

Supplementary material for:**Effect of a home-visiting parenting program, *Sugira Muryango*, to promote early childhood development and prevent violence: a cluster-randomized trial linked to Rwanda's social protection program**

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Supplementary text

Adverse Events

Intervention families

In the intervention families five risk of harm cases—all related to caregiver suicidality—were identified during the baseline assessment. One risk of harm case—a violent attack by neighbors—occurred during the intervention. Six risk of harm cases were identified during the midline assessment in the intervention families. Of these, five were related to suicidality in a caregiver and one was related to severe intimate partner violence. Between midline and endline, nine risk of harm cases occurred in the intervention families. Of these, four were the death of the child, two were the death of a caregiver, two were related to suicidality in a caregiver, and one was related to child neglect. Seven risk of harm cases were identified during the endline assessment in the intervention families. Of these, five were related to suicidality in a caregiver, one was related to both intimate partner violence and suicidality and, one was related to intimate partner violence.

Usual care families

Four risk of harm cases were reported in the usual care families during the baseline assessment, of these three were related to caregiver suicidality and one was related to severe violence towards a child. Eight risk of harm cases were identified during the midline assessments in the usual care families. Five risk of harm cases were related to caregiver suicidality, two were related to severe intimate partner violence, and one was related to severe physical discipline towards the children. Fifteen risk of harm cases were identified at the endline assessment. Of these, two were the death of the enrolled child, nine were related to suicidality in a caregiver, three were related to intimate partner violence and one was related to severe violence towards a child.

Supplementary Table S1. The twelve *Sugira Muryango* modules

- Module 1: Family Narrative (illuminating family strengths despite adversity)
- Module 2: The importance of early stimulation and play
- Module 3: Building early communication skills
- Module 4: The importance of good nutrition
- Module 5: The importance of good hygiene
- Module 6: The importance of good health
- Module 7: Managing the stresses of parenting and family life
- Module 8: Resolving conflicts in the home
- Module 9: The important role that everyone plays in raising a baby well
- Module 10: Good parenting is better than being born well
- Module 11: Making the home a place where a baby's brain can grow
- Module 12: With a united family, anything is possible

Supplementary Table S2: Community Based Coaches (CBCs): selection, training, supervision and incentives.

- Selection criteria: a) Live in the beneficiary households they will deliver the intervention to; b) be Rwandan; c) Be aged 18 or older; d) be able to write, read, and count in Kinyarwanda, e) be committed to young children and family values f) have the required amount of time to carry out the *Sugira Muryango* intervention with a select number of households; g) be recommended and approved by local community and authorities
- Selected from the local community using a three-step process which involved nomination from community members, a phone screening and an intensive interview whereby applicants were given a curriculum vignette of a challenging family situation and explain the vignette, instructed to explain an image shown from the curriculum which depicted family unity, nutrition, father engagement, and early stimulation and a writing test to capture demographic information and answer brief questions to identify any prior experience they may have had delivering community based programs.
- Three-week training session delivered by trained supervisors.
- Training included role-play-based learning, active coaching practices (focused on identifying and reinforcing serve and return interactions between male and female caregivers), techniques for engaging fathers, strategies for providing feedback to caregivers on early stimulation, conflict resolution, problem solving, and resource navigation.
- Supervision provided by *Sugira Muryango* supervisors who had been involved in previous pilot work.
- Supervision took the form of in-person supervision of the CBCs during the first three weeks of the intervention, and each supervisor shadowed each CBC once in the home. Telephone supervision and peer support groups occurred weekly, and group supervision was held once a month.
- CBCs audiotaped the home-based sessions, which were reviewed by a supervisor for fidelity monitoring.

CBCs were stipend according to local practices (28,000 Rwandan Francs per month for a caseload of five families, visiting weekly for a period of three months).

