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Impact of the Child-optimized Financial Education (COFE) curriculum among savings group participants in Uganda: A cluster randomised controlled trial

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ABSTRACT

This article reports on a post-test only cluster randomized controlled trial that assessed the impact of exposure to the Child-Optimized Financial Education (COFE) curriculum, delivered within Savings and Lending Communities (SILC) in Uganda, on caregivers' spending on school and healthcare expenses for children, and caregivers' financial self-efficacy. Participation in SILCs with COFE was significantly associated with caregivers paying for children's required school expenses compared to SILCs who were not exposed to COFE. Other outcomes were not significantly influenced by COFE. Child-centered household-level financial planning and saving may support the educational needs of Ugandan children and potentially Uganda's national-level education targets.

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KEYWORDS

Savings groups; financial inclusion; financial self-efficacy; financial education; children's school attendance; children's healthcare expenses

Introduction

Household poverty is a major hindrance to children's optimal health and educational attainment globally (Black et al. 2017; Tusting et al. 2020; AAP Council on Community Pediatrics 2016; Arpino, Gumà, and Julià 2018; Engle and Black 2008). The first four Sustainable Development Goals (SDG) highlight the significance of promoting children's health and education and aim to end poverty and hunger, achieve food security, ensure healthy lives and promote quality education and learning opportunities for all by 2030 (The Sustainable Development Goals Center for Africa and Sustainable Development Solutions Network 2020 (The SDG Center for ASDSN 2020)). The 2020 Africa SDG Index and Dashboards Report; however, noted that the majority of African countries are not on track for meeting these SDG targets. With the addition of the COVID-19 global pandemic, and its associated long-term school closures and reduced access to health services, many low- and middle-income countries (LMIC) are further burdened and challenged to alleviate poverty and food insecurity and meet child educational and well-being goals (The SDG Center for ASDSN 2020).

Uganda, which has a target of universal primary and secondary education, is experiencing significant challenges in meeting their SDG targets (The Sustainable Development Goals Center for Africa, and Sustainable Development Solutions Network 2020). In 2020, it was estimated that 37% of the Ugandan population lived in poverty, defined as living under \$1.90 per day (The Sustainable

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Development Goals Center for Africa, and Sustainable Development Solutions Network 2020) and nearly 84% of primary school-age population (6 to 12 years old) attended primary school in 2016 (Uganda Bureau of Statistics (UBOS) and ICF 2018) but only 53% completed primary school in 2017 (The World Bank, n.d.). The attendance and completion rate for secondary school (ages 13 to 18 years) was much lower at 20% in 2016 (Uganda Bureau of Statistics (UBOS) and ICF 2018) and 26% in 2017 (The World Bank, n.d.), respectively. Both primary and secondary school attendance rates show considerable variations by household wealth and gender. The poorest households had significantly lower school attendance rates and female students had lower attendance rates compared to male students at poorer wealth quintiles (Uganda Bureau of Statistics (UBOS) and ICF 2018). While there are various explanations for how household poverty affects school attendance and completion, an important one is a caregiver's ability to pay school fees, and buy uniforms, and other school supplies. Child-centred household-level financial planning and saving could potentially help address this issue and support Uganda's educational targets (Ministry of Education and Sports 2017).

There is also robust evidence that poverty limits children's access to routine and sick visit healthcare in LMICs (Peters et al. 2008). The impact of high out-of-pocket costs for clinic visits has many repercussions. A review of studies on how households cope with healthcare costs for chronic illnesses in LMICs revealed that families may take their children out of school, send them to work, and/or reduce spending on nutritious food or education more broadly (Murphy et al. 2019). The implications of being able to afford both clinical care and food are illustrated in Uganda, where a qualitative study among caregivers of children living with HIV confirmed that although they were accessing medication, families still experienced barriers, such as food insecurity, which affected their children's ability to take medication and remain antiretroviral therapy (ART) adherent (Nasuuna et al. 2019).

