Improving Child Growth and Nutrition

Lessons from Rigorous Evidence

Stunting, or being too short for one's age, is a warning signal that a child is at risk of failing to reach their full physical and developmental potential. Stunting is caused by poor nutrition during pregnancy, inadequate infant and young child feeding (IYCF) practices, and repeated infections. Stunting has been associated with impaired brain development, poor school achievement and progress, reduced earnings in adulthood, and a higher probability of living in poverty.[1] Stunted children are also at an increased risk of morbidity and childhood mortality from infectious diseases.[2] In this brief, Innovations for Poverty Action's Path-to-Scale Research team has compiled evidence from interventions to improve child growth and nutritional status[3] in low and middle-income countries (LMICs).

Based on the research, the following are key lessons to consider[4]:

- Consumption of small-quantity lipid-based nutrient supplements improves linear growth and nutritional status.
- Cash transfers combined with social and behavior change communication can facilitate improved child growth.
- Home-based growth monitoring by caregivers can support improved child growth.
- Increased consumption of animal-source foods can benefit child growth in some contexts.
- Micronutrient supplementation for children under the age of two reduces the risk of anemia but does not improve growth.
- Maternal supplementation during pregnancy improves birth and infant outcomes.
- Complementary feeding education alone can improve feeding practices but not growth.
- Nutrition-sensitive agricultural interventions have mixed effects on child growth.
- Water, sanitation and hygiene interventions (WASH) are insufficient for improving child growth.

Consumption of small-quantity lipid-based nutrient supplements improves linear growth and nutritional status.

Nutritionally adequate diets may be unavailable or cost prohibitive for many caregivers in low-income contexts, leaving children vulnerable to deficiencies that can compromise healthy growth and development. Small-quantity lipid-based nutrient supplements (SQ-LNS) are nutrient-dense products for infants and toddlers that provide energy, protein, essential fatty acids, and a wide range of micronutrients in a 20 gram package. SQ-LNS can be mixed with other foods or consumed alone, and was developed to fill potential nutrient gaps in child diets. A meta-analysis of individual participant data from 14 trials conducted in sub-Saharan Africa, Bangladesh, and Haiti found that consumption of SQ-LNS among children 6 to 24 months of age decreased stunting by 5 percentage points.[5] SQ-LNS also reduced iron deficiency, anemia and child mortality, and improved child language, social-emotional and motor development.[6]

Cash transfers combined with social and behavior change communication can facilitate improved child growth.

Evidence from Bangladesh suggests that cash and in-kind transfers improved household food intake, but only the group receiving cash and social and behavior change communication (SBCC) programming experienced reductions in stunting (7.8 percentage points).[9]

Cash transfers provide resources that may be invested in child nutrition and health when household incomes are insufficient. Cash transfers alone have shown mixed results for improving child growth,[7] which may be due to caregivers not knowing enough about and consistently exercising and prioritizing good child health and feeding practices. Social and behavior change communication (SBCC) programming uses various communication approaches to encourage changes in knowledge, attitudes, social norms, beliefs and behaviors.[8] Evidence from Bangladesh suggests that cash and in-kind transfers improved household food intake, but only the group receiving cash and SBCC experienced reductions in stunting (7.8 percentage points).[9] Cash alone also had no impact on child growth in Myanmar, while cash combined with SBCC led to a 4.6 percentage point/13.5 percent reduction in stunting.[10] In Nigeria, a monthly cash transfer along with SBCC led to a 5.4 percentage point/8 percent reduction in stunting that remained nearly two years after cash transfers concluded.[11]

Home-based growth monitoring by caregivers may support improved child growth.

A randomized evaluation in Zambia found that installing life-sized growth charts in homes for caregivers to monitor their child's height over time led to a 22-percentage point reduction in stunting among children stunted at baseline.[14]

Growth monitoring, typically implemented through primary healthcare or community-based services, is a diagnostic tool for assessing the status of a child's growth over time, and prompting effective action in response to growth faltering.[12] The evidence for this model of growth monitoring alone shows little to no effect on child growth or nutritional status.[13] However, a randomized evaluation in Zambia found that installing life-sized growth charts in homes for caregivers to monitor their child's height over time led to a 22-percentage point reduction in stunting among children stunted at baseline.[14] Additional studies testing village-based and in-home growth charts are underway in the Democratic Republic of the Congo, Indonesia, Pakistan and Zambia.[15]


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Increased consumption of animal-source foods benefits child growth in some contexts.

