



Effects of Two Early Childhood Interventions on the Developmental Outcomes of Children in Post-Earthquake Nepal

Author(s): Jonathan Seiden, Valeria Kunz, Sara Dang, Matrika Sharma, and Sagar Gyawali

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# EFFECTS OF TWO EARLY CHILDHOOD INTERVENTIONS ON THE DEVELOPMENTAL OUTCOMES OF CHILDREN IN POST-EARTHQUAKE NEPAL

JONATHAN SEIDEN, VALERIA KUNZ, SARA DANG,  
MATRIKA SHARMA, AND SAGAR GYAWALI

## ABSTRACT

*Natural disasters create immense challenges for young children by exposing them to a high degree of adversity. Interventions designed to build resilience in the aftermath of a natural disaster may help buffer the negative consequences of these adverse experiences. In this article, we report the results of our quasi-experimental evaluations of two interventions designed by Save the Children to improve children's developmental outcomes and parental engagement during a critical period. These interventions provided resources across eco-developmental levels to young survivors of the 2015 earthquake in Nepal's Sindhupalchok district by targeting children's families, teachers, and communities. The first was a caregiver-focused intervention aimed at improving parents' and caregivers' ability to provide early stimulation and responsive, positive caregiving for children ages 0-3; the other was a facilitator-focused intervention at an early childhood development (ECD) center that aimed to improve the quality of learning environments, family engagement, and psychosocial supports for children ages 3-6.*

*We found that the interventions had a mixed impact. The age 0-3 components had no detectable effect on developmental outcomes, whereas the age 3-6 components had a positive impact on children's early learning and development, particularly their pre-academic skills. Neither intervention improved parental engagement. We highlight the challenges of implementing family-focused interventions in emergency contexts and the importance of the delivery agents in ECD programs. Despite the null effects for the 0-3 group, these evaluations demonstrate that bolstering the quality of early learning environments and the skills of ECD facilitators can have a meaningful impact on child-level outcomes, even in postdisaster and emergency settings.*

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## INTRODUCTION

Natural disasters threaten children's lives, stability, safety, mental health and wellbeing, and emotional development. Children under five are at particular risk when a natural disaster strikes; they often have the highest mortality rates and are at increased risk of developing disabilities (UNICEF 2014). Nepal's massive earthquake on April 25, 2015, dealt a devastating blow to children and families across the vast mountainous regions surrounding the capital of Kathmandu, killing thousands of children and destroying a massive amount of the education infrastructure (Nepal Education Cluster 2015). After the earthquake, representatives from international nongovernmental organizations (NGOs) poured into the country to provide humanitarian relief; their efforts also raised billions of dollars in international donor pledges.

Often overlooked in the immediate response to a disaster are the longer-term challenges young children and their families face months and even years afterward. Even though it is known that young children in emergency settings are at higher risk for developmental difficulties, there is a lack of evidence on how and why early childhood programs can improve their outcomes in humanitarian settings. Interventions that provide young children and their families with improved resources across ecological levels (at the individual, family, and community levels) may be able to support their learning and development, and help buffer the long-term consequences of natural disasters. However, few credible causal evaluations have been conducted of such interventions (Murphy, Yoshikawa, and Wuermli 2018).

This evaluation helps to address this gap by reviewing two interventions aimed at improving children's developmental outcomes and parental engagement in the wake of the 2015 earthquake in Nepal, and at helping young children build resilience.<sup>1</sup> Implemented in Sindhupalchok, a district particularly hard hit by the earthquake, the programs focused on equipping caregivers to provide nurturing homes to children from birth to age three, and on providing quality early learning opportunities for children ages three to six in their homes and in early childhood development (ECD) centers.

Save the Children worked in conjunction with the coordinating humanitarian agencies and local government officials to select village development committees (VDCs) in which to implement the interventions. We then nonrandomly selected a

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1 The project this study covers was financed by Swiss Solidarity and other donors through Save the Children Switzerland.

set of sociodemographically and geographically similar VDCs that did not receive the intervention to serve as a comparison group. By tracking children over time and examining changes in their developmental status in both the intervention and the comparison groups, we attempted to capture the intervention's effect on early learning and developmental outcomes.

Our evaluation found that these interventions had mixed results. We found that the components targeting children ages 0-3 had no detectable effect on their cognitive, motor, or socioemotional development outcomes. The program for children ages 3-6 did have a positive effect on their early learning and development, most significantly on their emergent numeracy and literacy skills. These findings suggest that the project's efforts to increase caregiver engagement in early learning and responsive care, and thus to strengthen family resilience, were unsuccessful for both age groups. Noteworthy is the fact that the project did not provide families with resources such as housing, livelihood support, social protection, or mental health and psychosocial services. This may have left the parents and caregivers who were struggling to meet their family's basic needs unable to engage their children in a way that led to improved developmental outcomes.

This evaluation provides the first evidence of the effectiveness of Save the Children's approach to improving early learning outcomes in emergency settings, herein demonstrating the ability of ECD center-based programs to build resilience and buffer the negative effects of disasters. It also highlights the need to support children's resilience in emergency contexts by improving the provision of family-level resources.

Our article continues as follows. We first discuss how natural disasters can affect young children and review relevant interventions that aim to build resilience and mitigate the negative effects such disasters have on children. We then describe the nature of the interventions we evaluated in detail and provide a context for the effects of the earthquake in Sindhupalchok district. In the next section, we describe our quasi-experimental studies, including the sample-selection process, quantitative measures used, ethics considerations, and sample composition. We follow with our main findings, as well as our interpretations of the study results and how they can inform future ECD interventions in the wake of natural disasters. We then address the limitations of our study and conclude by suggesting key areas for future research.

## **BACKGROUND**

### **THE EFFECTS OF NATURAL DISASTERS ON YOUNG CHILDREN**

Very young children are often overlooked during emergencies because of the assumption that they are both resilient and well cared for by their families (Moving Minds Alliance 2018). However, emergencies expose young children to traumatic experiences that can have serious lifelong consequences (National Scientific Council on the Developing Child 2015; Vernberg et al. 1996). Being exposed to adverse experiences in the early years is associated with increased long-term risk for impaired behavior, learning, and physical and mental health (National Scientific Council on the Developing Child 2005).

Preschool children's response to traumatic experiences is often cognitive confusion, decreased verbalization, increased anxious attachment behavior, and other regressive symptomatology (DiNicola 1996). After the 1994 Northridge earthquake in California, for example, mothers reported that their young children felt fearful, had recurring thoughts about the earthquake, and had difficulty sleeping. Most of the children still experienced these symptoms eight months after the quake (DiNicola 1996).

Resilience is the ability to recover from traumatic experiences. Children who are more resilient tend to recover quickly from negative experiences, whereas less resilient children require additional support across eco-developmental levels, including social supports within the community and relational and family protection from those closest to them. A child's temperament and disposition lie at the core of this difference. However, resilience can be nurtured in all children by addressing the diverse eco-developmental levels that surround them.

## **RESILIENCE**

Understanding resilience involves identifying the characteristics of children who have healthy development despite being exposed to adverse events. Luthar, Cicchetti, and Becker (2000, 543) perceive resilience as a "dynamic process encompassing positive adaptation within the context of significant adversity." Threats and diminished resources are stressors that can evolve into trauma, as Lieberman and Van Horn (2011, 35) explain: "Stress becomes trauma when the intensity of frightening events becomes unmanageable to the point of threatening physical and psychological integrity."

Resources that nurture resilience in older children following a natural disaster have been found to include both internal and external protective factors (Terranova, Boxer, and Morris 2009). A study conducted in Aceh, Indonesia, after the 2004 tsunami identified resilient adolescents who survived the event. Hestyanti (2006) found that these children had both internal and external protective factors. The study emphasized that, when studying resilience in disaster settings, it is important to take into account both a child's internal appraisal mechanism and their external supports.

While studies on how to build resilience in young children in a postdisaster setting are scarce, research has shown that those who are able to overcome serious hardship and thrive have at least one stable relationship with a nurturing and responsive caregiver (National Scientific Council on the Developing Child 2015). These caregivers protect young children from developmental disruption by helping to strengthen their internal and external protective factors. Children's internal protective factors include a belief in their own capacity to overcome hardship, and their key adaptive capacities such as executive function and self-regulation skills. External protective factors include a stable, caring, responsive relationship with an important adult, and the support of affirming religious or cultural traditions. This combination of internal and external protective factors is the foundation of resilience in early childhood (National Scientific Council on the Developing Child 2015).

