Briefing paper
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SHINE
Finding ways to help children shine!

Reducing stunting among HIV-exposed uninfected children

Stunting among HIV-exposed uninfected children

The success of prevention of mother to child transmission programmes in recent years means the numbers of HIV-exposed uninfected children is increasing. These children are at higher risk of stunting than HIV-unexposed children, even though they themselves are not infected with the virus.

Child stunting is a serious problem, reducing child survival and leading 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. Maternal infection, including HIV infection, during pregnancy may also slow foetal growth. 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.

This briefing paper looks at how stunting might be prevented among HIV-exposed uninfected children, drawing on the results of the SHINE trial.

Key points

- The number of HIV-exposed uninfected children is growing with the success of PMTCT programmes.
- Children born to mothers who are HIV-infected are at higher risk of stunting, even if they themselves are not HIV-infected.
- Child stunting is a serious problem, 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 IYCF intervention reducing stunting among HIV-exposed uninfected children by 20%.
- The WASH intervention did not reduce stunting or improve other growth measures among HIV-exposed uninfected children.
- Infant and young child feeding interventions, including behaviour change modules and provision of nutritional supplements, can help reduce stunting, particularly in areas of high antenatal HIV prevalence.
- Despite the IYCF intervention reducing stunting, 40% of HIV-exposed uninfected children were still stunted. We need to do more to help HIV-exposed children survive and thrive.

The SHINE trial

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 interventions

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

The SHINE trial WASH intervention included:

- Behaviour change modules delivered to pregnant women and mothers of infants by village health workers covering:
    1. Safe disposal of faeces
    2. Hand-washing with soap at key times
    3. Protection of infants from geophagia (eating soil) and ingesting animal faeces
    4. Chlorination of drinking water, especially for the infant
    5. Hygienic preparation of complementary food

Households of pregnant women/infants in clusters randomised to this intervention also received:

- A Ventilated improved pit (VIP) latrine built within 6 weeks of enrollment
- Two hand-washing stations
- A washable plastic mat and play yard to separate children from animals
- A monthly delivery of soap and chlorine solution

How did HIV-exposed uninfected children do in the SHINE trial?

HIV-exposed uninfected children in the SHINE trial did significantly worse than HIV-unexposed children, despite >80% of HIV-infected mothers being on ART. Their cumulative mortality through 18 months was 39% higher, their length-for-age Z-Score was 0.34 lower, they were 48% more likely to be stunted and 88% more likely to be underweight than HIV-unexposed children.

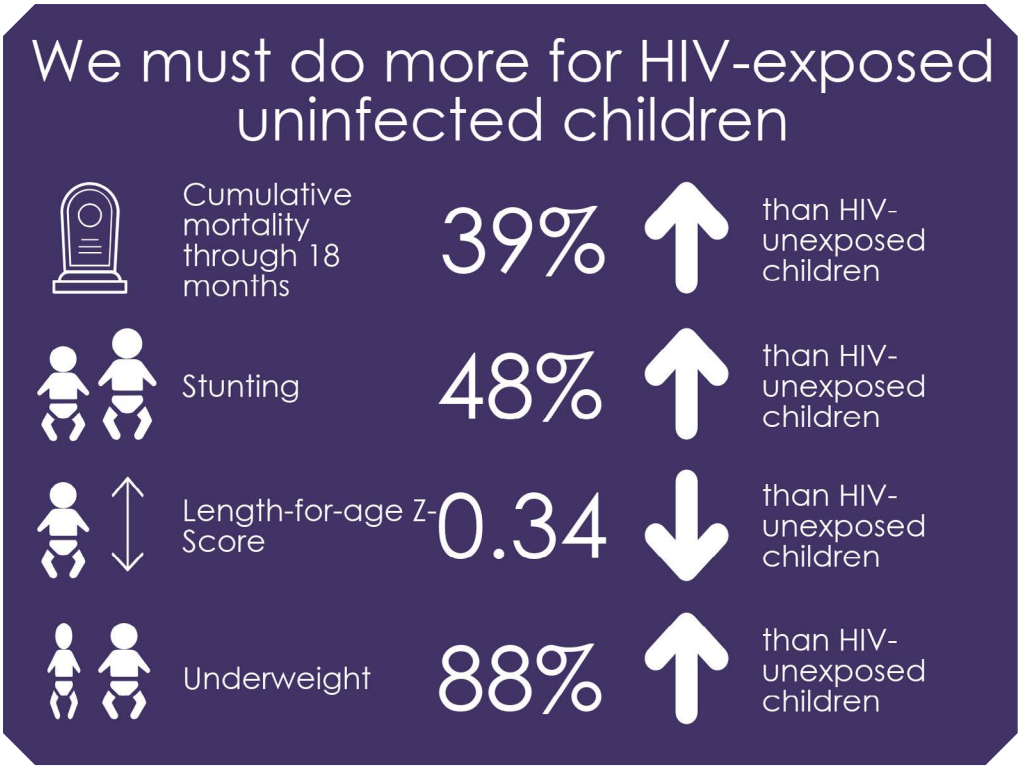
Infant and Young Child Feeding to reduce stunting among HIV-exposed uninfected children

