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Improving parenting practices and child health: Experimental evidence from Sierra Leone*

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Abstract

We examine the impact of an integrated parenting program that seeks to improve parent-child interactions, specifically, foster stimulation, responsive parenting as well as reduce parental abuse, violence, and neglect towards children. Exploiting experimental variation in program access, we show that the intervention was successful in improving children's health, as reflected by a decrease in the prevalence of wasting and improvements in the distribution of weight-for-height zscores. We find improvements in parenting practices related to psychosocial stimulation and harsh discipline to be the primary mechanisms through which children's health improves. Our results show that adding a parenting curriculum on stimulation, child abuse, and neglect to standard nutritional counseling can have important implications for children's lifetime well-being.

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

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

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1 Introduction

Investments in early childhood are critical for supporting healthy brain development among children. During this time, parents as primary caregivers have the most influence on children's physical, cognitive, and socio-emotional well-being. Parents make important decisions by choosing the quantity and quality of critical inputs - breastfeeding, immunization, nutrition supplementation, stimulation, harsh discipline, and responsive caregiving. Among these, interventions that focus on changing parental practices, such as, provision of affection, limiting physical abuse and neglect, and increasing cognitive stimulation are seen to have much promise (Black et al., 2017). First, these interventions rely on changing parental practices that do not require poor credit-constrained households to purchase inputs (e.g., nutritious food and medicines) from the market. Second, evidence shows that changing parental stimulation practices can have long-lasting economic gains, over and above those obtained from nutritional supplementation alone (Gertler et al., 2014).

This has led to a series of field experiments that focus on improving parental stimulation practices in low-and middle-income countries. These interventions have been successful in improving children's cognition, but had modest impacts on children's language and fine motor skills (Attanasio et al., 2014; Andrew et al., 2020; Sylvia et al., 2021). A smaller subset of these studies have also examined the impact of stimulation practices on children's health (Nahar et al., 2012; Attanasio et al., 2014, 2022). However, these studies focus exclusively on improving stimulation and fail to exploit synergies in parenting practices that combine features of responsive parenting, physical safety, and child protection in terms of abuse and neglect, integrating all components of nurturing care that are critical for child development (Walker et al., 2007; Britto et al., 2015; Black et al., 2017).

Since improving parenting practices offers much promise in resource-constrained low-income countries, which are also home to the largest proportion of stunted and wasted children in the world [1], in this paper, we specifically ask if adding components of integrated

[1]The UNICEF/WHO/World Bank Joint Child Malnutrition Estimates (March 2020) show that nearly

parenting related to stimulation, responsive parenting, and security and safety to standard nutritional counseling improves parenting practices and children's health in a low-income setting?

To answer this question, we design a cluster randomized control trial in Sierra Leone, 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 already prevalent Infant and Young Child Feeding (IYCF) activities/"business as usual"). 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 monthly community meetings, home visits, and nutritional aspects (related to IYCF) of the program identical between the treatment and control.[2] This helps mitigates concerns related to experimenter demand effects in ECD interventions where mothers in treatment villages have substantially higher contact with the provider compared to the control group that has zero contact with the provider. Furthermore, the program delivery used for the intervention also makes the results highly scalable as the program is delivered through Mother Support Groups that already exist in all parts of Sierra Leone.[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

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.

[2]None of the experimental evaluations of stimulation only interventions can keep these aspects identical between the treatment and the control (Attanasio et al., 2014, 2022).

[3]Researchers often create new ways of program delivery that is funded by grants and hence cannot be directly scaled.

[4]The length of our integrated parenting intervention is comparable to other stimulation interventions. Attanasio et al. (2022) delivered their stimulation and nutrition intervention 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.

treatment group (23 communities), or the control group (23 communities). We collect data on child anthropometrics as well as a wide range of parenting practices to estimate the intent-to-treat effect of the integrated early childhood parenting program on both parenting practices and child health.

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. The positive impacts on wasting are also accompanied by improvements in parenting practices related to psychosocial stimulation, harsh 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 shops which went up by 38 percentage points as well as toys made at home which increased 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 have the potential of improving long-term well-being through improvements in nutritional status as well as through better parenting practices related to stimulation and harsh discipline. Importantly, improvements in parenting practices related to stimulation, protection, and involvement do not crowd out hygiene and feeding practices.

