

**Meat supplementation improves growth, cognitive, and behavioral outcomes in Kenyan children. J Nutr . 2007 Apr; 137 ( 4 ): 1119-23 . PMID: 17374691 [PubMed - indexed for MEDLINE] Neumann CG, Murphy SP, Gewa C, Grillenberger M, Bwibo NO.**

Citation:

O PROFBWIBONIMROD. "Meat supplementation improves growth, cognitive, and behavioral outcomes in Kenyan children. J Nutr . 2007 Apr; 137 ( 4 ): 1119-23 . PMID: 17374691 [PubMed - indexed for MEDLINE] Neumann CG, Murphy SP, Gewa C, Grillenberger M, Bwibo NO." . In: J Nutr . 2007 Apr; 137 ( 4 ): 1119-23 . Anim. Hlth. Prod. Afr. 2008; 2007.

Abstract:

Department of Community Health Sciences, School of Public Health, University of California, Los Angeles, CA 90095, USA. [cneumann@mednet.ucla.edu](mailto:cneumann@mednet.ucla.edu)

A randomized, controlled school feeding study was conducted in rural Embu District, Kenya to test for a causal link between animal-source food intake and changes in micronutrient nutrition and growth, cognitive, and behavioral outcomes. Twelve primary schools were randomly assigned to 1 of 4 groups. Children in Standard I classes received the local plant-based dish githeri as a midmorning school snack supplemented with meat, milk, or fat added to equalize energy content in all feedings. The Control children received no feedings but participated in data collection. Main outcome measures assessed at baseline and longitudinally were 24-h food intake recall, anthropometry, cognitive function, physical activity, and behaviors during school free play. For cognitive function, the Meat group showed the steepest rate of increase on Raven's Progressive Matrices scores and in zone-wide school end-term total and arithmetic test scores. The Plain githeri and Meat groups performed better over time than the Milk and Control groups ( $P < 0.02-0.03$ ) on arithmetic tests. The Meat group showed the greatest increase in percentage time in high levels of physical activity and in initiative and leadership behaviors compared with all other groups. For growth, in the Milk group only younger and stunted children showed a greater rate of gain in height. The Meat group showed near doubling of upper midarm muscle area, and the Milk group a smaller degree of increase. This is the first randomized, controlled feeding study to examine the effect of meat- vs. milk- vs. plant-based snacks on functional outcomes in children.