

Impacts of an education cash transfer and a girls empowerment program on Adolescent Girls' Education, Health and Economic Outcomes in Kenya

Introduction

Over the past decade there has been a growing global focus on adolescents, particularly adolescent girls. Specifically, the focus on adolescent girls began two decades ago (Mensch et al. 1998) and has picked up momentum in the past decade with several multi-national and bi-national agencies, as well as researchers calling for dedicated attention, investment, and programmatic focus on adolescent girls (Levine et al. 2008; Hallman et al. 2013; Temin and Levine 2009). From the perspective of value for 'return on investment', early interventions with adolescents have the potential for triple benefit – in their current lives, in their future, and in the lives of their future children (Patton et al. 2014). Furthermore, it has been noted that a focus on very young adolescents, ages 10–14, is particularly critical as a window to intervene prior to negative outcomes occurring and laying a foundation for a healthy future in later adolescence and early adulthood (Igras et al. 2014; McCarthy et al. 2016; Blum et al. 2014).

It is argued that adolescent girls face intersecting vulnerabilities, as children and as females, and are even further at risk when living in marginalized or impoverished locations (Levine et al. 2008). Globally, among adolescents ages 15–19, girls make up two-thirds of new HIV infections (HIV/AIDS 2015) and 11% of births are to girls of the same age, with 95% of them occurring in low and middle income countries (Organization 2014). This is of concern because complications in pregnancy and childbirth are a leading cause of death for girls ages 15-24 (Mokdad et al. 2016). These health outcomes are not related to the health sector alone, but are often driven by underlying issues such as child marriage, inequitable gender norms, and unequal access to education – particularly in secondary school. Kenya is a country that shows similar trends for adolescent girls. Nine percent of girls in Kenyan informal settlements ages 15–17, and 45% of girls 18-20 have already given birth (APHRC 2014), 50% of girls in northeastern areas of Kenya are married by the age of 18 (Kenya National Bureau of Statistics and ICF International 2015), 25% of very young adolescent girls in northeastern Kenya have never been to school (Austrian et al. 2015), and 43% of girls ages 15-19 living in urban areas are not in school (Kenya National Bureau of Statistics and ICF International 2015). These health, demographic and education outcomes are compounded by inequitable norms among adolescents, with over half of very young adolescent girls indicating acceptability of intimate partner violence, a level similar to adult women (Kenya National Bureau of Statistics and ICF International 2015).

The factors driving health outcomes of adolescents are not only individual level indicators – such as educational attainment, attitudes on gender roles, and individual access to economic resources – but also factors within adolescents' households and communities. Therefore, when designing programs for adolescents, use of a socio-ecological approach has been promoted (Blum et al. 2014; Blum et al. 2012). The ecological model for adolescent health places individual health, education, self-efficacy, and safety at the center, but also acknowledges the role of the school, the family, and the neighborhood.

In addition, the literature suggests that taking a multi-sectoral approach – that is simultaneously addressing health, economic constraints, and education – is likely to result in a wider range and

longer-lasting set of outcomes for adolescent wellbeing. There is a wide literature that has shown the multiple benefits of educating girls, including improved reproductive health (Bates et al. 2007; Jejeebhoy 1995; C. Lloyd and Young 2009; C. B. Lloyd and Mensch 1999). These benefits include delaying marriage, lowering total fertility rates, and improved health for them and their children, as well as economic benefits to a woman, her family, and community. Evidence also suggests that economic assets have benefits in other areas of women and girls' lives beyond poverty indicators. A study in Malawi showed that girls who received a cash transfer for schooling were less likely to marry early, report sexual activity, and have a teenage pregnancy (S. Baird et al. 2010). An absence of economic assets among adolescent girls has also been identified as a barrier to safer sex practices and a factor associated with increased transactional sex (Austrian and Anderson 2015; Chatterji et al. 2005; Stoebenau et al. 2016). For example, girls who have fewer economic assets are more likely to have exchanged sex for money, gifts, or shelter compared to girls with more assets (Hallman 2005). However, economic interventions on their own are not likely to achieve desired health outcomes, and can even increase risk among adolescents (Austrian and Muthengi 2014; Dunbar et al. 2010), while programs that have combined economic strengthening interventions with prevention of violence and health components have had a positive outcome on all three areas (Pronyk et al. 2006), although there may be tradeoffs vis-à-vis cost and quality of implementing multi-component interventions.

Given the role of poverty as a hinderance to development, cash transfers, both conditional and unconditional, have been a central intervention in a wide range of programs – both government and non-government run. It has been established in the literature that household cash transfers have positive benefits on the children in the household, including on child labor (Kabeer and Waddington 2015), education outcomes (Sarah Baird et al. 2014; García and Saavedra 2017; Kremer et al. 2013; Benhassine et al. 2015), lowering the odds of sexual activity (Handa et al. 2014), and other risky sexual behavior among adolescents (Pettifor et al. 2016; L. Cluver et al. 2013; Heinrich et al. 2017). However, the ability of cash transfers on their own to lead to transformative effects have been called into question (Molyneux et al. 2016; L. Cluver and Sherr 2016), especially as evidence has emerged that cash alone often falls short on longer-term, secondary outcomes such as learning outcomes and morbidity (Attah et al. 2016; Bastagli et al. 2018). This has led to an interest in “cash-plus” programming, based on the hypothesis that cash transfers, combined with additional program components or linkages to external services, may be more effective in achieving desired, sustained effects than cash alone (Watson and Palermo 2016). While combined social protection has been shown to have greater effect sizes on HIV risk for adolescent girls in South Africa (L. D. Cluver et al. 2016), there is a paucity of research comparing cash alone to cash plus programming.

Hypotheses

The Adolescent Girls Initiative – Kenya (AGI-K) is a randomized trial that is testing the short (two-year) and longer-term (four-year) effects of a multi-level, multi-sectoral intervention for very young adolescent girls in two marginalized areas of Kenya. The two primary short-term hypotheses are that 1) the larger number of sectors the program intervenes in, the wider the range of individual level outcomes that will be positively impacted and 2) the cash-plus packages of intervention will result in stronger effects across sectors than the cash alone package.