The savings group methodology is one type of community-based poverty reduction programme that has been widely implemented (Allen and Panetta 2010). A savings group is designed to allow resource-poor community residents to regularly save a certain amount of money and contribute to common funds that are accessible to any group member for borrowing for business and personal needs based on demand and approval of other members. The collected money is 'shared out' at the end of each cycle (9 to 12 months in duration) with each member getting back their savings plus a portion of the 'profits' in proportion to the amount of individual savings. All written documentation, ledgers and cash are stored in a physical cash box with multiple locks managed by elected members of the savings group. Some savings groups are led by a trained facilitator or a private service provider (PSP) who supervises weekly meetings to ensure that all logistics and processes concerning the management of finances occur in a trusted and transparent manner (Allen and Panetta 2010). The primary motivation for implementing community-based savings groups is to increase financial inclusion, access to appropriate financial services, literacy and self-efficacy among poor and marginalised populations who otherwise may not have had access to financial services (Parr and Bachay 2015; Karlan et al. 2017). There is growing evidence of an association between savings group participation, household wealth and financial preparedness for child-related healthcare expenditure (Lee et al. 2021). In 2017, only about 59% of the adults (aged 15 or over) in Uganda had an account at a bank or other financial institutions or with a mobile money service provider (The World Bank, n.d.). The effort to increase financial inclusion in Uganda is currently underway through the introduction of new legislation and outreach strategies (Ministry of Finance, Planning and Economic Development, and Bank of Uganda 2017).

Catholic Relief Services (CRS), a global humanitarian aid organisation, has been promoting a savings groups methodology called Savings and Internal Lending Communities (SILC) in Uganda since 2006 (Beijuka and Odele 2007). Recognising that participation in savings groups alone may not be sufficient to make a significant impact on children's wellbeing and in response to an organisational programmatic priority to support HIV-affected families (Gash 2017; Parr and Bachay 2015), CRS created the Child-Optimised Financial Education (COFE) curriculum for delivery within SILC groups

(Catholic Relief Services 2019). COFE was specifically designed to help caregivers of orphans and vulnerable children (OVC) affected by HIV to plan and save for the education-, nutritious food- and health-related expenses for all the children in their care. While the COFE curriculum aligned with the President's Emergency Plan for AIDS Relief (PEPFAR) benchmarks for OVC programming (i.e. keeping children in school, safe, nourished and with financially stable households), this approach was also in line with prior recommendations that savings groups should be implemented with complementary interventions for synergistic effects (Gash 2017; Parr and Bachay 2015). The COFE curriculum includes content that could potentially benefit children and caregivers regardless of whether the household was HIV-affected.

Results presented here are from a cluster-randomised controlled trial to assess the extent to which the COFE curriculum increases: 1) caregivers' spending on children's required school expenses to allow students to stay in school; 2) caregivers' spending on children's healthcare expenses; and 3) caregivers' financial self-efficacy.

Methods

Study design

This study is a post-test only parallel cluster randomised controlled trial of 28 private service providers called PSPs (i.e. clusters) randomly assigned to the intervention or control arm, with each PSP facilitating 2–3 SILC groups in the study. The intervention-tested randomisation to the COFE program. Due to COVID-19 shutdowns in Uganda around the time baseline data collection was scheduled (August/September 2020) we were unable to collect and analyse baseline data for study participants. The estimated treatment effect based on endline-only data should be valid since any secular trend that could confound the estimate should be mitigated by baseline randomisation. Primary data collection occurred between 0 and 3 months post-intervention (April 2021 to June 2021).

Study setting

The 28 PSPs were selected from Gomba and Mityana districts of Uganda. According to the National Population and Housing Census 2014 report, over 80% of adults 18 years or older participate in the labour force and subsistence agriculture was the most common occupation in both Gomba and Mityana districts (Uganda Bureau of Statistics 2017a, 2017b). Children aged 10 to 17 years also participated in the labour force (Gomba: 21%; Mityana: 38% of children 10–17 years old) (Uganda Bureau of Statistics 2017a). Formal financial inclusion; however, was low with only 10% and 19% of households having any member with a bank account in Gomba and Mityana districts, respectively (Uganda Bureau of Statistics 2017a).

There was high accessibility to essential community services in both districts. In Gomba, 86% of the households were within 5 km of the nearest public primary school and 70% of the households were within 5 km of the nearest public or private health facility (Uganda Bureau of Statistics 2017a). In Mityana, 91% of the households were within 5 km of the nearest public primary school and 84% of the households were within 5 km of the nearest public or private health facility (Uganda Bureau of Statistics 2017a). Accordingly, there was high attendance in primary school in both districts (Gomba: 86%; Mityana: 84%) (Uganda Bureau of Statistics 2017a; 2017b). As for orphanhood, nearly 9% of children younger than 18 years of age had experienced the death of at least one parent in both Mityana and Gomba districts (Uganda Bureau of Statistics 2017a; 2017b). Within these districts, CRS was implementing the Sustainable Outcomes for Children and Youth in Central and Western Uganda project (SOCY) funded by the PEPFAR through the United States Agency for International Development (USAID). It was anticipated that some of the SILC group participants would also be SOCY participants by virtue of the location and project level targeting.