Our finding that treatment improves parenting practices on stimulation and reduces the incidence of wasting are consistent with recent evidence from a cluster randomized control trial of a combined psychosocial stimulation and nutrition intervention in Colombia(Attanasio et al., 2020). It is also plausible that some of the short run treatment effects observed here become stronger or emerge later in the life cycle (Heckman et al., 2006), especially the one's linking improved parenting practices (related to stimulation and harsh discipline) in early childhood to children's cognition and social-emotional development measured later in life. Further, 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).

This paper makes several contributions to the literature. First, to our knowledge, this is the first paper to provide causal evidence on the impact of an integrated early childhood parenting program on children's health as well as a wide range of parenting practices related to stimulation, responsive caregiving, harsh discipline, IYCF practices, and father's involvement. So far, there is some scalable evidence on only the impacts of psychosocial stimulation interventions in developing countries (Attanasio et al., 2014; Sylvia et al., 2021; Attanasio et al., 2020; Andrew et al., 2020).

Second, this paper adds to the broader literature on parenting practices and their impact on child development. Several interventions focus on altering parental practices such as, responsive caregiving, reducing abuse and neglect, psychosocial stimulation, handwashing, and complementary feeding practices (Engle et al., 1997). Dewey and Adu-Afarwuah (2008) review the literature on complementary feeding practices and note that the impact of providing complementary food and nutrition education is evident only among younger children. In Kingston, Jamaica, 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, China, and India (Attanasio et al., 2014; Sylvia et al., 2021; Andrew et al., 2020), which focus on cognition, language and fine motor skills, but not child health.

Third, our paper also adds to the literature on child abuse, maltreatment, mental health, and social-emotional wellbeing more generally.[5] 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, none of experimental evaluations of stimulation interventions (Attanasio et al., 2014; Sylvia et al., 2021; Attanasio et al., 2020; Andrew et al., 2020) focus on changing parenting practices around child abuse, violent behavior, and neglect. Further, in a systematic review of interventions to prevent child maltreatment, Macmillan et al. (2009) find positive parenting interventions to be promising, but call for further assessment and recommend the use of actual health measures. In this paper, we present impacts on both parenting practices related to maltreatment as well as child health.

Lastly, this paper adds to the broader literature on experimental evaluation of programs and policies that can reduce the prevalence of stunting and wasting in developing countries.

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

In New Delhi, deworming pills among pre-school age children is shown to improve child weight-for-height and weight-for-age z-scores (Bobonis et al., 2006). In Mexico, the conditional cash transfer program (PROGRESA) reduced the incidence of stunting (Behrman and Hoddinott, 2005) and increased child height (Gertler, 2004). In Colombia, stimulation plus nutritional supplement intervention reduces the incidence of low height-for-age z-scores (Attanasio et al., 2020). And in Nigeria, nutritional information and cash transfers improve parental practices on breastfeeding and antenatal care as well as parental investments in deworming and vaccination, which translate to improvements in children's height-for-age z-scores (Carneiro et al., 2021).

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. These gains are likely to translate to higher cognitive and non-cognitive skills in the long run.

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).[6] Owing to the poor health outcomes, Catholic Relief Services (CRS) in Sierra

[6]Underweight 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. The growth standards are based on heights and weights of well nourished children from Brazil, Ghana, India, Norway,

Leone, in partnership with the 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)

Oman, and USA.

of the program identical between the treatment and control. This unique aspect of our experiment also makes it highly scalable.[7] Every community has one MSG that includes 15 members of the community and met at least once a month. In addition, in 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.[8]

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 for 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)

[7] An 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.

[8] Unfortunately, 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.

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 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.[9]

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.[10] 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.

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-value=0.29), ruling out attrition related selection concerns. Attrition related concerns are discussed in further detail in Section 5.3.

[9]While 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.

[10]There 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.

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).[11] Wasting (WHZ<-2) in children is a symptom of acute undernutrition, usually 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 on all nutritional outcomes analyzed here.

[11] Recent 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).

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), 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 have the potential to 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 (Opondo 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., 2021). 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.[12]

At baseline, only 22% of the parents report practicing psychosocial stimulation with children at home.[13] A large proportion, approximately 53% of the parents report practicing physical punishments, 40% verbal punishments, and 17% non-violent punishments among children under 2.[14] 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

[12]There 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.

