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Integrating social protection and early childhood development: open trial of a family home-visiting intervention, *Sugira Muryango*

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ABSTRACT

A pre-post design with 6–13-month follow-up assessed the feasibility and acceptability of a home-visiting intervention to promote early childhood development, improve parenting and shared decision-making, and reduce violence in impoverished Rwandan households. Twenty vulnerable families with a child 36-months or younger enrolled in *Sugira Muryango*. Measures of parenting, home environment, family-violence, decision-making, and health-status were administered at pre/post and follow-up. Families reported high satisfaction post-intervention. OMCI scores improved for 4.8% of mother-child dyads at post-intervention and 19.0% at follow-up, while 9.5% of dyads showed declines at both times. HOME Inventory scores improved for 9.5% and 14.3% of dyads at post-intervention and follow-up respectively and declined for 4.8% and 0.0%. Indicators for equal decision-making and child dietary-diversity improved at post-intervention and follow-up. Fewer mothers believed physical punishment was necessary at follow-up. *Sugira Muryango* shows promise for improving parenting, beliefs about harsh punishment, child nutritional status, and shared decision-making among vulnerable families.

ARTICLE HISTORY

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KEYWORDS

Africa; child development; violence; child health; parenting

Introduction

To advance the development of children living in poverty globally, robust and feasible interventions that can be deployed in diverse cultural contexts are needed (Engle et al., 2011). Children living in poverty are at risk for poor health and development in addition to exposure to family stress and violence, which often perpetuates intergenerational cycles of limited human capital formation and poverty (Richter et al., 2017; Shonkoff & Fisher, 2013). Worldwide, this population has been the focus of a growing early childhood development (ECD) agenda, with emphasis on low- and middle-income countries (LMICs) (Black et al., 2017; Britto et al., 2017; Richter et al., 2017). Additionally, the development community is increasingly recognizing links between advancing social protection1 and ECD promotion. Given that poverty is associated with poor ECD outcomes (Grantham-McGregor et al., 2007) and that many disparities in health and wellbeing begin in early life (Shonkoff et al., 2012), pairing social protection services, such as cash transfers and public works programmes, with ECD promotion may be advantageous for several reasons. First, providing families with additional financial resources can release resources for caregivers to invest in the home environment

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and materials benefitting children (Bastagli et al., 2016). Research on social protection interventions such as cash transfers to vulnerable families indicates that they may reduce stress related to financial strain with implications for improving psychological wellbeing of the family and benefits on ECD (Fernald & Hidrobo, 2011). Linking ECD interventions with social safety net programmes may also enable ECD interventions to reach vulnerable populations and combat early development of disparities (Britto et al., 2017). Research in several LMICs indicates that ECD interventions combined with social protection efforts can advance child development, school readiness, and health outcomes (Bastagli et al., 2016; Britto et al., 2017; Engle et al., 2011). In Colombia, a family home-visiting intervention led by community ‘mother leaders’ contributed to significant improvements in cognition and language for children from families enrolled in a conditional cash transfer programme (Attanasio et al., 2014). Despite growing evidence for combined social protection/ECD interventions in LMICs, few have been evaluated in Sub-Saharan Africa (SSA) or have explicitly linked social protection and ECD interventions (Britto et al., 2017).

In Rwanda, 39% of households live in poverty with 16% in extreme poverty (National Institute of Statistics of Rwanda (NISR), 2015). Rwanda has made significant strides in improving child and family health through innovative policies and programmes (Farmer et al., 2013; Rich et al., 2012; UNAIDS, 2012), but continues to struggle – particularly among the poor – with high rates of stunting and other adverse child development outcomes (NISR, MOH, & ICF International, 2015). Several new initiatives in Rwanda aim to transform the lives of vulnerable families with young children. The recently revised and approved ECD policy (Republic of Rwanda Ministry of Gender and Family Promotion (MIGEPROF), 2016) establishes ECD as a priority, with a key pillar being increased cross-sectoral coordination, including with the social protection sector. The Rwandan government has prioritized national expansion of its flagship social protection programme Vision 2020 Umurenge Programme (VUP) to include gender- and child-sensitive social safety net components. The Sugira Muryango (Strong Family) ECD programme was developed within this context. Interventions focusing on the home environment could complement Rwanda’s broader ECD agenda, which has prioritized opening model ECD centres at the administrative sector- and cell-levels, supported by additional ECD services delivered through centre-, community-, and home-based programmes, and nutrition and ECD-awareness campaigns. Sugira Muryango was designed to provide additional support to families living in poverty to enrich caregiver and child interactions, reduce family conflict and violence and promote cognitive development, health, nutritional status and school readiness, all of which are critical to breaking intergenerational cycles of poverty (Ascend at The Aspen Institute, & Bernard van Leer Foundation, 2016). Cash injection provided by VUP public works could further improve child and family outcomes through increased material wellbeing.

Family-based preventive interventions have the potential to promote good parenting (uburere bwiza) and reduce violence in families facing multiple stressors. The Sugira Muryango programme offers coaching to caregivers of young children to promote early stimulation and responsive parenting. The programme seeks to help families navigate community resources and conflict resolution channels, while providing information on healthy child development. Since the programme is delivered via active coaching in the home, timing of the intervention delivery can be flexible, respond to individual family needs, and engage all caregivers, including fathers.