Participants

Participants were eligible for recruitment in the study if they were: 1) members of SILC groups managed by pre-selected and randomised PSPs; and 2) 18 years or older; or 3) 16 or 17 years old but considered to be an emancipated minor. In Uganda, emancipated minors (ages 16–17) can be defined as those who are either married, pregnant, have a child(ren), are the head of a household or work to earn money independently to support the livelihood of themselves and their family. Where applicable, emancipated minors were recruited because they were a part of the SILC groups and could therefore be beneficiaries of the COFE program.

Intervention

The SILC program was implemented by community-based entrepreneurs called Private Service Providers (PSP) in both the intervention and control groups. Each PSP worked with several SILC groups, with each SILC group comprising an average of about 19 members. Every week, members of the SILC group make savings deposits that are added to a main fund, from which members can take short-term loans for investment or consumption. Members can further contribute to a separate group social fund (which caters for unexpected financial emergencies affecting members) and an Edufund (an earmarked fund dedicated to anticipated children's education expenses). Groups record all financial transactions in ledger books that track member deposits, social fund contributions, loans issued and repaid, and cash balances of the various funds. All financial transactions are carried out in view of all members, and any cash balances, along with group records, are stored in a locked metal cash box kept by the group treasurer in between meetings (other members keep the keys to the multiple padlocks). SILC activities fall into cycles that typically last 9 to 12 months. At the conclusion of each cycle, all loans have been repaid and members recover their entire savings (along with any balance in their personal Edufund), with a share of group profit in proportion to their savings. The group composition for the next cycle can change, as members may leave and others may join.

Intervention groups were randomly assigned to have their respective PSPs implement the COFE program. These PSPs were trained by SILC supervisors who, themselves, had completed a total of 20 days of COFE training conducted by a CRS master trainer. During their training, PSPs reviewed the lessons and had an opportunity to practice preparing and delivering COFE sessions in the field with SILC members. COFE was delivered every other week, after the regular SILC meeting, for a total of 13 sessions between September 2020 and March 2021. Each COFE session lasted between 45 and 60 minutes. The curriculum was designed to help caregivers: 1) set financial goals that are sensitive to children's basic needs including education, healthcare and proper nutrition; 2) learn money management skills related to budgeting, savings and borrowing; 3) create a succession plan and, if interested (optional), a written will; 4) ensure that a family's financial challenges do not force children to miss school for labour; and 5) practice good parenting, child protection, and HIV prevention, care and treatment. After data collection and analysis were completed (September 2021), the PSPs assigned to the control group were trained to deliver the COFE curriculum.

Outcomes

The primary outcome of the study was whether caregivers (i.e. SILC participants) paid for all of the required school fees in the past 3 months for children under their care. The primary outcome, defined at the child level, was binary and only included school-age children (ages 6 to 17) whose school (i.e. candidate and semi-candidate classes) was not closed due to COVID-19 mandated restrictions (see Table S1) (Uganda Ministry of Education and Sports 2020). Two additional measures were examined in the study as secondary outcomes: 1) whether caregivers paid for health-related expenses of children who had a need for health services (binary, defined at the

child level); and 2) caregivers' financial self-efficacy (FSE) score (continuous, defined at the participant level) (Lown 2011). Financial self-efficacy items included six questions about adhering to the planned budget, making progress towards financial goals, responding to unexpected expenses, dealing with financial challenges, confidence in the ability to manage money and worries of not having enough money to take care of children. The response categories were strongly agree, somewhat agree, somewhat disagree, strongly disagree, does not apply and do not know.

Sample size

We powered on the difference between intervention and control arms for the primary outcome, ability to pay for school expenses for a child. Power calculations were performed using Optimal Design Software (Raudenbush et al. 2011). With a total of 1288 participants (28 PSPs, 2 SILC groups per PSP, 23 participants per SILC group), we estimated 84% power to detect a standardised effect of 0.35, assuming intraclass correlation coefficients (ICC) of <0.0001 and 0.06 at the PSP and SILC levels, respectively, and assuming only 70% of the 1288 participants have at least one child with school expenses. In practice, power is estimated to be higher due to a realised sample size of 1374 participants, and since some PSPs included 3 SILC groups.

