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Effect of savings-led economic empowerment on HIV preventive practices among orphaned adolescents in rural Uganda: results from the Suubi-Maka randomized experiment

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Abstract

Improving economic resources of impoverished youth may alter intentions to engage in sexual risk behaviors by motivating positive future planning to avoid HIV risk and by altering economic contexts contributing to HIV risk. Yet, few studies have examined the effect of economic-strengthening on economic and sexual behaviors of orphaned youth, despite high poverty and high HIV infection in this population. Hierarchal longitudinal regressions were used to examine the effect of a savings-led economic empowerment intervention, the Suubi-Maka Project, on changes in orphaned adolescents' cash savings and attitudes toward savings and HIV-preventive practices over time. We randomized 346 Ugandan adolescents, aged 10–17 years, to either the control group receiving usual orphan care plus mentoring (n = 167) or the intervention group receiving usual orphan care plus mentoring, financial education, and matched savings accounts (n = 179). Assessments were conducted at baseline, 12, and 24 months. Results indicated that intervention adolescents significantly increased their cash savings over time (b = $US12.32, ±1.12, p < .001) compared to adolescents in the control group. At 24 months post-baseline, 92% of intervention adolescents had accumulated savings compared to 43% in the control group (p < .001). The largest changes in savings goals were the proportion of intervention adolescents valuing saving for money to buy a home (Δ_{T1-T0} = +14.9, p < .001), pursue vocational training (Δ_{T1-T0} = +8.8, p < .01), and start a business ($_{T1-T0}$ = +6.7, p < .01). Intervention adolescents also had a significant relative increase over time in HIV-preventive attitudinal scores (b = +0.19, ±0.09, p < .05), most commonly toward perceived risk of HIV (95.8%, n = 159), sexual abstinence or postponement (91.6%, n = 152), and consistent condom use (93.4%, n = 144). In addition, intervention adolescents had 2.017 significantly greater odds of a maximum HIV-prevention score (OR = 2.017, 95%CI: 1.43–2.84). To minimize HIV risk throughout the adolescent and young adult periods, long-term strategies are needed to integrate youth economic development, including savings and income generation, with age-appropriate combination prevention interventions.

Disclosure statement

The authors declare no conflicts of interest related to this research.

Keywords

Economic empowerment; HIV prevention; orphans and vulnerable children; savings; Uganda

Introduction

Despite increasing access to antiretroviral therapy (ART) and declining new infections and AIDS-related mortality (UNAIDS, UNICEF, WHO, 2015), the number of HIV-affected children in Africa continues to rise as many people living with HIV lack access to care and treatment and continue to die from the disease (UNAIDS Report on the Global AIDS Epidemic, 2013, UNAIDS, UNICEF, WHO, 2015). There are now 17.8 million children under the age of 18 years who have lost one or both parents to AIDS, the majority living in sub-Saharan Africa (UNAIDS Report on the Global AIDS Epidemic, 2013). Orphaned children have a greater risk of living in households exacerbated by poverty due to lost earnings and increased medical costs of ill family members (Cluver, Gardner, & Operario, 2009; Fawzi et al., 2011; Howard, Matinhure, McCurdy, & Johnson, 2006). Studies have also linked orphan status with increased vulnerability to HIV. Orphaned youth are at greater risk of early sexual debut (Birdthistle et al., 2008; Kang, Dunbar, Laver, & Padian, 2008; Thurman, Brown, Richter, Maharaj, & Magnani, 2006), sexual exploitation (Gregson et al., 2005; Pascoe et al., 2010), early pregnancy (Gregson et al., 2005; Kang et al., 2008; Thurman et al., 2006;), unprotected sex (Birdthistle et al., 2008; Gregson et al., 2005; Operario, Pettifor, Cluver, MacPhail, & Rees, 2007; Pascoe et al., 2010), and transactional sex (Cluver, Orkin, Boyes, Gardner, & Meinck, 2011). Adolescent orphans also have higher rates of HIV and other sexually transmitted infections compared to non-orphans (Birdthistle et al., 2008; Gregson et al., 2005; Kang et al., 2008; Operario et al., 2007; Pascoe et al., 2010).

