

## **Nutrition Education, Counselling and Assessment Support Approach for People Living with HIV and AIDS: A Literature Review**

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### **Abstract**

Nutrition education, assessment and counselling is a multi-sectoral system approach to integrating nutrition care within health services. It is a framework that provides many countries with nutrition guidelines to help people living with Human Immunodeficiency Virus. Access to nutrition education, assessment and counselling by people living with Human Immunodeficiency Virus is crucial as it serves as a nutritional management care and support. This paper discusses how Nutrition education, assessment and counselling can be used as a multi-sectorial and support approach in supporting nutrition for people living with Human immunodeficiency virus. It also highlights the importance of nutrition education, assessment and counselling and how it can improve the quality of life in people living with Human Immunodeficiency Virus.

**Keywords:** Nutrition education, Nutrition Counselling, Nutrition assessment people living with HIV and AIDS

## 1. Introduction

Nutrition education, counselling and assessment (NEAC) plays a crucial role in comprehensive nutrition intervention in HIV and AIDS management and care support. Integrating nutrition intervention in HIV and AIDS care programmes prolong patient survival and reduces death due to malnutrition. NEAC empowers people living with HIV and AIDS (PLWHIV) to modify their diets using locally available nutrient dense and culturally acceptable foods to maintain good health, (UNAIDS :2014; Piwoz: 2004).

The integration of nutrition education and counselling have been recommended to be an effective way of improving the quality of lives of PLWHIV, (Food and Nutrition Technical Assistance (FANTA: 2014; Ministry of Health (MOH: 2011,). Many studies have asserted that nutritional problems among PLWHIV can be managed through provision of nutrition education and counselling, which are often available in primary healthcare. Nutrition education and counselling may help individuals, families, and communities make informed choices about food and lifestyles that support their physiological health, economic, and social well-being (USDA: 2012b). Nutrition education and counselling have been found to be effective in modifying dietary practices that affect chronic disease (Mc Nulty: 2013).

Nutritional counselling has also been confirmed to be effective in influencing health outcomes in HIV and AIDS infected people. Besides, it facilitates access to adequate dietary intake. In order to support provision of nutrition counselling, nutrition assessment is imperative. This component cannot be over emphasised in nutritional management in people living with HIV and AIDS (PLWHIV).

Access to nutrition education, counselling and assessment, coupled with the ART, psychosocial support, treatment of opportunistic infections (OIs) and the recommended medical nutrient

supplementation may lead to improved nutritional status of PLWHIV (United Nations Programme on HIV and AIDS (UNAIDS:2014). Lack or inadequate access or indeed poor knowledge and dietary practices by PLWHIV may significantly contribute to rapid progress of HIV to AIDS. This paper discusses the literature reviewed on NEAC as a nutrition management intervention and care support for People living with HIV and AIDS. It provides a reveal of the benefit of NEAC in improving the quality of life for people living with HIV/AIDS.

## **2. Access to Nutrition Education and Counselling by PLWHIV**

Access to NEAC in many countries has proved to be very critical in the care and support in HIV and AIDS patients. Many studies have indicated that NEAC can lead to changes in knowledge and availability of resources at the individual and household levels, which in turn influence dietary practices and food access (FANTA: 2012). Dietary practices and food access are potential factors that affect the health and nutritional status of PLWHIV.

A study on the effectiveness of nutrition education and counselling as an intervention to improve health outcomes to PLWHIV have shown that nutrition education and counselling improves health and nutritional status, allowing people with HIV and AIDS to lead longer and better quality lives ( Tabi et al: 2005).

In a quantitative cross-section study done in Nepal to estimate the prevalence of under nutrition among people living with HIV and AIDS who had no access to nutrition education and counselling, results showed that one in five PLWHIV was found to be under nourished. The results showed that nutrition intervention through nutrition education and counselling was lacking and the study concluded that nutrition intervention through nutrition education and counselling should form an integral part of HIV care programmes, (Thapa et al: 2015).

To further illustrate the effectiveness of nutrition education and counselling in PLWHIV, (Piwoz et.al: 2004) reported that nutrition education and counselling (NEAC) allows PLWHIV to modify their diets, using locally available, nutrient dense and culturally acceptable foods to maintain good health, improve their nutritional status and found that NEAC improves daily functioning of PLWHIV. In addition, (Bukasuba et.al: 2010) in their study reported the importance of NEAC in improving knowledge, attitudes and practice and thus allows PLWHIV to utilise the limited resources, modify diets to boost their immunity and improve response to ART and other treatment.

