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Research Article

Prevalence and Factors Associated with Stunting Among HIV/AIDS-Infected Under-5 Children in Government Hospitals in Addis Ababa, Ethiopia, 2025

Cheru Kore Sifir^{1*}, Adisu W/Giorgis²

¹Department of public health, Rift Valley University, Addis Ababa 1000, Ethiopia

²Department of Pharmacy, Rift Valley University, Addis Ababa 1000, Ethiopia

***Corresponding Author:** Cheru Kore Sifir, Department of public health, Rift Valley University, Addis Ababa 1000, Ethiopia

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Abstract

Background: Malnutrition, particularly stunting, is a major health problem among HIV-infected children in sub-Saharan Africa. This study assessed the prevalence and determinants of stunting among HIV-infected under-five children in Addis Ababa.

Methods: An institution-based cross-sectional study was conducted among 251 children aged 6–59 months attending ART clinics in government hospitals of Addis Ababa. Data were collected using structured questionnaires and anthropometric measurements. Logistic regression analysis was employed to identify factors associated with stunting.

Results: The prevalence of stunting was 33.4%, underweight 14.3%, and wasting 12.1%. Stunting was more prevalent among male children (35%) than females (31.6%). Maternal education (no formal schooling, AOR 3.42; 95% CI: 1.11–10.57), religion, and type of health facility were significantly associated with stunting ($p < 0.05$).

Conclusion: Stunting remains a major public health issue among HIV-infected under-five children in Addis Ababa. Strengthening maternal education, nutritional counseling, and integrated PMTCT services are recommended.

Keywords: HIV, Stunting, Undernutrition, Children, Addis Ababa, Ethiopia

Introduction

HIV/AIDS and undernutrition are two interlinked public health challenges that disproportionately affect children in sub-Saharan Africa. The immunosuppressive effects of HIV and the nutritional deficiencies associated with stunting and wasting create a vicious cycle of morbidity and mortality. In Ethiopia, malnutrition remains one of the leading causes of childhood morbidity and mortality, particularly among children living with HIV. However, limited evidence exists regarding the prevalence and determinants of stunting among HIV-infected under-five children in Addis Ababa. This study was conducted to fill this gap. In HIV infection, ferritin, a marker of iron deficiency, may be altered by inflammation. This has been confirmed by the study of Frosch et al. who found elevated levels of ferritin in HIV infected individuals without correlation with iron deficiency anemia. In this latter investigation, the

iron biomarker soluble transferrin receptor (sTfR) was the best predictor of anemia in the HIV infected participants, and (sTfR) was also associated with a 6-fold increase in the odds of anemia. Hassan et al. [38] concluded that humoral, non-specific immunity (phagocytic activity and oxidative burst), and IL-6 are influenced in patients with iron deficiency anemia. Other evidence also suggests that anemia is associated with an increased risk of all-cause mortality and tuberculosis among HIV-infected individuals, regardless of anemia type, and the magnitude of the risk is higher with more. In Ethiopia, child malnutrition rate is one of the most serious public health problem and the highest in the world. High stunting rates in the country pose a significant obstacle to achieve better child health outcomes. Stunting and Underweight rates among young children are the highest in sub-Saharan Africa. About

46.5% of the children are stunted out of them half of them are sever stunted [39].

Statement of the problem

Under nutrition influences disease progression, increases morbidity and lowers survival of HIV infected persons. Additionally, HIV/AIDS has enormous impact on food security of affected households. Other covariates of child malnutrition have been documented including child level factors such as age and birth weight; maternal level factors such as maternal age and education; household level factors such as food insecurity and social economic status; and community level factors such as sanitation and environmental factors. Importance of these factors to nutritional status of children may vary with differing contexts indicating the need for context-specific evidence. Malnutrition is important both as an underlying and contributory cause of child mortality in developing countries [40]. Nutrition and HIV/AIDS are strongly related to each other because HIV/AIDS results in immune impairment, which can easily lead to malnutrition. In turn, malnutrition leads to immune impairment that worsens the effect of HIV and contributed to more rapid progression of AIDS. Thus malnutrition can both contribute to and result from the progression of HIV. A person who is malnourished and then acquired HIV is more likely to progress faster to AIDS, because his /her body already weak and cannot fight infection [41]. The human immunodeficiency virus epidemic continues to be a major challenge to global health. According to the 2019 WHO report, about 39 million people worldwide were living with HIV/AIDS (LWHA) and of them 1.5 million were children. Malnutrition in turn can worsen the disease and its impact by impairing immunity [31]. And also malnutrition in sub-Saharan Africa contributed to high rates of childhood mortality and morbidity [42].