### INTERVENTIONS TO BUILD CHILDREN'S RESILIENCE

The most effective interventions are those that cater to children's internal and external resources to help them build resilience, while also recognizing that the primary goal is to help the children develop the ability to maintain their emotional equilibrium (Bonanno 2004). The interventions we describe are examples of programs that strengthen resilience at three eco-developmental levels—schools, families, and the children themselves.

**School-focused programs:** Schools are suitable venues in which to implement programs that reduce older children's distress and posttraumatic symptomatology. Enhancing Resiliency Among Students Experiencing Stress (ERASE-Stress) Sri Lanka, a program for tsunami-affected children between 9 and 15 years old, significantly reduced the severity of their posttraumatic stress disorder, depression, functional problems, and somatic complaints while also improving their self-reported measures of hope scores for months after the intervention (Berger and Gelkopf 2009).<sup>2</sup> The School Reactivation Program in Turkey also sped up

<sup>2</sup> As measured by the Adult Hope Scale (Snyder et al. 1991).

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children's recovery from an earthquake in 1999, including reduced posttraumatic stress, grief, and dissociative symptoms. This improvement was observed six weeks after the intervention, whereas a control group took another three years to reach the same reduction in symptoms (Wolmer et al. 2005). Both of these programs used schools as venues to organize students and deliver the sessions.

Offering ECD programs that mirror school-based programs involves setting up temporary learning spaces, rebuilding ECD centers, and training ECD facilitators in how to create predictable and playful early learning environments. After the 2009 earthquake near Padang, Indonesia, Plan International set up ECD services in schools and child-friendly spaces. Parents of those who attended reported that their children were more independent and had attained basic literacy and numeracy awareness (Plan International 2013). Primary school children who attended a similar Plan International program after 2009's Tropical Storm Ondoy in the Philippines had better social and problem-solving skills than children who did not, according to ECD workers and primary school teachers (Plan International 2013).<sup>3</sup>

**Family-focused programs:** Caregivers living in crisis contexts face significant obstacles to healthy parenting, such as their own traumatic experiences, insecurity, and a sense of hopelessness. Family-focused programs strengthen resilience by providing access to support services, including family unification, protection, livelihoods, and mental health and psychosocial support (Moving Minds Alliance 2018). Low-intensity programs, which require fewer resources, tend to focus on disseminating key messages through the media on responsive care, early learning, and caregivers' mental health; medium-intensity programs set up parenting support groups to build their skills and support caregiver mental health; high-intensity programs involve home visits and individual or small-group support for families whose children have disabilities or substantive health issues (World Health Organization 2020).

**Child-focused programs:** Beneficial child-centered interventions are those that protect children's mental and emotional wellbeing by helping them recognize, verbalize, and calm their emotions. Fear is an obvious consequence of traumatic experiences, and helping children to identify and express their emotions is a simple but valuable technique. For example, Sri Lankan children who were anxious about returning to school or playing on the beach after the 2004 tsunami were taught to understand and gradually overcome their fears (Nikapota 2006). An

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3 Typhoon Ketsana is known in the Philippines as Tropical Storm Ondoy.



intervention for child tsunami survivors in Chennai, India, encouraged them to express their negative emotions, and a year after the disaster many were able to express more positive emotions. Moreover, as the children became able to express their emotional distress in calmer ways, their hyperactive behavior became less frequent (Vijayakumar, Kannan, and Daniel 2006).

Child-focused interventions that take place at home can help caregivers develop more responsive caregiving skills, including the ability to recognize and respond to their young children's needs. Responsive care can buffer children from the detrimental effects of adversity, especially during their first three years of life. Child-focused interventions also take place in ECD centers. For example, Save the Children's Healing and Education through the Arts (HEART), a program implemented in emergency contexts around the world, uses the expressive arts to help children above the age of three to understand and express their feelings and learn to process stress (Phiri et al. 2016).<sup>4</sup> Young children who participated in the program were reportedly more confident, attentive, expressive, and better able to regulate their emotions (Phiri et al. 2016).

Natural disasters threaten children's lives, stability, safety, mental health, and emotional wellbeing. The threats that remain after a disaster and the resources available to minimize them contribute to survivors' degree of resilience. Depicting resilience as a dynamic internal construct mediated by available resources and subjective perceptions offers the opportunity to cultivate it as a quality every child can develop through carefully designed early childhood programs.

### THE 2015 EARTHQUAKE IN NEPAL

The magnitude 7.9 earthquake that hit Nepal on April 25, 2015—the country's worst disaster in more than 80 years—and a second major quake two weeks later killed over 9,000 people, including nearly 2,300 children, and damaged or destroyed more than 875,000 homes, as well as schools, health facilities, and other infrastructure (Ministry of Education, Department of Education 2016). The quake destroyed 35,986 classrooms across the country and another 16,671 were partially damaged, leaving more than one million children without access to education—approximately one in nine (Nepal Education Cluster 2015). The Sindhupalchok district, some 70 kilometers from Kathmandu and the geographic focus of our evaluations, was the epicenter of a high-magnitude aftershock that

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<sup>4</sup> HEART is an arts-based psychosocial support approach developed by Save the Children for children affected by serious or chronic stress. HEART helps children and youth between the ages of 3 and 20, as well as adults, process stress and engage with their peers in a fun and creative way.

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devastated the local education infrastructure (UN Office for the Coordination of Humanitarian Affairs 2015). After a school structure assessment, 89 percent of classrooms in the district were deemed unsafe and more than half required total demolition and reconstruction (Nepal Education Cluster 2015).

The earthquake damage extended beyond the infrastructure. Save the Children and its partners conducted a children’s consultation with nearly 700 children on the effects of the earthquake and recovery, which revealed that the “compounding fears and feelings of instability are starting to have psychosocial effects on children. A staggering 50 percent of children stated that a year after the earthquake, they continue to overreact to loud noises and 23 percent do not sleep as well as before the earthquake” (Plan International et al. 2016).

Save the Children has operated in Nepal since 1976 and has been engaged in community-based development work there for decades (Save the Children International n.d.). As a result, the organization was well equipped to take immediate action after the earthquake. Save the Children’s ECD-sector response to the Nepal earthquake centered around a three-phased approach: (1) providing temporary learning centers to meet the immediate need for safe spaces children could learn in; (2) making ECD services available and accessible by rebuilding damaged ECD centers; and (3) focusing specifically on improving the quality of the local early childhood care and development centers, ECD facilitators’ capacity, and parent and community engagement.

### **SAVE THE CHILDREN’S ECD INTERVENTIONS IN SINDHUPALCHOK**

Save the Children’s ECD program in Sindhupalchok consisted of two high-intensity components designed to improve children’s developmental outcomes and parental engagement. A younger group component for children ages 0-3 focused on strengthening child- and family-based resources. The other component was for a preschool group for children ages 3-6 that focused on improving child, family, and ECD center resources. The overall program was based on the hypothesis that offering resources across eco-developmental levels would enable young children to achieve positive outcomes despite vital threats to their development.

### **YOUNGER GROUP’S HEALTH MOTHER GROUP AND HOME VISITS INTERVENTION**

The younger group component focused on children from birth to age three. Aimed at strengthening child-level resources by improving caregiver-child interactions

and supports, the program offered monthly groups at which parents were taught to provide early stimulation, responsive caregiving, and positive parenting, and to help their children process stress, regulate their emotions, feel loved, and enjoy a safe, playful, and predictable home environment. This program built on content from Building Brains, a Save the Children Common Approach that is aligned with the Nurturing Care Framework, an evidence-based framework for how to support optimal childhood development and ensure that children survive and thrive (Pisani, Karnati, and Poehlman 2017; World Health Organization, World Bank Group, and UNICEF 2018).

Building Brains comprises socially interactive activities of increasing complexity that allow for developmentally appropriate variations. The program's aim is to equip caregivers with the ability to develop a stable, nurturing, and responsive relationship with their children starting at birth. Over the course of nine sessions, caregivers bond with their children and learn how to become responsive to their needs, to engage them in positive and playful experiences, and to help them develop self-regulation. Seven sessions focus on early stimulation, one session teaches positive discipline methods and responsive care, and one session covers safety from common accidents.