Dietary diversity, or eating foods from each of the food groups, is a good proxy for ensuring children consume quality diets with adequate amounts of critical nutrients for growth and development. Animal-source foods (ASFs), such as eggs, meat, fish and dairy, are a key component of

Provision of eggs to children ages six to nine months, along with a social marketing campaign that addressed allergy misconceptions in Ecuador led to a 47 percent reduction in stunting.[18] When replicated in Malawi among a population with a high baseline intake of fish, however, egg consumption had no effect.[19]

dietary diversity and may be especially important foods for the complementary feeding period given the relatively small amounts of foods that are consumed between the ages of 6 and 24 months (200 - 550 kcal/day; 137 - 515 grams/day).[16] ASFs may not be incorporated into the diet due to cost or context-specific ecological or cultural factors. In Ecuador, for example, eggs are widely available and affordable but not fed to children due to fear of allergic reactions.[17] Provision of eggs to children ages six to nine months, along with a social marketing campaign that addressed allergy misconceptions in Ecuador led to a 47 percent reduction in stunting.[18] When replicated in Malawi among a population with a high baseline intake of fish, however, egg consumption had no effect.[19] Another study in Malawi, which provided dried bovine colostrum and egg powder to improve gut health and enable a growth response, reduced linear growth faltering but was costlier than alternatives.[20] Poultry production along with a SBCC package in Burkina Faso increased child egg consumption but had no effect on stunting.[21] A systematic review of the provision of ASF found uncertain effects on child growth.[22]

Messages to add an animal source food to the baby's meal as part of a nutrition education project in Peru led to improved diets, and children were one centimeter taller and three times less likely to be stunted than children in the comparison group.[23] Some caregivers in rural China previously believed that infants could not digest ASFs and therefore did not include them in meals despite affordability and availability. Cooking demonstrations and key messages about the benefits of ASFs for growth led to caregivers feeding children more ASFs and infant height gains (0.66 cm).[24] An infant and young child feeding (IYCF) education project in Ethiopia that included nutrition-sensitive agricultural messages about designating chicken's eggs and vegetables from home gardens for children under the age of two, reduced stunting by 5.6 PPS.[25] Exposure to messages about "raising a baby's chicken" was strongly associated with height gains via increased egg consumption.

Micronutrient supplementation for children reduces the risk of anemia but does not improve growth.

Micronutrient deficiencies, a form of undernutrition, may occur when children's diets do not provide the full spectrum of nutrient needs in adequate quantities. Micronutrient supplementation addresses these deficiencies in the form of capsules, tablets, or drops. Other micronutrient interventions include fortification of staple foods or point-of-use fortification using micronutrient powders that can be mixed into a child's meal. A recent review of micronutrient interventions including single and multiple micronutrient supplementation, large-scale food fortification, targeted fortification, and point-of-use fortification for children under the age of five in LMICs found no effect on linear growth, though they were effective in reducing anemia.[26] The same review found a 30 percent increased risk of diarrhea associated with micronutrient powder use, which can exacerbate malnutrition, but other studies have found no effect.[27]

Maternal supplementation during pregnancy improves birth and infant outcomes.

Women need adequate nutrition throughout pregnancy to support both their own nutrient needs and also fetal growth and development. Undernutrition during this time contributes to adverse birth outcomes, such as low birth weight and small-for-gestational age infants, which can lead to stunting.[28] Iron-folic acid (IFA) supplementation is recommended by the World Health Organization to prevent maternal anemia and improve birth outcomes, but evidence suggests multiple micronutrient supplementation[29] should be considered the standard given the additional positive


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effects on birth and infant outcomes.[30] A meta analysis found that compared to IFA, SQ-LNS supplementation among pregnant women led to improved birth weight and length, reduced the risk of babies being small-for-gestational age by 6 percent, and stunting at 6 months of age by 18 percent.[31] In the same analysis, birth and infant outcomes did not differ significantly between SQ-LNS and multiple micronutrient supplements.[32]

Complementary feeding education alone may improve feeding practices but not growth.

