

The WASH benefits and SHINE trials: interpretation of WASH intervention effects on linear growth and diarrhoea Research snapshot¹

Globally, stunting is the most prevalent form of child undernutrition and is only modestly responsive to dietary interventions. Numerous observational studies have shown that water quality, sanitation, and handwashing (WASH) in a household are strongly associated with linear growth of children living in the same household, which may be partially mediated through diarrhoea, but primarily through environmental enteric dysfunction. Three randomised efficacy trials (SHINE) were undertaken to test improved household-level WASH with and without improved infant and young child feeding (IYCF) on child stunting and diarrhoea in Bangladesh, Kenya, and Zimbabwe. SHINE was a two-by-two factorial trial with four groups: IYCF (counselling on complementary feeding and provision of small-quantity, lipid-paste-nutrient supplement); WASH (combined sanitation, water chlorination and handwashing with soap); IYCF combined with WASH; and standard care. In all trials, the IYCF intervention modestly but significantly increased mean length-for-age (LAZ) by 0.13-0.25 (about one eighth of the deficit of the average child aged 18-24 months). A significant relative reduction in diarrhoea of 31-40% was observed in the water-chlorination intervention under WASH Bangladesh only. In all three trials, the WASH interventions had no effect on linear growth, and providing WASH concurrently with IYCF had no additional benefit on linear growth compared with providing IYCF alone.

These findings are inconsistent with existing and often-cited observational evidence. Further analysis suggests baseline sanitation was a strong risk for stunting. However, the relationship between household WASH indicators and child linear growth may be confounded. The effect on diarrhoea in Bangladesh is likely due to the

regular visits to participating household (six times per month), compared to monthly in Kenya and Zimbabwe. Such intense contact is not possible at scale. The authors conclude that these trials were not effective enough in reducing the faecal-oral transmission of pathogens to result in linear growth and optimal health, with children having high rates of enteric infection. Future research should explore interventions that are radically more effective in reducing faecal contamination in the domestic environment ('transformative WASH') and, irrespective of intervention, strengthened support is required for governance systems of financing, operations, monitoring, evaluation, and regulation.

¹ Pickering, A.J., Null, C., Winch, P.J., Mangwadu, G., Arnold, B.F., Prendergast, A.J. et al (2019) The WASH benefits and SHINE trials: interpretation of WASH intervention effects on linear growth and diarrhoea. *Lancet Glob Health* 2019; 7: e1139-46

Soya, maize and sorghum-based ready-to-use therapeutic food with amino acid for treatment of severe acute malnutrition Research snapshot¹

Development of more cost-effective ready-to-use therapeutic food (RUTF) for the treatment of severe acute malnutrition (SAM) is a global public-health priority. To date, previous lower-cost recipes have been less effective than the standard peanut and milk (PM)-based RUTF, particularly in children aged less than 24 months. This study aimed to compare the efficacy of the PM-RUTF to a milk-free soya, maize, and sorghum (FSMS) RUTF enriched with crystalline amino acids without cow milk powder, and a milk, soya, maize and sorghum (MSMS) RUTF containing 9.3% skim cow milk powder, both of which provide a substantially lower cost alternative. A non-blinded, three-arm, parallel

group, simple randomised controlled trial was undertaken in 21 clusters of three health districts in central Malawi. Between September 2015 and June 2016, a total of 22,790 children were screened. Of these, 2,277 were diagnosed with SAM and 1,347 randomly assigned to either the FSMS-RUTF (n=454), the MSM-RUTF (n=435), or the PM-RUTF (n=458) study groups. Another 48 children were excluded from the study after randomisation (because consent was withdrawn or medical complications became apparent), after which 1,299 were finally included (795 aged 6-23 months and 504 aged 24-59 months). Those children with SAM who did not meet study criteria² received routine treatment from pre-existing outpatient therapeutic services.

In intention-to-treat analyses, FSMS-RUTF showed noninferiority for recovery rates in children aged 24-59 months (Δ : 21.9%; 95% CI: 29.5%, 5.6%) and 6-23 months (Δ : 20.2%; 95% CI: 27.5%, 7.1%) compared with PM-RUTE. MSMS-RUTF also showed noninferiority for recovery rates in children aged 24-59 months (Δ : 0.0%; 95% CI: 27.3%, 7.4%) and 6-23 months (Δ : 0.6%; 95% CI: 24.3%, 5.5%). Noninferiority in recovery rates was also observed in per-protocol analyses. For length of stay in the programme (time to cure), both FSMS-RUTF in children aged 24-59 months (Δ : 2.8 d; 95% CI: 20.8, 6.5 d) and 6-23 months (Δ : 3.4 d; 95% CI: 21.2, 8.0 d) and MSMS-RUTF in children aged 24-59 months (Δ : 0.2 d; 95% CI: 23.1, 3.6 d) and 6-23 months (Δ : 1.2 d; 95% CI: 23.4, 5.8 d) were not inferior to PM-RUTE. FSMS-RUTF was also significantly better than PM-RUTF at increasing haemoglobin and body iron stores in anaemic children, with mean haemoglobin increases of 2.1 (95% CI: 1.6, 2.6) and 1.3 (95% CI: 0.9, 1.8) and mean body iron store increases of 2.0 (95% CI: 0.8, 3.3) and 0.1 (95% CI: 21.1, 1.3) for FSMS-RUTF and PM-RUTF, respectively. The authors conclude that FSMS-RUTF without milk is efficacious in the treatment of SAM in children aged 6-23 and 24-59 months and is better at correcting iron deficiency anaemia than PM-RUTE.

¹ Bahwere, P., Akomo, P., Mwale, M., Murakami, H., Banda, C., Kathumba, S., Banda, Chimwemwe., Jere, S., Sadler, K. and Collins, S. (2017). Soya, maize, and sorghum-based ready-to-use therapeutic food with amino acid is as efficacious as the standard milk and peanut paste-based formulation for the treatment of severe acute malnutrition in children: a non-inferiority individually randomized controlled efficacy clinical trial in Malawi. *Am J Clin Nutr* 2017;106:1100-12.
² Based on home distance, age >59 months, mother pregnant, weight-for-height <3 but MUAC \geq 115mm and others.



Mother and child in Bangwe Health Centre, Blantyre, Malawi, 2012

WFP/David Orr