From January 2017 to June 2018, Nepal's Female Community Health Volunteers (FCHVs), a national network of more than 50,000 government-supported female volunteers (Kandel and Lamichhane 2019), integrated the Building Brains sessions into their regular Health Mother Group meetings and home visits in the intervention areas. The group sessions, each of which was held twice, took place every month for 1.5 hours; the 87 FCHVs delivered a total of 1,503 sessions. To ensure that the caregivers shared their new knowledge with other family members, the FCHVs and Save the Children's partner NGO staff conducted regular home visits to practice the activities with caregivers one-on-one. Each family received a minimum of eighteen home visits over six months.

Working through the FCHVs to achieve sustainability, the program attempted to build the capacity of volunteers who were already supported by the government and present in each community. However, this model posed challenges, such as overburdening FCHVs who had limited education and facilitation skills with additional content. The Building Brains sessions were then integrated into the Health Mother Group meetings the FCHVs ran with mothers of children 0-3 years old. Early stimulation activities were practiced and discussed during those group sessions, along with health and nutrition topics.

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**PRESCHOOL GROUP'S ECD CENTER AND FACILITATOR INTERVENTION**

The component designed for preschool-age children focused on strengthening resilience at the child, family, and ECD-center levels. The project adopted Save the Children's HEART approach with children in emergency settings, which provided psychosocial support and helped them process their emotions (Save the Children n.d.). For families, the project provided a monthly parenting program to strengthen family engagement in children's learning. At the ECD centers, the project used the Quality Preschool Framework developed by Save the Children to review and improve the quality of the ECD center and the parenting program. The Quality Preschool Framework has eight components: (1) community partnership, (2) the learning environment, (3) the ECD center curriculum and routine, (4) teacher quality and support, which uses Save the Children's foundational training, (5) parental engagement, (6) nurturing care, (7) transitions, and (8) monitoring, evaluation, and improvement. The framework provided a comprehensive quality enhancement design that went beyond teacher training.

Save the Children used the framework to adapt the program to the post-emergency context in several ways. In terms of community partnership, from the start the project engaged school management committee members, children's club members, and the local government to address postdisaster needs, enroll out-of-school children, design the resilience-building approach, and engender community ownership. Save the Children also allowed the foundational training to be recognized as an accelerated training for ECD facilitators that was equivalent to the one-month basic government training. Given that many ECD facilitators were no longer available after the earthquake, offering a program that provided accelerated equivalent training was an important component of the post-emergency programming.

In terms of the learning environment, Save the Children found at the start of the project that no ECD centers had even the minimum materials needed. The project therefore supplied storybooks, puzzles, and other materials needed in a basic learning environment. In response to the curriculum and ECD center routine, Save the Children adapted and enhanced its foundational training for ECD facilitators to ensure that it put greater emphasis on those routines, and on safety, play-based learning (self-directed and teacher led), and how to build a positive relationship between the children and the ECD facilitators. The curriculum also used materials from HEART and the early literacy and math (ELM) approach. The ELM approach aims to develop school-readiness skills through play-based early literacy and math activities. It has been used in more than 20 countries around the world in both center-based and home-based programming (Borisova et al.

2017). To ensure teacher quality and support, the project gave the foundational training to more than 207 ECD facilitators, incorporating the ELM and HEART approaches. They shared their challenges and best practices at monthly meetings held for clusters of six to ten ECD centers.

To improve parental engagement, ECD facilitators were trained to run monthly ELM parenting sessions on how to make literacy and math games at home using simple materials. To improve nurturing care, the project focused on safety, the distribution of lunch boxes, and on water, sanitation, health, and hygiene. Caregivers and ECD facilitators were trained in disaster risk reduction and how to meet safety standards. The ECD centers received basic supplies to meet hygiene requirements, and hand-washing was incorporated into the daily routine.

To support transitions, the project gave grade-one teachers ECD training and developed plans for sessions that would support young children's transition into the first grade, which were integrated into the grade-one curriculum. A rapid baseline assessment was used to design a project implementation plan that included monitoring, evaluation, and improvement. The project was monitored regularly by Tuki, the partner organization, to identify and address gaps.

### **FINDINGS FROM EARLIER IMPLEMENTATIONS**

There is a dearth of impact evaluations of ECD programs in humanitarian settings around the globe (Murphy, Yoshikawa, and Wuermli 2018), thus the results of similar earlier programs guided the design of the interventions in Nepal.

Randomized control trials of Building Brains in Bangladesh (2013), Rwanda (2017), and Bhutan (2018), tested programmatic elements similar to the components implemented for the younger group, which showed that the programs had significant effects on both parenting practices and child development outcomes (Abimpaye et al. 2019; Aboud et al. 2013; Seiden, Dowd, and Chetri 2019). In Rwanda, Save the Children helped community-based workers offer “playful parenting” group sessions and home visits that were reinforced by a highly effective radio program offered by Save the Children (Abimpaye et al. 2019). A playful parenting pilot conducted in Bhutan included group sessions for all families with children ages 0-3 in the tested communities and individual counseling for children with developmental delays (Seiden, Dowd, and Chetri 2019). In Bangladesh, a community-based parent support model and modified government service delivery brought similar improvement to a center-based model in comparison to a control group (Aboud et al. 2013).

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Studies of the ELM program for preschool children ages 3-6 in Ethiopia (Borisova et al. 2017; Pisani and Amente 2015), Malawi (Phiri et al. 2016), and India (Bora et al. 2018; Seiden and Karnati 2019) have also shown positive results. In Ethiopia, children participating in an ELM program for seven months through ECD centers and parent education showed the strongest improvement in learning and development (Borisova et al. 2017; Pisani and Amente 2015). In Malawi, children in community-based childcare centers benefitted from the implementation of the ELM and the HEART programs. A randomized control trial in India found that the teacher-training, parental engagement, and community support components of ELM resulted in children learning 50 percent more than those in the control group on the International Development and Early Learning Assessment (Bora et al. 2018; Seiden and Karnati 2019).

### METHOD

We asked two primary research questions for each intervention:

1. Did Save the Children's post-earthquake ECD interventions in Nepal strengthen young children's resilience and promote their developmental outcomes?
2. What effect did Save the Children's post-earthquake ECD interventions have on responsive caregiving and positive parental interactions?

We sought to answer these questions by conducting two quasi-experimental impact evaluations that compared the outcomes of children and caregivers in an intervention group to those in a comparison group, as described below. The quasi-experimental nature of this evaluation rests on the assumption that the comparison group represents a credible counterfactual to the intervention group.

To answer our research questions, we first defined our primary outcome as children's developmental status. We also examined whether the interventions improved how caregivers engaged with young children—a more distal outcome measure—by assessing whether caregivers changed the types of stimulating activities they engaged in. Research and Inputs for Development and Action, an independent Nepalese research and data-collection firm, assisted with the study design, helped identify a suitable comparison group, collected all the data, conducted preliminary analyses, and wrote the endline reports (Lohani and Basnet 2018a, 2018b).

## INTERVENTION AND COMPARISON SAMPLE SELECTION

This study includes data from two separate samples, one consisting of younger children ages 0-3 at baseline (referred to as the younger sample) and one consisting of children ages 3-5 years at baseline (referred to as the preschool sample). The comparison and intervention samples of children are from VDCs in Sindhupalchok District.

Sindhupalchok can be roughly divided into two areas: mountains above 3,500 meters, and the more densely populated hilly areas (UN Office for the Coordination of Humanitarian Affairs 2015). The population is largely agrarian, even though the farmland is not very fertile and thus has a low yield (Sindhupalchowk District Coordination Committee Office 2018). According to the 2015-2016 Ministry of Education Flash Report, Sindhupalchok's ECD-age children are 58 percent ethnic minority (Janajati), 10 percent Dalit, and 32 percent "other." Sindhupalchok is home to 353 ECD centers, which have a 16.7 child-to-ECD center ratio (Ministry of Education, Department of Education, Monitoring, & Management Section 2016). The district government worked with Save the Children to identify five priority VDCs for the younger children intervention and six for the preschool intervention to ensure minimal overlap with other development and relief agencies.