Several factors contribute to orphans' heightened risk to HIV. These may include the psychological distress of a parent's death (Cluver et al., 2009; Puffer et al., 2011, 2012), inadequate caregiver support (Mmari, Michaelis, & Kiro, 2009; Operario et al., 2007; Puffer et al., 2012), and lack of money, housing, and other economic resources (Kang et al., 2008; Mmari et al., 2009; Puffer et al., 2012). Particularly, financial distress has been shown to motivate vulnerable groups to engage in high-risk survival strategies that increase vulnerability to HIV, such as combat, sexual violence, and sex exchange (Barnett, 2007; Dinkelman, Lam, & Leibbrandt, 2007; Ferguson, Bender, Thompson, Xie, & Pollio, 2011; Hein, 2011). Studies also suggest that the psychological effects of poverty, such as loss of hope from limited future aspirations, can diminish motivations to avoid exposure to risks, including HIV risk (Barnett, 2007; Campbell, 2003; Kim, Pronyk, Barnett, & Watts, 2008; Lewis, 1975). Yet, few programs targeting orphaned youth have addressed economic determinants of HIV vulnerability (Horton & Das, 2008).

One approach to reducing HIV risk among orphaned youth is implementing asset-based interventions that economically empower adolescents and their families (Spielberg et al., 2013; Ssewamala, Alicea, Bannon, & Ismayilova, 2008; Ssewamala, Han, Neilands, Ismayilova, & Sperber, 2010; Ssewamala, Ismayilova, et al., 2010). According to asset

theory, increasing productive assets of the poor can positively impact individual behaviors, including health behaviors, by motivating protective attitudes to avoid negative consequences in the future (Mueller et al., 2010; Schreiner & Sherraden, 2007; Sherraden, 1990; Yadama & Sherraden, 1996). This could mean that enabling poor youth to accumulate economic assets, such as savings, may encourage more positive beliefs about the future and, in turn, motivate youth to engage in fewer risk behaviors, including sexual risk behaviors, to affirm those positive expectations (Reininger et al., 2005; Schreiner & Sherraden, 2007; Ssewamala, Han, et al., 2010; Stratford, Mizuno, Williams, Courtenay-Quirk, & O'Leary, 2008). However, few studies have examined changes in savings assets and sexual risk-taking intentions among orphaned youth who are engaged in economic empowerment interventions. Such information may inform best practices for reducing HIV risk for orphaned youth through integrated prevention and economic programs.

This paper examines the effect of the Suubi-Maka Project, a savings-led economic empowerment intervention in Uganda, on orphaned adolescent's attitudes toward HIV-preventive practices, including changes in adolescent's cash savings and attitudes toward future savings over time. To foster economic development and more positive health intentions for adolescents in AIDS-affected families, the Suubi-Maka Project provided matched child savings accounts (CSAs) along with mentoring and HIV prevention and financial education. CSAs have received increasing attention as a mechanism to improve youth asset development and family economic-strengthening without the financial risks associated with loan debt (Armendáriz & Morduch, 2010; Fiebig, Hannig, & Wisniwski, 1999; Karimli, Ssewamala, & Neilands, 2014; Schreiner & Sherraden, 2007; Ssewamala & Ismayilova, 2009; Vonderlack & Schreiner, 2002). However, the impact of savings-led interventions through CSAs on adolescents' perceptions toward sexually protective behaviors over time is less well known.

Methods

Study design and setting

The Suubi-Maka study used a cluster randomized experimental design with three assessments at baseline, 12, and 24 months post-baseline in the Rakai and Masaka districts. The two districts are heavily affected by poverty and have high HIV prevalence rates of 8.5% and 10%, respectively, compared to the national average of 6.5% (Uganda AIDS Commission, 2013). An estimated two in five children are orphaned to AIDS each year in the districts, despite increasing coverage of ART (Karimli et al., 2014; Uganda AIDS Commission, 2013). The majority of Ugandan youth have limited access to formal financial services.

Sample

Three hundred and forty-six (n = 346) orphaned adolescents and their primary caregivers were enrolled in the study. Adolescents were eligible to participate if they: (i) had lost one or both biological parents to AIDS, (ii) were enrolled in the last two years of primary school (equivalent to US 6th and 7th grades), and (iii) were living within a family, not an

institution. Eligible adolescents were selected from 10 geographically separate, public primary schools with similar socioeconomic characteristics.

Study group assignment

Detailed information on the design and implementation of the Suubi-Maka randomized experiment is published elsewhere (Karimli et al., 2014; Ssewamala, Han, & Neilands, 2009; Ssewamala & Ismayilova, 2009). In summary, participating schools were randomly assigned to one of two study groups: intervention or control. Adolescents in the control group received usual services given to all orphaned children in the region. These included: counseling services, school lunch, and scholastic materials (textbooks and uniforms). Adolescents in the control group also received monthly mentoring sessions based on the study team's prior findings that mentorship offers orphaned youth opportunities to develop positive future trajectories (Ssewamala, Nabunya, Mukasa, Ilic, & Nattabi, 2014). Adolescents in the intervention group received usual orphan care services plus monthly mentoring, financial education, and a matched CSA held in the adolescent orphan's name. Accumulated savings in the CSAs were matched at a ratio of 2:1 during the 12-month intervention period with a match limit equivalent to US$10 a month, kept separate from the adolescent's own CSA.

