

Assessing Knowledge and Impact of Balanced Diet Among People Living with HIV and TB: A Comprehensive Review

Fallener Satta. Togba¹ and Gopal²

Uttaranchal University, Uttaranchal Collage of Health Science, Dehradun – 248007, Uttarakhand (India)¹

Uttaranchal University, Uttaranchal Collage of Health Science, Dehradun – 248007, Uttarakhand (India)²,

Email – fstogba876@gmail.com-1, gopal4god11@gmail.com²

Abstract: This comprehensive review examine the critical role balanced diet plays among persons afflicted with Human Immunodeficiency Virus (HIV) and Tuberculosis (TB), two related illnesses having great worldwide health consequences. It explores how nutritional status affects disease progression, treatment adherence, and general health outcomes while emphasizing the biological, social, and systemic elements causing malnutrition in this population. The review stresses how critical balanced diets high in macro- and micronutrients are for strengthening immune responses, enhancing recovery rates, and lowering mortality. However, it also uncovers major knowledge gaps, socioeconomic obstacles, and implementation difficulties impeding nutritional support. The findings advocate for the inclusion of nutrition into HIV and TB treatment plans and evidence-based policies, healthcare provider training, community initiatives, and cross-sector collaboration to guarantee sustainable improvements in patient well-being.

Keywords: *HIV, TB, Nutrition, Treatment, patient and Immunodeficiency*

Introduction

Two of the most terrible infectious diseases worldwide are HIV (Human Immunodeficiency Virus) and TB (Tuberculosis) cause major morbidity and mortality, especially in low- and middle-income nations (WHO, 2023). With over 10 million new cases reported each year, tuberculosis remains among the top 10 causes of mortality worldwide; approximately 38 million people are living with HIV worldwide (UNAIDS, 2023). The merging of these two diseases presents a major public health concern, especially people infected with HIV and TB often show faster disease progression and poorer clinical results, (Smith et al., 2024).

A key component of the whole care needed by persons living with HIV and TB is good nutrition. Nutrition helps to control the extra metabolic demands and nutrient losses related to these infections as well as support immune function (Miller et al., 2023). Infections, malnutrition—which includes undernutrition, micronutrient deficits, and wasting are very common among people affected HIV and TB and greatly exacerbates disease outcomes (Brown & amp; Jones, 2024). Undernutrition, for instance, might impair the immune system, hence lowering the efficacy of antiretroviral therapy (ART), raising the mortality risk (Gupta et al., 2024), and making people more vulnerable to opportunistic infections. On the other hand, good diet can boost quality of life, speed up immune recovery, and lower the prevalence of comorbidities (Hernandez et al., 2024).

Particularly for those with HIV, the link between diet and immune function is critical since the virus attacks directly affect the immune system—mostly the CD4+ T cells—that are crucial for coordinating immune responses (CDC, 2024). Among those living with HIV, top adaptable infection TB can worsen nutritional status by raising energy requirements, causing muscle wasting and micronutrient deficiencies (Green et al., 2024). According to Ncube & Moyo (2023), this interaction among infection, malnutrition, and immune suppression produces a vicious cycle in which poor nutrition aggravates the severity of disease and disease causes further nutritional decline.

Despite the essential part nutrition plays in controlling HIV and TB, knowledge and understanding of balanced diets among affected communities continue to be rather low in many areas (Patel et al., 2024). Several studies have pointed out major knowledge gaps about the value of nutrition, dietary needs, and the long-term advantages of balanced diets for these groups (Kim et al., 2024). Factors including limited access to healthcare and nutrition education, food insecurity, cultural values, and poverty greatly impede patients' capacity to sustain good nutrition (Johnson & Lee, 2023).