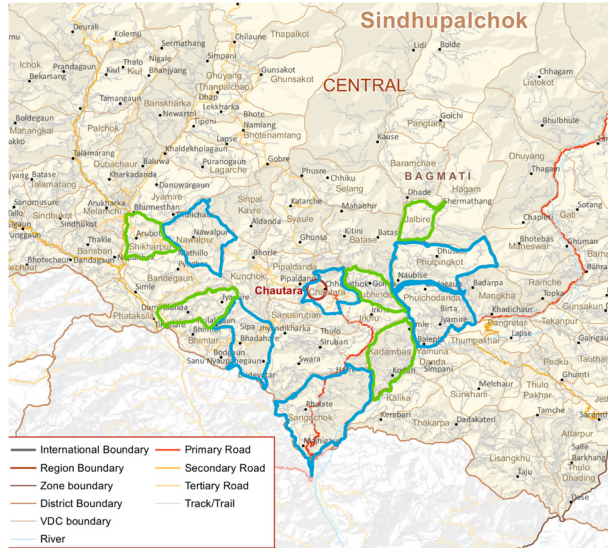
Quasi-experimental effects rest on the assumption that comparison areas represent a credible counterfactual for what would have happened in the intervention area in the absence of the program in question. To select a comparison group, the local research consulting firm, Research and Inputs for Development and Action, worked with the district education office to identify a set of VDCs that shared important sociodemographic characteristics with the younger and preschool intervention groups. To match each VDC with a suitable comparison, the research firm considered several factors. First, each was required to be geographically close to the intervention VDCs, to be in the hilly areas rather than in the mountains, and could not be involved with similar programs from other development partners. To select the most suitable list of comparison VDCs, the research firm then considered the urbanicity of the intervention VDCs, the ethnic and linguistic composition of the residents, and the degree of damage the earthquake caused. A list of the intervention and comparison VDCs for the younger and preschool samples is displayed in Figure 1.



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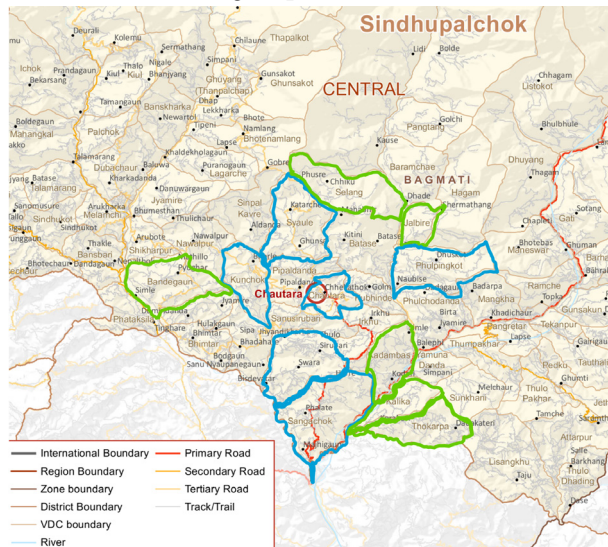
Figure 1: Map of Village Development Committees in Intervention and Comparison Groups

Panel 1: Younger group



Intervention in blue: Bhotasipa, Choutara, Fulpingdandagau, Fulpingkot, Nawalpur, and Sangachok  
Comparison in green: Jalbire, Kadambas, Kubhinde, Sikharpur, and Sipapokhare

Panel 2: Preschool group



Intervention in blue: Choutara, Fulpingkot, Kuncholk, Sangachok, Shaule, and Thulosirubari  
Comparison in green: Badegaun, Jalbire, Kadambas, Kalika, Selang, and Thokarpa

Map based on OCHA/ReliefWeb



We selected a representative sample of children within each VDC through random sampling, with a cluster-randomization sampling strategy at the ward and preschool levels. The data collection and sample selection were conducted independently, and the timing was in keeping with the programming targeting each group. We present their characteristics separately below.

#### **YOUNGER SAMPLE: 0-24 MONTHS AT BASELINE<sup>5</sup>**

The younger sample comprised 363 children ages 0-24 months at baseline, who were randomly selected in December 2016 from 44 wards within selected VDCs in the study area. We selected 22 wards each from the intervention and comparison VDCs without stratification and, after assembling a list of all age-eligible children in the ward, we selected children randomly from each, with probability of selection proportional to size. As such, we had a representative sample of young children ages 0-2 from the intervention and comparison VDCs at baseline. The comparison group consisted of 180 children from five VDCs at baseline, whereas the intervention group consisted of 183 children from six VDCs. The sample was well balanced in terms of the children's sex, with 179 girls and 184 boys.

At endline in December 2017, the data-collection firm was able to follow up with 308 of the 363 children, an overall attrition rate of 15.1 percent. Attrition was significantly different between the intervention and comparison groups: 22.4 percent for the intervention group and 7.8 percent for the comparison group. This attrition pattern is unusual, and we note that it is a significant limitation of our results. The final analytical sample of matched baseline-endline observations consisted of 166 children from the comparison areas and 142 children from the intervention areas. The highly differential attrition observed means that our endline results are subject to substantial bias and that attrition-related bias may exceed 0.05 standard deviations (IES WWC 2014). We nevertheless proceeded with the analysis and discuss the implications of these findings in detail in the limitations section.

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<sup>5</sup> Note that the intervention is for ages 0-3, but the sample baseline is ages 0-24 months in order for the children not to "age out" of the program.

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**PRESCHOOL SAMPLE: 3-5 YEARS OLD AT BASELINE<sup>6</sup>**

The preschool sample comprises 324 children ages 3-5 at baseline in May 2016 who were selected using cluster random sampling from more than 40 ECD centers in the intervention and comparison VDCs. Of the 324 children, 156 were studying in the comparison ECD centers, 168 in the intervention ECD centers. The sample was relatively balanced in terms of children's sex, with 172 girls and 152 boys.

We collected baseline and endline data for 310 of the 324 children in March 2017, an observed attrition rate of 4.3 percent.<sup>7</sup> The attrition rate was low for both groups, but was higher for the comparison group (6.5%) than the intervention group (2.0%). According to the What Works Clearinghouse, the observed levels of differential attrition (4.5 percentage points) and overall attrition (4.3 percentage points) mean that the attrition-related bias falls below the conservative boundary and is unlikely to bias results by more than 0.05 standard deviations (IES WWC 2014). Further analyses confirm insignificant relationships between attrition and outcomes at baseline, thus we are confident that attrition introduced minimal bias to our results for this sample.

**ETHICS**

Both components of the impact evaluation were vetted by the Save the Children ethics review committee prior to data collection and found to pose no more than a minimal risk to participants. Written informed consent was obtained from each caregiver in both the younger and the preschool samples before their interview, and assent was obtained from children in the preschool sample. Caregivers and children alike were informed that their participation in the study was entirely voluntary and would not be linked to any reward, or to a penalty if they did not participate.

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<sup>6</sup> The intervention targeted children ages 3-6, but the sample was restricted to ages 3-5 to make sure they did not age out.

<sup>7</sup> Research Inputs and Development Action initially reported a higher attrition rate between baseline and endline in their report to Save the Children. However, after re-analyzing the child-level datasets, the observed attrition rate was lower than first reported, due to incorrect calculation. Subsequent follow-up with the firm to clarify this issue was not possible, as the raw datasets unfortunately had been discarded. The calculation we present in the article is based on the authors' child-level datasets. We explore this potential source of bias in the limitations section.

## MEASURES

Children's development levels are the primary outcome for this evaluation. We argue that differences in developmental status serve as a proxy for us to determine whether or not the interventions improved children's resilience in the aftermath of the earthquake. We used different instruments for the younger and the preschool samples. We report on developmental outcomes for the younger sample using the Caregiver Reported Early Development Instruments (CREDI) (McCoy, Waldman, and Fink 2018; Waldman et al. 2021; McCoy et al. 2021). The CREDI is a caregiver-reported survey designed for children ages 0-3 that reports on their overall level of development and their cognitive, social-emotional, motor, and language development.<sup>8</sup> Designed to be universally relevant regardless of context or culture, the CREDI was translated into Nepali; it went through minimal adaptation after being prepiloted.

For the preschool sample, we measured early learning and development with the International Development and Early Learning Assessment (IDELA), a globally tested and validated direct assessment of ECD (Pisani, Borisova, and Dowd 2018). IDELA is designed to measure the developmental and learning status of children ages 3-6 through a series of games played with the child. It measures children's overall achievement and their development in four core domains: emergent literacy, emergent numeracy, social-emotional skills, and motor skills. The IDELA version we used for this assessment was adapted to the Nepali context; it has been used in multiple earlier evaluations. This evaluation dropped two motor domain subtasks from the 24 in the full IDELA because improved gross motor skills was not a specific target of the interventions.

