Muedamanga)	X	X		
1030103 (Mocuba-Munhiba/ Mocuba, Muedamanga/ Munhiba-Muedamanga/ Muedamanga-Linda/Linda)	X	X		
1040201 (Ile, Muliquela)	X		X	
1050101 (Gurue/ Alto Gurue, Muagia)	X		X	
1050201 (Gurue, Ruace/ Ruace-Sede)	X	X		
1040401 (Ile, Phalane-Vierua/ Vierua)	X		X	
1060201 (Alto Molucue, Chapal-Retxua/ Retxua)	X			X

While not systematically asked about ASCAs, other respondent types sometimes mentioned community savings and loan mechanisms that they associated with the intervention, including some informal arrangements. These findings are described in the section on financial impacts of the intervention.

What Girls Learned and Used Most from the Intervention

During Round 1, we asked all respondents an open-ended question about what girls learned in the intervention. In response to the open-ended questions, girls most commonly mentioned learning about the business component, followed by HIV, GBV and savings. Additionally, several girls spontaneously mentioned they had learned about sexual characteristics of women and men, being respectful, children's rights, the importance of going to school, and gender equity in the home. Other, less commonly mentioned topics included condoms, gender roles, importance of delaying dating/marriage/pregnancy, family planning, personal hygiene, not to call others names, and avoiding transactional sex/abstinence. Responses from other respondent types largely echoed girls' responses, but they were more likely than the girls to mention that girls learned to be respectful in the community and to be obedient and/or helpful at home. Other

respondents mentioned violence less commonly than girls and did not mention puberty/sexual characteristics. After the open-ended question, we asked all respondents specifically about what girls learned about business, HIV, violence, savings, and ASCAs; these results are included in the findings related to the primary outcomes and other outcomes in the sections below.

During Round 2, we asked girls, their heads of households and influential males what girls liked the most from what they learned in the intervention, and what they continue to use in their daily lives. Girls most commonly responded that they like and continue to use what they learned about business, savings, and HIV. Less frequently, girls mentioned learning to respect others, using condoms, and the importance of going to school. Girls' heads of households and influential males provided answers that supported what girls said, and also most frequently mentioned business, HIV and/or condom use, and savings.

Notably, in response to this question, nearly one-quarter of girls stated that they were not currently using anything that they had learned in the intervention or described a negative impact that occurred once the intervention ended, such as a business failing. This may suggest that although girls retained the knowledge gained through the intervention, their ability to actualize what they had learned was limited by external factors (such as, for example, businesses failing after the intervention ended).

Additionally, during Round 2, each FGD was asked specifically about the number of sessions the girls had on four intervention topic areas: HIV, GBV, Business, and Savings. While there was rarely consensus on the number of sessions and no clear trends across communities, respondents generally seemed to agree that there were multiple sessions on each topic in every community (meaning they never said the girls in their community did not have education on any of those four topics).

Primary Outcomes

This section focuses on the primary outcomes explored in the quantitative portion of this evaluation, including impacts on GBV, HIV knowledge, sexual behavior, and school attendance. Quantitative results from girls are presented first, followed by qualitative results, which include multi-level effects based on both rounds of data collection. We achieved thematic saturation on the qualitative data related to the primary outcomes.

Gender Based Violence

Quantitative Results

Seventy percent of intervention girls said they were likely to report an incident of GBV and 68 percent were likely to seek medical help for an incidence of GBV.

Table 14: Primary outcome variables

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=265)	Reduced Sample (n=174)
Willingness to report GBV (%)		
Likely	70.2	73.0
Unlikely	29.8	27.0
Missing	0	0
Willingness to seek medical help for GBV (%)		
Likely	67.6	67.8
Unlikely	31.7	31.0
Missing	0.8	1.2

Seventy-two percent of intervention girls at the first measurement occasion knew that laws against rape and sex with minors exist. When asked to list “safe places” 87 percent of girls mentioned home. The next most common responses were a relative’s house, school, community leader’s house, and religious institution. Eight percent of intervention girls were unable to identify a “safe place”.

When asked about places to go for help if sexually assaulted, intervention girls were most likely to say police, followed by family, local leader, youth-friendly health center, and then health center (youth-friendly not mentioned). Nine percent of girls said they don’t know where to go if sexually assaulted. At the first measurement occasion 17 percent of intervention girls did not know any effects of GBV.

Girls were asked the open-ended question, “In your opinion, what should someone do if they are raped?” A quarter of the intervention girls said go to the police at the first measurement occasion. The next most common response (23 percent) was to go to a youth-friendly health center (SAAJ) within 72 hours. Thirteen percent of intervention girls said they don’t know what someone should do. Only 4 percent of girls correctly stated that clothes should be wrapped in paper.

When asked the open-ended question, “In your opinion, what should someone NOT do if they are raped?” nearly half the intervention girls at the first measurement occasion (47 percent) said they don’t know. A quarter said that someone who is raped should not shower before going to the hospital or police. Fourteen percent mentioned to not wash or destroy clothes and 13 percent noted that clothes should not be wrapped in plastic.

Table 15. Knowledge related to gender-based violence

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=265)	Reduced Sample (n=174)
Knows rape law exists (%)		
Yes	72.1	72.4
No	17.7	18.4
Unsure	10.2	9.2
Missing	0	0
Knows sex with minors law exists (%)		
Yes	71.7	73.0
No	15.1	16.1
Unsure	13.2	10.9
Missing	0	0
Places that are safe (%)		
Home	86.7	85.6
Relative's house	14.0	12.1
School	12.8	16.7
Community leader's house	9.8	9.8
Religious institution	8.7	6.9
Friend's house	6.8	6.3
Health center	0.4	0.6
Youth-friendly health center (SAAJ)	0.4	0.6
Market	0	0
Office/workplace	0	0
Other safe place mentioned	0	0
Unsure	8.3	8.1
Missing	1.1	1.2
Places to go for help if sexually assaulted (%)		
Police	44.5	40.2
Family	29.1	34.5
Local official/leader	19.6	24.7
Youth-friendly health center	19.3	12.6
Health center	11.3	7.5
Friends	7.2	6.3
Religious institution	4.5	4.0
Neighbor	1.1	1.7

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=265)	Reduced Sample (n=174)
NGO	0.8	0.6
Other	0.4	0.6
Unsure	9.1	8.6
Missing	2.3	3.5
Mentioned as an outcome of gender-based violence (%)		
Undesired pregnancy	58.9	55.2
STIs/HIV	50.9	48.3
Death	28.7	24.7
Fear of being alone	3.0	3.5
Trauma	2.6	2.9
Fear of men	2.6	2.9
Depression	2.3	2.9
Gynecological problems	1.9	2.9
Poor school work	1.5	2.3
Fear in general	1.1	1.7
Sickness	1.1	1.7
Drug / alcohol abuse	0.4	0.6
Guilt	0.4	0.6
Low self-esteem	0.4	0.6
Sleeplessness / Nightmares	0.4	0.6
Suicide / self-harm	0.4	0.6
Painful sex / Injurious sex	0.4	0.6
Irritability	0	0
Other	0	0
Don't know	16.6	17.2
Missing	1.5	1.7
What to do if raped (%)		
Report incident to police	24.5	20.1
Go to a SAAJ within 72 hours	22.6	20.7
Go to a SAAJ (no time specified)	14.3	8.1
Go to a health facility within 72 hours	7.2	7.5
Go to a health facility (no time specified)	3.4	3.5
Take clothes to police	7.8	7.5
Wrap clothes in paper	3.8	4.6
Leave a mark on the perpetrator	3.4	1.2

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=265)	Reduced Sample (n=174)
Note the name of the policeman who takes report	0.8	0.6
Tell an official / leader (not police)	0.8	1.2
Tell family	0	0
Don't know	12.8	14.4
Missing	18.5	23.6
What NOT to do if raped (%)		
Shower before going to the hospital or police	25.3	16.7
Wash / destroy clothes	14.3	12.1
Wrap clothes in plastic	13.2	10.9
Other	9.1	11.5
Don't know	46.8	54.0
Missing	4.2	5.2

Exploratory Factor Analysis (EFA) for GBV knowledge

We initially considered 53 GBV knowledge items for use in the formation of a composite knowledge score. However, after dropping and combining some of the items based on face validity, only 30 were used in the EFA. Examination of the scree plot strongly suggested a single factor that accounted for 14 percent of the total variation among the items. Of the 30 items, 10 had loadings that exceeded the 0.4 cut-off we established for inclusion in the composite score. The 30 items included in the EFA and their loadings on the retained factor are shown in Table 16. Due to space limitations, we do not include the table showing how means of the items used in the composite score varied across discreet levels of the composite measure. However, the standardized Cronbach coefficient alpha for the 10 items was quite good, 0.76, and an examination of the table indicated that the mean of most of the items increased monotonically over the levels of the composite measure.

Table 16. Items and loadings on GBV knowledge factor

	Factor1
If raped, knows to go to a health center	0.62
Find help: Health Center	0.59
If raped: do NOT take shower before go to police/hospital	0.59
If raped, knows to go to police	0.55
Find help: police	0.50
If raped: do NOT wash or destroy clothes	0.49
Knows have law against sex with minors	0.47
GBV causes STDS	0.47
Knows have law against rape	0.46
GBV causes undesired pregnancy	0.45
GBV causes poor school performance	0.39
Safe place: religious institution	0.39
If raped: do NOT wrap clothes in plastic	0.39
If raped: leave mark on attacker	0.39
Safe place: Health Center	0.37
Safe place: relatives, community leaders, or friends house	0.37
GBV causes sleeping trouble, depression, and irritability	0.37
Find help: religious institution	0.36
Safe place: School	0.32
GBV causes fear of men	0.27
GBV causes guilt	0.26
GBV causes death	0.25
GBV causes fear of being alone	0.23
GBV causes trauma	0.20
If raped: wrap clothes in paper	0.19
Safe place: home	0.13
GBV causes gynecological problems	0.08
Find help: relatives, neighbors, or friends house	0.02
If raped: tell family	-0.04
If raped: tell official other than police	-0.06

Grey highlight indicates variables included in the factor

Preliminary model runs for GBV outcomes

Given our reliance on an extrapolated baseline mean and the need to estimate complex statistical models that include both girl and community-level variance components, we wanted to verify that the models converged on sensible values. We therefore estimated a preliminary set of models for each outcome using only data from intervention girls across both measurement occasions (see Appendix 3). Although the estimates we obtained for the extrapolated mean seemed reasonable for all the outcomes, this was not the case for the estimated variance components. The between-girl variance component indicated that two measures of the GBV – seek medical help indicator sampled from the same girl were inversely correlated. We encountered a different problem with the binary GBV reporting indicator. The estimated variance

components for this outcome suggested that the within-community associations were negative. We decided to drop these outcomes from further consideration for two reasons. First, the negative, within-girl associations raise doubts about the validity of these measures – particularly when the negative associations are observed within girls rather than communities. Second, there is also no way to estimate weighted regression models with marginal residual error structures; when employing sample weights at multiple levels, only conditional (i.e. random effect) models are available in SAS. Thus, even if we were to regard negative, within subject and within community associations as credible, we would be unable to estimate a properly specified mixed effects regression model.

The values obtained for the GBV knowledge indicator converged on reasonable values and therefore we retained this outcome.

Estimate of the Impact of the Intervention for GBV knowledge

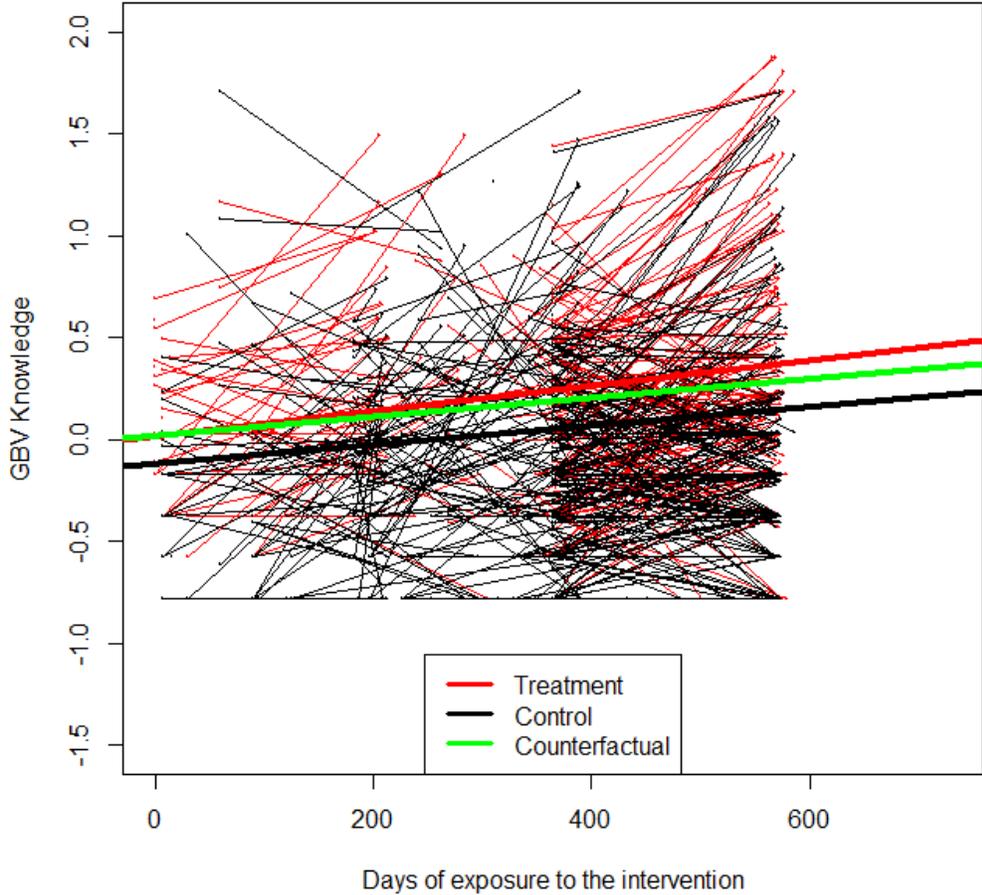
Table 17 contains the parameter estimates, fixed effects and variance components from the post-stratification weighted generalized linear mixed regression models predicting the GBV knowledge outcome. The intercept is the extrapolated mean outcome at baseline for the comparison group, while the main effect for “Study Group” is the difference between the intervention group and the comparison group at baseline. The third parameter is the average rate of growth in the outcome mean among the comparison girls during the post-intervention period, while the difference between the study groups in the growth rate is given by the interaction between days from the extrapolated baseline and study group. This estimate is also the DD estimate and we evaluated the cumulative effect of this differential rate of growth at 730 days (2 years) from the extrapolated baseline. This estimate is reported on the last line under the “fixed effects” heading. Although the estimate was in the expected direction, and indicated a small, positive effect of the intervention, it was not statistically significant ($p=.70$). The table also reports the estimated variance components and associated intra-class correlation coefficients at the community, girl, and measurement occasion (residual) level.

Table 17. Parameter estimates from generalized linear mixed models – GBV knowledge

Parameter	Outcome GBV Knowledge
<i>Fixed Effects</i>	
Intercept	Est. (p-value) -0.12 (0.27)
Study Group (reference category = comparison)	0.14 (0.39)
Days from extrapolated baseline	0.0005 (0.07)
Study Group*Days	0.0001 (.70)
Estimated impact of the intervention at 730 days	.11 (.70)
<i>Random Effects</i>	
Community-level	Variance (ICC) 0.12 (.36)
Girl-level	0.03 (.14)
Residual	0.18

The results from the GBV knowledge model are summarized in Figure 7. Figure 7 displays each data point used in the estimation of the model along with the fitted regression lines for: 1) the intervention group (red), 2) the comparison group (black), and 3) the constructed counterfactual (green). The estimated impact of the intervention is shown as the difference between the red and green fitted regression lines and could be evaluated at any location within the post intervention period (up to 600 days). We provide this figure to illustrate our modeling approach. Any slight differences observed between the red and green fitted regression lines are not statistically significant and should not be regarded as evidence for a treatment effect.

Figure 7. Results for GBV knowledge model



Qualitative Results

GBV impacts on girls

Table 18: GBV impacts on girls

Women First Effects	<ul style="list-style-type: none"> • Aware of different types of violence and how to recognize, prevent and report GBV • Some girls experienced reduced physical and emotional violence and vulnerability to sexual violence • Also learned about gender roles, inequities and women’s and girls’ rights
How?	Educational component
Sustainable?	<ul style="list-style-type: none"> • Girls retained knowledge and awareness • At Round 2, some said they do or would report GBV when they see it

During Round 1, all respondents were asked specifically what girls had learned about violence. Girls reported learning about recognizing, preventing and reporting GBV and many girls were more attuned to the presence of GBV and gender inequities in their own communities. In Round 2, most but not all respondents were asked about this topic; girls most frequently reported learning about intergenerational sex (including rape/sex with children or child marriage), rape, reporting sexual violence, and gender-based physical violence (such as men should not beat women). At both time points, girls’ knowledge of GBV often appeared to be quite superficial, as girls often provided very brief descriptions of different examples of GBV. Similarly, girls’ conceptualizations of GBV were linked to other types of violence, as girls often listed many different types of violence and/or harassment when asked what they learned about GBV. At Round 2, for example, respondents described girls learning about division of household labor, verbal harassment or discrimination (i.e. calling people names, making fun of disabled people), general physical violence (not beating others), and fair treatment of children (i.e. children shouldn’t be forced to carry heavy loads) nearly as often as they reported girls learning about GBV.

About a quarter of girls in Round 1 mentioned learning about reporting GBV to the police, community leaders, and/or parents or seeking medical services at the hospital, but respondents were not specifically probed about reporting or seeking services. This number was higher in Round 2, with nearly one half of girls mentioning this. In response to the question about what girls had learned about GBV, a few of each of the other respondent types also mentioned reporting and types of violence; however, they were most likely to mention what girls had learned about equitable gender norms or describe physical violence.

The following quotes demonstrate what girls said they learned about GBV in the intervention.

I learned that men and women should go to the farm together to weed. Men must help with the household chores, such as cooking, washing, sweeping the house, and fetching water, like the woman. I learned that children shouldn't be beaten, mistreated, and they cannot carry heavy things. I learned that men shouldn't rape children. I learned that if there is violence we should complain to the police. - Girl, Round 2

When the program arrived, it taught us that older men shouldn't have sex with children, that's violence. When they find them, they tie them up and take them to the squad. - Girl, Round 2

During both rounds, though they were not asked directly about girls' experiences of GBV, a few respondents stated that girls now no longer experienced GBV, or, more frequently, that girls were now able to avoid GBV, report their own experiences of GBV if assaulted, or help others report GBV, due to what they learned in the intervention. For example, two girls described reduced GBV as a result of the intervention:

Our dads don't beat us like before; they would drink and insult us a lot, and now they have stopped all of this because of the Women First program. - Girl, Round 2

[In the past] a lot of men beat people. They would drink and insult others; their wives, neighbors, children. They grabbed breasts and butts. But with the teachings from the program this has reduced, they're afraid of getting arrested by the chief. - Girl, Round 2

During Round 2, the majority of respondents who discussed whether girls' increased knowledge about GBV was sustained after the intervention ended said the increased knowledge was sustained; largely, this consisted of respondents stating that girls still knew what GBV was, that they continued to talk about GBV to others, or knew one should report GBV. In both rounds, a few girls said that they forgot what they had learned about GBV. For example, one girl said,

I: And what did you learn about gender-based violence?