This paper describes an open trial to assess feasibility, acceptability, and potential of the Sugira Muryango programme to improve ECD and parenting outcomes and its impact on violence within families and resource navigation. This trial was developed as a first stage to test delivery of the Sugira Muryango intervention and performance of the measurement instruments prior to implementing Sugira Muryango as part of a larger randomized controlled design powered to detect statistically significant differences between treatment and intervention groups. Sugira Muryango is designed to engage families eligible for the VUP public works programme, though not all participant families were yet receiving VUP support during the open trial. The upcoming randomized controlled trial will assess Sugira Muryango’s potential as a combination social protection/ECD intervention for families receiving VUP public works.
Methods

**Sugira Muryango development and adaptation**

*Sugira Muryango* was adapted from a parenting and family home-visiting intervention originally developed and tested in Rwanda for HIV- and AIDS-affected families (The Family Strengthening Intervention for HIV (FSI-HIV)) (Betancourt et al., 2014; Betancourt et al., 2017). The original FSI-HIV was based on the Family-Based Preventive Intervention (Beardslee, 1998), a strengths-based intervention to prevent depression in families living with caregiver depression, which has demonstrated efficacy in improving family functioning across a range of low-resource and culturally diverse settings (Beardslee et al., 1997, 2011; Beardslee, Gladstone, Wright, & Cooper, 2003; D’Angelo et al., 2009; Podorefsky, McDonald-Dowdell, & Beardslee, 2001; Sparrow et al., 2011). *Sugira Muryango* was developed for targeted use among the most vulnerable families in Rwanda as a complement to centre-based ECD programmes, which have historically struggled to provide access to families facing multiple stressors and have shown only limited ability to break cycles of poverty in LMICs (Biersteker, 2012; Garner, 2013; Howard & Brooks-Gunn, 2009). *Sugira Muryango* uses active coaching to enhance responsive parent-child interactions, conflict resolution and resource navigation, including links to centre-based ECD programmes and other services (Britto et al., 2017; Shonkoff & Fisher, 2013; UNICEF & Imbuto Foundation, 2015). Standardized *Sugira Muryango* training materials were developed for the Rwandan context with input from local and international ECD experts, Rwandan government ministry partners, and Community Advisory Boards (CABs). ECD content on early stimulation, health promotion, nutrition and hygiene was also drawn from UNICEF and WHO Care for Child Development materials (UNICEF & World Health Organization, 2012). Content on promoting improved family functioning, reducing caregiver conflict and family violence and promoting resilience and enriched parent-child interactions was adapted from the FSI-HIV materials.

**Core components of the Sugira Muryango programme**

*Sugira Muryango* is a structured intervention with five core components (see Figure 1): (1) providing education on children’s development, nutrition, health, and hygiene; (2) coaching caregivers in

![Figure 1. Sugira Muryango conceptual model.](image-url)
responsive parenting to promote ‘serve and return’ interactions (Center on the Developing Child at Harvard University, 2017); (3) violence reduction: reducing conflict via emotional regulation and coping skills to promote family resilience in the face of adversity; providing information on the importance of positive parenting, alternatives to harsh discipline, and the need for violence-free environments to support a child’s cognitive, physical and emotional development; (4) strengthening parental problem solving (executive function) skills and social support through improved navigation of available informal and formal resources; and (5) promoting early language learning and school readiness. *Sugira Muryango* delivers these components via structured modules based on active coaching through a home-visiting approach (see Table 1). During this open trial, intervention materials were refined to enhance future feasibility for government-led scale-up. The initial curriculum comprised 22 modules and was delivered to the first 10 participant families in the rural Rwinkwavu, Kayonza District. Based on those experiences, the intervention content was condensed into a 15-module version, maintaining the same core content, and was delivered to the remaining 10 families in the peri-urban Mageragere, Nyarugenge District. To ensure affordability and scalability, *Sugira Muryango* is designed to be delivered by community volunteer ‘coaches’ organized by local government and linked to ECD centres. However, for purposes of testing safety, feasibility and acceptability, coaches in this open trial were bachelor-level interventionists with previous experience delivering the FSI-HIV intervention. The number of sessions required to complete the programme followed the core module content but could be spread out over multiple sessions according to each family’s needs and challenges. Particular effort was made to engage fathers in dual-caregiver households to take a whole-family approach to violence reduction.

