Lively Minds Evaluation - Study protocols

Title: Improving early childhood development in rural Ghana through scalable low-cost community run play schemes

Principal Investigators

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1. Background

Early childhood care and education (ECCE) is critical to a child's development and their success in adult life. Children who receive quality ECCE are proven to be healthier, do better and stay longer in school, and have better economic trajectories in adult life. But in the remote rural communities in northern Ghana, where most families live on less than US$2 per day, children do not receive these vital opportunities. Although Ghana has relatively advanced ECCE policies and has introduced two compulsory years of Kindergarten (KG) into the primary education system (for ages 4-6), two barriers to ECCE persist. First, the quality of KG is low and marred by a lack of trained teachers, large class sizes, lack of play-based resources, teacher absenteeism and rote-based teaching. The second barrier to ECCE is the low level of maternal education, information and aspiration in deprived rural communities. The Ghana Demographic and Health Survey 2014 reports a median education attainment for women of 0.0 years (Northern) and 2.9 years (Upper East) compared to a national average of 7.2 years. Deprived from education and career opportunities, these women are insufficiently aware of the important role that they themselves can play as parents to fulfill their child's development and career potential, by offering stimulation and nurture in a safe home environment.

Lively Minds' innovation overcomes both of these challenges by training and empowering KG teachers and caregivers (usually mothers, so henceforth we refer to them as 'mothers') in highly deprived communities in Ghana to set up and run educational play schemes using local materials. This behaviour-change project incorporates health and hygiene activities to improve community health. To achieve sustainability, scalability and cost-effectiveness, play schemes are mainstreamed into and are designed to strengthen the Government KG system.

Initial pilot testing of a pathway to scale, delivered through the Ghana Education Service using a training of trainers approach, showed high rates of compliance and suggestive evidence of wide-ranging positive outcomes for teachers, mothers and children. The Institute for Fiscal Studies (IFS) will design and implement a randomised controlled trial to evaluate the impact of the Lively Minds programme implemented through the training-of-trainer approach on the targeted children, their siblings and caregivers, volunteer mothers who run the play-schemes and teachers who train the volunteer mothers. The evaluation will also assess the key mechanisms for effective implementation

of the programme contributing to the development of optimum strategies for scaling the programme. The evidence provided by this evaluation will be crucial for determining whether there is value in mainstreaming the programme across Ghana and replicating it in other countries.

2. Hypotheses

The intervention is intended to have the following final impacts:

1. Positive impact on child physical, cognitive and socio-emotional development and hygiene practices;

This is achieved through a combination of the following intermediate outcomes:

2. Direct impact from child's participation in the Play Schemes;
3. Indirect impact through improvements in Mothers' stimulation and care practices (through acquiring knowledge in the training sessions and interaction with Volunteer Mothers);
4. Indirect impact through improvements in Mothers' psychological wellbeing;
5. Indirect impact through a change in resource allocation (time and material) within the households by primary caregivers having more say;
6. Indirect impact through increased knowledge and awareness among Kindergarten Teachers on good stimulation and hygiene practices (through training) and reduced Teacher absenteeism (through higher motivation and improved accountability as a result of mothers' enhanced pre-school engagement);
7. Indirect impact on children who have not participated in the Play Scheme through interaction with siblings who have;

3. Study Design

3.1. The intervention

The intervention focuses on unlocking the potential of caregivers, both mothers and teachers, training and empowering them with the knowledge, skills and confidence to run educational Play Schemes in kindergarten classes and provide better care and stimulation at home, using local materials. The intervention will be carried out by Lively Minds, an award winning organisation that has been running the programme in rural Ghana (as well as Uganda) for 8 years. The structure of the program is as follows:

1. Kindergarten teachers trained at centralised workshops
    a. There are ten practical and participatory sessions, which cover the importance of education and play, classroom management, how to use and make games, and how to train Mothers.
2. Teachers train 30 Mothers in their community.
    a. Training includes two community meetings and nine participatory workshops. It is designed for women who are illiterate and have never been to school. Content includes how to make and play games, child-friendly teaching, and health practices. The syllabus uses behaviour-change and play-based approaches to transform

mindsets, gain buy-in and volunteerism. Teachers are supervised and supported by high performing Kindergarten Teachers from schools with existing Schemes.