R: I already forgot.

I: Sister, didn't you learn anything about gender-based violence?

R: Auntie (aunt) I don't know because it's been a long time. I already forgot.

- Girl, Round 2

GBV impacts on households and communities

Table 19: GBV impacts on others

Women First Effects	<ul style="list-style-type: none"> • Others learned about GBV and reporting • Some reported reduced domestic violence in the community • Community members now aware that having sex with a minor is sexual violence
How?	Girls learned information in the intervention and shared it with others, including through presentations in some communities
Sustainable?	<ul style="list-style-type: none"> • Knowledge and knowledge transfer sustainable • Some evidence that physical violence reduced, mixed evidence of reduced sex with minors at community level

There was little data on GBV impacts at the household, interpersonal, and community levels at Round 1, as respondents were not specifically asked about impacts on these levels, and only a few respondents volunteered information about girls teaching others about GBV. In Round 2, we explored GBV impacts at these levels more systematically.

In terms of household-level impacts related to GBV, influential males and household heads were asked if the girl talked to them about GBV. The majority said that girls told them or their family members about what they learned about gender-based violence and reporting. For example, one household head in Round 2 described what the girl said about GBV: *“She said that if a man arrives home and beats you for no reason, the woman has to press charges with the police. The police will talk to him and next time, if he does it again, he will go to jail.”* It was generally unclear if the information girls told their families was new information to them or if they already knew it, but in a few cases family members explicitly said it was new information to them.

We did not ask about household-level impacts on actual GBV behaviors (e.g. reduced perpetration, reporting, seeking medical care), but some respondents talked about reduced violence at the household level as a result of the intervention. In the context of whether their families treat them differently as a result of being in the intervention, a few girls said that their family members no longer beat them.

Although not asked specifically about community-level changes in knowledge about GBV, during Round 2 all participants were asked whether they thought that the community’s thoughts on GBV and intergenerational sex had changed as a result of the intervention. In response to these questions, many respondents described changes in understanding or knowledge of GBV-related topics, including what constitutes GBV, what victims should do if they experience GBV, and the potential consequences to perpetrators of GBV. Information on GBV knowledge

changes at the community-level also came up in questions about intervention participants' relationships with peers and community members.

Among respondents who described some type of community-level increase in knowledge of GBV, about half mentioned either that victims should report it and/or that perpetrators could be punished. These actions were almost exclusively described in relation to sexual or physical violence, although in a few cases it was unclear (ex: "She said a girl can't be assaulted. She has to report it. She can't keep quiet." - Head of Household, Round 2) No respondents mentioned reporting or consequences for child rights violations.

The program helped people in the community in regard to violence by giving talks, the girls and women of the program learned that when someone rapes you, you must go to the local leader or to the police to complain or inform that 'I was raped' and then go to hospital. If you report to the leader, that person will be notified to be heard and made accountable. Other people in the community know about it too. This way the men in the community are afraid of raping girls.

- FGD, Round 2

In about two-thirds of the transcripts, rather than focusing on just knowledge and attitudes, participants described positive effects of the intervention on perpetration of sexual or physical violence against women or girls in the community, more equitable division of labor in homes, respect for children's rights (such as going to school or child labor), or reporting of GBV. When asked specifically if men in the community were less likely to approach girls for sex and if this extended to girls outside the intervention, at least two respondents from every community said this behavior had decreased for all girls. (More details are given in the section on Sexual Behaviors below.) For example, a community member in an FGD said:

Yes, it changed, because there were older men who liked this practice of having sex with minors, now with the program's arrival they were told that it is a crime and they're afraid. Even the parents who used to take their daughters to marry older men aren't doing it anymore, it doesn't happen as frequently.

- FGD, Round 2

However, at least one respondent in each of 11 of the communities said some men still approach girls for sex.

I: Are older men from the community less likely to look for teenage girls as sexual partners as a result of the Women First program happening in your community?

R: They do look for girls! But they know that if they are caught, they will go to jail. Girls know that if an older man tease or try to seduce her, all she has to do is to go report! He will be arrested.

I: Do you think this applies only to the participants of the program or to all girls?

R: All girls! The ones who accept this are the ones who lead a dirty life.

- Girl, Round 2

In Round 2, many household heads and influential males said that girls continue to talk to them about GBV. Additionally, when talking about community-level knowledge about GBV and/or reporting or consequences, respondents mentioned that girls from the intervention informed community members via both formal education (i.e. presentations) and less formal dissemination of information from girls to friends, family members, and the broader community. In several communities, respondents mentioned organized presentations given either by WF girls or the Ogumaniha project in general. While not systematically asked if these activities were still ongoing, some respondents specified that they are still ongoing, and most talked about them in the present tense.

Because the program Women First would give talks on gender-based violence mobilizing people not to rape women and children in order to avoid the risks of HIV.

- Influential Male, Round 2

No, ever since it started happening until now she talks to people [about violence] during church meetings.

- Influential Male, Round 2

What I have seen is that they give talks on Fridays where they offer advice about HIV/AIDS, domestic violence, malaria, hygiene.

- Influential Male, Round 2

Regarding informal exchange of information, respondents most commonly mentioned that WF girls talked to other girls about violence, but several also mentioned that girls tell their family members and/or other community members. The quotes below illustrate the multi-level pathway:

Not only for those girls who participate in the program but also for those who are not involved, they know [about violence] because of their friends, these teach the others, and the same girls might speak to their mother and the mother tells the father.

- Influential Male, Round 2

Everybody here in the community knows nobody can beat up a woman for no reason, one can't have sex without putting on a condom, one can't get married before turning 18, and an older man can't date or assault a minor girl...each girl who learned something transmitted the information to their family, neighbors and friends, so that the information reached all the community.

- Girl, Round 2

HIV Knowledge

Quantitative Results

Girls were asked the open-ended question, "What can a person do to avoid getting HIV/AIDS?" Nearly 60 percent of intervention girls mentioned the use of condoms at the first measurement occasion. The next most common responses were having only one partner at a time, abstinence and avoiding sharp objects. Girls were then asked the open-ended question, "What are all the ways people can acquire HIV/AIDS?" The most common response was unprotected sex, followed by having more than one sexual partner, blood, and needles/sharps.

Table 20: HIV knowledge

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (n=265)	Reduced Sample (n=174)
Ways of avoiding HIV (%)		
Use condoms	57.0	62.1
Have only one partner at a time	35.1	31.0
Abstinence	32.8	31.0
Avoid sharp objects	14.0	17.2
Go to hospital	0.8	1.2
Have sex only with virgins	0.8	0.6
Pray	0.4	0.6
Not breastfeed baby	0.4	0.6
Take medicine	0.4	0
Other – neutral response	0	0
Unsure	0.4	0.6
Missing	12.5	12.6
Ways of acquiring HIV (%)		
Unprotected sex	57.0	61.5
Have multiple partners	46.8	40.8
Blood	17.7	17.2
Sharing needles/sharps	16.6	19.0
From mother	4.2	4.6
Mosquitoes	1.1	1.2
Sharing food	0	0
Supernatural powers	0	0
Other	0	0
Unsure	6.0	7.5
Missing	9.8	10.3

Exploratory Factor Analysis (EFA) for HIV knowledge

We initially considered 17 HIV knowledge items for use in the formation of a composite knowledge score. However, many were dropped from consideration due to limited variability and a few were combined into a single indicator because they contained redundant information. In the end we only included six HIV knowledge items in the EFA. Examination of the scree plot strongly suggested a single factor that accounted for 31 percent of the total variation among the items. Of the six items, the loadings of only four items exceeded the 0.4 cut-off we established

for inclusion in the composite score. The items included and their loadings on the retained factor are shown in Table 21.

Table 21. Items and loadings on HIV knowledge factor

Knowledge Item	Factor1
Acquire HIV via mother	0.67
Avoid or Acquire HIV - Needles	0.66
Acquire HIV via blood	0.64
Avoid or Acquire HIV - Condoms	0.57
Avoid HIV through abstinence	0.37
Avoid or Acquire HIV - Monogamy	0.33

Grey highlight indicates variables included in the factor

The standardized Cronbach coefficient alpha for the four items to be used in the composite score was 0.55, well below the 0.70 cut-off we established as an acceptable level. Nonetheless, given the importance of this outcome measure, we decided to proceed despite its low reliability. We then standardized the four items before averaging them within each girl to form a composite HIV knowledge score. In Table 22, we break the continuously scaled composite score into four categories using quantiles of the observed distribution as cut-points. The data presented is aggregated across all girls, study groups, and time periods and is not weighted. By examining how the proportion of girls providing the correct answer increases over levels of the composite measure, one can get a sense about the amount of variation in HIV knowledge present in our sample of intervention girls. However, the low reliability of this measure is also evident in this table because the proportion of correct responses does not increase monotonically for every indicator (e.g. Avoid or Acquire HIV – Needles).

Table 22. Quantiles of composite HIV knowledge score

		Mean	N	Min	Max
Acquire HIV via mother	< 25 Percentile	0.00	486	0.00	0.00
	50-75 Percentiles	0.00	937	0.00	1.00
	75-90 Percentiles	0.00	68	0.00	0.00
	>90 Percentile	0.59	165	0.00	1.00
Avoid or Acquire HIV – Needles	< 25 Percentile	0.00	486	0.00	0.00
	50-75 Percentiles	0.43	937	0.00	1.00
	75-90 Percentiles	0.12	68	0.00	1.00
	>90 Percentile	0.93	165	0.00	1.00
Acquire HIV via blood	< 25 Percentile	0.00	486	0.00	0.00
	50-75 Percentiles	0.01	937	0.00	1.00
	75-90 Percentiles	1.00	68	1.00	1.00
	>90 Percentile	0.75	165	0.00	1.00
Avoid or Acquire HIV - Condoms	< 25 Percentile	0.00	486	0.00	0.00
	50-75 Percentiles	0.90	937	0.00	1.00
	75-90 Percentiles	0.88	68	0.00	1.00
	>90 Percentile	0.97	165	0.00	1.00

Preliminary model run for HIV knowledge composite score

We estimated a preliminary model for the HIV knowledge composite score using only data from intervention girls across both measurement occasions. The results were particularly troubling. The between-girl variance component indicated that two measures of HIV knowledge sampled from the same girl were inversely correlated. In other words, girls observed above the mean level of knowledge at the first measurement occasion were likely to fall below the mean over the subsequent measurement occasion (and vice versa). We decided to drop this outcome from further consideration because the negative, within-girl associations raise doubts about the validity of these measures and we are unable to estimate a properly specified mixed effects regression model.

Qualitative Results

HIV knowledge impacts on girls

Table 23: Girls' HIV knowledge

Women First Effects	Aware of ways to prevent HIV, including using condoms, avoiding sharps, avoiding multiple concurrent partnerships; HIV testing and treatment; PMTCT
How?	Educational component
Sustainable?	Sustainable for the majority of girls

During both rounds, we asked respondents about what girls learned in the intervention specifically about HIV/AIDS. Responses were similar in both rounds: girls and other respondent types most commonly mentioned that girls learned about HIV prevention, including using condoms during sex, avoiding used sharp objects (e.g. blades used by traditional healers or needles used at hospitals), and avoiding multiple concurrent partnerships. Less commonly mentioned topics included information about HIV testing and treatment, and prevention of mother to child transmission (mentioned only by a few girls). In Round 2, a few head of household and influential male respondents stated that girls did not talk to them about what they had learned about HIV. Additionally, a few respondents provided seemingly inaccurate descriptions of what girls learned, indicating possible inaccurate, inadequate, or poorly-retained HIV knowledge.

In Round 2, the majority of respondents who discussed whether girls' increased HIV knowledge was sustained stated that these changes lasted over the past year after the intervention left. In most cases, girls said they retained their knowledge of HIV or other respondents stated that girls who were in the intervention still talk to others about HIV or remember what they learned.

HIV knowledge impacts on households and communities

Table 24: Others' HIV knowledge

Women First Effects	Girls shared knowledge about HIV (what it is, how to prevent it) and a few mentioned HIV testing
How?	Girls learned information in intervention and shared it with others
Sustainable?	Girls continued sharing information with family members, peers, and community members

In terms of household-level impacts related to HIV, in Round 2, influential males and household heads were asked if the girl talked to them about HIV. The majority in both groups said that girls told them or their family members about what they learned about HIV, such as general information about the disease, how to prevent it and that you should get tested. A few girls talked about telling their family members about HIV but this question was not directly asked of girls. In addition, some respondents in Round 1 also mentioned that girls spoke to family members about what they learned about HIV.

In most cases, it is unclear whether girls were giving families new information or advice about HIV or whether the families already knew it. In a few cases, heads of household described how girls taught them new information about HIV. For example,

The program was very good because it taught our daughters how to do things that they couldn't do alone. For example, as far as HIV/AIDS we only heard it as a story, we didn't know how you catch it and that it is possible to avoid it. So this is very good, and I liked it a lot... it helped the girls and their families. Because no one had this knowledge before.

- Head of household, Round 2

Regarding community-level impacts on HIV knowledge, many respondents in Round 2 mentioned that other girls or community members had learned about HIV-related topics, particularly when responding to questions about whether there had been community level changes related to intergenerational sex, transactional sex, and GBV; whether norms around early marriage had shifted; and whether WF girls had talked to others about HIV or condoms. Most of these described that others in the community had learned about some aspect of HIV; most mentioned sexual transmission of HIV, including ways to reduce risk of sexual transmission, such as using condoms, avoiding transactional and intergenerational sex, reducing multiple partners, or abstinence. Several also mentioned non-sexual transmission via contaminated blades or needles. Only a few respondents said girls had encouraged or informed others about HIV testing. In addition, some respondents in Round 1 also mentioned that girls spoke to peers or community members about what they learned about HIV.

In Round 2, many household heads and influential males said that girls continue to talk to them about HIV, STIs, condoms and avoiding premarital sex. For example,

I: Did she perhaps speak with you or other people about HIV and the prevention of HIV?

R: She usually says that HIV is a disease that one gets via sexual relations without the use of a condom, it can also be transmitted via non sterilized blades, syringes and needles and from a person who has HIV, she speaks to me and to other people about it. She has also told me that one can prevent it by using a condom, by not using the same sharp object such as blades, needles and syringes.

I: Did that change after the program closed in September?

R: She still speaks about it at home with the family and those friends who did not join the program.

- Influential Male, Round 2

When participants talked about community-level changes in HIV-related knowledge, they often mentioned how girls communicated these topics, including that girls gave “presentations”, that they talked to or taught friends, family members, or general community members, or that there were other channels utilized (i.e. posters, radio). Respondents generally did not give much detail, so data was categorized as a formal presentation when respondents used words like “presentation”, “lecture”, or “community meeting”; if these types of words were not used, they were classified as informal communication. Participants most often said that girls taught other girls in the community, but this was also a common probe, so it is not surprising that it came up most often. Participants generally talked about these topics in the present tense, possibly indicating that the interpersonal communication on HIV continued after the intervention ended. For example:

They still hold talks at the hospitals, at the health council in the community, regarding precautions that should be taken during occasional intercourse, about water conservation and hygiene in the community and in the home, they still speak about family planning and the use of a condom.

- Influential Male, Round 2

Additional information about girls’ continued engagement in informational presentations is available in the Overall Intervention Sustainability section.

Sexual Behavior

Quantitative Results

In the tables that follow we show descriptive statistics for the primary study outcomes for the intervention girls at the first measurement occasion. Girls were asked a series of questions about their last three sexual partners. The last two partners were asked about only if they were within the last year.

Most (86 percent) girls in the intervention group reported not having sex during the six months preceding the first measurement occasion. The six-month incidence of intergenerational sex and transactional sex observed among the intervention girls at the first measurement occasion

were much lower than expected; therefore, we dropped these sexual behavior outcomes from the analysis because they could not be validity assessed in the study population. Only 1 percent of girls reported having sex with a partner 10 or more years older during the six months preceding the first survey. The six-month incidence of transactional sex reported by the intervention girls was 7 percent.

Table 25: Primary outcome variables

Characteristic	First measurement occasion for Intervention group	
	Total Sample (n=265)	Total Sample (n=174)
Among the last 3 sexual partners in past 6 months(%)		
No sex in last 6 months	85.7	82.8
All partners were younger or the same age as the girl	6.4	6.9
At least one partner was between 1-9 years older than girl	2.6	3.5
At least one partner was 10 or more years older than girl	1.1	1.2
Missing	4.2	5.8
Transactional sex in the last 6 months with one of last 3 partners (%)		
Yes	7.2	9.2
No	89.4	86.2
Missing	3.4	4.6

Qualitative Results

Sexual behavior impacts on girls

Table 26: Individual level effects on girls' sexual behavior

Women First Effects	Reduced casual sex and formal relationships, and transactional and intergenerational sex
How?	Primarily through increased economic independence due to business component Increased knowledge about HIV/AIDS, STIs, pregnancy, and the legal age of adulthood
Sustainable?	Generally, sustainable for girls who could maintain their businesses and income

Sex under 18 & multiple partners

Many girls mentioned that they learned that they should not have sex before marriage in the intervention, saying they had learned that premarital sex was “wrong” or “bad”, or girls that engaged in premarital sex were less valued or respected than those that did not. Fewer girls mentioned concrete negative impacts of premarital sex such as STIs in general, HIV specifically, and unintended pregnancy.

In both rounds, a few girls and several of their heads of household and influential males reported that girls ended a formal “dating” relationship or reduced their number of “casual” sexual partners due to their involvement in the WF intervention. Some respondents volunteered information that girls were now practicing abstinence or delaying sex until age 18 due to the intervention. Respondents reported that girls were less likely to engage in these relationships due to: (1) attitudinal changes that reinforced the physical risks as well as the social unacceptability of pre-marital sex for girls, linked to the educational component of the WF intervention, (2) increased economic independence due to the business component of the intervention, and (3) a change in priorities and preference to spend time on business and selling products rather than engaging with sexual partners.

Similarly, respondents noted that the educational component of the intervention influenced girls’ thoughts and intentions on the timing of marriage. Many respondents in both rounds noted that girls now intend to delay marriage after learning about GBV through having the intervention leaders tell them that marriage should not occur before the age of 18. Although some girls mentioned the potential health risks of early marriage, most girls mentioned that they delayed or intended to delay marriage because the legal age of marriage was 18 and that they believed that marriage before that age could increase their risk of becoming victims of GBV. The potential health risks of early marriage mentioned by participant girls included increased HIV risk and the increased risk of complications during early childbirth.

Girls who were not yet engaged in sexual relationships (about one-third of girls at Round 2) either viewed themselves as unaffected because they did not consider themselves ready for sex, or they reported a changed intention to not engage in these types of pre-marital relationships due to the educational component of the intervention and the economic options it provided.

