

MADAGASCAR: What's the most effective way to tackle chronic malnutrition and poor child development?

Young children everywhere need sufficient nutrition and stimulation to grow and develop appropriately. A healthy, diverse diet and a supportive caregiving environment can help children grow and develop in their early years, and also make children more likely to succeed later in life. Across low-income countries, however, hundreds of millions of children don't get enough healthy food for their bodies and brains to develop fully, putting them at a disadvantage starting from an early age. With so many children at risk of stunted growth and development, policymakers are urgently seeking effective and scalable approaches to improve children's outcomes.

of their lives. But many questions remain on how to incorporate the insights from small-scale studies into policy. For example, can these proven approaches be integrated into an at-scale government program and produce similar positive results? What is the most effective (and cost-effective) way of combining these approaches to promote optimal development? Will these approaches be effective in an extremely poor, low-resource setting?

In Madagascar, the World Bank's Strategic Impact Evaluation Fund (SIEF) supported an evaluation to help answer these questions. Working within an existing community-based program, researchers evaluated nutritional supplements to children and pregnant and breastfeeding mothers, as well as support to parents to optimize their children's growth and development. After two years, the evaluation found that the nutritional supplements for children were effective at helping children grow, but only if kids received the supplements starting at six months of age. Additional supplementation to pregnant women did not augment impacts for their children. Home visiting to parents, on the other hand, led to only limited impacts: children ate better, but the changes were not enough to improve growth or children's cognitive, motor, or social development. Overall, the research confirms the benefits of incorporating preventive nutritious supplements for very young children in an integrated health and nutrition package, but also highlights the challenges of implementing effective parenting programs at scale and in a remote and highly resource-constrained setting like rural Madagascar. With this information, the government is scaling up the nutritional supplementation program for young children. With SIEF funding, the researchers are going back into the field with experiments that investigate the impacts of adaptations to the program on how community health workers allocate their time across tasks, how parents can be supported by behaviorally informed materials and how the program variants may improve child development outcomes.



Previous evidence suggests that providing families with certain nutritional supplements—containing fat, protein and essential micronutrients—can reduce chronic malnutrition. Providing intensive parental support in the home, as well as toys and books to help stimulate young brains, can promote cognitive and social-emotional skills that will help children thrive and learn for the rest

EARLY CHILDHOOD DEVELOPMENT

This policy note is based on, "[Effects of nutritional supplementation and home visiting on growth and development in young children in Madagascar: a cluster-randomised controlled trial.](#)" Emanuela Galasso, Ann M. Weber, Christine P. Stewart, Lisy Ratsifandrihamanana, and Lia CH Fernald, *The Lancet Global Health* (2019) and "[Lipid-Based Nutrient Supplementation Reduces Child Anemia and Increases Micronutrient Status in Madagascar: A Multiarm Cluster-Randomized Controlled Trial.](#)" Christine P. Stewart, Lia CH Fernald, Ann M. Weber, Charles Arnold and Emanuela Galasso, *The Journal of Nutrition* (2020).

Context

Madagascar is marked by widespread and deep poverty, with 75 percent of the population living on less than \$1.90 per person per day (in purchasing power parity). Approximately 45 percent of children under age five and 55 percent of children under age two are anemic, respectively. Almost half of all children in Madagascar have stunted growth.

This study took place in five regions in south and southeast Madagascar that had some of the highest rates of stunting in the country—64 percent of children in the study were short for their age compared to global standards. The majority of their caregivers had only completed primary school or less.

In 1999, Madagascar's National Nutrition Office rolled out a large-scale community-based nutrition program to address the issue of poor nutrition, and the program is still operational throughout the country. Through the government program, community health workers provide growth monitoring, nutrition education, cooking demonstrations, and health referrals. In spite of intense

government commitment to these problems, a previous evaluation found that the program showed only effects on weight (for their age) in young children and little to no effect on children's length (for their age).^{*} Given the high prevalence of stunting in Madagascar, further thinking and experimentation was needed to find out how to improve child growth. Researchers, together with Government counterparts and the World Bank operational teams, decided to investigate whether more intensive packages would work, by providing supplementation to both children and pregnant or lactating women and individualized counselling.

