

DISCUSSION PAPER SERIES

IZA DP No. 14054

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ABSTRACT

Experimental Evidence from an Integrated Early Childhood Parenting Program in Sierra Leone*

We present findings from an integrated early childhood parenting program on stunting and wasting in Sierra Leone, West Africa. Importantly, where half the communities were randomly assigned to receive the parenting program and the remaining half served as a control that received standard nutritional counseling delivered through community meetings and home visits, keeping all social aspects of the intervention identical between the treatment and the control. We find that access to the intervention reduced the incidence of wasting by 3 percentage points and had no impact on stunting. We find improvements in parenting practices related to psychosocial stimulation and harsh discipline to be the primary mechanisms through which wasting declines. We find no differences in responsive parenting practices between the treatment and the control. These results suggest that integrated early childhood parenting programs when delivered alongside standard nutritional counseling via existing mother support groups have the potential to improve long-term well-being through reductions in wasting as well as improvements in parenting practices related to stimulation and harsh discipline.

JEL Classification: I24, I25, J13, J24, O15

Keywords: early childhood development, nutrition, stimulation, randomized control trial, parenting intervention, Africa

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1 Introduction

A series of papers on Early Child Development (ECD) published in Lancet estimated that over 249 million children under 5 years worldwide were not fulfilling their potential for growth in health, cognition, and socio-emotional development (Lu et al., 2016; Richter et al., 2017). Stunting, wasting, learning poverty, and socio-emotional development failures continue to hamper child development. Due to the huge economic gains associated with early childhood development interventions (Alderman et al., 2014; Gertler et al., 2014; Heckman et al., 2010; Hoddinott et al., 2008; Maluccio et al., 2009), there has been a big push for integrated parenting interventions that target multiple aspects of early childhood development, specifically, health, nutrition, security and safety, responsive caregiving, and early learning (Walker et al., 2007; Britto et al., 2015; Black et al., 2017)— five components of the World Health Organization (2018) Nurturing Care Framework.

The 2015 UN Sustainable Development Goals (SDGs) also made a series of commitments for promoting holistic early childhood development by explicitly focusing on physical health, cognitive development, as well as child abuse.¹ Despite these efforts and commitments towards holistic child development, there is substantial scalable evidence on only the health and nutritional aspects of Early Childhood Development (ECD) in developing countries, such as deworming pills and iron supplements (Ahuja et al., 2017; Pasricha et al., 2013). There is some experimental evidence from developing countries on the impact of psychosocial stimulation interventions (related to early learning) on children’s cognition (Attanasio et al., 2014; Andrew et al., 2020; Sylvia et al., 2020), that finds positive impacts on cognition and modest impacts on language and fine motor skills. However, the impact of stimulation interventions on child health remains limited (Attanasio et al., 2014, 2018). Importantly, despite the call for integrated parenting programs at scale by both the UN SDGs as well as papers published as part of the 2007, 2011, and 2017 Lancet series on Early Childhood Development in developing countries, experimental evaluations of integrated parenting programs that tie all five (health, nutrition, security and safety, responsive caregiving, and early learning) aspects of ECD remain scarce.

In this paper, we examine the impact of a unique integrated early childhood parenting program

¹Goals 2 and 3 of the SDG commit to ending hunger and improving children’s health under age 5, Goal 4 commits to improving learning and education for children and Goal 16 specifically calls to end abuse, exploitation and violence against children.

that not only focuses on psychosocial stimulation as first delivered in the Jamaican home visitation program (Grantham-McGregor and Desai, 1975), but also combines features of responsive parenting, physical safety and child protection in terms of abuse and neglect, integrating all components of caregiving that go beyond physical care of the child within a community based home visitation program at scale (Britto et al., 2015). To obtain the causal impact of this intervention we will compare nutritional outcomes and parenting practices from a cluster randomized control trial where half the communities were randomly assigned to receive the treatment (an integrated early childhood parenting program) and the remaining half serve as the control (that are only exposed to Infant and Young Child Feeding (IYCF) activities). A unique aspect of our field experiment is that both IYCF practices and the parenting program are delivered through existing mother support groups in local communities keeping all social (monthly community meetings and home visits) and nutritional aspects (related to IYCF) of the program identical between the treatment and control.² The program delivery used for implementing the intervention also makes the results highly scalable.³

During 2016-2017, Mother Support Groups (MSGs) in Sierra Leone delivered a 16-month long integrated early childhood parenting program through monthly community meetings as well as home visits.⁴ To examine the impact of this intervention, 46 communities made up the sampling frame/target communities that were then randomly assigned to either the treatment group (23 communities), or the control group (23 communities). We use data on child anthropometrics, parenting practices and behaviors to estimate the intent-to-treat effect of the integrated early childhood parenting program. Specifically, we ask if adding components of integrated parenting programs to standard nutritional counseling provided through existing mother support groups in Sierra Leone improve nutritional outcomes and parenting practices?

We find that the intervention reduced the incidence of wasting among children by 3 percentage points in treatment communities relative to control, with no improvements in stunting. We find that the positive impacts on wasting were accompanied by improvements in parenting practices

²None of the experimental evaluations of stimulation intervention can keep the social aspects of these interventions identical between the treatment and the control (Attanasio et al., 2014, 2018).

³The program is delivered through existing Mother Support Groups that exist in all parts of Sierra Leone.

⁴The length of our integrated parenting intervention as well as mode of delivery is comparable to other stimulation interventions. Attanasio et al. (2018) study the impact of an integrated parenting program that is delivered through weekly group meetings and monthly home visits that lasted 15 months in Colombia where the treatment group received both stimulation and nutritional supplements. Attanasio et al. (2014) delivered a stimulation intervention through weekly home visits for about 18 months in Colombia. Andrew et al. (2020) delivered a stimulation intervention that included weekly home visits for about 18 months in India.

related to psychosocial stimulation, discipline, and father's involvement in child rearing. Parenting practices related to psychosocial stimulation were 21 percentage points higher in treatment communities, a 30% increase over the control mean. These were also accompanied by an increase in parental material investments in the form of purchase of toys from shop by 38 percentage points as well as toys made at home by 21 percentage points. We also find that the incidence of physical punishments and violent punishments reduced by 25 and 24 percentage points respectively. These are however associated with an increase in the incidence of non-violent punishments in the treatment group more than the control.

We also find an improvement in caregiver perception – there is an 18-percentage point increase in the proportion of parents in treatment communities who think they have a strong influence on the growth and development of their children compared to parents in control communities. We find an improvement in father's involvement – fathers in treatment communities are 24 percentage points more likely to be involved in activities that aid child growth compared to fathers in control communities. We find no impacts on responsive parenting. These results suggest that psychosocial stimulation and child protection when provided alongside standard nutritional counseling have the potential of improving long-term well-being through improvements in nutritional status as well as through better parenting practices in stimulation and harsh discipline.

Our finding that the intervention improves wasting and parenting practices in the short run is consistent with recent evidence from psychosocial stimulation interventions alone (Nahar et al., 2012a; Andrew et al., 2020; Sylvia et al., 2020; Attanasio et al., 2020). It is also plausible that some of these effects may become stronger or emerge later in the life cycle (Heckman et al., 2006), especially the one's linking parenting practices (related to stimulation and harsh discipline) to children's cognition and socioemotional development later in life. Lastly, synergies between the different components of parenting practices could lead to dynamic complementarities in early life skills which would result in both improvements in efficiency and equity in the long run (Alderman et al., 2014).

The UNICEF/WHO/World Bank Joint Child Malnutrition Estimates (March 2020 edition) show that nearly 200 million children under 5 years suffer from stunting (144 million) and wasting (47 million) – two important indicators of malnutrition. Four of five stunted children in the

world live in South Asia and sub-Saharan Africa. Identifying scalable solutions to fight malnutrition in South Asia and sub-Saharan Africa remains key for reducing the global incidence of malnutrition.

The main contribution of this paper is that for the first time we study the impact of a scalable early childhood parenting program that specifically integrates all five aspects of the WHO Nurturing Care Framework – psychosocial stimulation (that relates to early learning), security and safety, and responsive caregiving into ongoing IYCF interventions (that focus on child nutrition and health) drawing on experimental evidence from West Africa, keeping all IYCF and social aspects of the intervention identical between the treatment and the control.

This paper adds to the broader literature on ECD and specifically around experimental evidence related to psychosocial stimulation interventions. One of the early psychosocial stimulation interventions rolled-out in Kingston, Jamaica showed significant improvements in IQ for children in the short run (Grantham-McGregor and Desai, 1975).⁵ A similar study was subsequently conducted among severely malnourished children in hospitals. Once again, compared to children from a matched control group, children in the intervention group showed significant improvements in developmental quotients (Grantham-McGregor et al., 1980). This led to the roll out of a longer term RCT in Kingston where 129 stunted children were randomized into one of the following four treatment arms – nutritional supplementation only, psychosocial stimulation, both nutritional supplementation and psychosocial stimulation, and a control group that did not receive any treatment. Long term follow-ups conducted at ages 11-12 years (Walker et al., 2000), 17-18 years (Walker et al., 2005, 2006), and at 22 years (Walker et al., 2011) indicate that children exposed to the psychosocial stimulation intervention arm saw significant improvements in education, cognitive functioning, psychosocial functioning, and wage earnings (Gertler et al., 2014). These follow-up studies demonstrate the effectiveness and importance of home-visitation programs, parent-child interactions, and psychosocial stimulation for infants in generating long-term economic gains (Gertler et al., 2014). However, concerns related to selection bias and scalability remained. These concerns led to experimental evaluations of psychosocial stimulation interventions in developing countries like Colombia and China, but none from sub-Saharan Africa where malnutrition remains high (Attanasio et al.,

⁵The Jamaica Home Visitation intervention designed by Sally Grantham McGregor and colleagues, has been successfully adopted as the *Reach Up and Learn* program to provide an effective, adaptable program, feasible for low resource settings. It has also been adapted and implemented at a large scale by the Peruvian government through its Cuna Mas program.

2014; Sylvia et al., 2020).

Second, our paper also adds to the literature on child abuse, maltreatment, mental health, and socio-emotional wellbeing more generally.⁶ Maltreatment during childhood is negatively associated with children's cognitive development (Morales and Singh, 2015; Slade and Wissow, 2007). Children exposed to harsh parenting are also at the risk of developing conduct disorders, antisocial personality symptoms, and of becoming violent offenders more so if maltreatment is in early childhood (Keiley et al., 2001). All these factors are also likely to diminish these children's non-cognitive skills relevant for improving labor market outcomes. Despite the high prevalence of maltreatment and the potentially huge economic costs associated with this, relatively few studies in low-income countries and none from sub-Saharan Africa focus on experimental evaluations of parenting programs that focus on child abuse and neglect.