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

[14]The 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).

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.[15]

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:

$$Y_{i1} = \beta_0 + \beta_1 Y_{i0} + \beta_2 Treatment_i + \Sigma_{j=1}^{4} \gamma_j X_{ij0} + \epsilon_{i1} \quad (1)$$

Where Y includes the full set of outcome variables measured during endline and are de-

[15] In 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.

fined 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. (2021) 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, Xs 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.[16] 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 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.

[16] No data was collected on household assets, consumption expenditure or wage earnings.

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-value = 0.950). We arrive at a similar conclusion by comparing baseline HAZ between treatment and control (p-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-value < 0.10). At the same time there is no shift in the distribution of endline HAZ scores (p-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. The authors provide no assessment on children's stunting, wasting, HAZ scores or WHZ scores. Attanasio et al. (2022) 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. (2012) 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 and hence not directly comparable to our community based intervention that targets multiple aspects of integrated parenting.

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 community 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. In Table 4, Panel B we present the intent-to-treat effects on 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. Parents in treatment communities replace violent practices with non-violent practices, with no behavioral changes 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., 2021) and Columbia (Attanasio et al., 2014, 2022). 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 practices. 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. Com-

pared 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 [17]. 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 parent-

[17] We perform principal-component factor analysis, retain at most 1 factor, and then predict an index for each variable.

ing 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-value=0.254), physical punishment score (p-value=0.324), verbal punishment score (p-value=0.961), and affection score (p-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-value<0.01), physical punishment score (<0.01), verbal punishment score (<0.01), and affection score (p-value<0.01).

Sylvia et al. (2021) 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., 2021), 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 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.

[18] Justino 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.

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 is 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*).

$$Y_i = \alpha_0 + \alpha_1 Attrite_i + \alpha_2 Treatment_i + \alpha_3 (Attrite_i * Treatment_i) + \epsilon_i \quad (2)$$

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 as measured by stunting and wasting during early childhood is associated with fewer grades of schooling, lower test scores, smaller stature as an adult, lower psychosocial competencies, and earnings in the labor market (see Glewwe and Miguel (2007), Sudfeld et al. (2015), (Hoddinott et al., 2008, 2013; Victora et al., 2008; Behrman et al., 2009; Maluccio et al., 2009; Dercon and Sánchez, 2013).

Over the last decade, there has been a series of papers that argue for interventions that strengthen parent-child relationships. Parenting interventions offer much promise for improving early childhood development in low-income settings as they rely on changing parental

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

behaviors only. Despite the potentially large gains noted from improving parenting practices (Black et al., 2017), high quality impact evaluations targeted at improving multiple aspects of 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 improves nutritional outcomes? And how does this intervention impact parenting practices and parental investments? The latter is important in not only explaining the mechanisms through which the intervention improves nutritional outcomes, but also indicative of the potential improvements in children's cognition and socio-emotional development that are likely to follow later in life.

To answer this question, we design a cluster randomized control trial in Sierra Leone, 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 already prevalent Infant and Young Child Feeding (IYCF) activities/"business as usual"). 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 monthly community meetings, home visits, and nutritional aspects (related to IYCF) of the program identical between the treatment and control. We find that positive parenting when combined with standard nutritional counseling reduces the incidence of wasting, improves parenting stimulation practices, reduces the incidence of physical and violent punishments, and improves father's involvement in child development. We also find improvements in caregiver perception about child development.

Overall, 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.