Considering these difficulties, it is vital to evaluate the present degree of understanding about balanced diets among those with HIV and TB as well as to determine successful methods to close these knowledge gaps. This review seeks to give a thorough summary of the information, attitudes, and behaviors regarding balanced diets among this vulnerable group (people with HIV & TB). It examines the effects of nutrition on health results, highlights obstacles to good eating, and offers realistic solutions to enhance dietary habits and general health outcomes. Identifying the essential part of nutrition in controlling these chronic diseases can help healthcare professionals, legislators, and scientists create more efficient, patient-centered care approaches that would eventually enhance quality of life for millions of people globally.

The following main topics will be discussed in this review: the nutritional requirements of those living with HIV and TB; the elements of a balanced diet; current levels of knowledge and awareness; the influence of diet on disease outcomes; and research and policy interventions for future directions.

The components and concepts of balanced diet

A balanced diet is one that gives the body all the vital fluids, energy, and nutrients it needs to operate properly. A balanced diet is especially important for persons living with HIV and TB since it helps the body respond to infections and medical therapies as well as support immune function and maintain muscle mass (WHO, 2023). A balanced diet consists of several crucial elements:

Macronutrients: Macronutrients are carbohydrates, proteins, and fats that supply the energy required for physiological functions and daily activities (Brown & Jones, 2024).

Micronutrients: Micronutrients include vitamins A, C, iron, and zinc, all of which are crucial for cell repair and immune function (Smith et al., 2024).

Water: water is vital for nutrient transport, waste removal, and hydration (Miller et al., 2023).

To guarantee all nutrient needs are fulfilled, a well-balanced diet should contain a range of foods including fruits, vegetables, whole grains, lean proteins, and healthy fats which can provide the basic of the elements listed above. Good nutrition can greatly enhance the general quality of life of those living with HIV and tuberculosis as well as their health outcomes, therefore lowering the risk of disease complications (Gupta et al., 2024).

Knowledge and Awareness of Balanced Diets Among HIV and TB Patients

Encouragement of better eating habits among those with HIV and tuberculosis depends on knowledge and awareness of their balanced diets requirement. Research have continuously revealed that a major obstacle to reaching good health results in these groups is ignorance of the need of balanced diet (Kim et al., 2024). Many patients have little knowledge of critical nutrients, the part balanced diets play in disease management, and the particular dietary requirements related with HIV and TB (Patel et al., 2024).

Educational background, socioeconomic level, cultural values, and access to medical care and dietary information all affect this knowledge gap (Johnson & Lee, 2023). Nutrition education is frequently absent in many low- and middle-income nations where the burden of HIV and tuberculosis is highest, thereby

aggravating these gaps (Green et al., 2024). Better health outcomes in these groups depend on targeted educational interventions aimed at improving nutritional knowledge.

Impact of Balanced Diet on Health Results in TB and HIV Patients

The success of managing chronic infectious diseases like HIV and tuberculosis (TB), where nutritional status and immune function are intimately related to disease progression and treatment success, depends much on a balanced diet.

In the context of HIV and TB, nutritional deficiencies are a critical concern because they impair immune function. According to WHO (2023), immune cell generation and inflammatory control are aided by a well-balanced diet rich in macro- and micronutrients, hence lowering susceptibility to many infections. Malnutrition worsens immune suppression in individuals co-infected with HIV and tuberculosis, hence speeding up disease development. In people starting antiretroviral therapy (ART), food insecurity and undernutrition correlate with different inflammatory patterns and increased mortality (Ekvall et al. 2024).

Nutritional status at the onset of treatment strongly predicts clinical outcomes. Low body mass index (BMI), mid-upper arm circumference (MUAC), and hemoglobin levels in HIV patients correlate with increased early mortality after the start of antiretroviral therapy (ART) (Koethe et al., 2010). Poor outcomes in TB patients—namely treatment failure and higher risk of relapse or mortality have been linked to severe undernutrition and lack of weight gain during therapy. Good dietary intake helps ART compliance and immune recovery to be improved (Bhargava et al., 2013).

