**Child Nutrition Research and Literature**

*General Summary*

The articles in this review address the status of child nutrition in the context of western Kenya, as well as provide examples of past interventions to address child under-nutrition and its effects on general health. A major obstacle to good nutrition practices is lack of knowledge regarding best practices for breastfeeding and weaning. The transition is often poorly timed and executed, leading to various manifestations of malnourishment (height and weight stunting, kwashiokor, marasmus, wasting). A point emphasized to address these issues was education of caregivers regarding appropriate breastfeeding and weaning practices, as well as training for diversifying diets focused on behavioral changes.

Several studies also address the relationship of under-nutrition and susceptibility to other diseases. Causality is often inconclusive, but correlations exist between under-nutrition and malaria mortality, as well as death from common childhood illnesses.

*Articles*

* **Waswa et al.** Community-based educational intervention improved the diversity of complementary diets in western Kenya: results from a randomized controlled trial. **2015.**
  + A cross-sectional study of a health education intervention that utilized CHWs to provide nutrition education and collect information for caregivers and their children.
  + The intervention included four sessions involving educational trainings and cooking demonstrations.
  + The most significant results were yielded in terms of increased nutritional knowledge of caregivers, but this did not significantly correlate with greater nutritional diversity of children of these caregivers.
  + Salient quotations regarding causes:
    - "There was a significant increase in the proportion of children consuming vitamin A-rich vegetables and fruits, dark green leafy vegetables, legumes and nuts, and other fruits and vegetables in the intervention compared with the control group at endline." (pg. 3416)
    - "However, the increase in nutrition knowledge did not have a significant effect on the children’s dietary diversity in the present study. This finding demonstrates that the effect of the intervention on child dietary diversity was not via an increase in nutrition knowledge of the caregivers, and that while increased nutrition knowledge is an important factor, on its own it cannot lead to changes in behaviours. Accordingly nutrition education approaches are most effective when they focus on behaviour change and not merely on information transfer." (pg. 3417)
* **Bloss et al.** Prevalence and Predictors of Underweight, Stunting, and Wasting among Children Aged 5 and Under in Western Kenya. **2004.**
  + A cross-sectional study performed in three villages in the Siaya district to assess the health and nutritional status of under-five children. The authors used three indicators of under-nutrition and found the following statistics for prevalence of the indicators among the study participants:
    - Underweight– 30%
    - Stunting– 47%
    - Wasting– 7%
  + These statistics were noted to manifest more acutely by the second year of life, believed to be because this is the time children are being weaned from breastfeeding, or children are not being adequately breastfed. The authors recommended targeting mothers and educating them about healthy weaning practices.
  + Other causes and correlations of under-nutrition:
    - The population of children who were adopted was found to have higher rates of under-nutrition as opposed to those raised directly by a parent.
    - A recent spike in illness in the study area likely influenced the significant results of under-nutrition in the population.
  + Salient quotations regarding causes:
    - "Children in their second year of life were found to be most at risk of underweight and stunting, with more than half of the children aged 12–23 months below the –2 median z-scores, when compared with the WHO/NCHS reference data." (pg. 267)
    - "A targeted community-based nutritional intervention may be the least costly, most practical and effective alternative in improving the nutritional status of the children in the study community and others like it." (pg. 268)
    - "Based on the results from this survey, adopted children and children in their second year of life are at increased risk of undernutrition and should be targeted early to prevent malnourishment. There is also a great need for nutritional education to target mothers’ breastfeeding and weaning practices, improved sanitation to help reduce exposure to pathogens, and complete and current immunizations." (pg. 269)
* **Hamel et al.** A Reversal in Reductions of Child Mortality in Western Kenya, 2003–2009. **2011.**
  + A longitudinal statistical study analyzing the effects of numerous large-scale interventions addressing under-five child mortality from 2003 to 2009 using data from KEMRI and the CDC.
  + The article aimed at identifying causes of increased mortality over the time in question and identified malnutrition as a leading cause.
  + While malaria and anemia accounted for the greatest increases in child mortality, it is noted also that malnutrition can weaken the body's immune system. This in turn can lead to contraction of and mortality due to other diseases (such as malaria and anemia).
  + Salient quotations regarding causes:
    - "The increase in malnutrition deaths in the context of improving [socioeconomic status] may be an indication of continued perinatal HIV transmission with nutritional decline or wasting among HIV infected children." (pg. 603)
    - "To our knowledge, the simultaneous increase in pneumonia, diarrhea, and malnutrition mortality with increased malaria mortality has not been reported. It is possible that the increase in these other non–malaria-specific causes of mortality **reflect a widespread change in vulnerability or access to health care of the population**. Increasing malnutrition likely contributed to deaths from these common causes of childhood death." (pg. 603)
    - "Malnutrition can contribute to mortality directly or indirectly, increasing the risk of death from common childhood illnesses." (pg. 604)
* **Friedman et al.** Malaria and Nutritional Status among Pre-School Children: Results from Cross-Sectional Surveys in Western Kenya. **2005.**
  + A cross-sectional study attempting to define causality between malaria incidence and malnutrition. The authors evaluated if malnutrition led to increased or decreased morbidity and found strong correlation (not causation) that linked malnutrition to higher morbidity rates due to malaria.
    - One hypothesis in question was if malnutrition could lead to decreased susceptibility to malaria.
  + Correlations were made based on study of the following variables: use of insecticide-treated bed nets in homes, socioeconomic status of families, recent history of illness, current malaria infection status, and hemoglobin.
  + This study posits the idea that morbidity is more likely among children who have contracted the malaria parasite. This implies that malnutrition lowers the ability of the immune system to respond, especially among children.
  + Salient quotations regarding causes:
    - "In this study, malaria outcomes were consistently related to low height-for-age Z-scores, an indicator of achieved height and long-term nutritional status." (pg. 702)
    - "The study design limits the interpretation of cause and effect; however, regardless of causality, these findings support previous observations that stunted children are more likely to have malaria infection and illness than non-stunted children and do not support the hypothesis that malnourished children are partially protected from malaria and malaria morbidity." (pg. 703)