3. Play Schemes run
    a. A different group of 7 Mothers come into kindergarten each day of the week for an hour. 6 Mothers teach 30 kindergarten children indoors (1:5 parent child ratio). The remainingg children and Mothers participate in outdoor play. The teachers supervise. Children learn by playing with a variety of games that strengthen six different skillsets (counting/numeracy; matching/sorting; imagination and creativity; reading/books; sensory awareness; and physical education). These crosscutting skills develop executive functions, providing the foundation for learning. Teaching uses discovery and playbased methods, rather than rote method which is the norm in school.
4. Health and hygiene activities are incorporated
    a. Children have to handwash with soap before using the Scheme, sensitising them to this vital practice. Mothers are also taught how to erect simple handwashing devices (tippy-taps) at home. Once the Schemes are running, Mothers and teachers are given regular training on health and parenting topics to improve their childcare.
5. Teachers and Schemes are supported
    a. Play Schemes are given regular supervisory visits by Lively Minds staff and GES officials to quality control. Regular ``top-up'' training sessions are held for teachers where they discuss problems, share successes and also are trained to provide the Mothers with monthly skills workshops.
6. Mothers are supported
    a. Mothers are given monthly workshops on parenting and health topics and life skills by Teachers (topics include nutrition, hygiene, child rights, play, communication, malaria prevention, financial awareness, self-esteem, inclusive education). This increases awareness on a variety of childcare and public health issues, reinforces new behaviours, and is a powerful incentive to keep the Mothers committed to volunteering.
7. Sustainability and scalability
    a. District Education officials are involved in the mobilisation and training of schools. They monitor the Schemes and supervise the teachers and schools as part of their normal supervisory duties. High performing teachers and officials are trained to participate in the training and support of new cadres of teachers. Play Scheme Committees are established in each community.

3.2. Study design

The study is a cluster-randomised controlled trial, with the school as the unit of randomization. The trial take will take place across two districts in rural Northern Ghana; Bongo district, Upper East region and Tolon district, Northern region. Across these two regions, 80 schools will be selected to be part of the study. Within these schools, 40 will be randomly allocated to receive the intervention, and 40 allocated to the control group, who will receive the intervention at the end of the study. Randomisation will stratify using circuit (a geographical cluster of on average 6

schools falling under one supervisor from the Ghana Education Service), and school size (defined as high or low, based on whether the school has above or below the median number of total Kindergarten children). Randomisation will be conducted using Stata 14.

We will conduct two main rounds of data-collection (baseline and endline) following (a) 2,400 pre-school aged children (30 per community) aged 4-5 in September 2017 (referred as 'target children' in our study; (b) their primary caregivers; (c) their oldest younger sibling (less than 3 years of age); (d) their youngest older sibling and in the 6-10 age range; (e) their main KG teacher.

Panel data collected at baseline and endline will include:

Community Survey, administered to well-informed community leaders, will capture information about the location and key characteristics of the community (such as population, infrastructure and availability of public services).

Household Survey, administered to the head or most knowledgeable person in the household, will capture basic information on all household members (age, gender, marital status, disability and education) with more detailed education data collected for individuals under the age of 19. We will further inquire about amenities, wealth and expenditure as well as shocks experienced.

Primary caregiver survey, administered to the person that spent most of the time caring for the child in the last 6 months when the child was not in school (usually mother of the target child), will have two groups of questions: 1) caregiver characteristics, well-being knowledge, attitudes, expectations and beliefs around care-giving and the development of her/his children. 2) Information about younger sibling and target child (e.g. development, parent-child interactions, care-giving practices, health, food consumption).

Where possible we will use well-established instruments previously implemented in Ghana or comparable contexts. These include the Family Care Indicators (Frongillo et al. 2013) to measure the level of stimulation in the home; SRQ-20 (Beusenberg and Orley, 1994) to measure caregiver mental health and the Rosenberg self-esteem scale (Rosenberg,1965); Strengths and Difficulties Questionnaire (Goodman, 1997) and subscales from the Early Childhood Behaviour Questionnaire (Putnam et al., 2006) as measures of caregiver reported target child development; Caregiver Reported Early Childhood Development Index (McCoy et al., 2017) to assess the younger sibling's development.(See Annex 1 for References)

Target child Assessment will be conducted using International Development and Early Learning Assessment (IDELA) tool developed by 'Save the Children' (Save the Children, 2015) for assessment of target children and Raven's Progressive Matrices for assessment of the youngest older sibling. In addition, we will collect child anthropometric measures (arm circumference only) during the endline survey.

Pre-school Teacher Survey will gather information on school infrastructure, teacher knowledge about child development, teaching practices, routines and quality of care in the class, as well as teacher well-being.To assess short-term impacts, we will also collect data on child development outcomes (using a reduced version of the IDELA test) at midline, 6 months into the project, on a sub-sample of an average of 10 study children in each community.

All surveys will be administered by experienced interviewers hired by our in-country collaborator, Innovations for Poverty Action (IPA) using tablets on the SurveyCTO platform who have specific experience in evaluation of programmes to improve quality of early childhood care provision in pre-schools in Ghana.

3.3. Study Population

The study sample will consist of 2400 children between 3 and 5 years of age, living in the two study districts.

This sample will be taken from an initial sample frame obtained through a census survey. The census survey covers the closest households (up to 150 per school) to each of the 80 study schools. From this sample frame, eligible children were defined as those meeting two criteria: (i) aged between 3 and 5 years as of the start of the school term on the 11th September 2017, (ii) reported by their primary caregivers to be either currently attending or intending to attend in the first coming academic year, one of the 80 study schools. From this sample of children, a random sample of 2400 will be drawn, with an equal number across schools (where possible) and only including a maximum of one child per household. For each child their primary caregiver, household head, and older and younger sibling where possible will also be surveyed.

