The Impact of Growth Charts and Small-Quantity Lipid-Based Nutrient Supplements (SQ-LNS) on Child Growth in Zambia

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 and frequent infections during early life.

The consequences of stunting include impaired brain development, poor educational outcomes, reduced earnings in adulthood, and an increased probability of living in poverty. In Zambia, stunting remains a significant problem, impacting 35 percent of children under the age of five, which is higher than the average within Africa of 31 percent (UNICEF/WHO/World Bank 2023).

In collaboration with the Zambian Ministry of Health and IPA, researchers evaluated the impact of home-based growth charts and SQ-LNS— ready-to-eat small packets of paste that provide energy, protein, fats and micronutrients— on child growth, nutrition, and development outcomes.

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Key Findings

The distribution of small-quantity lipid-based nutrient supplements (**SQ-LNS**) to families in Zambia **led to notable improvements in the health and development of children** under five years old.

- The odds of a child being stunted decreased by 37 percent.
- The odds of a child having anemia went down by 26 percent. Children that suffer from anemia are at risk of impaired growth, brain and motor skills development, which lead to reduced productivity and income in adulthood.
- Child development scores, as measured by the Global Scales for Early Development (GSED), increased by 0.28 standard deviations[1], reflecting positive advancements across cognitive, motor, language, and social-emotional domains.

Growth charts demonstrated some positive impacts on children's health, but they **did not improve child growth and were less effective than SQ-LNS alone** in improving health and development outcomes.

Combining growth charts and SQ-LNS reduced the odds of anemia and being underweight, but it **did not have the same impact as using SQ-LNS alone** on child growth and development outcomes.

Recommendations

Given that SQ-LNS significantly improved child growth, nutrition, and development outcomes in this study, as well as in several recently published evaluations, **IPA recommends their use and scale-up in countries facing high rates of growth faltering and food insecurit**y. Furthermore, SQ-LNS is recognized as one of IPA's Best Bets—innovations that, according to IPA sector experts and scientific advisors, hold significant promise for making an impact at scale.

IPA advises further research to determine the cost-effectiveness of SQ-LNS supplementation and to understand how impact may vary based on context, duration of supplementation, delivery platform, and co-delivery with other interventions.

Where resources are limited, **IPA suggests priority should be given to children with low birth weight or early life growth faltering**, as subgroup analysis in this study indicates the SQ-LNS intervention appears to have been particularly impactful among these children.

Despite some positive impacts, **IPA does not recommend the use of growth charts to improve child growth and nutrition without further refinement and testing.**

The Evaluation

Researchers evaluated the impact of both Growth Charts and SQ-LNS on the health and development of children through a randomized evaluation (RCT). A total of 2,291 pairs of primary caregivers and their children, referred to as dyads, participated. Each child was between 6-11 months old at the start of the study. Dyads were divided randomly into four groups across three districts (Choma, Mansa and Lusaka) purposely selected by Zambian government and international health experts given the diverse stunting rates and dietary diversity.

- **Group 1: Growth charts:** This group was provided with growth charts intended for home use. The researchers installed these charts as posters in the homes of 643 dyads. Growth charts help caregivers track and interpret their child's growth. They feature two sections: one promoting essential feeding and nutrition messages, and another for measuring children's height, with color-coded zones to signify age-appropriate height. The nutrition messaging focused on locally available foods and thus did not mention SQ-LNS.

- **Group 2: SQ-LNS:** Each month, the research team distributed 30 sachets of SQ-LNS to 525 dyads, instructing caregivers to administer one sachet daily to the child. SQ-LNS are food supplements crafted to address nutrient gaps in children's diets. The small packets of paste contain energy, protein, essential fatty acids, and over 20 essential vitamins and minerals.

- **Group 3: Growth charts and SQ-LNS:** 566 dyads received both growth charts and monthly SQ-LNS.

- **Group 4: Comparison group:** 557 dyads were monitored as a comparison group, and they did not receive any intervention.

Results and Conclusions

Growth charts alone had no impact on child growth, but did improve some child health and development outcomes.

- The odds of anemia were reduced by 25 percent.
- Child development scores, as measured by the GSED, increased by 0.18 standard deviations, reflecting positive advancements across cognitive, motor, language, and social-emotional domains, though gains were greater for SQ-LNS.

SQ-LNS had a significantly positive impact on nearly all measures of children's growth and development.

- Mirroring results from similar studies in Bangladesh, Burkina Faso, Ghana, Haiti, Kenya, Madagascar, South Africa, and Zimbabwe, researchers observed a positive trend in children's growth: Their height-for-age increased by 0.21 standard deviations[2]. This improvement translates to a 37 percent decrease in the odds of stunting and a 43 percent reduction in the odds of being underweight.
- The odds of anemia were reduced by 26 percent
- Child development, as measured by the GSED, increased by 0.28 standard deviations, reflecting positive advancements across cognitive, motor, language, and social-emotional domains.

Results show combining the two interventions did not have the same impact as using SQ-LNS alone on child growth and development, but did improve some health outcomes.

- The odds of anemia were reduced by 28 percent.
- The odds of being underweight were reduced by 30 percent.

The exclusion of SQ-LNS messaging on the growth chart could have created confusion for caregivers in trying to follow both the recommended feeding practices and provide SQ-LNS to children. This may explain why the combined intervention was less effective than SQ-LNS alone.

Despite global progress in improving child nutrition, alarmingly high rates of malnutrition persist (UNICEF/WHO/World Bank 2023). To combat the devastating health, development, and economic consequences of malnutrition for individuals, communities, and countries, effective interventions such as SQ-LNS, which boasts a strong foundation of evidence for reducing malnutrition, should be scaled up.

Stakeholders are urged to collaborate and prioritize the implementation of evidence-based strategies, with a particular emphasis on expanding the reach and impact of SQ-LNS, to ensure a healthier and more prosperous future for our children and communities.

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[1] Children's development is measured as a z-score, which is a way to measure how far each child's development is from the average, and we express it in terms of standard deviations. If the score increases, it means the child's development has improved compared to the control group.

[2] Children's height is measured as a z-score, which is a way to measure how far each child's height is from the average, and we express it in terms of standard deviations. If the score increases, it means the child has grown taller compared to the control group.