Intergenerational and transactional sex

Before the WF intervention, having sex with men was a primary source of money and material support for adolescent girls in these communities. In Round 1, about one-third of girls and respondents in 11 out of the 12 communities mentioned that girls reduced engaging in transactional sex due to earning money through the WF intervention. Some respondents similarly described reduced transactional sex in Round 2 or stated that girls would have been having transactional sex if it were not for the intervention. Most girls that mentioned their own

reduced engagement in transactional sex mentioned that they were able to stop completely. However, the stigmatized nature of transactional sex may have influenced the way girls responded to these questions and some girls still involved in transactional sex may not have reported their continued activity. Girls also reported that if they were to stop earning money through the intervention or through their businesses, they expected that they would have to return to engaging in transactional sex for financial support.

According to respondents, involvement in the WF intervention reduced transactional sex through three avenues: (1) increasing access to resources and reducing reliance on men for money to meet basic needs; (2) competing with girls' time for transactional sex due to the time-intensive nature of the business component; and (3) providing education to change girls' perspectives on the acceptability of engaging in transactional sex. Sample quotes below:

I don't even know what I would do if it wasn't for this business that I have. I would be having sex with men in Lua-Lua to earn some [money] for my survival and my family's ... I think I would be a prostitute to help my mother, who is a farmer. What she produces isn't enough for all of us.
- Girl, Round 1

R1: This program helps the girls avoid prostituting themselves. They don't go out at night to whore.

R2: Yes, because some stopped going out with married men, older men and colleagues. They changed now because of the money from the cakes. We regret that it was such a short time for the learning.
- FGD, Round 1

In general, the concepts of having sex before 18, intergenerational sex, and transactional sex were highly conflated, with respondents seeming to believe that when girls chose to have sex before 18 it was because of poverty (i.e. transactional sex) and with older partners. Although it was mentioned less frequently, many respondents stated that girls took part in less intergenerational sex due to the intervention. Overwhelmingly, those respondents stated that these changes were due to learning that intergenerational sex was a crime/illegal and that they could acquire HIV/AIDS or "diseases" in general; furthermore, some respondents reported girls were no longer afraid to stand up to men and to threaten to report them if propositioned.

The girls were taught what to do to grow and prevent violence. When they are violated, if they go to school, they know where to report. So the violence is diminished because these girls studied here too. When a violent person comes to her they at least know how to flee this person who wants to violate her.
- FGD, Round 1

Condom and family planning use

In general, respondents from both rounds said that girls learned about condoms (for HIV and pregnancy prevention) and fewer said they learned about family planning methods through the intervention. Girls' knowledge about family planning seemed somewhat superficial, and focused

mainly on the concept of family planning such as saying one should go to the hospital to get family planning to space children, or listing short term methods such as condoms, pills and injectables. As described by one influential male:

She said that after getting married, you have to start your family planning to not have children back-to-back, to have time to educate your children so that they can grow better. Family planning is carried out by the man and the woman.

- Influential male, Round 2

In some cases, girls said they did not remember what they learned or did not understand what they learned about family planning.

At both rounds, some respondents from all groups described girls now using condoms to prevent pregnancy and/or HIV/AIDS; although respondents were not asked whether they used condoms due to the intervention, many mentioned girls learning about condoms or credit the intervention for their behavior. Fewer respondents described girls using oral or injectable contraceptives due to the intervention. Additionally, many girls in both rounds reported that they no longer wanted to get pregnant right now, and intended to wait until they were older and/or were married in order to start having children. Other girls indicated that they wanted to have fewer children and space their children apart in order to ensure their children would be healthy. Many girls in both rounds described wanting to or intending to use condoms or other family planning methods in the future for HIV prevention, pregnancy prevention, and birth spacing. The following quotes demonstrate changes in girls' condom use:

Before [sexual partners] did not consider me, and now they do...Before I entered the program I used to have intercourse without condoms. But after I entered the program I started using condoms.

- Girl, Round 2

I don't have a husband or a boyfriend. Very few times I have sex, and I demand the man put on a condom. I don't have sex with many partners like before...some accept to put on a condom for sex, some don't. For these ones, I say no...When they accept to put on a condom, I say yes.

- Girl, Round 2

Some girls said they actually use condoms, but more girls said that they do not. A few of these stated that they do not use condoms because their husband refuses or because they are married; a few additional girls mentioned trusting their husbands or girls simply not wanting to use condoms. Interestingly, simply being married seemed to be a legitimate reason for girls to not use (or not be able to use) condoms. Additionally, two girls stated that they did not use condoms in the past year after the intervention ended, and that they had unintended pregnancies. Both respondents conveyed a sense of surprise (“*I never thought I would get pregnant so soon.*”) and stated that they would use condoms in the future.

Sustainability

The positive effects on girls' sexual risk behaviors were generally sustainable for girls who could maintain their businesses and income, but not all girls could maintain their businesses. Some girls were very motivated to stay in school and reduce sexual behaviors. For example, a head of household in Round 2 said:

Before she joined the program she was out of control and I used to say that! Before concluding the 10th grade, she used to say that she wasn't going to do it, she was going to get married. But when she joined the program, she changed. Those boyfriends, who used to hang out with her, went away. We used to see her friends, each one with their boyfriends. Now, they are all gone. She is by herself and says "Mom, I don't want to hear about boyfriends until I finish school."

- Head of household, Round 2

In Round 2, some respondents (mostly girls) talked about how girls from the intervention re-engaged in transactional sex or multiple partners out of financial need or when their business failed. For example,

I would like for my husband to have a job to support the house, and I could stop having these lovers, because it is dangerous to have lovers. It's a problem when they find out, sometimes it even ends up in divorce.

- Girl, Round 2

Related to this, several girls at Round 2 reported getting married in the last year due to financial pressure or because of pregnancy. It appears that if the intervention's financial impacts had lasted, fewer girls may have gotten married or pregnant as this quote describes:

I was not able to accomplish my goals. I only sold products once ... I stopped studying, married at 16 years old, now this is not good. I cry when I see my girlfriends still doing business and studying.

- Girl, Round 2

Sexual behavior impacts on households and communities

Table 27: Intervention effects on girls' sexual behavior at the community-level

Women First Effects	Decrease in risky sexual behaviors among some girls who were not in WF Men feared punishment for having sex with minors
How?	WF girls taught other girls and community members what they learned about HIV and GBV
Sustainable?	Awareness of HIV and GBV remained high, but unclear to what extent men's fear of punishment translated to reduced GBV Lack of financial resources constrained girls' ability to maintain behavioral changes

Sex under 18 & multiple partners

At the household-level, several heads of households, influential males and respondents from FGDs said that they felt happy and proud that girls had reduced their sexual behaviors and that it reduced the shame they felt about the girls' previous behaviors. (More details in the Other impacts section below).

Regarding community-level impacts on sexual behaviors, respondents were not asked specifically about changes in sexual behavior among girls from the broader community outside the intervention during Round 1. However, a few respondents credited the intervention with reducing early marriage and pregnancy and GBV, which was seen as positive for the community; it was generally not clear if these improvements were seen as expanding to girls outside the intervention or had only been seen in WF girls.

What we used to see was that some would rush into marriages before growing up, but it was because they didn't have anywhere to go because of poverty. They had to look for friends to help them and give them soap. That's what we used to see, there were premature weddings, and with that our country will be ugly. - FGD, Round 1

This program doesn't benefit only the girls, we all benefit from the program, we all eat the cakes, we all know that the girls help us like they didn't do before, the girls stopped making children, and they go to school now. - FGD, Round 1

At Round 2, each interview guide included a series of questions about whether community perceptions about girls' involvement in sex had changed as a result of the intervention, including sex before 18, intergenerational sex, and transactional sex. Although the questions were phrased as "community thoughts", some respondents talked about general community attitudes or knowledge, while others focused on actual incidence of behaviors. In cases where respondents described actual changes in the incidence of sexual behaviors among girls, most described a decrease in girls having sex before turning 18, but respondents were generally not asked to clarify whether this applied to WF girls only or girls outside the intervention.

Regardless of whether they explicitly said attitudes or behaviors had changed because of the intervention, many respondents described generally negative community attitudes toward girls engaged in sex, while others noted that having sex with a minor is violence and/or puts girls at risk of negative health outcomes such as early pregnancy, HIV or other STIs. In the case of sex under age 18, the latter was much more common, but in some cases respondents expressed both ideas, such as in the quotes below:

When the program arrived, it taught us that older men shouldn't have sex with children, that's violence. When they find them, they tie them up and take them to the squad. And

girls who have sex before 18 years of age here in the community don't get married, they're called prostitutes.

- Girl, Round 2

There are families who think this behavior [sex before 18] is normal because they don't know this is a crime. Sometimes, it's the parents themselves who force their daughters to marry at a young age. They say the girls are big and have to get married, or because of poverty, they force their daughters to get married to help their families. Other families don't accept their daughters have sex or marry before they are 18. They force their daughters to go to school. These families, when they see girls having sex before 18, they say the girls are whores.

- Girl, Round 2

In cases where respondents described actual changes in the incidence of girls having sex before age 18, most described a decrease in girls having sex before turning 18, but respondents were generally not asked to clarify whether this applied to WF girls only or girls outside the intervention. In a few cases respondents noted that girls from the intervention had taught other girls these topics:

Girls used to like having sex before the right age in exchange for money, but when the program arrived here, they started training the girls and these girls transmit the idea to other girls. In general, they stopped having sex before turning 18.

- Head of household, Round 2

Others noted that girls still engaging in sex before 18 were not the girls from the intervention:

[Community members] say as follows: 'This [sex before 18] happens because they're not in the Women First program, and if they were these girls wouldn't do this. The girls from the program don't do this because they learned not to have sex before they're 18 years old.'

- Girl, Round 2

Intergenerational and transactional sex

As mentioned above, it was not clear in Round 1 whether respondents thought transactional sex had decreased among girls not in the intervention, but some talked about prostitution reducing generally and how this was good for the community. For example,

Now when I send her to the market she doesn't take long, she goes and comes back quickly, and she carries on her chores, and she doesn't care about boys.

I: What do you make of those changes?

I think that they are very good, they told them to be good, and it is a positive growth for these girls, and the community.

I: Why is it good for the community too?

The rate of prostitution and diseases are decreasing, and child mortality is also decreasing.

- Head of household, Round 1

At Round 2 each interview included questions on whether the community thoughts on girls' engagement in intergenerational sex and commercial sex had changed. Although the questions were phrased as "community thoughts", some participants focused on attitudes toward girls engaged in these behaviors, while others talked attitudes toward adults engaged in sex with minors and some talked about whether the actual practice of girls engaging in commercial and/or intergenerational sex work had decreased (and among whom). Although interviewers primarily used the terms "commercial sex work" or "sex workers," in the local context and based on the way interviewers probed about these practices, these terms refer to a broader definition of transactional sex than just formal prostitution and may also include exchanging sex for food, school fees, etc.

Overall, in Round 2, almost equal numbers of respondents said transactional sex practices had decreased among girls in the community as those that stated it is still happening. However, these descriptions are not mutually exclusive as evidenced by the quote below:

R1: Our daughters don't do that anymore; they do their little business and are able to buy their clothes and shoes.

R2: To me it happens, but not with all. Some do that because they can't buy soap, clothes and even food, which is the case with fish, oil and beans.

R3: This subject still happens, but it decreased because of the Women First program, which gave them product kits to sell and have their own money. The program also taught them that when a person has reckless sex, that person runs several risks, like, for example, a person can catch HIV, syphilis, mule (sexually transmitted disease), and other cases, it depends on each person.

- FGD, Round 2

Regarding the incidence of intergenerational sex, respondents often explicitly said it had decreased for girls inside and outside the intervention, including statements that adult men are now less likely to look for teenage girls as sex partners. However, as noted in the GBV impacts section, in most communities at least one respondent noted that intergenerational sex still occurs, and some highlighted that girls outside of the intervention had not been affected. For example, this intervention participant describes that older men still "prey" on girls who did not receive education through the intervention.

R: Yes, they don't look for it because we deny it. Because we were taught that otherwise they will get us pregnant or give us diseases.

I: Sister, when you say that they can give you diseases, what kind of diseases these men can give you?

R: HIV/AIDS.

I: Now, do you think that the fact that older men aren't looking for teenage girls as

sexual partners anymore only concerns the girls who participated in the Women First program?

R: They only look for the ones who are not in the program.

- Girl, Round 2

As noted above, many respondents answered these questions with statements about more general community attitudes or norms. Negative attitudes were especially pronounced in response to questions about girls engaged in commercial sex, especially among girls and FGD respondents. For example,

I: Did it change the way people from the community think about the girls' participation in commercial sex (sex workers)?

R: It did change through this Women First program, which used to talk a lot about HIV here in the community. That's why people here don't like these girls doing this, because they say that they will bring HIV/AIDS to the community, that's why people are afraid of HIV, because no one will want to marry these women who catch these diseases, and she will prostitute for the rest of her life.

- Influential male, Round 2

Here in Lima those kind of girls who have sex for money do not exist because they would be chased out of this community for that type of exchange, and we do not want that type of girl here.

- Influential male, Round 2

Although respondents did not often directly relate negative attitudes with the intervention teachings or content, their continued presence in Round 2 may indicate that the intervention had limited ability to combat negative social norms related to girls' sexuality. Similarly, many respondents mentioned that the intervention caused men to fear being caught for having sex with girls under 18 since it was a crime, but did not mention men changing their attitudes towards girls and their rights – such as having sex with a minor brings in inappropriate power dynamics: *Men fear going to jail, if they sleep with them [girls under 18] they would be raping them.* -Influential male, Round 2

Condom and family planning use

Regarding household-level impacts on condoms and family planning, at Round 2, influential males and heads of household were asked if the girl talked to them about pregnancy prevention. Almost half of household heads and almost two-thirds of influential males said that the girl talked to them about using condoms to avoid pregnancy, and using “family planning”, pills or injections to space pregnancies. In one case it appeared to be new information for the head of household but no males explicitly said that this was new information to them. It is also not clear if this knowledge transfer made any difference on household level use of condoms or family planning. Sample quote:

She usually tell us not to date because when we date many men, we get diseases...She told me to go to the hospital to take pills to avoid pregnancy and have sex with condoms only to not get pregnant.

- Head of household, Round 2

We did not ask about household-level impacts on actual HIV behaviors (e.g. condom use, testing behaviors, reducing number of partners), but in Round 2 one mother said she and her daughter got tested for HIV in the past year; and in another case a girl talked about how her family has changed their behaviors because of what she learned about HIV such as getting tested, bringing clean blades to the healer and making sure the syringes at the hospital were not used.

The experience [in the program] was very good...Because she learned a lot of constructive things, that even I didn't know; like how HIV is a big disease which kills and has no cure... Her and I even got tested this year for HIV here in the community.

- Head of household, Round 2

Regarding community-level impacts on condoms and family planning, some respondents said that girls talked to their peers or other community members about the importance of using condoms to prevent HIV and pregnancy and family planning to space births, both in informal ways as well as what seemed like more formal presentations. It is not clear whether this resulted in increased use of condoms and family planning by others in the community.

Sustainability

Several respondents from all groups said that girls continue to talk about issues related to sexual behavior informally and formally through presentations. While awareness of HIV and GBV remained high among community members, there is limited evidence that this knowledge translated into reduced high-risk sexual practices among girls in the community who were not in the intervention. The most promising evidence is related to girls' engagement in transactional sex. As noted in the section on GBV, community members posit the intervention with reinforcing awareness that sex with a minor is a crime, which may have reduced risk for some girls from the broader community.

School Attendance

Quantitative Results

Sixty-six percent of intervention girls were in school at the first measurement occasion.

Table 28: Primary Outcome Variables

Characteristic	First measurement occasion for <u>Intervention group</u>	
	Total Sample (N=265)	Total Sample (n=174)
Currently in school (%)	65.7	63.8

Preliminary model runs for school attendance

We estimated a preliminary model for the school outcome using only data from intervention girls across both measurement occasions. The values obtained for the school outcome converged on reasonable values and therefore we retained this outcome.

Estimate of the impact of the intervention for school attendance

Table 29 contains the parameter estimates, fixed effects and variance components, from the post-stratification weighted generalized linear mixed regression models predicting the school attendance outcome. The intercept is the extrapolated mean outcome at baseline for the comparison group, while the main effect for “Study Group” is the difference between the intervention group and the comparison group at baseline. The third parameter is the average rate of growth in the outcome mean among the comparison girls during the post-intervention period, while the difference between the study groups in the growth rate is given by the interaction between days from the extrapolated baseline and study group. This estimate is also the DD estimate and we evaluated the cumulative effect of this differential rate of growth at 730 days (2 years) from the extrapolated baseline. This estimate is reported on the last line under the “fixed effects” heading. Although the estimate was in the expected direction, and indicates a small, positive effect of the intervention, it was not statistically significant ($p=0.84$). The table also reports the estimated variance components and associated intra-class correlation coefficients at the community, girl, and measurement occasion (residual) level.

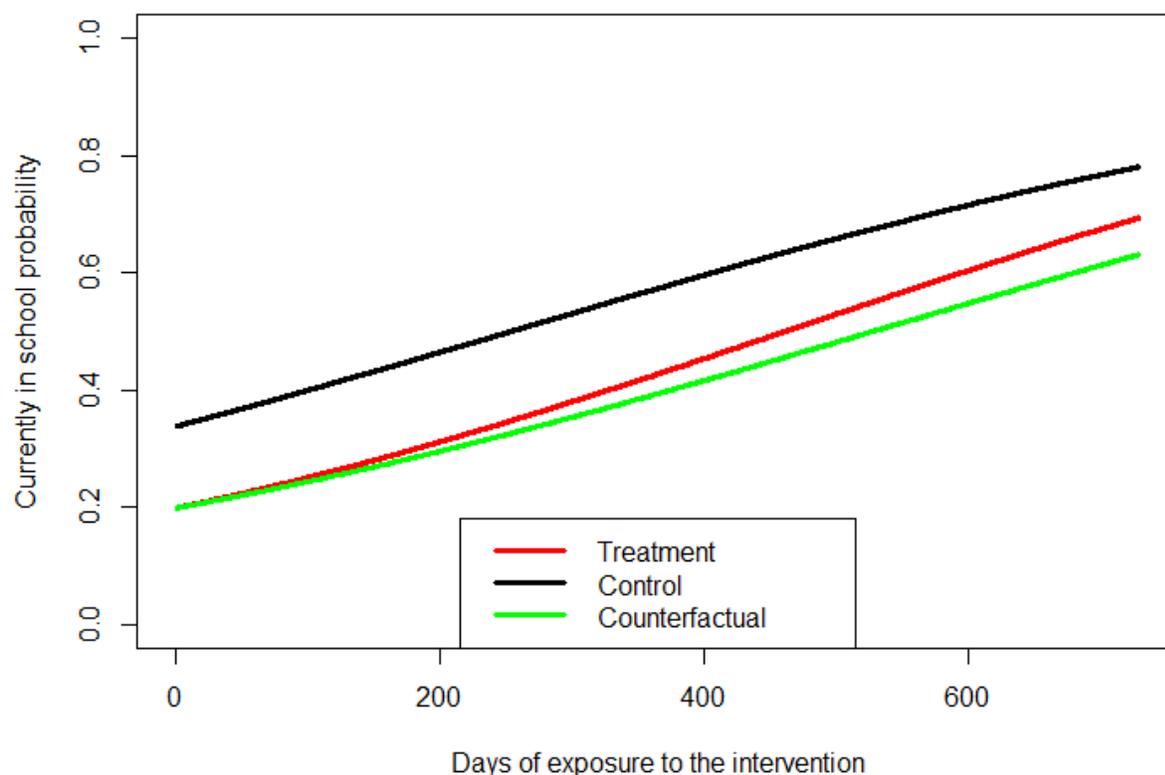
Table 29: Parameter estimates from generalized linear mixed models – School attendance

Parameter		Outcome
		School Attendance ¹
<i>Fixed Effects</i>		Est. (p-value)
	Intercept	-0.69 (.48)
	Study Group (reference category = comparison)	-.73 (.54)
	Days from extrapolated baseline	.003 (.10)
	Study Group*Days	.0004 (.84)
<i>Random Effects</i>		Variance (ICC)
	Community-level	4.15 (.35)
	Girl-level	4.27 (.56)
	Residual	$\frac{\pi^2}{3}$

¹ Estimates for the school attendance model are reported as log-odds or differences in the log-odds.