Methods

Trial Design

AGI-K was a randomized evaluation implemented in two sites. The first site, Kibera, is a large, urban informal settlement in Nairobi, Kenya, characterized by high population density, lack of government services, high crime rates, multiple religions and ethnic groups, and frequent in- and out- migration (Erulkar and Matheka 2007). The second site is rural Wajir County, along Kenya's northeastern border with Somalia, characterized by very low population density, lack of infrastructure, and one religion/ethnic group (Muslim Somalis) (Government 2018). A baseline behavioral survey was conducted prior to the start of the intervention, and a follow-up survey was conducted two years later at the end. Another follow-up survey will be conducted two years post-intervention to track longer-term outcomes.

Interventions

The AGI-K intervention had four components, each of which were implemented for two years, from August 2015 – July 2017. The *violence prevention intervention* employed community-level dialogues and contracts. A committee of key stakeholders was established in each community the groups were taken through a facilitated process to identify key issues that lead to the undervaluing of girls and violence against girls and women. The committee then developed and implemented an action plan to address and alleviate the issues facing girls in their community that they had identified.

The *education intervention* included a cash transfer conditioned on enrollment at the start of each of the three terms of the school year and attending throughout each term¹. At the start of the intervention, all girls—whether in school or out of school—were eligible for the transfer upon school enrollment. The four components of the conditional cash transfer included: 1) school fees paid to the school at the start of each term, up to ~US\$7 for primary school and ~US\$60 for secondary school; 2) a cash transfer of ~US\$11 in Kibera and ~US\$15 in Wajir paid to the head of the household twice per term; 3) school supply kits given directly to girls at the start of each term; and 4) a ~US\$5 incentive paid directly to the school based on the number of girls enrolled in the cash transfer program.

The *health intervention* consisted of weekly group meetings in which girls met under the guidance of a female mentor from the community. Groups were segmented at the start of the intervention by age (11–12 vs. 13–14 years old) in Kibera and by schooling status in Wajir. Group meetings included facilitated discussions using a health, life-skills, and nutrition curriculum, as well as time for open discussion.

¹ An initial system to use finger-print devices to take daily school attendance was established. However, due to lack of reliability in school staff making the devices available on a daily basis, that system was abandoned after two terms. At the start of each term the implementing organization (Plan International in Kenya and Save the Children in Wajir) conducted an enrollment verification exercise at each school. A team of research assistants came on a random day during the term to take attendance. A revisit the following week was conducted for any girl who was absent during the initial visit. Girls who were absent during both visits were ineligible for the second cash transfer payment of that term.

The *wealth creation intervention* included a financial education (FE) curriculum integrated into the safe spaces group meetings. In Kibera, girls opened a girl-friendly savings account and in Wajir, girls received a home bank (piggybank). Girls in both sites received an annual incentive of ~US\$3 to allow them to put into practice the skills learned in the FE sessions.

As the goal of AGI-K was not to test singular interventions, but to test multi-sectoral packages of interventions. AGI-K implemented the following packages:

- 1) Violence Prevention (V-only)
- 2) Violence Prevention + Education (VE)
- 3) Violence Prevention + Education + Health (VEH)
- 4) Violence Prevention + Education + Health + Wealth Creation (VEHW)

Randomization

The unit of randomization is different for the two sites: individual-level randomization in Kibera and cluster randomization in Wajir. In Kibera, an individual-level RCT design results in increased statistical power with the same number of girls compared to a cluster randomized evaluation. Given the density of the urban setting, it was possible to reach a large number of girls with excludable interventions. In Wajir, which is less densely populated, a cluster-level design allows for randomization to different combinations of interventions at the village level, while reaching a similar number of girls. In Wajir, clusters were defined as school-catchment areas or settlements with one public primary school. This was necessary to ensure that girls had access to a school and that they had access to group meeting locations. A total of 80 clusters were identified in Wajir and stratified by district: Wajir West (20 clusters), Wajir East (28 clusters), and Wajir South (32 clusters).

Assignment of clusters/individuals to study arms was conducted in the form of a public lottery to increase transparency and minimize questions and distrust regarding the selection process. In Kibera, girls were randomly assigned to study arms during a public meeting attended by local stakeholders and leaders. An Excel file with a list of girls' ID numbers was projected on the screen, and an Excel formula was used to generate a random number for each girl. The list was sorted in ascending order of the random number and divided girls into four equal groups based on this order. Four stakeholders volunteered to randomly pick a piece of paper from a bag with one of the four study arms written on it, and this arm was assigned to the particular group.

In Wajir, the eighty villages were stratified by sub-county (Wajir East, Wajir South, and Wajir West) and in each sub-county in Wajir, a meeting was held with stakeholders and leaders at the sub-county level, as well as one representative from each of the clusters. A list of all the clusters in the district in alphabetical order was pinned on the wall, and a representative from each village was asked to pick a piece of paper from a transparent container containing an equal number of papers listing the four study arms. Once the representative picked a paper, he/she was asked to publicly announce the arm selected, and it was pasted on the wall next to the name of the village. After all the villages had selected an arm, each representative was asked to sign the paper to acknowledge acceptance of the public lottery results.

Participants

The primary target intervention population was all eligible girls 11–14 who were residing within selected study sites. In Kibera, a household listing was conducted in late 2014 prior to the baseline survey to identify eligible girls to be invited to participate in the program and to be part of the research sample. Girls were considered to be eligible if they were still residing within the study sites at the time of the baseline survey and if they were not in boarding school at the time of the listing and/or at the time of the survey. Community members within these sites are targeted within the violence-prevention intervention.

In Wajir, due to the vastness of the terrain, a rapid household listing was conducted at the same time as the baseline data collection. In villages with less than 40 eligible girls, all girls ages 11–14 were selected for the baseline sample and interviewed. In villages with 40 or more eligible girls, team leaders used lists of random numbers to randomly select 40 households, and to randomly select one girl within each household for the baseline survey sample.

Outcomes

For the mid-term evaluation, the outcomes of focus are those anticipated to be directly impacted in early and mid-adolescence by the intervention components (Austrian et al. 2016). The key outcomes in the area of violence are: ‘experience of violence by a male in the past one year,’ defined as a binary variable that takes the value of 1 if she answered yes to one of 15 items measuring different dimensions of physical, emotional and sexual violence; ‘household norms on education’, defined as a dichotomous variable that takes the value of 1 if the household representative expects the girl to complete secondary school; and ‘household expectation for age of marriage’, defined as a dichotomous variable that takes the value of 1 if the household representative expects the girl to get married before age 22 in Kibera and before age 18 in Wajir.

