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Building the Human Capital of Tomorrow

An Impact Evaluation of the Early Childhood Stimulation Program

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GED06

SOUTH ASIA



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Abbreviations and Acronyms

DPE	Directorate of Primary Education
ECD	Early Childhood Development
ECS	Early Childhood Stimulation
GNI	Gross National Income
HOME	Home Observation for the Environment
ITT	Intention-to-Treat
MICS	Multiple Indicator Cluster Survey
MoHFW	Ministry of Health and Family Welfare
MoPME	Ministry of Primary and Mass Education
MoWCA	Ministry of Women and Children's Affairs
NEP	National Education Policy
NGO	Nongovernmental Organization
NNS	National Nutrition Services
PPE	Pre-Primary Education
SABER	Systems Approach to Better Education Results
SIEF	Strategic Impact Evaluation Fund
STEP	Skills Toward Employment and Productivity
TOT	Treatment-on-Treated
UNICEF	United Nations Children's Fund
WDI	World Development Indicators
WHO	World Health Organization

Executive Summary

1. Over the past several decades, Bangladesh has become internationally recognized for its achievements in improving educational and health outcomes. As its economic growth has accelerated, Bangladesh's social indicators have rapidly improved. However, much progress remains to be made, especially in the area of Early Childhood Development (ECD) and related outcomes.
2. Child malnutrition rates remain high in Bangladesh: 42 percent of children under the age of five show signs of stunting, while 31 percent are underweight. Indicators of child cognitive development and socio-emotional skills are also low, with large disparities by income and education level. Despite descriptive statistics showing that cognitive and linguistic skills among children soon after birth, at age 3-6 months, are broadly consistent with international standards, they continuously decline among older age groups and only 21 percent of age 36 to 59 months old reach their literacy and numeracy milestones. These figures underscore the urgent need for action to safeguard the health, wellbeing and socioeconomic potential of Bangladeshi children.
3. Children of poor households and children born to uneducated mothers have an especially negative developmental trajectory. Poorer and less educated parents often have limited knowledge about good childrearing practices in key areas such as health, nutrition and hygiene, and their children are more likely to suffer from low height, weight and cognitive-skills indicators. Moreover, child health status and household characteristics are mutually reinforcing. Poorer households are more likely to raise children with serious developmental challenges, yet less likely to possess the knowledge and skills necessary to cope with these challenges. Over the longer term, children raised without adequate healthcare, hygiene or nutrition tend to face a sharp decline in their educational attainment and earnings potential, which can greatly limit their ability to contribute to the welfare of their households and break the cycle of poverty.
4. In an effort to address this situation, Bangladesh's government has established a new policy and institutional framework for the ECD subsector. Multiple ministries have established ECD-related policies, including the Comprehensive Early Childhood Care and Development Policy adopted by the Ministry of Women and Children's Affairs in 2013 and Pre-Primary Education Operational Framework by the Directorate of Primary Education. Guided by these policies, Bangladesh has launched a number of new small- and large-scale ECD programs supported by government ministries, nongovernmental organizations and research institutions.
5. This policy note examines the status of ECD efforts in Bangladesh and presents the results of a rigorous impact evaluation of an ECD program. While Bangladeshi policymakers and their development partners are increasingly aware of the importance of ECD to the country's economic and social development objectives, empirical evidence of the effectiveness of individual ECD efforts remains limited. The impact evaluation, which focused on a set of ECD interventions implemented as part of Save the Children's Early Childhood Stimulation (ECS) program, was conducted between 2013 and 2015. The program was designed to improve parental knowledge of good childrearing practices through the distribution of informational materials combined with parental counseling sessions. The ECS program was implemented in three rural districts located in Sylhet, Barisal and Chittagong divisions, and it built on an existing community-clinic project implemented by the Ministry of Health and Family Welfare.
6. The impact evaluation revealed statistically significant improvements in cognitive and language development, physical growth and socio-emotional skills indicators among children in the treatment area, in which the ECS program was implemented. Overall, female children, younger children, children from low-income households and children whose mothers had little formal education appeared to experience the greatest positive impact. Although the evaluation was not able to provide a clear answer to the causality chain of the program due to presence of multiple channels of improvement, including increased take up rate

of the National Nutrition Services (NNS), the results indicate that the ECS program overall improved ECD outcomes among participating households, with especially positive effects on girls and poor and less-educated beneficiaries. It is worth noting that community clinics and the NNS contributed to the positive impacts of the ECS program since the program delivered its services through the clinics and collaborated with the NNS.

7. The ECS program proved both technically feasible and cost-effective. The program was implemented through community clinics as an extension of their existing health services. The program cost was US\$6.84 (BDT 530) per beneficiary child over a 1.5-year intervention period. This cost does not include operating costs of community clinics or the program cost of the NNS. Leveraging the existing community-clinic system helped minimize the program's implementation costs.

8. The evidence from the impact evaluation shows the potential for advancing Bangladeshi ECD objectives at a low cost by focusing on building parental knowledge and more closely monitoring child development. While a sustainable long-term ECD policy should include a holistic package of interventions in education, health and social protection, the impact evaluation suggests that rapid improvements in ECD indicators can be achieved through the dissemination of basic childcare knowledge and effective collaborations with community clinics and the NNS. Parents across Bangladesh still lack this knowledge, and therefore there is considerable scope to capitalize on the experience of the ECS programmatic model.

9. Because the existing network of community clinics, through which the ECS program was implemented, spreads across the country, the same implementation arrangement can be cost-effectively replicated in other districts or even rolled-out nationwide. However, the size, scope and content of the program should be tailored to reflect the unique needs of each region, district or municipality. While Bangladesh's ECD subsector has been fragmented, as the government, NGOs and research institutions pursue numerous small- and large-scale ECD initiatives, close collaboration among public agencies, non-governmental organizations, and development partners can generate implementation synergies by leveraging the unique competencies of different agencies and groups to provide multiple complementary channels for disseminating childcare knowledge and monitoring ECD outcomes.

10. The ECS impact evaluation has highlighted the enormous value of rigorously analyzing ECD interventions, and a comprehensive review of Bangladesh's ECD subsector could provide an empirical foundation for more effective national policies. Compared to other sub-sectors of education, evaluation of ECD programs has been limited in Bangladesh, and more extensive data and further impact evaluations could greatly improve the effectiveness of ECD interventions. In this context, the preparation of a comprehensive policy note on the ECD subsector could serve as an important first step in expanding the body of knowledge on ECD in Bangladesh. Such an analysis could address service quality and access issues, financing arrangements, and subsector governance and coordination, which are largely beyond the scope of the present policy note. An assessment conducted through the World Bank-developed Systems Approach for Better Education Results (SABER) could also prove highly useful. Gathering a wider range of evidence on the full spectrum of issues affecting the subsector, including education, health and nutrition, and social protection areas, could greatly facilitate the government's efforts to formulate a comprehensive and highly effective national policy framework for ECD.

1. Introduction

1.1. A Brief Overview of Socioeconomic Development in Bangladesh

1. **In recent decades, Bangladesh has achieved substantial progress in economic and social development.** Bangladesh's economy has grown at an average rate of 6.1 percent per year over the past 10 years, and poverty rates have fallen rapidly. Bangladesh was reclassified as a lower-middle-income country after its gross national income (GNI) rose from US\$1,080 per capita in 2014 to US\$1,190 in 2015. Bangladesh's economic progress has continued despite the country's considerable vulnerability to global economic shocks and natural disasters, its history of weak governance and political instability, and the rising costs of unplanned urbanization. Based on its high economic growth trajectory, Bangladesh is expected to become one of the world's next major emerging economies.

2. **Bangladesh's rapid economic development has been accompanied by substantial improvements in social indicators.** Poverty rates have fallen dramatically over the past decade, and the country achieved several of its Millennium Development Goals ahead of schedule. Bangladesh has a population of over 161 million people, 29 percent of whom are under the age of 15. The headcount poverty rate at the national poverty line fell from 49 percent in 2000 to 40 percent in 2005 and reached 32 percent in 2010. Gender parity in primary and secondary school enrollment improved from 0.53 female students per male student in 1980 to 0.75 in 1990 and 1.09 in 2010 (World Bank, 2016), eliminating girls' disadvantages in access to these levels of education.

3. **Bangladesh has made considerable strides in enhancing education access, quality and equity.** In addition to improving gender equity in primary and secondary education, Bangladesh has greatly expanded enrollment, markedly reduced repetition and dropout rates, and attained reasonably high levels of primary school completion. Under the 2010 National Education Policy, the authorities continue to focus on improving a wide range of access, quality and equity indicators. New competency-based assessment systems have been introduced at the primary and secondary levels, providing a wealth of quantifiable data on which to base further reforms.

4. **Bangladesh has also achieved remarkable improvements in health and nutritional indicators by rapidly expanding access to basic health services.** Since 1990, the child mortality rate has declined by more than two-thirds. Despite a rising and changing demand for health services, driven by complex dynamics such as population growth, urbanization and climate change, basic health indicators have improved significantly. The maternal mortality rate fell to 194 deaths per 100,000 live births in 2010, and in 2013, 34 percent of births were attended by a trained medical professional, up from 21 percent in 2007. In 2013, 59 percent of children were exclusively breastfed until they were at least 6 months old—up from 43 percent in 2007—and 86 percent of children under 23 months received basic vaccinations. The share of underweight children dropped from 62 percent in 1990 to 31 percent in 2013.

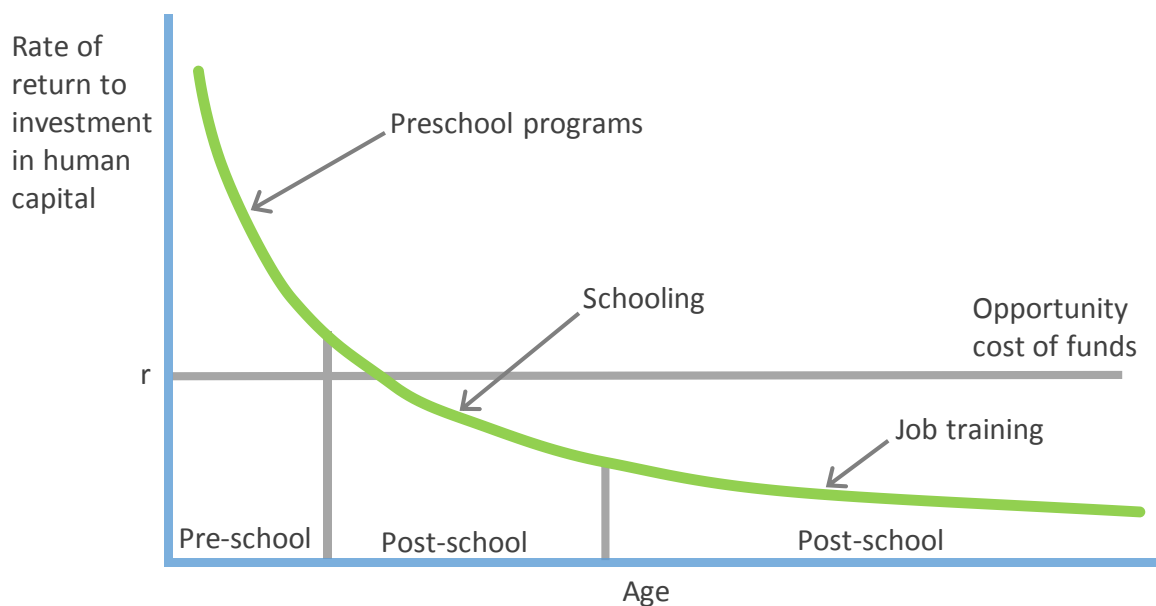
5. **Nevertheless, Bangladesh continues to face major challenges in promoting sustainable social development.** Educational indicators continue to lag among poor households, which suffer from persistent disparities in access, retention rates and learning outcomes. Overall repetition rates remain high despite a long-term decline, while transition rates are low across multiple educational levels. Children living in impoverished urban areas suffer from education constraints on both the demand and the supply side, and employers frequently report that even workers with upper secondary and tertiary qualifications lack critical workforce skills (World Bank, 2013). Similar challenges exist in the health and nutrition sector, and Bangladesh continues to have one of the world's largest populations of malnourished children.

6. **Early childhood development (ECD) is the foundation for educational success, physical and cognitive health and lifetime labor productivity, and ECD interventions are critical to support inclusive development in Bangladesh.** The international experience shows that investing in ECD is among the most cost-effective methods for improving economic and social indicators (Naudeau et al. 2011). While Bangladesh's ECD policy is still in its early stages, the authorities have demonstrated a strong interest in expanding ECD interventions and building a more comprehensive ECD framework. Due to its cross-cutting nature, an effective ECD agenda requires coordination between government ministries, nongovernmental and civil society organizations, the private sector and international institutions.

1.2. A Conceptual Framework for ECD

7. **In the ECD literature, early childhood is generally understood to extend from pregnancy to age six, or roughly the point when a child is old enough to enter pre-primary school.** The United Nations Convention on the Rights of the Child, General Comment 7 (UN Committee on the Rights of the Child, 2006) defines ECD as the sum of the physical, cognitive, linguistic and socioemotional development that takes place during early childhood. Studies from multiple disciplines have demonstrated the critical importance of ECD to an individual's lifelong physical, emotional, educational and economic wellbeing, and early childhood is widely regarded as the most crucial stage in human development (Naudeau et al. 2011). Recent neurological research suggests that the interrelated nature of physical, socio-emotional and cognitive development demands a holistic approach to ECD (Denboba et al., 2014). Longitudinal economic studies in both developed and developing countries have shown that ECD interventions have the highest rates of return of any form of human capital investment (Figure 1). Low levels of investment during the ECD phase, which are most commonly observed among the poor, are closely correlated with worse educational outcomes, including high repetition and dropout rates, and diminished labor productivity and income in adulthood. Moreover, these effects have a strong intergenerational dimension, as children who receive little investment in ECD are more likely to be poor as adults and less likely to invest in the ECD of their own children, perpetuating a cycle of poverty (Grantham-McGregor et al., 2007; Naudeau et al., 2011).

Figure 1: Rates of Return to Different Types of Human Capital Investment



Rate of return to human capital Investment initially setting investment to be equal across all ages

Source: Carneiro and Heckman (2003)

8. **ECD is the first stage in a lifelong process of learning and skills development.** The World Bank's comprehensive conceptual framework for skills development, called Skills Toward Employment and Productivity (STEP), identifies ECD as the first of five key stages in education and employment (World Bank, 2010).¹ Drawing on a large body of international and interdisciplinary literature, the STEP framework emphasizes a holistic approach to ECD (Denboba et al., 2014). This approach encompasses 25 essential interventions grouped into five policy areas: (i) nutrition, (ii) health, (iii) water and sanitation, (iv) education, and (v) social protection (Table 1).

Table 1: The 25 Essential STEP Interventions for Young Children and Their Families

Areas	Key Interventions
Nutrition	<ul style="list-style-type: none"> • Counseling on adequate diet during pregnancy • Iron and folic acid intake for pregnant mothers • Exclusive breastfeeding • Complementary feeding • Prevention and treatment for acute malnutrition • Therapeutic zinc supplements for diarrhea • An adequate, nutritious and safe diet
Health	<ul style="list-style-type: none"> • Antenatal visits • Attended delivery • Immunizations • Deworming • Planning for family size and pregnancy spacing • Access to health care • Prevention and treatment of parental depression
Water and Sanitation	<ul style="list-style-type: none"> • Access to safe water • Adequate sanitation • Hygiene and handwashing
Education	<ul style="list-style-type: none"> • Maternal education • Early cognitive and emotional stimulation • Early childhood and pre-primary programs • Continuity to quality primary education
Social Protection	<ul style="list-style-type: none"> • Birth registration • Parental leave and adequate childcare • Child protection services • Social-assistance transfer programs

Source: Adapted from Denboba et al. (2014)

9. **The STEP framework identified three vital ECD-related educational interventions: (i) maternal education, (ii) early cognitive and emotional stimulation, and (iii) early childhood and pre-primary education.** While it is often assumed that education starts at the pre-primary level (i.e. preschool), a child's cognitive and emotional development actually begins during pregnancy. It is crucial for parent to interact regularly with children before they reach school age. A mother's education level is closely correlated with the emotional and cognitive stimulation a child receives, and a mother's specific knowledge about childrearing is strongly associated with a child's physical, emotional, cognitive and educational development (Bornstein and Tamis-LeMonda, 1989; Tamis-LeMonda et al., 2001 & 2004).

¹ These five stages are: (i) getting children off to the right start, (ii) ensuring that all students learn, (iii) building job-relevant skills, (iv) encouraging entrepreneurship and innovation, and (v) facilitating labor mobility and job matching. ECD is a critical component of the first stage.

1.3. The Policy Framework for ECD in Bangladesh

10. **Several Bangladeshi ministries have adopted ECD policies in an effort to advance the goals of the country's Vision 2021 development strategy.** Vision 2021's core objective is to enable Bangladesh to become a poverty-free middle-income country by 2021. In order to accomplish this ambitious goal, the strategy prioritizes investments in health, education and other forms of human capital. Vision 2021 commits the government to ensuring the healthy development of all children and providing universal access to primary and secondary education.

11. **In 2013, Bangladesh adopted the Comprehensive Early Childhood Care and Development Policy to guide the development of the ECD subsector.** This policy was developed by the Ministry of Women and Children's Affairs (MoWCA), and it aims to establish a strong foundation for ECD by providing support to children and families of children, from pregnancy through age eight, irrespective of ethnicity, geographical location, gender, religion, special needs or socioeconomic status. MoWCA also adopted a National Children's Policy in 2011, which focuses on children's rights, social protection, education and health from ECD through adolescence.