The results from the school attendance model are summarized in Figure 8. Again, the figure displays each data point used in the estimation of the model along with the fitted regression lines for: 1) the intervention group (red), 2) the comparison group (black), and 3) the constructed counterfactual (green). The estimated impact of the intervention is shown as the difference between the red and green fitted regression lines and could be evaluated at any location within the post intervention period (up to 600 days). We provide this figure to illustrate our modeling approach. Any slight differences observed between the red and green fitted regression lines are not statistically significant and should not be regarded as evidence for a treatment effect.

Figure 8. Results for school attendance model



Qualitative Results

School attendance impacts on girls

Table 30: Impacts on girls' school attendance

Women First Effects	Increased enrollment in school and more girls able to continue with their education
How?	<ul style="list-style-type: none"> Girls' increased value on their education and due to the WF intervention emphasis Increased financial resources due to business component to pay for fees, uniforms and school supplies
Sustainable?	Sustainable for girls who could maintain their businesses and income, but only ~1/3 enrolled at Round 2

Some respondents reported that girls' enrollment in school increased and more girls were able to continue with their education due to their participation in the WF intervention. A smaller number of respondents, about one-fifth, stated that there were no changes in girls' school

attendance due to the intervention. Although at Round 1 we did not specifically ask whether girls were in school at the time of the interview, about half clearly stated they were in school. At Round 2, all girls were asked about their school enrolment and only about one-third of girls said they were still in school.

Messaging of the WF intervention emphasized the importance of obtaining an education, and at Round 1 some girls stated that they placed a higher value on their own education due to this aspect of the intervention. Furthermore, some girls mentioned that the intervention influenced their goals of attending higher education (secondary education and beyond). Earning money through the intervention also seemed to facilitate girls' school enrollment during Round 1, as some respondents stated that girls spent their money on school fees, uniforms, or school supplies, or, less frequently, stated directly that the business component of the intervention enabled girls to enroll or continue in school.

At Round 2, about one-third of girls said they had dropped out of school since intervention ended or in the past year (although intervention end dates varied between communities and were not always clear within communities). We analyzed barriers and facilitators that impacted girls' school attendance and found that barriers to staying in school included:

- Failed business and lack of money for enrollment fees, school supplies
- Getting pregnant or married
- Husband or father forbids going to school

For example, one household head described how girls running out of money and getting married reduced girls' ability to stay in school:

[Girls in the program] don't do anything since the program ended because there was a lot of hunger here and many girls got married, and went to live in other communities. So, just a few girls continue going to school, working on the farm, and doing the home activities.
- Head of household, Round 2

Facilitators to staying in school included:

- Continued success of girls' businesses – several respondents specifically credited the business component of the intervention as allowing girls to enroll in school and/or pay for their uniform and school supplies
- Girls' perception of importance of school and career goals
- Community proximity to secondary schools (some communities did not have secondary schools)

A girl who was still in school at Round 2 described what enabled her to stay in school:

When I joined the Women First program, I learned many things. For example, about business, HIV, hygiene, the right age for a girl to get married, many things! And when I started doing my business, buying my own stuff, paying my school fees, for my notebooks, my uniform and shoes, I started thinking I should continue to study until the 12th grade, then start working...I am still going to school. - Girl, Round 2

School attendance impacts on households and communities

Table 31: Impacts on others' school attendance

Women First Effects	<ul style="list-style-type: none"> • Some girls helped support siblings' school-related expenses • Some girls not in intervention attended school as a result of intervention in their community • Reinforced beliefs about the value of girls' education
How?	<ul style="list-style-type: none"> • Financial support from business component for school-related expenses • Intervention emphasizing importance of girls going to school changed communities' perceptions
Sustainable?	<ul style="list-style-type: none"> • Girls who continued business able to continue to support siblings' school-related expenses • At Round 2, some girls not in intervention still in school, others not

At the household level, several respondents (mostly girls and FGD respondents) talked about how girls would buy school supplies, uniforms or pay for school fees for their siblings. Respondents did not explicitly say that this enabled siblings to go to or stay in school, but we may be able to assume that there are some impacts on household level school attendance due to households having more money for school expenses as a result of the intervention. A few respondents discussed potential household level impacts on girls going to school, such as the intervention convincing parents to send their daughters to school:

After the arrival of the project, we, the parents, also changed our behavior. Before, we didn't want our girls to go to school because we were afraid they were going to become whores. But with the training they received in the program, they learned they had to go to school and they spread that idea to the parents. That's why many girls go to school today.
- FGD, Round 2

Regarding school enrolment for girls from the broader community, at Round 2 in a few cases respondents said the intervention had increased school participation among girls who did not participate in the intervention, but they noted some girls were still not in school, thus the

intervention effects were either not universal or had not been sustained over time. Additionally, in some cases when respondents noted that intervention impacts regarding school enrollment extended beyond the girls in the intervention, it was not clear that the girls were now enrolled in school as opposed to being more interested in attending school. Examples are quoted below:

It helped the community because some girls here, when they had babies, they stopped going to school. But my daughter explained to them that even after having a baby, they can go to school. So they now think of going to school.

- Head of household, Round 1

The community was affected because the girls who are in the program, almost all of them, are going to school. They help their families with that money they earned from the business. Many girls in the community now want to study.

- Influential male, Round 1

Other Intervention Impacts and Causal Pathways

This section focuses on the qualitative data related to how the intervention impacted girls, families and communities in terms of financial impacts, the way the community treats girls, girls' increased involvement in community activities, girls' future goals and self-confidence. We also identify and describe the causal pathways of the interventions' impacts related to girls' vulnerability to HIV.

Financial Impacts

Financial impacts on girls

When probed about what they learned about business in Round 1, girls and other respondents most commonly described girls learning about the business cycle, in particular the concept that part of the profits should be reinvested in the business. Several girls described learning what they should spend their money on, including school expenses, food or things for the household, and saving. Respondents provided similar information at Round 2 when asked.

When asked what they had learned about savings in Round 1, the most common answers described savings as part of a business cycle, where part of the profits are reinvested into the business rather than spending all the money on expenses. There was little knowledge or awareness of ASCAs among the girls or other respondents. Some girls, however, described saving the money that they earned with a "warehousewoman" or another adult associated with the WF intervention. Fewer girls described saving money at home, such as by giving their savings to a parent for safekeeping. Respondents provided similar information at Round 2 when asked.

At Round 1, nearly all girls stated that they earned money through the intervention's business component; very few girls provided unclear responses (such as saying no and then yes) or stated that they did not participate in the business component (due to being sick, for example). Among these, the majority of the girls stated that they were happy with the money that they

earned through the intervention; girls' responses indicated that they were satisfied both with the amount that they earned, citing the ways that the earnings had impacted their lives, as well as with the fact that they were simply able to earn money through selling products.

In both rounds, girls most commonly reported spending their money on clothing for themselves, products for their business, school-related expenses (supplies, uniforms, fees), and savings. Girls also spent money on household-level expenses (more details below). Sample quote:

Before we would only eat yucca leafs, cowpea, pumpkin, sweet potato, yam, banana... the products from our farm. Now with the money from the cake I buy fish somba, pende, oil, spaghetti, rice, omo, sugar, bread, broth, tomato, onion and garlic at the market. We also eat beef, goatling, pig, and eggs... I buy it for everyone and we eat it. Money has changed my life...I can vary our nutrition and I buy clothing for others and myself.

- Girl, Round 1

When girls and heads of household were asked how girls decide what to do with their money and who helps them make those decisions in Round 1, respondents most commonly described that family members such as a parent, aunt, or uncle influenced girls' decisions; in Round 2, girls, heads of household, and influential males were asked the same question and described similar groups of people. These respondents often stated that family members would talk to girls about what they wanted to purchase, provide encouragement, and give advice to not over-spend:

I: Now, how do you decide what to do with your money? How do you usually decide?

R: I usually sit with my mom, and tell her, "mom, I want to buy a blouse with this money, and save the rest", then sometimes mom will say that I should take this money and buy capulanas or skirts for her, and I'm buying.

- Girl, Round 2

I: How do you decide what to do with the money you earned?

R: I do my math, and take half for the savings, and use the rest of the money to help my mother with the house expenses.

I: Does anyone influence the decisions about the use of your money?

R: Yes.

I: Who?

R: My mother.

I: How does she influence?

R: She helps me do the math, and says that I shouldn't stop doing the savings.

- Girl, Round 2

In both rounds, only a few respondents mentioned that girls' husbands influenced their decisions on how to spend their money, while slightly more participants stated that girls made these decisions independently.

Slightly less than one-quarter of girls in Round 1 stated that they did not earn sufficient money or they were not satisfied with the money that they earned. Most of these girls described being dissatisfied with the money they had earned due to the fact that they had encountered issues with paying back the initial cost of the products they had received from the intervention. Among girls who were earning money in Round 1, earning money helped girls reduce transactional sex and/or relationships with men for financial support, increased enrollment and/or continuation with school, increased their ability to provide for their own basic needs, and, less commonly, delayed marriage and/or influenced intentions to get married later.

At Round 2, slightly more than half of the girls stated that they had earned money in the past year. Among these, about half stated that they were still earning money at the time of the interview, most often stating they were selling products or working on a farm and selling produce, while the other half stated that they were no longer earning money. We analyzed barriers and facilitators to continued involvement in business activities at Round 2 and found the following:

Facilitators. Among respondents that described girls being able to continue to do business once the intervention ended, there was little definitive data on factors that facilitated girls' continued success with their businesses. There was some evidence, however, to suggest that the following factors contributed to girls' success:

- Completing all three “kits” in the business component, which may have helped girls save more money
- Living in communities where the intervention was implemented for longer periods of time, which may have helped girls save more money
- Living in closer proximity to towns/cities, which reduced girls' transportation costs and may have made it easier for girls to buy products and sell them at a profit

Barriers. Over half of respondents stated that girls' ability to earn money was not sustained over the past year or that girls were currently facing significant issues with income generation such as earning very little money, or only a few girls in their community being able to continue earning money. Among respondents that described why these changes were not sustained, all mentioned structural factors outside of the girls' control which limited their ability to achieve financial success. These included (in order of frequency mentioned):

- Increased cost of products that occurred once intervention's product subsidies ended
- Drought or “hunger”
- Family illnesses (or girls themselves becoming ill) requiring costly treatment

Of note, the “hunger” mentioned by some respondents referred to an uncharacteristically severe drought that occurred in some regions during the second round of qualitative data collection and resulted in food insecurity in some communities. Some girls in these communities stated that

they had spent the money that they saved on food for their families during the drought and were later unable to continue doing business.

Financial impacts on households and communities

Table 32: Household and community-level economic impacts

Women First Effects	<ul style="list-style-type: none"> • Increased access to products in communities • A few girls extend credit/loans to community members • Increased access to village savings and loan groups mentioned in a few communities • Other girls and community members doing business activities • Households had more material and financial support
How?	<ul style="list-style-type: none"> • Girls and others began selling products within their community, reducing travel time to markets out of town • Girls taught other girls and community members business skills • WF brought savings and loans groups in the community • Girls used their earnings to pay for basic household necessities and buy things for family members
Sustainable?	Sustained in communities where girls are still doing business, and in some cases other community members continued business and savings even when the girls do not

Earning money through the intervention also impacted girls' interpersonal relationships, households, and their broader communities. At Round 1, some respondents described girls being treated better by their families because they are less dependent financially or are more respected in their communities because they do business and have money. Additionally, a couple of respondents at Round 1 described girls providing financial support to their boyfriends or sexual partners by lending them money. At Round 2, there was a small amount of data to indicate that some girls provided financial support to husbands.

At the household level, girls providing material support to their households was one of the most important impacts of the intervention. The majority of respondents from all groups in both rounds said the intervention enabled girls to provide for their families through purchasing food, clothing, and other material goods; lending money to parents or siblings to purchase food and household items; providing for housing; ensuring that household members went to the hospital when they were sick; and allowing others to use their bicycles for transportation. In addition, a few respondents talked about girls teaching their family members how to do business. One girl described the impact of her ability to help with household expenses:

By taking my money to buy curry, rice, oil and other things for the house, I was helping my father and my mother, and my siblings, I did not ask for money from my father to buy

exercise books, pens, soap, I would use my money, that is a huge help to my father because he, as a father, should give me money, but he did not have it. It helped here at home because when someone becomes ill I help take them to hospital.

- Girl, Round 2

Families appreciated the girls' help with household expenses:

For example, the house that the girl built does not benefit only her, but it benefited her grandmother, uncle, the girl's husband... this is a big help.

- FGD, Round 2

This program was very good. It helped the children go to school, and they earned money with the business to help their parents buy school supplies for them. Things were difficult at home before the program.

- Head of household, Round 2

In terms of impacts of girls doing business at the community level, some respondents at Round 1 in more than half of the communities discussed the increased availability of goods for sale in their community as a benefit of the intervention; although many respondents did not list specific products, soap and cakes were among the most commonly mentioned and cakes, in particular, were a new product for some community members. Participants mentioned the convenience of not having to travel to a further village for products, particularly at night, or not having to buy from neighbors. Respondents at Round 2 provided similar descriptions of the intervention increasing access to products, especially through reduced distances to products. However, it was not always clear if this change was still in effect at the time of interviews and there was some inconsistency among participants within a given community. Sample quote:

It reduced the distance to search for soap, salt, biscuits and containers, but now that the program has closed everything went back to what was before. To leave here and go to the village is far.

- Influential male, Round 2

Some respondents in Round 2 mentioned increased access to community savings and loans groups and some said girls from the intervention extend credit or loans to other community members. In most cases, it seemed these changes were ongoing. Sample quotes:

In this Muedamanga community the savings began when the IRD group was here. The program closed, but some people continued to save. Other communities heard and saw how to do the savings, and decided to imitate. Now all neighborhoods are still doing savings.

- FGD, Round 2

I didn't have money before, now I have the power to decide and buy small things like the ones I told you about for me and my family. I also have the privilege to lend to my girlfriends (ASCAs), who pay me back with interests... I lend 100 meticals they pay me back 200. I lend 200, they pay me back 400.

- Girl, Round 2

Some respondents noted that community members attempted to emulate WF girls by also starting businesses in Round 2, including other girls and adults. A few respondents said this didn't extend to other girls, but in one case, they noted other girls try to do business, but are not as successful as WF girls because they only have farm products to sell. Sample quote:

People who were not in the program do business today because of the teachings we had in the program, and we also taught them. - Girl, Round 2

Girls Acting “Respectful” or “In line” and Being Treated Better by Others

“Respect” impacts on girls

Although they were not specifically asked, many respondents during Round 1 mentioned girls learning about respect and/or becoming more “respectful” or “in line” due to the intervention. This concept was explored in more detail during Round 2 and we found that most respondents conceptualized girls being “respectful” or “in line” as a grouped set of characteristics including greeting and respecting elders, obeying parents and contributing to household chores, not being sexually active or interacting with males before marriage (and in a few cases, using condoms), and not “going out” or staying out late. Many respondents in Round 2 also stated that the intervention was responsible for making girls “good” or “in line,” a few of these credited the business component as having an influential role in reducing girls’ sexual activity and therefore making them appear more “respectful” by no longer engaging in transactional sex.

Over half of respondents in Round 2 described whether girls in the intervention continued to be “good,” “in line” or generally respectful and well-behaved after the intervention ended. All respondents except for one stated that girls in the intervention sustained these behaviors after the intervention ended.

Impacts on households and communities – girls treated better by others

Table 33: Girls treated better by others

Women First Effects	<ul style="list-style-type: none"> Girls acknowledged as part of the community Families valued girls more and treated them better
How?	<ul style="list-style-type: none"> Girls were perceived as being more respectful Girls shared what they learned with others, made money and were able to contribute to household expenses, and reduce sexual behavior which made families proud and community members treat them better
Sustainable?	Sustained, contingent on girls’ continued reduced sexual behaviors

Although we did not specifically ask respondents about respect or changes in how girls were treated by others in Round 1, we probed respondents if girls were respected more by other people (peers, families, community members) due to their participation in the intervention at Round 2 and therefore had more detailed information from the second round of data collection.

In Round 1, about one-quarter of girls stated that they had made girl friends in the intervention in response to a structured question, and a couple of respondents described girls having better relationships with their friends due to the intervention. In Round 2, almost one quarter of girls and very few males and heads of household said girls met new girl friends in the intervention and a few girls mentioned entering the intervention with friends and how this strengthened their relationships. For a few girls, and in two cases the same girl's household head and one girl's influential male, these new friendships were not sustained after the intervention ended, mainly because the girls did not see intervention friends as much because they stopped doing business.

Also related to peers, in Round 2, more than one third of IDI respondents said that girls now spend less time with male and female friends in general, or old friends, usually saying they no longer go out at night with girlfriends or boyfriends or they now spend more time at home, school or doing business. Several respondents said girls are now more selective of who they spend their time with. Overall most respondents said this change lasted. For example,

It did change. Ever since we learned about HIV/AIDS I had to choose who I should play with because I had a lot of girlfriends who had a bad life (prostitutes), and you wouldn't think so, but their behavior is influential. I was afraid of playing with them and taking the risk of catching HIV/AIDS (laughs).
- Girl, Round 2

In addition, in Round 2, more than one-quarter of IDI respondents and half of FGD respondents said girls now respect their friends more as a result of participating in the program, ranging from greeting them nicely to not insulting or fighting with them. A few respondents also talked about how friends respect the girls more now. This was usually regarding female friends, though some respondents specifically talked about male friends. The majority of respondents felt that this change was sustained.