**Table 1. Sugira Muryango intervention modules.**

<table>
<thead>
<tr>
<th>Core Component</th>
<th>Original 22 Module Version</th>
<th>Condensed 15 Module Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductions</td>
<td>Module 1: Nothing Can Defeat Combined Hands</td>
<td>Module 1: Children are the Future of Rwanda</td>
</tr>
<tr>
<td>Misinformation about Children’s Development Needs</td>
<td>Module 3: Children are the future of Rwanda</td>
<td>Module 4: Parenting is More than Giving Birth</td>
</tr>
<tr>
<td></td>
<td>Module 4: Learning About Your Baby’s Developing Brain</td>
<td>Module 11: Good Health and Hygiene</td>
</tr>
<tr>
<td></td>
<td>Modules 13–15: Good Nutrition for Developing Babies</td>
<td>Module 12: Good Nutrition for Developing Babies</td>
</tr>
<tr>
<td></td>
<td>Module 16: Good Household Hygiene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Module 17: Good Health</td>
<td></td>
</tr>
<tr>
<td>Limited Stimulation and Learning Opportunities</td>
<td>Module 5: Making the Home a Place Where a Baby’s Brain Can Grow</td>
<td>Module 5: Making the Home a Place Where a Baby’s Brain Can Grow</td>
</tr>
<tr>
<td></td>
<td>Module 6: The Importance of Play</td>
<td>Module 6: The Importance of Play</td>
</tr>
<tr>
<td></td>
<td>Module 7: Playtime</td>
<td>Module 7: Building Early Communication Skills</td>
</tr>
<tr>
<td></td>
<td>Module 8: Building Early Communication Skills</td>
<td>Module 8: Helping Children Learn Language</td>
</tr>
<tr>
<td></td>
<td>Module 9: Helping Kids Learn Language</td>
<td>Module 9: Good Parenting is Better Than Being Born Well</td>
</tr>
<tr>
<td></td>
<td>Module 10: Good Parenting is Better than Being Born Well</td>
<td>Module 10: Good Parenting is Better Than Being Born Well</td>
</tr>
<tr>
<td></td>
<td>Module 11: Responsive Parenting</td>
<td>Module 2: Nothing Can Defeat Combined Hands</td>
</tr>
<tr>
<td></td>
<td>Module 2: Parenting is More than Giving Birth</td>
<td>Module 13: Resolving Conflicts in the Home</td>
</tr>
<tr>
<td>Lack of Future Orientation and Planning</td>
<td>Module 12: The Important Role That Everyone Plays in Raising a Baby Well</td>
<td>Module 14: Keeping the Home Safe for Everyone</td>
</tr>
<tr>
<td>Family Social and Economic Stress</td>
<td>Module 18: The Future Development of the Child Depends upon Good Parenting in the First Months of Life</td>
<td>Module 15: With a United Family, Anything is Possible</td>
</tr>
<tr>
<td>Risk of Maltreatment</td>
<td>Module 19: Solving Conflicts Well in the Home</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Module 20: Avoiding Violence in the Home</td>
<td></td>
</tr>
<tr>
<td>Wrap-up</td>
<td>Module 21: With a United Family Anything is Possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Module 22: A Child Who is Well Taken Care of Becomes the King of Tomorrow</td>
<td></td>
</tr>
</tbody>
</table>
Sugira Muryango modules use activities drawn from Rwandan culture (e.g. songs, proverbs) to help families internalize core skills and incorporate active coaching, including in-home parent-child interactions to impart knowledge and skills. The Sugira Muryango curriculum focuses on core elements of child development – physical, cognitive, linguistic and socio-emotional – and builds on the WHO/UNICEF Care for Child Development Package (UNICEF & World Health Organization, 2012) which has been delivered successfully across LMICs. The final Sugira Muryango curricular materials were reviewed by counterparts at the Ministry of Gender and Family Promotion, the National Commission for Children, UNICEF and Imbuto Foundation, the lead nongovernmental organization involved in the scale-up of ECD centres nationally.

Counsellor selection, training, and supervision

Coaches were three males and one female Rwandan bachelor-level home visitors, all fluent in English and Kinyarwanda. Coaches underwent a two-week training in the delivery of the Sugira Muryango programme by the intervention developers and a graduate-level expert trainer with a background in ECD. Training included role-play-based learning and active coaching practice using a comprehensive intervention manual. Coaches were also trained on techniques for ensuring parent engagement and strategies for providing feedback to caregivers on early stimulation, conflict resolution and problem solving/resource navigation to overcome family challenges.

After initial training, investigators and ECD expert supervisors, including a graduate-level ECD expert and a PhD-level psychologist, provided weekly phone supervision that included case presentation, group discussion, problem solving and support. Coaches met with the Rwanda-based Programme Manager regularly to review feedback on Sugira Muryango delivery. CABs comprising parents of young children and stakeholders working in ECD also provided suggestions for improving materials.

Open trial

Participants

The inclusion criteria for families were: (1) families ranked as vulnerable by the Rwandan government’s community-based household-ranking system known as Ubudehe level one or two (Ministry of Finance and Economic Planning of Rwanda, 2002) and therefore eligible for VUP public works, (2) having at least one child 36 months or younger, and (3) caregivers’ willingness to participate in a home-visiting intervention to promote ECD and family functioning. The exclusion criterion was severe and active crisis in the family, including divorce proceedings, or an active mental health crisis, such as psychosis or suicide attempts by a caregiver. Participants received modest compensation, in the form of a children’s book written in the local language and foodstuffs after final assessments. Twenty households (n = 35 caregivers) were enrolled in the open trial (10 households in Rwinkwavu and 10 households in Mageragere – roughly one year apart), of which 15 were dual-caregiver. Of the 20 households that were enrolled, 19 completed the programme. One single-caregiver household withdrew after the mother reported not having enough time to participate.