Randomisation and blinding

We performed constrained randomisation using the `cvcrand` package (Gallis et al. 2018) in Stata to allocate the 28 PSPs to the two arms of the trial. Our goal was to balance the two arms on important PSP-level characteristics hypothesised to be related to the financial outcomes of interest. The four PSP-level characteristics chosen for balancing were proportion of group members that are households with OVC, proportion of groups that use Edufund, PSP experience in months (i.e. months since their first training), and region (Gomba vs. Mityana). A statistical analysis plan was specified prior to data collection, and the analysis team was blinded during the analysis phase. This study is registered in the American Economic Association's RCT Registry (#AEARCTR-0007415).

Statistical methods

A number of duplicate identifiers ($n = 27$) were found in the dataset in which data were recorded for the same SILC participant twice. Several rules were set to determine which entries to retain. If the data collectors were not in the village for which the participant belonged, the data entry was deleted. If key demographic data for the repeat participants were the same (age, sex, religion, work, # of children), the survey that was completed first was kept. If both the age and sex were different for the two entries for the same participant, both entries were deleted because the identity of the participant could not be confirmed.

Statistical analysis was conducted according to the CONSORT guidelines (Campbell et al. 2012; Juszczak et al. 2019). A CONSORT flow chart was created to show the participation of both intervention and control arms in terms of eligibility screening, recruitment and follow-up status. Characteristics of recruited participants, measured at endline, were reported by study arm. Continuous variables were summarised by means and standard deviation (SD). Categorical variables were summarised by counts and percentages.

All analyses followed intention-to-treat principles. For binary outcomes measured at the child-level, we fitted a modified Poisson mixed effects model with log link to estimate the ratios of the prevalence of the outcome on a relative scale and a linear mixed effects model with identity link to estimate the differences in the prevalence on an absolute scale. Mixed effects models with robust standard errors were fitted to handle correlated errors in the response. For continuous outcomes, such as financial self-efficacy, we fitted a linear mixed model to estimate mean differences. All

models were adjusted for the cluster-level variables on which the randomisation was constrained. In addition, models accounted for all sources of clustering, including household, SILC group and PSP-level correlation, as applicable, using random intercepts for each of these sources. P-values are reported only for the primary outcome on both relative and absolute scales, with statistical significance defined as $p < 0.05$. All other outcomes are reported with their 95% confidence intervals. A sensitivity analysis was performed by adjusting the individual-level regressions for any prespecified potential confounders shown to be imbalanced by intervention arm in time- and treatment-invariant variables collected at follow-up ($p < 0.10$) (**Tables S2-S4**).

Finally, we estimated whether any effect of the intervention on the ability to pay for children's school fees and health expenses was modified by SOCY status (self-reported as 22% of our sample). We assessed additive and multiplicative effect measure modification between SOCY and the treatment separately in models with identity link for absolute difference in prevalence and log link for the relative difference. Modification of the effect estimate was tested by fitting an interaction term in each model between treatment arm and SOCY status. All analyses were conducted using Stata/SE 16.1 (StataCorp 2019).

Ethical approvals

Ethical approval was received from the Duke University Campus IRB (#2021-0327), The AIDS Support Organization IRB (#TASOREC/017/2021-UG-REC-009) based in Kampala, Uganda, and the Uganda National Council for Science and Technology (#SS817ES). All participants signed a written informed consent form or, if they were illiterate, were read the consent form and provided their fingerprint with a witness signature.

Results

Participant characteristics

A total of 1374 participants from 28 PSPs were enrolled in the study, representing 4598 children in their care (**Figure 1**). The average PSP cluster size (standard deviation) was 50.6 (11.4) in control arm and 47.5 (15.1) in the intervention arm. The average age of the participants in the sample was 41.8 (14.3) years, with 69.2% female participants and 66.5% of the sample having completed primary school or higher levels of education. Household dietary diversity in the intervention group was slightly higher than in the control group at endline (7.28 and 6.90 respectively) Further individual characteristics measured at endline are presented in **Table 1**. Cluster-level characteristics are summarised in **Table 2**. Further participant-level characteristics of those who had at least one school-aged child whose school was not closed due to COVID-19, and those who had at least one child with health expenditures in the past 3 months, are presented in **Tables S3** and **S4**, respectively.

Outcomes

Descriptive statistics of the primary and secondary outcomes are summarised in **Table 3**. Among the 1374 study participants, 918 (66.8%) had at least one child eligible for measurement on the primary outcome of full school-fee payment (i.e. the child is school-aged and his/her school is not closed due to COVID-19 restrictions). The primary outcome was defined at the child level, resulting in 1956 eligible children under the care of the SILC participants recruited in the study (i.e. schools were closed due to COVID-19 restrictions for 1268 of the 3224 school-aged children). For the secondary outcomes on health expenses and financial self-efficacy, 1088 children and 1372 SILC participants were included in the analyses, respectively.

