Briefing paper
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SHINE
Finding ways to help children shine!

Infant and Young Child Feeding to prevent stunting and anaemia

Child stunting and anaemia

Child stunting is a serious problem, affecting almost one in four children aged <5 (151 million children). Stunting reduces child survival; it is associated with 15-17% of deaths among children under five years. It also leads to long-term cognitive deficits, reduced educational attainment, and lower adult economic productivity. Adults who are stunted are at higher risk of having children who are stunted. Stunting is estimated to cost $177 billion per annual birth cohort.

It is thought that stunting is caused predominantly by inadequate diet, recurrent illness and poor maternal health and diet before and during pregnancy. There is also some evidence to suggest that stunting may be associated with environmental enteric dysfunction (EED). EED is a subclinical disorder of the gut that may cause reduced absorption of nutrients and chronic inflammation, both of which could prevent healthy growth.

Anaemia is common in Africa and Asia, particularly in children aged between 12 to 24 months. It affects around half of children in Africa and Asia. Anaemia is the 15th leading cause of lost disability-adjusted life-years globally. Anaemia can cause tiredness and lethargy, and in children it can delay cognitive and behavioural development.

The most common cause of anaemia in young children is iron deficiency, which causes around half of anaemia in children under the age of 2.

Both stunting and anaemia can be related to nutrition. This briefing paper looks at the evidence around an Infant and Young Child Feeding intervention tested in the SHINE trial, for reducing stunting and anaemia. It focuses on HIV-unexposed infants. A companion briefing paper examines these issues in HIV-exposed infants.

Key points

- Child stunting is a serious problem, affecting one in four children aged <5 globally, causing deaths, cognitive deficits, reduced educational attainment and lower adult economic productivity
- The SHINE trial was a large, cluster randomised trial carried out in rural Zimbabwe investigating whether:
  - improved Infant and Young Child Feeding (IYCF) would reduce stunting and anaemia among children
  - improved water, sanitation and hygiene (WASH) would reduce stunting and anaemia among children
- The SHINE Infant and Young Child Feeding interventions were: behaviour change modules delivered to pregnant women and mothers of infants by village health workers, and a monthly delivery of Small-Quantity Lipid-based Nutrient Supplement (SQ-LNS) from 6-18 months
- The IYCF intervention reduced stunting and anaemia by 20-25%
- Infant and young child feeding interventions, including behaviour change modules and provision of nutritional supplements, can help reduce stunting and anaemia
- IYCF programmes alone are unlikely to eliminate stunting

The SHINE trial

The SHINE trial was a large, cluster randomised trial carried out in rural Zimbabwe investigating whether:

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The IYCF intervention

The SHINE trial ICYF intervention included:

- Behaviour change modules delivered to pregnant women and mothers of infants by village health workers covering:
    1. The importance of infant nutrition for infant health, growth and development
    2. Feeding nutrient-dense food and 20g small-quantity Lipid-based Nutrient Supplement (SQ-LNS) daily from 6-18 months
    3. Processing locally available foods to facilitate chewing and swallowing
    4. Feeding during illness
    5. Dietary diversity
- 20g small-quantity Lipid-based Nutrient Supplement (SQ-LNS) to be fed to the infant daily from 6-18 months

Infant and Young Child Feeding intervention delivery

The SHINE trial IYCF intervention was implemented with high fidelity. Mothers received a median of 15/15 planned intervention visits between enrolment and 12 months postpartum, and more than 78% of households in the IYCF arm received at least 80% of the planned 20g SQ-LNS deliveries.

Uptake of SQ-LNS was high, with 92% of infants having consumed 20g LNS the previous day at the 12 months visit. A higher proportion of children in the IYCF arms met minimum dietary diversity and had consumed animal-source iron rich and vitamin A-rich foods in the previous day.

