Improving Parenting Practices for Early Child Development: Experimental Evidence from Rwanda

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Motivation

Early childhood

- First years of life are critical for shaping development of a child.
- Neurological research indicates that brain particularly malleable (plasticity) and brain development rapid in early years.
- Early life status manifest impact in the long run on several outcomes.
Risk factors in developing countries

- Children from poor backgrounds or exposed to shocks may accumulate gaps in human development from very early years of life.

- Estimated 279 million children from low- and middle-income countries at risk of not reaching their development potential due to extreme poverty and stunting.

- Children growing up in extreme poverty estimated to lose 25% of their income generating potential as adults.
Motivation

Interventions in early years

- Investing in early child development is crucial.
- Importance of nutrition but also stimulation and home environment.
- Prominent role of parenting in shaping child’s future.
- Change in parental behavior crucial to produce sustainable impacts.
Knowledge gaps

- Rigorous evidence on effectiveness of ECD programs largely from high and middle income countries.

- Few studies in Sub-Saharan Africa where lowest levels of human capital accumulation are concentrated.

- Little knowledge on which curriculum best suited for scaling-up that produce sustainable impacts over time.
This paper

- Investigates impact of a parenting program in a low income context (Rwanda).

- Examines persistence of results in the medium term.

- Explores potential mechanisms driving changes in child development.
First Steps Program: key aspects

- **Parenting program**: improve parent-child interactions.
- Targeted parents of **0-3 age children**.
- 17 weekly **group** sessions.
- Used **radio drama** for uniform delivery of key parenting messages.
- Recruited **local** facilitators provided with basic training.
Sessions content and approach

- **Parenting session key content:**
  - Early communication and literacy promotion at home
  - Learning through play
  - Responsive care and bonding
  - Nutrition and health

- **Session approaches**
  - Radio drama
  - Pre- and post- radio discussion
  - Posters illustrating activities
  - Parent-child practice
Kwiga binyuze mu gukina
Gukina no gukura
Gukina bifasha umwana kunguka ubumenyi bushya

KUVA AVUKA
KUGEZA KU MWAKA I

Ibibazo byo kuzirikana

- Ni iki mama n’umwana barimo gukina?
- Ni iki gukina muri ubu buryo byigisha umwana?
- Ni iki uyu mukino wigisha umwana mu bijyanye n’imibanire n’abandí? Ni iki yiga kirebana no kumenya ururimi?
- Mbese ubwonko bw’umwana burimo gukura?
- Mbese gukoma mu mashyi byaba bifasha umwana mu mikurire y’umubiri?
FS sessions
# Experimental design

81 villages in Ngororero rural district (Western province)

<table>
<thead>
<tr>
<th>LIGHT TREATMENT (LT)</th>
<th>FULL TREATMENT (FT)</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3 sectors, 9 cells, 27 villages)</td>
<td>17 weekly group-based sessions of radio + facilitated discussions, including illustrated posters and activities</td>
<td>No intervention during research period</td>
</tr>
<tr>
<td>17 weekly group-based sessions of radio + facilitated discussions, including illustrated posters and activities</td>
<td>Plus Additional Components of:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional cell-based facilitator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 home visit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Take-home materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 book gifted</td>
<td></td>
</tr>
</tbody>
</table>
Timeline

<table>
<thead>
<tr>
<th>August 2015</th>
<th>November 2015</th>
<th>April 2016</th>
<th>September 2016</th>
<th>May 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child age:*</td>
<td>6</td>
<td>9</td>
<td>13</td>
<td>18</td>
</tr>
</tbody>
</table>

*Minimum age, expressed in months, of children participating to the First Steps programme. Maximum age is the age reported + 18 months.*
Data

- Sample: 1,614 families and children
- Respondent: principal caregiver of the child (93% mothers; 5% fathers).
- Collected data on:
  - Child development (ASQ)
  - Parents practices and influence (HOME-SF)
  - Parental self-efficacy (TOPSE)
  - Additional parents outcomes (attitudes, aspirations, locus of control).
Empirical strategy

- Exploit random assignment of program to identify causal impacts on child development and parents outcomes.
- Estimate impacts of LT and FT separately.
- Control for baseline level of outcome and for baseline characteristics.
Empirical Strategy

- Identify causal impact of the program on child development and parents outcomes.

\[ y_{ijt} = \alpha + \beta^L T^L_j + \beta^F T^F_j + \lambda y_{ij0} + \gamma X_{ij0} + e_{ijt} \]  