Outcomes

The primary outcomes of this analysis were adolescents' cash savings, attitudes toward savings, and attitudes toward HIV-preventive behaviors. Adolescents' cash savings were measured according to CSA cash deposits and other non-CSA savings. Deposits into CSAs were calculated monthly from bank-obtained financial statements and did not include the study-match provided to adolescents in separate savings accounts. The amount of other cash savings, such as at a bank, credit union, or with a caregiver/guardian, was assessed during a 90-minute survey administered by trained Ugandan interviewers at each of study's three time periods: baseline (time 0), 12 months post-baseline (time 1), and 24 months post-baseline (time 2) which corresponded to a one-year post-intervention assessment. Adolescents were asked if they had money saved anywhere else, and if so how much. A combined savings amount was calculated based on the total CSA deposits (excluding the study-match) and reported other savings. All values were recorded in Ugandan shillings (UGX) and converted to United States dollars ($US) using a time-appropriate standard exchange rate.

Attitudes toward savings were measured in two ways: (i) importance of saving and (ii) confidence in ability to save in the future. Importance of saving was assessed for six goals relating to education, family business, vocational training, familial assistance, buying an animal for income generation, or moving into one's own home. Adolescents were asked to state the importance of each savings goal and how confident they were in their ability to save for each goal. Affirmative responses of "very/somewhat important" and "very/somewhat confident" were coded as 1. Non-affirming responses of "not very/not important" and "not very/not confident" were coded as 0. A total savings attitudinal score was then calculated based on the sum of affirmative responses for the 12 savings items (scores

ranging from 0 to 12). Higher composite scores indicated more positive attitudes toward savings.

HIV-prevention attitudes were assessed across five statements relating to adolescents' perceived risk to HIV infection, acceptability of condom use, acceptability of sexual abstinence or delayed initiation of sex to avoid HIV infection, condom use with main sexual partners, and consistent condom use over time. Affirmative responses of "strongly/somewhat agree" were coded as 1 and "strongly/somewhat disagree" were coded as 0. A total HIV-prevention attitudinal score was similarly calculated for the sum of affirmative responses to the five prevention items (scores ranging from 0 to 5), where higher composite scores indicated higher sexually protective attitudes. All attitudinal items were adapted for Ugandan adolescents using previously tested instruments, including among youth in Uganda and South Africa (Bhana et al., 2004; Slonim-Nevo, Auslander, Munro, & Ozawa, 1994; Slonim-Nevo, Auslander, & Ozawa, 1995; Ssewamala et al., 2008).

Analysis

Two sample tests of proportions, *t*-tests, and chi-square statistics were used to examine baseline demographic characteristics by study group and within-group differences in the distribution of accumulated savings and attitudinal items by time period and study group. Data were hierarchically structured as observations (level 1) that were nested within individuals (level 2) who were nested within schools (level 3), requiring a multilevel approach (Hox, 2002). Mixed-effects linear and logistic regression models with an interaction term of study group and time were used to examine differences in accumulated savings and in attitudinal changes over time in the intervention group as compared to the control group. Random effects were incorporated to correct for unmeasured school- and individual-level characteristics, and fixed effects were included for measured demographic characteristics (Snijders & Bosker, 1999). STATA (Version 13.1) was used for all analyses with a $p < .05$ level of statistical significance.

Results

Savings and savings attitudes

Sample characteristics are summarized in Table 1. In terms of adolescents' savings, there were no statistically significant differences in the mean baseline (pre-intervention) cash savings in the intervention ($US0.7, ±2.4) versus control groups ($US0.8, ±2.9, $p > .05$) (Table 1). The mean total CSA deposits significantly increased in the intervention group from baseline to 12 months (Δ_{T1-T0} = +$US18.8, $p < .001$) and increased from 12 to 24 months (Δ_{T2-T1} = +$US5.7, $p > .05$), although not statistically significant (Table 2). Intervention adolescents also had significant increases in total other savings from baseline to 12 months (Δ_{T1-T0} = +$US3.1, $p < .01$) and from 12 to 24 months (Δ_{T2-T1} = +$US5.0, $p < .01$). Prior to the intervention, 20% and 18% ($p > .05$) of adolescents in the intervention and control groups, respectively, had any cash savings. No adolescents (0%) in either group had savings in CSAs at baseline. At 24 months, 92% of intervention adolescents had accumulated savings compared to 43% in the control ($p < .001$).