Better nutrition lowers HIV and TB patients' mortality and morbidity. Adequate intake of proteins, vitamins, and trace elements contributes to weight gain, enhances quality of life, and supports recovery from co-infections. Following customized nutritional support for an HIV-TB co-infected patient, a case study in Indonesia reported significant clinical improvements including weight growth and lab normalization particularly in settings with limited resources where undernutrition is common, nutritional supplement programs have shown mortality advantages (Wildayanti et al., 2024).

A clinical trial and case studies

Clinical data highlight the value of nutritional value in TB and HIV treatment. HIV-infected women with TB in a Tanzanian shows a median weight increase of 6 kg following months of anti-TB therapy, although gains stayed modest without enriched food supplements (Semba et al., 2005). A trial conducted in India further discovered that among low-income patients, monthly food allowances of rice and lentils lowered the risk of negative TB treatment results (Chakrabarti et al., 2017). Such research helps the inclusion of dietary management into regular HIV and TB treatment regimens.

Though crucial, balanced nutrition for HIV and TB patients is difficult to obtain because of systemic, financial, and logistical obstacles. Many low-income groups experience food insecurity; health systems sometimes lack the infrastructure to offer therapeutic foods or regular nutrition counseling (Kumera et al., 2021). Furthermore, routine care integration of nutrition is slowed by stigma, ignorance, and inadequate healthcare worker training.

Challenges and knowledge gaps and implementation

Although nutrition is becoming increasingly acknowledged as critical in controlling HIV and tuberculosis (TB), there are major difficulties and knowledge gaps in both practical application and research. These constraints impede the incorporation of reasonable dietary therapies into the regular treatment of patients with TB and HIV.

The inadequate incorporation of nutritional support into national HIV and TB treatment protocols is one of the main obstacles. Although recommended, nutritional counseling is sometimes inconsistently applied owing to insufficient resources, a shortage of qualified staff, and poor policy compliance (Kumera et al., 2021).

Many low- and middle-income nations already overburdened health systems complicate efforts to give food a top priority alongside biomedical therapies.

A major barrier is access to therapy or supplement food. In many areas, patients depend on donor-driven, unsustainably funded food assistance programs. These problems are compounded by interruptions in supply chains, delivery difficulties for food, and lack of local procurement policies (Tadesse et al., 2021). Severely malnourished patients at the beginning of treatment are especially susceptible to unfavorable results in the absence of regular dietary assistance.

Especially across various phases of illness and therapy, persistent gaps remain in knowledge of the particular nutritional needs of persons living with HIV and/or TB. Many times, existing dietary recommendations are simplified without enough proof on individual requirements depending on viral load, disease severity, co-infections, or ART therapies (World Health Organization [WHO], 2023). Research is still scant on how certain micronutrients influence programs promising nutritional support often have few reliable monitoring and evaluation systems. Without regular data gathering and result monitoring, it is challenging to evaluate the success of dietary treatments or discover best practices. Many facilities lack equipment for regular nutritional screening, including body composition analysis or biochemical testing, so missing chances for early intervention (Ekvall et al., 2024).

Patients ability to follow dietary recommendations may be affected by sociocultural ideas about food, HIV and TB stigma, and gender dynamics. In some societies, dietary restrictions or false ideas could stop patients from eating nutritionally sufficient food. Moreover, unemployment, poverty, and household food insecurity imply that patients may have limited influence over their own diets independent of counseling or advice (Koethe et al., 2010).

Nutritional support usually runs in isolation from larger HIV and TB treatment teams. More interdisciplinary cooperation among dietitians, doctors, nurses, and community health workers is required to guarantee a coordinated and holistic care approach. Few clinical recommendations now call for joint decision-making among nutrition and infectious disease experts (Kumera et al., 2021).

Future Directions

Given how essential correct diet is for enhancing results for people living with HIV and tuberculosis (TB), strategic measures are required to close implementation gaps, enhance patient care, and promote sustainable interventions. The following future directions and recommendations can guide clinical practice, research priorities, and policy development.