Procedures

Recruitment: Families were recommended by local government staff in Mageragere, Nyarugenge District and Rwinkwavu in Kayonza District. Local government staff identified families that met the Ubudehe criteria and Sugira Muryango coaches described the study to caregivers, confirmed eligibility and asked if the family was interested in participating. Families were enrolled between November 2014 and June 2015. Caregivers were first invited to give informed consent for their own participation and then for their eligible children (all children age 36 months and younger). All caregivers gave written consent for themselves and their children. Once enrolled, families were assigned to one of four coaches. All interviews and home-visiting sessions were conducted in families’ homes. Study procedures were approved by the Rwandan National Ethics Committee and the Harvard T.H. Chan
School of Public Health’s Institutional Review Board, where the principal investigator was based at the time of this study.

Quantitative data collection: Comprehensive quantitative batteries assessing main study outcomes were administered immediately before (baseline), immediately after (post-assessment), and six to thirteen months (depending on family availability) after the intervention (follow-up). The caregiver who stated that he or she knew the child best, which for this study was always the biological mother, provided reports on: (1) child development and health, and (2) the quality of the home environment and caregiver-child relationship. Caregivers provided self-reports on: (1) his or her own social support, parenting and mental health, (2) household reports on economic status of the family and family demographics, and (3) use and navigation of both formal and information resources such as accessing nutrition supplementation programmes or health services. Quantitative batteries were administered orally by the local research team in Kinyarwanda using Android tablets. Although a coach could deliver the baseline assessment to get to know a family, a different team member would administer the post- and follow-up assessments. The post-assessment battery included a measure of satisfaction.

Primary caregivers (mothers) completed all assessments. Assessments were not administered to secondary caregivers in Rwinkwavu families at baseline but were collected from secondary caregivers at subsequent time points. Secondary caregivers in Mageragere completed assessments at all time points, except one father who was unavailable at follow-up due to relocation for a temporary job (see Figure 2).

Measures

Process measures

Participant satisfaction: A 10-item questionnaire was administered post-intervention. Caregivers were asked whether they were satisfied with various intervention components and whether they would recommend the intervention to others.

Outcome measures: Measures of ECD, the home environment, child-caregiver interactions, ECD knowledge and attitudes, and child health were drawn from other trials focusing on ECD that had been conducted in Rwanda or adapted for this study. Measures followed a rigorous translation protocol, including back translation, from English to Kinyarwanda (Biddlecom, Awusabo-Asare, & Bankole, 2009; Messam, McKay, Kalogerogiannis, & Alicea, 2010).

Harsh punishment was assessed using an adapted 13-item version of the Multiple Indicator Cluster Survey-Round 4 (MICS4) Child Discipline Household Survey (UNICEF, 2009). Items were scored 0 = No, 1 = Yes.

The level of stimulation and support provided by caregivers in the home environment was measured using a locally-adapted 43-item version of the infant/toddler Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell & Bradley, 2003; Singla, Kumbakumba, & Aboud, 2015) (Cronbach’s \( \alpha = .78 \)). All items receive a binary score based on the presence (score = 1) or absence (score = 0) of self-reported and direct observation of parenting behaviours and household conditions. Item scores are summed to derive scores for the total scale and the six subscales, which include: (i) Variety: indicates the variety of people and events children are exposed to daily (max. 5 points; Cronbach’s \( \alpha = .53 \)); (ii) Organization: measures the regularity in a child’s routine and safety of their environment (max. 6 points; Cronbach’s \( \alpha = .28 \)); (iii) Acceptance: assesses the caregiver’s response to the child’s misbehaviour (max. 7 points; Cronbach’s \( \alpha = .58 \)); (iv) Involvement: indicates caregiver engagement of the child in play and learning (max. 5 points; Cronbach’s \( \alpha = .66 \)); (v) Learning Materials: assesses caregiver provision of appropriate learning and play materials (max. 9 points; Cronbach’s \( \alpha = .62 \)); and (vi) Responsivity: measures caregiver responsiveness to the child (max. 11 points; Cronbach’s \( \alpha = .66 \)).

The Observation of Mother-Child Interaction (OMCI) (Rasheed & Yousaafzai, 2015) was used to assess the responsiveness of caregiver-child interactions (Cronbach’s \( \alpha = .85 \)). A five-minute prompted play interaction was live scored by trained local staff by summing 19 items (scored
from 0 for ‘never’ to 3 for ‘often’) for a maximum possible score of 57, representing highly responsive and positive interactions. The OMCI contains two subscales: a score for behaviours exhibited by the caregiver (12 items, max. 36 points; Cronbach’s $\alpha = 0.77$) and a score for behaviours displayed by the child (7 items, max. 21 points; Cronbach’s $\alpha = 0.78$).

To assess nutrition intake caregivers completed a 24-hour dietary recall from the UNICEF Multiple Indicator Cluster Survey (MICS5) (UNICEF, 2013a) for the target child. Health status was measured using standard Demographic and Health Survey (DHS) modules reporting the prevalence of diarrhoea, fever, and cough in the seven days preceding the survey. Water, sanitation, and hygiene practices were examined using items from WASH modules in the MICS5 Household Questionnaire (UNICEF, 2013b) and DHS (NISR, 2006).