Orphaned adolescents most commonly valued at baseline saving goals related to money for one's education (100% in both groups), helping one's family out (97.2% and 98.2%, respectively), and buying an animal for income generation (96.1% and 98.8%, respectively) (Table 3). Confidence in one's ability to save money was the highest for education (95.0% and 92.2% in intervention and control groups, respectively), money to buy an animal (94.4% and 96.4%), and to help one's family (88.8% and 87.4%). The mean savings score at baseline was 10.5 (±1.9) for intervention adolescents and 10.9 (±1.6) for the control group. The baseline proportion of adolescents with a maximum savings score of 12 was 46.9% and 56.9% in intervention and control groups, respectively.

The mean savings attitudinal score significantly increased in the intervention group from baseline to 12 months (Δ_{T1-T0} = +0.9, $p < .001$), but significantly dropped from 12 to 24 months (Δ_{T2-T1} = −0.4, $p < .01$) resulting in a significant net increase of +0.5 points, $p < .01$ (Δ_{T2-T0}) (Table 3). The largest changes over time in savings goals for intervention adolescents were the proportion of adolescents valuing saving for money to buy a home (Δ_{T1-T0} = +14.9, $p < .001$), pursue vocational training (Δ_{T1-T0} = +8.8, $p < .01$), and start a family business (Δ_{T1-T0} = +6.7, $p < .001$). Significant increases were also observed in the proportion of adolescents with a maximum savings score from baseline to 12 months in the intervention (Δ_{T1-T0} = +29.4, $p < .001$) and control groups (Δ_{T1-T0} = +17.5, $p < .01$), but were attenuated by significant declines from 12 to 24 months (Δ_{T2-T1} = −22.1, $p < .001$ and Δ_{T2-T1} = −22.1, $p < .001$, respectively).

HIV-prevention attitudes

HIV-prevention attitudinal scores at baseline were low to moderate in both the intervention (mean score = 3.4, ±1.3) and control groups (mean score = 3.3, ±1.5). The baseline proportion of adolescents with a maximum prevention score of 5 was 15.6% and 27.5%, respectively. The most frequently affirmed HIV-prevention attitudes at baseline were perceived risk of HIV (80.4% intervention and 81.4% control), sexual abstinence or delayed initiation (78.8% and 71.9%, respectively), and consistent condom use (73.2% and 70.6%, respectively) (Table 3). Adolescents least affirmed using condoms with main sex partners (31.8% and 46.1%, respectively).

The mean HIV-prevention attitudinal score significantly increased in the intervention group from baseline to 12 months (Δ_{T1-T0} = +0.6, $p < .001$) and from 12 to 24 months (Δ_{T2-T1} = +0.4, $p < .001$) resulting in a significant net increase of +1.0 point (Δ_{T2-T0}, $p < .001$) (Table 3). Affirmations were most commonly toward perceived HIV risk (95.8%), sexual abstinence or postponement to avoid HIV (91.6%), and consistent condom use (93.4%). A smaller, but significant, net change was observed in the mean HIV-prevention scores in the control group (Δ_{T2-T0} = +0.7, $p < .001$) as a result of a significant gain at 12 months (Δ_{T1-T0} = +0.8, $p < .001$) which was attenuated by a decline at 24 months (Δ_{T2-T1} = −0.1, $p > .05$).

Adjusted effect of Suubi-Maka intervention

In adjusted models, intervention adolescents had an average significant increase of $US12.32 in CSA deposits per time period (b = 12.317, ±1.122, $p < .001$) and an average significant increase of $US15.00 in combined savings per time period (b = 14.996, ±1.657,

$p < .001$), adjusting for changes over time in the control group (group by time interaction) (Table 4). There were no differences in baseline CSA deposits ($b = 0$) or combined savings ($b = -0.053, \pm 0.291, p > .05$) by study group (group effect), and no significant changes over time in the control group (time effect) in CSA deposits ($b = 0$) or combined savings ($b = 1.978, \pm 1.194, p > .05$).