At the household level, some respondents during Round 1 described girls being treated better by their family members. Some respondents describe these changes occurring because girls were less dependent financially on their family; nearly as many respondents describe improved treatment of girls by family members because girls were no longer engaged in undesirable behavior such as interacting with men or staying out late, or because girls were more polite, obedient, or respectful. A few respondents stated that these relationships did not change due to the intervention, and a couple even stated that family members were jealous of girls or said it had a negative impact on their behavior. In Round 2, respondents from just over half of transcripts said that families now respect or value WF girls more due to their participation in the intervention, stating that families no longer insulted girls and valued them more because of the financial support and knowledge they gave them. Girls also described family members respecting them more because their parents liked that they did not sleep with men or stay out late. Sample quotes:

Having an empowered girl means a victory for the family. - Influential male, Round 2

I feel famous because I am the mother of a girl who knows how to explain things to others.
- Household head, Round 2

In the past people said she was a slut. Being a slut, I don't think she would have the chance to go to school and get married. But this program came to help not only her but also her family because she is now seen as a model person... Before, I saw her and treated her as a lost woman, but not anymore. She is responsible now. For a long time, she was on the streets prostituting herself but with the arrival of this program she learned and changed. That's why I see her differently now... I think these are good changes because she stopped being who she was, doing what she used to do. She became a businesswoman and a role model. That has recovered the family name and her own name.
- Influential male, Round 2

A few girls in Round 2 talked about their relationships with their husbands having improved due to what they learned in the intervention, such as by enabling them to have more equitable roles in decision-making. Sample quote:

In my house I can buy food, clothes for my child, and I can make decisions without waiting for my husband...he respects my decisions... For example, decisions about our expenses at home, the products for the farm, and the use of our money. We decide everything together. When he wants to do something, he talks to me and so do I...When I joined the Women First program I learned I had the right to participate in the decision-making at home...and I will for all my life...And because I have a little baby, I ask my husband to put on a condom to not pregnant right now...and he accepts it. So, I think this is a change.
- Girl, Round 2

Two of these girls specifically said they got married after the intervention ended and felt that they were able to use what they learned to have a more equitable marriage, which could indicate a lasting impact for some girls. Sample quote:

... as far as the kitchen and all the food for the house, I'm the only one who decides. And if we have any money at home, he always consults me before buying something...because I married after the program closed, and so that's when I started to make decisions at home. But I had the knowledge since I entered the program...We were taught in the program that we have the right to make decisions.
- Girl, Round 2

In terms of impacts at the community level, there was some data from Round 1 to indicate that community members treated girls better or thought of them more highly due to the intervention. For example, a few respondents spontaneously mentioned that girls from the intervention are examples for other girls in their communities, that community members are proud of girl participants because they are now respectful to elders and other community members, and, in a couple of responses, that there is now mutual respect between girls from the intervention and community members. However, it was typically not clarified if this respect extended to girls

outside of the intervention. Data from Round 2 further emphasized the impact on levels of respect between community members and girls from the intervention and indicated that they had been sustained after the intervention ended. Most respondents from all communities felt that the respect between participant girls and their families and communities was sustained after the intervention left. For example, respondents from one FGD said,

R1: I think that the respect has increased from the girls themselves, they respect themselves, and require that they are respected by adults. Because when a girl does not respect herself, others will hardly respect her too.

R2: The respect continues, the way they treat them continues. I will even say that it has increased, which wasn't the case before the program was implemented here in Mucorro.

- FGD, Round 2

In a few cases, respect from community members did not appear to be sustained after girls stopped doing business. For example, one girl described her experience:

When I was selling products they treated me with a lot of respect, because when they didn't have money they could owe me soap and Omo, and pay me later when they had money. But now some people pretend they don't even know me.

- Girl, Round 2

During Round 2, several FGDs and influential males provided insights on whether they perceived that these trends in respect applied to other girls outside the intervention. Among those who were probed, they were fairly evenly split between those who said all girls in the community are more respectful. The quotes below typify the dichotomy.

I: How do girls who participated in the program Women First behave toward others who did not participate?

R1: We notice the difference, those who did not participate in the program Women First could be out of the house right now doing prostitution, fooling around with boys, insulting their parents, whilst the girls who are in the program do not insult their parents, even when they meet grown-ups they first greet them, they say good morning or good afternoon.

R2: Because the girls who are in the program changed behavior they can greet people and even try to know what is happening with someone who is sick. They can tell if this is a good thing or a thing that one should not do, because of the teachings of the program Women First, whilst the girls who are not in the program do not understand that and know nothing.

- FGD, Round 2

I: Do you think that the Women First program changed the way the adults from this community think and respect all teenage girls, or did this change only happen with those girls who participated in the Women First program?

R: Yes, it changed for all.

I: Why?

R: Because these girls who were not in the program listen and understand what the other girls are saying; like how to respect the elderly, that they should not go out with older men because they can catch HIV, and they should study to be someone tomorrow.

- Influential male, Round 2

Additionally, some respondents' responses to questions about respect between girls and community members revealed how low the status of many of these girls was before the intervention came to their communities. Relative to their prior status, girls were now treated better; however, relative to other community members, girls still may not have garnered equitable amounts of respect. The following quotes from respondents at Round 2 demonstrate the low social standing of girls prior to the intervention:

The change I see is that now she is not like before when people said bad things about her and men insulted her here in the community. Because of the program, she learned how to respect people and people learned to respect her. Now that she is married, people respect her too.

- Household head, Round 2

Haven't I said that if it weren't for this program she would probably be dead? She was considered a slut by this community. She would not have got married. Now it's different because she joined the Women First program... she recovered her reputation due to her participation in the Women First program. It changed her behavior and she is now seen as a responsible woman.

- Influential male, Round 2

These girls were pigs, very dirty, but with the training they now take showers when they get home, and they don't go out with men without condoms.

- FGD, Round 2

Girls' Increased Engagement in Chores and Community Service

Table 34: Girls' involvement in chores and community service

Women First Effects	<ul style="list-style-type: none">• Girls more likely do household chores and community service such as: cleaning common spaces, attending funerals, church, or visiting/helping the sick and elderly• Families and community members like these behaviors
How?	<ul style="list-style-type: none">• Girls organized presentations in the community as part of the intervention (which is seen as community service)• Others perceived that girls were trained on how to be "good citizens" and obedient daughters in the intervention,• There may have been organized community service activities as part of the intervention
Sustainable?	Sustained

During both rounds of data collection, we asked if girls' involvement in the community changed because of the intervention. Most girls in Round 1 stated that their involvement in the community changed due to the intervention; these findings were supported by other respondent types. In describing changes in girls' community involvement, we found that most respondents described girls being involved in the following activities: cleaning common spaces (such as churches, cemeteries, and well/water pump areas), attending funerals, attending church, visiting the sick, and helping the sick and/or poor. These responses almost entirely overlapped with descriptions of changes in girls' daily activities (with the exception of descriptions of girls spending their time doing business and/or going to school, discussed above); several respondents also described girls being more involved in household chores such as cooking, cleaning, and carrying water. Respondents' responses from Round 2 were overall very similar, as about one-quarter of all respondents described girls being involved in these types of activities. All respondents that provided data about whether or not these changes lasted stated that these changes were sustained over the past year after the intervention ended.

Girls increased participation in community service and chores was often applauded by heads of household, influential males and focus group respondents. The following quotes show how much community members liked the girls doing chores and community service and also highlight the emphasis placed on traditional inequitable gender norms of girls being obedient and subservient (a topic which will be discussed in more detail in the Potential Harms section below):

We go to the community rallies, we go to church, we go to the cemetery, we participate in cleaning the graveyards, churches, and we clean the well where we all drink water. When someone gets sick we help take them to the hospital.

- Girl, Round 2

I feel very happy because they are human. When someone gets sick, they go visit the person who is ill.

- FGD, Round 2

The girls from the program, when they are at home...they cook, wash the dishes, sweep the floor and the backyard, and they go to the river to fetch water without being told to. Now, the ones who weren't in the program, first thing in the morning they are at the market or on the road to have sex.

- FGD, Round 2

There was little evidence that any girls outside the intervention became more engaged in community service because of the intervention. At Round 2, FGD respondents were asked a series of questions about how girls' participation in community activities had changed. While respondents noted that girls now participate in the community, they rarely clarified if this was all girls or only those from the intervention, and when they did, they all said it was only WF girls. Content related to community service also arose in interviews with girls and influential males when they were asked about how good girls behave and when giving general thoughts on the

intervention. They generally said community participation had only increased among those who were in the intervention.

I: Is the role in the community of the girls who participated in the program different from the girls who were not a part of the program?

R: The girls from the program help the elders in the community. For example, if a girl from the program finds an elder with a bucket of water in their head, she helps the elder to his/her house. While the one who is not in the program will find an older lady with a bucket of water and won't her help, she'll pass by as if she hadn't seen anything.

- FGD, Round 2

Girls' Future Goals

Table 35: Girls' future goals

Women First Effects	<ul style="list-style-type: none"> • Some girls' existing goals became achievable through the intervention • Some girls developed new goals for their career or continued education
How?	Earning money made it possible for girls to see themselves staying in school, intervention content encouraged higher education and career-seeking
Sustainable?	<ul style="list-style-type: none"> • Some girls continued to pursue their goals • Others, whose businesses failed, no longer had the means to do so

Respondents were asked in both rounds of data collection about girl participants' goals for the future and whether they had changed because of participating in the intervention. During Round 1, many girls reported that they wanted to continue with their schoolwork and continue to do their business activities in the future. The intervention influenced girls' goal of attending higher education due to their increased focus on the importance of education and the lessened financial barriers to attending school due to the business component. Girls also reported changes with respect to their careers. Earning money through the intervention brought these goals within reach, and some girls reported that they now intended to pursue a career in teaching or nursing. No girls mentioned actually enrolling in higher education for these careers, although some girls mentioned that they planned to enroll in secondary school with the intention of pursuing higher education later. A few girls described having the goal to build their own house. Earning money through the financial component of the intervention allowed girls to save money for large purchases such as housing supplies. A few girls mentioned that they purchased building supplies and were in the process of building houses. Among heads of households and influential males, most respondents confirmed that the intervention had changed girls' goals for the future.

During Round 2, nearly all respondents were asked about girls' future goals and slightly less than half of described that girls' goals had changed due to the intervention (others said the girls already had goals prior to entering the intervention or were unclear in their responses). Respondents' descriptions of girls' future goals were very similar to those provided in Round 1 and showed agreement between girls and their heads of household and influential males. One girl in Round 2 stated that the intervention made her dreams achievable, a sentiment that was echoed in a head of household for another girl:

R: In the future, I'd like to have a house, study and help my family.

I: What kind of help can you give your family in the future?

R: If I study, I can become a teacher and teach my family. If they need money and I have it, I can give them money.

...

I: Dear, how long will you take to achieve these goals since you're on the 10th grade?

R: I don't know. Maybe five years.

I: What are you doing now that will help you achieve these goals?

R: Besides studying, I'm doing my business to be able to go to school.

I: Dear, looking back before you joined the Women First program, are your objectives the same then and now after the program closed down?

R: Yes, they are the same objectives.

I: In what way are the objectives the same?

R: Before joining the program, I always wanted to study, but now I have money and I can do it.

- Girl, Round 2

Less encouragingly, nearly one-fifth of girls in Round 2 mentioned that they did not have the means to achieve their goals or that they are currently doing nothing to achieve them. Furthermore, two girls specifically stated that their dreams are now out of reach due to the intervention's end or its short duration. One head of household respondent also stated that the girl did not have the means to achieve her goals once the intervention left. Below are two examples of how girl participants were not able to achieve their goals:

I: If you could choose, how would you like your life to be?

R: I'm happy with this one, even though it wasn't what I wished for. But I would like to do my business or have a business.

I: What are your goals for the future?

R: I don't have it. Before it was to continue with my studies, but now I don't have any.

I: Why did you give up?

R: The wedding.

I: And why don't you think that you can continue to study because of your marriage?

R: It's impossible, that's all.

I: Going back a little bit, are your goals from when you were a part of the Women First program the same right now?

R: No, they all changed like I told you.

- Girl, Round 2

I: Did you have any complaints with the program, or any difficulty?

R: I was not able to accomplish my goals. I only sold products once, I was not able to accomplish the plans I had. For example, I already said that I stopped studying, married at 16 years old, now this is not good. I cry when I see my girlfriends still doing business and studying, some even have bicycles, and I don't. I have a real complaint... They should improve the organization. For example, give the products to the girls at the same time. Because, for example, the way they do it where they give it to the 1st group, 2nd group, 3rd group, etc., us who were in the last group were harmed. Our life got worse, we only sold once, and we were not able to do the plan we had when entering the program, which was to study and have a job one day, to decrease the disgrace in our families.

...

I: Did your thoughts about marriage change since our last interview in August/September of last year, and after the Women First program closed?

R: Yes, I had the idea of getting married only after the program closed, because I realized that there was no other way. So when someone showed up and proposed to me, I had no other ideas but to accept it. But when I entered the Women First program the plan was to study.

- Girl, Round 2

Girls' Self-confidence

Table 36: Girls' self-confidence

Women First Effects	<ul style="list-style-type: none"> Increased some girls' self-confidence Others saw some girls as more capable and motivated
How?	Involvement in the intervention (business and education component) empowered girls to make decisions, feel capable, and help others
Sustainable?	Sustained for some girls and not others

In Round 1, some girls reported an increase in their self-confidence due to their involvement in the intervention. Some stated that they now felt a sense of dignity, and others stated that they felt more powerful, capable, and able to take on new challenges. These changes were reported by a minority of girl respondents; although this is possibly due to the fact that girls were not explicitly asked about their self-confidence. Increased self-confidence did not necessarily seem to be dependent on earning money through the intervention; one girl who mentioned an increase in self-esteem also mentioned feeling dissatisfied with the money that she earned. For

example, a girl in Round 1 described that *“I feel powerful compared to before I entered the program; I grew up, now I believe I am capable of everything.”*

In some cases, girls’ increased self-confidence appeared to be linked to their independence from men and the financially supportive relationships they provided. Several girls and one influential male said WF girls’ sexual partners or men/boys in the community resent girls from the intervention because they no longer need men’s economic support. For instance, a girl in Round 1 stated that *“[Men] say that now because we do our own business, we don’t want to date them anymore...and I like when they say that...because I am the boss now.”* Several respondents in Round 1 said that girls who were in WF could no longer be “deceived” or “fooled” by men and boys; these statements seem to indicate some men or boys actively try to trick girls into having sex with them, as opposed to girls actively seeking out men and boys as sexual partners. Additionally, a few respondents described girls learning to “fear” men, indicating that improvements in girls’ self-confidence in relation to their sexual partners did not extend to all girl participants.

In Round 2, about one-fifth of IDI respondents described positive changes in girls’ self-confidence and/or sense of self. Girls described feeling good about themselves and feeling empowered to make their own decisions and help others. For example, a girl in Round 2 described: *“I don’t depend on my husband to buy clothes, for the home expenses or help my mother. I make the decisions,”* and illustrated the impact of the educational component by stating that *“to tell you the truth, before the program, I didn’t know anything. I lived in the dark.”* Heads of household respondents similarly described girls respecting themselves and having more self-confidence. Influential male respondents described girls growing up in the way they think, demonstrating increased “wisdom” or maturity, or displaying general good behavior. The following influential male respondent in Round 2 described changes in a girl’s behavior and maturity:

I. Dad, you said that she has the behavior of a grown up lady. How does a grown up lady behave?

R: A grown up lady knows what she wants, and not what she doesn't want; she knows how to decide and plan what she wants to do, and has the thoughts of a grown up person.

I. When you say that she has the thoughts of a grown up person, how?

R: She knows how to take care of herself, because if she was a child she wouldn't be taking good care of herself.

- Influential male, Round 2

Causal Pathways (Qualitative Only)

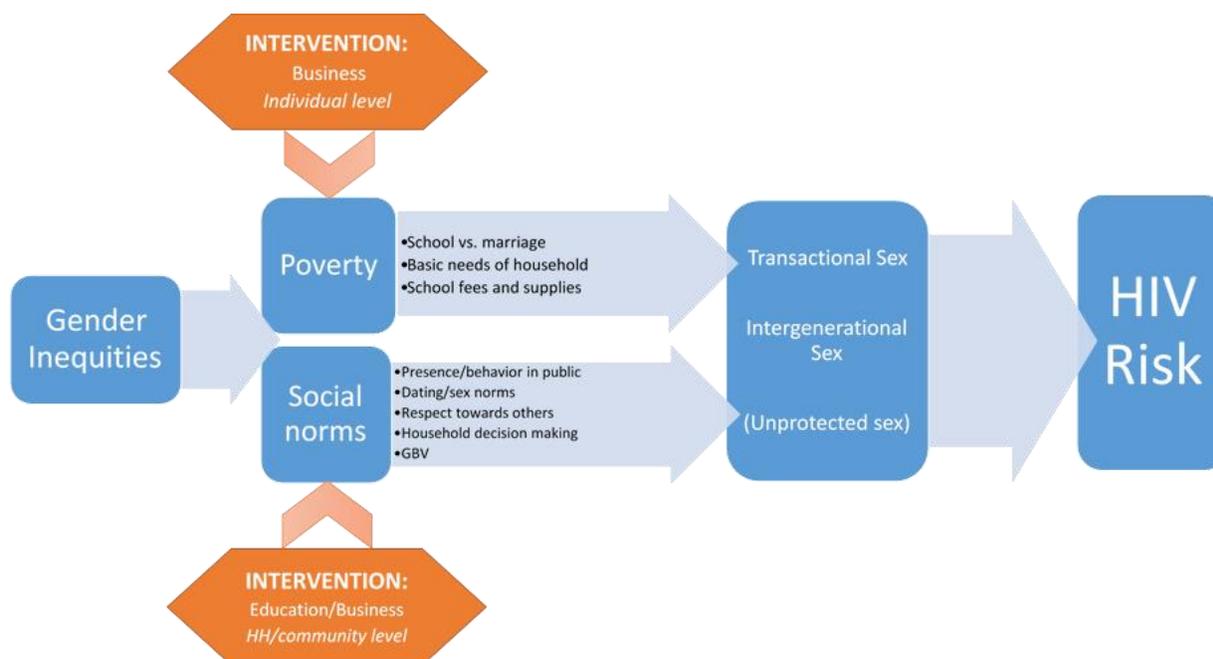
This section summarizes the ways in which the educational and business components of WF influenced girl participants’ vulnerability to HIV. After outlining the drivers of HIV risk in the participating communities, we will discuss the pathways through which the WF intervention may

have acted upon these drivers. Focused information on impacts of the intervention on drivers of HIV risk are pulled from the sections above.

Respondents in the interviews with girls, influential males, household heads, and FGDs were asked to describe what WF girl participants learned about HIV, and how the intervention impacted girls' attitudes and behaviors towards sex, dating, and marriage. All respondent types were also asked about the general impact on the intervention as well as impacts on girls' relationships with sexual partners. In the participant communities, the HIV risk factors most commonly identified were sexual risk behaviors such as transactional sex, intergenerational sex, dating and early sexual debut, and multiple concurrent partnerships; early marriage; early pregnancy; and condom non-use.