12. **The Ministry of Primary and Mass Education (MoPME) approved an operational framework for pre-primary education (PPE) in 2008, and the 2010 National Education Policy (NEP) stresses the importance of pre-primary education.** The NEP strives to equalize educational opportunities and to build an environment that is conducive to children's mental and physical health and that adequately prepares them to enter school. The NEP aims to provide one year of PPE to all children by age five, then to lower the threshold to age four. The overarching goal of the operational framework for PPE is to provide all children between the ages of three and five with access to some form of education, as well as health, nutrition, social, physical and intellectual development programs, and its key short-term objective is to provide one year of PPE to all children under the age of six (MoPME, 2013). In 2012 the Directorate of Primary Education (DPE) estimated that 3.4 million children were eligible for PPE, and that 73 percent of public primary schools offered PPE programs. Under the Third Primary Education Development Program, the government is attempting to expand PPE to all public schools, and the National Curriculum and Textbook Board has developed a new PPE curriculum and teaching package.

13. **The National Nutrition Services (NNS) is designed to address malnutrition through community-based efforts to promote positive nutrition practices, including exclusive breastfeeding for children under six months old, malnutrition screenings and referrals to healthcare facilities, among others.** As part of the NNS, health workers provide micronutrient supplements, administer deworming medications to prevent malnutrition and educate families on good health practices. The NNS uses the existing health and family planning infrastructure to deliver nutrition services. Community clinics are the main contact points for nutrition services. A recent assessment found that while the NNS had achieved promising results, an excessive number of intervention areas was hindering progress on core goals (Saha et al., 2015).

14. **Bangladesh's ECD subsector remains highly fragmented, as the government, NGOs and research institutions pursue numerous small- and large-scale ECD initiatives.** In 2010, a total of 18 government ministries and more than 200 organizations were involved in implementing ECD programs (Chinen and Bos, 2016). MoWCA and MoPME are the major government agencies active in the ECD subsector. Child development is part of MoWCA's core mission, and the ministry plays a leading role in policy development, coordination and facilitation. It has established 8,731 preschools serving approximately 800,000 children between the ages of four and five. Meanwhile, MoPME is a leading provider of PPE. The ministry offers academic preparatory classes at all public primary schools, and its goal is to achieve universal one-year PPE. The Ministry of Religious Affairs operates preschools in mosques that serve 570,000 children between the ages of four and six, and the Ministry of Health and

Family Welfare (MoHFW) supports ECD through a network of childcare centers. A national conditional cash transfer pilot program targeting poor households has also been shown to have a positive nutritional impact on children under three (Ferre and Sharif 2014). Key NGOs engaged in the ECD subsector include Save the Children, BRAC, Plan-Bangladesh and Dhaka Ahsania Mission, which provide a variety of health, education and social protection services to children under the age of eight.

15. **Better coordination among public and nongovernmental ECD service providers could support more effective interventions and promote better outcomes.** While the large and rising number of individual initiatives has greatly expanded the range of ECD services in Bangladesh, service quality and availability are highly uneven. The most effective ECD programs provide a comprehensive package of interventions, including education, health and social protection services, and concerted efforts could rapidly increase the number of children receiving holistic ECD support.

1.4. Objectives of This Policy Note

16. **This policy note presents the key findings from Bangladesh’s first empirically robust impact evaluation of an ECD intervention, the Early Childhood Stimulation (ECS) Program implemented by Save the Children in collaboration with Ministry of Health and Family Welfare between 2013 and 2015.** While it does not aim to provide a comprehensive analysis of the ECD subsector, Chapter 2 contextualizes the ECS program by presenting an overview of the current state of child development in Bangladesh. Chapter 3 offers a detailed look at the impact of the ECS program, and Chapter 4 synthesizes the key findings of the impact evaluation and explores their implications for national ECD policy. In line with the parameters of the ECS program, this policy note focuses on interventions designed to promote healthy cognitive development in children under the age of four through educational, nutritional and social protection support.

2. The Current Status of Young Children in Bangladesh

2.1. Child Health and Mortality

17. **Child health indicators in Bangladesh have improved over time, but serious challenges remain.** The infant mortality rate fell from 100 deaths per 1,000 live births in 1990 to 31 in 2015, while the under-five mortality rate fell from 144 to 38 (World Bank, 2016). Over the same period, the share of underweight children fell from 62 to 31 percent, the incidence of stunting dropped from 63 to 42 percent, and the incidence of wasting slid from 18 to 10 percent.²

Box 1: Clinical Definitions for “Stunted,” “Wasted,” and “Underweight”

“Stunted” refers to children who are significantly below the median height for their age. Stunting is a measure of chronic malnutrition. Based on the child growth standards published by the World Health Organization (WHO), children whose height is more than two standard deviations below the median are defined as stunted, while those who are three standard deviations below the median are defined as severely stunted. Stunting reflects a failure to receive adequate nutrition over a long period of time and may be worsened by both acute and chronic illness.

“Wasted” refers to children who are significantly below the median weight for their height. Wasting is a measure of current nutritional status. Children whose weight is two or three standard deviations below the WHO median are categorized as wasted or severely wasted, respectively. It reflects acute or recent nutritional deficit.

“Underweight” is a composite measure of wasting and stunting. Underweight status does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). Children whose weights are two or three standard deviations below the WHO reference median are considered underweight or severely underweight, respectively.

Source: Adopted from Chinen and Bos (2016) and WHO (2010)

Table 2: Key Child Health Indicators, 1990–2015

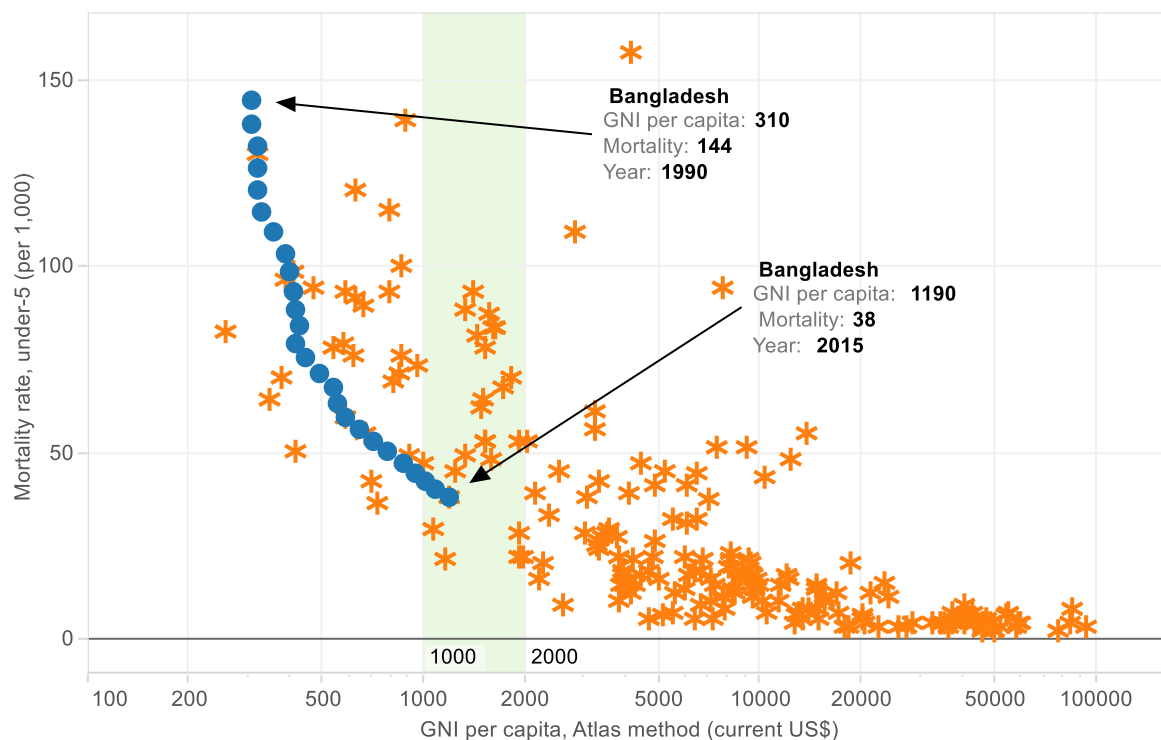
	1990	1995	2000	2005	2010	2013	2015
Infant mortality rate	100	81	64	51	39	-	31
Under-five mortality rate	144	114	88	67	50	-	38
Underweight prevalence, moderate and severe	62	58	42	39	-	31*	-
Stunting prevalence, moderate and severe	63	69	51	48	-	42*	-
Wasting prevalence, moderate and severe	18	16	13	12	-	10*	-
Primary school completion rate	-	-	-	64	66	79**	80**

Sources: * data from Multiple Indicator Cluster Survey (MICS) 2012/13. ** data from DPE 2016. Others data are from WDI June 2016 Database.

18. **Bangladesh’s child mortality rate has fallen to a relatively modest level by the standards of lower-middle-income countries.** Under-five mortality rates are closely correlated with GNI per capita (Figure 2). The decline in Bangladesh’s under-five mortality rate coincided with a period of robust economic growth. Bangladesh’s child mortality rate is now slightly lower than the average for countries whose annual GNI per capita is between US\$1,000 and US\$2,000.

² These statistics include both moderate and severe underweight/ stunting, and wasting.

Figure 2: Under-Five Mortality Rates and GNI per Capita, Bangladesh and International Comparators, 1990 and 2015

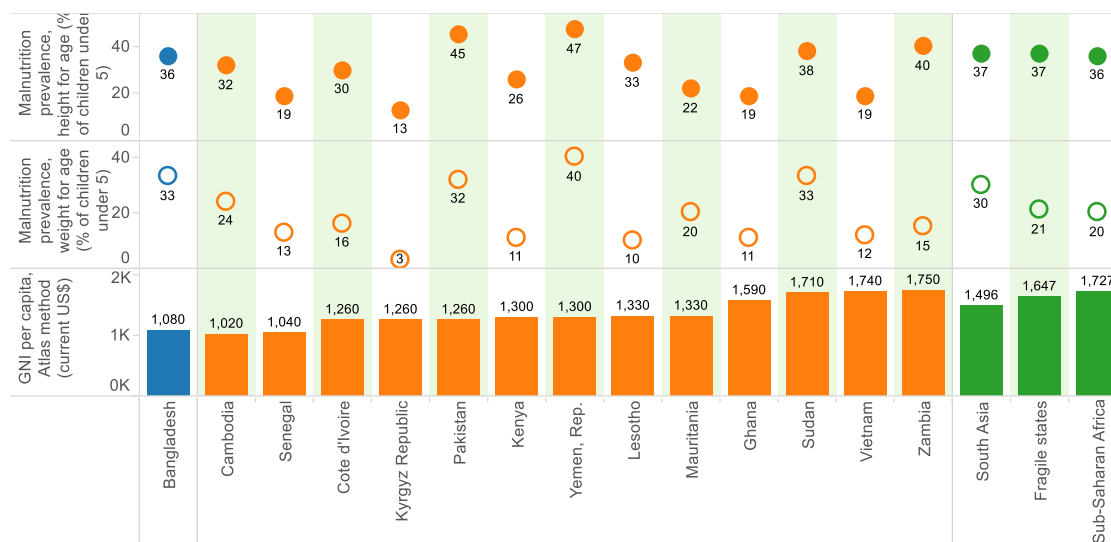


Source: WDI June 2016 Database.

Note: Data points for Bangladesh are from 1990 to 2015. For all other countries, only 2015 data points are included.

19. **However, indicators of child malnutrition in Bangladesh remain relatively high by the standards of comparable countries.** At 36 and 31 percent, respectively, the shares of stunted and underweight children in Bangladesh are broadly in line with the South Asia regional averages of 37 percent and 30 percent. However, Bangladesh's rates of stunting and underweight children are above the average for lower-middle-income countries in other regions.

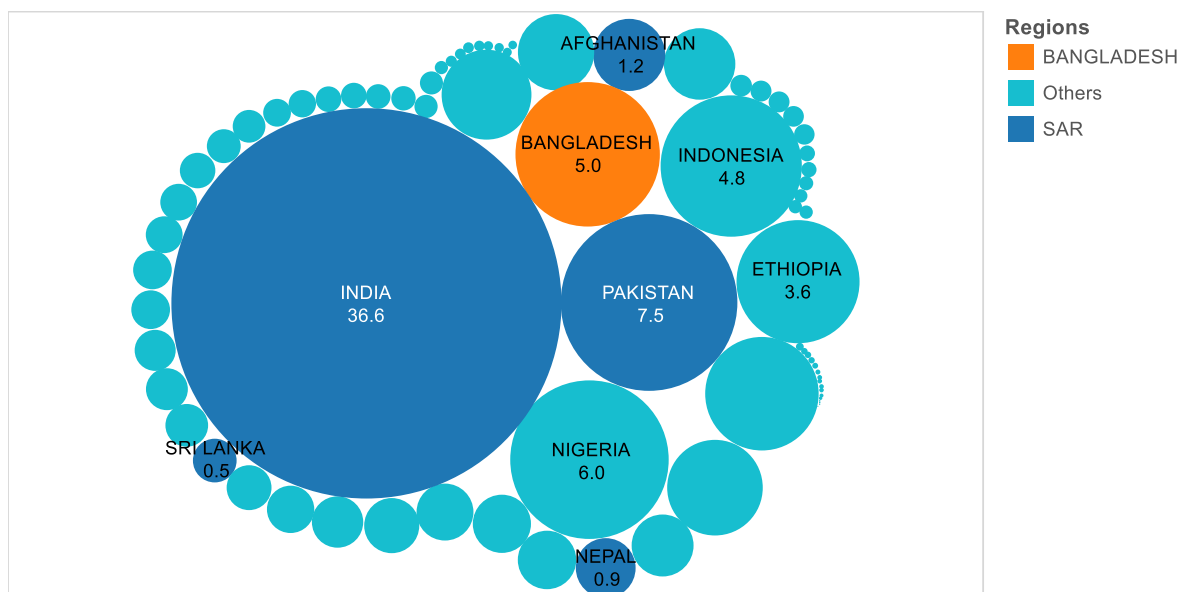
Figure 3: Malnutrition Indicators by Country, Circa 2014



Source: WDI June 2016 Database. Bangladesh data are from 2014. Country data are from 2012 to 2015.

20. **South Asia is home to the world's largest total population of malnourished children.** In 2014, there were an estimated 51.7 million malnourished children under the age of five in South Asia (Figure 4). Five million malnourished children lived in Bangladesh, the fourth largest population in the world after India, Pakistan and Nigeria. The total number of underweight children in Bangladesh fell from 10 million in 1990 to 5 million in 2015, while the number of stunted children dropped from 12 million to 5.5 million. While the population of wasted children declined only slightly from 2.9 million in 1990 to 2.6 million in 2015, it should be borne in mind that wasting is an acute condition that is highly sensitive to temporary circumstances.

Figure 4: Number of Underweight Children by Country (in millions)



Source: WDI June 2016 Database. Bangladesh data are from 2014. Country data are from 2012 to 2015.

Note: The size of each bubble represents the absolute number of malnourished children.

21. **Within Bangladesh, child health indicators differ substantially by geographic area and socioeconomic status.** According to the Multiple Indicator Cluster Survey (MICS) for 2012-13, the incidence of underweight children is 33.2 percent in rural areas, compared to 27.0 percent in urban centers in 2012 (Table 3). Similar differences are observed for stunting and wasting: 43.4 percent of rural children are stunted, versus 36.3 percent of urban children, and 9.8 percent of rural children are wasted, versus 9.1 percent of urban children. Sylhet division consistently records the highest rates for all three indicators. Nationwide, malnutrition indicators are strongly associated with household poverty and low levels of maternal education. Households in the poorest income quintile have underweight, stunting and wasting rates of 41.1, 52.8 and 11.6 percent, respectively, whereas in the wealthiest quintile these rates fall to 17.3, 27.0 and 6.4 percent.

22. **Poor physical development due to poor nutritional and health status leads to poor cognitive development.** International evidence from both developing and developed countries has consistently shown causal associations between cognitive development and nutritional and health status. For example, lower height during early childhood is associated with lower cognitive ability of several years later and lower schooling grades completed (Walker et al., 2011; Alderman et al., 2006). Stunting at early ages also leads to long-term negative outcomes such as reduced likelihood of formal employment at ages 20–22 (Carba et al., 2009) and weak psychological functioning in late adolescence (Walker et al., 2009). Not only the importance of macronutrients does the evidence shows (Walker et al., 2007), but also the importance of micronutrients (Britto et al., 2016). Micronutrient supplementation has been found to improve mental and

psychomotor development as well as academic performance. Infectious diseases at early ages also have negative consequences such as late school entry and weak linguistic development (Lorntz et al., 2006; Patrick et al. 2005). Early ages, particularly before 24 months after birth, are the most influential period for nutritional and health status to have negative future impacts (Black et al., 2016).