Supplementary Table S3: Estimated Means, Standard Errors, and 95% Confidence Intervals for main outcomes¹

Outcomes	Baseline				Post-Intervention				12-month follow-up				Group Size
	Mean	Std. Error	95 % C.I.		Mean	Std. Error	95 % C.I.		Mean	Std. Error	95 % C.I.		
			Lower Bound	Upper Bound			Lower Bound	Upper Bound			Lower Bound	Upper Bound	
Child development													
ASQ-3													
Gross motor z-score													
Usual Care	-1.373	0.077	-1.523	-1.223	-1.269	0.074	-1.414	-1.124	-1.776	0.102	-1.977	-1.576	525
Sugira Muryango	-1.656	0.080	-1.812	-1.500	-1.046	0.069	-1.182	-0.911	-1.460	0.094	-1.644	-1.276	559
Fine Motor z- score													
Usual Care	-1.539	0.065	-1.667	-1.411	-1.349	0.061	-1.469	-1.230	-1.064	0.052	-1.167	-0.962	525
Sugira Muryango	-1.660	0.069	-1.795	-1.525	-1.162	0.057	-1.275	-1.049	-1.067	0.054	-1.173	-0.961	559
Communication z- score													
Usual Care	-1.556	0.076	-1.705	-1.407	-1.411	0.073	-1.554	-1.268	-0.731	0.069	-0.866	-0.596	525
Sugira Muryango	-1.597	0.072	-1.739	-1.456	-1.130	0.063	-1.254	-1.006	-0.513	0.069	-0.648	-0.377	559
Prob. Solving z- score													
Usual Care	-1.084	0.066	-1.214	-0.955	-1.228	0.062	-1.350	-1.107	-0.815	0.059	-0.930	-0.700	525
Sugira Muryango	-1.274	0.070	-1.411	-1.138	-0.888	0.060	-1.007	-0.770	-0.637	0.055	-0.745	-0.530	559
Social emotional z- score													
Usual Care	-1.018	0.064	-1.145	-0.892	-1.087	0.064	-1.213	-0.962	-0.764	0.057	-0.875	-0.653	525
Sugira Muryango	-1.171	0.068	-1.304	-1.037	-0.801	0.065	-0.928	-0.673	-0.679	0.055	-0.787	-0.570	559
MDAT													
Gross motor z- score													
Usual Care	0.960	0.064	0.834	1.085	1.232	0.063	1.109	1.355	1.480	0.058	1.366	1.593	525
Sugira Muryango	0.878	0.063	0.754	1.002	1.199	0.063	1.075	1.323	1.455	0.061	1.335	1.575	559
Fine motor z- score													
Usual Care	0.124	0.057	0.011	0.236	0.340	0.061	0.221	0.459	0.990	0.081	0.830	1.149	525
Sugira Muryango	-0.038	0.058	-0.152	0.077	0.317	0.060	0.199	0.434	1.014	0.080	0.858	1.171	559
Language z- score													
Usual Care	-0.163	0.058	-0.277	-0.048	0.040	0.058	-0.073	0.153	0.371	0.061	0.251	0.491	525
Sugira Muryango	-0.050	0.058	-0.164	0.063	0.115	0.060	-0.004	0.233	0.441	0.059	0.326	0.557	559
Socioemotional z- score													
Usual Care	0.924	0.050	0.825	1.023	0.649	0.044	0.563	0.735	0.454	0.056	0.343	0.564	525
Sugira Muryango	0.967	0.051	0.868	1.066	0.805	0.048	0.712	0.899	0.617	0.053	0.513	0.722	559