Did you know...

In Madagascar

- 75 percent of the population lives below \$1.90 per person per day.
- More than half of all children under two years of age are anemic.
- Nearly half of all children are stunted (too short for their age).

Evaluation

A randomized controlled trial was used to evaluate the impact of providing mothers with parental support, either with or without nutritional supplements, on their children's growth and development.

The overall aim of the *MAHAY* study (meaning 'smart' or 'skilled' in Malagasy) as it was called, was to understand whether certain interventions, when packaged together, could significantly improve growth and development among young children in Madagascar.

The interventions were integrated into the existing community nutrition program and implemented over a two-year period by the Madagascar Government's National Nutrition Office with support from the World Bank. The evaluation took place at 125 sites, each comprised of 2-3 villages with approximately 100 children aged 0-2 each.

After the initial baseline survey which ran from June-August 2014, researchers randomly assigned the 125 program sites to

one of five groups. Pregnant women and infants younger than 12 months were eligible to participate. Women in the first group received the 'status quo': the standard program offered by the gov-



Source: Emanuela Galasso

^{*} Ann Weber, Emanuela Galasso, and Lia CH Fernald, "Perils of scaling up: Effects of expanding a nutrition programme in Madagascar," *Maternal & child nutrition* (2019).

ernment in which community health workers visit villages once a month to weigh and measure children and provide nutrition education to the group. Women in the second group received the same standard program *plus* home visits from by an additional community worker who provided preventive nutrition counseling. Women in the third group received the same package as the second group *plus* lipid-based nutritional supplements for children aged 6–18 months. Women in the fourth group received the same package as the third group *plus* nutritional supplements for pregnant and lactating women. Women in the fifth group received

the same services as the second group *plus* home visits every two weeks, designed to promote and encourage stimulation activities for young children.

Researchers were primarily interested in measuring changes in child growth (length-for-age and weight-for-length) and children's cognitive, motor, and social development. To measure these impacts they used data from two follow-up surveys, which took place one year after the baseline survey (September–October, 2015) and two years after the baseline survey (September–November, 2016).

Findings

While, on average, none of the interventions improved physical growth or development, children who received nutritional supplementation at an early age did experience healthier growth.

Children who were exposed to full nutrition supplementation starting when six months old experienced a significant increase in their length (length-for-age), a reduction in stunting, and improvements in weight (weight-for-age). These findings were quite similar to findings from research in different countries, including three evaluations in Kenya, Bangladesh, and Zimbabwe.

Researchers found no significant benefits in growth for the slightly older children who did not receive the full 12 months of supplementation, nor did they find any benefits on growth for any children from households given door-to-door counselling on early stimulation activities. The door-to-door counselling on best practices in nutrition generated a negligible improvement in length-for-age and small reduction in stunting for the youngest children, but these gains were only marginally statistically distinguishable from what the group receiving the status quo government program experienced.

Supplementing mothers yielded no additional benefits.

One of the arms of the evaluation was set up to distribute weekly sachets of lipid-based nutritional supplements to pregnant and lactating mothers both to consume themselves and to administer to their children. Throughout the project, NGO

supervisors monitored distribution and consumption of the supplements, and empty sachets had to be returned to the additional community health worker to avoid reselling. At the 1-year follow-up, approximately 95 percent of the children had received the supplements and 80 percent of pregnant or lactating women had received them. Despite the high reported receipt among mothers, this program variant did not generate additional benefits compared to the experimental arm in which only the children received the supplements.

The supplements for children had some nutritional benefits, too: they reduced the prevalence of anemia and iron deficiency.

Children who received supplements had around a 40 percent lower prevalence of anemia (deficiency of hemoglobin) and 25 percent lower prevalence of iron deficiency than children who didn't receive the supplements.

These findings suggest that providing these supplements within a large-scale program offers significant benefits on anemia and iron status in young children. However, these impacts faded out within months after the end of supplementation. It's possible the short-term improvements in micronutrient status and anemia could translate into lasting effects on child health and development beyond the period of supplementation, but further research would be needed to know.

Overall, delivering nutritional counseling via home visits over and above group messaging had little benefit: children's diet improved somewhat when visits were frequent, but these dietary shifts weren't enough to improve child growth.