It is then true to assert that nutrition education and counselling has the potential to support treatment, promote adherence to therapy and improve overall health. It can also support recovery of PLWHIV, improve the prognosis of dietary changes that promote long-term health and improve quality of life.

However, some studies done where nutrition education and counselling have been implemented as part of the integral care have shown otherwise. A cross-sectional study was conducted in six HIV clinics (3 Nutrition assessment, counselling and care support designated and 3 non-nutrition assessment, counselling and care support) to evaluate the implementation of the nutrition assessment, counselling and support (NEACS) program in Accra, Ghana, and to assess whether the level of implementation of NEACS was associated with the body mass index (BMI) of PLWHIV. It was concluded that, there was poor implementation of NEACS in the NEACS designated HIV clinics surveyed with no nutrition counselling offered nor food support available to those who needed it, (Sackey et al: 2018).

In another related study (Tushemeriwe: 2011) conduct a pilot study on nutrition education and counselling programme to improve nutrition knowledge attitudes and practices of PLWHIV in

Uganda. The study indicated that nutrition education and counselling activities were not planned for from the start of the care programme and not all clinics received practical session. The gap that existed was lack of staff to roll the programme to other clinics and lack of training for staff in nutrition intervention.

In Namibia a cross section descriptive study was conducted by the Ministry of Health and Social Science to review the implementation of nutrition assessment, counselling and support for People Living with HIV (PLWHIV) using the operational guidelines throughout the country. The study found that the ART health centres lacked adequate staff. The results indicated that storage conditions for specialized food products were inadequate. The same study revealed that health centres did not have all items checklist recommended for nutrition education and counselling programme. It further revealed that health providers only assessed clients who looked malnourished because they were too busy to assess each client on each visit and the clients indicated the need for clear counselling in the nutrition therapeutically purposes (Ministry of Health and Social Science MHSS: 2013).

From the studies reviewed there is clear evidence that access to nutrition education and counselling by PLWHIV has potential factors associated with influencing adequate dietary intake vice versa inadequate dietary intake to reduce malnutrition there by prolonging life and enhancing optimum nutrition status in PLWHIV. Nutrition interventions through NEAC can help transform the cycle of malnutrition and HIV into a cycle of improved nutritional status and stronger immune response. In response to this multifaceted relationship between HIV and nutrition, a range of food and nutrition interventions can be used to address the disease and its impacts among infected and affected populations.

### 3. Nutrition Assessment

Nutrition assessment refers to measurement of a client's nutritional status and dietary practices (UNIDS, 2014). Nutrition assessment is a critical first step in improving and maintaining nutritional status (FANTA: 2012). According to the Ministry of Health the objectives of nutrition assessment are to (1) determine the nutritional status of an individual: nutritional status is a sensitive indicator of well-being and helps identify problems early for quick response; (2) develop an individualized nutrition care plan to support the clinical management of PLWHIV (3) identify a specific nutrition intervention that a client needs such as diet change, food supplements and medical treatment, (4) measures changes in nutritional status to monitor progress and (5) determine eligibility for nutrition and food assistance for undernourished PLWHIV. (UNAIDS: 2014; MOH: 2011). These objectives are critical for PLWHIV as they help to monitor nutritional healthy and find appropriate intervention measures to address one's healthy.

A Study of nutrition management in PLWHIV by (Aishwarya: 2015), confirmed that nutrition assessment helps HIV positive people receive appropriate treatment, care and nutritional support. It further reported that screening for nutritional status and assessment of dietary intake should be included routinely in HIV treatment and care for adults and children. In another research done in LokNayak Hospital India which incorporated nutrition assessment of nutritional status indicated that prevalence of malnutrition based on body mass index and skin fold thickness showed a significant weight gain and increase CD4 (Dewan 2008). Therefore, Dewan concluded that nutrition assessment and counselling should aim at improving and maintaining nutritional status, prevent food borne illness, prevent weight loss and improve eating habits and diets.

There are a variety of methods used for nutrition assessments. The commonly used assessments of the nutritional status are summarised in mnemonics as "ABCD" which stands for

anthropometric measurement; measuring the physical dimensions of the body, biochemical or laboratory tests measuring biochemical indicators of particular nutrients, clinical indicators and dietary assessment measuring dietary intake and practices (Fields-Gardner: 2010). According to the (MOH: 2011) nutritional assessment (anthropometry, and clinical and dietary assessment), counselling and support should be an integral component of HIV care; it should be conducted at enrolment in care and monitored during all HIV care and treatment. It can further provide the basis for nutrition counselling and determine whether food assistance is required.