The WF intervention acted on girls' HIV risk through two main pathways: 1) providing access to financial resources and thereby reducing engagement in sexual behaviors that also exposed girls to HIV risk, and 2) providing education and empowerment to girls to recognize HIV risk factors and enact changes. In some cases, the education and empowerment was accompanied by changes in attitudes surrounding specific behaviors, such as sexual activity before age 18. Decreases in girls' stigmatized behaviors (particularly transactional sex and multiple partnerships) were highly valued by community members, heads of household, and influential males; however, the extent to which girls could enact these changes was, for the most part, realized when girls had increased financial resources. Notably, some changes occurred through a combination of access to financial resources and increased education and empowerment. These changes speak to the complimentary nature of the two intervention components and their combined effects.

Figure 9: Causal pathways to girls' HIV risk



Pathway 1. The WF intervention reduced HIV risk through providing access to financial resources and decreasing transactional sex

The economic component of the WF intervention had a significant impact on girls and their communities, as discussed above. The business component of the WF intervention impacted girls' HIV risk by providing an alternative means of accessing financial resources, which reduced activities that provided financial support but also heightened their risk of acquiring HIV. Earning money through the WF intervention impacted girls' HIV risk through (1) reducing transactional (and often intergenerational) sex, (2) reducing early marriage for financial reasons, and (3) reducing early pregnancy to obtain financial support and/or get married.

Transactional and intergenerational sex

The primary driver of reduced engagement in transactional sex was the business component of the WF intervention. Before the WF intervention, sexual relationships with men were a primary source of money for adolescent girls. Girls reported that the money they earned through the intervention served as an alternative means of acquiring money for food, school fees, and household items, thereby reducing their reliance on transactional sex and sexual relationships that provided financial support. Girls also reported that if they were to stop earning money through the intervention or through their businesses, they expected that they would have to return to engaging in transactional sex for financial support.

Information from respondents indicates that transactional sex included both discrete sex acts in exchange for money, which often occurs in the context of girls walking on the street, staying out late, and going to markets; as well as financial support provided within more lasting relationships. As discussed previously, some respondents indicated that both of these types of

relationships decreased due to the intervention. Intergenerational sex was also reported to have reduced due to the earnings of the WF intervention. Notably, intergenerational sex was always described as being transactional in nature. It is very possible that more (or even, possibly, most) of the transactional sex described by respondents occurred between older men and adolescent girls.

Notably, data from Round 2 illustrated the crucial role of earning money in maintaining changes in transactional sex behaviors. Some respondents noted that girls had to go back to engaging in transactional sex for financial support once their businesses failed after the intervention ended.

As previously discussed, few respondents specifically mentioned intergenerational sex, but most respondents used language such as having “sex with older men for money” which indicates that transactional sex and intergenerational sex may be largely overlapping concepts in this setting.

Delayed marriage

Earnings through the WF intervention impacted some girls’ intentions to get married and resulted in delayed marriages in some communities; however, this was mentioned less frequently than changes in girls’ engagement in transactional sex. Marriage was impacted by WF earnings in a similar way as transactional sex; girls reported that now that they had earnings from the intervention, they did not need to seek a husband for financial support. Some girls mentioned that they used to think about getting married because they needed the money, and that they no longer do so because they have their earnings from WF. In Round 2, a few girls whose business had failed mentioned that they had to get married in order to receive financial support, which illustrates the key role that the business component played in these changes.

Reduced intention to get pregnant to receive financial support

One influential male and one head of household in Round 1 mentioned that two girl participants had previously attempted to get pregnant in order to receive financial support from the child’s father. This was not necessarily linked to marriage, and these respondents stated that these girls no longer intended to get pregnant due to the fact that they were earning money through the WF intervention. This phenomenon did not emerge in Round 2.

Pathway 2. The WF intervention reduces HIV risk through increasing girls’ knowledge about HIV risk behaviors and empowering them to make changes that reduce their HIV risk.

Girls and other respondents often cited that the educational component of the WF intervention related to HIV/AIDS was highly valuable. Some respondents stated that before the intervention, girls knew very little about HIV and girls stated that they now knew how to protect themselves from HIV through using condoms, delaying sexual debut, and reducing the number of sexual partners. The intervention also provided specific information on HIV risks associated with sexual risk behaviors such as multiple concurrent partners, transactional sex, early sex, premarital sex, and intergenerational sex or sex with older partners. Furthermore, the WF intervention

empowered girls to be able to actualize the changes that they learned about through the intervention.

Girls' education and empowerment worked together to galvanize changes in girls' HIV risk behavior in the following ways: increased condom use; decreased sexual risk behaviors including multiple concurrent partners, transactional sex, early sexual debut/dating, and intergenerational sex; and delayed marriage. Some risk behaviors, such as transactional and intergenerational sex, had added impacts from the business component of the WF intervention. This indicates that a synergistic effect may be occurring between girls earning more money and gaining financial independence, learning how to protect themselves from HIV, and feeling sufficiently empowered and capable to bring about those changes.

Increased condom use

Girl participants in the WF intervention mentioned learning about condom use for prevention of HIV and other STIs as well as avoidance of unwanted pregnancy. Some girls mentioned that they now used condoms specifically for HIV prevention after learning about them through the educational component. Nearly one-quarter of all respondent girls mentioned that they planned to use condoms in the future for HIV prevention. Many of the girls that mentioned intending to use condoms in the future were not currently sexually active. Here, the educational component of the WF intervention had a tangible impact on girls' condom use, thereby reducing their current or future risk of acquiring HIV. Notably, girls did not mention that these changes were influenced by the business component of the WF intervention and its effects on girls' financial independence.

Multiple sexual partners

Some respondents noted that WF's educational component on concurrent sexual partners and HIV/STI risk had a tangible impact on girls' sexual risk behaviors. Some respondents reported learning about the heightened HIV risk of having multiple sexual partners at the same time. These respondents spoke of "multiple men," "multiple partners," or "many boyfriends." Some girls reported that they learned that they should date "only one man" in order to reduce their risk of HIV. Some respondents noted that girls who previously engaged with multiple sexual partnerships had reduced their number of partners and were now monogamous since joining the intervention. Notably, there was overlap between the impact of the educational component alone and the economic component alone on girls' engagement with multiple sexual partners. Some respondents noted that girls had reduced the number of sexual partners they engaged with due to the fact that they were now earning money through the intervention, as well as due to the fact that they had learned about the risks of such behaviors and wanted to avoid HIV. This indicates that in some cases, there may be a synergistic effect of the two components of the intervention.

Transactional sex

In addition to the changes in concurrent sexual partnerships driven by the financial component of the WF intervention described above, some respondents also mentioned that the educational

component of the WF intervention played a role in their reduced engagement in transactional sex. A few respondents stated that girls now avoided multiple concurrent partners because of what they had learned in the intervention. However, education and empowerment seemed to have minor impact on girls' engagement in transactional sex compared to earning money through the WF intervention.

Notably, the educational component of the intervention regarding transactional sex was well-received by community members, who mentioned that girls' reduced engagement in transactional sex reflected well upon families and communities. It appears as though the WF intervention influenced or further strengthened negative norms surrounding transactional sex for girls, as respondents mentioned that girls engaging in transactional sex were "whores," were not on a "good path," and that they brought shame on to their families and communities. However, these changes do not appear to have been broad enough to change girls' behavior. Wider, community-level changes in transactional sex due to education and norm change alone may have been able to be achieved if the intervention had intervened upon a wider audience, such as men and other community members.

Intergenerational sex

Although transactional and intergenerational sex were often described together, a small number of respondents specifically mentioned that some girls in their communities now avoided having sex with older men due to what they had learned about HIV risk and gender-based violence.

Any sex before marriage, and dating in general

A few girl respondents mentioned that they had stopped having sex before marriage because they had learned about the risk of HIV from premarital sex through the WF intervention or that they intended to delay sex until marriage. Some of these specifically mentioned that they intended to do so because of what they had learned about HIV risk through the intervention.

Some respondents mentioned that girls had changed in the way that they perceived men and dating and indicated that what girls learned about dating and HIV risk influenced their perception of men and sexual relationships. These respondents mentioned that girl participants were more "afraid" of men, were distrustful towards men, and saw relationships as risky; they credited the educational component of the WF intervention with these changes.

Notably, some respondents mentioned that the intervention empowered girls and made them feel more confident in dealing with men. Girl respondents mentioned that they can say no to potential sexual partners, mentioning that they no longer have to "accept abuse" and poor verbal treatment from men. This influenced girls' sexual risk behaviors due to the fact that girls were more readily able to decline advances from potential sexual partners.

Delayed marriage

Many girl respondents mention not wanting to get married, wanting to get married later, and/or wanting to delay childbirth due to what they learned through the intervention. Girls reported

learning about the risks of early marriage and childbirth, which in some cases was linked directly to HIV. The educational component of the intervention also influenced girls' intentions towards marriage through stressing the importance of finishing school and, in some cases, pursuing a career before getting married. Some girls reported that they wanted to get married later in life because they wanted to pursue higher education and start a career before getting married. Therefore, in some cases, girls' commitment to education played a role in whether and when girls intended to get married.

Overall Intervention Sustainability (Qualitative Only)

During Round 2, all respondent types were asked what activities continued after the intervention ended. A second question, asking whether the girl was involved in these activities, was also included in the intervention guide and was sometimes asked of IDI respondents.

Nearly all respondents provided information on activities that continued in their communities after the intervention ended. Almost two-thirds of these respondents stated that some intervention activities continued in their community after the intervention ended; the remaining respondents stated that activities did not continue. The types of continued activities described by respondents varied widely, and included girls' participation in community activities encouraged by the intervention, such as girls weeding, helping the sick or poor, and attending church or funerals, in addition to more organized activities established by the intervention such as girls doing business or giving informational community presentations. In reference to the community service activities, it is difficult to know whether these activities were formally organized or encouraged by the intervention, and, if organized, what these activities entailed in their entirety.

Girls were asked when the intervention ended and when they stopped participating in the intervention. Nearly half of indicated that they had stopped participating in the intervention at a later date than the time the intervention ended (or, in some girls' words, "closed" or stopped providing products). Girls did not provide additional information when asked this question; these responses simply indicate that slightly fewer than half of girl respondents were involved in some activities after the intervention's formal activities had ended.

Business Activities

About half of all respondents stated whether business and/or savings activities had continued in their communities; most of these stated that business/savings had continued. A minority of respondents stated that business/savings activities had not continued, citing that the intervention ended, or the business component of the intervention had closed. Additionally, some FGD respondents stated that "very few" girls continue to do business, while other FGD respondents described girls struggling to make a profit given higher commodity prices. In about half of the communities, all IDI respondents that talked about business/savings activities stated that these activities had continued; however, only two respondents in one of these communities provided data on this topic. These data were supported by data from FGD respondents in five communities.

One girl described continued business activities in her community:

I: What activities have continued after the program closed here in your community?

R: Business is the only activity that continued, but not all of them are doing business. Some stopped because they spent the money and don't have anywhere to get money to continue with their businesses. I do it to this day because I usually take some of the money and save it at the warehouse worker house. - Girl, Round 2

Similarly, another girl described continued business activities from the same community:

I: What activities continued after the program closed here in your community?

R: The ones who have good judgment and who save money in the savings are still doing business today, but the ones who took the money from the business and spent it recklessly, are not doing anything today.

I: And those who do business, what business are they doing?

R: They go to the village to buy flour, and make little cakes to sell in the market. Or buy bananas to make "ngata nhanssala" (traditional cakes made with banana), and take it to sell.

I: Are these activities currently happening here in your community?

R: Yes, they are. - Girl Round 2

In four communities, most respondents said that business/savings activities had continued while some (typically one or two respondents) stated that these activities had not continued. In all of these cases, FGD respondents that provided data stated that business activities had continued. For example, in one community, four respondents stated that they (or girls) continued to do business after the intervention ended while one stated that the girl was not doing business:

I: What activities continued after the program closed here in your community?

R: Here they do the farms from some associations, and savings.

I: And are you involved in these activities?

R: I'm only involved in savings. - Girl, Round 2

I: What activities kept going even after the program ended here in the community?

R: Savings.

I: Does it continue to happen here in your community?

R: Yes.

I: Can you describe it, please?

R: In the beginning of the month, on the 1st or 2nd, we put money away and at the end of the month, on the 30th, we all go share the money.

I: Are you involved in these activities?

R: Yes.

I: Which ones?

R: I do my business and savings.

- Girl, Round 2

When did the program stop providing girls with products to sell here in the community?

R: Last year, in 2015.

I: What activities kept on going after the program ended?

R: She only goes to school. She doesn't do any other activity.

I: Do you know if she's earned any money since last year after our last interview?

R: No, she hasn't.

I: Is she currently earning any money?

R: No, because she didn't receive any products from the program.

- Influential male, Round 2

In the final community, two respondents provided conflicting information as to whether business/saving activities had continued.

Informational Presentations

We did not directly ask about informational presentations, but about one-fifth of respondents discussed girls holding informational "presentations," "lectures," or "talks" with community members (or, more specifically, other girls in the community) after the intervention ended; all but one girl stated that this activity continued after the intervention ended. The majority of IDI respondents that stated presentations had continued were from three communities, this was also supported by FGD respondent responses.

Most of these respondents describe girls teaching others about HIV, condoms and other contraceptives, GBV, other diseases including STIs and malaria, and, less commonly, savings, hygiene, and water conservation. One respondent described that these presentations were led by the "warehousewomen" that organized the WF intervention, the remainder of respondents stated the girls led these presentations. A few respondents also stated that these meetings were held weekly; the remainder did not state how often they were held.

The majority of IDI respondents that stated presentations had continued were from three communities; in two of these communities, this was also supported by FGD respondent responses.

Perplexingly, several respondents in one of the three communities stated that informational presentations had continued in their community while an FGD respondent provided conflicting information:

I: Out of everything we mentioned, HIV-AIDS, business, gender-based violence, what are the components they still do even after the program ended September last year?

R: Since September when the program ended, the girls continued giving lectures. However, since they didn't have any continuity and reinforcement from the program, nobody directing them, they ended up stopping giving lectures in the neighborhood about violence, health care and hygiene.

- FGD, Round 2

In four additional communities, one or two respondents stated that business activities had continued, while one respondent in one of these four communities stated that presentations had not continued. This respondent, a girl participant, stated in Round 2 that "*There's no way for us to give presentations to the others, and a lot of girls are already married and the husbands don't let them leave the house.*"

In one community, an IDI respondent stated that presentations had continued in their community, while an FGD respondent stated that this activity had not continued.

ASCAs

(Note this is described in more detail in the Intervention content and implementation section.) Respondents in FGDs from eight communities stated that they had ASCAs as a part of the intervention; among these four stated that ASCAs had continued in their community and three stated that ASCAs had not continued. Respondents in an FGD in Round 2 described the continuation of the ASCA in their community:

I: In your community, is there the ASCAs savings program, also known as a cumulative and working capital savings group?

R1: There are many savings group, even outside girls want to join it.

R2: Not only saving groups for girls, but for adults too. When the girls started their saving groups, the adults noticed and liked it. So adults started doing it too.

I: Are the AscAs or GPAR programs still active until now?

R3: Yes, they are active until now.

R4: Yes, it works because if we weren't saving money, our children wouldn't be going to school. But thanks to these savings, we can buy notebooks for our children, and help the orphans buy clothes for them.

- FGD, Round 2

Respondents in the remaining community stated that they had an ASCA as part of the intervention but were not asked whether or not the ASCA had continued.

Community Service Activities

When asked about activities that continued after the intervention ended, about one-fifth of all respondents described participant girls' involvement in a variety of community service activities, including cleaning common spaces, attending church and/or funerals, helping the poor or sick, participating in community rallies or meetings, weeding, and household chores. Most of the respondents that described girl participants' involvement in community service activities described girls being involved in multiple different activities. Respondents' descriptions of girls being engaged in community service activities (specifically, participating in community meetings,

cleaning common spaces, helping the sick or poor, attending funerals or church, and weeding) were largely concentrated in two communities and were supported by data from FGD respondents in both communities. IDI respondents in two additional communities also mentioned girls cleaning common spaces, helping the sick or poor, or attending funerals or church; however, these activities were mentioned less frequently than in the two communities previously mentioned. IDI respondents' descriptions of the other continued activities were largely scattered across the remaining communities. These patterns were similar with FGD respondents.

Potential Harms (Qualitative Only)

Respondents were not asked directly about potential harms of the WF intervention, but this theme was included in our codebooks. Very few respondents mentioned any direct harms to WF girls during the intervention. In Round 1, two respondents described instances of theft, including cash and a bicycle. In one FGD, also in Round 1, respondents talked about girls being harassed while they sold goods at the market. When analysing data from Round 1, data on inequitable gender norms present at the community level began to emerge. This is a theme that we explored in greater depth in Round 2 with targeted probing. Furthermore, we believe that intervention staff at the community level likely used teaching methods or examples that reinforced traditional, often inequitable gender norms when educating girls about HIV risk, gender roles and sexuality. The following potential harms of the intervention emerged:

Jealousy

Several respondents in Round 1 described resentment or jealousy toward WF girls for their changes in behavior and image, and because of their opportunity to earn money. Some respondents were resentful when girls would not give out loans or share their money. In Round 2, some respondents described other people in the community being jealous or resentful of girls because they received products from the intervention and earned money. Respondents primarily talked about how girls not enrolled in the intervention, their parents, and sometimes community members more generally, became jealous or envious of, or spoke badly about, girls enrolled in the intervention because of the training and products they had received to do business. In a few cases, respondents described girls losing friends because of this jealousy. Interestingly, most respondents in Round 2 that described community members being jealous of girls in the intervention were from the same two communities.

Harmful Effects of Business Component

Some girls in Round 1 described being unable to sell products or, if profits were low, owing money to the intervention. Some girls and their families also expressed disappointment and shame when their businesses failed and they had to return to risky sexual behaviors or when they were no longer able to stay in school or contribute financially to the household. Some respondents talked about girls' dashed dreams about pursuing higher education and careers as result of their businesses failing.

In Round 2, a few respondents similarly described issues with the structure of the intervention's business component that led to financial problems once the intervention ended. Most frequently, respondents described that the amount of money girls had to repay to the intervention for products initially given was so high, they were unable to continue doing their businesses as most of the money they earned went to repaying the intervention. Respondents described that this issue, in addition to issues with the timing and length of the business component, were contributing factors to girls' failed businesses. Additional external factors, such as drought or "hunger," the need to travel long distances to obtain products, and the high cost of unsubsidized products, also contributed to girls' financial problems. Two communities each had multiple respondents that described these issues, indicating that perhaps the negative economic impacts of the intervention were concentrated in these areas.

Other respondents described related potential harms, including girls that began the business component later being unable to complete all three of the "kits" and therefore were unable to turn a sufficient profit to be able to continue with their businesses once the intervention ended; girls having to pay fees at the market to sell their product – which may or may not be linked to the intervention; the intervention ending without telling girls and leaving them without the funds they needed to continue with their business; and being afraid of having to repay the intervention for additional money earned by an adult WF intervention participant.

Negative Impacts of the Intervention Leaving

In Round 2, nearly half of all respondents described negative impacts of the intervention leaving, with all but one specifically mentioning the business component of the intervention or describing negative economic impacts. These included girls' businesses failing, negative impacts on girls' ability to stay in school, negative impacts on girls' communities (i.e. being unable to easily access subsidized products), and general dissatisfaction with the intervention ending.

