

NUTRITION AND HIV/AIDS: Evidence, Gaps, and Priority Actions

In Africa, where more than 25 million people are living with HIV/AIDS, malnutrition and food insecurity are endemic. Today, nearly 40% of African children < 5 years old are stunted due to chronic nutritional deprivation.¹ Underweight, an indicator of chronic and acute malnutrition, was the leading cause of mortality worldwide, responsible for 3.7 million deaths in 2000.² Nearly half of these deaths (48.6%) occurred in sub-Saharan Africa.

The effects of malnutrition on the immune system are well known and include decreases in CD4 T-cells, suppression of delayed hypersensitivity, and abnormal B-cell responses.³⁻⁴ The immune suppression caused by protein-energy malnutrition is similar in many ways to the effects of HIV infection.⁵ This document summarizes the evidence, gaps, and priority actions related to nutrition and HIV/AIDS.

Nutrition and HIV/AIDS: The Evidence and Gaps

HIV infection increases energy requirements. HIV infection affects nutrition through increases in resting energy expenditure, reductions in food intake, nutrient malabsorption and loss, and complex metabolic alterations that culminate in weight loss and wasting common in AIDS.⁶⁻⁷ The effect of HIV on nutrition begins early in the course of the disease, even before an individual may be aware that he or she is infected with the virus.⁸⁻¹⁰ Asymptomatic HIV-positive individuals require 10% more energy, and symptomatic HIV-positive individuals require 20%-30% more energy than HIV-negative individuals of the same age, sex, and physical activity level.¹¹

The impact of pre-existing malnutrition on HIV susceptibility and disease progression is difficult to study, and knowledge in this area is still limited. A systematic review of the literature is now underway by the World Health Organization (WHO).¹¹ Early studies demonstrated that weight loss and wasting were associated with increased risk of opportunistic infections¹² and shorter survival time in HIV-positive adults, independent of their immune status.¹³⁻¹⁴ Other studies showed that clinical outcome was poorer and risk of death was higher in HIV-positive adults with compromised micronutrient intake or status.¹⁵⁻²⁰

Micronutrient deficiencies may contribute to disease progression. Deficiencies of vitamins and minerals, such as vitamins A, B-complex, C, and E and selenium and zinc, which are needed by the immune system to fight infection, are common in people living with HIV.^{9, 21} Deficiencies of anti-oxidant vitamins and minerals contribute to oxidative stress, a condition that may accelerate immune cell death²²⁻²³ and increase the rate of HIV replication.²⁴⁻²⁶

Daily micronutrient (antioxidant) supplementation improved body weight and body cell mass²⁷; reduced HIV RNA levels²⁸; improved CD4 cell counts²⁸; and reduced the incidence of opportunistic infections²⁹ in small studies of adults with AIDS, including those on antiretroviral therapy. Larger clinical trials demonstrated that daily micronutrient supplementation increased survival in adults with low CD4 cell counts³⁰; prevented adverse birth outcomes when given during pregnancy³¹; and reduced mother-to-child HIV transmission in nutritionally vulnerable women with more advanced HIV disease.³² The optimal formulation of a daily multiple micronutrient supplement for HIV-positive individuals requires further study.¹¹

Antiretroviral therapy improves nutritional status, but ARVs may also have side effects and metabolic complications. Highly active antiretroviral therapy (HAART) improves nutritional status, independent of its effects on viral suppression and immune status,³³ although wasting still develops in some patients.³⁴ ARV side effects such as nausea and vomiting may affect adherence to therapy, particularly in the first months of treatment.³⁵ Additional metabolic complications such as derangements in glucose and lipid metabolism, bone metabolism, and lactic acidemia have been associated with the use of certain ARV drugs.³⁶ Research on the metabolic consequences of ARV therapy and appropriate strategies for their management is a growing field in industrialized countries. Further research is needed in resource-limited settings, where management options and follow-up monitoring may be more limited.

HIV exposure and infection exacerbates problems of child malnutrition. Children living with HIV or born into families affected by HIV are a high-risk group with special needs. HIV-positive women have a higher incidence of preterm and low birth weight deliveries, and, as a result, HIV-exposed infants may start life with impaired nutrition.³⁷⁻³⁸ HIV-positive infants experience slower growth and are at greater risk of severe malnutrition.³⁹⁻⁴⁰ Studies show that severe malnutrition in HIV-positive children can be reversed with hospital and home-based therapeutic feeding, though the time to recovery is longer than with uninfected children.⁴¹ Studies also indicate that periodic vitamin A supplementation reduces morbidity and mortality in HIV-positive children and improves their growth.⁴²⁻⁴⁴