To examine our second research question about effects on caregiver engagement, we included several questions about activities parents had done with their children in the previous three days for both the preschool group and the younger group samples. These questions were based on questions from UNICEF's Multiple Indicator Cluster Survey and have been used to measure caregiver engagement in other studies (Joshua Jeong et al. 2016). We also had hoped to measure children's exposure to adversity and to protective factors through a new researcher-designed assessment tool. However, the assessment's psychometric properties were poor and did not lend themselves to this evaluation (Seiden 2018).

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<sup>8</sup> Data were collected with the CREDI Version 4 and processed according to long-form multidimensional factor analysis algorithms developed by Waldman et al. (2021). This scoring procedure allows individual items to load onto multiple domains and generates a same-scale score with different item sets according to age. In accordance with CREDI guidance, all hypothesis testing was conducted using scaled scores.

## RESULTS

Our two interventions yielded mixed results. For the younger group, we observed no significant effect from the program on children's overall developmental outcomes as measured by CREDI nor any of CREDI's domains. For the preschool group, we found that the intervention had a modestly significant impact on children's developmental outcomes as measured by IDELA, with the largest relative improvements in the areas of emergent literacy and emergent numeracy. For both the younger and preschool groups, we found little evidence that the program improved parental engagement or children's exposure to learning activities at home.

### YOUNGER SAMPLE: 0-24 MONTHS OLD AT BASELINE

As mentioned above, we had substantial attrition in the sample of younger children. Despite this, we found that the restricted sample of 308 non-attrited children did not exhibit significant observed differences in terms of developmental status, age, or sex, as shown in Table 1. We found that the average CREDI scores and the age and sex of the children in the intervention and comparison groups were very similar. The story is slightly different when examining other covariates, caregiver-child interactions in particular. As Table 2 shows, among children who did not attrite, the intervention group had significantly higher baseline levels of playing with the child and reading books with the child. This suggests that, while the sample appears well balanced in terms of developmental outcomes, children in the intervention and comparison groups had significantly different home environments.

*Table 1: Baseline Balance of Child-Level Outcomes and Covariates for Younger Sample*

| Variable                | Comparison<br>Mean/[SE] | Intervention<br>Mean/[SE] | T-test of difference<br>(Comparison)-<br>(Intervention) |
|-------------------------|-------------------------|---------------------------|---|
| Overall CREDI           | 47.363<br>[0.178]       | 47.525<br>[0.187]         | -0.162  |
| Motor Domain            | 47.288<br>[0.216]       | 47.413<br>[0.215]         | -0.125  |
| Social Emotional Domain | 46.836<br>[0.174]       | 47.132<br>[0.208]         | -0.297  |
| Cognitive Domain        | 47.306<br>[0.182]       | 47.568<br>[0.188]         | -0.262  |
| Language Domain         | 48.021<br>[0.150]       | 47.987<br>[0.150]         | 0.034   |
| Child's age             | 11.596<br>[0.483]       | 11.697<br>[0.462]         | -0.101  |
| Child is female         | 0.506<br>[0.040]        | 0.493<br>[0.046]          | 0.013   |
| <b>N</b>                | <b>166</b>              | <b>142</b>                |   |
| <b>Clusters</b>         | <b>20</b>               | <b>16</b>                 |   |

*Note:* Average values for comparison and intervention groups are presented above clustered standard errors at the VDC ward level in parentheses.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

Using the multivariate regression process demonstrated in Table 3, we conducted a three-step model-building process to assess the impact of the program. During this process, we attempted to predict the overall CREDI score as our primary outcome of interest. In the first model, we fit the relationship between endline overall CREDI scores and intervention status. In the second model, we introduced a control for baseline overall CREDI score. Finally, in our third model, we controlled for baseline overall CREDI score and two child-level covariates (child's age and sex).

EFFECTS OF TWO EARLY CHILDHOOD INTERVENTIONS  
ON DEVELOPMENTAL OUTCOMES

*Table 2: Baseline Balance of Caregiver-Child Interactions for Younger Sample*

|  | <b>Comparison</b> | <b>Intervention</b> | <b>T-test of difference</b>     |
|--|-------------------|---------------------|---------------------------------|
| Variable                                 | Mean/[SE]         | Mean/[SE]           | (Comparison)-<br>(Intervention) |
| Talk to child                            | 0.759<br>[0.050]  | 0.852<br>[0.039]    | -0.093                          |
| Tell stories to child                    | 0.120<br>[0.030]  | 0.106<br>[0.030]    | 0.015                           |
| Play simple games with child             | 0.518<br>[0.028]  | 0.697<br>[0.055]    | -0.179**                        |
| Play with child with toys                | 0.512<br>[0.052]  | 0.634<br>[0.050]    | -0.122                          |
| Play with child while feeding            | 0.687<br>[0.048]  | 0.754<br>[0.031]    | -0.067                          |
| Sing to child                            | 0.223<br>[0.039]  | 0.310<br>[0.040]    | -0.087                          |
| Use picture book with child              | 0.133<br>[0.036]  | 0.268<br>[0.054]    | -0.135*                         |
| Praise child                             | 0.289<br>[0.027]  | 0.282<br>[0.038]    | 0.007                           |
| Hug child                                | 0.795<br>[0.036]  | 0.817<br>[0.053]    | -0.022                          |
| Total number of home learning activities | 4.036             | 4.718               | -0.682*                         |
| N  | 166               | 142                 |                                 |
| Clusters                                 | 20                | 16                  |                                 |

*Note:* Average values for comparison and intervention groups are presented above clustered standard errors at the VDC ward level in parentheses.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

In all three models, we found that the coefficient for the treatment effect was insignificant and close to zero. Adding in baseline covariates allowed us to explain nearly 70 percent of the variance in endline scores and granted us considerable statistical power to detect an intervention effect. The CREDI-scaled scores were not immediately interpretable, so we instead considered the effect size.<sup>9</sup> The 95 percent confidence interval of the treatment effect on total CREDI score extended

<sup>9</sup> Cohen's  $d$  is calculated by dividing the coefficient of the intervention variable by the baseline standard deviation of the outcome of the restricted nonattreated sample.

from -0.14 standard deviations to 0.11 standard deviations. As a result, we can state confidently that, as measured by CREDI, the intervention did not have meaningfully large positive or negative effects on children's developmental status.

*Table 3: Taxonomy of Models Fitting Overall CREDI Score*

|                 | <b>Model 1<br/>(No controls)</b> | <b>Model 2<br/>(Baseline control)</b> | <b>Model 3<br/>(Baseline + Child<br/>covariates)</b> |
|-----------------|----------------------------------|---------------------------------------|--|
| Intervention    | 0.00862<br>(0.205)               | -0.0771<br>(0.172)                    | -0.0323<br>(0.158)                                   |
| Baseline score  |                                  | 0.528***<br>(0.0183)                  | 0.171*<br>(0.0645)                                   |
| Age (in months) |                                  |                                       | 0.143***<br>(0.0244)                                 |
| Child is female |                                  |                                       | 0.0959<br>(0.0875)                                   |
| Constant        | 51.03***<br>(0.160)              | 26.03***<br>(0.834)                   | 41.23***<br>(2.760)                                  |
| Observations    | 308                              | 308                                   | 308  |
| R-squared       | 0.000                            | 0.619                                 | 0.663  |

*Note:* Standard errors clustered at the VDC ward level in parentheses.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

The final step in our analysis of the younger sample was to apply the third model to the four CREDI domains using our models from Table 4. We found results similar to the overall CREDI score, as shown in Figure 2. Children of caregivers in the intervention group scored similarly to children in the comparison group in the language, motor, social-emotional, and cognitive domains of CREDI, thus we can rule out effects larger than 0.15 or smaller than -0.2 standard deviations on all domains.