Overall, our findings show that integrating stimulation, discipline and responsive parenting into ongoing IYCF interventions at scale will both reduce the prevalence of malnutrition and improve parenting practices related to stimulation and discipline, all of which in the long run will contribute to both children's cognitive as well as non-cognitive skills.

The rest of the paper is organized as follows. Section 2 provides a complete description of the program. Section 3 describes the data and sampling strategy. The main results are presented in Section 4. Robustness checks related to self-reporting bias, variable construction, attrition, and other mechanisms are presented in Section 5. Concluding remarks follow in Section 6.

2 The Integrated Early Childhood Parenting Program

According to the Sierra Leone National Nutrition Survey (2014), among children aged 6-59 months, the prevalence of wasting and underweight stood at 4.7% and 12.9% respectively, but stunting was at 28.8% (though Sierra Leone has experienced a 15.5% reduction from its 2010 levels).⁷ Owing to the poor health outcomes, Catholic Relief Services (CRS) in Sierra Leone, in partnership with the

⁶See Heckman and Mosso (2014) for a literature review on the importance of early life family environment in shaping life skills.

⁷Underweight is when children's weight-for-age z-scores are below the -2 cutoff, similarly stunting is when children's height-for-age z-scores are below the -2 cutoff and wasting is when children's weight-for-height z-scores fall below the -2 cutoff. Z-scores are based on WHO Child Growth Standards (World Health Organization, 2006, 2007) capturing deficits in children's growth in height and or weight.

Koinadugu District Health Management Team, implemented an integrated early childhood parenting intervention during June 2016 through September 2017 (16 months) in the four chiefdoms of Koinadugu district, aimed at improving parenting practices and children's early childhood development indicators.

CRS works with existing community structures (such as mother support groups and community health workers) to implement Infant and Young Child Feeding (IYCF) and Community-based Management of Acute Malnutrition (CMAM) programs in Sierra Leone. For the first time, they integrated a new Early Childhood Development (ECD) component, wherein positive parenting messages for psychosocial stimulation, responsiveness, and providing safe environment, were provided alongside standard nutritional counseling to family members (mothers, fathers, older siblings, etc.) of children under 2 years in treatment communities. This program not only focuses on psychosocial stimulation, but also combines features of responsive parenting, physical safety and child protection in terms of abuse and neglect (that relate to security and safety, responsive caregiving, and early learning), integrating all components of caregiving that go beyond physical care of the child (Britto et al., 2015). Existing Mother Support Groups (MSGs) delivered both IYCF practices in control communities as well as the additional parenting messages in the treatment communities through monthly community meetings as well as home visits. These positive parenting practices would contribute towards building children's physiological, cognitive, and emotional capacities and foster improvements in a variety of early childhood developmental outcomes.

To obtain causal impact of the intervention we will compare nutritional outcomes and parenting practices for children in treatment communities (that are exposed to IYCF activities and the newly designed and implemented integrated early childhood parenting program) with children in control communities (that are only exposed to IYCF activities). A unique aspect of our field experiment is that both IYCF practices and the parenting program are delivered through existing mother support groups in local communities keeping all social (monthly community meetings and home visits) and nutritional aspects (IYCF component) of the program identical between the treatment and control. This unique aspect of our experiment also makes it highly scalable.⁸ Every community has one MSG that includes 15 members of the community and met at least once a month. In addition, in

⁸An evidence gap map reported by Barooah et al. (2019) highlights the prevalence of various group-based livelihood interventions in developing countries which we believe could be used for integrating ECD components related to psychosocial stimulation and harsh discipline.

line with the Ministry of Health and Sanitation and UNICEF guidelines, the protocol was for each MSG member to identify 10 households with pregnant or lactating women and or a mother of a child under 2, and conduct at least one home visit to each of the 10 households every month.⁹

The IYCF activities utilize a counseling card tool based on industry-standards available at a global level and adopted by Sierra Leone's Ministry of Health and Sanitation and UNICEF Sierra Leone, which provided CRS staff and MSG members with a visual aid for teaching caregivers about optimal IYCF practices. The key IYCF activity includes promotion of infant and young child feeding practices, such as, early initiation of breastfeeding within the first hour after birth, exclusive breastfeeding for the first six months, timely initiation of complementary feeding after the first six months, and proper hygiene and sanitation (among others) – IYCF includes all aspects of health and nutrition necessary for ECD (see Walker et al. (2007)).

The positive parenting counseling tool (see Online Appendix covering examples of key messages) was developed to complement the IYCF counseling cards tool and was designed so that they are similar in form and aesthetic and are easy to use in tandem. Note that messages around positive parenting behaviors were added to the traditional nutrition and health education sessions only in intervention communities. Where the key positive parenting activities include: (a) making the baby feel safe and loved, (b) making the home safe, (c) responsive and active feeding, (d) letting the baby explore and experiment, (e) singing, talking, and telling stories to the child, (f) using household things to teach the child, (g) building a relationship between the baby and the father, (h) taking the child outside the house, (i) encouraging the child to play with others, (j) talking to the child about wrong behaviors and encouraging positive behavior, (k) protecting all children from abuse, and treat all children equal, (l) dancing and playing with the child, and (m) giving the child an identity.

Recognizing that ECD depends on the capacity, support, and opportunities for families and the caregivers of children to adequately care and nurture children, this project is largely focused on the participation of families and communities in adopting positive parenting behaviors. Through

⁹Unfortunately, we don't have individual data linking the households in our sample to home visits from members of the MSG; therefore, we are unable to compute treatment on treated effects. However, we have details on program delivery from Catholic Relief Services on the average number of home visits made by every member of the MSG in a month, which are about 8.3 in treatment communities and 8.4 in control communities.

Mother Support Groups (MSGs), CRS engaged communities (not just family members of the target child, but also pastors, imams, traditional leaders, youth leaders, women's leaders, and health workers) to discuss evidence based positive parenting behaviors that can blend with what is known as the best environment for optimal child growth and development with traditional child care practices. Qualitative feedback and discussion also suggest that the project built public awareness, strengthened demand, and changed the practices and behaviors surrounding ECD through community-based approaches geared towards improving nutrition outcomes as well as the psychosocial outcomes among children under 2 years in the treatment communities.

To ensure effective implementation of the newly designed parenting program, CRS provided the four ECD field agents, project coordinator and project manager with ECD training using CRS parenting support facilitator's manual and positive parenting counseling guides. This training empowered the project team to further train MSG members – lead mothers and secretaries, who in turn cascaded their knowledge to fellow MSG members who in turn engaged mothers, fathers, and other caregivers on key positive parenting behaviors. In treatment communities, mothers were also encouraged to engage their male partners and other household members to practice positive parenting behaviors. Note that similar MSGs exist in the control communities as well except they met only to discuss IYCF practices.

The project directly identified and engaged key community stakeholders that played a crucial role in the successful implementation of the project. At the start of the project (prior to the start of field implementation), these stakeholders benefited from a one-day training that provided them with an overview of the project activities with emphasis on positive parenting and provided them with basic knowledge on nutrition and ECD (where applicable). Qualitative feedback and observations from the trainings show that there was an increase in nutrition and ECD knowledge among key stakeholders. Religious leaders included nutrition/ECD messages in religious sermons in churches and mosques. Community leaders (town chief and women's leaders) were encouraged to support MSG members in implementing project activities.

In addition to the monthly meetings held by MSGs as part of their routine activities, the project team held monthly community engagement meetings. These community meetings served as key events through which CRS reached both direct and indirect beneficiaries of the project. These

were part of the routine activities carried out by the field agents. These community meetings significantly improved community awareness on nutrition and parenting practices, and provided an open platform for community members to provide feedback on the project.

3 Data

3.1 Sampling, Randomization, and Surveys

This paper combines baseline and endline data from a cluster randomized control trial to estimate the impact of exposure to an integrated early childhood parenting program targeted to children under two years of age on short run health outcomes and parenting practices. During March-May 2016, 64 communities were identified, mapped and reviewed carefully for minimizing the risk of information spillovers, and communities that were geographically too close to at least one other community were then removed to minimize contamination bias. The remaining 46 communities made up the sampling frame/target communities that were then randomly assigned to either the treatment group (23 communities) or the control group (23 communities). From within each community, our goal was to then randomly sample approximately 12-15 age eligible (that is between 6 and 24 months) children and their caregivers. If a household had more than one age eligible child, enumerators further randomly selected a child from within the household.¹⁰

The baseline survey was implemented in 2016 among children aged 6-24 months and their caregivers and a similar endline survey was administered in 2017 targeting all original baseline respondents.¹¹ Both baseline and endline surveys collect data on: anthropometrics, demographics, IYCF behavior and knowledge (feeding practices, minimum dietary diversity, etc.), parenting practices and knowledge (psychosocial stimulation, parental discipline practices, involvement of caregiver and father in the child's day to day activities, caregiver's attitude about child development), and hygiene and sanitation practices (handwashing practices, availability of clean toilet facilities, etc.). In addition to these, both surveys collected details on a limited set of family background characteristics such as mother's age, mother's occupation, and location of the household.

¹⁰While both IYCF and positive parenting are appropriate starting in pregnancy and continuing through 23 months, children under 6 months were excluded since acute malnutrition (one of the key nutritional outcomes targeted in the study) is only a concern among children starting at the age of 6 months.

¹¹There are 59 children in the sample that are older than 24 months at baseline. Our results are robust to dropping these children from the analysis.

In an effort to update baseline figures on the prevalence of underweight children between 6 and 59 months, during baseline the enumerators also collected anthropometrics data on all children between ages 6 and 59 months present in a target household. The complete socioeconomic survey and anthropometrics data is only available for our target child (between 6 and 24 months) and his/her primary caregiver resulting in a full (anthropometrics + socioeconomic survey) baseline sample of 677 caregiver-child pairs (See Table 1). Note that during endline we only followed up on the children initially aged 6-24 months at baseline (our primary respondents and target sample for the intervention). Out of the 677 children measured at baseline, 515 were tracked and measured during endline. Attrition rate in the treatment group is 6% higher than the control group, however this difference is not statistically significant at even the 10% level ($p\text{-value}=0.29$), ruling out attrition related selection concerns. Attrition related concerns are discussed in further detail in Section 5.3.

3.2 Primary and Intermediary outcomes

Nutritional outcomes

The main goal of the study is to examine the impact of an integrated early childhood parenting program on nutritional outcomes. The key nutritional outcomes studied here include stunting that captures deficits in height-for-age z -score (HAZ) and wasting that measures deficits in weight-for-height z -score (WHZ). The percentage of children with a low height-for-age (stunting), or ‘growth retardation’ reflects the cumulative effects of undernutrition since birth. Stunting is associated with delayed schooling enrollment, fewer grades of schooling, reduced intellectual capacity, and lower wage earnings (see Glewwe and Miguel (2007) for an excellent review).¹² Wasting (WHZ<-2) in children is a symptom of acute undernutrition, usually as a consequence of insufficient food intake and or disease (e.g. diarrhea). Wasting increases the risk of morbidity and mortality and continued periods of wasting results in long term stunting (Ricci and Becker, 1996). See Panel A, Table 2 for variable definitions of nutritional outcomes.