### 3.1 Anthropometric Assessment

Anthropometric assessment relates to the measure of body dimensions. It includes measures of body composition, height, weight, weight change, body mass index (BMI), mid-upper arm circumference (MUAC), waist circumference, waist-to-hip ratio, and lean and fat tissue. These measures are used to ascertain the extent and severity of malnutrition.

The cut off points of nutritional status as defined by (WHO: 2003) are summarized in Table 1.

BMI (Kg/m <sup>2</sup> )	Classification	Risk of co-morbidities
<16.0	Severe under nutrition	Very high
16.0-17.0	Moderate under nutrition	High
17.1-18.4	Mild under nutrition	Moderate
18.5-24.9	Good nutrition status	Healthy
25.0-29.9	Overweight	Mild increased risk
>30.0	Obesity	High risk

Source: WHO. 2015. Obesity and Overweight. Fact Sheet No. 311.

<http://www.who.int/mediacentre/factsheets/fs311/en/>

### ***3.2 Biochemical assessment***

Biochemical assessment involves laboratory examinations of the body by-products such as the blood and urine. It provides precise methods of determining levels of nutrients in blood and urine as well as identifying diseases, deficiency and abnormalities; for blood (Hb, haematocrit), protein (serum albumin) and micronutrient (vitamin B12, iron, zinc, and folate), and lipid (cholesterol and triglycerides). It is useful to measure deficiencies before any clinical signs emerge. Analysis will indicate primary deficiency (nutrient deficiency has developed). Secondary deficiency (due to inadequate handling of nutrient in the body e.g. diabetes). Analysis indicates protein energy malnutrition (PEM), blood lipid measure, glucose level, vitamin and mineral status (UNAIDS: 2014, Castleman et al: 2008).

### ***3.4 Clinical Assessment***

Under clinic assessment PLWHIV are checked for symptoms that affect food intake (diarrhoea, nausea, vomiting, anorexia, mouth and throat sores, oral thrush), signs of clinical malnutrition (wasting and weight loss, skin changes, oedema, apathy, hair changes), and signs of anaemia (pale conjunctiva, gums, nails, and skin; breathlessness; rapid pulse; and oedema). In addition Dewan (2008) highlighted that clinical assessment should look at diarrhoea and vomiting, fever, anorexia, weight loss, odynophagia, aphthous ulcers and oral thrush. According to (Castleman et al: 2008), clinical assessment also helps to identify any potential drug-nutrition or drug-food interactions that can be harmful. The assessment includes also assessing symptoms of nutrient deficiencies or illness that affect food intake and absorption. Examples of symptoms of nutrient deficiencies are wasting, pallor of the tongue indicating anaemia, corneal/ulcer or scar indicating exophthalmia and bleeding gums indicating scurvy. It basically involves the physical assessment of the patient.



### ***3.5 Dietary Assessment***

Dietary assessment provides a record of a person's eating habits and food intake. It provides information about the types and amounts of foods eaten, appetite, food habits and eating behaviours. It helps identify factors that affect food intake such as food availability, side effects of medications, traditional food taboos, and economic factors. Besides dietary assessment, medical history of a person is very essential. This is where information about other illnesses (e.g., diabetes), psychological factors (e.g., depression and stress) and traditional therapies used by a person. It helps to identify needed nutrition and dietary interventions, as well as harmful drug-food interactions. In addition an assessment of the living environment of PLWHIV should be conducted. A clean environment is vital to the well-being of PLWHIV because of their compromised immune systems. At every contact, health service providers should assess the cleanliness and sanitation of a client's environment, the availability and use of safe and clean water, food hygiene, and support from family members, friends, and support groups. Furthermore an assessment of lifestyle practices should be conducted. Smoking, alcohol, and drug abuse may affect food and nutrient intake and decrease the effectiveness of some medications.

### **4. Nutrition Education**

Nutrition education refers to the provision of information by service providers to clients about nutritional needs, dietary practices, nutrient content of foods, meal planning, symptom management and other topics. It is also a planned information exchange that is designed to improve or maintain the nutritional well-being of individuals, groups and populations (IDNT: 2014). Education sessions are often presented in a group setting, and involve the provision of nutrition information by trained staff to PLWHIV. Education focuses on nutritional needs,

dietary practices, healthy eating, and the nutrient content of foods, meal planning, food hygiene, food preparation and storage and symptom management. Nutrition education provides an overview of nutritional issues, often in an informal setting such as a group meeting or camp.

According to (UNIDS : 2014), the objectives of nutrition education are to; increase knowledge about nutrition and its importance in health maintenance; improve skills in the preparation and selection of nutritious foods; and assist in changing food consumption practices. Research has established that nutrition education plays a very important role in dietary practices by enabling individuals to develop altitude and confidence on the sort of food and amount of food they need to eat to improve their nutritional status. It has also been found to be effective in modifying dietary practices that affect chronic disease. Research has also shown that a higher level of nutrition knowledge is positively and significantly associated with better dietary quality (Mengie: 2018).