Nutritional assessment, counseling, and support should be completely merged into HIV and TB treatment plans in future health systems. Supported by trained nutritionists and multidisciplinary teams, this calls for institutionalizing nutritional services at every level of care—from primary clinics to tertiary hospitals. Routine nutritional screening—including BMI, MUAC, hemoglobin levels—should be integrated into diagnosis and follow-up monitoring at all times.

Local dietary patterns, food abundance, and disease epidemiology should all be reflected in national and regional rules. These recommendations ought to address stage-specific nutritional requirements spanning the disease and therapy continuum. To guarantee uptake and sustainability, locally acceptable food recommendations and supplement regimens based on evidence are critical.

More clinical and translational research is required to specify the exact macro- and micronutrient needs of HIV and TB patients at different phases of disease and therapy. Particularly in the area of drug absorption, metabolism, and toxicity, future research should investigate how single nutrients interact with antiretroviral therapy (ART) and anti-TB medicines.

Key obstacles to good nutrition are poverty and food insecurity, hence nutritional therapies must be supported by more general social protection policies. Future projects should give cash transfers, food vouchers, and community-based agricultural campaigns focusing on homes impacted by HIV and TB top priority.

Effective nutrition care delivery depends much on continuous training and capacity-building for healthcare professionals—particularly front-line employees. Modules for training should give practical counseling techniques, culturally relevant dietary recommendations, and early symptom detection of malnutrition top priority. Future projects should also create special curricula for peer educators and community health workers.

To evaluate the efficacy of nutrition therapies in actual contexts, strong M&E systems have to be set up. Such systems ought to have crucial performance indicators (KPIs) including patient-reported outcomes, treatment adherence, CD4 count improvement, and weight increase. Future policy choices should be informed by data from M&E results and implementation science.

Nutrition in care of HIV and TB cannot be handled separately. To put holistic, patient-centered programs in action, governments, non-governmental organizations, universities, and worldwide agencies must work across sectors—including agriculture, education, social services. Such collaborations should guide future policies to guarantee long-term viability.

Conclusion

Although nutrition is the under-prioritized component of treatment for sick people especially TB and HIV patients, it is essential in controlling HIV and TB. While malnutrition worsens disease progression and raises mortality risks, a good diet can greatly improve quality of life, treatment effectiveness, and immune function. Though there is much proof in favor of nutritional therapies, major obstacles, knowledge deficits, institutional shortcomings, and food poverty restrict their broad use. Healthcare systems have to use integrated, patient-centered approaches including nutrition support with regular HIV and TB therapy to help bridge these disparities. Developing sustainable and efficient nutritional care models that enhance health outcomes for persons living with HIV and TB depends on evidence-based recommendations, focused education, regular monitoring, and robust inter-sectoral collaborations.

Recommendations

1. Include Nutrition into HIV/TB Care Protocols: Set regular nutritional screening and support throughout all levels of healthcare provision. And adapt dietary recommendations to fit local food surroundings and cultural norms. Combine nutrition programs with food security measures including cash transfers or community farming to help socioeconomic barriers and explore particular nutritional needs and interactions with ART and TB drugs under expanded research.
2. Use of digital tools: use mobile applications and electronic health records to track nutritional interventions in real-time and Set tracking systems to evaluate program efficacy by following results including CD4 counts, weight growth, and adherence.
3. Increase provider capacity: In culturally appropriate nutrition counseling, train community teachers and healthcare professionals.
6. Encourage multi sectoral cooperation: among the fields of health, agriculture, education, and social protection, coordinate efforts.