Key outcomes from the education intervention are ‘school enrollment,’ defined as having attended the current school year and ‘grade attainment,’ defined as highest grade completed. Primary school in Kenya has 8 grades. A critical bottleneck in schooling is the transition from completed primary to secondary. Therefore, in addition to grade attainment, we consider two conditional outcomes for Kibera examining progression during these years: (1) ‘primary school completion’ among respondents who had completed Class 6 but had not yet completed primary school at baseline; and (2) ‘transition to secondary’ among respondents who had completed Class 6 but had not yet attended secondary school at baseline. ‘Household norms on education’ defined earlier is also an outcome hypothesized to be directly impacted by the education intervention. In addition, we look at relative household economic status and cash liquidity to assess the impact of the cash transfer on household wealth. Cash liquidity was measured with a variable that took values 1–4, indicating whether the household had enough savings or assets to sell in case of need (1 = less than 1,000 KSh; 2 = 1,000 KSh to less than 5,000 KSh, 3 = 5,000 KSh to less than 10,000 KSh and 4 = 10,000 KSh or more). Principal components analysis (PCA) was used to derive a wealth score from a series of ownership of household assets questions. Quintiles were then estimated from the PCA score, with higher quintiles representing higher household wealth as measured by assets ownership.

The key outcomes from the health intervention measured at midline were sexual and reproductive health (SRH) knowledge, condom self-efficacy, and gender equitable attitudes. Two measures of SRH knowledge were assessed: ‘knowledge of modern contraception’, defined

as knowing at least one of seven methods of contraception without prompting name of method and a score on a seven-item scale made up of agree/disagree statements of common ‘SRH myths’. ‘Condom self-efficacy’ was measured with a score ranging from 5-25 derived from five questions on how sure a girl is that she could effectively talk about and use condoms, the higher the score the higher the girls’ condom self-efficacy; this outcome was only measured for Kibera. ‘Gender equitable attitudes’ was measured on a 10-item scale made up of agree/disagree gender norms statements. ‘Household norms on timing of marriage’ defined earlier is also an outcome from the health intervention.

The key outcomes from the girl-level wealth creation intervention were ‘financial literacy’, which was measured as a score made up of 10 items capturing knowledge, attitudes and behaviors about various financial practices, and ‘saving behavior’ defined as a binary variable that takes the value of 1 if a girl reported saving any money, formally or informally, in the past six months.

Sample Size

The study was powered to detect differences on the prevalence of first birth and number of years of schooling completed between the violence prevention only arm and each of the other three arms at the two year follow up survey when the sample will be aged 15-18 years old (Austrian et al. 2016). Based on individual randomization and using data from the 2012 Nairobi Cross-Sectional Slum Survey (APHRC 2014), the estimated sample size for Kibera was 600 girls per arm at follow-up (750 girls per arm at baseline, assuming a loss to follow-up of 20%). However, due to a higher than expected proportion of non-eligible girls, the attained baseline sample included approximately 600 girls per arm. Based on clustered randomization and using data on the Northeastern Province from the 2008/09 Kenya Demographic and Health Survey (Kenya National Bureau of Statistics - KNBS et al. 2010), the estimated sample size for Wajir was 20 clusters per arm with 32 girls per cluster at follow-up (40 girls per cluster at baseline, assuming a loss to follow-up of 20%). However, due to differences between population estimates and the actual number of eligible girls residing in these communities, the attained baseline sample included 20 clusters per arm with an average of 27 girls per cluster (Austrian et al. 2016).

Blinding

Data collectors were blinded to the study arm assignment of the respondents.

Statistical Methods

An intent-to-treat (ITT) approach was followed to estimate the impact of each combination of interventions to the violence only arm. ITT is defined as girls randomized to a specific study arm in Kibera, and as girls living in a village randomized to a specific study arm in Wajir, irrespective of their actual participation in the interventions. Difference-in-differences (DID) were estimated from linear regressions with girl-level fixed-effects for outcomes that were measured both at the baseline survey and at the first follow-up survey two years later. Simple differences at the two-year follow-up survey were estimated from linear regressions for outcomes that were not measured at baseline.

A secondary analysis was conducted to assess the impact of the treatment-on-the-treated (TOT) for the health and wealth interventions. While the majority of girls randomized to the education

intervention received the education intervention components, girls randomized to the health and wealth interventions which included attendance to weekly meetings had different levels of participation and thus different exposures to the interventions. The TOT analysis was conducted as a two-stage instrumental variable (IV) estimation. The invitation to participate in the program (the ITT) was used as the instrumental variable in the first stage to predict a certain level of participation in the weekly meetings. Participation was defined as attending above the median number of girls group meetings in the specific study arm and site.

As multiple indicators were evaluated, to address concerns of multiple hypotheses testing, for each indicator we constructed a z-score based on the mean and standard deviation of the V-only arm at midline. We then created a variable that was equal to the mean z-score for each set of related indicators and estimated the linear regression for simple differences at midline (Kling et al. 2007).

All regressions controlled for girls' age at the time of the survey. Regressions for simple differences at follow-up for Wajir also controlled for sub-counties. All regressions for Kibera were estimated with robust standard errors, and all regressions for Wajir were estimated with robust standard errors accounting for clustering at the village level. All statistical analysis was conducted using Stata 15.1.

Role of Funding Source

This study is funded by the UK Department for International Development (PO6171). The funder established an Expert Research Committee that reviewed and approved the study design and baseline instruments.

Results

Figure 2 shows the derivation of the analytical sample by study sites and arms. Baseline data was collected between February to May 2015 and the final sample consisted of 2,384 girls in Kibera and 2,147 girls in Wajir after further excluding 8 interviewed girls who were ineligible based on age or area of residence. At midline, 91% of girls in the baseline sample were re-interviewed in Kibera and 89% in Wajir.