Optimal infant and young child feeding practices are crucial in the context of HIV/AIDS. Breastfeeding practices may also affect the health of HIV-exposed children. The risk of HIV transmission through breastfeeding is directly related to the health, viral load, and immune status of their mothers. Infection occurs at an average rate of about 8.9 HIV transmissions per 100 child-years of breastfeeding.⁴⁵ HIV-positive mothers are recommended to avoid breastfeeding if replacement feeding is feasible, affordable, and safe.⁴⁶ In many resource-limited settings, this cannot be assured, and many HIV-positive women initiate breastfeeding.⁴⁷⁻⁴⁸ For these women, exclusive breastfeeding and early breastfeeding cessation are recommended.⁴⁶ Infants who are not breastfed or who stop breastfeeding early and do not have access to safe and nutritious replacement foods are at increased risk of malnutrition, diarrhea and other illnesses, and death.⁴⁹

Livelihoods, Food Security, and HIV/AIDS: Complex Interactions

Food security is the state in which all people have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life at all times.⁵⁰ Achieving this state is contingent on food being available, accessible, and utilized by the body. The relationship between HIV/AIDS, livelihoods, and food and nutrition security is complex and multidimensional.

Food insecurity and poverty may lead to high-risk sexual behaviors and migration, increasing the risk of acquiring HIV infection.⁵¹⁻⁵² HIV/AIDS, in turn, significantly undermines a household's ability to provide for basic needs. Livelihoods are diminished when HIV-infected adults cannot work and food production and/or earnings decrease. Healthy family members, particularly women, are often forced to stop work to care for sick family members, further reducing income for food and other basic needs. Household labor constraints can cause reductions in cultivated area, shifts to less labor- or cash-intensive crops, and depletion of livestock.⁵³

Food-insecure households frequently struggle to meet ordinary household needs without the added stress of HIV. Their capacity to absorb the costs associated with HIV-related illnesses, to provide enhanced nutritional support, and to participate in community programs is severely restricted, and many find themselves in a rapid downward economic spiral.⁵⁴ The spiral is made worse when disabled parents are unable to pass on practical crop and livestock knowledge,^{51, 55} and when children are withdrawn from school because of difficulty paying fees or the need for the young to care for ill family members, jeopardizing their future income-earning potential.

HIV/AIDS is impacting entire communities, with rippling effects, particularly in areas that are highly dependent on labor. For example, in rural Kenya, when HIV affects a relatively wealthy household and spending on health care increases, money to hire laborers declines. Poorer households become increasingly more vulnerable—food insecure, less able to send their children to school, and less able to meet their own health needs—when they can no longer find work because the wealthier families can not afford to hire them.⁵⁶ Entire communities are weakened by HIV, not just individuals, and traditional community safety nets are being stretched to their limit in highly affected areas.

Priority Actions

Nutrition counseling, care, and support are integral to comprehensive HIV care, including care given to HIV-positive individuals and orphans and vulnerable children (OVC). There are several nutrition and food-related interventions to consider. Appropriate actions depend on the local conditions, the HIV-positive individual's lifecycle state (e.g., child, pregnant or lactating, other adult), degree of disease progression (e.g., asymptomatic, symptomatic, AIDS), and whether they have initiated ARV therapy. Integrating nutritional care and support interventions strengthens home-, clinic-, and community-based care, ARV services, OVC activities, and national policies and strategies addressing the pandemic. Nutrition interventions may improve the quality and reach of care and promote successful treatment.

The main nutrition interventions are counseling on specific behaviors, prescribed/targeted nutrition supplements, and linkages with food-based interventions and programs. Three different types of nutrition supplements are considered: food rations to manage mild weight loss and nutrition-related side effects of ARV therapy and to address nutritional needs in food-insecure areas; micronutrient supplements for specific HIV-positive risk groups; and therapeutic foods for rehabilitation of moderate and severe malnutrition in HIV-positive adults and children. Priority actions are:

Nutrition for positive living. This includes nutrition counseling and support to improve food intake and maintain weight during asymptomatic HIV infection and to prevent food and waterborne infections. Food rations may be provided in food-insecure areas and for nutritionally vulnerable pregnant and lactating women. Daily multiple micronutrient supplements may be provided to HIV-positive pregnant women in areas where malnutrition rates are high, although the optimal formulation for such supplements is not yet known.

Nutritional management of HIV-related illnesses. This includes counseling to manage nutrition-related symptoms of common HIV-related illnesses/opportunistic infections (e.g., loss of appetite, oral sores, fat malabsorption). Home-based care programs, community efforts, and clinical services can provide counseling to help HIV-positive individuals and their households optimally use available foods to manage symptoms and maintain food intake. Guidance and materials to support nutritional management of symptoms, developed with USAID assistance, are already available in many countries.

Management of ARV interactions with food and nutrition. This includes providing information and support to help ARV clients manage side effects such as nausea and vomiting and prevent drug-food interactions. Side effects and interactions can negatively affect medication adherence and efficacy. Supporting ARV clients in appropriate dietary responses to manage these conditions helps ensure successful treatment. In addition to nutrition counseling, food rations may be provided in food-insecure areas, particularly in cases where lack of food is interfering with treatment adherence and among those experiencing weight loss that is not reversed after treatment is initiated.