Practices surrounding household decision-making were assessed using items from the UNICEF Rwanda and Imbuto Foundation 2015 Early Childhood Development and Family Services Baseline Evaluation (UNICEF & Imbuto Foundation, 2015).
Quantitative data analysis

Summary statistics for participant children and caregivers were examined at baseline in the total sample ($n = 22$ children, $n = 35$ caregivers) and in the analytic sample ($n = 21$ children, $n = 19$ caregivers). The analytic sample was restricted to reports from primary caregivers who completed the programme ($n = 19$) and the targeted children ($n = 21$).

Because of the small sample and to avoid bias related to missing data, multiple imputation by chained equations was applied to correct for data missing at random for the HOME and OMCI total scores and subscales, adapting a method for imputation of multi-item scales (Plumpton, Morris, Hughes, & White, 2016). Statistical significance of changes in mean OMCI and HOME scores from baseline to post-assessment and baseline to follow-up were assessed through univariate regression of change scores. Differences in HOME and OMCI scores across time points were further examined at the individual-level using Reliable Change Indices (RCIs) (Jacobson & Truax, 1991; Newnham et al., 2015). RCIs were calculated by taking (a) the difference in post-assessment and baseline scores and the difference in follow-up and baseline scores, (b) dividing the differences by the respective standard error of the difference and (c) comparing the resulting RCI against the critical value of T ($T = 2.08$ for 95% confidence level for sample size of $n = 21$). An RCI greater than 2.08 indicated reliable improvement, and an RCI less than $-2.08$ indicated a reliable decline.

Summary statistics for indicators for harsh punishment and child discipline, shared decision-making, knowledge and attitudes about ECD, child nutrition and health, and WASH practices were analysed at each time point, and change over time was assessed using Wilcoxon Signed-Rank tests. RCIs were calculated using Excel version 15.16 and all other analyses were conducted using Stata version 14.1.

Results

Participant & sample characteristics

Twenty-two children aged 7–36 months ($n = 13$ female) and 35 caregivers from 20 different households were enrolled in the study. Fifteen of the 20 households were dual caregiver, defined as two caregivers living in the home. Caregivers ranged from 19 to 62 years in age and included biological mothers ($n = 20$), biological fathers ($n = 13$), and grandmothers ($n = 2$). Twenty-five percent ($n = 5$) of households were female-headed-single-caregiver. Sixty-five percent of households ($n = 13$) had both a male and female caregiver. Family structures were diverse with 10% ($n = 2$) intergenerational families (i.e. grandmother in the home). Of the 20 families, 19 (95%) completed the Sugira Muryango programme. One male caregiver withdrew from the programme, although the female caregiver and child in this family completed the programme and all assessments.

The analytic sample for all statistical analysis included the 19 mothers and 21 children from the 19 families who completed the programme. Table 2 presents the demographic characteristics of the analytic sample.

Participant satisfaction

All 33 caregivers who finished the programme completed participant satisfaction assessments post-intervention; 97% of participant caregivers reported being satisfied with the sessions. All caregivers reported being satisfied with facilitators and length and content of sessions; 97% were satisfied with the information gained during sessions. Eighty percent said Sugira Muryango met their needs; poverty was cited as a primary reason for remaining unmet needs.

Parenting outcomes for mother-child dyads

The mean OMCI total score declined by 0.97 points from baseline to post-assessment and increased by 2.32 points from baseline to follow-up (though not significant at $\alpha = 0.05$). Reliable Change Indices
Table 2. Household, caregiver, and child characteristics of analytic sample at baseline.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Households (n = 19)</th>
<th>Primary Caregivers (n = 19)</th>
<th>Children (n = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Caregiver Households, n (%)</td>
<td>4 (21.05)</td>
<td>Maternal Age, M (SD)</td>
<td>32.57 (6.35)</td>
</tr>
<tr>
<td>Intergenerational Households, n (%)</td>
<td>2 (10.50)</td>
<td>Years of Education Completed, M (SD)</td>
<td>2.94 (1.34)</td>
</tr>
<tr>
<td>Household Size, M (SD)</td>
<td>5.74 (1.52)</td>
<td>Female, n (%)</td>
<td>13 (61.90)</td>
</tr>
<tr>
<td>Households with &gt;1 child enrolled, n (%)</td>
<td>2 (10.50)</td>
<td>Age in Months, M (SD)</td>
<td>20.40 (11.28)</td>
</tr>
</tbody>
</table>

(RCIs) indicated that from baseline to follow-up, 23.8% of dyads showed reliable improvements in the OMCI caregiver domain score, 9.5% in the OMCI child domain score, and 19.0% of dyads in the OMCI total score. Nine-point-five percent of mother-child dyads had reliable declines in caregiver and total OMCI scores, and 4.8% had reliable declines in the child domain score.

The mean HOME Inventory total score increased from 23.73 (SD = 5.29) points at baseline to 26.02 (SD = 3.59) at post-assessment and 27.34 (SD = 4.48) at follow-up (significant at $\alpha = 0.05$). Mean scores for the HOME Involvement and Learning Materials subscales were also significantly higher at post-assessment ($p < .01$) and follow-up ($p < .05$) relative to baseline. The mean HOME Acceptance domain score was significantly lower at post-assessment (4.75 points, SD = 1.39) compared to baseline (5.85 points, SD = 0.47), although this difference was no longer apparent at follow-up. Mean scores, results from univariate regression of change scores, and RCIs are outlined in Table 3.