As follow-up rates were not balanced by study arm (see Figure 2), multivariate logistic models predicting attrition at midline were estimated for each study site separately to assess potential bias from attrition (See Appendix 1). In addition to study arms, the models included the following covariates measured at baseline: age, school enrollment, grade attainment, literacy, numeracy and cognitive skills, self-efficacy, household assets, co-residence with parents, and sub-county (Wajir only). Significant differences in the likelihood of attrition by study arm were found in Kibera, with girls in the V-only arm being the least likely to have been re-interviewed at midline. Older girls and girls not living with their biological parents were also more likely to have been lost to follow-up at midline. In Wajir, girls in arm V+E+H+W were less likely to have been lost to follow-up at midline than girls in the V-only arm. Older girls and girls in Wajir South were more likely to have been lost to follow-up at midline, while girls enrolled in school and girls from households with more assets were less likely to have been lost to follow-up.

Tables 1 and 2 show means for the outcomes of interest in this paper, as well as the median number of cash transfers received and the median number of girls group meetings attended, for Kibera and Wajir, respectively. In Kibera, almost all girls were enrolled in school at baseline. Primary school completion (completion of Class 8) and the majority of girls were still of primary-school age. Households hold on average less than 5,000 KSh in savings or assets they could sell in case of need at baseline. The large majority of households at baseline expected girls to complete secondary school or higher and few households expected girls to get married before age 22. On average, at baseline, respondents scored below 6 out of 10 in financial literacy, and less than 30% had saved any money in the past six months. Around 30% of girls had experienced some form of violence perpetrated by a male in the past year.

In Wajir, around three quarters of girls were enrolled in school at baseline. Primary school completion (completion of Class 8) was very low, which was not unexpected as the majority of girls were still of primary-school age; the levels of primary school completion were considerably lower than those in Kibera. Households hold on average less than 5,000 KSh in savings or assets they could sell in case of need at baseline. While the majority (84%) of households at baseline expected girls to complete secondary school or higher, the figures are at least 10 percentage points lower than those in Kibera. Very few households (2%) expected girls to get married before age 18. On average, at baseline, respondents scored below 5 out of 10 in financial literacy, and less than 1% had saved any money in the past six months. Very few girls (less than 4%) had experienced some form of violence perpetrated by a male in the past year, although it is likely that there is substantial under-reporting of violence.

Tables 3 and 4 show results from the ITT analyses for Kibera and Wajir, respectively. In Kibera, a positive effect is observed in grade attainment, primary school completion (statistically significant for the V+E and V+E+H+W arms), transition to secondary school (statistically significant for the V+E+H+W arm), and marginally significant effects are observed in school enrollment for V+E+H+W. A statistically significant effect is found in household cash liquidity for all arms, and in household assets for the V+E+H+W arm. Positive and statistically significant effects are found for the V+E+H and V+E+H+W arms in SRH knowledge outcomes and condom self-efficacy. Positive and statistically significant effects are found for the V+E+H+W arm in both financial literacy and saving behavior. The TOT results (see Table A2 in Appendix 2) show that when the program had positive effects, the effects in were much stronger among girls in the V+E+H and V+E+H+W arms who had attended more than the median number of meetings attended by girls in each study arm.

In Wajir, statistically significant positive effects from the ITT analysis are found in household norms around girls' education and expectations for timing of marriage. A positive and statistically significant effect is observed in school enrollment, and for arm V+E in grade attainment. No positive effects are found in outcomes related directly to the health intervention and there appears to be a negative effect on contraceptive knowledge and gender attitudes. Positive but only marginally significant effects are found for the V+E+H+W arm in financial literacy. Positive and statistically significant effects are found for all arms in savings behavior, but with the effect for the V+E+H+W arm being much larger than the effects in the other two arms. As in Kibera, the TOT results (see Table A3 in Appendix 2) show that when the program had positive effects, the effects were much stronger among girls in the V+E+H and V+E+H+W

arms who had attended more than the median number of meetings attended by girls in each study arm.

Discussion

The analysis in this paper supports the hypothesis that if the goal is to improve a range of domains important to the well-being of young adolescent girls – including education, health, and economic status – a multi-sectoral/multi-level approach proved more effective as it leads to improvement in a larger number of domains. Each intervention component made a contribution to the outcomes that fit within their sector – for example, the education cash transfer improved education outcomes, the health intervention improved health knowledge, and the economic strengthening intervention improved financial literacy and savings. The question remains, in achieving the longer term goals of delaying childbearing, will improvements across sectors of outcomes be necessary and what are the tradeoffs with implementing a more complex and costly intervention.

In addition, the TOT analysis provides justification for the hypothesis that, especially with adolescents, a “cash-plus” approach will result in stronger outcomes and will also make the cash transfer more effective. As the results indicate, for girls who actively participated in the girls empowerment components (health alone and health and wealth together), the effect size of the education outcomes were larger. This supports the literature that states that cash alone is not the magic bullet because it does not impact all outcomes (L. Cluver and Sherr 2016), but it remains a key component of the combination of interventions that are needed to address the array of challenges that face adolescence in their transition into adulthood. Part of what is critical about the cash transfer in this context, is that it addresses the economic constraints at the household level, together with a focus on girls’ education – a key component of what makes the full package of AGI-K interventions both multi-sectoral, and reaching multiple levels of a girl’s socio-ecological environment.

Another learning from these results is that cultural norms and context will impact which results are obtained through the same interventions. While overall there was similar impact at a sector level in both Kibera and Wajir, the specific indicators differed by site. For example, in Kibera the education cash transfer improved primary school completion and the transition to secondary school for girls in the final two years of primary school when the intervention started, whereas in Wajir the same intervention had an impact largely on getting girls who were out of school at baseline to enroll in school, in most cases for the first time. This is largely due to the differences in schooling status of the two samples at baseline – with 99% of girls in Kibera enrolled in school and 71% enrolled at the appropriate grade level for their age as compared to 71% and 21%, respectively, in Wajir. Context will have important implication on the future targets of these interventions, and it is likely that differing context and culture will continue to have an influence on the pathways through which outcomes for young adolescent girls can be achieved. The two year follow up survey will focus on timing of sexual debut, childbearing and marriage which are the main outcomes of the study.