4. Outcomes of interest

4.1. Primary outcomes

The primary outcome of interest is the developmental outcomes of the target child. This will be measured through use of the IDELA tool (Pisani, Borisova & Dowd (2015)). This provides measures of development along 5 core domains; emergent numeracy, emergent literacy, socio-emotional skills, motor skills, and executive function. This will be scored in two ways; (i) following the guidance from Save the Children, by computing a simple % right score on each domain, (ii) scoring each item using Item Response Theory (IRT) and aggregating the domains through the use of exploratory factor analysis.

4.2. Secondary outcomes

Health impacts: As well as primary impacts on target child cognitive and socio-emotional development, we will also assess impacts on child's health, by using data on incidence of diarrhea, fever and respiratory infections using the definitions of the WHO as measures of morbidity. We will also measure arm circumference. We will also construct a hygiene knowledge score based on child's responses to questions such as what are good times to wash your hands, what material is needed to wash hands and what are reasons for why washing hands is important.

As well as impacts upon target children, we also intend to estimate the effects of the intervention on primary caregivers and siblings of children exposed to the program. The outcome measures used in each case are as follows:

Younger siblings: The primary outcome measure for younger siblings will be the CREDI short form (McCoy et al (2017)). This a maternal report measure of the overall development of the child.

Older siblings: The primary outcomes measure for older siblings is the Ravens test (Raven (1936)), a widely used measure of fluid intelligence. In addition, we will measure executive function through forwards and backwards digit span, and literacy and numeracy through adapting a previous test used in the Ghanaian context.

Primary caregivers: We will collect information on the mother's knowledge of stimulation, and her beliefs regarding the importance of these for children's development. To test knowledge, we will rely on a selection of items from the Knowledge of Infant Development (KIDI). We will measure psychological outcomes of primary caregivers through the use of two well-established scales; the SRQ-20 measure of depression (Goodman (1997)), and the Rosenborg measure of Self-esteem (Rosenberg (1965)). These will be scored as a simple aggregate of the answers on each question.

Home environment: The presence of toys and learning materials in the house will be assessed together with parental involvement with the child, the child's routines and organisation of the child's time inside and outside the family house. This will be assessed using the Family Care Indicators, developed by UNICEF.

Teachers: Although limited in statistical power because of relatively small sample size, we will also assess changes in outcomes of *teachers,* using an instrument developed by (Aber, Berman and Wolf (2017)) for use in Ghana. This includes a variety of measures including teacher practices, burnout, job satisfaction amongst other things. The SRQ-20 will also be assessed on teachers.

4.3. Intervention mediators

In order to understand the mechanisms underlying the effectiveness of the intervention, we will investigate heterogeneity in the effects of the program along a number of dimensions. These will include; socio-economic status of the household, characteristics of primary caregiver (including social networks and whether they were a volunteer mother), quality of the school, characteristics of the teacher, characteristics of the child (gender, age, initial developmental outcomes, schooling).

5. Analysis Plan

5.1. Primary outcomes

Analysis primary outcomes will be conducted through estimating equation (1) by ordinary least squares (OLS) regressions in Stata 14.

$$y_{ist} = \alpha + \delta y_{is0} + \beta treat_s + \gamma X_{is0} + \sigma strata_s + \epsilon_{ist} \quad (1)$$

Where y_{ist} is one of the above-mentioned outcomes for child *i* in school s, at time t (either midline or endline). y_{is0} is the same outcome at baseline, $treat_s$ is an indicator for whether the child's school is a treatment school, X_{is0} is a vector of child/household/school level control variables at baseline; such as gender, age and household socio-economic status. Vector X will include variables for which we observe imbalances at baseline, if any, in addition to other baseline variables with high explanatory power to improve precision. $strata_s$ is an indicator for the randomization strata that the school is in. We will cluster standard errors at the level of the school. In this framework,

coefficient β gives the causal effect of the intervention on a given outcome. We will also report results from a standard t-test, to determine whether the effect is statistically significant.

5.2. Secondary outcomes

Analysis of secondary outcomes will be conducted in an analogous way to the above; with secondary outcomes in place of y_{ist} and *i* denoting child, sibling, primary caregiver or teacher.

5.3. Mediators

The effect of mediators will be assessed through estimation of equation (2) through OLS:

$$y_{ist} = \alpha + \delta y_{is0} + \beta treat_s + \omega m_{ist} + \tau m_{ist} * treat_s + \gamma X_{is0} + \sigma strata_s + \epsilon_{ist} \quad (2)$$

Where m_{ist} is a given mediator. In this framework the coefficient on τ estimates the differences in the impact of the intervention on a given outcome. For example if m is an indicator for gender, τ estimates the difference in the effect of the intervention for boys and girls.

6. Ethical Considerations

Ethical clearance has been obtained from the UCL Institutional Review Board, Innovations for Poverty Action (IPA), and the Ghana Health Services Ethics Review Board.

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