The more intensive nutrition counselling led to an increase in caregiver reports of children's consumption of protein, namely meat, fish, dairy, and egg intake, suggesting that the addition of individualized messages from the home visits was better than group messaging (from the standard growth monitoring sessions) at getting across key nutritional messages. There was no overall impact on dietary diversity, however, which was probably due to a reduction in consumption of vitamin-A-rich fruits and vegetables that offset the increased intake of dairy and animal source foods.

The home visits focused on promoting early stimulation weren't successful in improving children's cognitive, motor, or social development.

Improving child development outcomes was a primary focus of the home-visit component of the program. Researchers assessed development at each follow-up using the Ages and Stages Questionnaire Inventory, a comprehensive caregiver-report assessment of child development, which measures skills in communication, gross motor, fine motor, personal-social, and problem-solving domains. This assessment was complemented at endline with a direct infant assessment by a psychologist using the Bayley Scales of Infant Development on a subset of children. The study didn't find impacts from any of the interventions on any of these areas of child development over the course of the evaluation.

One possible reason why the home-visit interventions didn't have larger impacts could be that community health workers had difficulty reaching homes in dispersed and far-flung villages.

As in other countries, communities in rural Madagascar are often distant from each other with low population density, resulting in a logistical challenge for the community health workers. Not only did the geography make it difficult to reach families, but it also made it harder to spend sufficient time with caregivers to deliver the intensive counselling. In other words, logistical

factors might have overburdened community workers, and, as a result, dampened the impact of the program.

Plus, caregivers' may have had relatively limited ability to act on the advice and suggestions coming from the community health workers.

Mothers' responsiveness to the program may have been hindered by insufficient time, willingness to engage with the community health workers, or lack of interest in topics covered by the health workers. It is also possible caregivers were simply unable to act on suggestions made by the community health workers due to insufficient money to purchase food or toys. Caregivers might need additional behavioral support to sustain caregiver-child play in between sessions. Toys and books might be crucial to sustain mothers' interest in engaging in stimulation activities with children on a daily basis and to review the skills learned from session to session. However, in this case, the demonstration materials that community health workers used during the visits were not available for families to keep or borrow.

It is also possible that community health workers had too much to do.

Door-to-door visits to deliver intensive nutrition counselling and explaining to parents how to support early childhood development through early stimulation activities were time consuming and did not prove to be effective in improving nutrition and child development outcomes. The Government has since decided to rely on a community platform for the delivery of health, group nutrition, and early stimulation activities. In an integrated program, community workers health workers might find it hard to balance existing health and nutrition duties with new added tasks. To test the feasibility of integrating early stimulation activities within the existing platform, researchers are going back into the field with funding through SIEF's nimble evaluation window. They will test new models of group meetings and capture information on how community workers allocate their time across tasks.

Conclusion

These findings support the potential for lipid-based nutritional supplements to be used effectively to increase child growth, decrease stunting, and reduce anemia as a preventive component of a nutrition package in low-income settings such as Madagascar, provided that the supplementation starts early enough (at six months of age). However, the results also suggest the additional cost of supplementing mothers during pregnancy and lactation might not be warranted as adding this component yielded no additional benefits.

While the intensive parental support component was helpful in shifting feeding behaviors, the model tested here was not much better than delivering health messages to groups via the usual avenues, at least in this context of high poverty and food

insecurity.

Finally, this study highlights important challenges to improving early child development in a very low-income context, including the difficulty for community health workers to make home visits in a geographically dispersed terrain, limited adoption of stimulation activities by caregivers due to other pulls on their time and resources, and the program's lack of resources to provide intensive support or materials like toys and books to all families. As the government adapts their early stimulation program to overcome these challenges, the research team will continue to iteratively test these refinements on children's growth and development.

The Strategic Impact Evaluation Fund, part of the World Bank Group, supports and disseminates research evaluating the impact of development projects to help alleviate poverty. **The goal is to collect and build empirical evidence that can help governments and development organizations design and implement the most appropriate and effective policies for better educational, health, and job opportunities for people in low and middle income countries.** For more information about who we are and what we do, go to: <http://www.worldbank.org/sief>.

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