This paper has a few limitations. The main limitation is that there is no “pure control” and we cannot isolate the effect of the violence prevention intervention. Therefore, while we are unable

to comment empirically if it is important to include a community level intervention that focuses on improving the value of girls, it remains a critical part of the socioecological model (Blum et al. 2012) and the theory of change. Second, we did not have an arm that tested the empowerment components (health or wealth creation on their own, or together without the education component), so we do not have the full factorial design and cannot comment on whether empowerment programming on its own would have been as successful without the education intervention, or on the education outcomes. Finally, as the girls in the sample are still quite young, we do not have the power to test the impact on longer term outcomes such as secondary school completion and timing or sexual debut, first pregnancy, or marriage. Those will be the outcomes of focus in the endline data.

Beyond the limitations, this paper has several strengths, including a rigorous research design, high two-year follow-up rates in both sites, and data from both the household and the adolescent girls. It is also a timely contribution to the literature on multi-sectoral programming for adolescent girls and the cash versus cash-plus debate. This evidence is encouraging and reinforces the theory that addressing empowerment for adolescent girls through a multi-sectoral approach leads to a larger impact and that “cash plus,” or supplementing household economic incentives with additional social, health, and asset-building for girls themselves, provides the best value for money across education, health, and economic outcomes.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Population Council Institutional Review Board, the AMREF Ethics and Scientific Review Committee in Kenya and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

All study participants provided written consent if they were age 18 and older; assent and guardian written informed consent was obtained for all participants under the age of 18.

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Figure 1. AGI-K Theory of Change

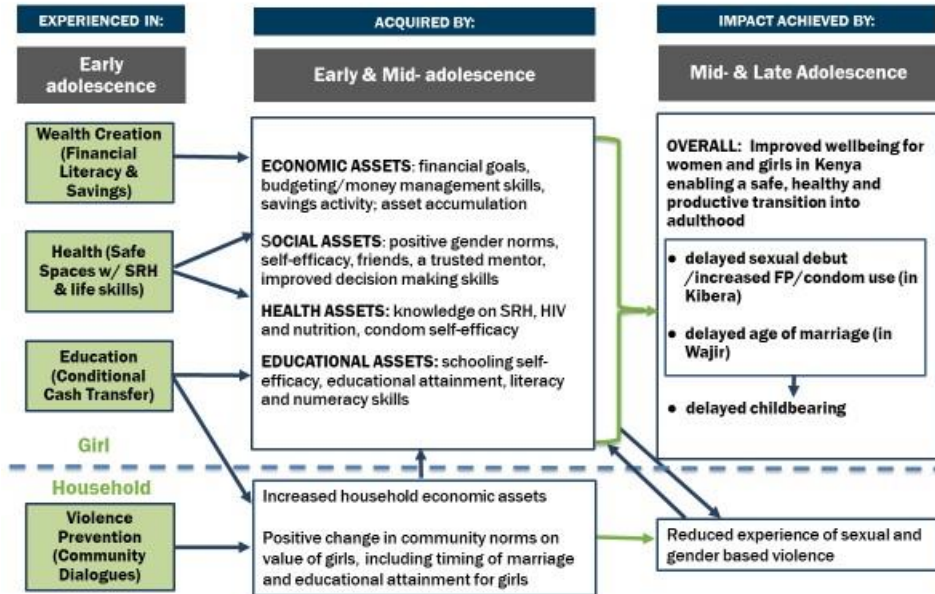


Figure 2. Sample Flow

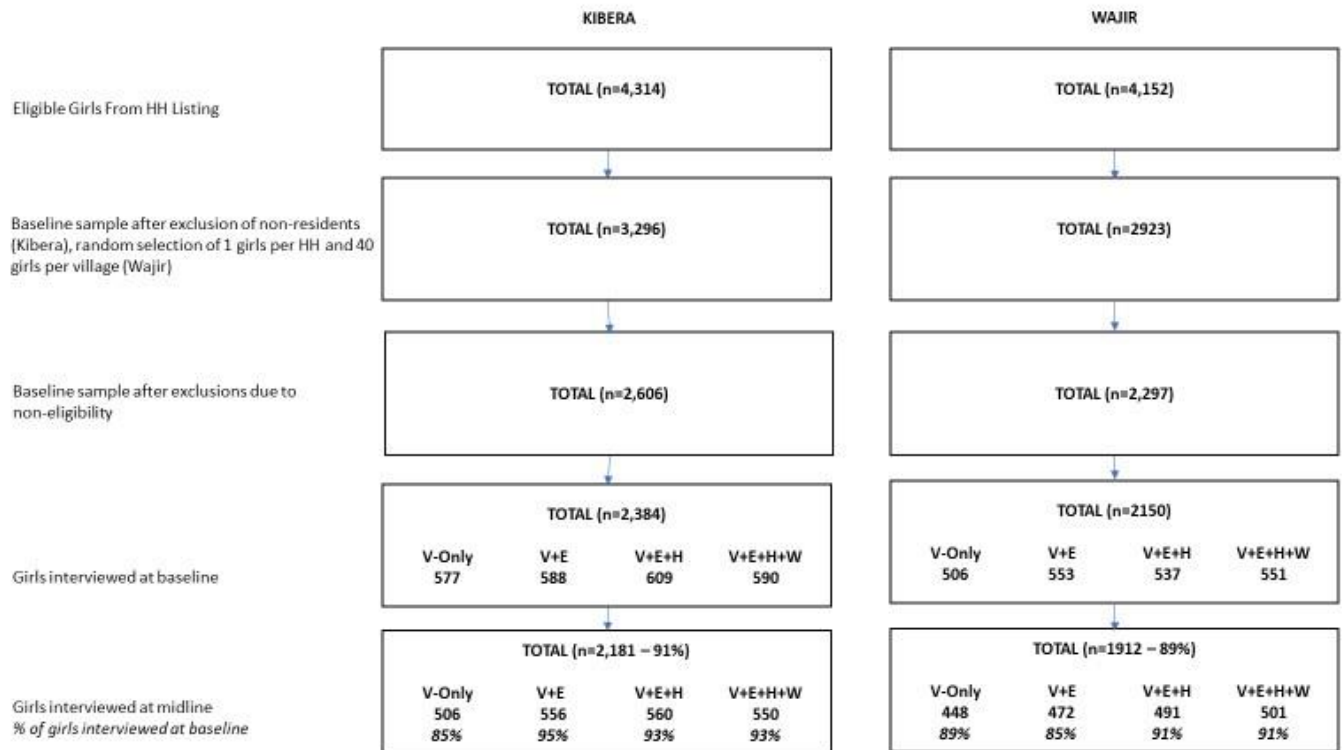


Table 1. Kibera baseline and midline means for key outcomes among analytical sample, by study arm

