

HIV/AIDS and Nutrition: A Review of Current Evidence

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Abstract

Human Immune Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) epidemic is increasingly driven by and contributes to factors that also create malnutrition. Nutrition plays a critical role in comprehensive care, support and treatment of HIV infected people. There are complex interactions between nutrition and HIV/AIDS. HIV progressively weakens the immune system and leads to malnutrition. Malnutrition worsens the effects of HIV and contributes to more rapid progression to AIDS. The association of malnutrition, micronutrient deficiencies, weight loss and muscle wasting with the increased morbidity and mortality is clearly present in patients living with HIV/AIDS. The available evidence shows that nutritional education, counseling and supplementation improve nutritional status among people with HIV/AIDS. Thus to conclude, nutrition should be fully incorporated into care, support and treatment for HIV-infected people and affected families.

Key words: HIV/ AIDS, Malnutrition, Nutrition

Introduction

Globally, 36.7 million people were living with Human immune virus (HIV) at the end of 2016. An estimated 0.8% of adults aged 15–49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions. Sub-Saharan Africa remains the most severely affected (WHO, 2017). Among affected, 17.8 million are women of 15 years and older and 2.1 million are children under 15 years {United Nations Programme on HIV and AIDS (UNAIDS, 2017)}. In Nepal, 39 000 [34 000 - 46 000] people are currently living with HIV (UNAIDS, 2017). In many countries, food and nutrition insecurity and frank malnutrition combine to aggravate the HIV/AIDS pandemic, thereby intensifying and accelerating its negative impact (WHO, 2003).

Acquired immune deficiency syndrome (AIDS), is a disease caused by a retrovirus, the human immunodeficiency virus, which attacks and impairs body's natural defense system against disease and infection (Duggal, Chugh & Duggal, 2012). Adults

with HIV have 10–30% higher energy requirements than a healthy adult without HIV, and for children with HIV, the requirement is 50–100% higher than normal. Food availability and good nutrition are thus essential for keeping people with HIV healthy so that they will be able to resist opportunistic infections such as tuberculosis for longer (UNAIDS, 2008).

Adequate intake of nutrients is required for the immune system to function efficiently. Lack of adequate macronutrients, or micronutrients, especially zinc, selenium, iron, and the antioxidant vitamins, can lead to clinically significant immune deficiency and infections (Oguntibeju, van den Heever & Van Schalkwyk, 2007; de Pee & Semba, 2010). In addition, micronutrient deficiency suppresses immune functions by affecting the innate T-cell-mediated immune response and adaptive antibody response, and leads to deregulation of the balanced host response. This increases the susceptibility to infections, with increased morbidity and mortality (Wintergerst, Maggini & Hornig, 2007). Furthermore, chronic under-nutrition and

micronutrient deficiency compromise cytokine response and affect immune cell trafficking leading to altered immune cell populations which further weakens the immune response (Cunningham-Rundles, McNeeley & Moon, 2005).

Healthy nutrition plays a central role in the management of HIV/AIDS, especially those symptoms (diarrhoea, anorexia, sore mouth, fever, and muscle wasting) directly associated with the disease. They help to ease the burden of the disease and to alleviate the overall impact of malnutrition (WHO, 2003). Food insecurity, unavailability of sufficient, safe and nutritious food to meet dietary needs (United Nations, 2010), is associated with nutrient inadequacy, poor self-reported health, increased HIV transmission, high-risk behaviors, decreased anti retroviral therapy (ART) adherence, reduced baseline cluster of differentiation 4 (CD4) cell count, and decreased survival (Anema, Vogenthaler, Frongillo, Kadiyala, & Weiser, 2009; Maluccio, Palermo, Kadiyala, & Rawat, 2015; Anema et al., 2013). Consequently, improving food security and nutrition is recognized as fundamental across the four pillars—prevention, care, treatment, and mitigation—of a holistic response to the AIDS epidemic (Maluccio et al., 2015).

Since many people living with HIV/AIDS are already burdened with a lack of access to a good quality diet and suffer from deficiencies in specific micronutrients or macronutrients (WHO, 2005), higher levels of intake may be required to compensate for the deficiencies (UNAIDS, 2007). Thus, there is an urgent need for renewed focus on and use of resources for nutrition as a fundamental part of the comprehensive package of care at the country level.

Relationship between Nutrition and HIV/AIDS Infection

Nutrition and HIV are strongly related and complement each other. HIV causes immune

impairment leading to malnutrition which leads to further immune deficiency, and contributes to rapid progression of HIV infection to AIDS (Oguntibeju et al., 2007; Duggal et al., 2012). Three key factors contribute to malnutrition in patients with HIV/AIDS: inadequate intake, malabsorption and increased energy expenditure (UNAIDS, 2001; Hsu, Pencharz, Macallan & Tomkins, 2005).

Good nutrition, being a fundamental part of caring for people living with HIV/AIDS, translated into a balanced diet is a positive way to respond to this illness, and it helps people live longer, and have more comfortable lives (WHO, 2009). Deficiencies in vitamins and minerals contribute to oxidative stress, which can accelerate immune cell death and increase HIV replication (Jesson et al., 2015). Good nutrition increases resistance to infections, improves energy, and thus makes a person stronger and more productive.

An HIV-infected person is more at risk for malnutrition due to reduced food intake, poor absorption, changes in metabolism, chronic infections and illnesses like diarrhoea, fever, oral thrush etc (UNAIDS, 2001). In addition, weight loss, caused by low dietary intake (loss of appetite, mouth ulcers, food insecurity), mal-absorption, and altered metabolism, is common in HIV infection (de Pee & Semba, 2010). Sub-Saharan Africa has the highest proportion of undernourished people in the world, along with the highest number of people living with HIV and AIDS (Audain, Zotor, Amuna, & Ellahi, 2015). The study from Nepal by Thapa, & colleagues, (2015) reported one in five patients living with HIVs being under nourished.