A cross section descriptive study in Nigeria by (Banwat: 2014) reported that a good knowledge of nutritional requirements for an individual with chronic disease has been found to be vital for proper management of the diseases as well as prevention of complications. A related study by (Olive et al: 2013) in Nairobi titled the effects of nutritional knowledge on the dietary practices of PLWHIV revealed that nutritional knowledge influences the dietary practices and behaviour. It further explains that nutritional knowledge influences the choice of nutrient dense foods that are high in nutrients compared to weight and meals consumed in a day. They concluded that, there is a strong relationship between nutrition knowledge and the dietary practices. This practice consequently, addresses the poor appetite and other opportunistic infections which contribute to the consumption of reduced quantities and more informed choices are made regarding to food intake. Similar studies have also highlighted that once an individual is equipped with appropriate

nutrition knowledge they will improve in dietary practices (Walsh 2003). This is a clear indication that nutrition knowledge has an influence on the dietary practices of PLWHIV. A study on Nutrition knowledge, diet quality and nutritional status of People Living (PLWHIV) in Ghana recommended that the governments and Non-governmental organisation and other stakeholders in the plight of people living with HIV/AIDS must emphasis nutrition education interventions programmes (Nti et al: 2012).

Martinez et al : 2014) conducted a study titled tailored nutrition education and food assistance to improve adherence to HIV antiretroviral therapy in Honduras and recommended the need to establishing best practices for comprehensive care to PLWHIV inclusion of nutrition education activities as part of the regular comprehensive care provided at the HIV centres. Nutrition information should thus be a key component to the care of PLWHIV and should be initiated at the entry point to the comprehensive care. Therefore, it should be continuous throughout the period of care. It can be deduced that Nutrition education at this early stage gives the person a chance to build up healthy eating habits and to take action to improve food security in the home, particularly as regards the cultivation, storage and cooking of food

## **5. Nutrition Counseling**

Nutrition education alone for PLWHIV or patients is not always enough to improve their nutritional status. People face many barriers in improving their nutrition, which may include cost, time, family responsibilities and illness. However, education may present other unique benefits, such as the creation of peer support networks through group interaction. Nutrition counselling strategies based on the results of the nutrition assessment has been shown to improve body weight for PLWHIV, especially when provided early in the disease process. Nutrition counselling refers to an interactive process between provider and client to assess nutritional

status and needs; understand client preferences, constraints and options; and plan a feasible course of action that supports healthy nutritional practices, (MOH: 2011). Counselling helps identify client preferences, barriers to behaviour change, and possible solutions to overcome those barriers FANTA. (2012).The nutrition counselling process involves developing a specific management plan that takes account of the broad range of factors that influence food intake (UNAIDS: 2014).

UNAIDS highlighted the objectives of nutrition counselling as; to develop an individual nutrition strategy to address the nutrition requirements of PLWHIV identified during the assessment; facilitate behaviour change with regard to nutrition and food; and provide on-going, individualized support and guidance in the maintenance phase of the disease (UNAIDS: 2014). For PLWHIV who are already on treatment, adequate nutrition counselling can greatly assist in controlling food and drug interactions (the bioavailability of certain medication might be altered by the type of food), and treatment side effects.

Many studies have indicated that nutritional counselling has shown to be effective and influence health outcomes in HIV infection (WHO: 2003; Alo et al: 2014; Ivers: 2014; Tang et al: 2015). When dietary counselling is combined with oral nutritional supplements, there is additional evidence for its value. Nutritional counselling also facilitates access to adequate dietary intake. The President's Emergency Plan for AIDS Relief (PEPFAR: 2006) asserts that nutritional counselling should be an essential component of all HIV care and treatment programs. It further explains that, additional efforts are needed to focus on appropriate strategies and program models for nutritional assessment, counselling, and management of PLWHIV in resource-limited settings, including non-clinical settings. Nutritional counselling in HIV has demonstrated effectiveness as it is more sustainable and is associated with behavioural change. He further

stresses that counselling should be clinic based, home based and community based with appropriate nutritional counselling materials. A study conducted by (Alo et al: 2014) in Nigeria on the nutrition intervention through counselling on the maintenance of body weight in PLWHIV and haemoglobin. The findings indicated that there was significant effect of nutrition counselling on body mass index and haemoglobin in HIV positive people and further concluded that nutrition intervention is important in the management of people living with HIV and AIDs and can be achieved through nutrition counselling and monitoring.

