SUMMARY

Background: Undernutrition and HIV/AIDS are strongly inter-related and highly prevalent in many parts of the world particularly in sub-Saharan Africa. To tackle undernutrition among people living with HIV, many countries including Ethiopia integrated nutritional programs into their HIV care services, with nutritional assessment, counselling and food supplement as key program elements. Despite some research on the effectiveness of such programs, proper evaluation of nutritional programs in the context of the Ethiopian health system is lacking. Little evidence exists about the determinants of nutritional outcomes of people living with HIV in the nutritional program or barriers and facilitators of program utilisation. Using socioecological and social determinants of health models, this study aimed to examine factors influencing the success or failure of the nutritional program in HIV care settings in Ethiopia.

Methods: The study used mixed methods involving quantitative and qualitative elements. The quantitative element of the study included a retrospective cohort study involving HIV patient records from 1757 adults and 236 children from three purposively selected hospitals in Tigray region, Ethiopia. The nutritional outcomes analysed were:

a) **Incompleteness** (failure to stay in the program for three to six months depending on the nutritional status);
b) **Non-response** (failure to achieve target BMI>18.5kg/m^2 among those completing the program and
c) **Relapse** of undernutrition after program completion and nutritional recovery.

Logistic and Cox regression analysis were employed to identify the independent predictors of these outcomes including demographic and socioeconomic, clinical and immunological, nutritional and anthropometric factors. In the qualitative inquiry, a total of 48 in-depth interviews were conducted with adults living with HIV (n=20), caregivers of children living with HIV (n=15), health providers (n=11) and program managers (n=2). Data were analysed using a framework approach guided by the socioecological model.

Results: Rates of program incompleteness and non-response in adults were 18% and 20% respectively, while program incompleteness and non-response in children were each 14%. Among those who achieved nutritional recovery, 18% of adults and 7% of children relapsed to undernutrition. The average time to relapse of adults living with HIV to the nutritional program was 68.5 months (95% CI, 67.0–69.9).

Urban residence (AOR=1.4, p≤0.02), attending the nutritional program in Shul (AOR=4.6, p≤0.0001) and Lemlem Karl (AOR=2.5, p≤0.0001) were independent predictors of nutritional program incompleteness. Similarly, urban residence (AOR= 1.46, p≤0.03), attending the nutritional program in Shul hospital (AOR=2.92, p≤<0.0001) and Lemlem Karl (AOR=1.49, p≤0.047) hospitals were associated with non-response to the nutritional program. Being employed and working was associated with nutritional program incompleteness (AOR=1.39, p≤0.046) and frequency of relapsing (AOR=3.86, p≤0.029).

Lower educational status (attending primary (AOR=3.68, p≤0.03) and secondary education (AOR=3.25, p≤0.049)) and not being a member of a community support group (AOR= 1.78, p≤0.001) were independent predictors of relapse of undernutrition. Adults in the WHO classification of lower clinical stages II (AOR=2.49, p≤0.001) and III (AOR=1.46, p≤0.037) and presence of anaemia at baseline (AOR=1.77, p≤0.001) were associated with program incompleteness. Patients with advanced (WHO clinical stage IV) (AOR,0.52, p≤0.047) ≤ and bedridden functional status (AOR=0.36, p≤0.02) were more likely to recover in the nutritional program. Staying more than 24 months on ART (AOR=2.15, p≤0.004 and presence of opportunistic infections (AOR=1.68, p≤0.004) were the clinical predictors of relapse to undernutrition in adults. Children with opportunistic infections at enrolment were more likely to become non-respondent than their counter parts (AOR=8.18, p≤0.006. Severe acute undernutrition at enrolment was associated with program incompleteness in both adults and children (AOR=13.71, p≤0.024), and non-response (AOR=4.25, p<0.0001) and frequency of relapse of undernutrition (AOR=9.90, p≤0.004) only in adults.

The findings from the qualitative study revealed that knowledge of nutrition and the nutritional program, ongoing motivation to maintain the program, nutritional counselling and experience in the health service were key factors facilitating program utilisation. Experience of the nutritional support, health system related factors such as poor access, poor management and implementation of the program were reported as key barriers to the utilisation of the nutritional program. Broader sociocultural factors such as food insecurity, poverty and poor livelihood, cultural meaning of food, religious fasting, stigma and discrimination were critical challenges in program utilisation and its effectiveness in meeting the key objectives of improved nutritional status and HIV condition.

Conclusion and recommendations: A range of factors at the individual, community, health system and broader contextual levels interacted and influenced the effectiveness of the nutritional program. High rates of program incompleteness, non-response and relapse were apparent. These outcomes were associated with demographic and socioeconomic, clinical and immunological, nutritional and anthropometric characteristics of patients. Broader sociocultural factors were underlying determinants that constrained the optimal access to, and utilisation of the nutritional program in Ethiopia. The current medically-oriented strategies with an emphasis on nutritional supplements failed to address these underlying causes of undernutrition and were unable to assist patients living with HIV in maintaining nutritional wellbeing beyond the life of the program. This study concludes that individual and broader sociocultural and contextual factors are crucial considerations for nutrition program planning, implementation and evaluation, if these programs are to be successful in reaching their goals of improving health and wellbeing for people living with HIV. To improve the nutritional outcome of patients enrolled in the nutritional program:

- Nutritional programs need to have more emphasis on women and individuals living in urban areas during enrolment, patient monitoring and follow up.
- the location of health services requires special attention to improve access to the nutritional program
- NGOs in Ethiopia needs to work more in relation to the local and national Ethiopian health priorities and health system issues while focusing on local capacity building
- Graduation criteria should take into account long term household food security, not just the acute treatment of undernutrition.