Protein calorie malnutrition and zinc deficiency activate the hypothalamic-pituitary-adrenal axis. Increased circulating levels of glucocorticoids cause thymic atrophy and affect hematopoiesis (Cunningham-Rundles et al., 2005). Undernutrition has a debilitating effect on the immune system due to key nutrient deficiencies and the overproduction

of reactive species (oxidative stress), which causes rapid HIV progression and the onset of AIDS, even among people receiving antiretroviral therapy (ART) {Hsu et al., 2005; Aberman, Rawat, Drimie, Claros, & Kadiyala, 2014; Audain et al., 2015; UNICEF, 2016}. Thus, malnutrition, as a consequence, contributes to the severity of opportunistic infections which is a major factor in survival, as a body cell mass less than 54% of ideal body weight could result in death (Derman et al., 2010).

Human Immune Virus/Acquired Immune Deficiency Syndrome leads to poor absorption of nutrients (protein, carbohydrates, fats, vitamins, minerals and water) which accompanies diarrhea, a gastrointestinal complaint with HIV infection (UNAIDS, 2001; Crum-Cianflone, 2010). GI symptoms are reported by 50–70% of HIV-infected persons, with even higher percentages among those residing in the developing world. More recently, a study team found that among HIV-positive individuals receiving ART in Canada, being food insecure and underweight were independently associated with a 1.94 increased risk of non-accidental death, compared to being food secure and of normal weight (Anema et al., 2013).

Through a vicious cycle of immune dysfunction, infectious disease and malnutrition, the impact is altogether devastating in terms of: human and economic development, food production and food security, and individual nutritional status (WHO, 2003). Furthermore, HIV/AIDS is associated with biological and social factors that affect the individual's ability to consume, utilize, and acquire food. Once there is an infection with HIV, the patient's nutritional status declines further leading to immune depletion and HIV progression (Duggal et al., 2012). Thus, food insecurity calls for structural interventions that address basic survival needs among people living with HIV, especially food security (Kalichman et al., 2014; Singer, Weiser & McCoy, 2015).

Nutritional Care and Support for People Living with HIV/AIDS

Nutritional care and support for people living with HIV/AIDS is an important way to reduce human suffering and to regenerate societies that are damaged by the epidemic (Coetzee, 2013). Adequate dietary intake and absorption are essential for achieving the full benefits of antiretroviral therapy, and there is emerging evidence that patients who begin therapy without adequate nutrition have lower survival rates (UNAIDS, 2008). Dietary supplements using a range of palatable, affordable, available foodstuffs are needed for management of severe opportunistic infections such as persistent diarrhoea and tuberculosis (Hsu et al., 2005).

It is essential to maintain an adequate intake of macro and micronutrients to restore malnutrition-related immune dysfunction (Derman et al., 2010). For macronutrients, during the asymptomatic HIV stage, a 10% increase in energy intake is recommended in order to maintain body weight and physical activity. During the symptomatic stage and the stages thereafter that progress to AIDS, these requirements are increased to 20–30%. Energy requirements are increased by up to 50–100% during opportunistic infections (WHO, 2003; WHO, 2005; Derman et al., 2010). In addition to the extra energy requirements due to HIV infection, the pregnant and lactating women need to consume extra energy, protein and micronutrients required by pregnancy or lactation (UNAIDS, 2007).

With regards to recommendations for protein intake, protein requirement should fulfill 12% to 15% of total energy intake (WHO, 2005) which can result in a positive nitrogen balance and lean body mass repletion (Derman et al., 2010). The intake of fat depends on tolerance and individual symptoms, such as malabsorption and diarrhoea. Thus, fat intake may vary between individuals and need to be considered when determining each patient's recommendations for fat intake (WHO, 2003; Derman et al., 2010).

World health organization (WHO) recommends vitamin A, zinc, iron, folate and multiple micronutrient supplements should remain the same. Micronutrient intakes at daily recommended levels need to be assured in HIV-infected adults and children through consumption of diversified diets, fortified foods, and micronutrient supplements as needed (WHO, 2005; Derman et al., 2010).

Addressing the nutritional needs of people living with HIV, the WHO has integrated food and nutrition into the global AIDS policy which includes clinical nutritional assessments and nutrition counseling and supports. This policy includes the provision of specialized foods or micronutrient supplements- in clinical HIV setting (WHO, 2003). Equally, United Nations Children's Fund (UNICEF) provides support for nutritional assessments and counseling to manage HIV disease and the side effects of antiretroviral drugs. UNICEF also supports therapeutic feeding, together with antiretroviral therapy, for children living with HIV and suffering from severe acute malnutrition (UNICEF, 2016).

It is suggested that counseling on nutrient selection and food preparation should begin and be periodically reinforced which will establish a strong link between nutrition and HIV infection in the mind of the patient and health personnel that will alert both parties to more aggressive nutritional intervention when needed later (Oguntibeju et al., 2007). Thus, early ongoing medical nutrition therapy is important for all individuals with HIV infection and AIDS (Coetzee, 2013).

Conclusion

Human Immune Virus/Acquired Immune Deficiency Syndrome has a devastating impact on health, nutrition, food security and overall socioeconomic development in countries that have been greatly affected by the disease. Inadequate intake of nutrients may lead to suppressed immunity predisposing to infections and malnutrition among HIV/AIDS people. Therefore, supporting adequate dietary and nutritional intake as a part of successful

treatment programs, including thorough provision of nutritional counseling and education is a crucial part of HIV/AIDS management.

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