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Figures

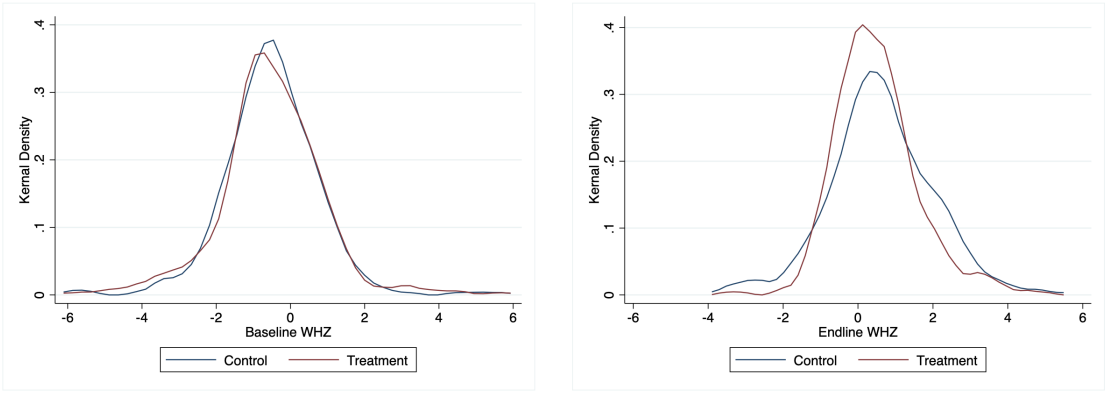


Figure 1: Kernel density functions of WHZ by time and treatment assignment

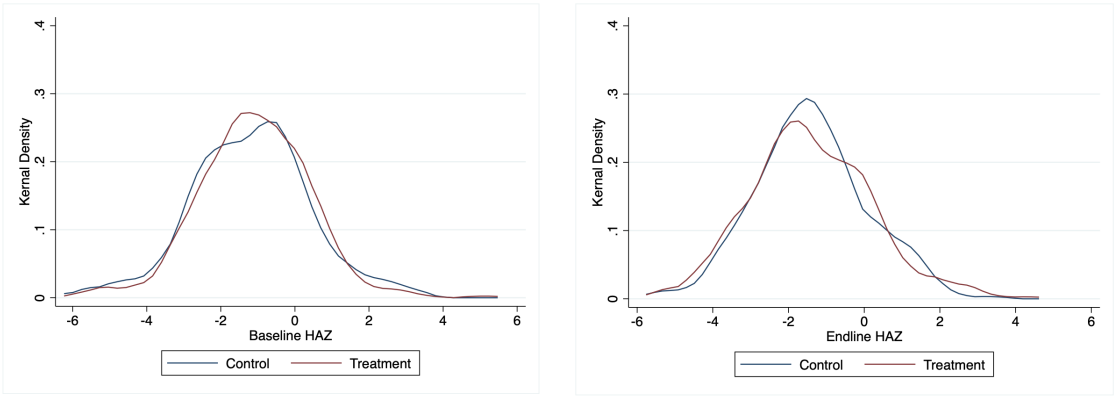


Figure 2: Kernel density functions of HAZ by time and treatment assignment

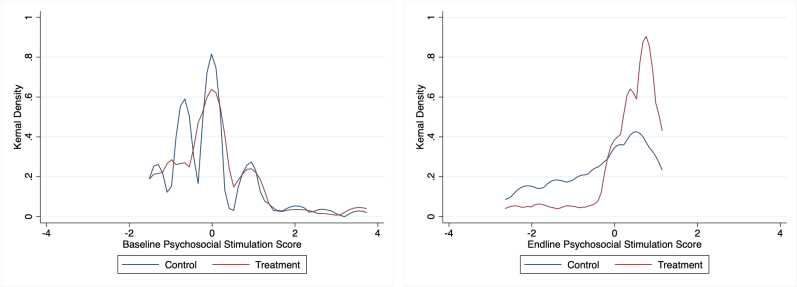


Figure 3: Kernel density functions of psychosocial stimulation score by time and treatment assignment

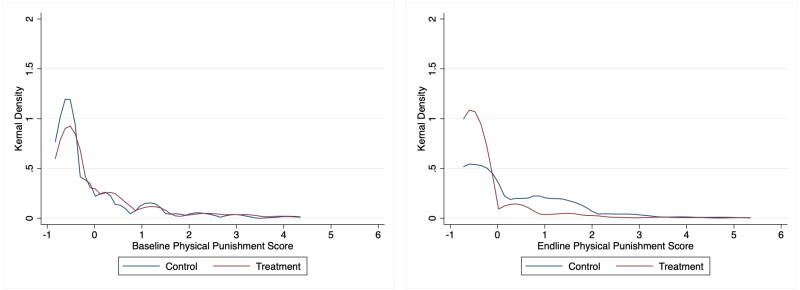


Figure 4: Kernel density functions of physical punishment score by time and treatment assignment