Parenting Practices

We are also interested in examining the impact of the intervention on intermediary outcomes such as key parenting practices related to psychosocial stimulation (playing, singing, and reading to the child), harsh discipline (physical punishment, verbal punishment, and non-violent punishment),

¹²Recent evidence shows catch up effects in health exist, that is, at least some of the long term costs associated with stunting and under 5 malnutrition can be reversed (Mani, 2012; Outes and Porter, 2013; Handa and Peterman, 2016).

caregiver's perception of influence on growth, father's involvement in child rearing, and responsive parenting (affection, responsiveness, praise and encouragement). These parenting practices are the key channels or behavioral mechanisms through which we expect the parenting intervention to impact child health. A series of papers since the 1990's have emphasized and shown the existence of strong linkages between responsive parenting and children's health through improved nutritional intake and protection from disease (Engle and Ricciuti, 1995; Eshel et al., 2006). Improvements in caregiver responsiveness and psychosocial stimulation are also related to building children's nervous system and immune system helping them fight diseases and absorb nutrients (McCartney and Phillips, 2006). Reduction in harsh discipline is necessary for improving parenting practices related to stimulation and responsive feeding. Improvements in parental practices related to responsiveness, stimulation, harsh discipline, caregiver perception and father's involvement have tremendous synergies and positive interactions that together improve child health in the form of reductions in wasting and stunting (see Britto et al. (2015) and Britto et al. (2017) for excellent reviews).

First, we construct parenting practices related to psychosocial stimulation using parental responses to the following questions: (a) read books or looked at picture books with the child, (b) play with the child, (c) tell stories to the child, (d) name, count, or draw things for the child, (e) sing songs to the child, and (f) take the child outside the home, compound, yard, or enclosure. Using UNICEF guidelines, if a caregiver meets three out of these six activities on a daily basis, the household is categorized as engaging in positive parenting practices related to psychosocial stimulation, 0 otherwise.

Next, parental practices on physical punishments are measured using caregiver responses to the following questions: (a) shook the child, (b) spanked, hit or slapped child on the bottom with bare hand, (c) hit the child on the bottom or elsewhere on the body with something like a belt, hairbrush, stick or other hard object, (d) hit or slapped child on the face, head or ears, (e) hit or slapped child on the hand, arm, or leg, and (f) beat the child up, that is hit him/her over and over as hard as one could. Similarly, parental practices on verbal punishments are captured using parents' responses on the following questions: (a) shouted, yelled at or screamed at the child, and (b) insulted the child, or called him/her dumb, stupid, lazy, or another name like that. If a caregiver carries out one or more forms of physical punishments, the household is categorized as engaging in physical punishments, 0 otherwise. Similarly, if a caregiver carries out one or both forms of verbal punishments,

the household is categorized as engaging in verbal punishments, 0 otherwise. If there are no forms of physical or verbal punishments at all, and one or more forms of non-violent punishments (include (a) took away toys or forbade something the child liked or did not allow him/her to leave the house, (b) explained to the child why his/her behavior was wrong, and (c) gave him/her something else to do), the household is categorized as engaging in non-violent punishments. Primary caregiver is also asked whether they believe to have any influence on their children's growth and development.

Another goal of the intervention is to improve father's involvement in child rearing (Oondo et al., 2016). Father's involvement is measured using caregiver's response to the question: *what activities of your child's life is the father involved in?* The respondents were not given options for this question, and every answer was recorded. Some of the responses include feeding, clothing, learning to prepare for school, hygiene, discipline etc. If the father is spending time doing any three child rearing activities, the father is categorized as being involved in child rearing.

Lastly, responsive parenting refers to family interactions in which parents are aware of their children's emotional and physical needs and respond appropriately and consistently. It includes showing affection (using gestures such as hugs, telling the child, or with actions such as giving things to the child), responding actively and non-violently to the child's needs (e.g. taking the child into arms, feeding the child, talking to the child, not hitting or shouting at the child when the child cries or makes requests), and expressing praise and encouragement (e.g. when the child succeeds in doing something, when the child behaves well, when the child has tried to do something new but did not succeed) to the child. For each of these, if the primary caregiver responds positively in two or more ways, the household is categorized as being affectionate, responsive, or expressive through praise and encouragement.

See Panel B, Table 2 for variable definitions on all parenting practices.

Parental Investments

We next measure parental investments by asking the primary caregiver about the things that the child plays with at home. Psychosocial stimulation interventions are seen to encourage the use and purchase of books and toys, namely, parental investments (Sylvia et al., 2020). These include toys made at home (=1 if the child plays with toys made at home, 0 otherwise), toys from a shop

(=1 if the child plays with toys purchased from a shop, 0 otherwise), and household objects such as bowls or pots, or objects found outside such as sticks, rocks, animal shells or leaves (=1 if the child plays with household objects or objects found outside, 0 otherwise). Lastly, we also ask the number of children's books or picture books the household owns. See Panel C, Table 2 for variable definitions on all parental investments.

All key outcome variables of interest for the paper are defined in Panels A, B and C of Table 2. In Panel D, we present the full set of family and individual background characteristics to be included as controls in the regression analysis. We control for child's age, maternal age and occupation, and child's gender.

3.3 Summary Statistics

In Table 3, we present pre-intervention averages on all variables used in the analysis. In Columns 1, 2, and 3, we present sample averages for the pooled sample, the treatment group, and the control group, respectively. Column 1 shows that the average height-for-age *z*-score – a long run indicator of health status – is -1.14, that is, the average child in our sample is about 1 standard deviation shorter than a well nourished child, and that 28% of the children suffer from stunting (height-for-age *z*-score < -2). The average prevalence of wasting (weight-for-height *z*-score < -2) at baseline is 10% where the mean weight-for-height *z*-score is -0.52, about half a standard deviation lower than a well-nourished child. Note that the prevalence of wasting is generally low in Sierra Leone – 4.7% in 2014, however, our sample has double the incidence of wasting than the national average. Importantly, the prevalence of wasting in our sample is close to the wasting threshold of 10% at which UNICEF calls for an urgent policy response.¹³

At baseline, only 22% of the parents report practicing psychosocial stimulation with children at home.¹⁴ A large proportion, approximately 53% of the parents report practicing physical punishments, 40% verbal punishments, and 17% non-violent punishments among children under 2.¹⁵

¹³There are only 24 developing countries as per the UNICEF with under 5 wasting rates of 10 percent or more and calls for an urgent policy response to the problem. Of the 24 countries, only five have wasting rates higher than 15 percent.

¹⁴About 1 in 4 children aged 3-5 years, in 64 countries, do not experience psychosocial stimulation (UNICEF global databases, 2017).

¹⁵The prevalence rates on harsh discipline are lower in our sample compared to the global incidence – about 80 percent of children aged 2-4 years, in 74 countries, are subjected to harsh discipline by their caregivers (UNICEF global databases, 2017).

Only a quarter of the caregivers believe they have a strong influence on child growth. Almost half of the households in the sample report active involvement of the father in child rearing activities. About 69% and 51% of the caregivers show affection and responsiveness respectively. Only 17% of the children play with toys made at home, but almost double the number play with toys purchased from a shop, or with household objects. The average number of children's books in a house is 0.04 – which suggests that many households have zero children's books. The average age of a child in our sample is 18 months at baseline. The average age of caregiver is 26 years and 89% of the caregivers are employed.

Our ability to obtain unbiased treatment effects from a cluster randomized control trial relies on random assignment of clusters into treatment and control. This randomization automatically facilitates causal interpretation of impact estimates. Yet, it is standard practice in the development literature to check if this randomization was indeed successful. That is, at baseline, were the outcome variables and selected list of covariates that are likely to predict outcomes similar. In addition to examining mean differences between the treatment and control groups based on statistical significance as reported in Column 3, Table 3, we also present normalized differences, a scale-free measure of difference in means in Column 5, Table 3 that allows us to focus on the size of the imbalance, if any (Imbens and Wooldridge, 2009; Imbens and Rubin, 2015). Imbens and Rubin (2015) suggest that normalized differences of 0.25 or less generally indicates good balance, mitigating concerns related to selection on observables (and consequently selection on unobservables). At baseline, there are no statistically significant differences in nutritional status (in Panel A), parenting practices (in Panel B), parental investments (in Panel C), and family background characteristics (in Panel D) between children in the treatment group and the control group except for father's involvement where the baseline difference between treatment and control communities is significant at the 1% level. However, none of the normalized differences exceed the Imbens and Rubin (2015) rule of thumb of 0.25, ruling out selection concerns induced by baseline imbalance except for child's age which will be controlled in the regressions as its an important predictor of early childhood developmental outcomes.¹⁶

¹⁶In addition, in Appendix Table A1 we show baseline balance for our panel sample only, and once again find that none of the normalized differences in baseline characteristics exceeds the Imbens and Rubin (2015) rule of thumb of 0.25.

4 Program Impacts

4.1 Intent-to-Treat effects of the program – Conceptual framework

To capture the Intent-to-Treat (ITT) effects of the integrated early childhood parenting program, we estimate the following equation:

$$Y_{i1} = \beta_0 + \beta_1 Y_{i0} + \beta_2 Treatment_i + \sum_{j=1}^4 \gamma_j X_{ij} + \epsilon_i \quad (1)$$

Where Y includes the full set of outcome variables defined in Panels A and B of Table 2, treatment is a dummy variable that takes a value 1 if the child lives in a community that was randomly assigned to receive the community based parenting program, and 0 if the child lives in a control community. Similar to Maitra and Mani (2017), Sylvia et al. (2020) and others, we also control for baseline outcomes (Y_{i0}) in this specification to improve the precision of the coefficient estimates. The coefficient estimate on treatment dummy, β_2 captures the short-run intent-to-treat (ITT) effect of the integrated parenting program. Lastly, X s include basic controls related to child's age, gender, mother's occupation, and mother's age (reported in Panel D, Table 2) that are commonly associated with child health.¹⁷ The disturbance term in equation (1) includes factors that influence the outcome but are unobservable to the econometrician. To account for unobserved correlation between children living in a community all standard errors are clustered at the community level.

OLS estimates of equation (1) are presented in Table 4, where Column 1 reports β_2 that measures the intent-to-treat (ITT) effect of the intervention and the corresponding naïve p-values are reported in Column 4.