Most of the respondents who spoke about negative financial impacts of the intervention leaving described girls going "bankrupt" and most or all girls in the community being unable to continue having a profitable business. Some stated that some girls continue to try to apply their business skills by selling smaller items like salt and excess produce from their farms or fields, but profits from these sales were much smaller than those when the girls were involved in the intervention and didn't allow girls to earn a meaningful profit or build their businesses.

Respondents' reasons for these negative economic impacts largely centered around the fact that the intervention left before girls could save a significant amount of money. Girls' small amounts of savings were often depleted shortly after the intervention ended due to "hunger" or drought in certain communities, compounded by the high prices of unsubsidized products and (in some, presumably more rural communities) the large distance that girls would have to travel in order to acquire products to sell. Many respondents described girls using up the small amounts of money they had saved shortly after the intervention ended, often spending money

on food for their families due to drought and poor crop yields or spending money on other things for their families.

A few respondents described girls no longer being able to continue with school or facing issues with enrollment for financial reasons now that the intervention has ended. A few others described negative impacts on girls' families due to the intervention leaving, including no longer having basic necessities, general financial distress, and not having the means to support the girl now that she is no longer earning her own money. A small number of respondents described girls' communities facing negative impacts once the intervention ended and mentioned that community members had benefitted from having subsidized products available in their immediate communities, and that once the intervention ended they now had to travel farther and pay more money for these same products.

A few respondents described other negative impacts on girls due to the intervention leaving or made general requests for the intervention to return; respondents described a girl having to get married for financial reasons because the intervention ended, a girl not having as many friends now that the intervention has ended, some girls began engaging in transactional sex or "went back to having bad behaviors" because the intervention didn't last long enough for them to save a sufficient amount of money. Respondents from some FGDs described feeling abandoned or highly dissatisfied that the intervention ended. Many respondents asked in their interviews for the intervention to return to their communities.

Reinforcing Inequitable Gender Norms

Several respondents volunteered information that implied that the content of the WF intervention in some communities reinforced or perpetuated inequitable gender norms towards girls and women. Although it is impossible to know exactly how the messaging of the WF intervention was delivered in each community, and to what extent respondents' responses are shaped by their pre-existing attitudes rather than the information given to them through the intervention, the presence of negative language surrounding girls, their behavior, and their sexuality in particular seems to indicate that not all WF intervention participants were truly empowered through their experiences with the intervention. In certain cases, it appears clear that the content of the WF intervention reinforced (in respondents' eyes, at least) normative, gendered attitudes towards girls and women. Interestingly, half of all respondents who discussed themes related to reinforcing inequitable gender norms were all from the same community. The following themes related to reinforcing inequitable gender norms emerged among all respondents.

Stigmatizing attitudes towards girls' sexuality

Although the intervention was geared towards empowering girls that participated, respondents' language surrounding girls and their sexual behavior revealed the continued presence of inequitable gender norms and stigma towards girls' sexual activity. Based on respondents' descriptions of what girls learned and more general descriptions of girls' sexual behavior, it appeared that the intervention as it was delivered in these communities may have further perpetuated inequitable gender norms.

For example, several girl respondents described learning that engaging in transactional or intergenerational sex, and having sex before age 18 or before marriage, was “wrong” or “bad.” Some other respondents described girls' value being dependent upon their sexual behavior. Girls that were “good” and were valued were those that abstained from sex, avoided multiple partners, or refused to have transactional or intergenerational sex. Engaging in these activities, according to these particular respondents, reduced girls' value to their community and their desirability to men.

Some respondents described that the intervention taught girls how to behave with their husbands in ways that reinforced traditional gender norms. Others described positive feelings towards girls getting married because they were no longer “prostituting” or being sexually active outside of marriage, a concept that was portrayed as very negative through the intervention. Respondents made similar comments regarding girls' value and their engagement in transactional or intergenerational sex. Furthermore, some respondents described girls' sexual activity as related to “disgrace” or “shame” for the girls' families or communities. This type of language indicates that respondents ascribed to beliefs that girls' open sexual activity (outside of what was deemed an acceptable marriage) reduced not only the value of the girl in others' eyes, but also impacted family and community reputations.

More broadly, data on community-level impacts of the intervention revealed persistent negative community attitudes towards girls' engagement in sexual activity. Negative community attitudes toward girls engaged in sex before 18 were described by about one quarter of all respondents; nearly as many noted that the community views girls engaged in intergenerational sex negatively, using expressions such as “whore”, “prostitute”, and “gold digger.” Similar language was used to describe girls' engagement in transactional sex. For example, a girl respondent stated in Round 2 that *“Here in Lima those kind of girls who have sex for money do not exist because they would be chased out of this community for that type of exchange, and we do not want that type of girl here.”* Some expressed that sex workers are responsible for spreading HIV in the community and/or that girls engaged in sex work would never be married.

Fear of men, encouraging girls to avoid perpetrators, reinforcing submissive actions towards men

A few respondents described girls learning to be afraid of men through the intervention, to avoid men as potential perpetrators of sexual violence, or to act submissive towards men. For example, in describing archetypal “good girls,” girls stated that a “good girl” doesn't talk to men because she is afraid of being raped, doesn't sit close to older men, give up their seat for men, and always acts wary of men.

Lower status than husbands and lack of decision-making power

A few respondents described girls having lower status than their husbands, including having little to no decision-making power in their marriages. One girl, for example, stated that she learned that *“using condoms with their wives is abusive to the husbands,”* while another respondent stated that the girl learned in the intervention that women are secondary in their

households and that *"The man is the head of the household. He is the one who makes the decision in the house. Even if the woman has a job, the head will always be the man. The woman can advise her husband."* Other respondents described girls no longer going to school because they got married and they are no longer allowed to attend school, or having to ask their husbands for money because they are no longer financially independent. An influential male in Round 2 described a girl participant learning about traditional, inequitable gender roles through the intervention:

I: Does she talk about gender roles or decision-making in the household?

R: The man is the head of the household. He is the one who makes the decision in the house. Even if the woman has a job, the head will always be the man. The woman can advise her husband.

I: Has this changed since last year after our last interview with her in August/September or after the program ended?

R: Yes, she learned that in the program and through lectures here in the community. And at school they always talk about it.

Importance of doing domestic chores

More than one-third of respondents described the intervention reinforcing the importance of girls being able to do domestic tasks; respondents described girls being viewed more positively in the community because they now do household chores such as washing dishes or sweeping floors, or viewing changes in a girl as positive because she is now a "home girl" and stays at home to do chores. Similarly, one influential male respondent stated that the girl learned that older men shouldn't have sex with younger girls because they won't be able to handle their housework if they were to get pregnant, among other reasons. An influential male in Round 2 described a girl learning to do domestic house work:

I: What did she learn?

R: For example, she helps her grandmother with the kitchen chores, she helps around the house, so I can see that this project is educating the girls.

Importance of obedience and respect

Some heads of household and influential male respondents described girls learning about the importance of being obedient as a girl through the intervention and focused heavily on the importance of obedience as a positive characteristic in girls. When examining household-level impacts, respondents from over one-third of all transcripts said that girls in the intervention do more chores and/or help their families on the farm as a result of what they learned in WF.

More generally, participants from almost two-thirds of transcripts said that as a result of the WF intervention, girls are more respectful to their families. Examples of how girls were more respectful to their families included listening to or obeying their parents, not going out or staying out late, greeting family members and being polite, not insulting family members, supporting them financially and sharing knowledge they learned in the intervention. At the community level,

about half of respondents described that girls from the intervention are more respectful towards community members as a result of the intervention, which often included girls cleaning public areas or caring for the sick, stereotypically female activities.

These following quotes illustrate how these norms are attributed to the WF intervention:

I: Of all the things you learned in the program, which ones do you currently use the most in your life?

The package about respecting people.

- Girl, Round 2

What I didn't like was when she didn't respect and didn't obey me as her father. But now she obeys me.... my daughter respects people at home and here in the community.

People say good things about me and my daughter, and I like this a lot.

- Head of household, Round 2

Other Potential Harms

In Round 2, a few respondents described other potential harms to girl participants due to the intervention. Two respondents stated that a girl, or girls in the intervention more generally, stopped going to school because of their businesses. Two respondents described girls' parents taking the money that they earned for their own use. One respondent described that a girl lost friends once she was no longer able to earn money through the intervention. One head of household respondent simply stated that "some girls were harmed" due to the intervention and did not provide any further information.

Additional Descriptive Quantitative data

In Appendix 4, we provide additional descriptive quantitative data from the intervention and comparison samples that can be used to understand the context of both the intervention and comparison study sites. However, these data should not be used to assess the effectiveness of the intervention. For estimates of the impact of the intervention on targeted outcomes (i.e. GBV knowledge and school attendance), we refer the reader to the weighted difference in difference analyses reported above.

DISCUSSION

Impacts on Primary Outcomes

Of the seven primary quantitative outcomes, two outcomes were retained for analysis. We estimated the impact of the WF intervention on knowledge related to GBV and school attendance approximately two years after the intervention began, and found both outcomes were positive and trending in the expected direction, but there was no statistically significant impact. We were not able to obtain accurate measures for the other five quantitative outcomes and therefore could not assess impact of WF on these outcomes.

Although the quantitative component of the evaluation was not able to demonstrate causality between the intervention and primary outcomes, the qualitative data revealed some promising impacts on the outcomes of interest and illustrated causal pathways leading from intervention impacts to potential reductions in HIV vulnerability among participant girls. Most girls learned about what GBV was, although descriptions were superficial and overlapped with other types of violence or discrimination. Moreover, the program may have overemphasized the age of 18 as the age of consent as opposed to a more nuanced understanding of negative impacts of power imbalances which occur when there are large age differences between sexual partners. Fewer girls discussed learning about reporting GBV, and while some described intending to report GBV or helping others report, few girls mentioned changes in experiencing GBV (though this was not directly asked). Girls' households and communities also gained knowledge related to GBV, although their descriptions of knowledge gained was similarly thin; few respondents described changes in GBV at the household level, while many respondents described men in the community being less likely to solicit sex from younger girls or perpetrate GBV out of fear of legal consequences. Although GBV knowledge was largely sustained, impacts on GBV perpetration would likely be influenced by other factors not modified by the WF intervention such as community-level gender norms and men's attitudes towards girls and their rights. These findings highlight the need for future interventions to target the larger community including both perpetrators and survivors of GBV, and to seek to galvanize change in broader gender norms rather than focusing on inciting fear of punishment among (potential) perpetrators.

Similarly, most girls learned about what HIV was and how the virus was transmitted and prevented; respondents' descriptions overall lacked depth that would indicate detailed knowledge about this topic and a small number of respondents indicated low or incorrect knowledge. Girls' households and communities also gained some, although not very detailed, information about HIV transmission and prevention. At all levels, HIV testing was mentioned infrequently compared to other topics. These findings indicate that intervention participants did not obtain a detailed understanding of HIV, although it is encouraging that the knowledge that they did acquire was retained after the intervention ended.

Many respondents described girls learning that they should not engage in sexual activity including sex before marriage (or before 18 years), transactional or intergenerational sex, and having multiple partners; many described these behaviors as "bad" or "wrong" and some linked these behaviors to HIV risk. Some respondents indicated that girls had ended sexual relationships, reduced their number of sexual partners, no longer engaged in transactional or intergenerational sex, or now use condoms or other contraception due to the WF intervention. Girls' households and communities sometimes reported gaining knowledge that girls should not have sex before 18 and that intergenerational sex was wrong, and households and communities were often described as being proud of girls' reduced sexual activity. A few respondents also credited the intervention with reducing early marriage and pregnancy and GBV, which was viewed in a positive light by the community. Earning money through the intervention was a driver of girls' ability to reduce their sexual behavior, and these changes were often sustained

only in cases where girls could continue supporting themselves financially through doing business.

Respondents' statements about girls' sexual behaviors and any changes that they may have observed revealed stigmatizing attitudes towards girls' sexuality that seemed to have been unaffected by the intervention; in some cases, these stigmatizing attitudes seemed to have been reinforced in the way the intervention was delivered. Furthermore, the qualitative data suggests that the intervention may have unintentionally reinforced existing inequitable gender norms which may have affected the responses girls gave during the quantitative surveys—by lowering the propensity to accurately report sexual behavior—especially since the first survey was administered after almost all girls had begun participating in the WF intervention.

Some girls continued with their education or re-enrolled in school due to the intervention; the sustainability of these changes were largely determined by girls' ability to continue with their businesses and by factors external to the intervention such as the lack of access to secondary schools in their communities and drought. More commonly, girls reported changes in their perceptions of the importance of school in relation to their future goals and careers due to the intervention. Several respondents recalled girls purchasing school supplies for siblings and other family members, and a few community members described school enrollment increasing among girls who were not part of the intervention thanks to WF.

Community-level differences in the implementation of the intervention and the various community contexts, especially in relation to their degrees of poverty, drought, political conflict, and inequitable gender norms, may have played a role in the variable impact on the outcomes—in effect cancelling effects out. Low statistical power after using multi-level exact matching to reduce bias in the quantitative analysis may mean we could not detect small effects. The qualitative data may have been more sensitive to detecting such effects, but it is difficult to quantify how large an effect there actually is using qualitative methods

Other Impacts and Causal Pathways

Overall, the WF intervention received positive feedback from all groups interviewed. Most respondents identified the component that taught the girls how to run a business and save money as their favorite aspect of the intervention; however, some girl participants did not make a profit, and some were not able to continue with their businesses and earn a profit once the intervention ended. Factors both internal and external to the intervention influenced the success of girls' businesses, such as the length of time girls received subsidized products through WF, political conflict in the region that may have affected social and purchasing patterns, and natural disasters such as drought and flooding that can disrupt participation in and access to local markets, as well as distances to local markets and higher prices of unsubsidized goods.

Other impacts related to girls' behaviors and daily activities were well-received by respondents. Many respondents described girls in the intervention becoming “good,” “in line” or generally respectful and well-behaved, and nearly all stated that these behaviors continued after the

intervention ended. Girls' "good" behavior was linked to being respectful of others (as well as not being sexually active if unmarried), although in many cases "good" behavior seemed to conform with inequitable gender norms. Many girls were subsequently treated with greater respect by community members. During analysis, we felt that information about how community members treated girls revealed girls' low social standing prior to the intervention. Respondents widely agreed that WF girls and girls outside of the intervention were treated better because of the intervention, but most of respondents' examples of prior or current treatment demonstrate that girls were treated very poorly and their status improved only marginally because of the intervention. This was particularly true among girls engaged in transactional sex prior to the intervention.

Related to this, respondents described appreciating changes in girls' daily activities including participating in community service activities, such as cleaning common spaces, as well as doing household chores. Most respondents described that these changes were sustained after the intervention ended. Although initially the intervention seemed to have influenced girls' future goals, over time some girls described no longer being able to achieve their goals once the intervention ended, usually because their businesses did not last. In a few cases, girls described having crushed dreams after the intervention ended.

Analysis of the causal pathways through which the intervention influenced potential predecessors of girls' HIV risk, such as intergenerational and transactional sex, revealed the complimentary nature of the business and education components of the intervention. Although the educational component of the intervention was essential to increasing girls' knowledge and improving their awareness of high-risk sexual behaviors and GBV, and to the spread of knowledge on the household and community levels, girls' ability to change their actual behaviors was largely moderated by their access to financial resources. This is further supported by the fact that at Round 2, some girls whose businesses had failed reported re-engaging in transactional or intergenerational sex for financial support. These findings speak to the increased impact that may be leveraged through implementing multi-component interventions and to the importance of integrating sustainable economic components into health interventions that aim to decrease financially-driven sexual risk behaviors in high-poverty settings.

Quantitative Limitations

Our study design evolved in response to programmatic and logistical constraints. Initially, our preference was to implement a randomized controlled trial design, but after meeting with intervention implementers we learned this design was not possible because of the programmatic realities that often complicate real-world evaluations. Specifically, there were fewer intervention participants than anticipated, the intervention had already begun in some groups, part of the intervention was not implemented at all, intervention components were not the same across all groups, names used to identify communities and participants varied, and extreme seasonal flooding and political conflict in the province affected the research plan.

The inability to obtain valid measures of our outcomes was a limitation of this study. Self-reported six-month incidence of transactional and intergenerational sex were intended to be primary outcomes in this evaluation, but were dropped because they could not be validly assessed in the study population. SCIP chose to implement the WF intervention with adolescent girls in Zambézia Province because this population is engaging in sexual behaviors (voluntarily or involuntarily) which put them at risk for acquiring HIV. According to the 2011 Mozambique Demographic and Health Survey, 23 percent of girls 15-17 in Zambézia Province have experienced physical or sexual violence at any time in life and 8.4 percent of 15-17 year olds had sex with at least one man 10 or more years older than them within the last 12 months¹³. Furthermore, 62 percent of girls 15-19 years had concomitant sex partners in the last 12 months and nearly half (49 percent) of girls who experienced physical/sexual violence neither told somebody nor asked for help for physical/sexual violence¹³. However, the six-month incidence of transactional sex (7 percent) and intergenerational sex (1 percent) observed among the intervention girls at the first measurement occasion in our study were much lower than expected. This means there are two, significant components that generated variation in our measures of these outcomes – actual sexual behavior and the propensity to accurately report sexual behavior. We are not interested in the impact the intervention had on the tendency to report sexual behavior, but this is confounded with actual sexual behavior and therefore we could not validly assess these sexual behavior outcomes in the population in our study. Before examining these outcomes at endline or for the comparison group, we dropped these outcomes from the analysis. This is unfortunate because these outcomes directly influence HIV vulnerability and therefore this situation limits our ability to evaluate the full impact of the WF intervention.

Age was a criterion for participation in the WF intervention and also this evaluation. Age is important because HIV vulnerability is influenced by age of the girls and their sexual partners, and the intervention emphasized that girls should not have sex or get married until they are 18 years old. Unfortunately, we were not able to measure age with validity or reliability in this study for two primary reasons. First, age is not a salient concept in the study communities. People in the study communities do not know their exact ages or dates of birth. Moreover, birth certificates are not common and other official documents such as baptismal certificates or voting cards are only approximate ages. Second, the WF intervention did not verify girls' ages prior to their participation. The intervention was very attractive to potential beneficiaries because of its economic component and WF could not accommodate all girls who were interested in participating. This situation created an incentive for girls and their caregivers to lie about the girls' ages to be able to participate in the intervention. Indeed, when comparing girls' reported ages from the first measurement occasion to the endline we discovered that 58 girls from the intervention group and 70 girls from the comparison group had inconsistent ages defined as increasing by more than one year or decreasing between the first measurement occasion and endline. We sent field staff out to try to uncover girls "true" ages and were able to resolve the age discrepancies for 54 intervention girls and 63 comparison girls. However, results based on self-reported age should not be overly interpreted because time is elastic in the study population and therefore measured with error.

Statistical power was another limitation. Although the target sample size was 300 girls in the intervention group and 650 girls in the comparison group, the effective sample size after matching and post-stratification weighting was 174 and 323 respectively – well below our target numbers. This means the minimal detectable effect size we calculated when we designed this study was, in end, much higher. This could not be known in advance, but it limited our ability to detect small or even medium sized impacts on the outcomes.