The study done by (Gwidakad: 2013) on impact of nutritional counselling on dietary practices and body mass index among people living with HIV/AIDS, concurred with the other studies done and indicated that individual nutritional counselling was effective in improving dietary practices in adults living with HIV infection. It was further noted that nutritional counselling was effective in improving the nutritional status (weight and BMI) in the patients. In another related study by which was conducted in Mumbai, it showed that nutritional counselling and support could delay or even prevent the development of Nutritionally Acquired Immune Deficiency Syndromes (NAIDS) and could improve both the quality and length of life for PLWHIV.

One large study by Tang et al (2015) identified and analysed articles published between 2005 and 2014 on the effectiveness of nutrition assessment and Counselling Support interventions, particularly its impact on five outcomes: mortality, morbidity, retention in care, quality of life, and/or prevention of on-going HIV transmission. These studies were conducted in a number of countries which included; Malawi, Uganda, Cameroon, Niger, Kenya, Zambia, India, Nigeria, Haiti, Ethiopia and Mozambique. From the six studies examined, they concluded that the use of food supplement had no effect in the change of CD4+, only two studies had effect; a study by (Nyamathi et al: 2013) in India and a study by (Saddler et al: 2013) in Ethiopia. Seven studies

were examined on the effect of food supplementation on adherence to ART and the majority of these studies indicated that food supplement had positive impact to adherence to food (Tirivayi: 2013; Nyamathi: 2013; Ivers: 2014; Cantrell: 2008). Further seven studies were examined on the effect of food supplement on quality of life. Most studies showed that there was improvement. The findings indicated that the impact of nutrition assessment care support was weak because the implementation did not encompass the entire spectrum of nutrition interventions. They stated that none of the studies reviewed evaluated a comprehensive nutrition assessment and care support program, each had only a component. This study point to a complex role comprehensive nutrition intervention play in addressing nutrition problems in HIV and AIDS. They concluded that nutrition assessment and counselling could play an important role in the chronic care and treatment of PLWHIV who now have life expectancies of decades, rather than months or years. Therefore, early and intensive dietary interventions should be a fundamental part of the care management of HIV-infected individuals at the level of ART centre itself. Consequently, it can be argued that such interventions like nutrition counselling geared at improving the nutritional practices are essential in mitigating some dietary practice issues in PLWHIV and may help in the prevention of rapid progression of HIV to AIDS. Moreover, nutrition counselling of HIV patients has demonstrated that it is an effective tool to manage HIV/AIDS problems.

#### **6. Importance of integrating NEAC into HIV and AIDS Care Programs**

Integrating nutrition interventions into HIV and AIDS Care programs prolongs patient survival and reduces death due to malnutrition among PLWHIV, receiving ART and Prophylaxis (UNAIDS: 2014). Nutrition interventions like Nutrition Education, Assessment, and Counselling (NEAC) are vital in HIV and AIDS care. NEAC can empower PLWHIV to modify their diets, using locally available, nutrient dense and culturally acceptable foods to maintain good health,

improve their nutritional status and daily functioning in situations of limited resources. World Health Organisation (WHO) recommends integration of nutrition interventions through NEAC into care programs, as a priority action to ensure holistic HIV and AIDS care (UNAIDS:2014). This mitigates the two pronged disease burden, caused by HIV and AIDS and malnutrition. Other components of care that should be provided should include appropriate treatment of opportunistic infection, stress management, physical exercise, psychological and emotion counselling. For malnourished patient food supplements can also be part of the care and support. Research has demonstrated that Nutritional care and support help to break this vicious cycle by helping individuals improve, maintain or slow the decline of nutritional status; manage symptoms; boost immune response; and improve adherence and response to antiretroviral therapy (ART) and other medical treatment (Bukusuba et al: 2010). Therefore, nutrition is critical in combating HIV and AIDS and interventions can be implemented throughout prevention, care, treatment and support strategies.

#### **7. Constraints of Nutrition education, Assessment and Counselling (NEAC)**

Recent research has highlighted that nutrition assessment, education and counselling can remain weak components of nutritional interventions for PLWHIV without human capital (Abeman: 2014). Most reported studies of nutritional counselling interventions for PLWHIV have relied on professional staff (Almeida et al: 2011, Serrano et al: 2010, Martinez et al: 2014) and this type of support is limited in low-resource settings. Therefore, it can be argued that integration of nutrition support through NEAC should involve trained community health workers. Not only will this represent a possible solution to enhance its effectiveness but it also offers the linguistic, cultural, and community-building skills to establish rapport with PLWHIV. Besides, using the community health worker may help to reducing stigma, improving retention in care, and

