Abstract Number 42

IMPACT OF IMPROVED NUTRITION/SANITATION ON NEURODEVELOPMENT OF HIV-EXPOSED CHILDREN

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Background:

HIV-exposed children may be at risk of impaired early child development (ECD), but preventive interventions are currently limited.

Methods:

We conducted a 2x2 factorial cluster-randomized trial of improved infant and young child feeding (IYCF) and improved water, sanitation and hygiene (WASH) in rural Zimbabwe (ClinicalTrials.gov NCT01824940). Pregnant women were eligible if they lived in study clusters randomized to standard-of-care (SOC; 52 clusters); IYCF (20g Nutributter®/day for infants from 6-18mo, complementary feeding counseling; 53 clusters); WASH (pit latrine, 2 hand-washing stations, liquid soap, chlorine, play space, hygiene counseling; 53 clusters);or (IYCF+WASH;53 clusters). A sub-study evaluated ECD outcomes at 2 years of age among HIV-exposed children using the Malawi Developmental Assessment Tool (MDAT; assessing motor, cognitive, language and social development); MacArthur-Bates Communication Development Inventory (CDI) (assessing vocabulary and grammar); A-not-B test (assessing object permanence); and a self-control task. Masking of participants/fieldworkers was not possible. Analysis was by intention-to-treat using unadjusted and adjusted generalized estimating equations.

Results:

726 HIV-positive pregnant women were recruited. Mean (SD) CD4 count was 473 (221) cells/μL. Among 738 HIV-exposed live births (additional 12 from twin pregnancies), 323 children from 142 clusters had ECD assessments (68 from 31 SOC clusters; 68 from 40 IYCF clusters; 83 _from 33 WASH clusters; 104 from 38 IYCF+WASH clusters). 300 children were HIV-exposed uninfected, 6 were HIV-positive and 17 had an unknown HIV status. Compared to SOC, children randomized to combined ICYF+WASH had higher MDAT scores (+4.6; 95%CI 1.9, 7.2), but there was no evidence of impact of IYCF or WASH alone (Table). The increase was accompanied by higher gross motor (+1.5; 95%CI 0.5, 2.5), fine motor (+0.7; 0.0, 1.5), language (+1.5; 95%CI 0.2, 2.8) and social components (+1.0; 95%CI 0.5, 1.5). Children randomized to combined IYCF+WASH also had higher MacArthur-Bates CDI vocabulary scores (+8.5 words; 95%CI 3.7, 13.3), but we found no evidence of an impact of IYCF or WASH alone. There was no evidence of an impact of either intervention on object permanence or self-control.

Conclusion:

Combining IYCF and WASH interventions significantly improved motor and cognitive development in HIV-exposed children at 2 years of age.