The WASH Benefits Bangladesh, WASH Benefits Kenya, and SHINE Trials: A Summary of Their Findings

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The WASH Benefits Bangladesh [1], WASH Benefits Kenya [2], and Sanitation, Hygiene, Infant Nutrition Efficacy (SHINE) [3] – Zimbabwe trials were cluster-randomized trials to test the independent and combined effects of improved water and sanitation/hygiene (WASH) and improved infant and young child feeding (IYCF) on child linear growth and hemoglobin concentration. The trials were designed as “proof of concept” studies [4, 5]: the goal was to implement our best effort to minimize fecal ingestion in the WASH arms and optimize infant diet in the IYCF arms. The WASH Benefits trials had 7 arms (water chlorination, sanitation [provision of an improved latrine], handwashing with soap [provision of two handwashing stations and soap], these 3 interventions together – WASH, IYCF (complementary feeding counseling and provision of 20 g small-quantity lipid-paste nutrient supplement [LNS]), WASH + IYCF, and a double-sized control arm which was passive in Bangladesh and active in Kenya. SHINE was a $2 \times 2$ factorial trial with 4 groups: WASH, IYCF, WASH + IYCF, and Standard of Care (SOC). Together the trials enrolled more than 19,000 pregnant women and measured their infants (15,500) at 18 months (SHINE) or 24 months (WASH Benefits) of age. All trials included behavior change communication based on published models of behavior change theory. Interventions were delivered by trained teams who lived in and were respected by the study communities. Interventions were delivered with high fidelity of implementation and achieved substantial contrast in WASH facilities and behaviors between WASH arms and non-WASH arms in all trials. Consumption of LNS in the previous 24 hours was >90% among children in the IYCF arms.

Results of these trials showed that in all three trials, the IYCF intervention improved length-for-age Z score (LAZ) by 0.13–0.26. In all three trials, the WASH interventions had no effect on linear growth. In Bangladesh, all the interventions except water chlorination alone reduced
diarrhea by 35–40%, while in the African sites, no intervention reduced diarrhea.

The increase in LAZ achieved by the IYCF intervention in all three trials is consistent with a large literature showing that complementary feeding interventions, on average, increase LAZ by 0.1 – 0.2. The failure of the WASH interventions in all three studies to improve linear growth is probably because the interventions implemented in these trials did not reduce exposure to environmental pathogens sufficiently to reduce linear growth faltering.

The reason why the WASH interventions reduced diarrhea in Bangladesh but not Kenya or Zimbabwe may be due to differences in the failure of the WASH interventions to reduce diarrhea in the African sites may be due to differences in the intensity of behavior change promotion: in Bangladesh, promoters visited participants 6 times per month (while households in the passive control group were visited only for outcome measurement), while in the African sites, promoters visit all participants monthly. It may be that very frequent behavior change promotion is required to achieve a high enough adherence to WASH behaviors to reduce diarrhea.

In summary, new innovative WASH interventions that are less reliant on behavior change and much more effective in reducing fecal exposure may be required to optimize child health and growth.

Reference