improving quality and outcomes of HIV care. In support some studies have illustrated that the use of peer counselling in nutritional has produced effective results, an example of such a study was done in Honduras where A peer-delivered nutritional counselling intervention for PLWHIV was associated with improvements in dietary quality and reduced food insecurity among a population of diverse nutritional statuses assert that community health workers were reported to enhance the quality of HIV services as well as the dignity, quality of life and retention in care of PLWHIV was associated with improvements in dietary quality and reduced food insecurity among a population of diverse nutritional statuses . Their study filled a key gap in the literature on nutrition education and counselling interventions for PLHIV in resource-limited settings and proposed that future studies should rigorously test the effectiveness of peer-led nutritional education models on ART adherence and HIV outcomes (Derose et al: 2015). In another related by study (Banwat: 2013) it was reported that the involvement of health workers, the media, as well as governmental and non-governmental organisation in nutrition education would enhance improvement in the knowledge and practice of adequate nutritional intake among studied HIV and AIDS patients.

Another challenge in integrating nutrition in HIV care is that, in a busy HIV clinic it can be hard to find time to properly address nutrition issues. Since patients are not likely to die of malnutrition in the short term, health providers tend to prioritize acute conditions and disregard or under-treat chronic problems such as nutrition (UNAIDS: 2010). Lack of time among primary care physicians is one of the most strongly identified barriers to providing any kind of preventive care to patients during appointments (Kolasa & Rickett: 2010; Wynn et al: 2010).



## **8. Conclusion**

The importance of holistic nutrition management in PLWHIV and its benefits in improving the quality of life of PLWHIV cannot be over emphasised. There is need for holistic nutrition management through nutrition education, assessment and counselling incorporation in the care and support of HIV and AIDS. Nutritional intervention is one potential means to modify disease progression. Appropriate nutrition support can have a major effect on morbidity and mortality and may also result in improvements in immune function.

The following recommendations are suggested.

- For sustainable integration of NEAC services into routine health care, program interventions there is need for continued capacity building of health workers through refresher trainings, coaching and conducting technical support supervision for health workers that includes their role in providing nutrition-related services.
- Healthcare professionals, including nurses, physicians, dieticians, and knowledge of current nutritional issues are essential to provide appropriate nutrition and support for HIV- positive patients.
- It is essential that nutritional counselling be individualized to maintain and maximize the nutritional status and quality of life of each HIV- positive person. Good nutritional status might reduce the risk of infection and improve the patients' lives. In addition, since HIV and AIDS are highly sensitive issues and require behavioural change, appropriate communication strategies are crucial.
- Improve and expand NEAC capacity building through on-the-job training at health care centres to all health care providers.
- Train health extension workers in nutrition screening, referral and client follow-up.

## References

- Aberman, N. L., Rawat, R., Drimie, S., Claros, J.M., &Kadiyala, S. (2014). Food Security and Nutrition Interventions in Response to the AIDS Epidemic: Assessing Global Action and Evidence. *AIDS Behaviour*.18 (5), S554-565.
- Aishwarya. R.1. (2015). Assessment of Nutritional Status of people living with HIV/AIDS (PLWHA) in the age group of 18-55 years. *Journal of Nursing and Health Science* 4, (2) 17-28.
- Almeida, L.B., Segurado, A.C., Duran, A.C., & Jaime, P.C. (2011).Impact of a nutritional counselling program on prevention of HAART-related metabolic and morphologic abnormalities. *AIDS Care*. 23(6):755–63.
- Alo, C., Ogbonnaya, L.U., &Azuogu, B.N. (2014). Effects of nutrition counselling and monitoring on the weight and hemoglobin of patients receiving antiretroviral therapy in Ebonyi State, Southeast Nigeria. *HIV/AIDS*. 6:91–97.
- Banwat, M.E, Yakubu, N.W, Olalude, E.O, &Ogunsakin, J.A (2013) An Assessment of the Nutritional Knowledge, Practice and Status of Adult HIV/ Aids Patients Attending an Art Centre in Jos, North Central Nigeria. *Health Care Current Reviews* 1: 101. doi: 10.4172/hccr.1000101
- Bukusuba J., Kikafunda J.K. & Whitehead, G. R. (2010). Nutritional Knowledge, Attitudes and Practices of Women living with HIV in Eastern Uganda. *Journal of Health, Population and Nutrition*, 28, 182-188.
- Cantrell, R. A., Sinkala, M., Megazinni, K., Lawson-Marriott, S., Washington, S. & Chi B. (2008). A pilot study of food supplementation to improve adherence to antiretroviral