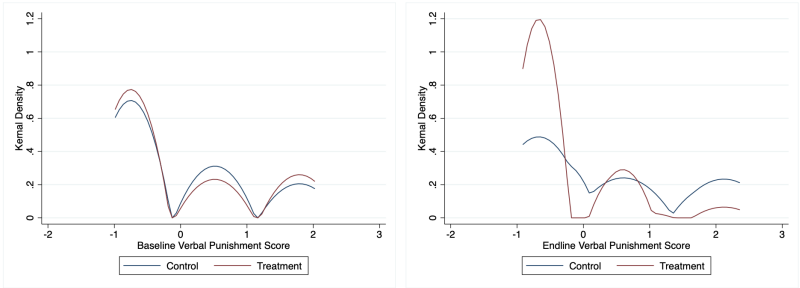


Figure 5: Kernel density functions of verbal punishment score by time and treatment assignment

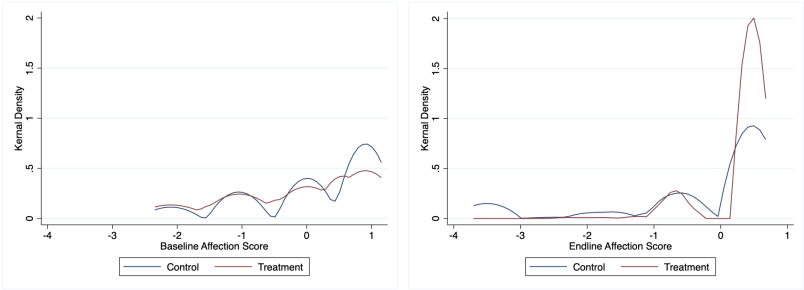


Figure 6: Kernel density functions of affection score by time and treatment assignment

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

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

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

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

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)	N
Psychosocial stimulation score	0.621***	470
	(0.221)	
Physical punishment score	-0.469**	473
	(0.184)	
Verbal punishment score	-0.629***	473
	(0.202)	
Affection score	0.577**	465
	(0.262)	

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			
		5%	10%	15%	N
	(1)	(2)	(3)	(4)	
Panel A – positive response bias in treatment group					
Psychosocial stimulation	0.217**	0.174**	0.128	0.091	473
	(0.084)	(0.083)	(0.085)	(0.085)	
Physical punishment	-0.261***	-0.222**	-0.183*	-0.137	473
	(0.091)	(0.089)	(0.091)	(0.089)	
Verbal punishment	-0.256***	-0.220**	-0.181*	-0.142	473
	(0.091)	(0.094)	(0.090)	(0.091)	
Non-violent punishment	0.237***	0.205**	0.169*	0.137	473
	(0.087)	(0.087)	(0.087)	(0.088)	
Growth perception	0.184*	0.163	0.126	0.097	465
	(0.100)	(0.097)	(0.098)	(0.092)	
Father's Involvement	0.244***	0.210**	0.171**	0.132*	465
	(0.086)	(0.088)	(0.078)	(0.073)	
Affection	-0.124	-0.155	-0.184*	-0.221**	473
	(0.104)	(0.102)	(0.098)	(0.093)	
Responsiveness	-0.026	-0.048	-0.062	-0.089	473
	(0.115)	(0.116)	(0.113)	(0.108)	
Praise and encouragement	0.077	0.055	0.035	0.012	465
	(0.105)	(0.101)	(0.099)	(0.106)	
Toys made at home	0.210**	0.169*	0.125	0.078	465
	(0.085)	(0.085)	(0.085)	(0.082)	
Toys from shop	0.387***	0.349***	0.313***	0.269***	473
	(0.088)	(0.086)	(0.087)	(0.085)	
Household objects as toys	0.115	0.076	0.030	-0.015	473
	(0.080)	(0.079)	(0.077)	(0.080)	
Panel B – positive response bias in control group					
Psychosocial stimulation	0.217**	0.249***	0.282***	0.315***	473
	(0.084)	(0.078)	(0.082)	(0.076)	
Physical punishment	-0.261***	-0.289***	-0.314***	-0.336***	473
	(0.091)	(0.087)	(0.082)	(0.086)	
Verbal punishment	-0.256***	-0.277***	-0.307***	-0.327***	473
	(0.091)	(0.087)	(0.087)	(0.090)	
Non-violent punishment	0.237***	0.257***	0.281***	0.301***	473
	(0.087)	(0.086)	(0.084)	(0.079)	
Growth perception	0.184*	0.201*	0.219**	0.241**	465
	(0.100)	(0.100)	(0.099)	(0.093)	
Father's Involvement	0.244***	0.266***	0.290***	0.313***	465
	(0.086)	(0.086)	(0.081)	(0.087)	
Affection	-0.124	-0.089	-0.052	-0.013	473
	(0.104)	(0.103)	(0.100)	(0.103)	
Responsiveness	-0.026	-0.005	0.017	0.045	473
	(0.115)	(0.113)	(0.108)	(0.108)	
Praise and encouragement	0.077	0.094	0.113	0.132	465
	(0.105)	(0.101)	(0.101)	(0.098)	
Toys made at home	0.210**	0.241***	0.272***	0.306***	465
	(0.085)	(0.083)	(0.078)	(0.082)	
Toys from shop	0.387***	0.405***	0.428***	0.443***	473
	(0.088)	(0.082)	(0.081)	(0.077)	
Household objects as toys	0.115	0.150*	0.190**	0.222***	473
	(0.080)	(0.078)	(0.071)	(0.070)	