Regression results are presented in **Table 4**. The prevalence of paying children's school fees in the intervention arm was 8% higher, on average, compared to the prevalence in the control arm [absolute difference: 0.08, 95% confidence interval (CI): 0.01 to 0.16, p-value:

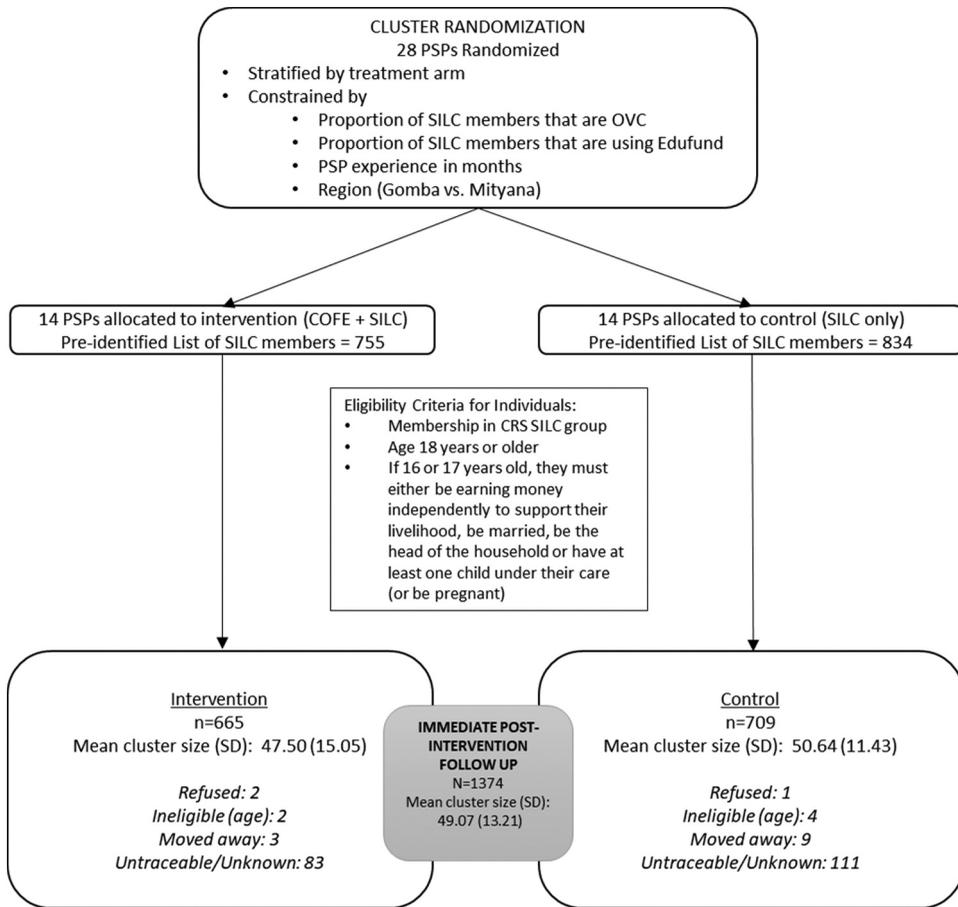


Figure 1. CONSORT Diagram.

0.03]. This corresponds to a relative difference of 1.17 [95% CI: 1.04 to 1.31, p-value: 0.01], or 17% higher relative to the control arm. Observed differences in the secondary outcomes between the intervention and control arms were relatively small (see Table 4). Sensitivity analyses adjusting for the prespecified list of potential confounders showed qualitatively similar results (Table S5).

Descriptive statistics of the outcomes stratified by SOCY status are summarised in Table S6, while regression results of the effect modification analyses are presented in Table S7. The effect of the intervention on the primary and secondary outcomes was not substantially different by SOCY status. The treatment effect on the ability to pay for school fees was slightly stronger among non-SOCY beneficiaries; estimates, however, were imprecise.

Discussion

The main findings of our study have important programmatic implications for child-focused financial education integrated into savings groups in Uganda and may be relevant for similar low-resource settings. Participation in SILC groups with the COFE curriculum was significantly associated with greater spending on children’s required school expenses compared to participation in SILC groups without the COFE curriculum. We believe that COFE’s targeted messaging on financial planning and

Table 1. Participant-level characteristics among all SILC participants at study endline.