- therapy among food-insecure adults in Lusaka, Zambia. *Journal Acquire Immune Deficiency Syndrome*. 49(2):190–5.
- Castleman, T., Megan D. & Alison T., (2008). A Guide to Monitoring and Evaluation of Nutrition Assessment, Education and Counseling of People Living with HIV. Food and Nutrition Technical Assistance Project. Washington DC: Academy for Educational Development.
- Derose, K. P., Felician, M., Han, B., Palar, K., Blanca Ramírez, B., Farías, H. & Martínez, H. (2015). A pre-post pilot study of peer nutritional counselling and food insecurity and nutritional outcomes among antiretroviral therapy patients in Honduras. *BMC Nutrition* 1:21DOI 10.1186/s40795-015-0017-7.
- Dewan, R. (2008) operational lessons on nutritional counselling. National conference in nutrition and HIV/AIDS from knowledge to action conference report. Nagpur pp 38-39.
- FANTA. (2012). *Defining Nutrition Assessment, Counselling, and Support (NACS). Technical Note No.13*. Washington, DC: FHI360/FANTA.
- Fields-Gardner C. & Campa A, (2010). American Dietetic Association. Position of the American Dietetic Association: nutrition intervention and human immunodeficiency virus infection. *Journal Am Diet Assoc*. 110(7):1105–19.
- Food and Nutrition Technical Assistance (FANTA) Project. (2004). *HIV/AIDS: A Guide for Nutritional Care and Support*, (2<sup>nd</sup> Ed). Washington, DC: FHI 360.
- Gaikwad, S. S., Giri, P. A., Suryawanshi S. R., Garg, S., Singh, M. M. & Gupta V. K, (2013), “Impact of Nutritional Counselling on Dietary Practices and Body Mass Index among People Living with HIV/AIDS at a Tertiary Care Teaching Hospital in Mumbai. *J Med NutrNutraceut*, (2) 99-102

International dietetics nutrition & terminology (IDNT). (2014). Reference manual. 4<sup>th</sup> edition. Washington, DC: Academy of Nutrition and Dietetics, (<https://www.eatright.org/shop/product.aspx?id=6442471673>).

Ivers, L.C, Jerome G, & Freedberg, K.A. (2010). Food assistance is associated with improved body mass index, food security and attendance at clinic in an HIV program in central Haiti: a prospective observational cohort study. *AIDS Res Ther.* 7(33):1–8.

Kolasa, K. M., & Rickett, K. (2010). Barriers to providing nutrition counselling cited by Physicians: A survey of primary care practitioners. *Nutrition in Clinical Practice*, 25(5), 502-509.

Maertens, J.A. (2011). Barriers to Nutrition management among people living with HIV on Antiretroviral Therapy. Dissertation for Doctor for philosophy. Available at: [http://digitool.library.colostate.edu/exlibris/dt/d3\\_1/apache\\_media/L2V4bGlicmlzL2R0bC9kM18xL2FwYWNoZV9tZWRpYS8xMTc0ODA=.pdf](http://digitool.library.colostate.edu/exlibris/dt/d3_1/apache_media/L2V4bGlicmlzL2R0bC9kM18xL2FwYWNoZV9tZWRpYS8xMTc0ODA=.pdf)

Martinez, H., Palar, K., Linnemayr, S., Smith, A, Derose, K.P. & Ramirez B. (2014). Tailored nutrition education and food assistance improve adherence to HIV antiretroviral therapy: evidence from Honduras. *AIDS Behaviour.* 18 Suppl5:S566–77.

Mc Nulty, J (2013). *Challenges and Issues in Nutrition Education. Paper presented at the first International Conference in Rome: FAO.*

Ministry of Health. (2011). *Nutrition Guidelines for Care and Support of People Living with HIV/AIDS.* Lusaka: NFNC.

Ministry of health and social service. (2013). *Review Nutrition Assessment Counselling and Support (NACS) service Implementation in Namibia.* Windhoek: MHSS.