Table 3: Health and Education Indicators among Children under the Age of Five by Household Characteristics

	Underweight	Stunted	Wasted	Attendance rate for Early Childhood Care and Education program ³ (age 36–59 months)
Location				
Urban	27.0	36.3	9.1	14.2
Rural	33.2	43.4	9.8	13.2
Income				
Poorest quintile	41.1	52.8	11.6	11.7
Richest quintile	17.3	27.0	6.6	17.5
Education				
Mothers with no education	40.5	51.4	11.2	9.5
Mothers with secondary completion or higher	17.5	23.3	6.4	18.3
National	31.9	42.0	9.6	13.4

Source: MICS 2012/13

2.2. Early Childhood Education

23. **More than 93,000 primary education institutions in Bangladesh offer pre-primary classes, which together served 2.9 million children in 2015.** In line with the NEP 2010 and the operational framework for PPE, the government has progressively expanded educational outreach to young children, starting with one year of PPE in all public primary schools. Enrollment in PPE rapidly increased from 895,000 children in 2010 to 1.8 million in 2013 and reached 2.9 million in 2015. Currently, 99 percent of public primary schools and 95 percent of newly nationalized primary schools offer PPE (DPE, 2015). However, ensuring the quality of PPE is a serious challenge. The government has formed partnerships with NGOs, the National Curriculum and Textbook Board has developed a new PPE curriculum and learning materials, and public schools are recruiting additional PPE teachers. Nevertheless, the PPE system is still at an early stage in its development, and the government will need to build its institutional experience with PPE in order to improve service quality.

24. **Due in part to the limitations of the PPE system and in part to persistent malnutrition, cognitive development indicators are relatively poor in Bangladesh.** According to the Multiple Indicator Cluster Survey (MICS) for 2012-13, only 21.2 percent of children between the ages of three and five are on track in terms of literacy and numeracy. The ECD Index tracks children's development across four dimensions: (i) literacy-numeracy, (ii) physical development, (iii) socio-emotional development, and (iv) learning.⁴ According to the ECD Index, 92 percent of Bangladeshi children between the ages of 36 and 59

³ The Early Childhood Care and Education program strives to improve early childhood care and learning outcomes in Bangladesh by providing daycare services and PPE.

⁴ Definitions are the following. **Literacy-numeracy:** Children are identified as being developmentally on track based on whether they can identify/name at least ten letters of the alphabet, whether they can read at least four simple, popular words, and whether they know the name and recognize the symbols of all numbers from 1 to 10. If at least two of these are true, then the child is considered developmentally on track. **Physical:** If the child can pick

months have met their physical development milestones, and 86 percent have reached their learning milestones. However, only 68 percent have met their socio-emotional milestones and just 21 percent have achieved their literacy-numeracy milestones. Significant disparities are observed across social and economic groups. Whereas 34 percent of urban children have reached their literacy-numeracy milestones, the same is true for only 18 percent of rural children. While 43 percent of children in the wealthiest income quintile have achieved all of their developmental milestones, only 11 percent of children in the poorest quintile have done the same (Bangladesh Bureau of Statistics and UNICEF Bangladesh, 2014).

2.3. Cognitive, Linguistic and Physical Development

25. **Cognitive and linguistic development indicators are low among children in Bangladesh, and as children get older they fall further behind international benchmarks.** The cognitive, linguistic, and physical development indicators were collected by surveys conducted for the impact evaluation of the ECS program (see Box 2). The Bayley Scales of Infant and Toddler Development can be used to measure children's cognitive and linguistic skills (see Box 33). The Bayley Scales use a baseline score of 100, which reflects the standardized mean score of American children at each age, to compare scores for children in other countries. In rural Bangladesh, children's average scores stand at around 100, on par with the American standard, until about the age of 12 months, then drop continuously. At 28 months and above, the average cognitive and linguistic development scores for Bangladeshi children fall to 80-85, with both boys and girls experiencing a similar decline.

Box 2: The Early Childhood Stimulation Program Impact Evaluation Surveys

The longitudinal household and child data collected by the impact evaluation surveys offer a unique insight into the status of ECD in selected areas of rural Bangladesh. The first survey was administered in 2013 in order to establish a baseline for ECD indicators, while a second survey in 2015 was designed to gauge the impact of the ECS program. The evaluation, which were funded by the World Bank's Strategic Impact Evaluation Fund (SIEF), collected extensive information about ECS knowledge and parenting practices, as well as children's cognitive, linguistic and physical development. The surveys were implemented in the districts of Barisal, Chittagong and Moulvibazar. The first survey was conducted between October 2013 and January 2014 and involved a total of 2,574 randomly sampled households with children aged 4-18 months. The same households were surveyed again between September and November 2015, when the children were 20-40 months old. The surveys collected information on a wide range of household characteristics, and the survey teams conducted cognitive skills tests, assessed socio-emotional growth, and measured physical development indicators such as weight and height.

up a small object with two fingers, like a stick or a rock from the ground and/or the mother/caretaker does not indicate that the child is sometimes too sick to play, then the child is regarded as being developmentally on track in the physical domain. **Social-emotional:** Children are considered to be developmentally on track if two of the following are true: If the child gets along well with other children, if the child does not kick, bite, or hit other children and if the child does not get distracted easily. **Learning:** If the child follows simple directions on how to do something correctly and/or when given something to do, is able to do it independently, then the child is considered to be developmentally on track in this domain. ECDI is then calculated as the percentage of children who are developmentally on track in at least three of these four domains (Bangladesh Bureau of Statistics and UNICEF Bangladesh, 2014).

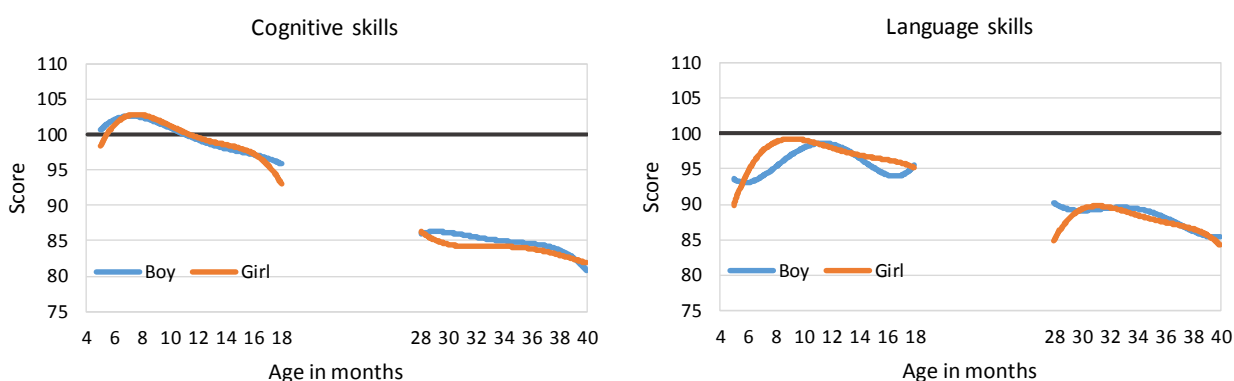
Box 3: The Bayley Scales of Infant and Toddler Development, Third Edition (Bayley–III)

The Bayley–III assesses the development of children up to the age of 42 months across five dimensions: (i) cognitive skills, (ii) language skills, (iii) motor skills, (iv) emotional development, and (v) adaptive behavior. Though created in the US, the Bayley Scales have been applied to children in Bangladesh by Hamadani et al. (2006), Nahar et al. (2012) and Tofail et al. (2013), as well as by the impact evaluation of the ECS program described in this policy note.

The impact evaluation survey used an adapted version of the Bayley–III to assess the dimensions of cognitive skills and language skills. Cognitive skills reflect how children think, react and learn about the world at different ages. The skills include sensorimotor development, exploration and manipulation, object-relatedness, concept information and memory. Language skills include receptive communication and expressive communication. Receptive communication reflects how well children recognize sounds and whether they understand spoken words. It also reflects vocabulary and vocabulary-related morphological development. Expressive communication means how well children at each age communicate using sounds, gestures and words.

The Bayley–III tests conducted for the ECS evaluation were individually administered at community clinics, satellite clinics, family welfare centers, primary schools and other public facilities, but not in homes. The Bayley scores were normalized so that the average score for American children would be 100, from which one standard deviation would be 15 for each age group. The results are presented in Figure 6, Figure 7 and Figure 8.

Figure 5: Bayley Scales Score for Cognitive and Language Skills, Bangladesh



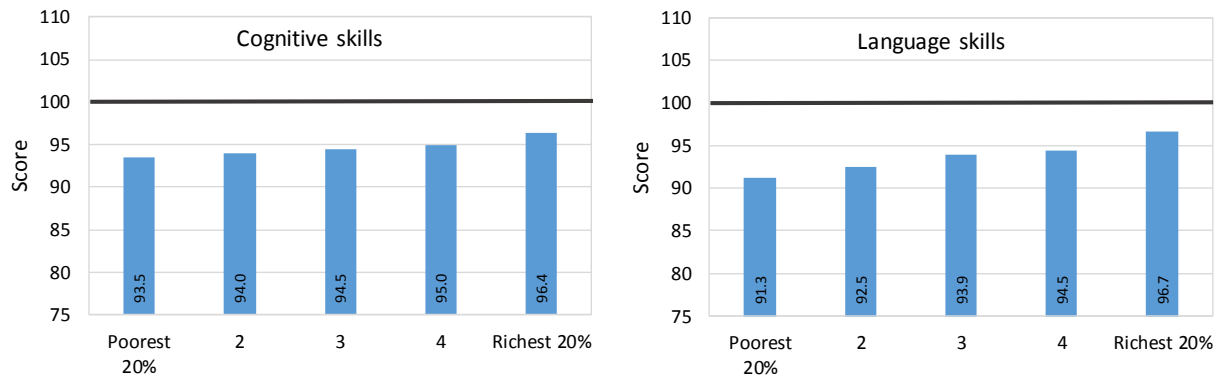
Source: Authors' calculations based on Bayley Scales scores collected during the impact evaluation of the ECS project.

Note: 100 is the standardized mean score for American children at each age. Lines are smoothed by regressions on quartic polynomial of age. Scores for 28 to 40 months old reflect the control group only.

26. **As with health and education, indicators of cognitive and linguistic development are closely correlated with household income.**⁵ In line with the findings of the MICS survey, children from wealthier households tended to have better cognitive and language skills than children from poorer households. The average Bayley scores of children from the poorest 20 percent of households were 93.5 for cognitive development and 91.3 for linguistic development, while those of children from the wealthiest 20 percent were 96.4 and 96.7, respectively. This gap remains remarkably consistent at every age level.

⁵ A preliminary analysis, which is not included in this policy note, suggests that a similar score gap exists between children from the most educated and least educated households.

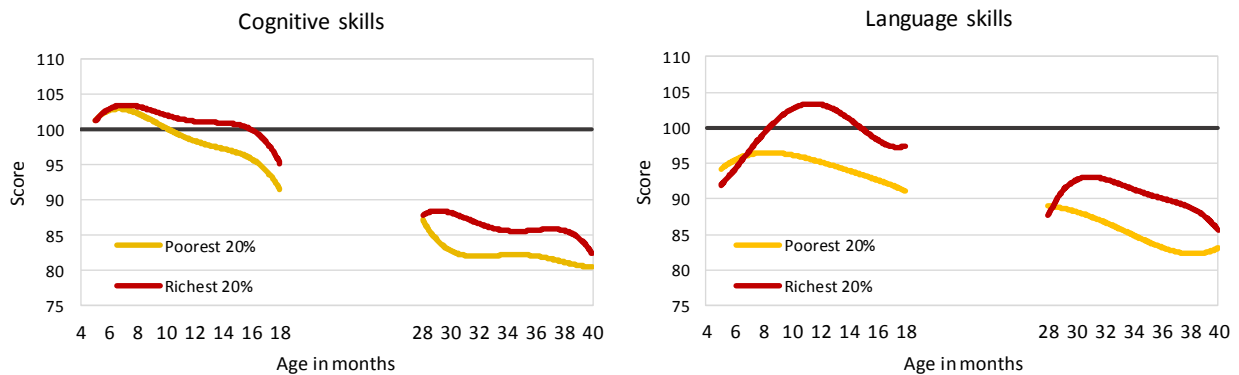
Figure 6: Average Bayley Scores for Cognitive and Language Skills among Children Aged 5-40 Months by Household Income Level



Source: Authors' calculations based on the impact evaluation for the ECS program.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line.

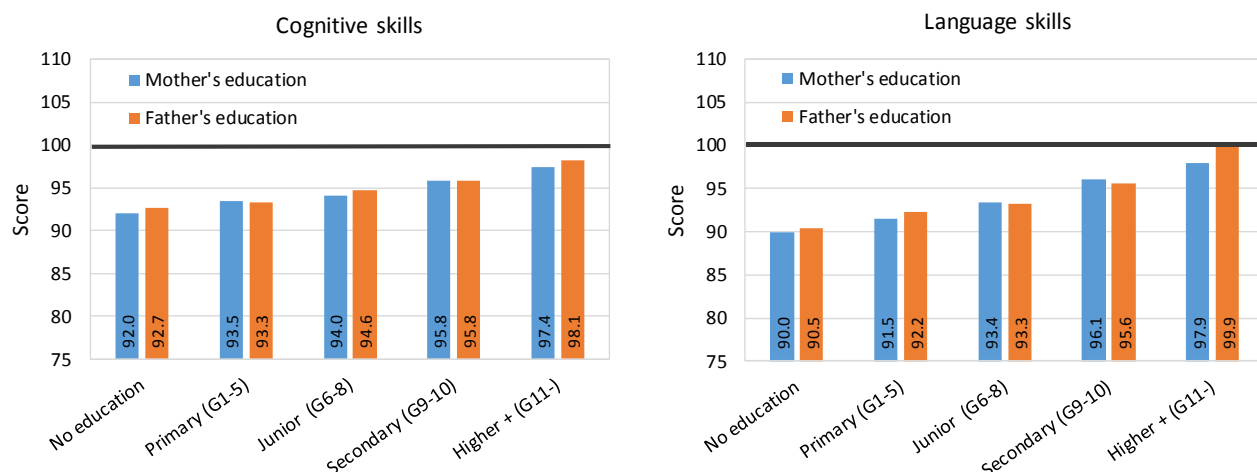
Figure 7: Average Bayley Scores for Cognitive and Language Skills among Children from Households in the Top and Bottom Income Quintiles



Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: 100 is the standardized mean score for American children at each age. Lines are smoothed by regressions on quartic polynomial of age. Scores for 28 to 40 months old reflect the control group only.

Figure 8: Average Bayley Scores for Cognitive and Language Skills among Children Aged 5–40 Months by Parental Education Level

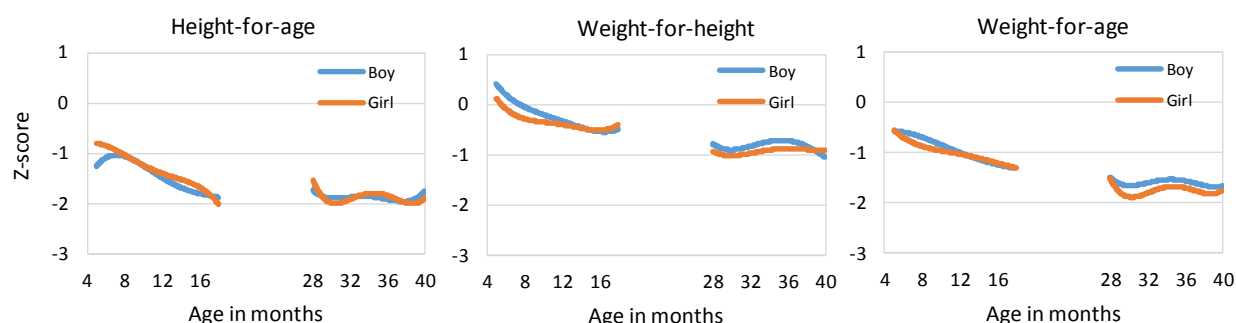


Source: Authors' calculations based on the impact evaluation for the ECS program.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line.

27. **In line with the MICS and other national-level surveys, the ECS impact evaluation also recorded low scores for physical (anthropometric) development among children in rural Bangladesh.** Average height-for-age, weight-for-height and weight-for-age ratios were found to be significantly below official WHO benchmarks for anthropometric development at every age from 4 to 40 months. Moreover, physical growth indicators were found to continuously decline until about 18 months and then largely stabilize. The impact evaluation estimated the incidence of stunted, wasted and underweight children at 36.6 percent, 8.5 percent and 25.6 percent, respectively. These findings suggest that many Bangladeshi children begin to exhibit clear signs of malnutrition in their first few months, and that successful ECD efforts will require a significant improvement in nutritional conditions during early childhood.

Figure 9: Height-for-Age, Weight-for-Height, and Weight-for-Age Ratios



Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: Lines are smoothed by regressions on the quartic polynomial of age. Scores for 28 to 40 months old reflect the control group only.

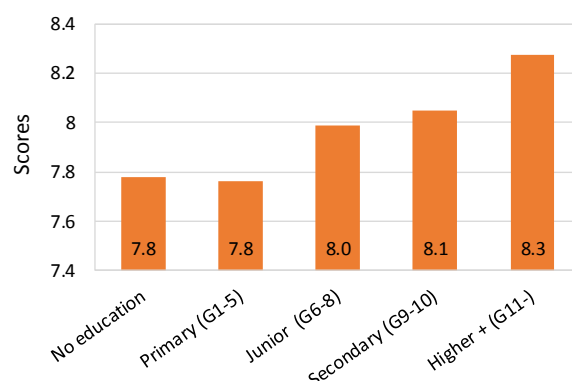
2.4. The Role of Early Stimulation in ECD

28. **A mother's knowledge about the importance of physical and intellectual stimulation in early childhood is a key determinant of a child's cognitive and linguistic development.** The surveys conducted as part of the ECS impact evaluation measured maternal knowledge of childhood stimulation by asking questions about childrearing practices and the home environment to mothers of children in different

age groups. A baseline survey was conducted in 2013, followed by an end-period survey in 2015. Different sets of questions were asked in each survey, and respondents were scored on a scale of 0-8 for the first survey and 0-14 for the second.