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

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	Lower	Upper
	(1)	(2)	(3)
Panel A: Physical Punishment			
ITT	-0.261***		
	(0.091)		
Kling and Liebman bounds: Mean ± 0.10 s.d		-0.291***	-0.248***
		(0.069)	(0.069)
Kling and Liebman bounds: Mean ± 0.25 s.d		-0.324***	-0.216***
		(0.070)	(0.070)
N		630	630
Panel B: Children's Books			
ITT	-0.136		
	(0.138)		
Kling and Liebman bounds: Mean ± 0.10 s.d		-0.178*	-0.077
		(0.104)	(0.103)
Kling and Liebman bounds: Mean ± 0.25 s.d		-0.254**	-0.001
		(0.106)	(0.103)
N		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*
Panel A: Hygiene		
Hand washing knowledge	-0.009	453
	(0.118)	
No sanitation facility	-0.033	453
	(0.032)	
Excreta disposal	0.038	461
	(0.046)	
Panel B: Responsive feeding		
Responsive feeding (day)	0.015	473
	(0.034)	
Responsive feeding (night)	0.009	473
	(0.073)	

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

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

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

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

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

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)	*N*
Panel A: Hygiene						
Hand washing knowledge	0.45	0.44	0.45	-0.010	-0.01	672
				(0.054)		
No sanitation facility	0.08	0.10	0.06	0.034	0.03	672
				(0.041)		
Excreta disposal	0.56	0.51	0.62	-0.118	-0.12	672
				(0.073)		
Panel B: Responsive Feeding						
Responsive feeding (day)	0.95	0.95	0.97	-0.023	-0.08	675
				(0.018)		
Responsive feeding (night)	0.96	0.95	0.96	-0.011	-0.04	675
				(0.020)		

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

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

Online Appendix

Growing to their Full Potential: Positive Parenting for Improved Child Nutrition Outcomes

Counseling Cards

Your child is special
Make your baby feel safe and loved

Why this is important:

- Your child develops in his own way and at his own pace. For example, your baby may start to walk at 10 months, which is earlier than his older sister who started to walk at 12 months.
- Your child is different from adults and has different ways of looking at the world.
- Your child deserves to be treated in the same way, whether a boy or a girl, with a disability or without.
- Your child is too young to look after himself and needs to be protected and cared for.
- When you take care of your baby's needs quickly he will feel safe and secure. Building trust is the most important thing you can do to meet the needs of your baby.
- When your baby feels safe he will feel confident to explore his world and the people in it.

What you can do:

- Respond quickly to your baby's needs…
  - To be fed
  - To have her nappy changed
  - To be played with
- You do not spoil babies when you meet their needs on demand (when they cry).
- Give baby lots of attention – talk and sing to him, cuddle and pat her, play with her.
- Give baby opportunities to develop and learn in his own way.
- Let baby try out his own ideas to find out how something feels or sounds and what it can do.
- Follow his lead rather than showing what to do when he is playing.
- Ask questions that help him work things out himself, e.g. "why do you think the water spilled?" "How could you do it differently?"
- Give lots of encouragement, love and attention. Praise your child when he has tried hard.