EFFECTS OF TWO EARLY CHILDHOOD INTERVENTIONS  
ON DEVELOPMENTAL OUTCOMES

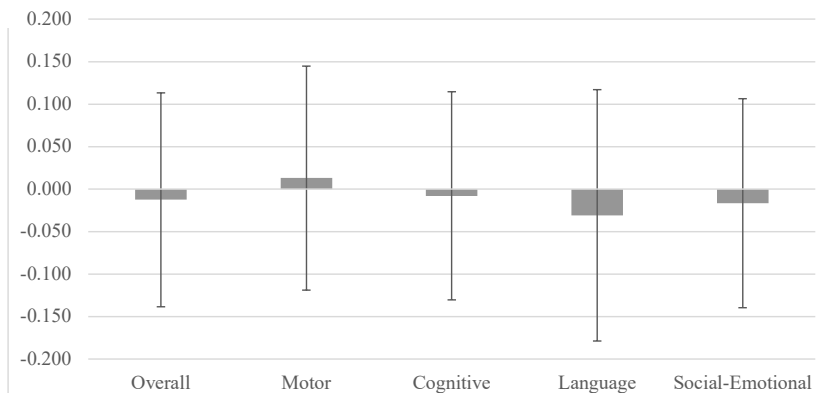
*Table 4: Final Model Applied to CREDI Domains*

|                                     | (1)<br><b>Motor<br/>Domain</b> | (2)<br><b>Social-<br/>Emotional<br/>Domain</b> | (3)<br><b>Cognitive<br/>Domain</b> | (4)<br><b>Language Do-<br/>main</b> |
|-------------------------------------|--------------------------------|--|------------------------------------|-------------------------------------|
| Intervention                        | 0.0396<br>(0.200)              | -0.0440<br>(0.160)                             | -0.0199<br>(0.151)                 | -0.0654<br>(0.154)                  |
| Age (in months)                     | 0.164***<br>(0.0237)           | 0.166***<br>(0.0253)                           | 0.115***<br>(0.0194)               | 0.181***<br>(0.0220)                |
| Child is female                     | 0.126<br>(0.0942)              | 0.0509<br>(0.0966)                             | 0.0462<br>(0.0828)                 | 0.155<br>(0.127)                    |
| Motor Domain<br>baseline            | 0.122*<br>(0.0483)             |  |                                    |                                     |
| Social-Emotional<br>Domain baseline |                                | 0.101<br>(0.0648)                              |                                    |                                     |
| Cognitive Domain<br>baseline score  |                                |  | 0.108*<br>(0.0522)                 |                                     |
| Language Domain<br>baseline score   |                                |  |                                    | 0.215**<br>(0.0715)                 |
| Constant                            | 43.43***<br>(1.987)            | 44.05***<br>(2.740)                            | 44.35***<br>(2.244)                | 38.89***<br>(3.182)                 |
| Observations                        | 308                            | 308  | 308                                | 308                                 |
| R-squared                           | 0.633                          | 0.648  | 0.556                              | 0.648                               |

Note: Standard errors clustered at the VDC ward level in parentheses.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

*Figure 2: Effect Size (Cohen's d) Estimates of Intervention Effect on CREDI Domains (n=308)*



Note: Error bars represent the 95 percent confidence interval of the intervention effect, clustered standard errors at the ward level.



We found similar null results when attempting to assess the program's effect on caregiver engagement. There were no differences in the total types of learning activities caregivers reported engaging in with their children at either baseline or endline.

### **PRESCHOOL SAMPLE: 3-5 YEARS OLD AT BASELINE**

We took a similar analytical approach to analyzing the preschool sample and found substantially more encouraging results. As noted earlier, the observed attrition in the preschool sample was lower and nondifferential. As with the younger sample, we found that the comparison and intervention groups exhibited good balance in terms of children's sex, age, and developmental outcomes at baseline, as shown in Table 5. We do report in Table 6 that there were some slight differences in the caregiving practices of the preschool sample at baseline; namely, that caregivers in the intervention group were more likely than those in the comparison group to report playing with their child and teaching them new things; however, these differences were only marginally significant at the  $p < 0.1$  level. The non-attrited preschool sample appeared well balanced between the intervention and comparison groups.

To assess the intervention's impact on the preschool sample, we followed the same process we took with the younger sample. The results of this process are detailed in Table 7. In our first model, we estimated a positive intervention effect of approximately 5.4 percentage points correct on the total IDELA score, but at  $p = 0.082$ , the coefficient was insignificant. Adding the baseline IDELA score did not substantively change our estimate of the intervention effect but it narrowed our standard error dramatically by explaining nearly 30 percent of the variance in endline IDELA scores. In this model, our intervention effect was estimated at 5.5 percentage points and was significant at the conventional level of significance ( $p < 0.05$ ). Our final model controlled for baseline status, child's age, and child's sex, and it enabled us to further refine our estimate to 5.6 percentage points, significant at the  $p < 0.01$  level. Extrapolating from this final model, we fit the estimated means at baseline and endline for children in the intervention and comparison groups, as shown in Figure 2.

As with the younger group, we took the final model and applied it to the four core domains of the IDELA assessment, as shown in Table 8. Figure 3 demonstrates that the intervention effect was large and positive for all of the core IDELA domains and the total IDELA score. However, the effect was only significant for the emergent numeracy and emergent literacy domains.

EFFECTS OF TWO EARLY CHILDHOOD INTERVENTIONS  
ON DEVELOPMENTAL OUTCOMES

*Table 5: Baseline Balance of Child-Level Outcomes and Covariates in Preschool Sample*

|                               | Comparison       | Intervention     | T-test of difference            |
|-------------------------------|------------------|------------------|---------------------------------|
| <b>Variable</b>               | Mean/[SE]        | Mean/[SE]        | (Comparison)-<br>(Intervention) |
| Child is female               | 0.516<br>[0.037] | 0.562<br>[0.051] | -0.046                          |
| Child's age                   | 4.139<br>[0.093] | 4.093<br>[0.160] | 0.046                           |
| Motor Domain                  | 0.147<br>[0.031] | 0.138<br>[0.025] | 0.009                           |
| Emergent Literacy Domain      | 0.107<br>[0.014] | 0.103<br>[0.013] | 0.005                           |
| Emergent Numeracy Domain      | 0.201<br>[0.017] | 0.207<br>[0.015] | -0.007                          |
| Social-Emotional Domain       | 0.089<br>[0.009] | 0.092<br>[0.011] | -0.003                          |
| Executive Function Domain     | 0.089<br>[0.018] | 0.079<br>[0.012] | 0.010                           |
| Approaches to Learning Domain | 0.503<br>[0.034] | 0.521<br>[0.027] | -0.018                          |
| IDELA Total                   | 0.136<br>[0.016] | 0.135<br>[0.014] | 0.001                           |
| <b>N</b>                      | 157              | 153              |                                 |
| <b>Clusters</b>               | 36               | 29               |                                 |

*Note:* Average values for comparison and intervention groups are presented above clustered standard errors at the preschool level in parentheses.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

*Table 6: Baseline Balance of Caregiver-Child Interactions for Preschool Sample*

|   | <b>Comparison</b> | <b>Intervention</b> | <b>T-test of difference</b>     |
|---|-------------------|---------------------|---------------------------------|
| Variable  | Mean/[SE]         | Mean/[SE]           | (Comparison)-<br>(Intervention) |
| Read to child                                     | 0.503<br>[0.040]  | 0.601<br>[0.067]    | -0.098                          |
| Told child stories                                | 0.306<br>[0.035]  | 0.359<br>[0.051]    | -0.054                          |
| Sing to child                                     | 0.338<br>[0.046]  | 0.386<br>[0.046]    | -0.048                          |
| Talk child out                                    | 0.439<br>[0.047]  | 0.431<br>[0.056]    | 0.008                           |
| Play with child                                   | 0.210<br>[0.039]  | 0.333<br>[0.051]    | -0.123                          |
| Draw with child                                   | 0.191<br>[0.043]  | 0.268<br>[0.049]    | -0.077                          |
| Teach child new things                            | 0.210<br>[0.039]  | 0.327<br>[0.057]    | -0.117                          |
| Teach child letters                               | 0.312<br>[0.049]  | 0.379<br>[0.034]    | -0.067                          |
| Teach child numbers                               | 0.197<br>[0.033]  | 0.261<br>[0.045]    | -0.064                          |
| Hug child   | 0.726<br>[0.046]  | 0.843<br>[0.042]    | -0.117                          |
| Total number of types of Home Learning Activities | 3.433<br>[0.260]  | 4.190<br>[0.384]    | -0.756                          |
| <i>N</i>  | 157               | 142                 |                                 |
| <i>Clusters</i>                                   | 36                | 29                  |                                 |

*Note:* Average values for comparison and intervention groups are presented above clustered standard errors at the VDC ward level in parentheses.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