Mean savings attitudinal scores at baseline were significantly lower in the intervention group as compared to the control group ($b = -0.637, \pm 0.281, p < .05$). However, adolescents in the intervention group had an average relative increase of 0.252 points per time period ($b = +0.252, \pm 0.107, p < .05$) compared to adolescents in the control group where no significant time effect was observed ($b = +0.002, \pm 0.077, p > .05$). Intervention adolescents had 35% greater odds of having a maximum savings attitudinal score over time compared to the control group, although this trend was only marginally significant (OR = 1.354, 95% CI: 0.96–1.91).

Mean adjusted scores for HIV-prevention attitudes were comparable between intervention and control at baseline with no significant group effect ($b = -0.217, \pm 0.226, p > .05$). However, significant time and group by time effects were observed. There was an average significant relative increase of 0.189 points in HIV-prevention scores per time period among intervention adolescents ($b = +0.189, \pm 0.089, p < .05$), adjusting for significant changes over time in the control group ($b = +0.356, \pm 0.064, p < .001$). Adolescents in the intervention group also had 2.017 significantly greater odds of having a maximum HIV-prevention score over time (OR = 2.017, 95% CI: 1.43–2.84), adjusting for significant changes over time in the control group (OR = 1.542, 95%CI: 1.22–1.95).

Discussion

These findings suggest that in resource-poor communities a savings-led economic empowerment intervention can expand orphaned adolescents' financial resources and positively impact attitudes toward future economic goals and attitudes toward HIV-preventive practices. Over the two-year assessment period, adolescents participating in the Suubi-Maka Project significantly increased their cash deposits in registered CSAs and also reported higher other savings compared to orphaned adolescents in the control group. These financial gains were coupled with more positive attitudes toward saving for the future and more positive attitudes toward engaging in sexually protective behaviors to avoid HIV infection. The largest improvements were observed during the intervention's active phase. Adolescents' cash savings and HIV-protective attitudes also continued to increase in the year following the intervention, although adolescents' value placed on savings and confidence in their ability to save decreased after the intervention's match incentives ceased.

One important implication is that these findings support the premise proposed by asset theory that increasing vulnerable youth's assets, or savings in this case, would encourage more positive beliefs about the future, which in turn would result in more healthful and self-protective intentions (Mueller et al., 2010; Schreiner & Sherraden, 2007; Sherraden, 1990; Yadama & Sherraden, 1996). Our results suggest that the Suubi-Maka Project may have enabled orphaned adolescents to identify tangible goals toward creating a more positive

future that included both improving their economic situation and avoiding further negative consequences of HIV and AIDS. All enrolled youth had experienced the death of one or both parents due to AIDS. However, participation in the Suubi-Maka Project appeared to raise awareness on ways to avoid HIV infection and provide actual economic means to pursue opportunities shown to reduce HIV risk, such as education (Hargreaves et al., 2008; Jukes, Simmons, & Bundy, 2008). Such findings are consistent likewise with studies that have shown that youthled savings, as a form of economic empowerment, can decrease risky sexual attitudes and behaviors by alternating the economic contexts contributing to risk (Cluver, Orkin, Boyes, & Sherr, 2014; Ssewamala et al., 2008, 2014; Ssewamala, Han, et al., 2010; Ssewamala, Ismayilova, et al., 2010; Tsai, Witte, Aira, Altantsetseg, & Riedel, 2011).

The second important implication relates to the observation that the largest changes in HIV-prevention attitudes were regarding recognition of HIV as a risk factor in adolescent's communities and increased endorsement of safer sex practices, such as consistent condom use. These changes were coupled with the largest changes in savings goals for a family business (income generation), vocational training, and purchase of a home. Adolescents potentially perceived being able to financially support and shelter themselves and their families, with the requisite skills to do so, as the most essential economic capabilities (Jennings, Shore, Strohminger, & Allison, 2015). Reaching these goals may also have been associated with increased self-efficacy to avoid unprotected sex as a result of sexually exploitive housing or income-earning arrangements (Luke, 2003; Mmari et al., 2009; Reed, Gupta, Biradavolu, Devireddy, & Blankenship, 2011). Other studies have demonstrated the importance of housing for HIV prevention (Holtgrave et al., 2007; Shubert & Bernstine, 2007). There is also a growing body of literature on the efficacy of income-generating activities to minimize economic determinants of HIV among youth (Dunbar et al., 2010; Kim et al., 2009; Odek et al., 2009; Pronyk et al., 2008; Rosenberg, Seavey, Jules, & Kershaw, 2011; Sherman et al., 2010). Findings from the Suubi-Maka Project suggest that enabling adolescents to increase their financial assets through formal savings initiatives is an important step in youth's broader pathway to overcome the economic shocks experienced by youth and families made vulnerable due to HIV.