29. **Knowledge of early childhood stimulation was closely correlated with the mother's education level (Error! Reference source not found.).** More educated mothers tend to have better knowledge about stimulation. The fact that a large number of mothers lack the stimulation knowledge implies that there is large room for improving the knowledge in Bangladesh, and measures to improve the knowledge may need to target less educated mothers. Maternal knowledge of early childhood stimulation is positively associated with children's cognitive and language scores (Figure 11). The findings appear to confirm that educated mothers know more about the importance of early childhood stimulation, leading to better developmental outcomes, though maternal education and knowledge of early childhood stimulation are also likely to correlate with other variables, such as household income level, that may independently affect ECD indicators.

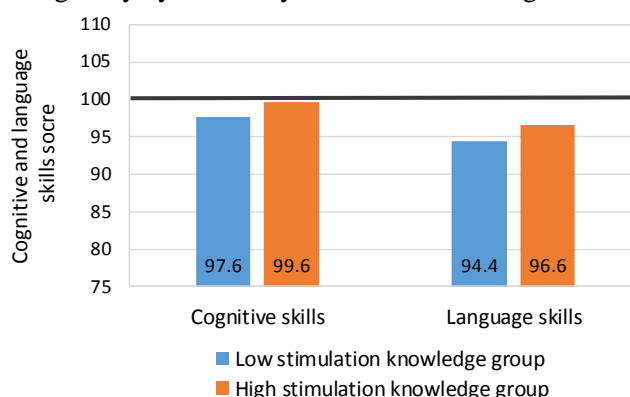
Figure 10: Maternal Knowledge about Early Childhood Stimulation, by Education Level



Source: Authors' calculations based on the ECS impact evaluation surveys

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line. The knowledge scores ranged from 0–8 in the baseline survey and 0–14 in the end line survey. To make this figure, the scores are rescaled to 0–10.

Figure 11: Average Bayley Scores by Maternal Knowledge of Early Stimulation



Source: Authors' calculations based on the baseline survey conducted for the ECS impact evaluation

Note: The "low stimulation knowledge" group includes mothers whose stimulation knowledge scores were five or less. Mothers who scored higher are included in the "high stimulation knowledge" group.

Box 4: Measuring Maternal Knowledge on Child Stimulation

The surveys asked mothers whether they agreed or disagreed with the favorable and unfavorable statements listed in the table below. The score for each question reflects the share of respondents who agreed (or disagreed) with a favorable (or unfavorable) statement.

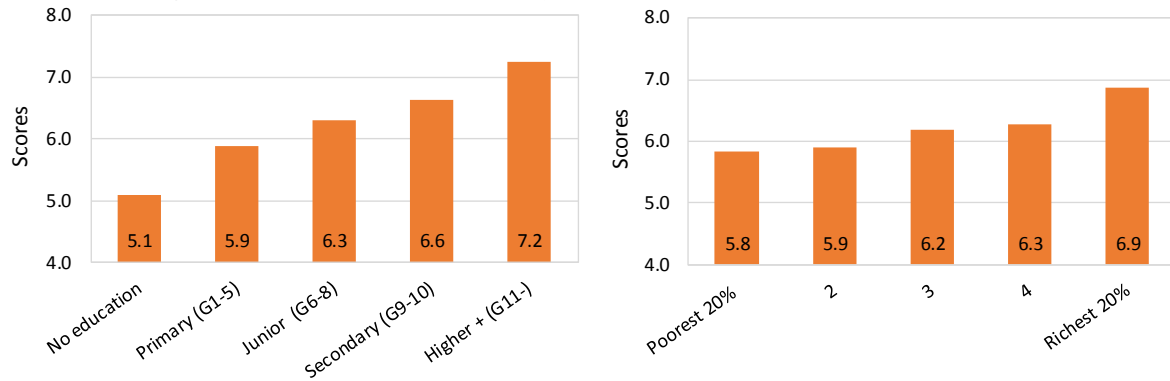
Statements	Proportion (%)
<i><u>Baseline: Mothers of children aged 3-18 months</u></i>	
Favorable statement	
It is important to play games with the baby.	98
It is important to teach the baby names of simple objects and colors.	97
It is important to talk and sing to your baby.	95
Talking to a child about things he/she is doing helps its mental development.	95
Unfavorable statement	
Fathers are naturally clumsy when it comes to taking care of babies.	81
Infants understand only words they can say.	41
A baby should not be held when he/she is crying.	23
Babies do some things just to make trouble for their parents, like crying, pooping.	7
<i><u>Endline: Mothers of children aged 28 months and above</u></i>	
Favorable statement	
Teaching your child the names of simple objects is good for him/her development.	98
Children can learn several things while playing.	98
Parents can teach things to their children by playing with them.	97
Parents can teach things to their children by reading to them.	97
Mothers can teach things to the child while doing household chores.	97
Young children (under 3 years old) can learn things from picture books.	96
Singing to child is good for him/her development.	92
Unfavorable statement	
Fathers are naturally clumsy when it comes to taking care of children.	62
Children benefit from books only when they learn how to read.	51
Children understand only words they can say.	48
Children should only play with toys not with household utensils.	43
Children learn more from the TV than from parents.	21
Talking to young children is NOT important because they do not understand words yet.	11
Soothing your crying child by talking to him/her spoils him/her.	10

Source: Authors' calculations based on the impact evaluation for the ECS program.

Note: The values represent the share of the mothers who agreed (disagreed) with each favorable (unfavorable) statement.

30. **In addition to maternal knowledge of early childhood stimulation, actually practicing childhood stimulation has been shown to have a significant impact on cognitive and linguistic development.** The Home Observation for the Environment (HOME) method measures the frequency and quality of early childhood stimulation, and higher levels of stimulation are correlated with better cognitive and language scores (see Box 5). This supports the intuitive assumption that early childhood stimulation knowledge will only be effective if it is put into practice. As with maternal knowledge of early childhood stimulation, the degree of actual stimulation differs substantially between households. Greater stimulation is positively associated with higher levels of maternal education and household income (Figure 12).

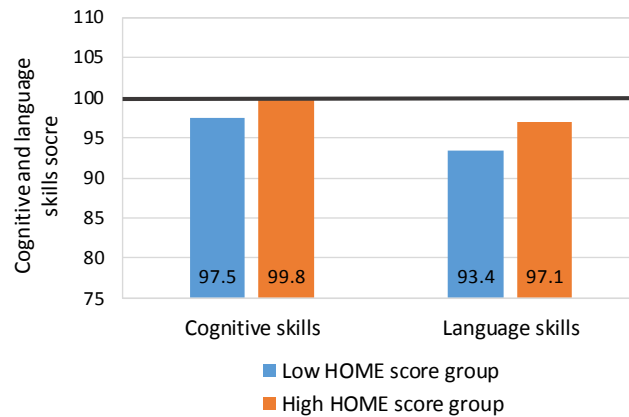
Figure 12: Actual Stimulation by Maternal Education and Household Income



Source: Authors' calculations based on the impact evaluation for the ECS program.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line. The HOME scores ranged from 0–10 for the first survey and 0–5 for the second survey. To make this figure, the scores for the second survey were doubled so that both surveys would have the same range of 0–10.

Figure 13: Actual Stimulation and Cognitive and Language Scores



Source: Authors' calculations based on the baseline survey of the impact evaluation for the ECS program

Note: The low HOME score group includes families whose HOME scores for ECS were five or less. All other families are included in the high HOME score group.

Box 5: The Home Observation for the Environment (HOME) Method

The HOME method is a tool for observing and measuring cognitive stimulation and emotional support at home (Caldwell & Bradley 1984). As part of the ECS impact evaluation, an adapted version of the HOME surveys were administered to mothers. The first survey asked 10 questions about ECS practices, and the second asked five. The questions and a summary of responses are presented in the table below. HOME scores were constructed on a scale of 0 to 10 for the first survey and 0 to 5 for the second.

Practices	Proportion (%)
<i><u>Baseline: Mothers of children aged 3-18 months</u></i>	
The mother believes the child's behavior can be changed/modified by the parents' behavior.	98
In the last 12 months, the family did not move (or moved once) from their residing location or house.	97
The child is regularly taken to a health clinic to be weighed or immunized.	93
The child is never left alone or with someone aged 12 and younger.	83
The mother talks to your child while doing housework.	74
More than two different persons usually look after the child when the mother is not around.	71
The child has a special specific place to keep his/her toys.	47
Twice a month or more the family receive relatives at home or take your child to their homes.	38
The child is taken to stores once a week or more.	33
The family's friends visit your home twice a month or more.	18
<i><u>Endline: Mothers of children aged 28 months and above</u></i>	
The mother gave something new for the child to play with.	90
The mother showed or taught something new to the child last week.	78
The mother showed pictures in a book/magazine last week.	54
After a visitor praises child, the mother responds positively.	33
The mother spontaneously praises child without prompt.	21

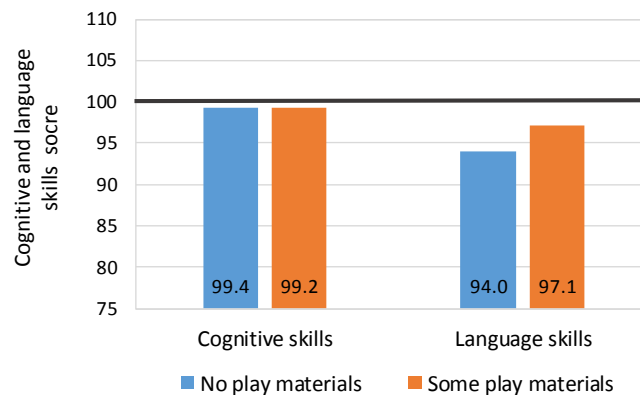
Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line.

31. **The play environment at home has been found to have an important impact on cognitive and linguistic development.** The quality of the play environment is not captured by the HOME scores, but was assessed by the survey teams using the Family Care Indicators.⁶ These indicators, which are measured on a scale of 0 to 5, reflect various aspects of play, such as play materials (books, toys, drawing supplies, etc.) and play activities with adult household members. A substantial gap was discovered between the cognitive and language scores of children who had access to play materials and activities and those who did not.

⁶ The Family Care Indicators were developed to measure the quality of the home environment. They have been used in previous research in Bangladesh (e.g. Hamadani, 2010). The indicators adopted for the ECS impact evaluation surveys consisted of items reflecting a variety of play materials (e.g., toys, music, drawing materials, games, balls and skipping rope) and play activities (e.g., reading, telling stories and nursery rhymes, singing songs, playing with toys, and naming, counting, or drawing things with the child) (Chinen and Bos, 2016).

Figure 14: Cognitive and Language Skills by Household Play Materials

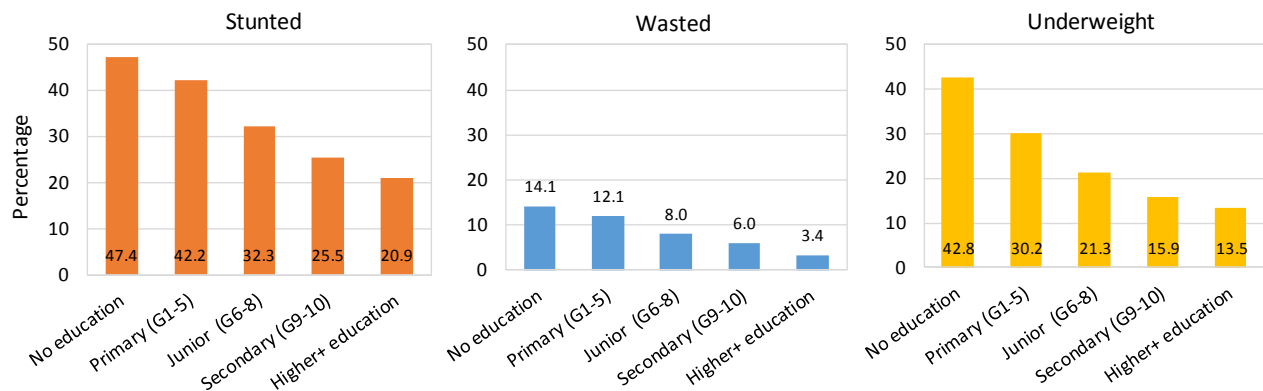


Source: Authors' calculations based on the baseline survey conducted for the ECS impact evaluation.

Note: "No play materials" refers to families whose play materials score was zero. "Some play materials" refers to families whose play materials scores were between one and five.

32. **As with other ECD indicators, children's physical development is closely correlated with maternal education and household income.** Children whose mothers have lower levels of educational attainment or who live in poorer households are systematically more likely to suffer from physical underdevelopment. Overall, the incidence of malnourished children among households in the top income quintile was less than half the rate among households in the bottom quintile, even within the same rural district. For example, the share of stunted children among households in the bottom income quintile is 46.5 percent, compared to 23.3 percent in the top quintile. The figures for maternal education reveal a similar disparity. The incidence of stunting is 47.4 percent among children whose mothers are in the least educated 20 percent, compared to just 20.9 percent among children whose mothers are in the most educated 20 percent. Further analysis confirms that these gaps appear at every age level.

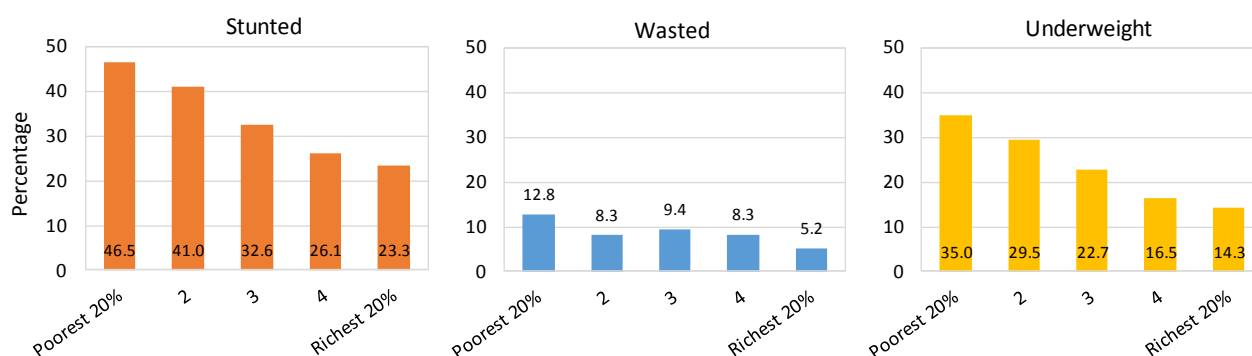
Figure 15: Malnutrition Incidence by Maternal Education



Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line.

Figure 16: Incidence of Malnutrition by Household Income



Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line.

33. **A lack of parental knowledge about appropriate feeding practices is a major cause of the low physical development indicators observed among children in rural Bangladesh.** Statistics show that 22 percent of mothers do not do anything when children refuse to eat. At the same time, 50 percent of households lack sufficient dietary diversity. While dietary diversity may be linked to household income level, the observed patterns of positive and negative feeding practices indicate a lack of parental knowledge about feeding practices that cuts across income levels. These findings suggest that behavioral interventions and awareness campaigns could have a significant impact on the incidence of malnutrition.

Table 4: Feeding Practices and Dietary Diversity

Feeding and nutritional practices	Proportion (%)
Positive feeding practices: What does a mother do when a child refuses to eat?	
Caress a child	85
Play with a child	65
Entertain a child	46
Give other types of food	35
Negative feeding practices: What does a mother do when a child refuses to eat?	
Do nothing	22
Force a child to eat	42
Beat a child	11
Threaten a child	22
Diet diversity: Is the minimum level diet diversity maintained?	50
Does a child take a vitamin A capsule? (only children aged at 12 months and older)	73
Is iodized salt used?	86
Does a child take a deworming pill? (only for children aged at 12 months and older)	48

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The data used are for the control and treatment groups in the baseline and the control group in the end line.

34. **The surveys conducted for the ECS impact evaluation not only reconfirmed the low cognitive, linguistic and physical development indicators found in national-level statistics, but also offered crucial insights into how early childhood stimulation knowledge, maternal education, household income level and other factors affect early childhood development.** Overall, ECD outcomes in Bangladesh appear to be closely correlated with a set of mutually consistent household characteristics, all of which are associated with poverty. The surveys also found that ECD indicators begin to fall below international benchmarks at an early age, indeed often shortly after birth, suggesting that interventions need to begin early. The following chapter examines the impact of the ECS program on these indicators and explores how the lessons learned from this experience can be used to inform future ECD interventions in Bangladesh.

3. The Early Childhood Stimulation Program: Key Findings

3.1. The ECS Program and the Impact Evaluation

35. **An impact evaluation applying a randomized controlled trial (RCT) was conducted to rigorously assess the impacts of an early childhood stimulation in Bangladesh.** In 2014, Save the Children launched the ECS program in three districts of Chittagong, Barisal and Sylhet divisions. The program was designed to promote ECS practices. It targeted mothers with children under the age of three, attempting to build their knowledge about ECS and expand their access to stimulation materials. The program's impact was rigorously evaluated by randomly selecting treatment and control groups. The baseline and end line surveys were administered in October 2013–January 2014 and September–November 2015, respectively.