- \( y_{ijt} \): outcome for individual (child or parent) \( i \), in sector \( j \) surveyed at time \( t \).
- \( t=0 \) for baseline, \( t=1 \) for endline and \( t=2 \) for follow-up observations.
- \( T^L_j \) and \( T^F_j \): binary indicators for Light (LT) and Full (FT) treatment sector-level interventions.
- \( y_{ij0} \): baseline level of the outcome for individual \( i \) in sector \( j \).
- \( X_{ij0} \): baseline characteristics.
Child development: short-term

ASQ Skills tested (short-term)

- Child development
- ASQ Communication
- ASQ Gross Motor
- ASQ Fine Motor
- ASQ Problem Solving
- ASQ Personal Social

Note: ITT effect on each ASQ skill with WILD confidence of intervals
Mother time investment: short-term

Note: ITT effect on Mother time investment dimensions with WILD confidence of intervals
Mother influence: short-term

Mother Influence (short-term)

- Mother influence
- Learning
- Development
- Nutrition
- Care
- Discipline
- Health

Note: ITT effect on each dimension of mother influence with WILD confidence of intervals
Child development: medium-term

ASQ Skills tested (medium-term)

- Child development
- ASQ Communication
- ASQ Gross Motor
- ASQ Fine Motor
- ASQ Problem Solving
- ASQ Personal Social

ITT of standardized coefficients

Light treatment
Full treatment

Note: ITT effect on each ASQ skill with WILD confidence of intervals
Mother time investment: medium-term

Note: ITT effect on each Mother-Child activity with WILD confidence of intervals
Mechanisms
What explains impact of FS on child development?

Estimated change in child development explained by changes in parental investments?

- **Observed mechanisms:**
  - Mother time investment explains 20% of change in child development.
  - Mother influence explains 10% of change in child development.

- **Unobserved mechanisms:**
  - Other mechanisms that we do not observe (explain 70% of change in child development).

- No crowding out effect.
- No economic incentive provided: disqualifies partly channels through household budget constraints.
Mediation analysis

- Mean index
- Communication
- Gross-Motor
- Fine-Motor
- Problem-Solving
- Personal-Social

Legend:
- Mother time investment
- Mother influence
- Other factors
  * <10%, ** <5%, *** <1% in two-sided p-value
Robustness checks

- **Attrition**: 10% at EL and 18% at FU. Test for differential attrition.

- **Social desirability bias**: parents outcomes and some child development questions are self-reported by the respondent.

- **Multiple hypothesis testing**: Romano-Wolf correction to account for FWER (Romano and Wolf, 2005) and aggregate mean index (Kling et al 2007).

- **Weighted mean index**: use inverse co-variance weighted index.
Conclusions

- Large effects of low-budget ECD intervention, potential for scale-up.

- Additional components in FT group seem critical for sustainability of effects (i.e., home visits, books).
Scope for scaling up?

- **Use of technology**: radio, video, others?
  - uniform delivery message
  - complement or substitute delivery mechanism?

- **Group-based sessions**
  - complement with few home visits?
  - incentivize fathers?

- **Use of local facilitators**
  - supported/trained by trained community workers?
Next paper

- Nudging Parental Investment by Improving Efficacy and Beliefs? A Randomized Video Intervention in Rwanda (Justino et al, 2020)
Child Development

- Ages and Stages Questionnaire (ASQ): observational tool.
- Child assessed on six activities in five development dimensions: communication, gross motor, fine motor, problem solving and personal-social.
- No need of professionals.
- Questionnaire tailored to different age ranges, with 2 to 6 months age span.
- Child performance observed by enumerator (codes as: yes, sometimes, not yet).
- Calculated standardized scores for each child development dimension and aggregate mean index.
Parents practices, influence and self-efficacy

- Home Observation for Measurement of the Environment (HOME-SF)
  - Parents time investment: respondent reports on frequency of interactions on set of activities from 0 (never) to 5 (very frequent).
  - Parental influence: respondent reports how much influence has over child’s distinct dimensions from 0 (no influence) to 3 (very much influence).

- Tool to measure Parenting Self-Efficacy (TOPSE)
  - Respondent answers to self-efficacy statements using a scale from 1 (disagree a lot) to 5 (agree a lot) over 8 different dimensions.

- For each activity/dimension: standardized score and aggregate mean index.