We also show that our results reported in Table 4 are robust to both Type I and Type II error related concerns. In Column 3 of Table 4, we report intent-to-treat effects of the program using a Seemingly Unrelated Regression (SUR) framework that accounts for unobserved correlation between errors across the multiple outcomes improving on power, reducing the Type II error.

In addition, since Type I error increases in the number of outcomes tested, to account for over-rejection of the null, we report sharpened two-stage q values in Column 5 of Table 4 following the

¹⁷No data was collected on household assets, consumption expenditure or wage earnings.

procedure proposed by Benjamini et al. (2006) and implemented in Anderson (2008). We find that our results are robust to Type I and Type II error related concerns.

4.2 Intent-to-treat effects on Nutritional outcomes

The main estimates reported in Column 1, Table 4 show that the intervention has a substantive impact on reducing the incidence of wasting by 3 percentage points in treatment communities relative to control, however, not surprisingly there is no associated improvement in stunting, WHZ and HAZ. These findings are also supported by the overall changes in the distribution of HAZ and WHZ reported in Figures 1 and 2 where we present the kernel density estimates for HAZ and WHZ separated by treatment status and time. A Kolmogorov Smirnov (K-S) test shows no differences in the distribution of baseline WHZ between the treatment and control ($p\text{-value} = 0.950$). We arrive at a similar conclusion by comparing baseline HAZ between treatment and control ($p\text{-value} = 0.352$). However, at endline we find that the distribution of WHZ has shifted to the right rejecting the null of equal distributions ($p\text{-value} < 0.10$). At the same time there is no shift in the distribution of endline HAZ scores ($p\text{-value} = 0.554$). This suggests that the integrated early childhood parenting intervention has an important role in improving wasting over and above the ongoing IYCF activities that were available to both the treatment and the control group.

Only two papers examine the impact of stimulation and related interventions on child health at scale. Attanasio et al. (2014) find that in Columbia, the psychosocial stimulation treatment had no impact on children's height, weight and hemoglobin. However, Attanasio et al. (2018) show that an integrated parenting program that also includes nutritional supplementation in Colombia reduced the percentage of children whose height-for-age z-scores were below -1 standard deviations. Nahar et al. (2012b) find that a stimulation intervention in Bangladesh improved child weight-for-age z-scores by 0.26 standard deviations, however, this intervention was targeted to severely underweight hospitalized children.

4.3 Intent-to-treat effects on Parenting Practices

The only way the intervention can impact child health is through changes in parental practices in one or more of the following: psychosocial stimulation, harsh discipline, responsive parenting, affection, encouragement, father's involvement, and growth perception. Since all other aspects of the program such as IYCF practices and nutritional counseling are also delivered through com-

munity meetings and home visits made by members of the MSGs in both treatment and control communities, the changes in child health must be accompanied with changes in parenting practices. Note that a unique aspect of this field experiment is that all social interactions between families and MSGs are also identical between the treatment and the control. In Table 4, Panel B we present the intent-to-treat effects on the mechanisms mainly operating through parenting practices. We find that the intervention improves parenting practices related to psychosocial stimulation by 21 percentage points.

We next find that the incidence of physical and verbal punishments decreases by 26 and 25 percentage points respectively. Not surprisingly, these are associated with an increase in non-violent punishments which have increased by 23 percentage points. As expected, this is due to parents replacing violent practices with non-violent practices among children in treatment communities, with no such behavioral changes occurring in control communities.

We also find an improvement in caregiver perception – there is an 18-percentage point increase in the proportion of parents in treatment communities who think they have a strong influence on the growth and development of their children compared to parents in control communities. We find an improvement in involvement of father in child rearing – fathers in treatment communities are 24 percentage points more likely to be involved in activities that aid child growth. We find no improvement in responsive parenting.

4.4 Intent-to-treat effects on Parental Investments

We find that the intervention increased the number of households in the treatment group who invest in toys for their children–both made at home or bought from a shop. We find that exposure to the integrated early childhood parenting program increases the incidence of toys made at home by 21 percentage points and toys purchased in a shop by 38 percentage points (see Panel C, Table 4). There is no change in the parentage of households using homemade objects as toys and or no. of children’s books available in a household.

Our findings on parenting practices (reflect parental time investments) and parental investments (reflect parental material investments) are comparable to evidence from psychosocial stimulation interventions in both China (Sylvia et al., 2020) and Columbia (Attanasio et al., 2014, 2018). All

parenting practices and investments in our sample lead to at least a 0.37 standard deviation increase in terms of effect size which reflects a sizable improvement in parenting behaviors. The improvements in parental practices related to father's involvement, discipline and caregiver perception are unique to our integrated parenting program and remain comparable to other childhood parenting programs in developing countries (Justino et al., 2020).

4.5 ITT effects on health by ranges of the distribution

In Table 5, we present the intent-to-treat effects of the intervention on selected measures defined over the ranges of the distribution of weight-for-height and height-for-age z -scores. The results indicate that the treatment reduced the incidence of wasting for children whose weight-for-height z -score is below -1 SD by 6.7 percentage points. We also see that the treatment increased the number of children with normal weight-for-height z -score (between -1 and 1 SD) by 15 percentage points. We see notable improvements over the distribution of WHZ scores. However, we see no impacts on the different measures defined over the ranges of the distribution of height-for-age z -scores.

4.6 Heterogeneity results

We also estimate our treatment effects separately for males and females, as male and female children respond differentially to early life conditions. In Columns 1 and 3 of Table 6 we present the treatment effects for girls and boys separately. From Table 6, we note that the intervention lead to a significant reduction (4.2 percentage point) in wasting among boys. There is significant increase in psychosocial stimulation for boys, but none for girls. Compared to the control group, incidence of psychosocial stimulation for boys in the treatment group increases by 30 percentage points. Incidence of physical and verbal punishments has reduced significantly for both girls and boys in the treatment communities (relative to the control), and as expected the incidence of non-violent punishments increased. We also find that that the intervention had no impact on growth perception of girl's caregivers, however, did lead to improvements in boy's caregivers and could be associated with the more positive parenting practices observed among boys' caregivers. The gains from the intervention are greater for boys. We report baseline balance check for boys and girls in Appendix Tables A2 and A3 and show that the sample is largely balanced at baseline for both boys and girls. We also rule out attrition related selection for both genders (see Appendix Tables A4 and A5).

5 Robustness

5.1 Parenting practices using factor analysis

To examine robustness in the impact of our treatment on parenting practices, we measure psychosocial stimulation and other parenting practices using standard factor analysis that extracts maximum common variance from several survey responses about caregiver's involvement in respective activities. For example, a higher value of the psychosocial stimulation score means that the caregiver is more invested in stimulation practices. We estimate treatment effects on these composite scores and find that the intervention increased psychosocial stimulation score in the treatment group by 0.62 standard deviations compared to the control group (see Table 7). The composite scores for physical punishment and verbal punishment are similarly constructed and show that the intervention in fact successfully decreased both physical punishment and verbal punishments scores by 0.46 and 0.63 standard deviations respectively. We also find that the intervention improved the parental affection score by 0.57 standard deviations.

These findings are also supported by the overall changes in the distribution of parenting practices presented in Figures 3-6. We present the kernel density estimates for the parenting scores separated by treatment assignment and time. A Kolmogorov Smirnov (K-S) test shows no differences in the distribution of baseline parenting scores between the treatment and control for the: psychosocial stimulation score ($p\text{-value}=0.254$), physical punishment score ($p\text{-value}=0.324$), verbal punishment score ($p\text{-value}=0.961$), and affection score ($p\text{-value}=0.183$). However, at endline, we reject the null of equal distributions in parenting scores between treatment and control for the: psychosocial stimulation score ($p\text{-value}<0.01$), physical punishment score (<0.01), verbal punishment score (<0.01), and affection score ($p\text{-value}<0.01$).

Sylvia et al. (2020) find that exposure to a psychosocial stimulation intervention alone improved parenting skill factor (same as parenting practices in our case) by 0.34 standard deviations in China, which is only about half the size of the impacts reported here. The higher impacts reported here could be due to higher effects of psychosocial stimulation alone and or due to the multidimensional nature of our intervention where synergies across integrated parenting (psychosocial stimulation, responsive parenting and harsh discipline) are likely to push the frontier of parenting skills/practices

further.

5.2 Social Desirability Bias

Our primary outcome variables related to stunting and wasting are based on objective indicators of health such as anthropometrics, mitigating concerns related to subjective measurement error bias. However, the intermediary outcomes/mechanisms through which the parenting program impacts child health are based on self-reported measures raising concerns related to subjective measurement error that might bias our treatment effects. Parenting practices are often measured using self-reported data (Justino et al., 2020; Sylvia et al., 2020), hence it becomes critical to examine the robustness of our results to such self-reporting bias. Assuming that parents in the treatment group give more socially desirable responses to the parenting practices, that is, say yes more often to the positive aspects of parenting and no to the negative aspects then that could bias the treatment effects reported in Table 4 upwards, on the contrary, if parents in the control group were to give more socially desirable responses then that would bias the treatment effects downwards.

Using the intuition used to construct bounds in the attrition literature, we conduct some simulations to examine the sensitivity of our treatment effects to social desirability bias.¹⁸ In Table 8, we re-estimate the ITT effects of the program where in Panel A we assume that about 5%, 10%, and 15% of our sample was giving socially desirable response in the treatment group. That is, we randomly choose 5 (or 10 or 15)% of the observations in the treatment group that reported one on the positive parenting practices in the endline survey and change it to zero. Recall that our main impacts reported in Table 4 primarily operate through improvements observed in psychosocial stimulation, physical punishments, verbal punishment, fathers' involvement and growth perception. We find that all our impacts hold at the 5% and most of our main impacts allow for even 10% reporting bias but at 15% only the impacts for physical and verbal punishments hold up. In Panel A of Table 8 we discuss concerns related to overestimating treatment effects. However, it is also possible for the control group to give socially desirable responses too, which would do the opposite and result in underestimating the treatment effects. In fact, in a separate context, Baird and Özler (2012) compare school attendance ledgers with self-reported data on school participation. They

¹⁸Justino et al. (2020) examine the robustness of their estimates to self-reporting bias by looking at impacts on parenting practices as reported by the primary respondent as well as those reported by their partner, and report that their results remain consistent and unchanged. Andrew et al. (2020) measure quality of home environment using an index of various questions that were observed by the enumerator as well. Since we have data on neither of these, we adopt a bounding approach to examine the robustness of our impacts.

find that all study participants overstate their enrollment and attendance rates, but the number is substantially higher in the control group than the treatment, underestimating the treatment effects of the cash transfer program. To account for such underestimation, we now randomly allow for 5 (or 10 or 15)% of the observations in the control group that reported one on the positive parenting practices in the endline survey and changed it to zero. We find that our results on parenting practices related to psychosocial stimulation, fathers' involvement, and growth perception are all much higher than the benchmark estimates reported in Column 1, Panel B, and hold up at all levels of reporting bias.