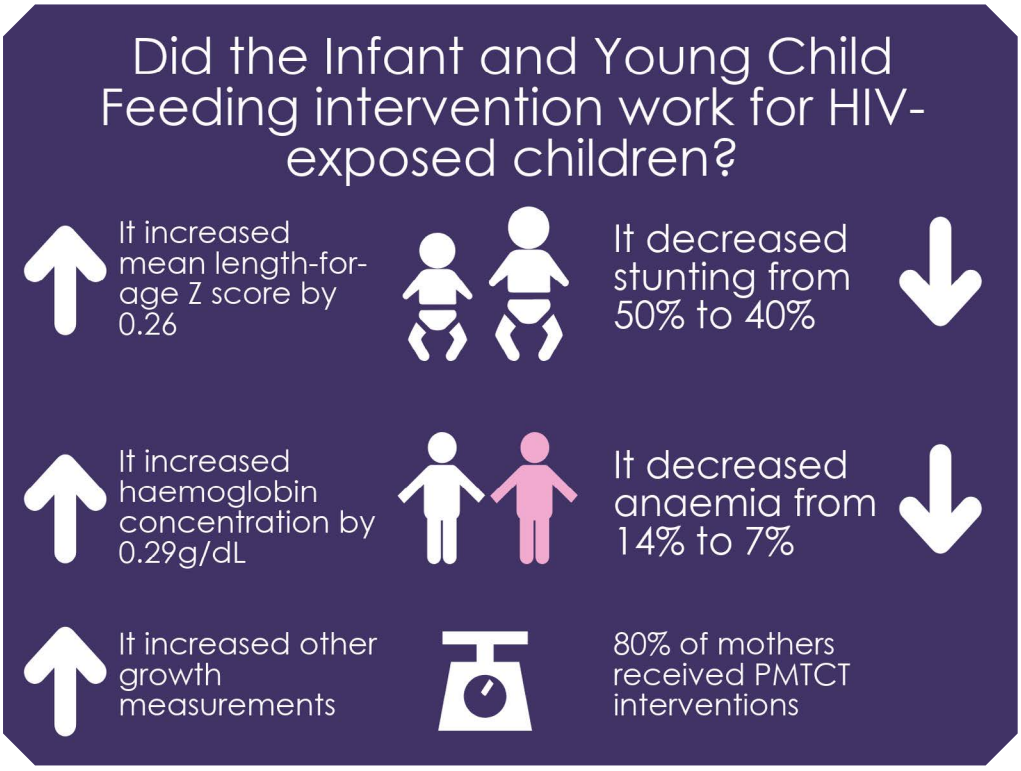
The IYCF intervention significantly improved growth and reduced stunting. Stunting was reduced among HIV-exposed uninfected children from 50% to 40%. Children in the IYCF arms had a mean length-for-age Z-score 0.26 higher than those in the non-IYCF arms at 18 months. This is greater than the increase in mean length-for-age Z-score observed among HIV-unexposed children (0.16). IYCF