36. **The main interventions in the program consisted of (i) distributing stimulation materials to parents, and (ii) holding parental counseling sessions on ECS, including how to use the stimulation materials.** The interventions were implemented through 39 community clinics in the treatment group. The stimulation materials consisted of a child development card, two picture books and a key-messages picture booklet (see Box 6). The materials as well as the implementation arrangement were developed by Save the Children and endorsed by the MoHFW. The program also included the following secondary interventions: (i) displaying a poster version of the child development card at the community clinics, (ii) providing ECD counseling at NNS Growth Monitoring Promotion meetings, and (iii) raising village-level community mobilizers who assisted in promoting the ECS program.

Box 6: The Stimulation Materials Provided by the ECS Program

- **The child development (*Shishu Bikash*) card:** This illustrated card was designed to provide parents with information about the importance of playing and communicating with young children and guidance on interacting with a small child. It demonstrated games to play with children, how to use play materials, how to respond to children and how to support children's linguistic development. The card's recommendations were simple, age-appropriate and easy for parents to practice. The illustrations were designed to ensure that illiterate parents could clearly understand the card's messages.
- **Picture books:** Two books were distributed in an effort to help parents teach children new words, initiate extended conversations, promote a strong emotional connection and engage in playful communication. The Household Picture Book (*Amar Bari*) included pictures of everyday items such as household goods and furniture and identified them in simple terms. The Nature Picture Book (*Amar Jogot*) did the same with natural objects such as trees, birds, flowers and clouds.
- **The key-messages picture booklet (*Amar Shishur Bikash Pustika*):** This illustrated booklet was designed to deliver key messages on ECS and ECD. Its messages are outlined in the table below. The booklet was based on relevant national and international guidelines and its development was informed by consultations with experts in Bangladesh, including representatives from the MoHFW. Its main messages were piloted in an earlier Save the Children program on child stimulation in Bangladesh.

Key messages	Description
Care during pregnancy	Your baby's brain is already developing. Eating nutritious food and taking good care of yourself helps your baby grow well.
Love and affection	Give affection to your child every day. Show your love by smiling and hugging. Praise him or her.
Play and games	Play games with your child every day. Let your child play with different play materials at home.
Talk and communication	Talk with your child while doing household work every day. Respond to your child's sounds and attempts to talk. Teach your child new words, songs, and stories.
Positive discipline	Practice gentle discipline and praise your child for good behaviors.
Responsive feeding	Feed your child with patience and good humor. Talk with your child during a meal, keep eye contact, and follow the child's cues.
Health and hygiene	Wash your hands and help your child practice hand washing with soap.
Share messages	Share your knowledge with others in your home and community as often as possible.

Source: Chinen and Bos (2016)

37. **The ECS program was implemented by existing community clinics and their staff; no additional staff or incentives were provided.** Save the Children provided clinic staff with training on ECS,⁷ and the clinics implemented the ECS program in addition to their ordinary tasks. The ECS program collaborated closely with the MoHFW. In particular, the program was harmonized with the NNS, which aimed to eradicate childhood malnutrition, since the NNS provided its services through its services through various delivery points including community clinics. The ECS program leveraged the capacity of community clinics as a service delivery point, which had been established in the NNS. As a result, the service providers assumed responsibilities for both the ECS and the NNS.

⁷ Save the Children provided the service providers explained in Box 7 with a four-day training course on early stimulation and responsive care in March–April 2014. It also provided refresher training three times—two-day training in October 2014, two-day in February–March 2015, and one-day in August 2015. In addition to the training for the service providers, it offered orientation to their supervisors, i.e., health inspectors, assistant health inspectors, and family planning inspectors in March–April 2014.

Box 7: The Role of Community Clinics and their Staff in Implementing the ECS Program

The three types of community clinic staff—community health care providers, health assistants, and family welfare assistants—were designated as the service providers in the program responsible for delivering the stimulation materials and counseling sessions. They were tasked with delivering them when they visited households and when beneficiaries visited community clinics. In the counseling sessions they were expected to show mothers and other caregivers how to use the materials to create a variety of early childhood learning opportunities. The program aimed to give a total of 15 sessions from pregnancy and three sessions to mothers of older children. Apart from the responsibility in the program, their ordinary job descriptions are briefly given below:

- **Community healthcare providers** are stationed in community clinics, where they are responsible for providing nutrition and health services to children under the age of five.
- **Health assistants** provide health services to children under the age of five; they conduct household visits to treat malnutrition, diarrhea and fever and to provide immunizations.
- **Family welfare assistants** are responsible for providing family planning services and promoting the general wellbeing of pregnant mothers and children under the age of three; their responsibilities include monthly household visits.

They were supervised by health inspectors, assistant health inspectors and family planning inspectors.

Source: Chinen and Bos (2016)

38. **A randomized controlled trial was conducted to rigorously assess the effectiveness of the parenting stimulation promoted by the ECS program.** The program involved 78 community clinics in 30 localities (*unions*). 39 community clinics were randomly assigned to the treatment group, and the other 39 to the control group.⁸ The interventions were implemented only in the treatment area, i.e., the catchment areas of the treatment community clinics. Households in the treatment area had access to the ECS program while those in the control area did not. The primary outcomes of interest were children's cognitive, linguistic and physical development. The hypothesized mechanism of the impacts was that improvement in stimulation knowledge and practices of parents, particularly mothers, and nutrition and hygiene practices would improve the outcomes. Data were collected through household surveys, service provider surveys, community leader surveys, focus group discussions and the program's expense records.⁹ The program was implemented between early 2014 and late 2015.

3.2. The Impact of the ECS Program

39. **The impact evaluation revealed that the ECS program yielded positive and statistically significant impacts on cognitive, linguistic and physical development as well as modest improvements in socio-emotional development.** The impact evaluation yielded empirical evidence on the effectiveness of the ECS interventions in key outcome domains. It also suggested plausible causal mechanisms. The parents who took up the treatment were more likely to diversify the playing activities and improve the quality of interactions with their children. Also, they were more likely to use NNS services, which may lead to improved anthropometric outcomes of children.

40. **The take-up rate was 53 percent, and the duration of treatment varied by location.** There was an important degree of heterogeneity in the intensity of treatment among households in the treatment areas. 53 percent of the treatment households received any type of the interventions, and the average period of exposure to the intervention was 12 months as opposed to the planned 24 month duration. 80 percent of

⁸ The random assignment was stratified at the union level so that each union had at least one treatment and one control clinic.

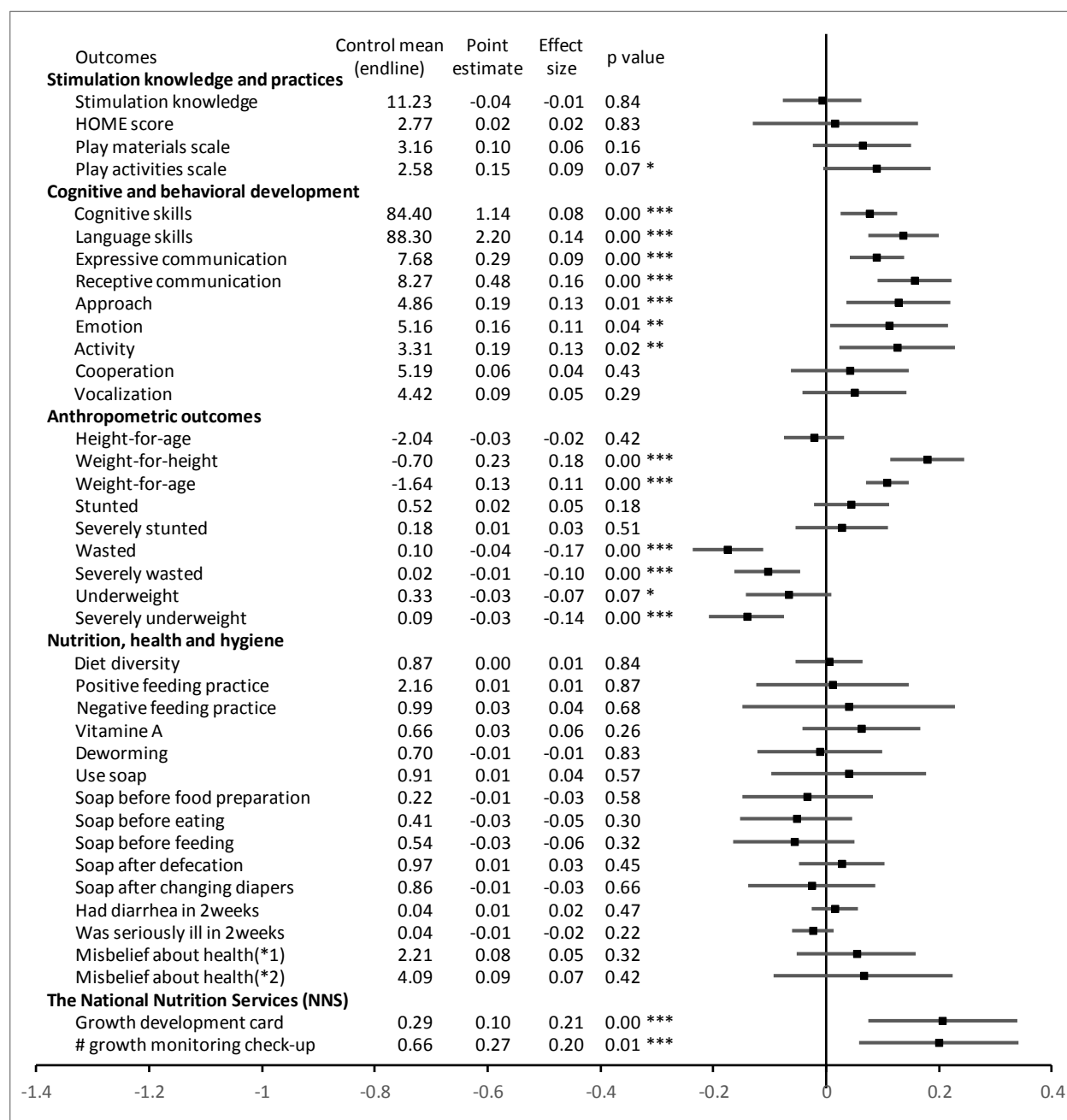
⁹ For further details on the household surveys, see **Error! Reference source not found.**

those who took up were exposed to the interventions for more than a year, and their actual usage of the intervention materials was high. 97 percent of them used the materials.¹⁰ The two key variables—maternal employment and distance from the community clinic—were associated with lower take-up. This implies that the distance and mother’s availability played a role in determining the take-up (See Appendix 1)

41. **The IE estimated the two types of impacts, (i) intention-to-treat (ITT) impacts and (ii) treatment-on-treated (TOT) impacts.** ITT impacts show average impacts on the entire group of intended beneficiaries, including those who did not take up the interventions, while TOT impacts are the effects on only those who took up them. The results show that the TOT impacts were twice as large as the ITT impacts, which is consistent with the take-up rate of about 50 percent. The summary of impacts by outcome variables are illustrated in Figure 17 and Figure 18 (See also Appendices 3 and 4).

¹⁰ It should be noted that households who received materials also used them with the siblings of the intended beneficiary children. It is considered as positive externalities of the interventions.

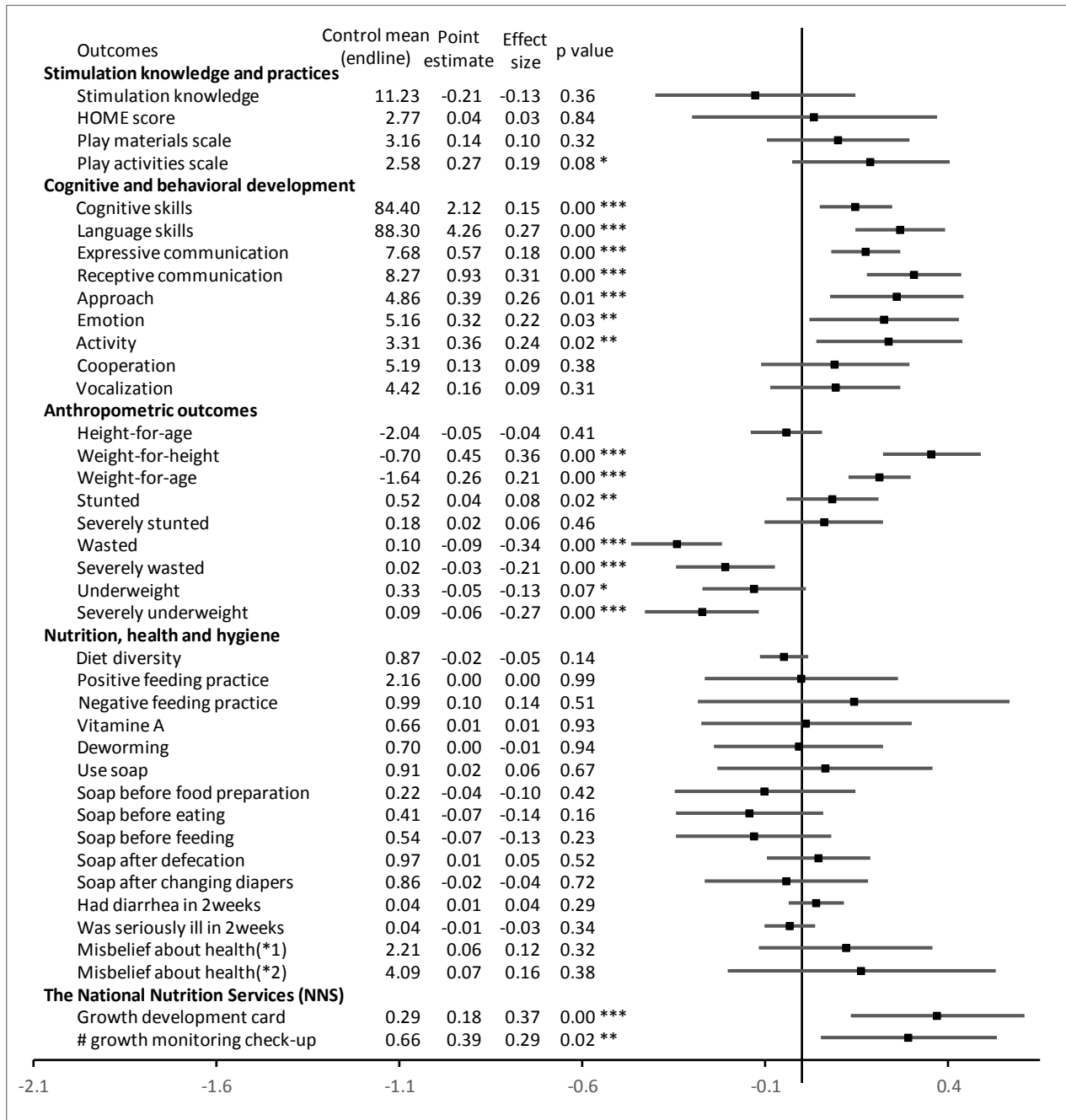
Figure 17: Estimated Intention-to-Treat (ITT) Impacts of the ECS Program Interventions



Source: Chinen and Bos (2016) and the authors

Note: The bars present the 95% confidence intervals. The number of observations varies between estimations in the range of 2289–2424. The point estimates essentially equal the treatment means minus the control means at the end line. *1: Misbelief about health = agree with the statement that health of my children does not depend on my action but our fate. *2: Misbelief about health = agree with the statement that health of my children does not depend on my action but wishes of almighty Allah or god.

Figure 18: Treatment-on-Treated (TOT) Effects of the ECS Program Interventions



Source: Chinen and Bos (2016) and the authors

Note: The TOT effects are estimated based on two-state least square regressions. The treatment variable is the dummy indicating that a household received at least one of the ECS program materials, i.e., the child development card, the picture books, and the key message picture booklet. The instrumental variable used is the treatment assignment. The bars present the 95% confidence intervals. The standard errors are clustered by community clinics. The standard deviations used to calculate the effect sizes are obtained from all the observations at the baseline survey if available or at the end line survey otherwise.

3.2.1. The Impact of the ECS Program on Cognitive and Emotional Skills Development

42. **The ECS program yielded positive and statistically significant impacts on the cognitive, linguistic and socio-emotional development.** The results for each intervention component are presented below.

Output Indicators

43. **Mothers' knowledge of early stimulation: no ITT or TOT impacts were found.** The study found no statistically significant differences in the stimulation knowledge between the treatment and control group mothers. Both groups' answers to ECS questions were very similar. The estimated TOT effects were larger than the ITT effects, but not significant.¹¹

44. **Stimulation practices at home: no ITT or TOT impacts were found.** The evaluation revealed no statistically significant difference in the home environment. The ITT effect size was 0.02 and not significant. Survey responses of the treatment and control groups were similar across ECS categories such as responsiveness, acceptance and involvement.

45. **The variety of play materials and play activities at home: no impacts were found for the materials, but a positive impact was found for the play activities.** Although the evaluation results showed no major differences in terms of the availability of play materials, a significant difference was observed in the way mothers and households in the treatment group interacted with children. The diversity of play activities reflects whether parents pursued activities with children such as reading books, showing pictures, telling stories, singing songs, playing with toys, or drawing. Given the expense involved in purchasing play materials, this result suggests that households were pursuing the most cost-effective options for improving ECD outcomes. The ITT and TOT effect sizes for the diversity of play activities were 0.09 and 0.19, respectively.

Outcome Indicators

46. **Cognitive development: a positive impact was found.** The ITT and TOT effect sizes for the Bayley cognitive skills score were 0.08 and 0.15, respectively, and significant at the 1 percent level. This result means that the ECS program interventions are effective at improving the cognitive skills of children, although the study did not fully reveal its causal mechanisms as it was unable to detect the output-level impacts.