5.3 Attrition

Our identification strategy also assumes the absence of selective attrition between the treatment and the control group. Out of the 677 children measured at baseline, 515 were tracked and measured during endline—resulting in an attrition rate of 24.5% for the full baseline. As previously noted in Section 3.1, this difference is not statistically significant (p -value = 0.29).

To further investigate attrition related selection concerns, we estimate the following model of attrition, where each baseline outcome variable is regressed on the attrition dummy ($Attrite$), treatment dummy ($Treatment$), and an interaction term ($Treatment * Attrite$).

$$Y_{i0} = \alpha_0 + \alpha_1 Attrite_i + \alpha_2 Treatment_i + \alpha_3 (Attrite_i * Treatment_i) + \epsilon_i \quad (2)$$

The results from equation (2) are presented in Table 9.

The estimates reported in Column 3, Table 9 show that attrition related concerns could bias the impact estimates on physical punishment and children's books only. Therefore, treatment effects for these two variables must be interpreted with caution. However, once we account for Type I error in Table 9 as well, the FDR sharpened q -values reported in Column 4 indicate that there is no selective attrition in any of the outcomes.

To further check for attrition related bias in physical punishments, we bound the intent-to-treat estimates using the Kling and Liebman (2004) technique in Table 10. For the attritors in treatment group at endline, for the lower (upper) bound estimates, we impute the mean minus

(plus) 0.10 standard deviations of the non-attrited treatment group. Similarly, for the attritors in the control group, for the lower (upper) bound, we impute the mean plus (minus) 0.10 standard deviations of the non-attrited control group. We repeat the same bounding exercise using 0.25 standard deviations. We report the benchmark intent-to-treat effects in Column 1, Table 10 as well as the lower and upper bounds produced from the bounding procedures, in Columns 2 and 3, Table 10. We find that the bounding exercise, consistent with our benchmark estimates shows significant reduction in physical punishments and no impacts on children's books mitigating attrition related selection biasing our main impacts reported in Table 4.

5.4 IYCF Practices

Next we rule out other channels also by evaluating the impact of the intervention on hygiene and responsive feeding as we suspect they may be driving the improvement in wasting. In Table 11 we present the intent-to-treat effects of the intervention on hand washing knowledge of the caregiver (=1 if the caregiver knows at least three of the five critical times to wash hands, 0 otherwise), availability of sanitation facility in the house (=1 if the household practices open defecation, 0 otherwise), excreta disposal habits of the child (=1 if the child disposed off the stool in a toilet facility, 0 otherwise), and responsive feeding by the caregiver during the day and the night (=1 if the caregiver breastfeeds or gives food to the child when he/she cries, 0 otherwise). ¹⁹ We find that none of these factors are impacted by the intervention. This is not surprising as IYCF practices are targeted to both the treatment and the control. In fact, its worth noting that the parenting program does not improve IYCF practices more in the treatment group relative to the control.

6 Conclusion

Chronic malnutrition measured by stunting and wasting among children under the age of 5 is associated with fewer grades of schooling, lower test scores, and smaller stature as an adult (see Glewwe and Miguel (2007) and Sudfeld et al. (2015) for recent reviews). Consequently, the long-term effects of poor nutrition on labor force participation, and earnings manifests through fewer grades of schooling, lower test scores, and/or lower psychosocial competencies (Hoddinott et al., 2008, 2013; Victora et al., 2008; Behrman et al., 2009; Maluccio et al., 2009; Dercon and Sánchez, 2013).

¹⁹The associated baseline balance tests and tests on selective attrition are reported in Appendix Tables A6 and A7 respectively.

Over the last decade, there has been a series of papers that argue for significant investments in early childhood development (Engle et al., 2007; Behrman et al., 2007). Time and again it has been noted that the benefit cost ratios remain highest for investments made in early childhood development. Despite these notable gains from investments in early childhood development, high quality impact evaluations targeted at improving caregiver-child relationships remain limited.

In this paper, we examine the impact of an integrated parenting program (that include features of psychosocial stimulation, responsive parenting, and child protection), wherein we ask if adding components of integrated parenting to standard nutritional counseling provided through existing mother support groups in Sierra Leone improves nutritional outcomes? Further, how does this intervention impact parenting practices/parental investments? The latter is important in not only explaining the mechanisms through which the intervention improves nutritional outcomes, but also reflective of the potential improvements in children's cognition and socio-emotional development that are likely to follow improvements in parenting practices. In fact a series of papers from developing countries (such as Bangladesh, China, Colombia, and India) all show strong linkages between improvements in parental practices and improvements in children's cognitive development (Aboud et al., 2013; Andrew et al., 2020; Attanasio et al., 2014, 2018, 2020; Sylvia et al., 2020).

We find that positive parenting when combined with standard nutritional counseling has a potential to reduce wasting in the short run and improving parenting practices in psychosocial stimulation and reducing the incidence of physical and violent punishments. We also find an improvement in caregiver perception about child development and improvement in father's involvement. For the first time, we show that adding a comprehensive parenting program to existing IYCF practices has the potential to improve child malnutrition (through reduction in wasting) and cognitive and noncognitive development (through current improvements in parenting practices related to stimulation and harsh discipline) substantially in sub-Saharan Africa.

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Figures

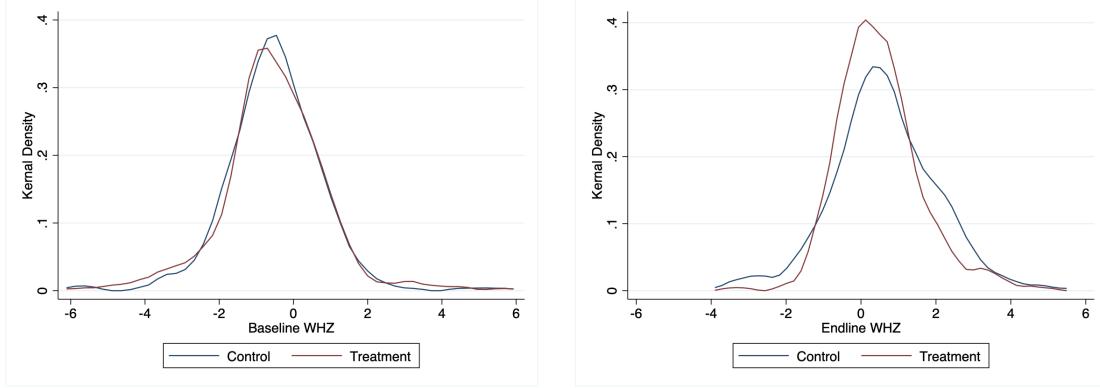


Figure 1: Kernel density functions of WHZ by time and treatment assignment

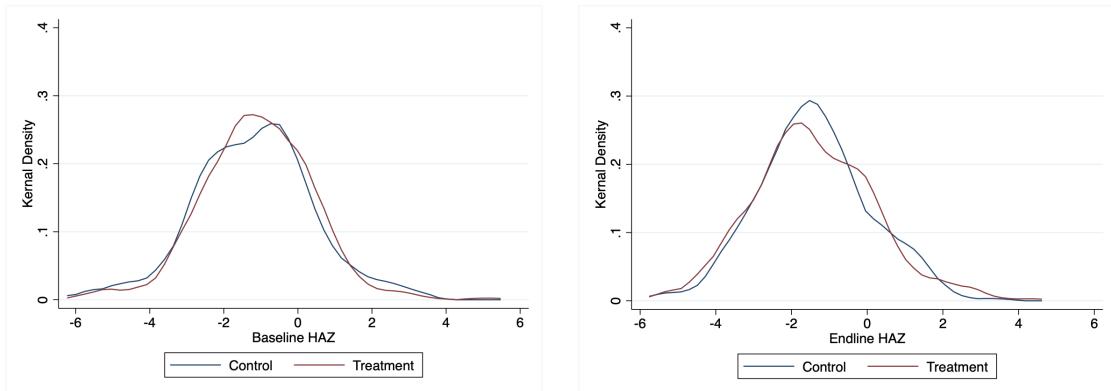


Figure 2: Kernel density functions of HAZ by time and treatment assignment

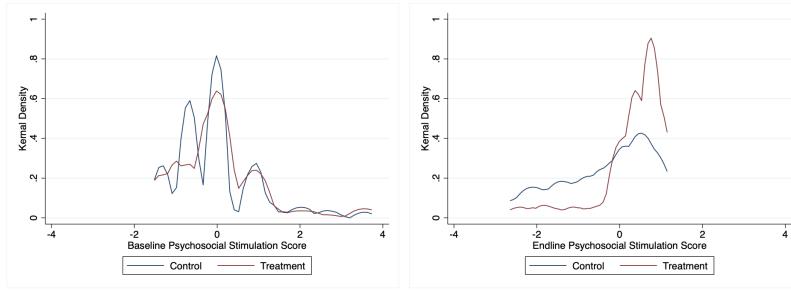


Figure 3: Kernel density functions of psychosocial stimulation score by time and treatment assignment

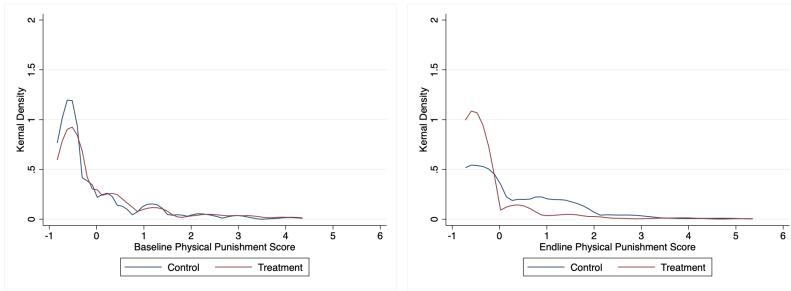


Figure 4: Kernel density functions of physical punishment score by time and treatment assignment

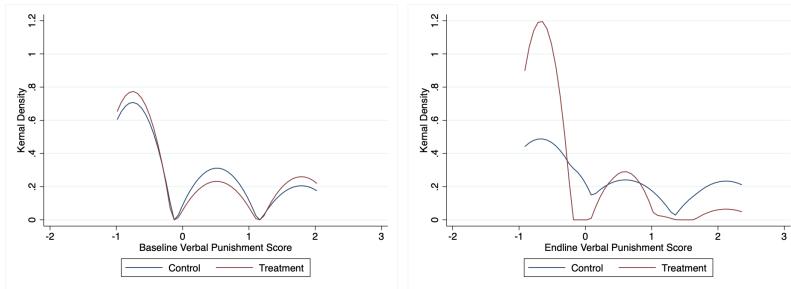


Figure 5: Kernel density functions of verbal punishment score by time and treatment assignment