**Harsh punishment & child discipline practices and beliefs**

Indicators for parental use of harsh punishment showed mixed results (see Table 4). The number of caregivers reporting use of psychological aggression toward the child by any household member within the past month increased. Caregivers reporting use of physical punishment initially declined from baseline to post-assessment but increased at follow-up. However, when caregivers were asked to report on their beliefs about whether physical punishment is necessary to raise a child well, the number of caregivers endorsing the statement declined from baseline to post-assessment and follow-up (significant baseline-follow-up decline, Wilcoxon signed rank: $z = -2.333, p = 0.020$).

**Equal decision-making among dual caregivers**

The number of mothers who reported engaging in equal decision-making with male caregivers about enrolling the child in ECD programming increased from baseline to follow-up (although not statistically significant). The number of mothers reporting engaging in equal decision-making with fathers around actions to take when the child is sick significantly increased from baseline to post-assessment (Wilcoxon signed rank: $z = 2.121; p = 0.034$). Decisions surrounding the child’s diet remained largely a female caregiver decision (presented in Table 4).

**Knowledge and attitudes about ECD**

Caregiver knowledge and attitudes about ECD and perceptions of caregiver roles also changed over time (although not significant at $\alpha = 0.05$). The number of mothers open to gentler forms of discipline increased (33.3–42.9%), and the number of mothers who perceived fathers’ roles as restricted to traditional ‘protector and breadwinner’ responsibilities decreased (52.4–38.1%). Mothers’
conceptualization of their own role shifted slightly, with five women (23.8%) agreeing that the mother’s role is to safely care for the child’s health and nutrition at follow-up, compared to eight (38.1%) at baseline (see Table 4).

### Child nutrition and health

Caregiver reports indicated improvement in child dietary diversity. The reported number of children receiving at least four food groups the day before the survey increased significantly from baseline to follow-up (Wilcoxon signed-rank: \( z = 2.000; p = 0.046 \)). There was no change in household food insecurity (\( n = 17, 85\% \)) or in the number of children receiving the minimum meal frequency. Child health improved along indicators for incidence and treatment for diarrhoea, though trends were not significant (see Table 4).

### Household water, sanitation, and hygiene practices

The number of households treating their drinking water appropriately increased at baseline and follow-up, although changes were not statistically significant. The number of households storing water in closed containers significantly increased from baseline to follow-up (Wilcoxon signed rank: \( z = 2.236, p = 0.025 \) (Table 4).

### Discussion

This open trial demonstrates initial feasibility and acceptability of *Sugira Muryango* for promoting responsive parenting, dual-caregiver decision-making, child health and nutrition status, caregiver knowledge and attitudes toward ECD, and violence among families living in poverty in Rwanda. Results indicate that improvements in stimulation and support provided by maternal caregivers as
measured by the HOME Inventory were strengthened and sustained from post-assessment to follow-up. Significant improvement in the HOME Involvement and Learning Materials domains suggests that *Sugira Muryango* is appropriate for targeting caregiver capacities to engage children in their daily routines and provide suitable play and learning materials. Declines in caregiver scores in the HOME Acceptance domain indicate that the *Sugira Muryango* curriculum could be strengthened to limit caregivers’ use of punishment.