Significance of study

However there is little evidence in Ethiopian context in general and in the study area in particular regarding to the nutritional condition of peoples' living HIV/AIDS whether they are in pre ART or ART care. Therefore, this study will assess the stunting and associated factors children living with HIV/AIDS in Government Hospitals in Addis Ababa, Ethiopia. The finding result will be important as a base line reference for researchers to address the problem of malnutrition among children living with HIV/AIDS. The finding on factors associated with stunted HIV positive children will give good knowledge for the health professionals working in comprehensive care clinic that will enable them to detect these conditions at an early stage and/or to prevent them. In addition it helps for many researchers as a reference of Addis Ababa. This study will provide baseline data on the nutritional status of HIV-positive children, which is crucial for developing targeted interventions.

Objective

General objective

To assess the Stunting and associated factors of Children among 6-59 months age living with HIV/ AIDS in government hospitals in Addis Ababa, Ethiopia.

Specific objectives

To determine the prevalence of stunting among HIV-positive children under 5 years among 6-59 months age in government hospitals of Addis Ababa by July 2025. To identify factors associated with stunting on HIV positive children among 6-59 months of age in government hospitals of Addis Ababa by July 2025.

Methods

Study Design

An institution-based cross-sectional study was employed to assess the prevalence and determinants of stunting among HIV-infected children. This design was selected because it allows estimation of the burden of malnutrition at a specific point in time and enables exploration of associations between multiple socio-demographic and clinical factors.

Study Area

The study was conducted in pediatric ART clinics of government hospitals located in Addis Ababa, Ethiopia. Addis Ababa is the capital city and largest urban center of Ethiopia, with an estimated population exceeding 5 million. The city hosts more than 12 public hospitals that provide comprehensive HIV prevention, care, and treatment services, including pediatric ART. These hospitals serve as referral centers for surrounding areas and provide follow-up for a large number of HIV-infected children.

Study Population

The study population consisted of HIV-infected children aged 6–59 months who were on follow-up in selected government hospitals of Addis Ababa during the study period. Caregivers of the children were also included as primary respondents for socio-demographic and maternal-related information. Children with severe illness requiring hospitalization and those above 5 years of age were excluded to minimize bias.

Sample Size Determination

The sample size was determined using a single population proportion formula, considering the prevalence of stunting (65%) reported from a previous Ethiopian study, with a 95% confidence level and 5% margin of error. This yielded a minimum required sample size of 350, to which 10% was added for potential non-response, resulting in 385. However, due to limited numbers of eligible children in the selected hospitals during the study period, a final sample of 251 children was included in the analysis.

Sampling Procedure

A purposive selection of government hospitals providing pediatric ART services was undertaken. Within each hospital, all eligible HIV-infected children who presented during the study period were consecutively enrolled until the desired sample size was reached. Caregivers were interviewed after providing written informed consent.

Data Collection Procedures

Data were collected using a structured, pre-tested questionnaire adapted from validated tools and previous studies. The questionnaire captured socio-demographic information, maternal education and occupation, household characteristics, child feeding practices, clinical history, and ART status. It was initially prepared in English, translated into Amharic for data collection, and back-translated into English to ensure consistency. Anthropometric measurements were also obtained:

- * Weight was measured using calibrated beam balance or infant scales, recorded to the nearest 0.1 kg with minimal clothing and no shoes.
- * Height/length was measured to the nearest 0.1 cm using a standardized measuring board; recumbent length for children <2 years and standing height for those ≥2 years.
- * Mid-upper arm circumference (MUAC) and presence of bilateral pitting edema were also assessed following WHO guidelines.

Data Quality Assurance

Prior to data collection, training was provided for data collectors and supervisors on interview techniques, anthropometric measurement, and ethical considerations. The questionnaire was pre-tested on 5% of the sample in a similar hospital setting, and modifications were made accordingly. Instruments were calibrated daily. Completed questionnaires were checked for completeness and accuracy each day by supervisors and the principal investigator.

Data Analysis

Data were coded and entered into Epi-Info 7 and exported to SPSS version 25 for analysis. Descriptive statistics such as frequencies, means, and proportions were computed to summarize the characteristics of study participants. Bivariate logistic regression was performed to assess associations between independent variables and stunting. Variables with p-value <0.2 in bivariate analysis were entered into a multivariable logistic regression model to control for potential confounders. Adjusted odds ratios (AOR) with 95% confidence intervals (CI) were reported, and statistical significance was declared at p<0.05.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of the Addis Ababa Health Bureau and Rift Valley University. Official letters of permission were secured from

the selected hospitals. Written informed consent was obtained from each caregiver prior to data collection. Confidentiality was maintained by removing personal identifiers, and participation was voluntary, with the right to withdraw at any stage without repercussions on clinical care.