Improvements in feeding practices and child diets but not growth indicate there may be other factors constraining a growth response beyond caregivers' knowledge, such as access to and affordability of sufficient quantities of nutritious foods.

Caregivers' knowledge around proper complementary feeding practices, such as timely introduction to foods, feeding a variety of foods, and providing enough meals throughout the day, is an important determinant in infant and young childrens' diets. Educational interventions deliver information using a variety of strategies, activities and platforms to improve knowledge and change behaviors. The evidence for educational interventions alone is positive for improving feeding practices[33] but the effect on child growth is mixed. An intensive behavior change program in Ethiopia[34] improved complementary feeding practices and reduced stunting (5.6 percentage points), while similar programs in Bangladesh[35] and Vietnam[36] only improved complementary feeding practices. A meta analysis[37] found educational interventions had no effect on growth parameters while a systematic review[38] of education interventions in LMICs found a 35 percent decrease in stunting in food insecure settings,[39] and a non-significant effect in food secure settings.

Improvements in feeding practices and child diets but not growth indicate there may be other factors constraining a growth response beyond caregivers' knowledge, such as access to and affordability of sufficient quantities of nutritious foods. Studies in Bangladesh and Mali found a 5-and 8-percent reduction in stunting for children in a nutrient supplement (SQ-LNS) plus education intervention arm compared to children in the education-only arm.[40]

Nutrition-sensitive agricultural interventions have mixed effects on child growth.

Nutrition-sensitive agricultural programs aim to improve child growth by addressing underlying determinants of child malnutrition such as financial resources, availability and access to nutritious food, and gender equity.[41] Production and sale of food can provide access to food and income with which to purchase nutritious food while behavior change communication can emphasize complementary feeding practices. The effects of nutrition-sensitive agriculture programs for child growth are mixed. A program in Malawi[42] reduced stunting by 17 percentage points[43] through provision of inputs and training on home gardening and poultry rearing in addition to complementary feeding and BCC. Linear growth improved from a program in Ghana that provided home gardening and poultry production inputs as well as nutrition, healthcare, and child stimulation education.[44] A 2018 review of nutrition-sensitive agricultural programs found positive effects for complementary feeding practices and diets but no impact on linear growth or stunting.[45]

Water, sanitation and hygiene interventions (WASH) are insufficient for improving child growth.

Estimates published in 2008 suggested that 25 percent of the burden of stunting can be attributed to five or more episodes of diarrhea before the age of two.[46] Poor sanitation, hygiene practices, and drinking water quality can expose children to pathogens that cause enteric infections such as diarrhea, which increases the need for food while negatively impacting nutrient absorption.[47] A systematic review[48] found no effect of household-level WASH interventions[49] on child growth, though subgroup analysis of interventions delivered over 18-60 months did show improvements in growth. Three large studies conducted in Bangladesh[50], Kenya[51] and Zimbabwe[52], including over 18,000 children, found household-level WASH interventions had mixed effects on diarrhea and no effect on child growth. Furthermore, these studies assessed the combined and independent effects of WASH and nutrient supplements plus SBCC and found WASH had no additional benefit over supplements and SBCC alone. More intensive WASH interventions, such as providing a continuous and safe drinking water piped to a household, may facilitate improvements in child growth but have not been rigorously tested.[53]

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Writers: Savanna Henderson and Shana S. Warren | **Editor:** Laura Burke | **Designer:** Ion Florie Ho

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IPA Path-to-Scale Research (PSR) | path2scale@poverty-action.org **|** poverty-action.org/impact/path-scale-research

IPA's Path-to-Scale Research (PSR) Initiative on Child Growth and Development focuses on moving evidence-based interventions to scalable and adaptable programs and policies to reduce and prevent growth faltering and stunting. The PSR team, in collaboration with academic and practitioner experts, has consolidated research agendas around four evidence-based interventions for improving linear growth to address evidence gaps. The prioritized interventions include **small-quantity lipid-based nutrient supplements (SQ-LNS)** and **animal-source foods** to complement infant diets, **cash transfers with social and behavior change communication (SBCC)** programs, and **home-based growth monitoring.**