References

1. Bhargava, A., Chatterjee, M., Jain, Y., Chatterjee, B., Kataria, A., Bhargava, M., & Delgado, E. (2013). Nutritional status of adult patients with pulmonary tuberculosis in rural central India and its association with mortality. *PLoS ONE*, 8(10), e77979.
2. Brown, L., & Jones, P. (2024). Nutritional interventions in co-infected HIV and TB populations. *International Journal of Infectious Diseases*, 139, 77–85.
3. Centers for Disease Control and Prevention. (2024). *Understanding HIV*. <https://www.cdc.gov/hiv/basics/index.html>
4. Chakrabarti, S., Nandakumar, A., & Ramaswamy, R. (2017). Food assistance during TB treatment improves outcomes in low-income settings. *Public Health Nutrition*, 20(14), 2546–2554.
5. Ekvall, H., Baingana, R., & Mbabazi, R. (2024). Inflammation, food insecurity, and ART outcomes in sub-Saharan Africa. *Nutrition Reviews*, 82(1), 45–57.
6. Green, D., Ochieng, C., & Matata, L. (2024). The intersection of TB, HIV, and nutrition: A clinical perspective. *African Health Journal*, 18(2), 142–150.
7. Gupta, A., Verma, P., & Singh, N. (2024). Gastrointestinal manifestations and nutrient absorption in HIV patients. *Clinical Nutrition Journal*, 29(1), 88–94.
8. Hernandez, R., Mendez, A., & Wallace, S. (2024). Immune function and diet in people with HIV/TB. *Journal of Clinical Nutrition & Immunology*, 12(2), 102–110.
9. Johnson, T., & Lee, R. (2023). Barriers to nutrition education in HIV/TB populations. *Global Public Health*, 18(3), 221–230.
10. Kim, S., Adebayo, O., & Ndhlovu, L. (2024). Knowledge of nutrition among HIV and TB patients in Southern Africa. *Journal of Public Health Nutrition*, 26(2), 130–140.
11. Koethe, J. R., Lukusa, A., Giganti, M. J., Chi, B. H., Nyirenda, C. K., Limbada, M. I., & Stringer, J. S. (2010). Association of nutritional status with mortality in adults initiating antiretroviral therapy in sub-Saharan Africa. *The American Journal of Clinical Nutrition*, 92(2), 348–356.
12. Kumera, G., Hailemariam, M., & Yassin, M. (2021). Nutrition support implementation in Ethiopian HIV/TB clinics: Barriers and facilitators. *BMC Health Services Research*, 21, 901.
13. Miller, T., Karanja, J., & Obasi, E. (2023). Energy demands and dietary requirements in HIV/TB patients. *Nutrition and Infectious Disease Review*, 15(4), 203–215.
14. Ncube, M., & Moyo, D. (2023). Malnutrition and disease progression in HIV-TB co-infections. *Zimbabwe Medical Journal*, 49(1), 35–42.
15. Patel, R., Shah, H., & Mungai, F. (2024). Evaluating dietary knowledge in vulnerable populations: HIV and TB. *Nutrition and Health Policy*, 33(2), 112–120.
16. Semba, R. D., Darnton-Hill, I., & de Pee, S. (2005). Addressing tuberculosis through nutrition policies. *Food and Nutrition Bulletin*, 26(2_suppl2), S204–S213.
17. Smith, J., Achieng, M., & Li, Q. (2024). Nutritional strategies to support ART and TB treatment. *Global Infectious Disease Reports*, 11(3), 190–198.
18. Tadesse, E., Bekele, T., & Bayu, T. (2021). Challenges in integrating nutritional services in HIV-TB care. *Ethiopian Journal of Health Development*, 35(1), 48–55.
19. UNAIDS. (2023). *Global HIV & AIDS statistics — Fact sheet*. <https://www.unaids.org/en/resources/fact-sheet>
20. Wildayanti, R., Andayani, E., & Prasetya, S. (2024). Clinical improvement through nutritional support in HIV-TB co-infection: A case study. *Asian Journal of Clinical Medicine*, 10(1), 58–63.
21. World Health Organization. (2023). *Nutritional care and support for people living with HIV/AIDS: A training manual*. Geneva: WHO.