SHINE participants

The SHINE trial monitored the health of 738 HIV-exposed babies, of whom 22 were HIV-positive, 594 HIV-exposed uninfected, and 52 with unknown HIV status. Among households taking part in the trial:

- More than half of household members practiced open defecation
- Around one third of households had an improved latrine
- Very few had electricity from the grid
- Almost two thirds had a solar panel
- 40% of households obtained drinking water from an unimproved source
- The average return trip to water was 20 minutes
- Volume of water collected was 9.5 L per capita per day
- Mothers were well-educated
- Most mothers were married
- Around 10% of mothers were infected with *Schistosoma haematobium*
- Mean infant birth weight was 2.99kg (11% <2.5kg)
- Over 80% of infants were delivered in health facilities





significantly increased mean weight-for-age Z-scores, weight-for-height Z-scores, and head circumference Z-scores. It also halved anaemia.

These findings are consistent with the SHINE findings for HIV-unexposed children.

WASH to reduce stunting among HIV-exposed uninfected children

Despite good uptake of the WASH intervention, it had no effect on stunting or other growth outcomes. There was also no evidence of reduced anaemia or respiratory tract infections in the WASH arms, no consistent reduction in diarrhoea, and no significant difference in mortality.

These findings are consistent with the SHINE findings for HIV-unexposed children, and the results of the WASH Benefits Bangladesh and WASH Benefits Kenya trials. For further discussion of why the WASH intervention failed to improve outcomes, see the companion briefing paper ***'Water, sanitation and hygiene to prevent child stunting and anaemia'***.

Implications for policy and practice

These findings suggest that an IYCF intervention, including behaviour change modules and provision of nutrient supplements, can help reduce stunting and anaemia, including in areas of high antenatal HIV prevalence.

Even with the IYCF intervention, 40% of HIV-exposed uninfected children were stunted at 18 months. This suggests that IYCF programmes alone will not eliminate stunting, and that research is needed to better understand all the causes of stunting, particularly among children born to HIV-positive mothers, and test interventions to tackle these causes.

The lack of benefit from the household-level WASH intervention suggests that integrating this sort of intervention with IYCF programmes is not likely to be beneficial over and above IYCF alone.

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

HIV-exposed children respond particularly well to IYCF interventions

IYCF programmes are unlikely to eliminate stunting

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

Effectively protecting infants and young children from exposure to faecal pathogens is essential for their health and growth. The findings of the SHINE and Wash Benefits trials suggest we need more and better WASH interventions than were implemented in these trials to achieve optimal child growth and health. Investment in WASH is important.

Recommendations

- IYCF programmes combining complementary feeding education and provision of a lipid-based nutrient supplement should be considered in settings with high prevalence of child stunting, particularly where there is also a high prevalence of HIV among pregnant women.
- Despite the IYCF intervention reducing stunting, 40% of HIV-exposed uninfected children were still stunted.
- PMTCT programmes should incorporate interventions that help HIV-exposed children survive and thrive.
- Research is needed to better understand the drivers of stunting among HIV-exposed uninfected children, and test interventions to tackle these causes
- Research is also needed to develop and test WASH interventions that can effectively protect infants and young children from exposure to faecal pathogens.

Further reading

Prendergast AJ, Chasekwa B, Evans C et al. **A cluster randomised trial of improved complementary feeding and improved water, sanitation and hygiene for stunting and anaemia among HIV-exposed children in rural Zimbabwe.** The Lancet Child and Adolescent Health. 2018.

South A, Humphrey JH, Prendergast AJ. **Infant and young child feeding to prevent stunting and anaemia.** SHINE briefing paper number 1. 2018.

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