- Nti, C.A., Hayford, J. & Obiswa, C.O. (2012). Nutrition knowledge, Diet Quality and nutritional status of People Living with HIV (PLWHIV) in Ghana. *Food and Public Health*. 2(6) 219-227.
- Nyamathi, A., Sinha, S., Ganguly, K.K., Ramakrishna, P., Suresh, P., & Carpenter, C.L. (2013). Impact of protein supplementation and care and support on body composition and CD4 count among HIV-infected women living in rural India: results from a randomized pilot clinical trial. *AIDS Behaviour*. 17(6):2011–2021.
- Olive, G. M., Mwangi, A.M., & Mbugua, S.K. (2014). The Effects of Nutritional Knowledge on the Dietary Practices of People Living with HIV in Kayole Division, Nairobi-Kenya. *International Journal of Nutrition and Food Sciences*. 3 (6) 597-601. doi: 10.11648/j.ijnfs.20140306.27.
- Piwoz, E. G. (2004.) *Nutrition and HIV/AIDS: Evidence, Gaps, and Priority Actions*. Washington, DC: SARA Project, FHI 360.
- Piwoz, E. G., & Preble, E. A. (2000). HIV/AIDS and Nutrition: A review of the Literature and Recommendations for Nutritional Care and Support in Sub-Saharan Africa. Support for Analysis and Research in Africa (SARA) Project. Academy for educational Development. Washington DC 20009.III:8-21.
- Sackey, J., Zhang,F. Rogers, B.,Aryeetey, R. Wanke, C. (2018) Food security and dietary diversity are associated with health related quality of life after 6 months of follow up among people living with HIV in Accra, Ghana. *AIDS Care*. 30 (12) 1567-1571
- SCN 2004. 5th Report on the world nutrition situation: Nutrition for Improved Development outcomes. *In: SCN (Ed.)*. Geneva: United Nations System: Standing Committee on Nutrition.

- Serrano, C. Laporte, R., Ide, M., et al. (2010). Family nutritional support improves survival, immune restoration and adherence in HIV patients receiving ART in developing country. *Asia Pacific journal of clinical nutrition*. 19(1):68–75.
- Tabi, M., Robert L. Vogel. (2005). Nutritional counselling: an intervention for HIV-positive patients. *Journal of Advanced Nursing*, 54(6), 676-682.
- Tabi, M. & Robert, L. V. (2005). Nutritional counselling: An Intervention for HIV-Positive Patients, *Journal of Advanced Nursing*, 54(6), 676-682.
- Tang, M., A., Quick, T., Chung, M & Wanke, C. A. (2015). Nutrition Assessment, Counselling And Support Interventions To Improve Health-Related Outcomes in People Living with HIV/AIDS: A Systematic Review of the Literature, *Journal of acquired immune Deficiency Syndrome*. 68(3) 340-349.
- Thapa, R. Amatya, A., Pahari, D.P, Bam, K. & Newman, S, (2015). Nutritional status and its association with quality of life among people living with HIV attending public anti-retroviral therapy sites of Kathmandu Valley, Nepal. *AIDS Research and Therapy*. DOI 10.1186/s12981-015-0056-9
- The President's Emergency Plan for AIDS Relief (PEPFAR) (2006). Report on Food and Nutrition for People Living with HIV/AIDS May 2006.
- Tirivayi N, Koethe J, & Groot W. (2012). Clinic-based food assistance is associated with increased medication adherence among HIV-infected adults on long-term antiretroviral therapy in Zambia. *J AIDS Clinic Res* 3(7)
- Tushemerirwe, F.T. (2016). *Integrating the Nutrition Education and Counselling (NEC) Intervention into the Rakai Health Sciences HIV/AIDS Care Program*. Unpublished

- UNAIDS, (2014), “Nutrition assessment, counselling and support for adolescents and adults living with HIV a programming guide: Food and Nutrition in the Context of HIV and TB” Guidance Note, Geneva: UNAIDS
- UNAIDS, (2014). *Global Nutrition Report 2014*. Geneva: UNAIDS.
- UNAIDS. (2010). *Integrating nutrition into HIV/AIDS care, treatment and support using quality improvement approach: results from Uganda*. Kampala: UNAIDS
- USDA. (2012b). Nutrition – Website: National Institute of Food and Agriculture. Available at: [www.nifa.usda.gov/nutrition.cfm](http://www.nifa.usda.gov/nutrition.cfm)
- Walsh C, Dannhauser A, & Joubert, G. (2003). Impact of a nutrition education programme on nutrition knowledge and dietary practices of lower socioeconomic communities in the Northern Cape. *South African Journal of Clinical Nutrition* 16: 89-95.
- World Health Organisation, (2003). “*Nutrient Requirements for people* “Nutrient Requirements for PLHIV”. Report of a Technical Consultation, May 13 --15, 2003. Geneva: WHO
- Wynn, K., Trudeau, J. D., Taunton, K., Gowans, M., & Scott, I. (2010). Nutrition in primary care: Current practices, attitudes, and barriers. *Canadian FamilyPhysician*, 56, 109-116
- Yoon, H. Yang, H. and Her E. (2000). Effect of nutrition education program on nutrition knowledge, dietary diversity of elementary school children. Korean. *Journal of Community Nutrition*, 5 (3), 513-521.