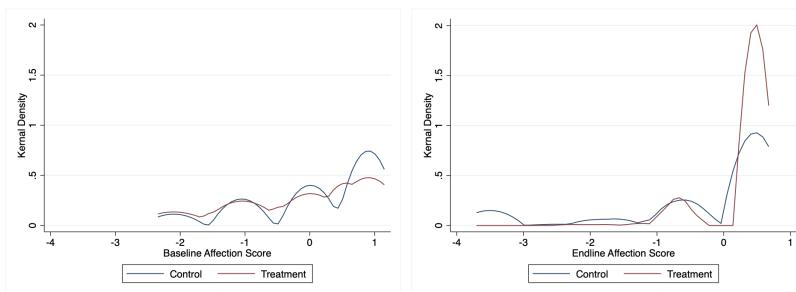


Figure 6: Kernel density functions of affection score by time and treatment assignment

Tables

Table 1: Summary Statistics

	Full Sample (1)	Control (2)	Treatment (3)
Baseline anthropometrics	844	427	417
Baseline anthropometrics & socioeconomic survey	677	311	366
Follow-up anthropometrics & socioeconomic survey	515	247	268
Total no. of communities	46	23	23

Table 2: Variable Definitions

Variable name	Definition
Panel A: Nutritional Outcomes	
WHZ	=Weight-for-height z-score
Wasting	=1 if WHZ < -2, 0 otherwise
HAZ	=Height-for-age z-score
Stunting	=1 if HAZ < -2, 0 otherwise
Panel B: Parenting Practices	
Psychosocial stimulation	=1 if there are three or more cognitive stimulation practices, 0 otherwise
Physical punishment	=1 if there is one or more forms of physical punishment, 0 otherwise
Verbal punishment	=1 if there is one or both forms of verbal punishments, 0 otherwise
Non-violent punishment	=1 if there are no forms of physical or verbal punishments at all and one or more forms of non-violent punishments, 0 otherwise
Growth Perception	=1 if the caregiver believes that parents have a strong influence on their children's development, 0 otherwise
Father's Involvement	=1 if there is father's involvement in at least 3 activities of child-rearing, 0 otherwise
Affection	=1 if the caregiver shows affection to the child in two or more ways, 0 otherwise
Responsiveness	=1 if the caregiver actively and non-violently responds to the child when the child cries, 0 otherwise
Praise and Encouragement	=1 if the caregiver offers praise and encouragement to the child, 0 otherwise
Panel C: Parental Investment	
Toys made at home	=1 if the child plays with toys made at home, 0 otherwise
Toys from shop	=1 if the child plays with toys bought from a shop, 0 otherwise
Household objects as toys	=1 if the child plays with household objects such as bowls or pots, or objects found outside, 0 otherwise
Children's books	Number of children's books or picture books in the house
Panel D: Background Characteristics	
Age	Child's age in months
Female	=1 for female children, 0 for male
Mother's Occupation	=1 if mother works for a living, 0 otherwise
Mother's age	Mother's age in years

Table 3: Baseline Balance

	Mean Pooled (1)	Mean Treatment (2)	Mean Control (3)	Difference (4)=(2)-(3)	Normalized Differences (5)	<i>N</i>
<i>Panel A: Nutritional Outcomes</i>						
WHZ	-0.52	-0.52	-0.52	-0.005 (0.136)	-0.002	658
Wasting	0.10	0.11	0.10	0.010 (0.033)	0.024	658
HAZ	-1.14	-1.09	-1.20	0.098 (0.160)	0.045	662
Stunting	0.28	0.25	0.32	-0.067 (0.050)	-0.106	662
<i>Panel B: Parenting Practices</i>						
Psychosocial stimulation	0.22	0.23	0.21	0.017 (0.053)	0.029	675
Physical punishment	0.53	0.55	0.50	0.053 (0.067)	0.076	675
Verbal punishment	0.40	0.39	0.42	-0.034 (0.071)	-0.048	675
Non-violent punishment	0.17	0.17	0.17	-0.002 (0.048)	-0.003	675
Growth perception	0.24	0.23	0.24	-0.009 (0.060)	-0.015	675
Father's Involvement	0.48	0.42	0.56	-0.136*** (0.045)	-0.194	675
Affection	0.69	0.66	0.73	-0.075 (0.054)	-0.115	675
Responsiveness	0.51	0.47	0.55	-0.084 (0.055)	-0.119	675
Praise and encouragement	0.11	0.10	0.12	-0.021 (0.041)	-0.047	674
<i>Panel C: Parental Investment</i>						
Toys made at home	0.17	0.14	0.20	-0.054 (0.038)	-0.102	675
Toys from shop	0.36	0.35	0.37	-0.023 (0.070)	-0.034	675
Household objects as toys	0.32	0.32	0.31	0.005 (0.046)	0.007	675
Children's books	0.04	0.05	0.03	0.026 (0.027)	0.066	675
<i>Panel D: Background Characteristics</i>						
Child's age (in months)	18.52	19.16	17.78	1.379 (0.843)	0.080	672
Female	0.50	0.50	0.51	-0.009 (0.040)	-0.013	672
Mother's occupation	0.89	0.87	0.92	-0.049 (0.045)	-0.113	672
Mother's age (in years)	26.62	26.5	26.78	-0.292 (0.465)	-0.038	677

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 4: Intent-to-treat effects of the intervention

	OLS (1)	Control Mean (2)	SUR Framework (3)	Naive <i>p</i> value (4)	FDR <i>q</i> value (5)	<i>N</i>
Panel A: Nutritional Outcomes						
WHZ	-0.101 (0.193)	0.614	-0.101 (0.192)	0.604	0.433	499
Wasting	-0.030** (0.015)	0.033	-0.030** (0.014)	0.046	0.061	499
HAZ	0.001 (0.248)	-1.403	0.001 (0.246)	0.996	0.593	502
Stunting	0.020 (0.072)	0.332	0.020 (0.071)	0.782	0.564	502
Panel B: Parenting Practices						
Psychosocial stimulation	0.217** (0.084)	0.685	0.217** (0.083)	0.013	0.035	473
Physical punishment	-0.261*** (0.091)	0.461	-0.261*** (0.090)	0.007	0.033	473
Verbal punishment	-0.256*** (0.091)	0.496	-0.256*** (0.091)	0.008	0.033	473
Non-violent punishment	0.237*** (0.087)	0.439	0.237*** (0.086)	0.010	0.033	473
Growth perception	0.184* (0.100)	0.387	0.184* (0.99)	0.072	0.088	465
Father's Involvement	0.244*** (0.086)	0.483	0.244*** (0.086)	0.008	0.033	465
Affection	-0.124 (0.104)	0.759	-0.124 (0.103)	0.241	0.213	473
Responsiveness	-0.026 (0.115)	0.457	-0.026 (0.114)	0.823	0.564	473
Praise and Encouragement	0.077 (0.105)	0.378	0.077 (0.104)	0.469	0.366	465
Panel C: Parental Investment						
Toys made at home	0.210** (0.085)	0.648	0.210** (0.085)	0.019	0.035	465
Toys from shop	0.387*** (0.088)	0.388	0.387*** (0.087)	0.000	0.002	473
Household objects as toys	0.115 (0.080)	0.741	0.115 (0.079)	0.157	0.159	473
Children's books	-0.136 (0.138)	0.696	-0.136 (0.137)	0.329	0.282	465

Notes: Column (1) shows the results from OLS regressions based on equation (1) with the corresponding *p* values reported in Column (4), and include the following controls: child gender, child age at baseline, mother's age at baseline, and mother's employment status at baseline. Column (2) presents the mean values of the control group at endline. Column (3) estimates show the treatment effects using a SUR framework. Column (5) reports the FDR sharpened *q* values computed using the two-stage procedure as outlined in Anderson (2008). Anderson (2008) also notes that sharpened FDR *q* values can be less than unadjusted *p* values when many hypotheses are rejected, because if there are many true rejections, then several false rejections too can be tolerated and this effectively happens for *p* values that are so large that they cannot be rejected regardless. Robust standard errors clustered at the community level in parentheses. *** *p*<0.01, ** *p*<0.05, * *p*<0.10.

Table 5: Distributional Effects

	ITT	<i>N</i>
<i>Panel A: WHZ</i>		
At risk (-2 SD < whz < -1 SD)	-0.034 (0.024)	499
Low WHZ (whz < -1 SD)	-0.067** (0.026)	499
Normal WHZ (-1 SD < whz < 1 SD)	0.152** (0.066)	499
High WHZ (whz > 1 SD)	-0.076 (0.070)	515
<i>Panel B: HAZ</i>		
At risk (-2 SD < haz < -1 SD)	-0.023 (0.045)	487
Low HAZ (haz < -1 SD)	-0.016 (0.068)	487
Normal HAZ (-1 SD < haz < 1 SD)	-0.002 (0.061)	487
High HAZ (haz > 1 SD)	0.031 (0.031)	515

Notes: This table reports results from OLS regressions based on equation (1) and include the following controls: child's gender, child's age at baseline, mother's age at baseline, and mother's employment status at baseline. Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 6: Intent-to-treat effects of the intervention by gender

	ITT effects Girls (1)	FDR <i>q</i> value (2)	<i>N</i>	ITT effects Boys (3)	FDR <i>q</i> value (4)	<i>N</i>
Panel A: Nutritional Outcomes						
WHZ	-0.020 (0.184)	0.611	246	-0.187 (0.237)	0.34	253
Wasting	-0.019 (0.022)	0.56	246	-0.042** (0.021)	0.055	253
HAZ	-0.128 (0.258)	0.611	246	0.117 (0.316)	0.532	256
Stunting	0.061 (0.060)	0.462	246	-0.025 (0.096)	0.532	256
Panel B: Parenting Practices						
Psychosocial stimulation	0.137 (0.091)	0.339	231	0.301*** (0.084)	0.006	242
Physical punishment	-0.287*** (0.089)	0.07	231	-0.237** (0.098)	0.037	242
Verbal punishment	-0.216* (0.114)	0.206	231	-0.297*** (0.082)	0.006	242
Non-violent punishment	0.244** (0.100)	0.097	231	0.233** (0.088)	0.028	242
Growth perception	0.142 (0.114)	0.366	227	0.228** (0.110)	0.055	238
Father's Involvement	0.250** (0.105)	0.097	227	0.243** (0.087)	0.025	238
Affection	-0.153 (0.120)	0.366	231	-0.103 (0.113)	0.307	242
Responsiveness	-0.064 (0.141)	0.611	231	0.017 (0.109)	0.569	242
Praise and Encouragement	0.138 (0.118)	0.374	227	0.027 (0.102)	0.532	238
Panel C: Parental Investment						
Toys made at home	0.145 (0.097)	0.339	227	0.268*** (0.092)	0.023	238
Toys from shop	0.384*** (0.107)	0.018	231	0.398*** (0.092)	0.003	242
Household objects as toys	0.058 (0.092)	0.611	231	0.170** (0.083)	0.055	242
Children's books	-0.191 (0.147)	0.366	227	-0.076 (0.170)	0.532	238

