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Impact of Household Food Security and Government Food Assistance on the Nutritional Status of PLHIV in Malang, Indonesia

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ABSTRACT

This study examined the relationship between household food security, the Ministry of Social Affairs' ATENSI food assistance, and the nutritional status of people living with HIV (PLHIV) in WPA Turen, Malang, Indonesia. Conducted in November 2025, this cross-sectional quantitative study involved 110 ATENSI recipients. Data were collected via questionnaires and Body Mass Index (BMI) measurements, then analyzed using Chi-square tests. Most respondents were socio-economically vulnerable: 86.4% earned below IDR 3,000,000 monthly, and nearly half were unemployed. Nutritionally, 60.9% had normal status, 23.6% were underweight, and 15.5% were overweight. Furthermore, 65.5% considered the ATENSI assistance inadequate for their household needs. A significant association was found between household food security and nutritional status (p=0.005), showing that food-insecure PLHIV were more likely to be underweight. However, the relationship between ATENSI assistance and nutritional status was not significant (p=0.238), likely because the assistance is only distributed annually, limiting its long-term impact. In conclusion, while household food security critically determines PLHIV nutritional status, annual assistance is insufficient. The study recommends shifting to monthly or quarterly distributions, alongside food diversification, nutrition education, and economic empowerment programs to address underlying poverty and improve health outcomes.

Key Messages:

- Household food security is a significant determinant of nutritional status among PLHIV, highlighting the importance of stable access to adequate food.
- Annual food assistance programs, such as ATENSI, may be insufficient alone to improve the nutritional status of PLHIV.

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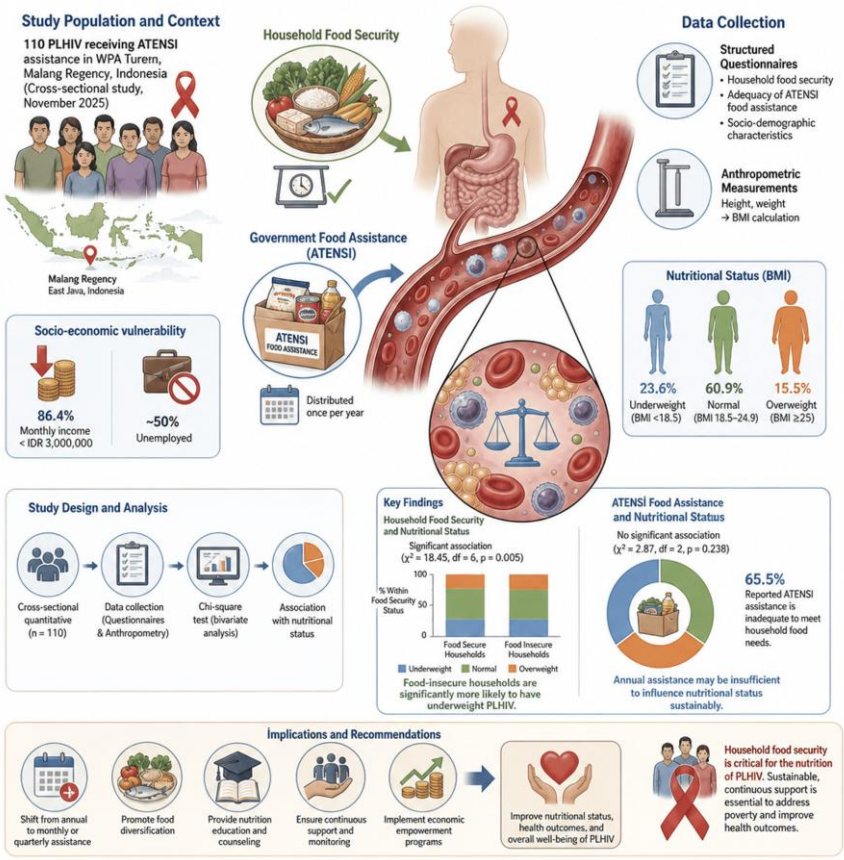
GRAPHICAL ABSTRACT



INTRODUCTION

HIV/AIDS remains a complex public health challenge, particularly in middle-income countries such as Indonesia. The infection affects not only the immune system but also the social, psychological, and functional well-being of people living with HIV (PLHIV). Numerous studies emphasize that HIV is not an isolated medical condition; rather, it interacts with various factors such as nutritional status, food security, and social support, which collectively exacerbate the overall health burden among PLHIV(1). Nutritional problems constitute one of the most critical issues closely linked to the progression of HIV. HIV infection accelerates metabolic degradation, increases energy requirements, and reduces nutrient absorption efficiency. These processes often lead to weight loss, micronutrient deficiencies, and heightened vulnerability to opportunistic infections. Evidence from various studies shows that PLHIV are at greater risk of malnutrition, particularly when they lack access to sufficient and nutritious food (2). Beyond its social implications, inadequate food intake also represents a direct medical barrier to effective HIV treatment, as poor nutritional status reduces tolerance to antiretroviral therapy (ART) and increases the likelihood of treatment interruption. Household food insecurity further contributes to poor nutritional outcomes because it reduces both the quality and quantity of daily dietary intake.