	Control (N = 709)	Intervention (N = 665)	Total (N = 1374)
Age (Years)	41.09 (14.13)	42.53 (14.34)	41.79 (14.25)
Female	485 (68.4%)	466 (70.1%)	951 (69.2%)
PHQ-9 score	3.74 (3.60)	3.65 (3.86)	3.69 (3.73)
Married or cohabitating	472 (66.6%)	420 (63.2%)	892 (64.9%)
Highest level of schooling completed			
No education/some primary	261 (36.8%)	200 (30.1%)	461 (33.6%)
Primary completed	283 (39.9%)	271 (40.8%)	554 (40.3%)
'O' Level	125 (17.6%)	156 (23.5%)	281 (20.5%)
'A' Level or higher	40 (5.6%)	38 (5.7%)	78 (5.7%)
Number of children <18 caring for	3.38 (2.08)	3.31 (2.01)	3.35 (2.05)
Household Dietary Diversity	6.90 (2.77)	7.28 (3.04)	7.08 (2.91)
Hunger Score- Categorized			
Little to none	645 (91.5%)	630 (94.7%)	1275 (93.1%)
Moderate	52 (7.4%)	34 (5.1%)	86 (6.3%)
Severe hunger	8 (1.1%)	1 (0.2%)	9 (0.7%)
Worked for cash or kind in the last 3 months	558 (78.7%)	485 (72.9%)	1043 (75.9%)
Paid for large, unexpected household expenses in the past 3 months	492 (69.4%)	428 (64.5%)	920 (67.0%)
Personal or household's income negatively affected by COVID-19	655 (92.4%)	617 (92.8%)	1272 (92.6%)
Self-reported health in past 12 months			
Very good	89 (12.6%)	122 (18.3%)	211 (15.4%)
Good	227 (32.0%)	224 (33.7%)	451 (32.8%)
Fair	343 (48.4%)	280 (42.1%)	623 (45.3%)
Poor	50 (7.1%)	39 (5.9%)	89 (6.5%)
Participant has health insurance			
No	673 (94.9%)	639 (96.1%)	1312 (95.5%)
Yes	23 (3.2%)	19 (2.9%)	42 (3.1%)
Do not know/No Response	13 (1.8%)	7 (1.1%)	20 (1.5%)
Decision-maker for children's education expenses			
Respondent alone	131 (27.8%)	99 (23.6%)	230 (25.8%)
Partner alone	42 (8.9%)	24 (5.7%)	66 (7.4%)
Respondent and partner	285 (60.4%)	288 (68.6%)	573 (64.2%)
Someone else	6 (1.3%)	3 (0.7%)	9 (1.0%)
No children to care for	4 (0.8%)	4 (1.0%)	8 (0.9%)
Do not know/no response	4 (0.8%)	2 (0.5%)	6 (0.7%)
Decision-maker for children's health care			
Respondent alone	127 (26.9%)	106 (25.2%)	233 (26.1%)
Partner alone	52 (11.0%)	26 (6.2%)	78 (8.7%)
Respondent and partner	283 (60.0%)	281 (66.9%)	564 (63.2%)
Someone else	7 (1.5%)	3 (0.7%)	10 (1.1%)
No children to care for	3 (0.6%)	4 (1.0%)	7 (0.8%)
Number of community saving groups saving in	1.59 (0.86)	1.48 (0.72)	1.53 (0.80)
In current SILC group, number of share outs or cycles participated in Participating in Education Fund (Edufund)	2.06 (1.59)	1.97 (1.12)	2.02 (1.39)
Participating in Social Fund	366 (51.6%)	310 (46.6%)	676 (49.2%)
	630 (88.9%)	561 (84.4%)	1191 (86.7%)

Notes: Data are n (%) or mean (SD). Medians were found to be slightly smaller than the means for the potentially right skewed variables, including age, number of children, etc., but the difference is negligible. PHQ-9, patient health questionnaire; Household dietary diversity, the number of unique foods consumed by household members the day before the interview; Hunger score, indicator of household hunger over the past 30 days

Table 2. PSP-level characteristics

	Intervention (N = 14)	Control (N = 14)	Total (N = 28)
Estimated proportion of group members with OVC	0.43 (0.10)	0.42 (0.11)	0.42 (0.10)
Estimated proportion of groups using Edufund	0.20 (0.23)	0.26 (0.32)	0.23 (0.27)
PSP Months of Experience	25.77 (2.97)	25.66 (6.61)	25.71 (5.03)
Region			
Gomba	8 (57.1%)	9 (64.3%)	17 (60.7%)
Mityana	6 (42.9%)	5 (35.7%)	11 (39.3%)

Abbreviations: Edufund – Education Fund; OVC – Orphans and vulnerable children; PSP – Primary service provider.