Father engagement in childcare²														
Usual Care	0.590	0.030	0.530	0.650	0.590	0.030	0.530	0.650	0.604	0.031	0.544	0.664	261	
Sugira Muryango	0.624	0.030	0.565	0.682	0.748	0.027	0.695	0.800	0.748	0.027	0.695	0.801	263	
Child growth outcomes														
Height for Age (HAZ)														
Usual Care	-2.050	0.055	-2.157	-1.943	-2.032	0.052	-2.134	-1.930	-1.993	0.049	-2.090	-1.897	525	
Sugira Muryango	-2.001	0.052	-2.103	-1.899	-2.012	0.049	-2.109	-1.916	-2.012	0.045	-2.101	-1.923	559	
Weight for Age (WAZ)														
Usual Care	-1.069	0.048	-1.163	-0.975	-1.013	0.045	-1.101	-0.926	-1.003	0.040	-1.082	-0.924	525	
Sugira Muryango	-0.986	0.047	-1.077	-0.894	-0.964	0.044	-1.051	-0.877	-0.994	0.042	-1.075	-0.912	559	
Weight for Height (WHZ)														
Usual Care	0.047	0.044	-0.039	0.134	0.101	0.041	0.020	0.182	0.205	0.039	0.128	0.281	525	
Sugira Muryango	0.090	0.046	0.001	0.180	0.136	0.045	0.048	0.224	0.220	0.043	0.136	0.304	559	
Middle Upper Arm Circumference (MUAC)														
Usual Care	0.005	0.046	-0.086	0.096	-0.337	0.042	-0.420	-0.255	-0.356	0.039	-0.432	-0.280	525	
Sugira Muryango	0.052	0.045	-0.036	0.141	-0.345	0.043	-0.430	-0.260	-0.370	0.040	-0.449	-0.292	559	
Violence and safety														
Harsh discipline (MICS ³)														
Usual Care	1.082	0.069	0.946	1.218	1.035	0.065	0.907	1.163	1.110	0.068	0.977	1.244	525	
Sugira Muryango	1.108	0.067	0.977	1.239	0.589	0.048	0.494	0.683	0.736	0.055	0.629	0.843	559	
Victimization ⁴														
Usual Care	0.596	0.083	0.433	0.759	0.573	0.090	0.395	0.750	0.619	0.095	0.433	0.805	261	
Sugira Muryango	0.862	0.107	0.652	1.071	0.459	0.073	0.316	0.603	0.467	0.081	0.309	0.626	262	
Perpetration ⁵														
Usual Care	0.126	0.028	0.071	0.180	0.102	0.033	0.036	0.167	0.145	0.043	0.061	0.230	223	
Sugira Muryango	0.242	0.047	0.149	0.335	0.130	0.034	0.063	0.196	0.092	0.028	0.036	0.147	227	

ASQ-3=Ages and Stages Questionnaire; MDAT=Malawi Developmental Assessment Tool

1: Estimates from multiple-imputed datasets.

2: Among households with a father, displayed as proportions.

3: MICS: UNICEF's Multiple Indicator Cluster Survey

4: Among female caregivers reporting a current intimate partner at baseline.

5: Among male caregivers reporting a current intimate partner at baseline.

Supplementary Table S4: Estimated Intra-Class Correlations from Null Models for main outcomes¹

Outcome	Intra-Class Correlation Estimate
Child development outcomes	
ASQ-3 Gross motor z-score	0.037
ASQ-3 Fine Motor z- score	0.017
ASQ-3 Communication z- score	0.027
ASQ-3 Prob. Solving z- score	0.027
ASQ-3 Social Emotional z- score	0.015
MDAT Gross motor z- score	0.029
MDAT fine motor z- score	0.033
MDAT language z- score	0.040
MDAT socioemotional z- score	0.028
Father Engagement	
Father engagement in childcare ²	0.117
Child growth outcomes	
Height-for-age (HAZ)	0.050
Weight-for-age (WAZ)	0.029
Weight-for-height (WHZ)	0.033
Middle upper arm circumference (MUAC)	0.063
Violence and safety	
Harsh discipline (MICS4) ³	0.029
Victimization (female caregivers) ⁴	0.001
Perpetration (male caregivers) ⁵	0.001

ASQ-3=Ages and Stages Questionnaire; MDAT=Malawi Developmental Assessment Tool

1: ICC estimates for Negative Binomial models were computed based on Leckie G, Browne WJ, Goldstein H, Merlo J, Austin PC. Partitioning variation in multilevel models for count data. *Psychol Methods*. 2020 Apr 20. doi: 10.1037/met0000265. Epub ahead of print. PMID: 32309962. Results should be interpreted with caution given there is no generally accepted way of estimating ICCs for count models, and this is an ongoing discussion.

2: Among households with a father (N=524)

3: MICS: UNICEF's Multiple Indicator Cluster Survey

4: Among female caregivers reporting a current intimate partner at baseline (N=523)

5: Among male caregivers reporting a current intimate partner at baseline (N=450)