EFFECTS OF TWO EARLY CHILDHOOD INTERVENTIONS  
ON DEVELOPMENTAL OUTCOMES

*Table 7:* Taxonomy of models fitting Total IDELA score

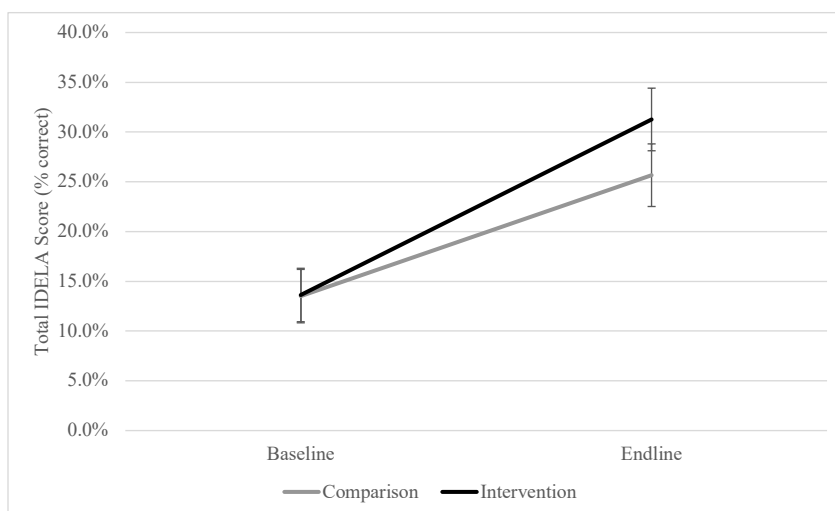
| Variable        | Model 1<br>(No controls) | Model 2<br>(Baseline control) | Model 3<br>(Baseline + Child<br>covariates) |
|-----------------|--------------------------|-------------------------------|---|
| Intervention    | 0.0545<br>(0.0305)       | 0.0551*<br>(0.0211)           | 0.0560**<br>(0.0199)                        |
| Baseline Score  |                          | 0.769***<br>(0.0761)          | 0.696***<br>(0.0807)                        |
| Child's age     |                          |                               | 0.0304*<br>(0.0123)                         |
| Child is female |                          |                               | 0.0229<br>(0.0134)                          |
| Constant        | 0.257***<br>(0.0198)     | 0.153***<br>(0.0170)          | -0.000585<br>(0.0577)                       |
| Observations    | 310                      | 310                           | 310   |
| R-squared       | 0.031                    | 0.316                         | 0.348                                       |

*Note:* Unstandardized coefficients are presented above standard errors (in parentheses).

All models include clustered standard errors at the ECCD Center level.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

*Figure 3:* Fitted Baseline and Endline IDELA Scores in Intervention and Comparison Groups (N=310)



*Note:* Error bars represent the 95 percent confidence interval of the estimate with clustered standard errors at the ECD-center level.

The confidence interval on the total IDELA score and its core domains was substantially larger than that we found with the younger group. While the baseline-endline correlation was strong and significant for both CREDI and IDELA, at  $p = 0.786$ , the baseline-endline correlation for the CREDI score was much higher than for IDELA ( $p = 0.534$ ). As such, we were able to refine our intervention effect estimates much more for CREDI than for IDELA. In fact, the plausible estimates for the impact of the intervention on the total IDELA score ranged from the rather small effect of 0.15 to the huge effect of 0.89. This is even more stark when examining the domain-level results. While all the point estimates were positive, the plausible range of effects on the emergent literacy domain was 0.04 to 1.07. Our most accurate estimate of the effect was for the emergent numeracy domain, where we are confident that the program generated an effect of 0.15 to 0.73 standard deviations. Our estimates of the program's impact are fairly imprecise in all cases.

We also examined the results of caregiver engagement with children in the preschool sample. As was the case with the younger sample, we found little evidence that the program had a positive impact on caregivers' engagement with children. There were no differences in the total types of learning activities caregivers reported engaging in with their children at either baseline or endline.

Table 8: Final Model Applied to IDELA Domains

|                                    | (1)<br>Motor         | (2)<br>Emergent<br>Literacy | (3)<br>Emergent<br>Numeracy | (4)<br>Social-<br>Emotional |
|------------------------------------|----------------------|-----------------------------|-----------------------------|-----------------------------|
| Intervention                       | 0.0723<br>(0.0372)   | 0.0649*<br>(0.0301)         | 0.0592**<br>(0.0194)        | 0.0304<br>(0.0152)          |
| Child's age                        | 0.0562**<br>(0.0196) | 0.0456**<br>(0.0166)        | 0.0389**<br>(0.0118)        | 0.0103<br>(0.0106)          |
| Child is female                    | 0.0615*<br>(0.0287)  | 0.0178<br>(0.0203)          | -0.00923<br>(0.0116)        | 0.0120<br>(0.0149)          |
| Motor Domain<br>baseline           | 0.562***<br>(0.0658) |                             |                             |                             |
| Emergent Literacy                  |                      | 0.570***<br>(0.0833)        |                             |                             |
| Emergent<br>Numeracy base-<br>line |                      |                             | 0.414***<br>(0.0782)        |                             |
| Social-Emotional<br>baseline       |                      |                             |                             | 0.389***<br>(0.101)         |

EFFECTS OF TWO EARLY CHILDHOOD INTERVENTIONS  
ON DEVELOPMENTAL OUTCOMES

|                | (1)<br>Motor       | (2)<br>Emergent<br>Literacy | (3)<br>Emergent<br>Numeracy | (4)<br>Social-<br>Emotional |
|----------------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| Constant       | -0.0587<br>(0.101) | -0.0479<br>(0.0784)         | 0.0200<br>(0.0545)          | 0.0595<br>(0.0533)          |
| Observations   | 310                | 310                         | 310                         | 310                         |
| R <sup>2</sup> | 0.236              | 0.222                       | 0.291                       | 0.111                       |

Note: Unstandardized coefficients are presented above standard errors (in parentheses). Models include clustered standard errors at the ECCD Center level.

\* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

## DISCUSSION

Our two evaluations yielded different results. For the younger sample, we observed that the program had no effect on children’s overall developmental outcomes, nor on children’s motor, language, cognitive, and social-emotional abilities. For the preschool sample, we found that the intervention had a significant, if imprecisely estimated, impact on children’s developmental outcomes, with the academic skills of emergent numeracy and emergent literacy showing the strongest gains. For both groups, we found little evidence that caregiver behaviors, and specifically their engagement in home learning activities, changed as a result of the intervention.

To understand the different results, we first considered the ecological levels each intervention targeted. The effort to build resilience through improvements in caregiver-child interactions at the family level appeared to be unsuccessful for both age groups. The intervention sought to equip caregivers with the skills needed to respond to and play with young children in a positive way, but it did not provide additional family-level resources, such as housing, livelihood support, social protection, or mental health and psychosocial services. Caregivers who had lost almost everything in the earthquake were living in temporary homes during the intervention, and they were struggling to meet their family’s basic needs. Thus, they likely needed additional family-level resources in order to engage effectively with their children and provide a nurturing, stimulating, and predictable home environment. They also may have needed specific support to promote parent and caregiver mental health, which could have enabled them to act on the responsive caregiving lessons provided in the younger child intervention.

The attempt to build resilience by providing resources at the ECD-center level appeared to be more effective, although our evaluation does not allow us to disentangle which aspect of the intervention promoted this outcome most effectively. Providing children with a consistent routine in a play-based quality learning environment may have had a significant impact on children's early learning and developmental outcomes.

The program's service-delivery providers may also have played a role in the interventions' respective successes. The preschool group was served directly by ECD facilitators who were used to working with children, so the intervention was not a significant departure for them from their usual roles and responsibilities. By building on the ECD center facilitators' existing experience, capacity, and skills, they were able to build a quality early learning environment that improved children's resilience. Conversely, the skills introduced to the FCHVs may have been more challenging, as they likely had limited experience with responsive care and early stimulation. Using FCHVs was considered a more sustainable method of delivering responsive caregiving interventions at the family level, but their capacity and roles may not have been well aligned with the goals of the younger intervention, which possibly diluted the potential effects on caregiver-child interactions. Future programs for children ages 0-3 must consider the pros and cons of various service deliverers more carefully and select measures that improve both the content knowledge and facilitation skills of the delivery agents.

#### **YOUNGER GROUP HEALTH MOTHER GROUP AND HOME VISITS INTERVENTION**

We relied on FCHVs to incorporate proven means of responsive care and early stimulation into their home visits, and to teach caregivers ways to improve their caregiving practices in parenting group sessions, with the support of partner NGO social mobilizers. This program experienced a variety of challenges. On the one hand, to promote the program's sustainability, they had deliberately chosen to work through FCHVs who were already present and embedded in government health outreach mechanisms. This was similar to an approach used in Rwanda that relied on a combination of community volunteers and a salaried community family facilitator (Abimpaye et al. 2019). While attractive from a sustainability perspective, this approach created several challenges: FCHVs have numerous responsibilities that center on health and nutrition, so integrating a new and unfamiliar concept into their routine required additional time and effort.