	Baseline					Midline				
	Sample	V- Only	V+E	V+E+H	V+E+H+W	Sample	V- Only	V+E	V+E+H	V+E+H+W
Violence prevention										
Experienced violence perpetrated by a male in the past year, %	2181	29.1%	29.5%	30.6%	32.2%	2181	42.3%	33.3%	36.6%	38.4%
Girl expected to complete secondary school, %	2166	99.4%	98.7%	98.8%	99.6%	2177	98.6%	97.7%	98.2%	98.5%
Girl expected to get married before age 22, %	2147	2.2%	3.5%	2.7%	3.2%	2155	1.4%	1.1%	1.6%	1.3%
Education intervention										
Enrollment in current school year, %	2180	99.2%	99.1%	98.4%	99.1%	2181	95.8%	96.6%	96.3%	97.8%
Grade attainment, mean	2181	5.7	5.7	5.7	5.7	2181	7.5	7.6	7.5	7.5
If had completed Class 6 but had not completed Class 8 at baseline: Completed primary school, %						1114	83.7%	89.8%	85.9%	91.1%
If had completed Class 6 but had not attended secondary school at baseline: Transitioned to secondary school, %						1151	81.2%	86.1%	85.8%	88.8%
Household cash liquidity (1-4), mean	2129	2.0	1.9	1.8	1.9	2149	1.7	1.8	1.8	1.8
Household assets quintile (1-5), mean	2166	2.9	2.9	2.9	2.9	2177	2.8	2.8	2.9	3.0
Health intervention										
Knowledge of at least one method of modern contraception ¹ , %						2181	55.3%	54.5%	68.2%	66.7%
SRH myths knowledge score (0-7) ¹ , mean						2181	4.4	4.5	4.7	4.7
Condom self-efficacy score (5-25) ¹ , mean						1771	14.6	14.8	15.7	15.4
Gender equitable attitudes score (0-10) ¹ , mean						2181	5.7	5.6	5.8	5.8
Wealth creation intervention										
Financial literacy score (0-10), mean	2181	5.8	5.6	5.7	5.8	2181	5.6	5.6	5.7	6.3
Saved any money in the past six months, %	2181	27.9%	25.7%	26.4%	28.4%	2181	44.7%	44.2%	46.2%	65.1%
Participation in interventions										
Number of cash transfers received (max 12), median							11	11	11	11
Number of girls group meetings attended, median									35	39

¹ Data not available at baseline.

Table 2. Wajir baseline and midline means for key outcomes among analytical sample, by study arm

	Baseline					Midline				
	Sample	V- Only	V+E	V+E+H	V+E+H+W	Sample	V- Only	V+E	V+E+H	V+E+H+W
Violence prevention										
Experienced violence perpetrated by a male in the past year, %	1912	4.0%	4.0%	3.1%	2.2%	1912	4.0%	3.6%	5.3%	1.6%
Girl expected to complete secondary school, %	1895	88.1%	82.3%	83.5%	82.7%	1828	88.4%	92.7%	92.6%	91.7%
Girl expected to get married before age 18, %	1859	0.2%	0.9%	2.7%	2.7%	1742	2.2%	2.1%	1.3%	1.1%
Education intervention										
Enrollment in current school year, %	1912	82.4%	70.6%	77.6%	72.5%	1912	80.8%	90.3%	87.0%	85.8%
Grade attainment, mean	1912	3.4	3.0	3.1	2.9	1861	4.5	4.6	4.4	4.2
If had completed Class 6 but had not completed Class 8 at baseline: Completed primary school, %						285	57.0%	48.6%	62.3%	50.9%
If had completed Class 6 but had not attended secondary school at baseline: Transitioned to secondary school, %						327	54.1%	53.8%	63.1%	59.7%
Household cash liquidity (1-4), mean	1887	2.0	1.8	1.9	1.9	1822	1.7	1.6	1.7	1.7
Household assets quintile (1-5), mean	1895	3.0	2.9	2.8	2.4	1828	2.8	2.8	3.1	2.7
Health intervention										
Knowledge of at least one method of modern contraception ¹ , %						1912	37.9%	29.2%	26.7%	28.9%
SRH myths knowledge score (0-7) ¹ , mean						1912	3.2	3.5	3.6	3.6
Gender equitable attitudes score (0-10) ¹ , mean						1912	3.8	3.4	3.4	3.8
Wealth creation intervention										
Financial literacy score (0-10), mean	1912	4.5	4.2	4.1	4.1	1912	5.4	5.2	5.3	5.6
Saved any money in the past six months, %	1912	0.7%	0.4%	0.4%	0.8%	1912	1.1%	3.8%	5.9%	42.5%
Participation in interventions										
Number of cash transfers received (max 12), median							11	11	11	11
Number of girls group meetings attended, median									28	40

¹ Data not available at baseline.