Notes: Columns (1) and (2) show the results from OLS regressions based on equation (1) for girls and boys, respectively, and include the following controls: child's age at baseline, mother's age at baseline, and mother's employment status at baseline. Columns (2) and (4) report the FDR sharpened *q* values computed using the two-stage procedure as outlined in Anderson (2008). Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 7: Intent-to-treat effects on Parenting Scores

	Treatment (1)	<i>N</i>
Psychosocial stimulation score	0.621*** (0.221)	470
Physical punishment score	-0.469** (0.184)	473
Verbal punishment score	-0.629*** (0.202)	473
Affection score	0.577** (0.262)	465

Notes: The table presents treatment effects on four distinct indices of parenting outcomes computed using factor analysis. All estimates are obtained from OLS regressions based on equation (1), and include the following controls: child's gender, child's age at baseline, mother's age at baseline, and mother's employment status at baseline. Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 8: ITT effects allowing for measurement error bias

	Benchmark ITT	ITT effects under simulated scenarios			<i>N</i>
	(1)	5%	10%	15%	
Panel A – positive response bias in treatment group					
Psychosocial stimulation	0.217** (0.084)	0.174** (0.083)	0.128 (0.085)	0.091 (0.085)	473
Physical punishment	-0.261*** (0.091)	-0.222** (0.089)	-0.183* (0.091)	-0.137 (0.089)	473
Verbal punishment	-0.256*** (0.091)	-0.220** (0.094)	-0.181* (0.090)	-0.142 (0.091)	473
Non-violent punishment	0.237*** (0.087)	0.205** (0.087)	0.169* (0.087)	0.137 (0.088)	473
Growth perception	0.184* (0.100)	0.163 (0.097)	0.126 (0.098)	0.097 (0.092)	465
Father's Involvement	0.244*** (0.086)	0.210** (0.088)	0.171** (0.078)	0.132* (0.073)	465
Affection	-0.124 (0.104)	-0.155 (0.102)	-0.184* (0.098)	-0.221** (0.093)	473
Responsiveness	-0.026 (0.115)	-0.048 (0.116)	-0.062 (0.113)	-0.089 (0.108)	473
Praise and encouragement	0.077 (0.105)	0.055 (0.101)	0.035 (0.099)	0.012 (0.106)	465
Toys made at home	0.210** (0.085)	0.169* (0.085)	0.125 (0.085)	0.078 (0.082)	465
Toys from shop	0.387*** (0.088)	0.349*** (0.086)	0.313*** (0.087)	0.269*** (0.085)	473
Household objects as toys	0.115 (0.080)	0.076 (0.079)	0.030 (0.077)	-0.015 (0.080)	473
Panel B – positive response bias in control group					
Psychosocial stimulation	0.217** (0.084)	0.249*** (0.078)	0.282*** (0.082)	0.315*** (0.076)	473
Physical punishment	-0.261*** (0.091)	-0.289*** (0.087)	-0.314*** (0.082)	-0.336*** (0.086)	473
Verbal punishment	-0.256*** (0.091)	-0.277*** (0.087)	-0.307*** (0.087)	-0.327*** (0.090)	473
Non-violent punishment	0.237*** (0.087)	0.257*** (0.086)	0.281*** (0.084)	0.301*** (0.079)	473
Growth perception	0.184* (0.100)	0.201* (0.100)	0.219** (0.099)	0.241** (0.093)	465
Father's Involvement	0.244*** (0.086)	0.266*** (0.086)	0.290*** (0.081)	0.313*** (0.087)	465
Affection	-0.124 (0.104)	-0.089 (0.103)	-0.052 (0.100)	-0.013 (0.103)	473
Responsiveness	-0.026 (0.115)	-0.005 (0.113)	0.017 (0.108)	0.045 (0.108)	473
Praise and encouragement	0.077 (0.105)	0.094 (0.101)	0.113 (0.101)	0.132 (0.098)	465
Toys made at home	0.210** (0.085)	0.241*** (0.083)	0.272*** (0.078)	0.306*** (0.082)	465
Toys from shop	0.387*** (0.088)	0.405*** (0.082)	0.428*** (0.081)	0.443*** (0.077)	473
Household objects as toys	0.115 (0.080)	0.150* (0.078)	0.190** (0.071)	0.222*** (0.070)	473

Notes: The table presents the treatment effects on self-reported outcomes when there is a positive response bias in the treatment group (Panel A) and when there is a positive response bias in control group (Panel B), as a result of social desirability. All estimates show the results from OLS regression based on equation (1), and include the following controls: child's gender, child's age at baseline, mother's age at baseline, and mother's employment status at baseline. Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 9: Selective Attrition

	Treatment (1)	Attrite (2)	Treatment*Attrite (3)	FDR (4)	<i>q</i> value	<i>N</i>
<i>Panel A: Nutritional Outcomes</i>						
WHZ	-0.001 (0.147)	0.128 (0.137)	-0.043 (0.205)		1	658
Wasting	0.008 (0.036)	0.001 (0.034)	0.009 (0.043)		1	658
HAZ	0.072 (0.177)	-0.224 (0.277)	0.154 (0.351)		1	662
Stunting	-0.043 (0.046)	0.130** (0.061)	-0.121 (0.081)	0.832	662	
<i>Panel B: Parenting Practices</i>						
Psychosocial stimulation	0.021 (0.053)	0.041 (0.062)	-0.023 (0.083)		1	675
Physical punishment	0.123* (0.068)	0.069 (0.046)	-0.223*** (0.076)	0.108	675	
Verbal punishment	0.005 (0.075)	0.018 (0.064)	-0.118 (0.077)	0.832	675	
Non-violent punishment	-0.015 (0.056)	-0.061 (0.054)	0.057 (0.069)		1	675
Growth perception	0.003 (0.067)	-0.040 (0.059)	-0.023 (0.074)		1	675
Father's Involvement	-0.093 (0.057)	-0.011 (0.054)	-0.119 (0.074)	0.832	675	
Affection	-0.102* (0.060)	-0.019 (0.063)	0.086 (0.078)		1	675
Responsiveness	-0.082 (0.063)	0.064 (0.076)	-0.020 (0.113)		1	675
Praise and encouragement	-0.028 (0.046)	-0.064* (0.032)	0.039 (0.046)		1	674
<i>Panel B: Parental Investment</i>						
Toys made at home	-0.051 (0.043)	0.004 (0.043)	-0.011 (0.054)		1	675
Toys from shop	-0.034 (0.080)	0.035 (0.057)	0.024 (0.084)		1	675
Household objects as toys	0.001 (0.053)	-0.024 (0.042)	0.019 (0.080)		1	675
Children's books	0.051 (0.033)	0.033 (0.032)	-0.078* (0.044)	0.832	675	

Notes: The table presents results obtained from OLS regressions based on equation (2). Column (4) reports the adjusted FDR sharpened *q* values for the estimates reported in Column (3). Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 10: Bounding Exercise

	Benchmark ITT (1)	Lower (2)	Upper (3)
Panel A: Physical Punishment			
ITT	-0.261*** (0.091)		
Kling and Liebman bounds: Mean \pm 0.10 s.d		-0.291*** (0.069)	-0.248*** (0.069)
Kling and Liebman bounds: Mean \pm 0.25 s.d		-0.324*** (0.070)	-0.216*** (0.070)
<i>N</i>		630	630
Panel B: Children's Books			
ITT	-0.136 (0.138)		
Kling and Liebman bounds: Mean \pm 0.10 s.d		-0.178* (0.104)	-0.077 (0.103)
Kling and Liebman bounds: Mean \pm 0.25 s.d		-0.254** (0.106)	-0.001 (0.103)
<i>N</i>		622	622

Notes: The table presents lower and upper bounds estimates on the ITT effects for the variables that have selective attrition. The methodology is outlined in Section 5.3. All estimates show results from OLS regressions based on equation (1). Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 11: Intent-to-Treat effects on IYCF practices

	ITT (1)	N
<i>Panel A: Hygiene</i>		
Hand washing knowledge	-0.009 (0.118)	453
No sanitation facility	-0.033 (0.032)	453
Excreta disposal	0.038 (0.046)	461
<i>Panel B: Responsive feeding</i>		
Responsive feeding (day)	0.015 (0.034)	473
Responsive feeding (night)	0.009 (0.073)	473

Notes: The table presents treatment effects on two IYCF practices—Hygiene and Responsive Feeding. All estimates show results from OLS regressions based on equation (1) and include the following controls: child's gender, child's age at baseline, mother's age at baseline, and mother's employment status at baseline. Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Appendix

Table A1: Baseline Check for Non-Attrited Sample

	Mean Pooled (1)	Mean Treatment (2)	Mean Control (3)	Difference (4)=(2)-(3)	Normalized Differences (5)	N
Panel A: Nutritional Outcomes						
WHZ	-0.55	-0.55	-0.54	-0.009 (0.147)	-0.005	505
Wasting	0.10	0.10	0.10	0.011 (0.036)	0.025	505
HAZ	-1.11	-1.07	-1.15	-0.078 (0.176)	0.036	507
Stunting	0.26	0.24	0.29	-0.048 (0.045)	-0.076	507
Panel B: Parenting Practices						
Psychosocial stimulation	0.22	0.22	0.21	0.017 (0.055)	0.030	513
Physical punishment	0.54	0.60	0.48	0.116 (0.069)	0.165	513
Verbal punishment	0.41	0.41	0.41	0.001 (0.077)	0.002	513
Non-violent punishment	0.18	0.17	0.19	-0.015 (0.055)	-0.027	513
Growth perception	0.24	0.24	0.24	0.004 (0.067)	0.007	513
Father's Involvement	0.49	0.44	0.55	-0.115** (0.051)	-0.163	513
Affection	0.69	0.64	0.74	-0.103* (0.058)	-0.158	513
Responsiveness	0.49	0.44	0.54	-0.107* (0.061)	-0.151	513
Praise and encouragement	0.12	0.11	0.13	-0.025 (0.046)	-0.054	512
Panel C: Parental Investment						
Toys made at home	0.17	0.14	0.20	-0.057 (0.047)	-0.107	513
Toys from shop	0.35	0.34	0.37	-0.037 (0.083)	-0.054	513
Household objects as toys	0.32	0.32	0.33	-0.007 (0.054)	-0.010	513
Children's books	0.04	0.06	0.02	0.044 (0.030)	0.108	513
Panel D: Background Characteristics						
Child's age (in months)	17.13	17.73	16.47	1.265 (1.075)	0.082	515
Female	0.50	0.51	0.49	0.021 (0.043)	0.030	515
Mother's occupation	0.89	0.88	0.90	-0.019 (0.046)	-0.042	515
Mother's age (in years)	26.59	26.37	26.83	-0.465 (0.494)	-0.060	515