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Moreover, the program implementers reported that many FCHVs were illiterate and their facilitation skills were weak. In comparison, the highly successful implementation of the Building Brains program in Bhutan used highly trained district health officials as delivery agents (Seiden, Dowd, and Chetri 2019). Numerous challenges were also faced during the program rollout:

- Caregiver participation in the sessions was not continuous. Fathers, mothers, sisters, and other family members attended the sessions interchangeably and did not always share the lessons learned with other family members after each session. Monthly home visits could only compensate for that to a limited degree.
- There were few safe and suitable indoor places to hold the group learning sessions, due to the earthquake damage, so they had to be conducted in the open. Rain, wind, and high temperatures might have affected participation and retention.
- Parents were distracted by their children during the sessions and there was a lack of toys to keep the children engaged.

While early stimulation is a proven concept, there is a limited number of impact evaluations of ECD programs in emergency settings (Murphy, Yoshikawa, and Wuermli 2018). There also are large outstanding questions about how to generate the desired results and which intervention methods offer scalable and effective results (Baker-Henningham and López Bóo 2010). Home visitations conducted by dedicated paraprofessionals, as is done with the Jamaica Reach Up program, have been shown to improve children's long-term developmental outcomes and even their adult earning potential (Gertler et al. 2014). Interventions aimed at promoting early stimulation at a reduced cost have shown that the short-term gains generated by relatively inexpensive iterations of early stimulation programming can fade over time (Andrew et al. 2018). As the creators of the Reach Up program acknowledge, it is incredibly challenging to scale high-quality early stimulation interventions on a national scale and they come at a high cost (Government of Peru 2016). To build early stimulation and responsive caregiving skills, it is critical to find the correct balance between the intensity of the interventions, the minimum level and amount of exposure to key messages required, and the most effective touchpoints. The results of this program reinforce the importance of quality and consistency when it comes to early stimulation interventions.



## **PRESCHOOL GROUP ECD CENTER AND FACILITATOR INTERVENTION**

The results for our preschool group are similar to other evaluations of ELM programming, both in terms of the magnitude of the effects generated and the domains in which ELM generated the largest and most significant effects. This evaluation followed a quasi-experimental design, but the 0.52 effect size on total IDELA score is similar to the effect size found in evaluations conducted in India (Bora et al. 2018; Seiden and Karnati 2019) and Ethiopia (Dowd et al. 2016; Pisani and Amente 2015) under experimental conditions. The observed effects also closely match the implementation of the early literacy and math program, which, as the name suggests, focuses on pre-academic skills. However, this ELM training lasted only two days because it was embedded in the larger foundational training, whereas the traditional stand-alone ELM training usually lasts four days.

Of interest (though insignificant) are the effects on other early learning and development domains. The gains children in the preschool group demonstrated in the social-emotional domain are of particular interest. This may point to the added benefit of integrating HEART into the curriculum as a way to provide children with psychosocial support and resources to build resilience, and of encouraging children to voice their feelings. Overall, we argue that our evaluation has demonstrated that bolstering ECD facilitators' ability to improve the quality of ECD centers can have a meaningful impact on children' outcomes, even in postdisaster and emergency settings.

### **LIMITATIONS**

Quasi-experimental designs only generate credible causal estimates if the comparison group represents a reasonable estimate of the counterfactual. The largest potential limitation to our estimates of impact is unobserved bias in the characteristics of intervention and comparison children. While we assessed balance on outcomes at baseline and a few observable characteristics and found no differences between the groups, we cannot conclude that the comparison group was a perfect counterfactual. Our counterfactual was designed at the VDC level and attempted to create representative samples of children from VDCs that were similar in terms of geographic area, earthquake damage, urbanicity, and socioeconomic and demographic conditions. A stronger quasi-experimental design would have included a more refined process that matched individual intervention communities and ECD centers with comparison communities and ECD centers on a defined set of characteristics. Unfortunately, we did not have

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the data to make this design improvement ahead of the project implementation. Our causal claims therefore rest on the credibility of our VDC selection process.

We also considered patterns of attrition. With the younger sample, we were able to conclude unambiguously that attrition may have biased our results. While attrition is often more prevalent in comparison groups, in our case the younger sample actually had a higher attrition rate in the intervention sample. We do not have a definitive answer as to why that occurred, but we suspect that the data collection method may have negatively affected the attrition rate in the intervention group. Sampling in the intervention areas relied on sampling from attendees at group sessions, which were not always attended consistently. In the comparison group, data collection was done exclusively at the household level, which resulted in an overall lower attrition level. Fortunately, the probability of attrition was not significantly predicted by any outcome or measured covariate. Nevertheless, the strongly differential attrition between intervention groups indicates a strong possibility of biased endline results and gives us substantially less confidence in the results from the younger group.

The preschool group's story of attrition was much more positive. The overall attrition in the analyzed dataset was low, did not differ by intervention group, and was well within acceptable thresholds. However, we were unable to verify with the original research consultant that no baseline cases were excluded from our dataset.<sup>10</sup> Given the excellent balance observed in the preschool sample, we are not overly concerned about this possibility, but we include it as a caveat for our findings with the preschool groups.

The measurement tools are another limitation of our results. CREDI and IDELA are both well-established instruments for measuring early learning and development, but they likely measure slightly different constructs. As such, the lack of findings in our younger sample could be due to the tool used rather than to the program's failure to have an effect on early learning and development. While such a finding is possible, we believe it is unlikely. First, while CREDI and IDELA measure slightly different constructs, there is a large degree of overlap; failing to detect an impact on one assessment tool without finding it on the other assessment is quite unlikely. A recent longitudinal study in the Philippines found that baseline CREDI scores were as predictive of endline IDELA scores

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<sup>10</sup> The authors repeatedly tried to recover completely raw data files from the research firm, but unfortunately this data had been discarded. The fast-paced nature of applied research and project-based evaluation in the context of postdisaster settings can unfortunately lead to less-than-ideal data storage and maintenance and is a limitation of research in these types of settings.

for older children as they were for endline CREDI scores for younger children (Seiden et al. 2018).

In general, finding an appropriate comparison group is a recurring challenge researchers face in the humanitarian context. The density of interventions is high and there are ethical considerations in withholding a program for the purposes of evaluation. This challenge was encountered in this program as well. For the younger sample, our monitoring system alerted us to programmatic spillover into the comparison group. Since the FCHV meetings followed the monthly staff meetings organized at government health posts (with participation of both targeted and nontargeted FCHV), FCHVs from the control sites learned about the Better Brains approach and replicated some of its activities in their own sessions with parents. Moreover, the fact that the partner NGO Tuki was implementing programs at both the comparison and the intervention sites could have affected some of our findings. The partner NGO staff working on the project shared some best practices with their colleagues, which also could have affected the comparison group's exposure to Better Brains content. In the rushed nature of emergency programming, it is difficult to select faultless comparison groups, and we do not believe that easy solutions to these challenges exist. Nevertheless, we feel that the benefits of attempting to rigorously evaluate programs in these contexts, even imperfectly, can generate useful lessons about the effects of programs and the conditions under which they work best.

## CONCLUSION

We presented the results of two concurrently conducted impact evaluations of interventions seeking to improve ECD and resiliency in post-earthquake Nepal. We were able to find clear evidence that Save the Children's Quality Preschool Framework, which incorporates the foundational training for ECD facilitators, can provide resources for building resilience at the ECD-center and child levels and help mitigate the negative learning and developmental consequences anticipated in the wake of a disaster for children enrolled in preschool. However, we failed to find any evidence that the parenting programs for the 0-3 and 3-6 age groups, which attempted to improve resources for resilience at the family and child levels, were able to improve parental engagement or the developmental status of the youngest children suffering the long-term psychosocial harm caused by a natural disaster.

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These findings suggest that the Quality Preschool Framework, coupled with the foundational training for ECD facilitators, is an appropriate approach to use to guide program design and implementation in emergency settings. However, we must continue to consider how to strengthen family-level resources for parenting programming in postdisaster settings and how to optimize the parenting program design. Programs should examine whether well-qualified health workers would be more effective delivery agents for the family-focused components. Future research also should examine whether providing more family-level resources to build resilience and help caregivers to meet their basic needs can unlock caregivers' potential to provide young children with safe, predictable, playful, and responsive homes in post-emergency settings.

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