Table 3: Kibera intent-to-treat (ITT) results

	ITT			Differences across arms		
	V+E	V+E+H	V+E+H+W	V+E+H vs V+E	V+E+H+W vs V+E	V+E+H+W vs V+E+H
	Coef	Coef	Coef	Diff	Diff	Diff
Violence prevention						
Experienced violence perpetrated by a male in the past year ¹	-0.094 *	-0.073 *	-0.070 †	0.021	0.024	0.003
Girl expected to complete secondary school ¹	-0.003	0.003	-0.003	0.005	0.000	-0.006
Girl expected to get married before age 22 ¹	-0.014	-0.003	-0.011	0.011	0.003	-0.008
<i>Multiple violence and household norms indicators mean z-score²</i>	<i>0.047</i>	<i>0.033</i>	<i>0.029</i>	<i>-0.013</i>	<i>-0.018</i>	<i>-0.004</i>
Education intervention						
Enrollment in current school year ¹	0.008	0.013	0.021 †	0.004	0.012	0.008
Grade attainment ¹	0.092 *	0.081 *	0.071 †	-0.011	-0.020	-0.010
Primary school completion ^{2,3}	0.059 *	0.019	0.074 *	-0.040	0.015	0.055 *
Transition to secondary school ^{2,4}	0.048	0.045	0.076 *	-0.003	0.028	0.031
<i>Multiple schooling indicators mean z-score²</i>	<i>0.084 *</i>	<i>0.047</i>	<i>0.115 **</i>	<i>-0.037</i>	<i>0.031</i>	<i>0.068 †</i>
Household cash liquidity ¹	0.156 *	0.211 **	0.172 *	0.055	0.016	-0.040
Household assets quintile ¹	-0.015	0.117	0.241 **	0.132	0.256 **	0.124
<i>Multiple household wealth indicators mean z-score²</i>	<i>0.047</i>	<i>0.070</i>	<i>0.117 *</i>	<i>0.023</i>	<i>0.070</i>	<i>0.047</i>
Health intervention						
Knows of at least one method of modern contraception ²	-0.002	0.126 ***	0.122 ***	0.128 ***	0.124 ***	-0.005
SRH myths knowledge score ²	0.092	0.300 **	0.312 **	0.208 *	0.220 **	0.012
Condom self-efficacy score ²	0.215	1.043 **	0.742 †	0.828 *	0.526	-0.301
Gender equitable attitudes score ²	-0.063	0.094	0.141	0.157	0.204 †	0.047
<i>Multiple health indicators mean z-score²</i>	<i>0.019</i>	<i>0.168 ***</i>	<i>0.162 ***</i>	<i>0.149 ***</i>	<i>0.143 ***</i>	<i>-0.006</i>
Wealth creation intervention						
Financial literacy score ¹	0.139	0.191	0.723 ***	0.052	0.584 ***	0.532 ***

Saved any money in the past six months ¹	0.017	0.031	0.200 ***	0.013	0.182 ***	0.169 ***
<i>Multiple wealth creation indicators mean z-score</i> ²	<i>-0.003</i>	<i>0.031</i>	<i>0.394 ***</i>	<i>0.035</i>	<i>0.397 ***</i>	<i>0.362 ***</i>

¹ ITT: Difference-in-differences estimated from linear regressions with girl-level fixed-effects. Models control for girl's age and are estimated with robust standard errors. V-only is the reference study arm.

² ITT: Difference at midline estimated from linear regressions. Models control for girl's age and are estimated with robust standard errors. V-only is the reference study arm.

³ Among girls who had completed Class 6 but had not completed Class 8 at baseline.

⁴ Among girls who had completed Class 6 but had not attended secondary school at baseline.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Table 4: Wajir intent-to-treat (ITT) results

-	ITT			Differences across arms		
	V+E	V+E+H	V+E+H+W	V+E+H vs V+E	V+E+H+W vs V+E	V+E+H+W vs V+E+H
	Coef	Coef	Coef	Diff	Diff	Diff
Violence prevention						
Experienced violence perpetrated by a male in the past year ¹	-0.005	0.022	-0.007	0.027	-0.002	-0.029
Girl expected to complete secondary school ¹	0.095 **	0.084 **	0.084 *	-0.010	-0.011	0.000
Girl expected to get married before age 18 ¹	-0.006	-0.029 *	-0.029 *	-0.023 *	-0.023 †	0.000
<i>Multiple violence and household norms indicators mean z-score²</i>	<i>0.045</i>	<i>0.025</i>	<i>0.096</i>	<i>-0.020</i>	<i>0.051</i>	<i>0.071</i>
Education intervention						
Enrollment in current school year ¹	0.213 ***	0.110 **	0.150 ***	-0.103 *	-0.063	0.040
Grade attainment ¹	0.308 *	0.127	0.106	-0.182	-0.202	-0.021
<i>Multiple schooling indicators mean z-score²</i>	<i>0.132</i>	<i>0.072</i>	<i>-0.006</i>	<i>-0.059</i>	<i>-0.138</i>	<i>-0.078</i>
Household cash liquidity ¹	0.016	0.061	0.018	0.045	0.002	-0.043
Household assets quintile ¹	0.073	0.477	0.461	0.404	0.388	-0.016
<i>Multiple household wealth indicators mean z-score²</i>	<i>-0.091</i>	<i>0.060</i>	<i>-0.067</i>	<i>0.151</i>	<i>0.024</i>	<i>-0.127</i>
Health intervention						
Knows of at least one method of modern contraception ²	-0.090	-0.103 *	-0.086	-0.013	0.004	0.017
SRH myths knowledge score ²	0.238	0.435	0.371	0.197	0.133	-0.064
Gender equitable attitudes score ²	-0.349	-0.417 *	-0.018	-0.068	0.330	0.398 †
<i>Multiple health indicators mean z-score²</i>	<i>-0.078</i>	<i>-0.063</i>	<i>0.003</i>	<i>0.014</i>	<i>0.081</i>	<i>0.066</i>
Wealth creation intervention						
Financial literacy score ¹	0.127	0.396	0.697 †	0.269	0.571 †	0.302
Saved any money in the past six months ¹	0.028 *	0.049 **	0.411 ***	0.021	0.383 ***	0.362 ***
<i>Multiple wealth creation indicators mean z-score²</i>	<i>0.090</i>	<i>0.219 †</i>	<i>2.004 ***</i>	<i>0.128</i>	<i>1.914 ***</i>	<i>1.785 ***</i>

¹ ITT: Difference-in-differences estimated from linear regressions with girl-level fixed-effects. Models control for girl's age and are estimated with robust standard errors adjusted for clustering at the village level. V-only is the reference study arm.

² ITT: Difference at midline estimated from linear regressions. Models control for girl's age and sub-county and are estimated with robust standard errors adjusted for clustering at the village level. V-only is the reference study arm.

³ Among girls who had completed Class 6 but had not completed Class 8 at baseline.