Therapeutic feeding for moderately and severely malnourished HIV-positive children and adults. This includes hospital-based stabilization and home- or community-based care using therapeutic (nutrient-dense) foods, per WHO or local nutrition rehabilitation protocols. The foods and protocols used to treat severe malnutrition in the general population may be used for HIV-positive patients, although some adaptations may be required for adults and those experiencing severe symptoms.

Infant and young child nutrition for HIV-exposed children. This includes counseling on feeding options for HIV-exposed children, including orphans, and support for safer breastfeeding or replacement feeding, per WHO or local protocols. Food rations, therapeutic foods, and micronutrient supplements may also be provided, depending on local circumstances such as food availability, diet quality, and malnutrition rates. Vitamin A supplementation is recommended, per WHO protocols.

Palliative care and community coping mechanisms. This includes nutrition counseling and supplements for HIV-positive and HIV-affected households delivered through home-, clinic-, and community-based care programs and strengthening links to social support organizations, building community food stocks, sharing labor, modifying costly customs (funerals, marriages), and providing food assistance and training to widows, orphans, and vulnerable children. The U.S. Government, through USAID, has Title II programs providing this type of assistance in several countries, including Ethiopia, Haiti, Kenya, Mozambique, Rwanda, Uganda, and Zambia. The USAID-funded C-Safe Program is linking Title II food to HIV home-based care programs in Malawi, Zambia, and Zimbabwe.

Summary of Nutrition Interventions according to HIV Disease Progression

Intervention	HIV+ Asymptomatic	HIV+ Symptomatic	AIDS	Families affected by an HIV-related Death
<i>Counseling/care</i>	Nutrition education and counseling for positive living	Nutrition management of HIV-related opportunistic infections (OI), symptoms, and medications	Nutrition management of ARV therapy (where available) Nutrition management in home-, clinic- and community-based, palliative care	Counseling on special food and nutritional needs of orphans, vulnerable infants, and young children
<i>Prescribed/targeted nutrition supplementation</i>	For high-risk groups only (e.g., pregnant and lactating HIV+ women, HIV-exposed non-breastfed children)	For high-risk groups For persons who are losing weight or do not respond to medications Therapeutic feeding for moderately and severely malnourished HIV+ adults and children	Therapeutic feeding for moderately and severely malnourished HIV+ adults and children	For high-risk groups (e.g., HIV-exposed non-breastfed children < 2 years or HIV-exposed children with growth faltering)
<i>Other food interventions</i>	To prevent nutritional deterioration for HIV-affected families living in highly food-insecure communities	To improve adherence/participation in OI treatment programs	To improve adherence/participation in ARV and OI treatment programs To use in home-, clinic-, and community-based care programs	To protect the health of orphans and vulnerable children and for surviving family members when livelihoods are compromised because of HIV-related sickness or death

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10 Key Messages on Nutrition and HIV/AIDS

- 1. HIV/AIDS and malnutrition are interrelated.**
- 2. HIV affects nutrition through multiple mechanisms. Its impact begins early during asymptomatic infection and continues throughout the lifecycle.**
- 3. HIV exposure and infection exacerbate problems of child malnutrition.**
- 4. Infants who are not breastfed due to maternal choice, illness, or mortality are especially vulnerable to malnutrition.**
- 5. Nutrition interventions have shown a wide range of benefits for HIV-related outcomes.**
- 6. Nutrition counseling may improve adherence to lifesaving ARV drugs and medications for treating HIV-related infections.**
- 7. Goals for nutrition care vary at different stages of HIV from asymptomatic to symptomatic HIV and AIDS and after death for surviving family members.**
- 8. Priority actions include nutrition for positive living, nutrition management of HIV-related illnesses, management of ARV interactions with food and nutrition, therapeutic feeding for moderately and severely malnourished HIV-positive children and adults, nutrition for HIV-exposed infants and young children, and home-, clinic-, and community-based palliative care.**
- 9. Nutrition interventions for people living with HIV/AIDS include food and nutrition assessment, counseling and support, targeted nutrition supplements, and linkages with food security and livelihood programs.**
- 10. Nutrition counseling, care, and support are important components of comprehensive HIV care and should be considered at the outset when planning programs.**



This brief was prepared by Ellen Piwoz of the Support for Analysis and Research in Africa (SARA) project with inputs from Patricia Bonnard, Tony Castleman, Bruce Cogill, Leslie Elder, Sandra Remancus, and Caroline Tanner of the Food and Nutrition Technical Assistance (FANTA) project. Both projects are operated by the Academy for Educational Development (AED) and funded by the U.S. Agency for International Development (USAID). April 2004