In addition, the continued growth of intervention adolescents' cash savings and HIV-preventive attitudinal scores implies that savings-led economic empowerment initiatives for orphaned youth may have lasting effects after the intervention activities are completed. At the same time, the decline in intervention adolescents' confidence to save suggests that ongoing efforts are still needed to support continued economic growth. In the absence of the intervention's matched savings and educational workshops, adolescents may have perceived a loss of support that influenced their perceptions toward saving in the future. Our analysis measured attitudes toward sexual risk-taking rather than sexual behaviors since prior research with this population indicated low rates of sexual activity (Ssewamala, Han, et al., 2010). However, the transitional period from adolescence to young adulthood is one of the riskiest periods for HIV acquisition (Patton et al., 2010; Stanton et al., 2015). Motivating orphaned adolescents to avoid HIV through ongoing engagement both prior to and at the start of sexual activity will be crucial. Our Suubi-Maka study found that even at relatively young ages, adolescents at baseline had lower awareness of HIV risk and affirmed several high-risk sexual behaviors. Integrated economic and prevention-focused programs for

orphaned youth are needed to provide long-term support to mitigate HIV vulnerabilities over time.

Limitations

The study was limited by inclusion only of adolescent orphans enrolled in school and is therefore not representative of poorer orphans who did not attend school. The high agreement across some attitudinal items may have introduced a ceiling effect which limited the study's detection of further attitudinal shifts. In addition, attitudes toward risky sexual practices are important precursors to behavior, but were not direct measures of behavior.

Conclusion

This study contributes to the body of knowledge regarding care and support for orphaned youth by demonstrating that in resource-poor settings a savings-led economic empowerment intervention can increase orphaned adolescents' financial resources and positively impact youths' attitudes toward future economic goals and HIV-preventive behaviors. However, to minimize HIV risk throughout the adolescent and young adult periods, more effort is needed to develop long-term strategies that economically strengthen youth and their families.

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Table 1

Demographic characteristics of orphaned adolescents in intervention and control groups at baseline.

		Study group		
Baseline characteristic	**Total**	**Intervention**	**Control**	***p*-Value**
Sample size (*n*)	346	179	167	–
Proportion of sample size enrollment (%)	100.0	51.7	48.2	–
Gender				
Female	225 (65.0%)	117 (65.4%)	108 (64.7%)	.89
Male	121 (35.0%)	62 (34.6%)	59 (35.3%)	
Mean age in years (±SD)	13.4 (± 1.24)	13.4 (± 1.25)	13.4 (± 1.23)	.95
Orphan status				
Maternal orphan	60 (17.3%)	34 (19.0%)	26 (15.6%)	.02
Paternal orphan	181 (52.3%)	103 (57.5%)	78 (46.7%)	
Dual orphan	105 (30.4%)	42 (23.5%)	63 (37.7%)	
Mean number of years living caregiver/guardian (±SD)	9.5 (±4.7)	9.4 (±4.8)	9.6 (±4.6)	.67
Mean caregiver/guardian household size[a] (±SD)	6.5 (±2.3)	6.6 (±2.4)	6.3 (±2.1)	.33
Mean number children living in household[a] (±SD)	4.3 (±1.9)	4.4 (±2.1)	4.3 (±1.8)	.61
School assignment				
School 1	17 (4.9%)	17 (9.5%)	0	
School 2	48 (13.9%)	48 (26.8%)	0	
School 3	44 (12.7%)	44 (24.6%)	0	
School 4	19 (5.5%)	19 (10.6%)	0	
School 5	51 (14.7%)	51 (28.5%)	0	
School 6	43 (12.4%)	0	43 (25.8%)	
School 7	32 (9.3%)	0	32 (19.2%)	
School 8	20 (5.8%)	0	20 (12.0%)	
School 9	48 (13.9%)	0	48 (28.7%)	
School 10	24 (6.9%)	0	24 (14.4%)	.00
Any prior cash savings available	66 (19.1%)	36 (20.1%)	30 (18.0%)	.26
Pre-intervention cash savings amount (UGX) (±SD)	2,262 (±429.0)	2,169 (±533.0)	2,362 (± 682.5)	.82
Pre-intervention cash savings amount ($US) (±SD)	$0.76 (±2.7)	$0.72 (±2.4)	$0.79 (±2.9)	.82
Number (%) retained at Time 1 follow-up (%)	331 (95.7%)	171 (95.5%)	160 (95.8%)	–
Number (%) retained at Time 2 follow-up (%)	317 (91.6%)	166 (92.7%)	151 (90.4%)	–

[a] Adult and child household estimates include count of study-enrolled adolescent.