Your child is special
Make your baby feel safe and loved

Make your home safe

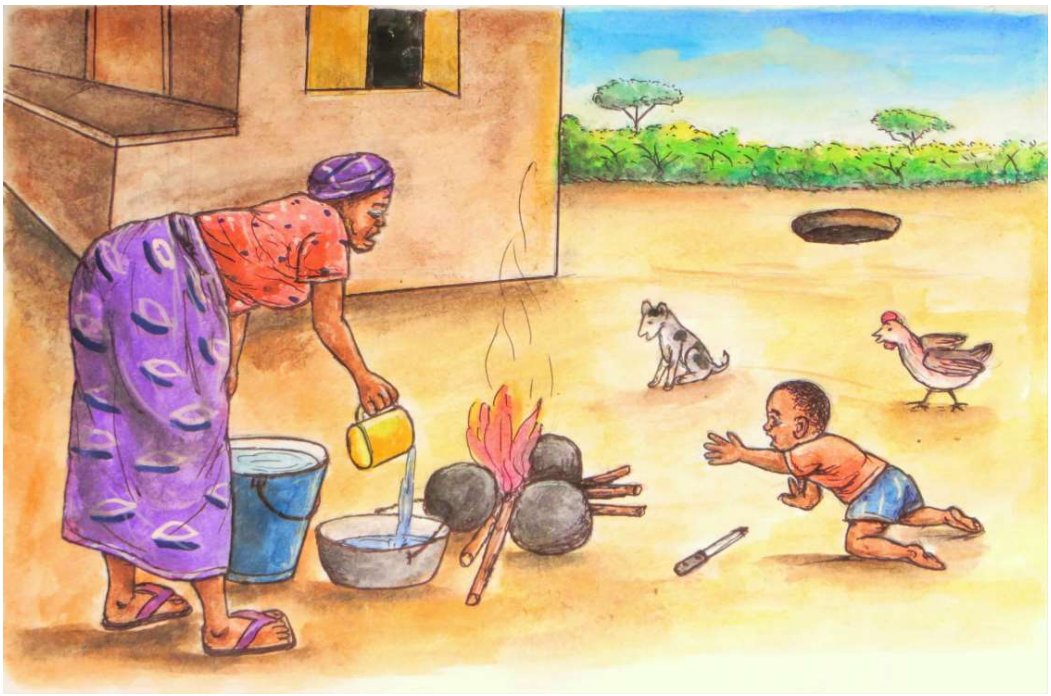
Why this is important:

- Your child is curious and learns by exploring things around your home and outside
- You need to protect her from getting hurt in and around your home.

What you can do:

- Put things away or out of reach that you don't want children to touch
- Keep your child away from fire and hot things in your home (cooking areas).
- Don't let your baby put small things in her mouth that she could swallow, to avoid choking.
- Don't leave your child unattended. (Make sure some-one is always attending your child)
- Don't leave your child near water.
- Make sure the area around your home is safe for your child. Pick up anything that might be dangerous to a curious child and discard them out of your child's reach, e.g. pieces of broken glass, old metal, animal feces, etc.
- Make sure wells are covered or fenced so children cannot fall in.

Make your home safe



Your baby is learning all the time

Why this is important:

- Children are not just little adults. Everything in the world is new to them.
- Babies especially have a lot to learn about how the world works
- Their bodies are still developing physically, and using different muscles takes practice
- They also need to learn about social relationships, how to express their emotions, how to handle difficult situations, and what is right and wrong.
- Often, when babies are upset, it is because they are frustrated, don't know how to react, or are having trouble expressing themselves.
- Babies learn how to do these things by observing older people around them, and by experimenting.

What you can do:

- Help children to understand their world and their place in it by explaining things and situations around them
- Be understanding and supportive when your baby is having difficulty doing something
- If your baby is upset, talk to her, ask what is wrong, and comfort her.
- Your baby will learn how to act in a situation based on how she sees you act. Model behaviors that you want to see reflected

Your baby is learning all the time

Responsive Feeding

Why this is important:

- Young children have small stomachs and need to eat more often than adults to help them grow
- A baby shows signs of hunger long before he/she starts crying or reaching for his/her mother's breast. For example, they look at other people who are eating, they move their mouths and tongues as if they were eating, they put other objects in their mouths, they spit.
- Showing baby that you notice his/her cues makes her/him feel safe and taken care of. This helps them to be confident and more willing to try new things.
- When a baby feels full, he/she will often starting turning their head away from new food.