47. **Linguistic development: positive impacts were found.** A statistically significant improvement was also observed in linguistic development. The ITT and TOT effect sizes on the Bayley language skills score were 0.14 and 0.27, respectively. The ITT and TOT effect sizes for expressive communication were 0.09 and 0.18, respectively, and for receptive communication were 0.16 and 0.31, respectively.

¹¹ There are two likely reasons for the lack of impact on parental knowledge of ECS. A first, anecdotal explanation is that many beneficiary mothers were not familiar with interview and survey methods, especially multiple-choice questions, and may not have fully understood the questions. A second, potentially more important reason is the possibility that some survey respondents were not the children's primary caregivers. The second survey, which evaluated the effects of the intervention, revealed that a non-negligible number of respondents were not mothers. As primary caregivers may be male and are not necessarily family members, there is a possibility of discrepancy between those who received the interventions and those who responded to the survey. However, the dataset does not allow for a test of this hypothesis. Given the intervention's positive and statistically positive impact on cognitive development, data- and survey-related are a likely reason for this finding.

48. **Socio-emotional development: Positive impacts were found.** The Wolke Behavioral Rating Scale (Wolke *et al.*, 1990) assesses children's socio-emotional development across five dimensions: (i) approach to a tester, which measures their responsiveness during the first 10 minutes (1: avoiding—9: friendly), (ii) emotion, which measures how unhappy, happy, fussy or cheerful they look (1: unhappy—9: happy), (iii) gross motor activity (1: very still—9: overactive), (iv) cooperation, which measures how well they cooperate and comply with tester's requests (1: resisting—9: cooperative/compliant), and (v) vocalization, which measures non-crying utterances (1: very quiet—9: constantly vocalizing). Positive impacts were detected in the areas of approach, emotion, and gross motor activity, with ITT effect sizes of 0.13, 0.11 and 0.13 and TOT effect sizes of 0.26, 0.22 and 0.24, respectively. All effects were significant at the 1 percent level.¹²

3.2.2. The Impact of the ECS Program on Physical Growth, Nutrition and Health

Output Indicators

49. **The ECS intervention led to higher usage of the NNS services.** The households in the treatment group were more likely to have a growth development card and receive growth monitoring check-ups. The services were offered at the same clinics that implemented the ECS program, and the take-up of the ECS interventions and that of the NNS services were closely correlated.

50. **Health Practices and Nutrition: No ITT or TOT impacts were found.** Despite the increased usage of the NNS services, no impacts were observed on output indicators for nutrition, health and hygiene. There were no significant differences between the treatment and control groups in terms of dietary diversity, positive or negative feeding practices, the use of vitamin A pills, or in the use of deworming pills. Although the information materials included messages designed to promote better feeding, health and hygiene practices, no change was detected. It should be noted that no nutritional supplements or health-related guidance were provided by the intervention, even though it was implemented through community clinics.¹³

Outcome Indicators

51. **Anthropometric outcomes: Positive ITT and TOT impacts were found.** Although the intervention had no statistically significant impacts on the output indicators, striking impacts on anthropometric outcomes were observed. Weight-related indicators improved substantially. The average weight of children in the treatment group increased relative to both their height and age, and wasting and underweight status indicators improved. The size of the ITT impacts on lower incidence of wasting, severe wasting, underweight status and severely underweight status was 0.17, 0.10, 0.07 and 0.14, respectively. The TOT impact sizes were larger at 0.34, 0.21, 0.13, and 0.27, respectively. Given the insignificant impacts on dietary diversity, feeding practices, and nutrition, it is hard to explain the mechanisms of the positive impacts on anthropometric outcomes. Nonetheless, the study suggests the possibility that the ECS interventions enhanced parental awareness of children's growth, thereby improving the anthropometric growth. This hypothesized possibility conforms to the finding that the parents in the treatment group tended to use the NNS services more than those in the control group. Also, the hypothesis fits anecdotal evidence that caregivers in the treatment group more regularly brought children to community clinics for check-ups and measuring their weight and height. By making a growth path more visible to caregivers, regular check-

¹² The Wolke ratings were created by Wolke *et al.* (1990). In Bangladesh, Hamadani *et al.* (2001) and Tofail *et al.* (2006) used them to examine the effects of certain nutrients on children's behavioral development. Baker-Henningham *et al.* (2009) used them to study the consequences of malnutrition on children's behavioral and socio-emotional development, finding a significant correlation with mothers' perceptions about their children's behavior.

¹³ As with the outcome indicator related to the mother's knowledge of early stimulation, survey-related issues likely explain this result, as a non-negligible share of respondents to the second survey were not mothers.

ups might have influenced their motivation for maintaining healthy growth. The insignificance of the impacts on feeding practices might be due to measurement errors as indicated by the large confidence intervals for the practices. Further studies are required, however, to confirm the hypothesis.

3.2.3. Subgroup Analysis: Results by Gender, Age, Household Income, Maternal Education and Distance to the Nearest Clinic

52. **The evaluation uncovered differences in the impacts of the ECS interventions by various subgroups.** To understand the impacts more in detail, a series of sub-group analysis has been conducted. These analyses are intended to investigate whether and how the impacts differ between households' and children's characteristics.

53. **Gender: slightly larger impacts were observed among girls than among boys.** The impact on linguistic and behavioral skills was marginally larger for girls than for boys. Besides, the impact on anthropometric development was larger for girls. The effect size on the weight-for-height was 0.22 for girls and 0.14 for boys, and the effect on severely wasting was -0.18 for girls and -0.01 for boys. Improvements in nutrition, health and hygiene practices were observed among girls and may have led to better improvement in weight indicators.

54. **Age: larger impacts on socio-emotional skills and anthropometric indicators were observed among younger children.** The evaluation divided the children into two age groups, 28–34 month-olds and 35–40 month-olds. While the impacts of the intervention on linguistic development and anthropometrics were generally positive and broadly consistent among both groups, the effect on socio-emotional skills followed a distinct pattern. Positive and relatively large impacts were observed among younger children, but the effects on older children were not statistically significant. Meanwhile, the effect on cognitive development was statistically significant for the older group, but not for the younger group. The reduction in the incidence of severely wasted, underweight and severely underweight children was more pronounced among the younger group, but statistically significant for both groups. Overall, greater improvements in cognitive, socio-emotional and anthropometric indicators were observed among younger children.

55. **Household wealth: larger impacts were observed among children from lower-income households.** In terms of nutrition and hygiene, the impacts on positive feeding practices, the use of vitamin A supplements and deworming pills, and washing with soap were greater among the households in the bottom 20 percent of the household wealth distribution than among those in the top 20 percent. The correlation with NNS participation was also higher among poor households. This suggests that poor households were more likely to make use of the available services and change their health-related behavior. The impacts on anthropometric outcomes were also substantially greater among poor households than their wealthier counterparts. Weight-for-height ratios showed an especially strong improvement among poor households, which also registered a larger decline in the incidence of wasting. In terms of cognitive development, while no change in stimulation knowledge was recorded among parents, children's behavioral scores for tester response and motor activity improved more among the poorest households.

56. **Maternal education: larger impacts were observed among less-educated mothers.** Improvements in outcome indicators, especially those related to anthropometric development, tended to be stronger among children of mothers who had not completed primary education than they were among children whose mothers had completed secondary education. A statistically significant difference was observed in height-for-age and weight-for-age, and the incidence of severely stunted, wasted and severely underweight children decreased more among children of less-educated mothers. The reasons for this disparity are not immediately clear. Participation rates in the NNS seem to be higher among more-educated mothers, and except for an increase in the use of soap before feeding and reduced illness during the previous two weeks, there do not appear to be any prominent nutrition-related effects among more-educated mothers.

Differences in the impact patterns observed between the models of education level and family wealth levels suggests that the poor households and the household with uneducated parents are not exactly the same group while both groups largely benefited from the program.

57. **Distance to the nearest community clinic: larger impacts were observed among households located nearer to the clinics.** The difference in the impacts between those living near a community clinic and those far from it was greater for cognitive and behavioral development than for anthropometric development. There were also statistically significant differences in output indicators such as stimulation knowledge, and children from households located nearer to clinics showed greater improvements in linguistic skills and behavioral indicators. Proximity to a clinic was also associated with greater weight-for-height ratios and a lower incidence of wasting.

58. **Anthropometric characteristics of children: larger impacts were observed among children with lower anthropometric growth at the baseline.** Differential impacts were assessed for children with above or below the median for height-for-age, height-for-weight, and weight-for-age z-scores at the baseline. Overall, some larger impacts were observed among children with lower anthropometric growth at the baseline. While no statistically different impacts were observed for cognitive development, statistically significant differences in language and behavioral development was observed for children with lower height-for-weight and lower weight-for-age. Differences were much starker for anthropometric outcomes—especially for the outcome of height-for-age. Children with lower height-for-age (i.e. stunted) gained benefited more from the intervention.

4. Policy Implications and Conclusions

59. **Bangladesh has achieved considerable success in improving educational and health outcomes over the past several decades, but there is still enormous scope to enhance ECD.** As its economy has grown, Bangladesh has registered considerable gains in economic and social indicators. The national poverty rate fell from 49 percent in 2000 to 32 percent in 2010, and the under-five mortality rate dropped from 144 deaths per 1,000 live births in 1990 to 38 in 2015. Gender parity in primary school enrollment contributed to the early achievement of several Millennium Development Goals, and the primary completion rate rose from 64 percent in 2005 to 80 percent in 2015. However, there is still much room for improvement in ECD indicators. Forty-two percent of Bangladeshi children under the age of five show signs of stunting and 31 percent are underweight. In a country of 161 million, around 5 million children were malnourished in 2015.

60. **Bangladesh has strengthened its policy environment for ECD, which is increasingly recognized as an important target for human capital investment.** Supported by emerging global evidence on ECD's role in human development, the authorities are progressively expanding ECD interventions. Multiple ministries have established ECD-related policies, including MoWCA's 2013 Comprehensive Early Childhood Care and Development Policy and 2011 National Children's Policy, MoPME's 2008 Pre-primary Education Operational Framework, and the Ministry of Education's 2010 National Education Policy. Based on this policy framework, Bangladesh's government and its development partners have launched a range of small- and large-scale initiatives throughout the country. While the supply of ECD services has greatly improved, local availability and service quality remain uneven. Effective ECD programs require a comprehensive approach to educational, health and social protection support, and ensuring effective multi-stakeholder coordination remains a key challenge.

61. **Children in rural Bangladesh continue to perform poorly on indicators of cognitive, linguistic, socio-emotional and physical development, especially children from lower-income households and those whose mothers have lower levels of educational attainment.** The ECS impact evaluation reconfirmed the national data on cognitive and physical development among pre-primary school age children. Cognitive and linguistic skills among children aged 3-6 months are broadly consistent with international standards, but they decline continuously among older children. Children from poor households and whose mothers have lower levels of formal education tend to experience an especially negative development trajectory. A similar pattern is observed for anthropometric indicators such as height and weight.

4.1. Findings

62. **While policymakers increasingly recognize the importance of ECD interventions, empirical evidence regarding their impact on human capital formation remains limited.** The rigorous impact evaluation of Save the Children's ECS program was designed to bolster the body of knowledge on the relationship between ECS and ECD in rural Bangladesh. Its main findings and their policy implications are summarized below.

63. **The impact evaluation found that the ECS program made statistically significant positive effects on cognitive and linguistic skills and physical growth, as well as a more modest impact on socio-emotional development.** It is worth noting that community clinics and the NNS contributed to the positive impacts of the ECS program because the program delivered its services through the clinics and collaborated with the NNS. If the ECS program had been implemented without community clinics and the NNS, the impacts would have been different. Although the evaluation was unable to provide convincing evidence about mechanisms of the impacts since output-level impacts were insignificant, it still found

pieces of the evidence. The parents in the treatment group diversified and improved playing and interaction with their children, which might have led to the improvement in cognitive, linguistic and socio-emotional development. They tended to more receive the NNS services and growth check-ups, which might have improved the physical development. The way that the ECS program increased the NNS usage and check-ups might be that its interventions enhanced parental awareness of children's growth. Larger measurement errors on the outputs, such as childrearing knowledge and practices, than on the outcomes, such as the Bayley scores and weight, are likely to be the reason for the insignificance of output-level impacts.

64. **In general, larger impacts were observed among girls, younger children, children from poorer households and children whose mothers have little formal education.** Although gender differences were marginal, girls tended to experience a greater improvement in ECD outcomes, especially in terms of cognitive, linguistic and anthropometric development. Younger children also tended to exhibit better outcomes than older children, suggesting that earlier interventions yield greater benefits. While the program generated no statistically significant impact on the cognitive development of children from households in the highest income quintile, children from households in the bottom quintile experienced significant improvements in cognitive, linguistic, socio-emotional and anthropometric outcomes. A similar, though not identical pattern is observed for maternal education. These results appear to indicate that the impact of parental knowledge interventions is likely to be greatest among poor households and mothers with low levels of education.

65. **The effectiveness of the interventions is correlated with the exposure to the interventions, as reflected in the difference between the ITT and TOT impacts and the larger impacts observed among beneficiaries living closer to community clinics.** The TOT impacts, which are for those who took up them, were twice as large as the ITT impacts, which are for the entire group of intended beneficiaries. The proximity of households to community clinics also had a modest impact on the number of clinic visits and a larger observed improvement in cognitive and physical development outcomes.

66. **The impact evaluation was unable to identify clear causal chains of the impacts.** It did not detect impacts on stimulation knowledge and practices or health and nutrition practices. Further studies are required to identify the causal chains.

67. **The ECS program proved to be cost effective.** The program cost per beneficiary child was US\$6.84, and the cost per clinic was US\$3,270 (Chinen and Bos, 2016). The overall cost was US\$127,534 over a period of 1.5 years, during which 18,644 children under the age of four received the interventions. The effect size per US\$100 spent on a child is 2.20 for the cognitive skills, 3.95 for the language skills, 5.27 for the weight-for-height, and 3.07 for the weight-for-age. These sizes are deemed to be considerable although comparable data about other ECD interventions is not abundant.¹⁴ The ECS program lowered costs by leveraging the existing network of community clinics. In other words, the ECS program did not need to allocate a budget for operating costs of community clinics. The overall cost above does not include operating costs of community clinics or the program cost of the NNS.

4.2. Policy Implications

68. **The impact evaluation shows that the ECS program improved ECD outcomes in collaboration with community clinics and the NNS, with an especially positive impact on poor households.** Children in rural Bangladesh begin to fall behind developmental benchmarks at a very early age. The ECS interventions can counter this trend by yielding improvements in cognitive and physical

¹⁴ For example, the effect size per US\$100 per child of a Mozambican preschool program is estimated at 2.19 for cognitive and language skills, 0.11 for weight-for-age on the assumption that an enrolled child attends preschool for 16 months over 2 years (Martinez et al. 2012).

development indicators. The evaluation also suggests that successful ECD program does not necessarily require labor- or capital-intensive interventions. While an ECD program may be most effective when it offers a holistic package of educational, health and social protection interventions (Denboba et al. 2014), the impact evaluation demonstrates that an add-on effort on ECS is able to generate a substantial contribution to improving ECD outcomes.

69. **There is considerable scope to build upon the experience from the ECS program.** The ECD sector is still under development and has considerable room for enhancing its service delivery. Three recommendations as to the delivery are drawn from the impact evaluation. First, service delivery through the network of community clinics is recommended. Since the network extends nationwide, this delivery arrangement can be relatively easily rolled out with modest resources. Second, implementation arrangements can be further strengthened by tailoring interventions to reflect local needs and service-delivery issues, as national statistics show considerable geographical variations in ECD indicators and programs. Third, materials can be improved. For example, the child development card, which was a main instrument for the intervention, should be laminated to be protected from damages. Also, providing a poster-version of the card is recommended so that it will be hung, not lost, and more visible (Chinen and Bos 2016).

70. **The relationship between Save the Children's ECS program and the NNS underscores the importance of partnerships with various stakeholders.** For example, ECS initiatives can be linked to maternity support programs for pregnant women and mothers of young children. ECS interventions should reflect the unique needs of different beneficiary groups. Various public sector and civil society stakeholders have distinct advantages in different areas, and leveraging these complementarities will enhance the impact of future programs.

71. **Further studies, including a comprehensive review of the current state of the ECD sector, will contribute to advancing the ECD agenda.** Compared to other sectors in education and social development, a weakness of the ECD sector is that little knowledge of ECD has yet accumulated. Thus, further studies of the sector are recommended. For example, a comprehensive follow-on policy note on ECD, from early stimulation to pre-primary education, will be useful. Issues to be addressed in such a policy note include the quality of service provision, financing arrangements, governance, and policy coordination. Also, since the mechanisms of the impacts of the ECS program remain unknown, future researches need to identify the mechanism. Given that the collaboration with the NNS proved successful, experimentation on the program is a promising area of research. Another useful study would be an assessment through the Systems Approach for Better Education Results (SABER), developed by the World Bank. While this policy note primarily focuses on ECS, the intervention on ECD is more widespread. Therefore, it is important to gather evidence on the full spectrum of ECD in Bangladesh to develop a comprehensive policy framework.

Appendix 1: Implementation Assessment - Program Participation

Fifty-two percent of target beneficiaries received the child development card, the household picture book and the nature picture book, while just 19 percent received the key-messages picture booklet. Fifty-three percent of target beneficiaries received at least one of the ECS materials. The duration of exposure to the ECS materials ranged from zero to 18 months. The average was 12.3 months, and 80 percent of beneficiaries were exposed to the materials for more than one year. The main reason for the relatively short duration was a delay in obtaining administrative clearance for the interventions.