### Table 4. Comparison of baseline and post-assessment/follow-up indicators for harsh punishment, equal decision-making, knowledge and attitudes about ECD, child nutrition and health, and water, sanitation, and hygiene practices.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Baseline</th>
<th>Post</th>
<th>6–13-month Follow-up</th>
<th>Baseline to Post-assessment</th>
<th>Baseline to Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Harsh Punishment &amp; Child Discipline Practices and Beliefs (n = 21 Mother-Child dyads)</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mother/another household member used psychological aggression within past 30 days, n (%)</td>
<td>5 (23.8)</td>
<td>8 (38.1)</td>
<td>8 (38.1)</td>
<td>1.000 0.317</td>
<td>1.342 0.180</td>
</tr>
<tr>
<td>Mother/another household member used physical punishment within past 30 days, n (%)</td>
<td>10 (47.6)</td>
<td>7 (33.3)</td>
<td>10 (47.6)</td>
<td>−1.134 0.257</td>
<td>−0.000 1.000</td>
</tr>
<tr>
<td>Mother/another household member used severe physical punishment within past 30 days, n (%)</td>
<td>1 (4.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>−1.000 0.317</td>
<td>−1.000 0.317</td>
</tr>
<tr>
<td>Mother/another household member used any form of violent discipline within past 30 days, n (%)</td>
<td>11 (52.4)</td>
<td>10 (47.6)</td>
<td>14 (66.7)</td>
<td>−0.378 0.706</td>
<td>1.134 0.257</td>
</tr>
<tr>
<td>Mother/another household member used only nonviolent forms of discipline within past 30 days, n (%)</td>
<td>2 (16.7)</td>
<td>2 (16.7)</td>
<td>4 (22.2)</td>
<td>1.000 0.317</td>
<td>−1.000 0.317</td>
</tr>
<tr>
<td>Mother believes physical punishment is necessary to raise a child well, n (%)</td>
<td>10 (47.6)</td>
<td>8 (38.1)</td>
<td>3 (14.3)</td>
<td>−0.707 0.480</td>
<td>−2.333 0.020*</td>
</tr>
<tr>
<td><strong>Shared Decision-making (n = 17 Mother-Child dyads from 15 dual caregiver households)</strong></td>
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</tr>
<tr>
<td>Mother reports equal decision-making between dual caregivers regarding whether child attends ECD programme, n (%)</td>
<td>8 (47.1)</td>
<td>9 (52.9)</td>
<td>13 (76.5)</td>
<td>0.812 0.417</td>
<td>1.824 0.068</td>
</tr>
<tr>
<td>Mother reports equal decision-making between dual caregivers regarding what action to take when child is sick, n (%)</td>
<td>3 (17.7)</td>
<td>8 (47.1)</td>
<td>7 (41.1)</td>
<td>2.121 0.034*</td>
<td>1.414 0.157</td>
</tr>
<tr>
<td>Mother reports equal decision-making between dual caregivers regarding what the child eats, n (%)</td>
<td>2 (11.8)</td>
<td>3 (17.7)</td>
<td>1 (5.9)</td>
<td>0.000 1.000</td>
<td>−1.000 0.317</td>
</tr>
<tr>
<td><strong>Knowledge and Attitudes about ECD (n = 21 Mother-child dyads)</strong></td>
<td></td>
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<tr>
<td>Mothers disagree that if parents are too gentle, kids will not listen when they try to discipline, n (%)</td>
<td>7 (33.3)</td>
<td>9 (42.9)</td>
<td>12 (57.14)</td>
<td>−0.447 0.655</td>
<td>−1.265 0.206</td>
</tr>
<tr>
<td>Mothers agree that a father’s role is to discipline, pay school fees, and provide at home, n (%)</td>
<td>11 (52.4)</td>
<td>8 (38.1)</td>
<td>7 (33.3)</td>
<td>−1.134 0.257</td>
<td>−1.414 0.157</td>
</tr>
<tr>
<td>Mothers agree that a mother’s role is to care for the child’s health and nutrition, n (%)</td>
<td>8 (38.1)</td>
<td>9 (42.9)</td>
<td>5 (23.8)</td>
<td>0.333 0.739</td>
<td>−1.134 0.257</td>
</tr>
<tr>
<td><strong>Child Nutrition &amp; Health (n = 21 Children)</strong></td>
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<tr>
<td>Children met the criteria for minimum dietary diversity, receiving at least 4 food groups in the 24 h preceding the survey, n (%)</td>
<td>2 (9.5)</td>
<td>4 (19.0)</td>
<td>6 (28.6)</td>
<td>0.816 0.414</td>
<td>2.000 0.046*</td>
</tr>
<tr>
<td>Child had diarrhoea in two weeks preceding the survey, n (%)</td>
<td>9 (42.9)</td>
<td>5 (23.8)</td>
<td>5 (23.8)</td>
<td>−1.265 0.206</td>
<td>−1.414 0.157</td>
</tr>
<tr>
<td>Among children with diarrhoea, sought treatment, n (%)</td>
<td>6 (66.7)</td>
<td>3 (60.0)</td>
<td>5 (100.0)</td>
<td>– –</td>
<td>1.000 0.317</td>
</tr>
<tr>
<td><strong>Household Water, Sanitation, and Hygiene Practices (n = 19 households)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household appropriately treats water before drinking, n (%)</td>
<td>6 (31.6)</td>
<td>9 (47.4)</td>
<td>10 (52.6)</td>
<td>1.732 0.083</td>
<td>1.633 0.103</td>
</tr>
<tr>
<td>Household stores water in closed containers, n (%)</td>
<td>1 (5.3)</td>
<td>5 (26.3)</td>
<td>6 (33.3)</td>
<td>1.633 0.103</td>
<td>2.236 0.025*</td>
</tr>
</tbody>
</table>

*aWilcoxon Signed-Rank Test assessing significant differences from baseline to post-assessment; *p < .05. *bWilcoxon Signed-Rank Test assessing significant differences from baseline to follow-up; *p < .05.
Limited effects on reducing family violence are noteworthy and merit attention in further intervention research. It is possible that behaviour change could eventually follow given a longer follow-up period. Differences in reported behaviour change between baseline and follow-up may also reflect caregiver comfort in reporting such stigmatized topics, such as harsh treatment of children. Recent iterations of the curriculum have focused on strengthening content around harsh punishment to more effectively address child discipline attitudes and practices.

Our results resonate with those of other home-visiting ECD interventions which have shown promise in LMIC settings, including South Africa, Pakistan, and Colombia (Richter et al., 2017; Rotheram-Borus et al., 2014; Yousafzai, Rasheed, Rizvi, Armstrong, & Bhutta, 2014). Sugira Muryango expands upon these interventions by demonstrating the opportunities inherent in linking ECD and social protection programmes. Though not all participant families received social protection services during the open trial, Sugira Muryango is designed to address the needs of Rwanda’s most vulnerable, VUP-eligible families. Its home-visiting approach allows coaches to involve a range of family members, including fathers, and to decrease barriers related to transportation and distance that can hamper purely centre-based ECD approaches. Complementing centre-based approaches with ECD home-visiting and group work interventions can provide a continuum of services, strengthening the impact of ECD investment, especially for reaching the most vulnerable and addressing complex family issues. Active coaching and strengths-based models also help families draw on their own resources to better navigate formal and informal support structures. The value of the programme to vulnerable families is evident in the high satisfaction ratings they gave as well as their willingness to recommend it to others.