What you can do:

- Notice your baby's cues that he/she is getting hungry before he/she becomes upset or starts crying.
- If your baby is showing hunger cues, offer your child breast milk or a small snack, even if it is not a usual mealtime.
- Keep some "ready to eat" foods around – such as a banana, mangoes, or BenniMix - so you can respond when your baby is hungry.

Responsive Feeding

Active Feeding

Why this is important:

- Young children need help to eat to make sure they get enough of the right foods to grow.
- Eating uses different muscles than breastfeeding. Babies who have only been breastfed and are being introduced to complementary foods need time to learn how to eat properly. They will not do it perfectly on the first try.
- When children breastfeed, they use their tongues to help them suck. When they start eating, they will sometimes push out their tongues with the food. This doesn't mean they don't like the food – they are just still learning to eat in a new way. They need to be encouraged to practice and gain skills in keeping food in their mouth, chewing, and swallowing.
- In the first few weeks of complementary feeding, your baby still gets most of her nutrition from breast milk (when breastfeeding is continued). This period should be focused on teaching baby how to eat. Approach it as a learning process.
- As new complementary foods are introduced, babies need time to get used to new textures and new flavors. They may not accept new foods right away. They are experimenting and learning about these new experiences.

What you can do:

- Always have an adult sit with a young child to encourage and help them eat.
- Give baby small portions of new foods to see whether he/she likes them.
- If baby does not accept a new food, try something else. Come back to the rejected food later (another day, another week). It is ok to experiment with different foods and with the same foods at different times.
- Give baby foods he/she has liked in the past while also expanding the diversity of foods he/she is exposed to, keeping in mind nutritional balance and dietary diversity.
- Do not become upset if baby does not finish foods, especially in the first few weeks. As long as breastfeeding continues, during the ages of 6 to 9 months, your baby will still get the nutrition he/she needs.
- Do not force your baby to eat. Mealtimes should be fun and interesting. If meal time becomes upsetting or anxious, your baby will not want to eat.

Active Feeding

Sing, talk, and tell stories to your baby

Why this is important:

- Singing helps your baby learn language skills because she develops an awareness of sound.
- Talking to your baby encourages her listening skills and helps her to understand words.
- Listening will help your child to develop memory skills. She will learn new words which will help her to read and write better.
- Storytelling is the way that traditions and beliefs are passed down and kept alive.
- Your child will learn more about her culture and feel proud of who she is and where she comes from.
- Stories help build your child's creativity and imagination, which are important in developing problem solving skills later in life.

What you can do:

- Sing songs when washing, changing the nappy or putting him/her to sleep.
- Talk to baby about what you are doing and the things you see around you, e.g.
  - "Look, you are smiling"
  - "You found your feet"
  - "I am going to roll you over now"
- As you talk to your baby, pause to allow them to 'respond.' Even if they cannot talk, they will make noises to acknowledge that you are in a 'conversation.' This will help them learn how to interact with people and express themselves.
- Tell traditional tales that have been passed down over generations.
- Tell your child about where your family is from.
- Tell a story about what you and baby did during the day.
- Listen to a story on the radio.
- As your child grows and learns to talk, encourage her to tell you a story.

Sing, talk, and tell stories to your baby

Use household objects to teach your child

Why this is important:

- Building activities:
  - When your child builds, she learns about mathematics: height, space, size, shape, color, and number
  - She develops her large and small muscles as well as balance and coordination.
- Sorting and matching:
  - Your child is developing important thinking skills when she recognizes that things are the same and not the same.
- Counting:
  - Counting real objects will help your child understand about numbers.
  - Even if your baby is too young to know real numbers, counting things early (fingers, toes, laundry items, family members) will help them be familiar with the concept later and start building the foundation for math skills.

What you can do:

- Make building blocks from cardboard, sanded wood scraps, stones of different sizes, pots and pans, etc. Encourage your child to use her own ideas to make things from her imagination, stack the items, group them together by similar characteristics, etc.
- Sort and match the clean washing together – by color, by type of clothing, by whom it belongs to, by which room it goes in, etc.
- Give your child opportunities to count real things during daily activities, e.g. cups, plates, spoons, washing pegs, food items. Encourage the child to touch the items as you count.
- **You do not need expensive toys or specialized equipment to help your child learn!**

Use household objects to teach your child