Table 2

CSA deposits and other savings among orphaned adolescents at baseline, 12 months, and 24 months post-baseline by study group.

	Intervention						Control					
Time	***T0***	***T1***	***T2***	Δ_{T1-T0}	Δ_{T2-T1}	Δ_{T2-T0}	***T0***	***T1***	***T2***	Δ_{T1-T0}	Δ_{T2-T1}	Δ_{T2-T0}
Sample size (*n*)	179	171	166	–	–	–	167	160	151	–	–	–
% Adolescents with any savings	20.1	89.4	92.2	+69.3***	+2.8	+72.1***	18.0	27.0	43.1	+9.0*	+16.2**	+25.1***
Mean total CSA deposits ($US)	0	18.8 (±25.2)	24.5 (±38.9)	+18.8***	+5.7	+24.5***	0	0	0	–	–	–
Mean total other savings ($US)	0.7 (± 2.4)	3.8 (±13.5)	8.9 (±19.5)	+3.1**	+5.0**	+8.1***	0.8 (±2.9)	0.9 (±2.4)	4.8 (±27.8)	+0.1	+3.9	+4.0
Mean total combined savings ($US)	0.7 (± 2.4)	23.2 (±29.1)	34.5 (±46.9)	+22.5***	+11.3**	+33.8***	0.8 (±2.9)	0.9 (±2.4)	4.8 (±27.8)	+0.1	+3.9	+4.0

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Proportion of orphaned adolescents reporting affirmative attitudes toward savings and HIV-preventive behaviors at baseline, 12 months, and 24 months post-baseline by study group.

Percentage of adolescents with affirmative responses	**Intervention**						**Control**					
Time	***T0***	***T1***	***T2***	Δ_{T1-T0}	Δ_{T2-T1}	Δ_{T2-T0}	***T0***	***T1***	***T2***	Δ_{T1-T0}	Δ_{T2-T1}	Δ_{T2-T0}
Sample size (*n*)	179	171	166	–	–	–	167	160	151	–	–	–
Value placed on savings[a]												
Saving money for a family business	93.3	100.0	99.4	+6.7***	−0.6	+6.1**	98.8	99.4	98.7	+0.6	−0.7	−0.1
Saving money for one's education	100.0	100.0	99.4	0	−0.6	−0.6	100.0	100.0	99.3	0	−0.7	−0.7
Saving money for vocational/job training	87.7	96.5	92.8	+8.8**	−3.7	+5.1	91.6	95.0	92.7	+3.4	−2.3	+1.1
Saving money to help one's family out	97.2	99.4	97.0	+2.2	−2.4	−0.2	98.2	99.4	96.7	+1.1	−2.7	−1.5
Saving money to buy an animal	96.1	100.0	100.0	+3.9**	0	+3.9*	98.8	100.0	100.0	+1.2	0	+1.2
Saving money to move into one's own home	81.0	95.9	78.3	+14.9***	−17.6***	−2.7	91.6	92.5	76.8	+0.9	−15.7***	−14.8***
Confidence in savings ability[b]												
Save money for a family business	72.6	90.1	89.8	+17.4***	−0.3	+17.1***	77.2	90.0	87.4	+12.8**	−2.6	+10.2*
Save money for one's education	95.0	96.5	95.2	+1.5	−1.3	+0.2	92.2	92.5	95.4	+0.3	+2.9	+3.1
Save money for vocational/job training	82.7	89.5	86.1	+6.8	−3.3	+3.5	83.2	90.6	86.8	+7.4*	−3.9	+3.5
Save money for help one's family out	88.8	94.2	91.0	+5.3	−3.2	+2.1	87.4	95.0	90.1	+7.6*	−4.9	+2.6
Save money to buy an animal	94.4	96.5	97.6	+2.1	+1.1	+3.2	96.4	98.1	96.7	+1.7	−1.4	+0.3
Save money to move into one's own home	62.0	82.5	73.5	+21.4***	−9.9*	+11.5*	74.3	84.4	66.9	+10.1*	−17.5***	−7.4
Mean savings attitudes score (±SD)	10.5 (±1.9)	11.4 (±1.4)	11.0 (±1.5)	+0.9***	−0.4**	+0.5**	10.9 (±1.6)	11.4 (±1.4)	10.9 (±1.5)	+0.5**	−0.5**	0
% with maximum savings score of 12	46.9	76.3	54.2	+29.4***	−22.1***	+7.3	56.9	74.4	52.3	+17.5**	−22.1***	−4.6
HIV/AIDS-prevention attitudes[c]												
AIDS is a threat to my health	80.4	94.2	95.8	+13.7**	+1.6	+15.3***	81.4	91.3	93.4	+9.8*	+2.1	+11.9**