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A2: Balance check at baseline – Girls

	Mean Pooled (1)	Mean Treatment (2)	Mean Control (3)	Difference (4)=(2)-(3)	Normalized Differences (5)	<i>N</i>
<i>Panel A: Nutritional Outcomes</i>						
WHZ	-0.41	-0.46	-0.34	-0.127 (0.177)	-0.066	333
Wasting	0.08	0.08	0.07	0.011 (0.036)	0.030	333
HAZ	-1.06	-0.96	-1.16	0.198 (0.168)	0.085	334
Stunting	0.26	0.21	0.32	-0.107** (0.052)	-0.172	334
<i>Panel B: Parenting Practices</i>						
Psychosocial stimulation	0.23	0.23	0.23	0.005 (0.066)	0.009	338
Physical punishment	0.54	0.57	0.51	0.054 (0.081)	0.077	338
Verbal punishment	0.43	0.42	0.43	-0.008 (0.075)	-0.012	338
Non-violent punishment	0.18	0.2	0.16	0.042 (0.059)	0.077	338
Growth perception	0.21	0.22	0.21	0.008 (0.064)	0.013	338
Father's Involvement	0.47	0.4	0.54	-0.144** (0.062)	-0.206	338
Affection	0.71	0.68	0.74	-0.057 (0.068)	-0.089	338
Responsiveness	0.53	0.53	0.53	-0.004 (0.068)	-0.005	338
Praise and encouragement	0.12	0.11	0.12	-0.009 (0.046)	-0.019	338
<i>Panel C: Parental Investment</i>						
Toys made at home	0.19	0.14	0.23	-0.090* (0.050)	-0.163	338
Toys from shop	0.37	0.32	0.42	-0.095 (0.066)	-0.140	338
Household objects as toys	0.35	0.35	0.35	0.001 (0.059)	0.002	338
Children's books	0.04	0.05	0.03	0.030 (0.027)	0.079	338
<i>Panel D: Background Characteristics</i>						
Child's age (in months)	18.96	19.12	18.78	0.344 (1.445)	0.020	338
Mother's occupation	0.87	0.84	0.89	-0.048 (0.062)	-0.100	338
Mother's age (in years)	26.25	26.07	26.45	-0.383 (0.488)	-0.053	338

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A3: Balance check at baseline – Boys

	Mean Pooled (1)	Mean Treatment (2)	Mean Control (3)	Difference (4)=(2)-(3)	Normalized Differences (5)	<i>N</i>
<i>Panel A: Nutritional Outcomes</i>						
WHZ	-0.63	-0.58	-0.70	0.123 (0.137)	0.068	325
Wasting	0.13	0.13	0.12	0.008 (0.044)	0.018	325
HAZ	-1.22	-1.22	-1.22	-0.003 (0.217)	-0.001	328
Stunting	0.30	0.29	0.31	-0.027 (0.068)	-0.041	328
<i>Panel B: Parenting Practices</i>						
Psychosocial stimulation	0.22	0.23	0.20	0.036 (0.058)	0.062	332
Physical punishment	0.52	0.55	0.49	0.069 (0.081)	0.097	332
Verbal punishment	0.38	0.36	0.41	-0.053 (0.090)	-0.077	332
Non-violent punishment	0.16	0.14	0.19	-0.046 (0.058)	-0.088	332
Growth perception	0.26	0.24	0.28	-0.037 (0.074)	-0.060	332
Father's Involvement	0.50	0.44	0.57	-0.128** (0.063)	-0.182	332
Affection	0.68	0.64	0.72	-0.079 (0.069)	-0.121	332
Responsiveness	0.49	0.42	0.58	-0.157** (0.063)	-0.224	332
Praise and encouragement	0.11	0.09	0.13	-0.031 (0.046)	-0.069	332
<i>Panel C: Parental Investment</i>						
Toys made at home	0.15	0.14	0.16	-0.013 (0.040)	-0.026	332
Toys from shop	0.35	0.37	0.32	0.050 (0.095)	0.074	332
Household objects as toys	0.28	0.29	0.27	0.019 (0.058)	0.030	332
Children's books	0.04	0.05	0.03	0.024 (0.033)	0.056	332
<i>Panel D: Background Characteristics</i>						
Child's age (in months)	18.08	19.20	16.75	2.447* (1.271)	0.143	334
Mother's occupation	0.91	0.89	0.94	-0.201 (0.650)	-0.131	334
Mother's age (in years)	27.01	26.92	27.12	-0.052 (0.039)	-0.025	334

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A4: Selective Attrition – Girls

	Treatment (1)	Attrite (2)	Treatment*Attrite (3)	FDR <i>q</i> value (4)	<i>N</i>
<i>Panel A: Nutritional Outcomes</i>					
WHZ	-0.059 (0.170)	0.048 (0.202)	-0.276 (0.357)	1	333
Wasting	-0.009 (0.035)	0.015 (0.049)	0.081 (0.067)	1	333
HAZ	0.322 (0.198)	0.017 (0.395)	-0.488 (0.523)	1	334
Stunting	-0.126** (0.054)	0.056 (0.089)	0.069 (0.119)	1	334
<i>Panel B: Parenting Practices</i>					
Psychosocial stimulation	-0.007 (0.071)	0.039 (0.092)	0.037 (0.118)	1	338
Physical punishment	0.135 (0.083)	0.118** (0.054)	-0.267*** (0.088)	0.077	338
Verbal punishment	-0.006 (0.074)	-0.037 (0.071)	-0.005 (0.093)	1	338
Non-violent punishment	0.004 (0.063)	-0.104** (0.050)	0.125 (0.079)	0.958	338
Growth perception	0.018 (0.077)	-0.091 (0.071)	-0.026 (0.099)	1	338
Father's Involvement	-0.146* (0.080)	-0.064 (0.065)	0.008 (0.097)	1	338
Affection	-0.112 (0.075)	-0.055 (0.085)	0.177 (0.108)	0.958	338
Responsiveness	0.046 (0.081)	0.152* (0.083)	-0.166 (0.128)	1	338
Praise and encouragement	-0.013 (0.050)	-0.053 (0.042)	0.018 (0.057)	1	337
<i>Panel C: Parental Investment</i>					
Toys made at home	-0.088 (0.054)	0.023 (0.057)	-0.007 (0.072)	1	338
Toys from shop	-0.115 (0.078)	0.041 (0.075)	0.061 (0.097)	1	338
Household objects as toys	0.011 (0.076)	-0.02 (0.065)	-0.030 (0.133)	1	338
Children's books	0.064* (0.037)	0.023 (0.046)	-0.105* (0.056)	0.958	338

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A5: Selective Attrition – Boys

	Treatment (1)	Attrite (2)	Treatment*Attrite (3)	FDR <i>q</i> value (4)	<i>N</i>
<i>Panel A: Nutritional Outcomes</i>					
WHZ	0.038 (0.160)	0.155 (0.206)	0.228 (0.288)	1	325
Wasting	0.029 (0.057)	-0.008 (0.095)	-0.068 (0.103)	1	325
HAZ	-0.193 (0.216)	-0.550 (0.406)	0.875* (0.444)	0.421	328
Stunting	0.043 (0.058)	0.226* (0.123)	-0.332** (0.133)	0.402	328
<i>Panel B: Parenting Practices</i>					
Psychosocial stimulation	0.049 (0.059)	0.036 (0.070)	-0.053 (0.098)	1	332
Physical punishment	0.111 (0.079)	-0.004 (0.096)	-0.118 (0.136)	1	332
Verbal punishment	0.014 (0.096)	0.087 (0.110)	-0.228* (0.129)	0.46	332
Non-violent punishment	-0.036 (0.067)	0.003 (0.104)	-0.030 (0.121)	1	332
Growth perception	-0.010 (0.079)	0.046 (0.095)	-0.094 (0.103)	1	332
Father's Involvement	-0.036 (0.086)	0.067 (0.114)	-0.275** (0.135)	0.421	332
Affection	-0.095 (0.078)	0.023 (0.073)	0.036 (0.090)	1	332
Responsiveness	-0.211*** (0.064)	-0.038 (0.116)	0.170 (0.163)	1	332
Praise and encouragement	-0.044 (0.058)	-0.079 (0.066)	0.071 (0.084)	1	332
<i>Panel C: Parental Investment</i>					
Toys made at home	-0.016 (0.049)	-0.042 (0.065)	0.026 (0.080)	1	332
Toys from shop	0.045 (0.106)	0.000 (0.089)	0.013 (0.124)	1	332
Household objects as toys	-0.016 (0.063)	-0.055 (0.074)	0.124 (0.092)	0.96	332
Children's books	0.036 (0.040)	0.046 (0.061)	-0.054 (0.073)	1	332

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A6: Balance in IYCF Practices

	Mean Pooled (1)	Mean Treatment (2)	Mean Control (3)	Difference (4)=(2)-(3)	Normalized Differences (5)	<i>N</i>
<i>Panel A: Hygiene</i>						
Hand washing knowledge	0.45	0.44	0.45	-0.010 (0.054)	-0.01	672
No sanitation facility	0.08	0.10	0.06	0.034 (0.041)	0.03	672
Excreta disposal	0.56	0.51	0.62	-0.118 (0.073)	-0.12	672
<i>Panel B: Responsive Feeding</i>						
Responsive feeding (day)	0.95	0.95	0.97	-0.023 (0.018)	-0.08	675
Responsive feeding (night)	0.96	0.95	0.96	-0.011 (0.020)	-0.04	675

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A7: Selective Attrition in IYCF Practices

	Treatment (1)	Attrite (2)	Treatment*Attrite (3)	<i>N</i>
<i>Panel A: Hygiene</i>				
Hand washing knowledge	-0.048 (0.055)	-0.079 (0.053)	0.163** (0.072)	672
No sanitation facility	0.025 (0.044)	0.017 (0.049)	0.031 (0.059)	672
Excreta disposal	-0.117 (0.079)	0.016 (0.074)	-0.008 (0.092)	672
<i>Panel B: Responsive Feeding</i>				
Responsive feeding (day)	-0.020 (0.019)	0.001 (0.025)	-0.010 (0.032)	675
Responsive feeding (night)	-0.001 (0.024)	0.005 (0.040)	-0.039 (0.044)	675

Notes: Robust standard errors clustered at the community level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.