



Fortified Peanut Butter Supplements and the Treatment of Malnutrition Medical Background Paper

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Malnutrition in Sub-Saharan Africa

Malnutrition in sub-Saharan Africa is a significant problem. An estimated 28% of children under the age of five years are moderately or severely underweight and 38% of children under the age of five years have significantly stunted growth.¹ Malnutrition during childhood negatively impacts physical and cognitive development in addition to increasing risk of mortality from life-threatening infections. Mortality rates of malnourished children are five to twenty times higher than those of well-nourished children.² HIV/AIDS is a concurrent challenge to eliminating malnutrition in sub-Saharan Africa where an estimated 2 million children are HIV infected. Malnutrition becomes more problematic in the presence of HIV/AIDS. Proper nutrition is essential to the growth and development of all children and is particularly necessary for HIV-infected children. Malnutrition complicates HIV treatment because antiretroviral drugs (ARVs) do not reach maximum efficacy in the absence of proper nutrition. HIV infection interferes with the absorption of essential nutrients, thereby exacerbating malnutrition. It is difficult to move forward with ARV treatment of critically ill and malnourished children without also addressing malnutrition.³ Even adequate nutrition without ARVs is efficacious in slowing the progression to AIDS.⁴

¹ Table 2. Nutrition. State of the World's Children 2008: Child Survival. UNICEF.

² World Health Organization, Community-based Management of Severe Acute Malnutrition.2007. Accessed 3 Aug. 2008. www.who.int/nutrition/topics/Statement_community_based_man_sev_acute_mal_eng.pdf

³ Nachman SA, Lindsey JC, Moye J, Stanley KE, Johnson GM, Krogstad PA, Wiznia AA. Growth of Human Immunodeficiency Virus-Infected Children Receiving Highly Active Antiretroviral Therapy. *Pediatric Infectious Disease Journal*. 2005; 352-357.

⁴ Ndekha MJ, et al. Home-based therapy with ready-to-use therapeutic food is of benefit to malnourished, HIV-infected

Nutrition and HIV Treatment

Antiretroviral drugs are difficult to tolerate and nearly impossible to take without food. Though ARVs control the multiplication of the virus, they have a limited impact on growth and development in the absence of adequate nutrition^{5,6,7}. Further, even without ARV treatment, proper nutrition has been shown to reduce mortality in HIV-infected children by as much as 59%. Properly nourished HIV-infected children are more capable in fighting off opportunistic infections. Collins et al. (2006) reported in *Lancet* that a synergy exists between pediatric ARV treatment programs and nutrition programs.⁸ The authors conclude that the two programs, coupled with home-based care, are the ideal treatment approaches for malnourished HIV-infected children.

The infants of an HIV-infected mother, whether they become HIV-infected or not, have a noticeable growth deceleration by three months of age.^{9,10,11} Clinical trials document improved growth in children receiving ARVs, but even with this growth, the average child is significantly below WHO recommended growth standards.^{12,13,14} As growth rates of children are highest in children under three years of age, this is a crucial period for nutrition intervention to allow child to catch-up in his or her growth, which was slowed due to HIV-infection and poor nutrition.¹⁵

Malawian children. *Acta Paediatr.* 2005 Feb;94(2):222-5.

⁵ Arpadi SM et al. Growth velocity, fat-free mass and energy intake are inversely related to viral load in HIV-infected children. *Journal of Nutrition*, 2000, 130:2498-2502.

⁶ Nachman S et al. Growth in human immunodeficiency virus type-1 infected children receiving ritonavir-containing antiretroviral therapy. *Archives of Pediatric and Adolescent Medicine*, 2002, 156:497-503.

⁷ Verweel G et al. Treatment with highly active antiretroviral therapy in human immunodeficiency virus type 1-infected children is associated with a sustained effect on growth. *Pediatrics*, 2002, 109 (2):e25.

⁸ Collins S, Binns P, Bahwere P, Sadler K, Halla A. Management of severe acute malnutrition in children. *Lancet* 2006; 368.

⁹ Ryder RW. Perinatal transmission of the human immunodeficiency virus type 1 to infants of women in Zaire. *New England Journal of Medicine*. 1998;320:1637-1642.

¹⁰ Temmerman M. Maternal human immunodeficiency virus-1 infection and pregnancy outcome. *Obstetrics and Gynecology*. 1994(83): 495-501.

¹¹ Butlerys M. Maternal human immunodeficiency virus infection and intrauterine growth: a prospective cohort study in Butare, Rwanda. *Pediatric Infectious Disease Journal*. 1994;13:94-100.

¹² Hendricks MK, Bourne LT. Nutrition and HIV/AIDS in infants and children in South Africa: implications for food-based dietary guidelines. *Maternal Child Nutr.* 2007;3(4): 322-333.

¹³ Steiner F. Growth in human immunodeficiency virus type 1-infected children treated with protease inhibitors. *European Journal of Pediatrics*. 2001; 160: 611-616.

¹⁴ Lepage P. Growth of human immunodeficiency virus type-1 infected and uninfected children: a prospective cohort study in Kigali, Rwanda. 1988-1993. *Pediatric Infectious Disease Journal*. 1996; 15:479-485.

¹⁵ Saavedra JM, et al. Longitudinal assessment of growth in children born to mothers with human immunodeficiency virus infection. *Arch Pediatr Adolesc Med*. 1995;149:497-502.

Ready-To-Use Therapeutic Food and Treatment of Malnutrition

A fortified peanut butter supplement (FPBS) is advantageous for addressing acute and chronic malnutrition for many reasons. First, the FPBS supplement requires no cooking and therefore no additional fuel cost. Second, the product is packaged in individual serving containers, which decrease the risk of food-sharing within the family. Third, FPBS is an oil-based product with low water activity levels that limit microbial and bacterial contamination. Lastly, the nutrient content of FPBS is of higher quality than cereal based products. It contains all essential vitamins and minerals, optimal protein levels for re-feeding a severely malnourished child, and a fat-based concentrated energy source. FPBS reduces hospital admittance for acute malnutrition and allows home-based care.¹⁶ Therefore, FPBS is a superior treatment for severely malnourished children.

¹⁶ Manary MJ, et al. Home based therapy for severe malnutrition with ready-to-use food. *Arch Dis Child*. 2004;89:557-561