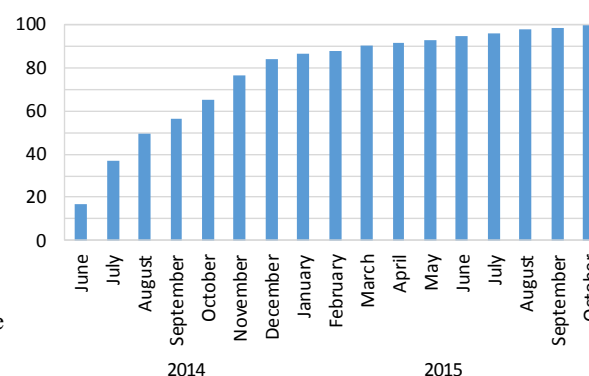
Table 5: Number and Share of Households in the Treatment Group Who Received the Stimulation Materials

Materials received	No. of Households	%
Child development card	648	51.8
Household picture book	649	51.9
Nature picture book	643	51.4
Key message picture booklet	231	18.5
Any of the four materials	660	52.8

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The total number of households in the treatment group is 1,250.

Figure 19: Cumulative Share of Time after Receiving the Stimulation Materials



Source: Authors' estimates based on the ECS impact evaluation survey

Beneficiaries in the treatment group received an average of 1.8 ECD counseling sessions, either at home or in community clinics. Forty-four percent received only one session, 41 percent received two, and 12 percent received three. Participation rates may have been reduced by the relatively small inputs and the shortened intervention period. To implement the intervention, the ECS program relied on the existing institutional framework, staff and incentives, and there were reports that some clinics were overextended. In addition, the start of the intervention was delayed by four months, which put further pressure on service delivery. Better coordination among service providers and closer monitoring could have improved participation.

While only about half of the intended beneficiaries received the ECS materials, those who did were highly likely to use them. Among those who received the materials, 98 percent used the child development card, 98 percent used the picture books and 94 percent used the key-messages booklet. Moreover, 95 percent of beneficiaries used the materials very frequently— between three to seven days a week. In 54 percent of cases, these materials were also used with the siblings of the target children.

Table 6: Number of ECD Counseling Sessions Taken by Treatment Households Who Received the Stimulation Materials

No. of the counseling received	No. of households	%
0	4	0.6
1	291	42.1
2	267	38.6
3	77	11.1
4	14	2.0
5	5	0.7
6	1	0.1
Total	659	100.0
Mean	1.73	

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The counseling information is missing for one treatment household who received the stimulation materials.

A regression analysis of program participation revealed a number of important findings. First, maternal employment was associated with lower levels of participation, suggesting that mothers engaged in wage employment face a higher opportunity cost of program participation. Second, distance to the nearest community clinic reduced participation. Third, higher levels of maternal education may be associated with increased participation, though this relationship was not statistically significant. A one-year increase in maternal education was associated with 0.8 percentage point increase in the participation rate. None of the following factors were found to influence participation rates: the child's gender, household income level, maternal literacy, maternal age, paternal education level, single-parent household status, whether the mother is Muslim, or the number of family members.

Table 7: Regression Analysis of Program Participation

Explanatory variables	Dependent variables					
	Child development card	Household picture book	Nature picture book	Key message picture booklet	Any of the four materials	No. of ECD counseling
Girls						
Family wealth						–
Mother's schooling year						
Father's schooling year						
Mother is literate.						
Mother's age				–		
Mother is employed.	–	–	–		–	
Single parent						
No. of household members						
Muslim						
Distance to the nearest community clinic	–	–	–	–	–	
N	1,225	1,225	1,225	1,225	1,225	654

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

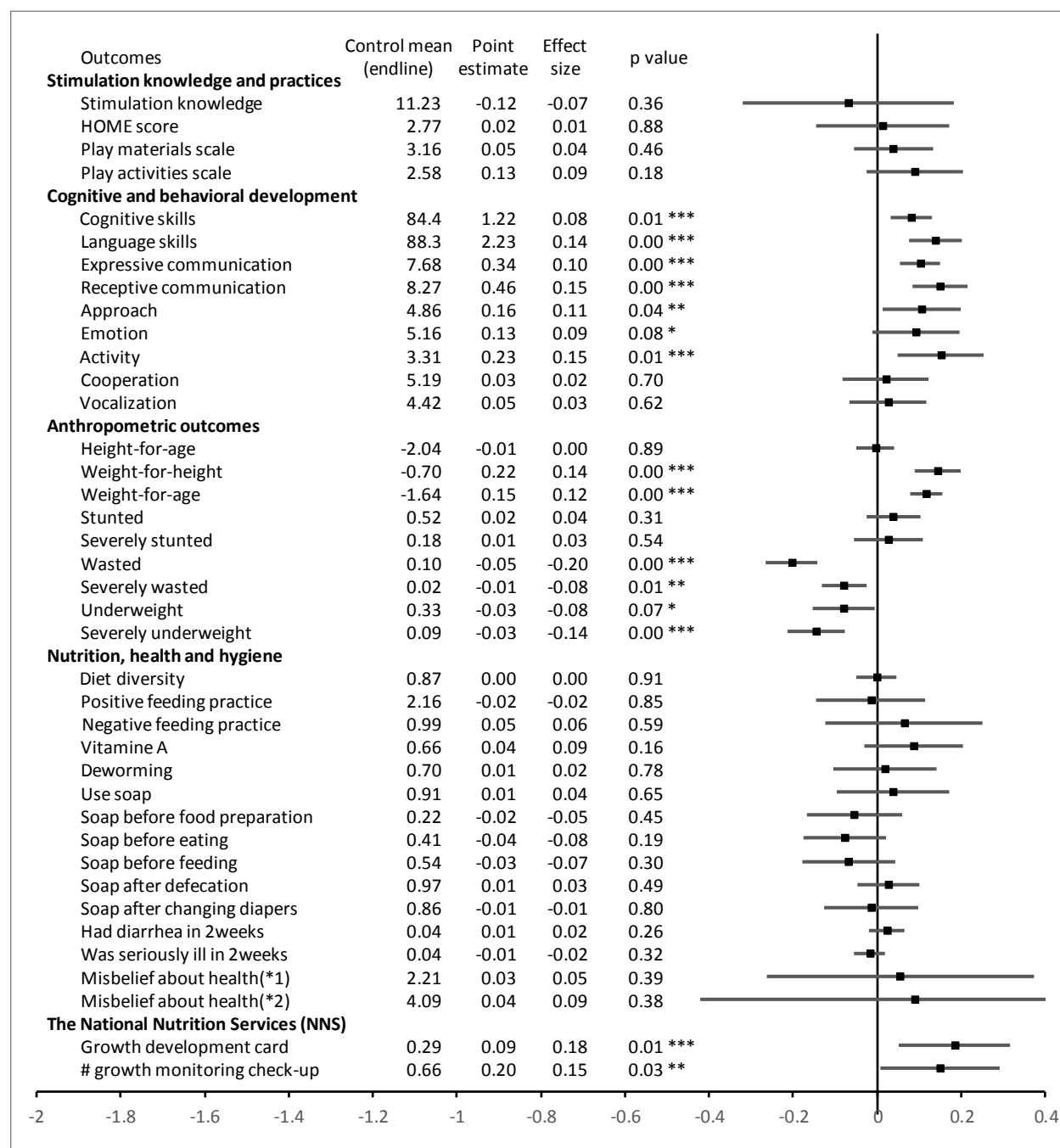
Note: (–) sign indicates statistically significant negative coefficients at the 10% level.

Appendix 2: Baseline Summary Statistics

Variables	Control		Treatment		p-value: equal means
	Mean	N	Mean	N	
Stimulation knowledge and practices					
Stimulation knowledge score (0–8)	6.445	1,109	6.449	1,084	0.955
Stimulation practice score (0–10)	6.586	1,281	6.458	1,277	0.264
Play materials score (0–5)	1.333	1,287	1.258	1,285	0.459
Play activities score (0–5)	1.615	1,287	1.605	1,285	0.946
Cognitive development					
Cognitive skills	98.757	1,287	99.751	1,287	0.505
Language skills	95.526	1,287	96.921	1,287	0.358
Expressive communication	9.502	1,287	9.779	1,287	0.307
Receptive communication	8.901	1,287	9.103	1,287	0.468
Anthropometric outcomes					
Height-for-age	-1.377	1,279	-1.329	1,278	0.472
Weight-for-height	-0.356	1,275	-0.328	1,266	0.660
Weidht-for-age	-0.993	1,286	-0.956	1,287	0.537
Stunted	0.287	1,279	0.272	1,278	0.537
Wasted	0.067	1,275	0.069	1,266	0.844
Underweight	0.199	1,286	0.186	1,287	0.449
Household characteristics					
Child's age in months	11.81	1,287	11.337	1,287	0.149
Child is female	0.491	1,287	0.474	1,287	0.414
Mother's age	25.699	1,287	25.738	1,286	0.846
Mother's years of schooling	6.6	1,284	6.616	1,287	0.949
Mother employed	0.06	1,283	0.05	1,284	0.499
No. of household members	5.94	1,287	6.039	1,287	0.466
Single parent household	0.172	1,287	0.169	1,287	0.914

Appendix 3: Result of the ITT Estimation with Minimum Set of Controls

Table 8: Intention-to-Treat Impacts with Only Geographical Controls



Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Note: The model includes only treatment assignment and geographic union dummies.

Appendix 4: Result of the ITT Estimation by Subgroup

Table 9: Intention-to-Treat Impacts by Gender

	Boy		Girl		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices					
Stimulation knowledge	-0.02	0.36	-0.01	0.58	0.68
HOME score	-0.01	0.90	0.05	0.63	0.32
Play materials scale	0.05	0.36	0.04	0.47	0.90
Play activities scale	0.08	0.14	0.07	0.17	0.85
Cognitive and behavioral development					
Cognitive skills	0.07	0.02 **	0.08	0.01 **	0.74
Language skills	0.12	0.00 ***	0.15	0.00 ***	0.37
Expressive communication	0.07	0.02	0.13	0.00 ***	0.09
Receptive communication	0.14	0.00	0.17	0.00 ***	0.43
Approach	0.09	0.11	0.12	0.04 **	0.56
Emotion	0.07	0.25	0.12	0.06 *	0.45
Activity	0.12	0.06 *	0.16	0.01 **	0.52
Cooperation	0.00	0.98	0.05	0.43	0.38
Vocalization	0.01	0.83	0.06	0.30	0.34
Anthropometric outcomes					
Height-for-age	0.03	0.41	-0.06	0.14	0.09 *
Weight-for-height	0.14	0.00 ***	0.22	0.00 ***	0.11
Weight-for-age	0.11	0.00 ***	0.13	0.00 ***	0.59
Stunted	-0.01	0.89	0.11	0.02 **	0.12
Severely stunted	0.01	0.77	0.01	0.87	0.94
Wasted	-0.16	0.00 ***	-0.28	0.00 ***	0.12
Severely wasted	-0.01	0.73	-0.18	0.00 ***	0.01 ***
Underweight	-0.11	0.02 **	-0.04	0.60	0.35
Severely underweight	-0.09	0.05 **	-0.22	0.00 ***	0.13
Nutrition, health and hygiene					
Diet diversity	-0.02	0.57	-0.03	0.37	0.82
Positive feeding practice	-0.05	0.46	0.04	0.65	0.12
Negative feeding practice	0.13	0.33	-0.01	0.92	0.14
Vitamine A	-0.01	0.94	-0.01	0.88	0.96
Deworming	0.02	0.78	-0.03	0.66	0.56
Use soap	-0.03	0.71	0.11	0.18	0.01 ***
Soap before food preparation	-0.07	0.30	-0.01	0.92	0.40
Soap before eating	-0.12	0.06 *	-0.01	0.88	0.08 *
Soap before feeding	-0.13	0.05 *	0.01	0.93	0.01 **
Soap after defecation	0.02	0.64	0.03	0.52	0.88
Soap after changing diapers	-0.08	0.33	0.05	0.42	0.06 *
Had diarrhea in 2weeks	-0.02	0.54	0.06	0.02 **	0.07 *
Was seriously ill in 2weeks	-0.02	0.35	-0.02	0.53	0.84
Misbelief about health(*1)	0.01	0.65	0.03	0.31	0.40
Misbelief about health(*2)	0.02	0.46	0.03	0.41	0.75
The National Nutrition Services (NNS)					
Growth development card	0.21	0.00 ***	0.18	0.03 **	0.64
# growth monitoring check-up	0.16	0.03 **	0.14	0.06 *	0.76

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 10: Intention-to-Treat Impacts by Age

	Age at the end line:		28-34 months		35-40 months		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0			
Stimulation knowledge and practices							
Stimulation knowledge	-0.02	0.36	-0.01	0.56		0.58	
HOME score	0.11	0.21	-0.04	0.64		0.01 **	
Play materials scale	0.09	0.11	0.00	0.99		0.07 *	
Play activities scale	0.12	0.04 **	0.07	0.23		0.38	
Cognitive and behavioral development							
Cognitive skills	0.06	0.10	0.08	0.00 ***		0.53	
Language skills	0.13	0.00 ***	0.12	0.00 ***		0.82	
Expressive communication	0.08	0.02 **	0.09	0.00 ***		0.90	
Receptive communication	0.17	0.00 ***	0.14	0.00 ***		0.53	
Approach	0.16	0.02 **	0.08	0.10		0.15	
Emotion	0.15	0.03 **	0.08	0.13		0.26	
Activity	0.16	0.03 **	0.11	0.09 *		0.49	
Cooperation	0.02	0.74	0.06	0.31		0.50	
Vocalization	0.02	0.76	0.05	0.35		0.57	
Anthropometric outcomes							
Height-for-age	0.03	0.47	-0.05	0.26		0.15	
Weight-for-height	0.17	0.00 ***	0.21	0.00 ***		0.38	
Weight-for-age	0.12	0.00 ***	0.13	0.00 ***		0.76	
Stunted	-0.02	0.71	0.07	0.17		0.19	
Severely stunted	-0.07	0.16	0.06	0.28		0.10 *	
Wasted	-0.24	0.00 ***	-0.23	0.00 ***		0.96	
Severely wasted	-0.11	0.00 ***	-0.06	0.26		0.34	
Underweight	-0.13	0.02 **	-0.03	0.56		0.16	
Severely underweight	-0.18	0.00 ***	-0.11	0.06 *		0.39	
Nutrition, health and hygiene							
Diet diversity	0.05	0.30	0.08	0.01 ***		0.53	
Positive feeding practice	-0.01	0.93	-0.08	0.31		0.29	
Negative feeding practice	-0.01	0.94	0.14	0.30		0.19	
Use soap	0.04	0.59	0.08	0.34		0.51	
Soap before food preparation	-0.03	0.64	-0.06	0.51		0.74	
Soap before eating	-0.09	0.18	-0.02	0.83		0.31	
Soap before feeding	-0.06	0.36	-0.07	0.25		0.83	
Soap after defecation	0.09	0.05 **	-0.02	0.68		0.01 **	
Soap after changing diapers	-0.01	0.90	-0.03	0.54		0.69	
Had diarrhea in 2weeks	-0.02	0.42	0.06	0.02 **		0.02 **	
Was seriously ill in 2weeks	-0.06	0.03 **	0.04	0.08 *		0.00 ***	
Misbelief about health(*1)	0.02	0.35	0.00	0.88		0.50	
Misbelief about health(*2)	0.04	0.24	0.01	0.80		0.18	
The National Nutrition Services (NNS)							
Growth development card	0.24	0.00 ***	0.12	0.12		0.07 *	
# growth monitoring check-up	0.16	0.03 **	0.15	0.07 *		0.85	

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 11: Intention-to-Treat Impacts by Maternal Education

	Mother's education:	0-4 years		10- years		P-value: Equal effects
		Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices						
Stimulation knowledge		-0.05	0.06 *	0.01	0.60	0.03 **
HOME score		0.07	0.52	0.04	0.72	0.78
Play materials scale		0.11	0.21	0.07	0.30	0.67
Play activities scale		0.07	0.45	0.12	0.12	0.58
Cognitive and behavioral development						
Cognitive skills		0.12	0.03 **	0.10	0.05 **	0.73
Language skills		0.11	0.02 **	0.17	0.01 **	0.31
Expressive communication		0.10	0.01 **	0.11	0.05 *	0.86
Receptive communication		0.09	0.06 *	0.22	0.00 ***	0.05 **
Approach		0.11	0.26	0.13	0.16	0.80
Emotion		0.10	0.37	0.16	0.12	0.60
Activity		0.08	0.39	0.18	0.04 **	0.42
Cooperation		0.09	0.28	0.11	0.26	0.85
Vocalization		0.04	0.60	0.06	0.48	0.83
Anthropometric outcomes						
Height-for-age		0.14	0.04 **	-0.13	0.07 *	0.01 ***
Weight-for-height		0.19	0.00 ***	0.11	0.11	0.31
Weight-for-age		0.22	0.00 ***	-0.01	0.83	0.00 ***
Stunted		-0.02	0.80	0.18	0.05 *	0.09 *
Severely stunted		-0.21	0.04 **	0.21	0.05 **	0.00 ***
Wasted		-0.36	0.00 ***	0.02	0.78	0.00 ***
Severely wasted		-0.16	0.09 *	-0.16	0.01 ***	0.96
Underweight		-0.18	0.06 *	0.04	0.63	0.08 *
Severely underweight		-0.36	0.00 ***	0.06	0.24	0.00 ***
Nutrition, health and hygiene						
Diet diversity		-0.12	0.03 **	-0.05	0.49	0.45
Positive feeding practice		-0.01	0.93	-0.14	0.25	0.26
Negative feeding practice		0.05	0.76	0.10	0.46	0.79
Vitamine A		0.01	0.97	0.04	0.75	0.85
Deworming		-0.30	0.06 *	0.09	0.33	0.03 **
Use soap		0.11	0.51	0.05	0.43	0.68
Soap before food preparation		0.03	0.77	-0.06	0.70	0.58
Soap before eating		0.05	0.54	-0.22	0.03 **	0.02 **
Soap before feeding		0.15	0.15	-0.19	0.04 **	0.00 ***
Soap after defecation		0.04	0.65	0.05	0.30	0.90
Soap after changing diapers		0.04	0.72	0.00	0.99	0.74
Had diarrhea in 2weeks		-0.04	0.52	-0.02	0.73	0.81
Was seriously ill in 2weeks		-0.08	0.07 *	0.00	0.98	0.17
Misbelief about health(*1)		-0.03	0.29	0.03	0.20	0.03 **
Misbelief about health(*2)		0.01	0.76	0.05	0.38	0.43
The National Nutrition Services (NNS)						
Growth development card		0.12	0.26	0.32	0.00 ***	0.09 *
# growth monitoring check-up		0.04	0.54	0.31	0.00 ***	0.01 **

Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 12: Intention-to-Treat Impacts by Household Income

Households' wealth:	Poorest 20%		Richest 20%		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices					
Stimulation knowledge	-0.06	0.05 **	0.01	0.80	0.05 **
HOME score	-0.04	0.74	-0.01	0.94	0.75
Play materials scale	-0.06	0.50	0.00	1.00	0.54
Play activities scale	0.13	0.10	-0.01	0.90	0.12
Cognitive and behavioral development					
Cognitive skills	0.04	0.43	0.05	0.23	0.78
Language skills	0.07	0.03 **	0.06	0.36	0.89
Expressive communication	0.08	0.02 **	0.05	0.32	0.55
Receptive communication	0.07	0.07 *	0.09	0.18	0.76
Approach	0.17	0.05 *	-0.08	0.36	0.03 **
Emotion	0.06	0.40	-0.09	0.30	0.13
Activity	0.21	0.01 **	0.14	0.12	0.55
Cooperation	-0.03	0.71	-0.13	0.14	0.34
Vocalization	0.06	0.56	-0.09	0.32	0.21
Anthropometric outcomes					
Height-for-age	-0.08	0.26	0.08	0.36	0.15
Weight-for-height	0.23	0.00 ***	0.05	0.53	0.03 **
Weight-for-age	0.15	0.00 ***	0.09	0.04 **	0.25
Stunted	0.02	0.76	-0.15	0.11	0.16
Severely stunted	-0.01	0.90	0.01	0.95	0.90
Wasted	-0.26	0.00 ***	-0.07	0.40	0.09 *
Severely wasted	-0.01	0.93	-0.03	0.41	0.80
Underweight	-0.16	0.05 *	-0.17	0.05 **	0.93
Severely underweight	-0.14	0.12	-0.08	0.26	0.56
Nutrition, health and hygiene					
Diet diversity	0.04	0.44	-0.03	0.58	0.26
Positive feeding practice	0.27	0.03 **	-0.08	0.48	0.01 ***
Negative feeding practice	0.19	0.33	0.03	0.82	0.35
Vitamine A	0.18	0.26	-0.09	0.31	0.10 *
Deworming	0.19	0.12	0.00	0.95	0.08 *
Use soap	0.13	0.53	0.01	0.51	0.54
Soap before food preparation	0.12	0.19	-0.12	0.33	0.05 **
Soap before eating	0.13	0.10	-0.20	0.05 *	0.00 ***
Soap before feeding	0.04	0.59	-0.17	0.05 *	0.03 **
Soap after defecation	0.04	0.74	0.04	0.04 **	1.00
Soap after changing diapers	0.02	0.89	0.05	0.43	0.80
Had diarrhea in 2weeks	-0.03	0.74	0.01	0.74	0.65
Was seriously ill in 2weeks	0.01	0.85	0.07	0.08 *	0.34
Misbelief about health(*1)	0.01	0.69	0.08	0.01 **	0.13
Misbelief about health(*2)	0.04	0.37	0.03	0.56	0.86
The National Nutrition Services (NNS)					
Growth development card	0.21	0.03 **	0.06	0.55	0.20
# growth monitoring check-up	0.21	0.04 **	0.01	0.96	0.07 *

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 13: Intention-to-Treat Impacts by Distance to the Nearest Community Clinic

Distance to the nearest clinic:	Closest 20%		Farthest 20%		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices					
Stimulation knowledge	0.01	0.72	-0.08	0.07 *	0.05 *
HOME score	0.06	0.54	0.14	0.15	0.44
Play materials scale	0.05	0.47	0.17	0.13	0.30
Play activities scale	0.08	0.17	0.16	0.12	0.40
Cognitive and behavioral development					
Cognitive skills	0.08	0.04 **	0.03	0.51	0.31
Language skills	0.20	0.00 ***	0.05	0.41	0.05 **
Expressive communication	0.16	0.00 ***	0.11	0.10	0.51
Receptive communication	0.22	0.00 ***	0.01	0.88	0.00 ***
Approach	0.17	0.02 **	-0.01	0.96	0.13
Emotion	0.16	0.03 **	-0.01	0.96	0.17
Activity	0.28	0.00 ***	-0.03	0.81	0.01 ***
Cooperation	0.07	0.37	0.10	0.38	0.80
Vocalization	0.08	0.28	0.12	0.33	0.77
Anthropometric outcomes					
Height-for-age	0.01	0.91	-0.01	0.95	0.91
Weight-for-height	0.15	0.00 ***	0.07	0.33	0.28
Weight-for-age	0.09	0.01 ***	0.03	0.57	0.35
Stunted	0.00	0.97	0.12	0.33	0.35
Severely stunted	-0.01	0.91	-0.08	0.48	0.57
Wasted	-0.25	0.00 ***	-0.04	0.77	0.15
Severely wasted	-0.07	0.21	-0.09	0.23	0.80
Underweight	-0.09	0.13	0.03	0.74	0.25
Severely underweight	-0.05	0.51	-0.12	0.33	0.57
Nutrition, health and hygiene					
Diet diversity	0.03	0.46	-0.08	0.30	0.20
Positive feeding practice	0.13	0.11	0.01	0.93	0.39
Negative feeding practice	0.03	0.83	-0.15	0.46	0.42
Vitamine A	-0.11	0.20	0.05	0.82	0.45
Deworming	0.00	0.96	-0.05	0.77	0.79
Use soap	0.14	0.05 *	0.13	0.31	0.97
Soap before food preparation	-0.07	0.41	0.11	0.38	0.18
Soap before eating	-0.08	0.34	0.07	0.57	0.30
Soap before feeding	-0.04	0.60	0.00	0.99	0.81
Soap after defecation	0.11	0.02 **	-0.02	0.82	0.11
Soap after changing diapers	-0.02	0.85	0.01	0.92	0.81
Had diarrhea in 2weeks	0.00	0.87	-0.08	0.16	0.13
Was seriously ill in 2weeks	0.00	0.91	0.04	0.44	0.43
Misbelief about health(*1)	0.04	0.05 *	-0.03	0.57	0.12
Misbelief about health(*2)	0.02	0.49	-0.01	0.66	0.36
The National Nutrition Services (NNS)					
Growth development card	0.25	0.01 ***	0.14	0.23	0.42
# growth monitoring check-up	0.13	0.17	0.17	0.03 **	0.69

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 14: Intention-to-Treat Impacts by Height-for-Age at Baseline

Height_for_age at the baseline	Below median		Above median		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices					
Stimulation knowledge	-0.02	0.35	-0.02	0.41	0.91
HOME score	0.02	0.79	0.01	0.93	0.78
Play materials scale	0.05	0.34	0.03	0.55	0.72
Play activities scale	0.11	0.06 *	0.06	0.31	0.37
Cognitive and behavioral development					
Cognitive skills	0.09	0.00 ***	0.07	0.03 **	0.37
Language skills	0.13	0.00 ***	0.15	0.00 ***	0.55
Expressive communication	0.11	0.00 ***	0.11	0.00 ***	0.98
Receptive communication	0.12	0.01 **	0.18	0.00 ***	0.11
Approach	0.15	0.00 ***	0.07	0.27	0.17
Emotion	0.10	0.09 *	0.08	0.23	0.78
Activity	0.10	0.12	0.18	0.01 ***	0.23
Cooperation	0.05	0.52	0.01	0.87	0.60
Vocalization	0.08	0.18	-0.01	0.91	0.23
Anthropometric outcomes					
Height-for-age	0.05	0.22	-0.10	0.01 ***	0.00 ***
Weight-for-height	0.22	0.00 ***	0.13	0.00 ***	0.11
Weight-for-age	0.19	0.00 ***	0.04	0.18	0.00 ***
Stunted	-0.02	0.73	0.14	0.00 ***	0.03 **
Severely stunted	-0.04	0.52	0.09	0.01 ***	0.08 *
Wasted	-0.32	0.00 ***	-0.10	0.04 **	0.01 ***
Severely wasted	-0.06	0.27	-0.11	0.02 **	0.46
Underweight	-0.20	0.00 ***	0.04	0.31	0.00 ***
Severely underweight	-0.27	0.00 ***	0.02	0.59	0.00 ***
Nutrition, health and hygiene					
Diet diversity	0.01	0.91	0.06	0.08 *	0.31
Positive feeding practice	-0.06	0.42	0.06	0.48	0.02 **
Negative feeding practice	0.19	0.12	-0.03	0.79	0.01 ***
Vitamine A	-0.01	0.90	0.03	0.71	0.69
Deworming	-0.06	0.38	0.08	0.23	0.11
Use soap	0.06	0.51	0.01	0.86	0.38
Soap before food preparation	0.03	0.64	-0.12	0.12	0.01 ***
Soap before eating	-0.02	0.69	-0.12	0.10 *	0.12
Soap before feeding	-0.05	0.42	-0.07	0.28	0.66
Soap after defecation	0.02	0.70	0.04	0.27	0.71
Soap after changing diapers	-0.05	0.50	0.01	0.92	0.29
Had diarrhea in 2weeks	0.02	0.46	0.03	0.45	0.91
Was seriously ill in 2weeks	0.01	0.79	-0.04	0.05 *	0.15
Misbelief about health(*1)	0.00	0.85	0.04	0.09 *	0.10 *
Misbelief about health(*2)	0.02	0.46	0.03	0.43	0.77
The National Nutrition Services (NNS)					
Growth development card	0.16	0.04 **	0.23	0.01 ***	0.39
# growth monitoring check-up	0.15	0.07 *	0.16	0.03 **	0.89

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 15: Intention-to-Treat Impacts by Weight-for-Height at Baseline

Weight-for-height at the baseline	Below median		Above median		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices					
Stimulation knowledge	-0.01	0.52	-0.02	0.35	0.71
HOME score	0.05	0.57	0.00	1.00	0.29
Play materials scale	0.03	0.62	0.06	0.31	0.52
Play activities scale	0.11	0.06 *	0.06	0.23	0.22
Cognitive and behavioral development					
Cognitive skills	0.09	0.01 ***	0.07	0.02 **	0.65
Language skills	0.12	0.00 ***	0.17	0.00 ***	0.23
Expressive communication	0.10	0.00 ***	0.12	0.00 ***	0.73
Receptive communication	0.12	0.00 ***	0.19	0.00 ***	0.07 *
Approach	0.18	0.01 ***	0.07	0.27	0.12
Emotion	0.14	0.04 **	0.07	0.25	0.24
Activity	0.19	0.00 ***	0.11	0.11	0.28
Cooperation	0.08	0.20	-0.02	0.68	0.07 *
Vocalization	0.09	0.17	0.00	0.97	0.16
Anthropometric outcomes					
Height-for-age	-0.01	0.79	-0.02	0.63	0.89
Weight-for-height	0.19	0.00 ***	0.17	0.00 ***	0.70
Weight-for-age	0.13	0.00 ***	0.10	0.00 ***	0.37
Stunted	0.06	0.17	0.05	0.37	0.85
Severely stunted	0.04	0.38	-0.01	0.82	0.43
Wasted	-0.30	0.00 ***	-0.14	0.00 ***	0.02 **
Severely wasted	-0.10	0.13	-0.08	0.02 **	0.84
Underweight	-0.11	0.04 **	-0.04	0.42	0.17
Severely underweight	-0.24	0.00 ***	-0.05	0.22	0.03 **
Nutrition, health and hygiene					
Diet diversity	0.02	0.62	0.03	0.50	0.83
Positive feeding practice	0.01	0.93	-0.01	0.89	0.78
Negative feeding practice	-0.04	0.77	0.14	0.27	0.06 *
Vitamine A	0.10	0.25	-0.15	0.03 **	0.00 ***
Deworming	0.01	0.85	-0.01	0.94	0.79
Use soap	0.03	0.74	0.05	0.53	0.65
Soap before food preparation	-0.04	0.60	-0.07	0.28	0.60
Soap before eating	-0.02	0.70	-0.16	0.02 **	0.03 **
Soap before feeding	-0.02	0.79	-0.13	0.04 **	0.07 *
Soap after defecation	0.02	0.75	0.06	0.15	0.18
Soap after changing diapers	-0.04	0.56	0.02	0.80	0.32
Had diarrhea in 2weeks	0.01	0.79	0.02	0.37	0.68
Was seriously ill in 2weeks	0.00	0.89	-0.04	0.09 *	0.31
Misbelief about health(*1)	0.02	0.44	0.03	0.18	0.49
Misbelief about health(*2)	0.02	0.59	0.04	0.22	0.28
The National Nutrition Services (NNS)					
Growth development card	0.14	0.06 *	0.24	0.01 ***	0.15
# growth monitoring check-up	0.10	0.17	0.20	0.01 **	0.14

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

Table 16: Intention-to-Treat Impacts by Weight-for-Age at Baseline

Weight-for-age at the baseline	Below median		Above median		P-value: Equal effects
	Effect size	P-value: Effect=0	Effect size	P-value: Effect=0	
Stimulation knowledge and practices					
Stimulation knowledge	-0.01	0.76	-0.03	0.22	0.28
HOME score	0.02	0.80	0.02	0.85	0.88
Play materials scale	0.04	0.44	0.04	0.40	0.99
Play activities scale	0.14	0.02 **	0.02	0.62	0.01 ***
Cognitive and behavioral development					
Cognitive skills	0.09	0.00 ***	0.06	0.06 *	0.20
Language skills	0.14	0.00 ***	0.13	0.00 ***	0.76
Expressive communication	0.12	0.00 ***	0.09	0.01 **	0.32
Receptive communication	0.15	0.00 ***	0.16	0.00 ***	0.61
Approach	0.21	0.00 ***	0.02	0.78	0.00 ***
Emotion	0.17	0.01 ***	0.03	0.70	0.03 **
Activity	0.17	0.00 ***	0.12	0.07 *	0.43
Cooperation	0.09	0.17	-0.05	0.46	0.05 **
Vocalization	0.09	0.13	-0.03	0.69	0.07 *
Anthropometric outcomes					
Height-for-age	-0.01	0.75	-0.02	0.62	0.92
Weight-for-height	0.22	0.00 ***	0.15	0.00 ***	0.16
Weight-for-age	0.16	0.00 ***	0.09	0.01 ***	0.08 *
Stunted	0.03	0.49	0.07	0.16	0.59
Severely stunted	0.04	0.57	-0.01	0.74	0.53
Wasted	-0.36	0.00 ***	-0.08	0.06 *	0.00 ***
Severely wasted	-0.10	0.08 *	-0.07	0.01 ***	0.55
Underweight	-0.15	0.00 ***	-0.02	0.68	0.04 **
Severely underweight	-0.30	0.00 ***	-0.03	0.36	0.00 ***
Nutrition, health and hygiene					
Diet diversity	0.02	0.63	0.04	0.29	0.65
Positive feeding practice	-0.02	0.84	0.02	0.75	0.44
Negative feeding practice	0.06	0.62	0.05	0.68	0.82
Vitamine A	0.08	0.35	-0.12	0.08 *	0.02 **
Deworming	-0.01	0.86	0.03	0.59	0.51
Use soap	0.06	0.54	0.02	0.76	0.45
Soap before food preparation	-0.01	0.91	-0.09	0.24	0.16
Soap before eating	0.01	0.91	-0.16	0.03 **	0.01 ***
Soap before feeding	-0.05	0.40	-0.08	0.23	0.62
Soap after defecation	0.02	0.69	0.04	0.17	0.64
Soap after changing diapers	-0.04	0.58	0.01	0.92	0.39
Had diarrhea in 2weeks	0.01	0.64	0.03	0.38	0.69
Was seriously ill in 2weeks	-0.02	0.54	-0.01	0.75	0.72
Misbelief about health(*1)	0.01	0.75	0.04	0.10	0.08 *
Misbelief about health(*2)	0.01	0.73	0.04	0.23	0.07 *
The National Nutrition Services (NNS)					
Growth development card	0.16	0.04 **	0.22	0.00 ***	0.41
# growth monitoring check-up	0.13	0.10 *	0.17	0.02 **	0.54

Source: Authors' calculations based on surveys conducted for the ECS impact evaluation.

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