Percentage of adolescents with affirmative responses	Intervention						Control					
Time	***T0***	***T1***	***T2***	Δ_{T1-T0}	Δ_{T2-T1}	Δ_{T2-T0}	***T0***	***T1***	***T2***	Δ_{T1-T0}	Δ_{T2-T1}	Δ_{T2-T0}
All people my age who have sex should use condoms	70.9	74.3	79.5	+3.3	+5.2	+8.6	63.5	71.9	66.9	+8.4	−5.0	+3.4
The best way to avoid getting AIDS is not to have sex	78.8	82.5	91.6	+3.7	+9.1*	+12.8***	71.9	87.5	88.1	+15.6***	+0.6	+16.2***
Even if you know your partner very well you should use a condom	31.8	68.4	82.5	+36.6***	+14.1**	+50.7***	46.1	73.1	71.5	+27.0***	−1.6	+25.4***
It is important to use condoms every time one has sex	73.2	81.9	93.4	+8.7	+11.5**	+20.2***	70.6	85.6	83.4	+15.0**	−2.2	+12.8**
Mean HIV prevention attitudes score (±SD)	3.4 (±1.3)	4.0 (±1.2)	4.4 (±1.0)	+0.6***	+0.4***	+1.0***	3.3 (±1.5)	4.1 (±1.2)	4.0 (±1.3)	+0.8***	−0.1	+0.7***
% With maximum protective behaviors score of 5	15.6	48.0	62.6	+32.3***	+14.6**	+46.9***	27.5	53.8	46.7	+26.2***	−7.0	+19.2***

[a] % Reporting “very/somewhat important”.

[b] % Reporting “very/a little confident”.

[c] % Reporting “strongly/somewhat agree”.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Changes in orphaned adolescent savings and attitudinal scores toward savings and HIV-preventive behaviors with estimated effect of group, time, and group by time interactions using mixed linear and logistic regression models.

	Unadjusted beta coefficients[a] (±SE) and *p*-value			Adjusted beta coefficients[b] (±SE) and *p*-value		
	Group effect[c]	**Time effect[d]**	**Group*Time interaction[e]**	**Group effect[c]**	**Time effect[d]**	**Group*Time interaction[e]**
Savings amount[f]						
Mean CSA deposits	0	0	12.248 (±1.120) 0.000***	0	0	12.317 (±1.122) 0.000***
Mean combined savings	0.064 (+0.287) 0.823	1.964 (±1.194) 0.100	14.903 (±1.653) 0.000***	−0.053 (±0.291) 0.856	1.978 (±1.194) 0.098	14.996 (±1.657) 0.000***
Savings attitudes						
Mean continuous score	−0.622 (±0.277) 0.025*	0.003 (±0.077) 0.971	0.248 (±0.107) 0.021*	−0.637 (±0.281) 0.024*	0.002 (±0.077) 0.982	0.252 (±0.107) 0.019*
Odds ratio of high score	0.497 (±0.120) 0.082	0.911 (±0.115) 0.462	1.332 (±0.232) 0.101	0.482 (±0.194) 0.070	0.910 (±0.114) 0.452	1.354 (±0.237) 0.084
HIV-prevention attitudes						
Mean continuous score	−0.235 (±0.220) 0.285	0.356 (±0.064) 0.000***	0.186 (±0.089) 0.036*	−0.217 (±0.226) 0.338	0.356 (±0.064) 0.000***	0.189 (±0.089)(br/ 0.034*
Odds ratio of high score	0.239 (±0.102) 0.001**	1.541 (±0.183) 0.000***	2.016 (±0.352) 0.000***	0.254 (±0.110) 0.002**	1.542 (±0.184) 0.000***	2.017 (±0.353) 0.000***

[a] No fixed effects are applied.

[b] Adjusted for correlation of observations; school- and subject-level characteristics (random effects); gender, age, orphan status, years living with caregiver/guardian, and adult and child household sizes (fixed effects).

[c] Difference in mean score or log odds between intervention and control at baseline.

[d] Change over time in control.

[e] Difference in change over time in intervention versus control.

[f] Savings are shown in equivalent US dollars.

* $p < .05$.

** $p < .01$.

*** $p < .001$.