Note: Data are n (%) or mean (SD). Estimated proportion of groups using Edufund and proportion OVC are pre-intervention estimates.

Table 3. Outcomes

Child level	Intervention (N = 2199)	Control (N = 2399)
Child's school fees fully paid (primary outcome)		
No	340 (34.9%)	434 (44.2%)
Yes	634 (65.1%)	548 (55.8%)
Not eligible or missing	1225 (.%)	1417 (.%)
Child's health expenses paid (secondary outcome)		
No	148 (32.7%)	199 (31.3%)
Yes	304 (67.3%)	437 (68.7%)
Not eligible or missing	1747 (.%)	1763 (.%)
SILC Participant level		
	Intervention (N=665)	Control (N=709)
Financial self-efficacy, higher is better Mean (SD); [range 6-24]	11.27 (3.56)	11.59 (3.49)

Table 4. Regression results.

Outcome	Method	Scale	Number of SILC participants or children eligible for analysis	Predicted difference in prop./mean, Intervention vs. Control	p-value
Primary outcome					
School Fee	Mixed Effects	absolute	N = 1956 (children)	0.08 (0.01, 0.16)	0.03
School Fee	Mixed Effects	relative	N = 1956 (children)	1.17 (1.04, 1.31)	0.01
Secondary outcomes					
Health Expenses	Mixed Effects	absolute	N = 1088 (children)	-0.01 (-0.07, 0.05)	
Health Expenses	Mixed Effects	relative	N = 1088 (children)	0.97 (0.84, 1.13)	
FSE	Mixed Effects	absolute	N = 1372 (SILC participants)	-0.31 (-0.79, 0.17)	

Abbreviations: School Fee, proportion of children with school fees fully paid; Health Expenses, proportion of children with health expenses paid or health need met; FSE, Financial self-efficacy score, higher is better.

Note: In all models, we adjusted for the 4 variables used in constrained randomisation, i.e. estimated proportion of group members who are OVC, estimated proportion of groups using Edufund, PSP Months of Experience and region (details reported in Table 2).

saving for children's education needs likely led to this intended behaviour change. It is also important to note that we observed this effect with nearly half of the sample participating in the Edufund, which was specifically designed to help with paying for anticipated education fees. Our findings, therefore, suggest that child-focused financial education can bring added value to services that are specifically designed to facilitate spending on children's education (i.e. SILC and Edufund).

However, other studies have found mixed results regarding savings groups' impact on children's education and health outcomes, including for marginalised populations, such as households with OVC (Gash 2017; Parr and Bachay 2015). For example, a cross-sectional study in Uganda found that participation in savings groups by caregivers of OVC was associated with higher frequency of meals and nutritious foods for children, greater ability to pay for school-related fees and health seeking behaviour for children (Gash 2017; Swarts et al. 2010; Parr and Bachay 2015). In addition, a pre-test-post-test study in Rwanda reported that participating caregivers were able to better afford health insurance, increase meal frequency and increase savings for children's education (Gash 2017; Dills, Mayson, and Mukankusi 2008; Parr and Bachay 2015). A case study from Kenya, however, reported that participating OVC households did not experience improvements in food security and educational outcomes compared to the OVC population in nearby communities (Larson et al. 2013; Parr and Bachay 2015). The overall quality of evidence is considered to be of low to moderate rigour as studies on the impact of savings groups lack a strong experimental study design (Gash 2017; Parr and Bachay 2015).

At least 22% of our study sample were likely from HIV-affected OVC households due to their participation in the SOCY project implemented by CRS. It is plausible that there could be more OVC households in the sample that were not part of the SOCY project. Despite being interested in COFE's impact on SOCY participants, the current study did not limit recruitment to SOCY participants because of ethical and administrative reasons. For example, identifying and separating SOCY participants would have inadvertently introduced HIV-related social stigma. There were also administrative challenges with tracking SOCY participants while trying to minimise the risk of stigma. Moreover, limiting participant recruitment to a subset of the general population requires larger sample sizes to maintain adequate statistical power, which translates to higher costs in collecting data. In light of this, the overall positive impact of COFE delivered in SILC groups is an encouraging finding and may potentially indicate that SOCY participants who are within the larger study sample could have benefited from the program as well. Effect modification analyses by SOCY participation however showed that the effect of COFE on paying for required school fees is not necessarily any better with the SOCY participants compared to non-SOCY participants. This finding should be interpreted with caution as we were not powered to detect a difference and SOCY status was determined by self-report and thus not well-defined.