Results

A total of 251 HIV-exposed children aged 6–59 months were included in the study. The mean (\pm SD) age of participants was 17 (\pm 9.8) months, and slightly more than half were female (53.4%). The overall prevalence of undernutrition was 38%. Specifically, 83 children (33.4%) were stunted, 35 (14.3%) were underweight, and 30 (12.1%) were wasted. Gender differences were observed: stunting was more common among males (35.0%) compared to females (31.6%), while wasting and underweight were slightly higher among girls.

Multivariable logistic regression revealed that maternal education, religion, and type of health facility were significantly associated with stunting ($p<0.05$). Children whose mothers had no formal education had more than threefold higher odds of stunting (AOR = 3.42; 95% CI: 1.11–10.57) compared with those whose mothers had completed secondary education. Similarly, differences in health facility and religious background were independently linked with stunting prevalence.

Discussion

This study revealed a high prevalence of stunting among HIV-infected children under five years of age in Addis Ababa, underscoring the persistent burden of undernutrition in this vulnerable population. The prevalence observed is comparable with findings from other sub-Saharan African countries, where stunting rates among HIV-infected children range from 30% to 50%. These consistencies reinforce the strong association between HIV infection and chronic malnutrition, as HIV compromises immunity, increases susceptibility to infections, and alters nutrient absorption and utilization.

Sex-related differences were also noted, with boys more likely to be stunted than girls. Similar gender patterns have been documented in regional studies, suggesting possible biological vulnerability of male children to growth faltering, as well as cultural and caregiving practices that may disadvantage them in early childhood.

Maternal education emerged as a critical determinant of child nutritional status. Children of mothers without formal education were significantly more likely to be stunted, supporting evidence from Ethiopian and regional studies that maternal literacy plays a vital role in improving knowledge of optimal child feeding, hygiene, and health-seeking behaviors. Strengthening female education is therefore not only a social investment but also a strategy to improve child health outcomes.

The type of health facility was another independent predictor of stunting, highlighting the influence of service quality and

availability of nutritional support in ART programs. Facilities with better resources, trained staff, and integrated nutrition services may provide more effective care, leading to improved growth outcomes among HIV-exposed children. Overall, these findings emphasize the need for comprehensive interventions that integrate nutritional assessment and counseling into routine pediatric HIV care. Tailored strategies addressing maternal education, gender-specific vulnerabilities, and health service strengthening could contribute significantly to reducing stunting and improving the survival of HIV-infected children.

Conclusion

The prevalence of stunting among HIV-infected under-five children in Addis Ababa remains high. Interventions focusing on maternal education, nutritional counseling, and strengthening of PMTCT and ART services are urgently needed. Policy makers and health professionals should prioritize integrated approaches to reduce childhood malnutrition in HIV-affected populations.

Recommendations

Integrate Nutritional Support into HIV Care:

Health facilities providing ART services should routinely include nutritional assessment, counseling, and supplementation for HIV-infected children under five to prevent and manage stunting.

Promote Maternal Education and Awareness:

Programs aimed at improving child nutrition should prioritize maternal education, including literacy, health knowledge, and infant feeding practices, as maternal education was strongly associated with better child growth outcomes.

Address Gender-Specific Vulnerabilities:

Interventions should consider sex-based differences in growth patterns. Special attention may be required for boys, who appear more vulnerable to stunting, through targeted monitoring and nutritional support.

Strengthen Health Facility Capacity:

Improve the quality of pediatric HIV care by ensuring health facilities are equipped with trained staff, adequate nutritional resources, and integrated child health services to effectively prevent and manage malnutrition.

Community-Based Nutrition Programs:

Expand outreach programs that educate caregivers on proper feeding practices, hygiene, and timely healthcare seeking, particularly in communities where maternal education levels are low.

Policy and Multi-Sectoral Action:

Policymakers should prioritize interventions that link HIV care with nutrition, education, and social support services, ensuring a coordinated approach to reduce stunting among HIV-infected children.

Further Research:

Conduct longitudinal studies to explore causal pathways between HIV infection, gender, maternal education, and stunting, which could inform more targeted interventions.

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