The upcoming larger trial will further examine the Sugira Muryango’s impact in combination with VUP social protection services to explore the effects of both classic and expanded VUP public works programmes on child and family outcomes. This pilot study has also illuminated barriers and facilitators to ensuring fidelity in delivery of the intervention. We have learned that beyond the initial training, emphasis must be placed on fidelity monitoring and quality improvement. In subsequent research with the intervention, expert coaches have been reviewing audiotapes of home-visiting coaching sessions done by new workers. This approach then gives them a platform for offering targeted problem solving, role-play and practice to prepare for their next home visit.

In future research, Sugira Muryango could be further adapted to make explicit links to ECD centres and include a mix of both group- and family-based sessions, creating opportunities for social support among participants. Of the improvements observed, significant changes in hygiene and shared decision-making show tremendous promise. Should such patterns continue in the larger, fully-powered trial, there is potential to layer in other nutritional interventions, such as food or micronutrient supplementation, to bolster the effects observed with coaching alone.

Of additional importance, this open trial served to refine Sugira Muryango based on the experiences of participants and coaches, which strengthened the quality of Sugira Muryango materials and intervention tools for future implementation, evaluation, and diffusion. To improve the feasibility of the modularized content, the Sugira Muryango intervention was condensed from 22 to 15 modules between the phase of delivering to the first 10 households and the last 10 households. Because the first 10 households lived in a more rural area, the challenges and nature of referral resources were more robust than the peri-urban region in which the remaining 10 households lived.

While results of this open trial are promising, study limitations must be noted. Although coaches reported that participation rates were strong, we do not have fidelity ratings that capture quality of intervention delivery. Such data collection and quality improvement mechanisms will be essential in the larger trial. Furthermore, as a feasibility trial, this research did not involve a control group and was not adequately powered to detect small changes over time or comparisons between rural and urban subsamples. However, even with limited statistical power, our analyses detected significant changes both immediately post-treatment and at a modest follow-up period of at least six months, and more broadly the nonsignificant trends tended to show positive effects of Sugira Muryango. While initial results demonstrate the acceptability and feasibility of Sugira Muryango, future research
should investigate intervention effectiveness, costs, quality, fidelity issues, and maintenance of effects longitudinally.

**Conclusion**

Integrating the ECD and social protection agenda is a promising area for helping children and families break intergenerational cycles of poverty and violence. Family home-visiting interventions have an important role to play in promoting ECD globally. Interventions like *Sugira Muryango* should be investigated further through fully-powered effectiveness trials in combination with social protections intervention and implementation research.

**Notes**

1. ‘Social protection is a set of policies and programmes aimed at preventing or protecting all people against poverty, vulnerability, and social exclusion throughout their lifecycles, with a particular emphasis towards vulnerable groups’ (Inter Agency Social Protection Assessments (ISPA), 2017).

2. In Rwanda, Ubudehe categorization is a household-based categorization used since 2002 as the basis for targeting access to social benefits and services. Ubudehe categorization is based on community-based social-economic mapping. Initially, six categories were identified to stratify the population according to social and economic well-being. Ubudehe categories 1 and 2 were considered the most vulnerable. In 2014, Ubudehe categories were reviewed and the 2015 Ubudehe categorization re-ranked Rwandan households into 4 categories, with 1 being the most socially and economically vulnerable households.

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**Disclosure statement**

No potential conflict of interest was reported by the authors.

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Christian Ukundineza is a project officer at Francois-Xavier Bagnoud International with the Sugira Muryango programme. He supports the training and supervision of community-based volunteers and works with beneficiary families to connect them with community resources. Previously he was a research assistant at Partners in Health, supporting the Family Strengthening Intervention. He received a bachelor’s degree in Applied Biochemistry from the University of Rwanda College of Sciences and Technology, formerly the Kigali Institute of Science and Technology, and a master’s degree in Project Management from Mount Kenya University.

Rose Wilder is an international development practitioner with five years’ experience engaging a multitude of stakeholders at various stages of programme life cycles, with a specific focus on East Africa. As an interculturalist, she is firmly committed to community-driven programming, accounting for and empowering local voices and customs. Rose arrived in Kigali, Rwanda as the full-time Programme Manager in January 2016; after the 22-module intervention was completed and just as the 15-module iteration of the Sugira Muryango intervention was ending. Managing the day-to-day field implementation, she supported the follow-up data collection for the 22-module iteration of the Sugira Muryango intervention, as well as post-assessment and follow-up data collection for the 15-module intervention sample.

Briana Wilson is a Senior Social Protection Specialist in the World Bank’s Social Protection and Jobs Global Practice. She specializes in monitoring and evaluating social protection interventions and over the last decade has contributed to designing government interventions in Africa, Latin America and Europe and Central Asia. She also supports the World Bank’s global results agenda.

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References