Impact of IYCF on stunting and growth

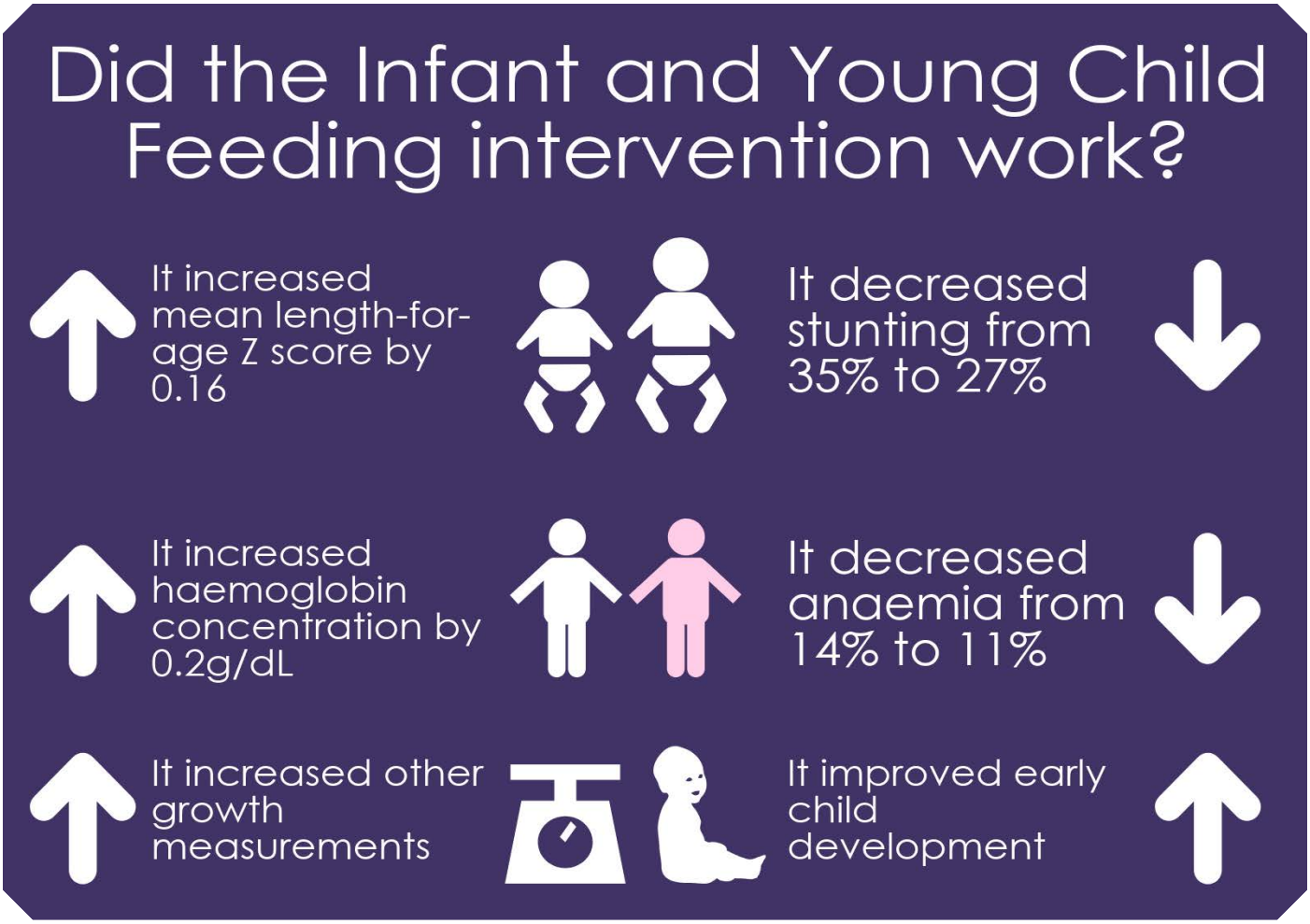
The IYCF intervention significantly improved growth and reduced stunting. Children in the IYCF arms had a mean length-for-age Z-score 0.16 higher than those in the non-IYCF arms at 18 months. Stunting was reduced from 35% to 27%. IYCF also significantly increased mean weight-for-age Z-scores, weight-for-height Z-scores, and head circumference Z-scores.

This is consistent with the results of a recent systematic review, which concluded that improving the quantity or quality of infant diet may help modestly improve linear growth. Their analysis estimated the average effect to be 0.1 length-for-age Z score, which is ~5-10%

SHINE participants

The SHINE trial monitored the health of 3,686 HIV-unexposed babies. Among households taking part in the trial:

- Around half of household members practiced open defecation
- One third of households had an improved latrine
- Very few had electricity from the grid
- Two thirds had a solar panel
- 40% of households obtained drinking water from an unimproved source
- 40% had a return-trip to water >30 minutes.
- Volume of water collected was 9.5 L per capita per day
- Mothers were well-educated
- Most mothers were married
- 10% of mothers were infected with *S. haematobium*
- Mean infant birth weight was 3.1kg (9% <2.5kg)
- 88% of infants were delivered in health facilities



of the growth deficit experienced by Asian and African children. It is also consistent with the results of the WASH Benefits trials in Kenya and Bangladesh.

Impact of IYCF on anaemia

The IYCF intervention also significantly reduced anaemia. Haemoglobin concentration was 0.2 g/dL higher in the IYCF arms. IYCF reduced anaemia by 3.5 percentage points. IYCF reduced the proportion of children with anemia by 25% (14% to 11%).

This is consistent with many previous studies in which providing extra iron either as iron supplements or iron-fortified foods reduces anemia in young children but only partially.

Impact of IYCF on other outcomes

The IYCF intervention also led to a small but significant improvement in early child development.

There was no difference in cumulative mortality between the IYCF and non-IYCF arms.

Implications of these findings

These findings suggest that an IYCF intervention, combining complementary feeding education and provision of a lipid-based nutrient supplement, could have a major impact on stunting and anaemia.

While provision of supplemental food comes at a cost, this must be weighed against the considerable cost that stunting has, in terms of lower educational attainment, economic productivity and intergenerational effects. Further work is needed to assess the cost-effectiveness of IYCF for reducing stunting and anaemia.

The SHINE trial showed it was feasible to implement the complementary feeding education through existing district structures, delivered to pregnant women and mothers by village health workers.

The IYCF intervention had a significant impact on stunting, but was not sufficient to eliminate it. Further research is needed to find additional approaches that can effectively reduce the remaining burden of stunting that the IYCF intervention did not address.

What do the IYCF results mean?

Infant and young child feeding interventions, including behaviour change modules and provision of nutritional supplements, can help reduce stunting and anaemia

IYCF programmes are unlikely to eliminate stunting

We need research to identify other causes of stunting and effective ways of tackling them

Recommendations

- IYCF programmes combining complementary feeding education and provision of a lipid-based nutrient supplement should be considered in settings with high prevalence of infant stunting and/ or anaemia, particularly where there is also a high prevalence of HIV among pregnant women.
- Further research is needed to identify effective approaches for reducing the remaining burden of stunting, which is not tractable to IYCF interventions.

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Further reading

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