⁴ Among girls who had completed Class 6 but had not attended secondary school at baseline.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Appendix Table A1: Odds ratios from logistic regressions for attrition between baseline and midline

-	Kibera ¹	Wajir ²
	OR	OR
Covariates		
Intervention arms		
V-only (ref)		
V+E	0.325 ***	1.071
V+E+H	0.386 ***	0.625
V+E+H+W	0.400 ***	0.592 *
Age	1.268 **	1.166 **
In school	1.135	0.408 ***
Grade attainment	0.988	0.951
Literate in English and Swahili	0.838	0.581
Numeracy score	0.902	0.805
Cognitive score	0.895	1.021
Self-efficacy score	1.003	1.070
Household assets	0.973	0.832 *
Co-residence with biological parents		
Lives with both parents (ref)		
Lives with mother only	1.211	1.015
Lives with father only	1.092	1.250
Lives with neither parent	1.478 *	1.101
Sub-county		
Wajir East (ref)		
Wajir South		1.654 *
Wajir West		1.266
Constant	0.010 ***	0.039 ***
N	2384	2147

¹ Model estimated with robust standard errors.

² Model estimated with robust standard errors adjusted for clustering at the village level.

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

Appendix Table A2: Kibera treatment-on-the-treated (TOT) results

-	TOT ⁵			Differences across arms		
	V+E	V+E+H	V+E+H+W	V+E+H vs V+E	V+E+H+W vs V+E	V+E+H+W vs V+E+H
	Coef	Coef	Coef	Diff	Diff	Diff
Violence prevention						
Experienced violence perpetrated by a male in the past year ¹	-0.094 *	-0.147 *	-0.140 †	-0.053	-0.046	0.007
Girl expected to complete secondary school ¹	-0.003	0.005	-0.006	0.008	-0.003	-0.011
Girl expected to get married before age 22 ¹	-0.014	-0.005	-0.021	0.009	-0.008	-0.016
Education intervention						
Enrollment in current school year ¹	0.008	0.025	0.041 †	0.017	0.033 †	0.016
Grade attainment ¹	0.092 *	0.164 *	0.144 †	0.072	0.052	-0.020
Primary school completion ^{2,3}	0.059 *	0.047	0.182 *	-0.012	0.123 *	0.135 *
Transition to secondary school ^{2,4}	0.047	0.111	0.190 *	0.064	0.142 *	0.078
Household cash liquidity ¹	0.156 *	0.413 **	0.345 *	0.257 *	0.189	-0.067
Household assets quintile ¹	-0.015	0.234	0.483 **	0.249	0.498 **	0.249
Health intervention						
Knows of at least one method of modern contraception ²	-0.002	0.254 ***	0.246 ***	0.256 ***	0.247 ***	-0.009
SRH myths knowledge score ²	0.094	0.604 **	0.629 **	0.511 **	0.536 ***	0.025
Condom self-efficacy score ²	0.217	2.151 **	1.466 †	1.934 **	1.250 †	-0.685
Gender equitable attitudes score ²	-0.063	0.189	0.285	0.252	0.348 †	0.096
Wealth creation intervention						
Financial literacy score ¹	0.139	0.386	1.452 ***	0.247	1.313 ***	1.066 ***
Saved any money in the past six months ¹	0.017	0.062	0.401 ***	0.044	0.383 ***	0.339 ***

¹ TOT: Difference-in-differences estimated from two-stage least squares instrumental variable regressions with girl-level fixed-effects. Models control for girl's age and are estimated with robust standard errors. V-only is the reference study arm.

² TOT: Difference-in-differences estimated from two-stage least squares instrumental variable regressions with girl-level fixed-effects. Models control for girl's age and are estimated with robust standard errors. V-only is the reference study arm.

³ Among girls who had completed Class 6 but had not completed Class 8 at baseline.

⁴ Among girls who had completed Class 6 but had not attended secondary school at baseline.

⁵ Treatment is defined as attendance above the median number of meetings attended in the respective arm: above 35 meetings for arm V+E+H and above 39 meetings for arm V+E+H+W.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

Appendix Table A3: Wajir treatment-on-the-treated (TOT) results

-	TOT ⁵			Differences across arms		
	V+E	V+E+H	V+E+H+W	V+E+H vs V+E	V+E+H+W vs V+E	V+E+H+W vs V+E+H
	Coef	Coef	Coef	Diff	Diff	Diff
Violence prevention						
Experienced violence perpetrated by a male in the past year ¹	-0.005	0.045	-0.013	0.050	-0.009	-0.059
Girl expected to complete secondary school ¹	0.095 **	0.174 **	0.173 **	0.079	0.078	-0.002
Girl expected to get married before age 18 ¹	-0.006	-0.059 *	-0.058 †	-0.053 *	-0.052 †	0.001
Education intervention						
Enrollment in current school year ¹	0.214 ***	0.227 **	0.308 **	0.014	0.094	0.080
Grade attainment ¹	0.308 *	0.261	0.214	-0.048	-0.094	-0.046
Household cash liquidity ¹	0.016	0.126	0.037	0.110	0.021	-0.089
Household assets quintile ¹	0.073	0.987	0.949	0.914	0.876 †	-0.038
Health intervention						
Knows of at least one method of modern contraception ²	-0.089	-0.215 *	-0.173	-0.126	-0.084	0.042
SRH myths knowledge score ²	0.235	0.911	0.751	0.676	0.516	-0.160
Gender equitable attitudes score ²	-0.348	-0.866 *	-0.037	-0.519	0.310	0.829 †
Wealth creation intervention						
Financial literacy score ¹	0.127	0.818	1.428 †	0.690	1.301 †	0.611
Saved any money in the past six months ¹	0.029 *	0.103 **	0.842 ***	0.074 *	0.813 ***	0.739 ***

¹ TOT: Difference-in-differences estimated from two-stage least squares instrumental variable regressions with girl-level fixed-effects. Models control for girl's age and are estimated with robust standard errors adjusted for clustering at the village level. V-only is the reference study arm.

² TOT: Difference at midline estimated from two-stage least squares instrumental variable regressions. Models control for girl's age and sub-county and are estimated with robust standard errors adjusted for clustering at the village level. V-only is the reference study arm.

³ Among girls who had completed Class 6 but had not completed Class 8 at baseline.

⁴ Among girls who had completed Class 6 but had not attended secondary school at baseline.

⁵ Treatment is defined as attendance above the median number of meetings attended in the respective arm: above 28 meetings for arm V+E+H and above 40 meetings for arm V+E+H+W.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1