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Benjamin McCormick

Laura Caulfield

Stephanie Richard

Laura Pendergast

Laura Murray-Kolb

See next page for additional authors

Authors

Benjamin McCormick, Laura Caulfield, Stephanie Richard, Laura Pendergast, Laura Murray-Kolb, and Mal-Ed Network Investigators

Nurturing Environments and Nutrient-Rich Diets May Improve Cognitive Development: Analysis of Cognitive Trajectories from Six to Sixty Months from the MAL-ED Study (OR10-01-19)

Benjamin McCormick,[1] Laura Caulfield,[2] Stephanie Richard,[1] Laura Pendergast,[3] Laura Murray-Kolb,[4] and Mal-Ed Network Investigators[5]

[1]NIH Fogarty International Center; [2]Johns Hopkins University; [3]Temple University; [4]The Pennsylvania State University; and [5]FNIH

Objectives: To identify clusters of cognitive developmental trajectories and associated differentiating factors of children aged 6 to 60 months old in 5 low to middle-income sites.

Methods: We followed 835 children and assessed anthropometry at enrolment ($\leq$ 17 d old); bi-weekly illness data (0–24 and 60 mo); non-diarrheal and diarrheal stools (0–24 mo) analyzed for a panel of enteropathogens; quantitative complementary food intakes (9–24 and 60 mo); micronutrient status (Fe, Zn, Vit A; 7, 15, and 24 mo); quality of the child's home environment (6, 24, and 60 mo) and maternal reasoning ability and depressive symptoms via questionnaire. Child cognitive development was assessed by the Bayley Scales of Infant Development III (6, 15 and 24 mo) and Wechsler Preschool and Primary Scale of Intelligence (60 mo). Clusters of trajectories were identified using a latent class mixed model. Differences between clusters were described using discriminant analysis to rank the contribution of each variable using correlation-adjusted t-scores (CAT).

Results: Five clusters were identified. From 51 discriminatory factors, 10 had greatest descriptive power: HOME score at 60 mo (mean CAT[2] $\pm$ SD: 34.6 $\pm$ 0.35), proportion of days ill from 0–24 mo (23.9 $\pm$ 0.18), years of maternal schooling (13.8 $\pm$ 0.23), mean nutrient densities of zinc (12.3 $\pm$ 0.07), protein (8.95 $\pm$ 0.09), vitamin B6 (8.2 $\pm$ 0.10), phytate (7.91 $\pm$ 0.05) and mean energy (7.82 $\pm$ 0.04) from complementary foods (9–24 mo), % days of exclusive breastfeeding (0–6 mo; 6.42 $\pm$ 0.10) and weight-for-age at enrolment (6.14 $\pm$ 0.17). The discriminant analysis model fit was statistically significant (Wilk's λ 0.54, $P < 0.01$).

Conclusions: Early life factors associated with higher scoring trajectories included stimulation and support for the child in their home, complementary feeding that typified greater diversity and animal-source foods, and maternal years of schooling. Influences associated with lower scoring trajectories included lower weight at enrolment and higher prevalence of illness. Policies promoting maternal and child nutrition, education and fostering a nurturing environment are likely to have greatest impact on child development.

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