We found little evidence that COFE was associated with caregivers' financial self-efficacy or with paying for children's health expenses. The lack of an overall program impact on financial self-efficacy may in part be due to the measure not directly corresponding to the COFE curriculum. For example, even after acquiring specific knowledge and skills related to seasonal financial planning, goal-setting, savings and management, participants can still feel like it is difficult to stick to a financial plan and make progress towards related goals. They may further be worried that they do not have enough money to adequately take care of their household and thus fear facing unexpected financial difficulties, especially during the COVID-19 pandemic. It is also plausible that there was not enough time between the intervention and data collection for participants to practice learned skills (e.g. sticking to a financial plan and meeting goals) and subsequently develop financial self-efficacy.

There could be many reasons beyond individual knowledge and skills why health expenses could not be paid. Many of these are structural and financial barriers, such as distance to the preferred type of health facility, high cost of care, lack of health insurance, perceived stigma related to treatment, perceived low quality of care and unfriendly attitude by medical staff (Thaddeus and Maine 1994; Gabrysch and Campbell 2009). These reasons are beyond the individual's control and participation in neither SILC nor exposure to COFE would have had much impact if a combination of these barriers were working against the participants at large. In Uganda, nearly 60% of women age 15 to 49 years reported that getting permission to go to the doctor, getting money for medical advice or treatment, travelling far distance to a health facility and not wanting to go alone were major challenges (Uganda Bureau of Statistics (UBOS) and ICF 2018). Such issues would be outside of the scope of COFE's ability to impact. In addition, healthcare expenses for acute illnesses/curative care can be less predictable while education expenses are typically expected and routine. In case of unexpected healthcare expenses, we could speculate that participants used the social fund, which was designed for emergency needs. The majority of participants in both the intervention and control groups had access to the social fund. However, the control group had a higher percentage of participation in the social fund. That said, we have very little concrete information about how the social funds were used in general, much less for healthcare.

Savings groups were originally designed to help poorer households escape poverty through better management of their scarce financial resources and better secure their financial future (Allen and Panetta 2010; Parr and Bachay 2015; Karlan et al. 2017). Thus, pairing savings groups with a child-focused financial education curriculum may create more opportunities for children than savings groups alone. We encourage future studies to examine whether participants are able to retain acquired financial knowledge, skills and practices over a longer time horizon and if such knowledge was being transferred to their children.

Limitations

A noteworthy limitation of the study was that we only used endline data to assess program impact. The absence of baseline data was due to COVID-19 shutdowns in Uganda around the time baseline data collection was scheduled to occur (August/September 2020). For this reason, we were unable to calculate changes in outcomes over time. We were also unable to empirically assess whether study outcomes were different by treatment arm at baseline; however, we have every reason to believe that our constrained randomisation method achieved strong balance on important covariates, limiting the risk of bias in our measures of treatment effect. Sensitivity analyses adjusting for imbalanced covariates at endline support this conclusion, and show similar results as the main analysis. However, the study could have benefited from also constraining on average savings rates within groups to balance on the proportion of SILC members who show a greater propensity to save. Furthermore, not all schools were fully reopened at the time of endline data collection (April 2021). It is important to note that school-age children whose schools were closed due to COVID-19 (and have no required school expenses to pay for) were excluded from the final analysis, which may affect the generalisability of our findings. And finally, an in-depth qualitative study could also have given additional insight about the process through which a child-focused financial education curriculum impacted relevant outcomes.

Conclusions

Participation in SILC groups with the COFE curriculum is associated with a significant increase in caregivers paying for children's required school expenses compared to SILC groups who were not exposed to COFE. Caregivers' financial self-efficacy and paying for children's healthcare expenses were not significantly influenced by COFE, at least not within the timeframe in which this study was conducted. We suggest complementing savings group activities serving vulnerable households affected by HIV with a child-focused financial education curriculum as this appears to lead to better educational opportunities for children.

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Disclosure statement

ETK, YZ, LM, ML, JKB, CA, AMO, JRE, JAG and JNB report a contract from CRS during the conduct of the study; and five authors of this publication were paid consultants of CRS, the funder, via a subcontract from Duke University when this study was carried out and assisted with study design, data collection, and manuscript preparation. However, no CRS author had access to aggregate study data during data collection, nor was any CRS employee involved with data analysis.

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