In hindsight, our sampling strategy was not efficient. Although we would have been unable to match the distribution of intervention communities across districts exactly, we could have come closer than we did. Our sampling of comparison communities is therefore not optimal with respect to statistical efficiency. This is also true with respect to distance from the capital. Both region and distance from the district capital were known prior to the sampling of comparison communities, but we failed to use this information to its fullest potential in our sampling of comparison communities.

The selection of communities and girls for participation in the intervention was non-probabilistic and largely unobserved. We attempted to compensate for this by asking SCIP to replicate their community selection criteria on a population of unselected communities from the same six districts. We also employed matching procedures to equalize the two groups of girls on observable community and individual-level factors believed to be related to both treatment selection and the outcome measures. In addition, the use of an extrapolated baseline allows us to provide difference in difference (DD) estimates of the treatment impacts. This estimation strategy is robust with respect to unobserved time stable sources of confounding. In general, we want to discourage readers from thinking about the comparison girls as being sampled from a population of interest. We are only comparing them to intervention girls with respect to their *change* in the outcome measures and we are only concerned about sources of non-equivalence with respect to observed variables that have impacts on change. We address this concern by matching the samples on a set of observed characteristics that were selected *a priori*. We acknowledge that the two populations are potentially dissimilar on any number of factors, but our identification strategy requires that we assume that these are unrelated to change in the primary outcome measures.

Our time line to conduct this evaluation was constrained—the two measurement occasions were only six months apart—and this may have reduced our ability to detect change. If growth is roughly linear past two years from the start of the intervention, then more outcome data further out would have been helpful. It would also have allowed us to get more accurate estimates of the baseline increasing power and relaxing the linear growth assumption.

As mentioned above, our study extrapolated baseline values and this method relies heavily on the assumption of linearity in the outcome means over the post-intervention time period. This introduces a potential source of specification error which may bias our treatment effect estimates. In addition, error in the reporting of the start of the intervention for each girl will

attenuate any treatment effect estimates. Finally, relying on an extrapolated baseline lowers the statistical precision of our treatment effect estimates and has an adverse impact on power.

Our difference in difference identification strategy for estimating the causal effect of the intervention on selected outcomes depends critically on obtaining valid estimates of the difference in the outcome means at baseline between the two cohorts. This task was made difficult for two reasons. First, the participants in the intervention group were only interviewed *after* exposure to the intervention had already begun – in many cases, several months after exposure. We therefore based our estimates of the baseline population means on an average over the intercepts from the weighted, within-subject regressions of the outcome on the subject-specific time elapsed since the beginning of exposure. This is what it means to center estimates of the fixed effects on a subject-level random effects distribution in a hierarchical linear growth model (HLGM). The averaging over subject-specific regressions raises a second difficulty. Because we only have two (at most) measurement occasions per subject, we had to base our extrapolated base-line means (i.e. intercepts) on a single parameter (linear) growth model. However, growth in the outcome after exposure to an intervention may not be linear. Instead, it is more likely to be non-linear—rapid at first until it reaches an inflection point after which the benefits of the intervention would level off. Depending on the true functional form of the growth in the outcomes means in the intervention and comparison populations (e.g. location of the inflection point), the assumption of linear growth over the entire post-intervention period could result in systematically biased estimates of the baseline population means and the [related] estimated impact of the intervention (i.e. differences in the population growth parameters). We therefore considered possible ways of relaxing the linear growth assumption.

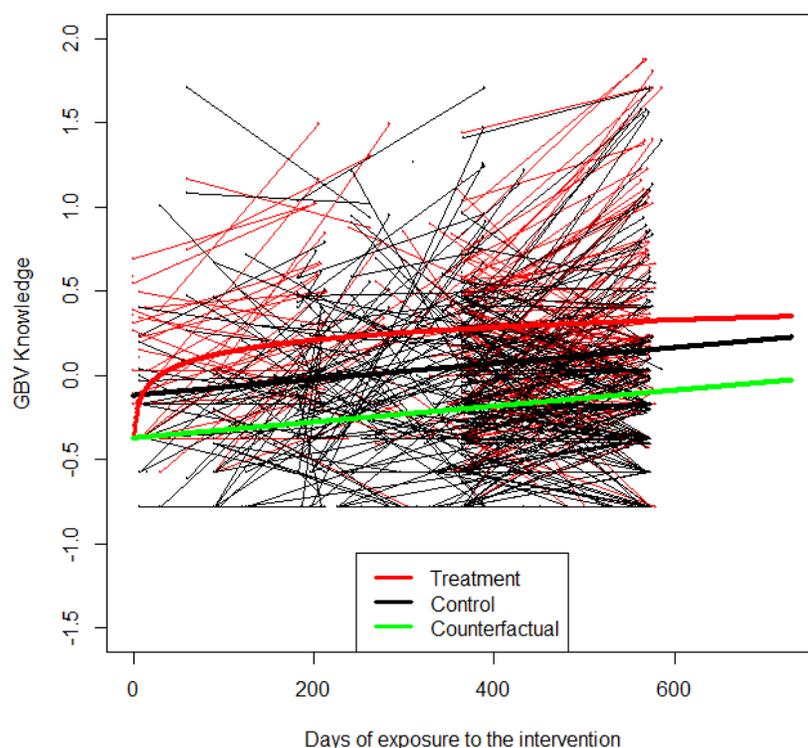
First, still averaging over the within subject regressions (i.e. HLGM), we could regress the outcome on a monotonic transformation of the time variable (e.g. logarithmic). Although such a strategy would force non-linear growth in both groups, it is possible to parameterize the model in way that forces strictly linear growth in one group (i.e. comparison group) while forcing non-linear growth in the other (i.e. intervention group). The Box-Cox transformation offers a flexible approach to specifying non-linear growth in the outcome mean among the subjects in the intervention group. By choosing values of λ at increasing distances from 1 in equation below, we can specify *a priori* how rapidly growth is accelerating ($\lambda > 1$) or decaying ($\lambda < 1$).

$$y_i^{(\lambda)} = \begin{cases} \frac{y_i^\lambda - 1}{\lambda} & \text{if } \lambda \neq 0, \\ \ln(y_i) & \text{if } \lambda = 0, \end{cases}$$

In an exploration of this possibility using our data for the GBV knowledge, we assumed growth in the intervention group was a linear function of a Box-Cox transformed time variable, and chose values λ that ranged from -1 to 1. For this range of λ , the rate of growth in the intervention group over the untransformed time variable decelerates at a rate that depends on both λ and the HLGM estimated growth parameter. For the comparison group, we assumed strictly linear

growth (i.e. $\lambda = 1$). For each value of λ chosen, we estimated a HGLM growth model and retained the -2 log likelihood fit statistic. Because smaller values on this statistic indicate a better fitting model, an examination of how this statistics changes across each choice of λ could provide an empirical basis for choosing λ . The results of this exercise indicated that choices in the vicinity of $\lambda = 0$ provided the best fit. The model adjusted means from this model are shown in Figure 10.

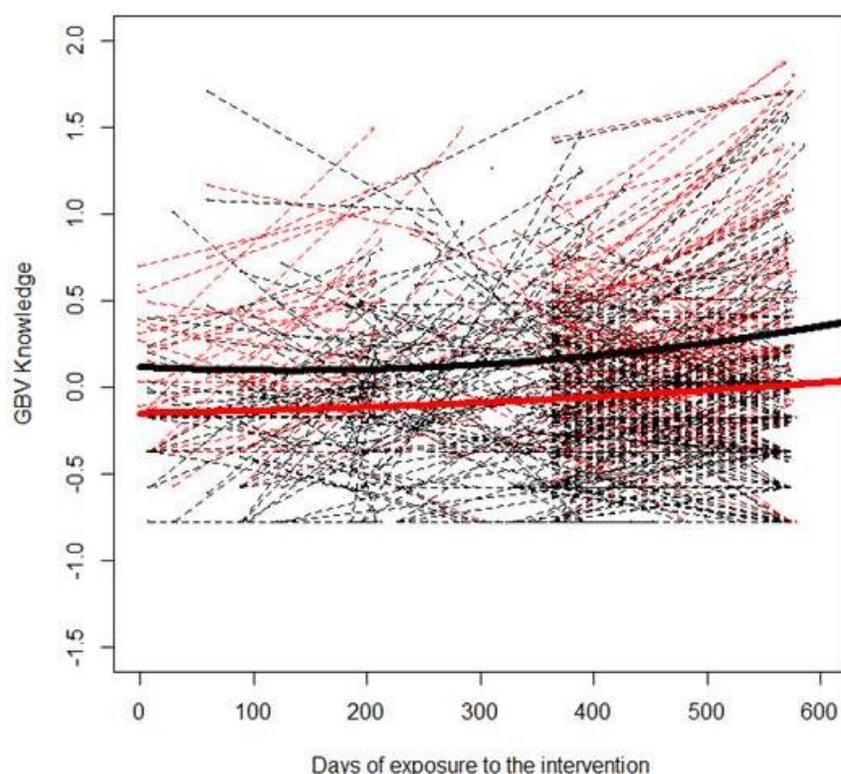
Figure 10: Alternative parameterization results for GBV knowledge



The first thing to note, is that our method of picking λ resulted in a model that assumes very rapidly decelerating growth in the intervention group. The consequence is that the baseline mean for this group is shifted considerably down from where it was in our original model for this outcome (see Figure 4). This would tend to result in a more positive treatment effect than we originally reported. Indeed, the estimated treatment effect increases by a factor of 5 over our original estimate, but still remains below the level of statistical significance. However, this alternative parameterization also assumes that the majority of the benefit of the intervention accrues in the first month or so of the intervention. While rapid growth in the first months might be credible, the extremely low extrapolated baseline mean associated with this approach is not consistent with the small amount outcome data from the early post-intervention period that is available from participants in the intervention group. Indeed, most of the sample points (shown in red) lie above the extrapolated baseline mean for this group. It would be therefore very difficult for us to conclude that this alternative parameterization has any reasonable empirical justification.

A second way of relaxing the linear growth assumption is to abandon the HGLM approach altogether and provide fixed effect estimates that are not centered on the subject-level random effects distribution. In our data, this is possible because, at the population level, we do have outcome data at multiple time points over a two-year post-intervention period. It is only when we try to model within-subject growth in the outcome that we are restricted to a single parameter growth model. The problem with estimating growth exclusively at the level of the population is that it potentially confounds changes occurring within individuals with changes in the composition of the population. In this case, changes in the composition of the population have two sources; loss to follow up and the possibility that the outcome is not independent of the timing of measurement occasions (e.g. subjects with less knowledge were interviewed later). Nonetheless, if we assume that data from the second measurement occasion is missing completely at random (MCAR) and that the timing of the interviews is not dependent on the outcome or the treatment effect, then we can estimate a non-multi-level model that assumes quadratic growth in the outcome over time and use complex survey methods to adjust the standard errors for the multi-staged sampling design (subjects → measurement occasions). The results of this effort are shown in Figure 11.

Figure 11. Non-multi-level model results for GBV knowledge



Keeping in mind the aforementioned limitations of these analyses, there is no evidence in Figure 7 that growth in the outcome means in either group is dramatically non-linear. In addition, the nearly parallel slopes shown in this figure are even more consistent with the null hypothesis

then are the results from our primary analysis. In conclusion, each of alternative identification strategies we explored involves a different and, in many cases, equally implausible set of assumptions. Furthermore, neither would dramatically alter our conclusions regarding the hypothesized impacts of the intervention.

Quantitative Strengths

Despite the constraints mentioned above, we implemented the most robust design possible and followed procedures consistent with a confirmatory study. Notably, our design included a comparison group and two measurement occasions, and the refusal rate for joining the study was low and our retention rate was high. We employed robust analytic methods to adjust for the non-equivalence we anticipated. Indeed, multi-level exact matching and a difference-in-differences estimation is more rigorous than covariate adjustment because the latter requires models to include numerous interaction terms for proper adjustment which researchers often eliminate or not even attempt due to loss of power. We also pre-specified our primary outcomes and analysis approach *a priori* and any adjustments we made to our approach (e.g. dropping outcome measures) was made before seeing any data from the endline or the comparison group. Furthermore, we minimized the number of outcomes involved in hypothesis testing so as to not over inflate the type 1 error rate and we fully report all of our findings. These factors taken together increase the validity of our findings.

Qualitative Limitations

Despite our data collectors' best efforts to explain otherwise, it is always possible that social desirability bias may have influenced the qualitative findings due to respondents hoping the researchers could bring the WF intervention back to their community. For example, we also heard some conflicting information from girls and their heads of household and influential males about the outcomes. Our data collectors believe this may have stemmed from differing motivations among the respondents to respond in ways to encourage the intervention to return (i.e., by stating that the intervention had a more positive effect than it did). Strong negative attitudes towards girls' sexuality may have also influenced responses (i.e., respondents may have been less forthcoming in describing girls' sexual behavior). Another potential threat to the findings is recall bias since many respondents were recalling experiences from a year before we interviewed them the first time. We also cannot rule out that selection bias may have influenced our findings, especially for the male respondents who were identified by the girl respondents. For example, girls did not often invite their sexual partners to be part of our evaluation; rather, most girls chose uncles or other male family members.

Qualitative Strengths

While the quantitative component of this study was not able to provide a lot of information about the effectiveness of the WF intervention, the qualitative research component provided rich information about the effectiveness of the intervention and causal pathways which can be used to inform future programs.

The longitudinal design of the qualitative component is an important strength of this evaluation. Multiple qualitative rounds allowed us to analyse the data from the first round and adapt the interview guides for the second round to ask detailed follow-up questions about our interpretation of the first round of data. This enabled us to get a better understanding of the impacts and sustainability of the intervention.

The use of the Social Ecological Model in the qualitative component allowed us to triangulate findings across the individual, interpersonal, household and community levels which increases the validity of the findings. We also achieved thematic saturation in many of the main themes due to this design and the interview guides.

A high retention rate was another strength of the qualitative evaluation. Our data collectors kept in contact with respondents and their communities over the course of the study, even when we were not collecting data, and this facilitated our high retention rate in a traditionally hard-to-track population, and thus increases the validity of our findings.

Conclusion

Considering both the quantitative and qualitative findings together, the data suggest that the WF intervention is a potentially promising strategy for reducing girls' HIV vulnerability. Our analysis of the economic component of the WF intervention provides a nuanced and differentiated view of the conditions of poverty encountered by adolescent girls in an area that frequently employs non-monetary economic structures and is heavily reliant on subsistence farming and fishing. Additionally, the evaluation yielded valuable information to strengthen future iterations of WF and other interventions like it, and highlights the need to address potential harms in interventions serving vulnerable girls.

RECOMMENDATIONS

Research Recommendations

Our experience implementing this evaluation and our findings can inform future evaluations of interventions aimed at reducing girls' vulnerability to HIV in sub-Saharan Africa.

Our study design evolved in response to programmatic and logistical constraints. Initially, our preference was to implement a randomized controlled trial design, but after meeting with intervention implementers we learned this design was not possible. We recommend prospective evaluation designs with random allocation be accommodated early in the program planning phase. We also recommend that designs incorporate more than one research method to triangulate findings. In our study the qualitative research component provided a lot more information about the impact of the WF intervention than the quantitative component because of programmatic and logistical constraints of the quantitative design.

When a prospective design with random allocation is not possible, quasi-experimental studies should collect data from very large samples, since sample sizes are difficult to calculate in advance because the level of non-equivalence is not known until after data collection.

To reduce measurement bias, we recommend biological endpoints such as incidence of sexually transmitted infections serve as primary outcomes for evaluations of programs intending to reduce sexual behaviors associated with HIV infection.

We recognize that an ideal evaluation situation is not always possible and in these cases, we recommend rigorous quasi-experimental evaluations be conducted where researchers specify decisions *a priori*, thoroughly examine the validity and reliability of key analytic measures prior to testing the main hypotheses, and report all their findings with complete transparency, as we have attempted to do in this evaluation.

Program Recommendations

Key programmatic recommendations stemming from this evaluation include diversifying the products girls sell within a community so girls do not compete and drive down their profits. Also, girls' businesses may be more sustainable if program staff strengthen the connections between the input suppliers and girl participants so that after the intervention ends girls can negotiate inputs at low costs on their own. This may be achieved with bulk purchasing, but this skillset would have to be included in the curriculum. This may be achieved by implementing the business component for a longer period, by connecting the WF intervention with other interventions being implemented by government ministries, and ensuring that the curriculum addresses negotiation skills and strategies, such as bulk purchasing inputs. It may be possible to collaborate with local district level government offices (Department for Economic Development or Women and Social Action) and incorporate them into training and implementation oversight. Sustainability of behavioral impacts would likely benefit by strengthening the savings component of the intervention, so girls have savings to draw upon when their profits are low or their businesses fail. Girls would also benefit if the curriculum taught resilience skills to prepare them for potential business failure.

We recommend the educational components of the intervention, especially the GBV component, be expanded to others in the community, including men. Furthermore, the content of the educational components should be enhanced beyond providing superficial information, such as listing types of violence, to furnish participants with a deeper understanding of the concepts within a human rights-based approach. We also recommend connecting girls to HIV prevention and testing and family planning services in their communities. To avoid potential harms and ensure interventions are being implemented as designed, it is critical that programs take proactive steps to ensure staff are not introducing their own biases, especially reinforcing inequitable gender norms during implementation. Lastly, we recommend accurate and detailed documentation of actual program implementation down to the site level to facilitate and enhance the quality of monitoring and evaluation efforts.

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APPENDICES

Please refer to the Annex document for all appendices.

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Mission Statement

ASPIRES accelerates evidence-based practice in economic strengthening for vulnerable populations through research and technical assistance.

Statement of Purpose

ASPIRES is a PEPFAR- and USAID-funded economic strengthening (ES) project focused on vulnerable populations, especially those affected by HIV. We aim to promote evidence-based practice by providing technical assistance (TA) for integrated ES programming most consistent with positive livelihood, health, and well-being outcomes. At the same time, we strengthen the evidentiary record through rigorous research so that future programming efforts have stronger foundations.

Research is at the heart of the ASPIRES identity, and all of our projects begin with a systematic interrogation of the existing evidence base in relevant program areas. We make major investments in original evaluation research of the highest possible rigor, both for course correction in implementation and to add to the evidence base. We share our findings on best practices with partners, the broader development community, policymakers, and other key constituents, and we offer TA to support programs that seek to replicate those practices.

ASPIRES provides limited direct implementation. Instead, we focus on providing existing USAID-funded projects with TA and research related to ES. This allows us to balance the collaboration necessary for in-depth research with independence from program operations. In this manner, we generate findings that contribute to identifying a core set of pathways to greater resilience for vulnerable households, and that provide insight into effective, efficient, and scalable interventions to achieve the desired impacts.

ASPIRES has no single theory of change; we are not a single-model or one-size-fits-all project. We are open to all manner of integrated ES interventions of interest to our USAID and PEPFAR stakeholders, with the ultimate aim to shape interventions around the best evidence available.