The HIV/AIDS epidemic remains a major global public health challenge, with an estimated 39.9 million people living with HIV in 2023, highlighting the persistent global burden(3). In Indonesia, the national estimate indicates approximately 564,000 people living with HIV, demonstrating that the epidemic continues to demand significant public health attention(4). At the provincial level, East Java ranks as the region with the highest number of HIV/AIDS cases nationally, recording 65,238 cases in 2025. Locally, Malang Regency documented 1,293 HIV/AIDS cases in 2025, showing that the epidemic remains substantial at the district level. Identified active PLHIV community involvement in Turen, underscoring that HIV in Malang is not merely numerical but reflects lived experiences within the community(5). In the study area, socio-economic vulnerability is pronounced, with 86.4% of PLHIV reporting monthly incomes below IDR 3,000,000 and nearly half being unemployed. These conditions limit household purchasing power and

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directly affect food availability, access, and utilization, which are the core dimensions of household food security.

Recent literature highlights that food assistance has become a crucial component of support for people living with HIV (PLHIV), especially in low- and middle-income settings. Food support plays a dual role: it addresses nutritional deficits and promotes adherence to antiretroviral therapy (ART), as individuals experiencing hunger are more likely to skip medications or fail to follow treatment schedules(6). Evidence also shows that structured food assistance programs can improve nutritional status, prevent weight loss, and enhance overall immunity among PLHIV(7). In Indonesia, food assistance has been integrated into the national social protection system as part of the government's efforts to support vulnerable populations. Studies conducted in the Indonesian context indicate that PLHIV frequently face household food insecurity due to reduced work capacity, social stigma, and unstable income, making them heavily dependent on sustained food support (8).

The Ministry of Social Affairs' ATENSI Permakanan program represents one of the government's initiatives designed to provide staple food supplies and address the nutritional vulnerabilities of PLHIV. However, the ATENSI food assistance program is distributed only once per year, which raises concerns regarding its capacity to address chronic food insecurity and sustain adequate nutritional status over time. This situation is evident in WPA Turen, where many PLHIV continue to face household food shortages. Interviews conducted with Internal Peer Support Volunteers (PDIV) of WPA Turen during 2024–2025 revealed that most PLHIV in the community receive food assistance from the Ministry of Social Affairs to support their daily dietary intake. However, the PDIV reported that this food assistance does not always fully meet individual nutritional needs, especially among PLHIV experiencing severe economic hardship or those with greater household responsibilities. In addition, households in this area commonly consist of four to six members, which increases total food demand and dilutes the impact of food assistance packages intended primarily for individual beneficiaries. Some beneficiaries continue to experience irregular eating patterns, reduced meal portions, or reliance on low-cost, nutrient-poor food choices.

Recent studies also emphasize that food quantity alone is insufficient; dietary diversity and access to nutrient-dense foods, particularly adequate protein, fruits, and vegetables, are essential for maintaining immune function and supporting ART effectiveness among PLHIV. These local observations align with international findings that the effectiveness of food assistance programs for PLHIV is strongly influenced by household food security levels and economic stability. When food support is inconsistent or insufficient relative to individual energy needs, its impact on nutritional improvement becomes limited (9). Consequently, the situation in WPA Turen underscores the need to examine the relationship between household food security, government food assistance, and the nutritional status of PLHIV to ensure more effective and well-targeted interventions.

METHODS

This study employed a quantitative approach with a cross-sectional design, selected to assess the relationship between household food security and Ministry of Social Affairs' ATENSI food assistance with the nutritional status of PLHIV at WPA Turen at a single point in time. The research was conducted in November 2025 and involved all active PLHIV registered as recipients of the support program, totaling 110 respondents, using a total sampling technique. Inclusion criteria included: (1) active membership at WPA Turen, (2) receipt of ATENSI food assistance at least once during the program year, and (3) willingness to provide written informed consent. Respondents with incomplete anthropometric data were excluded.

Data were collected through structured questionnaires and anthropometric measurements. Household food security was measured using the Household Food Insecurity Access Scale (HFIAS), consisting of 9 standard items. Each item was scored on a scale of 0–3, resulting in a total score ranging from 0 to 27. Based on standard HFIAS guidelines, respondents were categorized into four levels: food secure (0–1), mildly food insecure (2–7), moderately food insecure (8–14), and severely food insecure (15–27).

ATENSI food assistance was assessed through a questionnaire covering the frequency of assistance received, perceived adequacy, and utilization of the food packages. Perceived adequacy was measured

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subjectively based on respondents' self-assessment using the question "Does the food assistance meet your household's daily food needs?", with response options categorized as adequate or inadequate. To account for variations in food demand, respondents were also asked to report household size, which commonly ranged from four to six members in the study area. Utilization was defined as how the food assistance was consumed, including whether it was used solely by the PLHIV or shared among household members. Nutritional status of PLHIV was determined by calculating Body Mass Index (BMI) based on directly measured weight and height by trained health staff using calibrated digital scales and microtoise. BMI classification followed the World Health Organization (WHO) international standards: underweight (<18.5 kg/m^2), normal (18.5–24.9 kg/m^2), and overweight (≥25.0 kg/m^2).

Data analysis included univariate analysis to describe the distribution of each variable and respondent characteristics, and bivariate analysis to examine the relationships between household food security and nutritional status, as well as between ATENSI food assistance and nutritional status, using the Chi-square test. To further control for potential confounding factors, multivariable logistic regression analysis was conducted to assess whether household food security remained a significant predictor of nutritional status after adjusting for socio-economic variables, including monthly income, employment status, and household size. All data analyses were performed using SPSS version 26.

Prior to data collection, the questionnaire assessing ATENSI food assistance was pilot-tested among 15 PLHIV outside the study sample to ensure clarity and reliability. Internal consistency was evaluated using Cronbach's alpha, with a coefficient of ≥0.70 considered acceptable.

Participation was entirely voluntary. Respondents were informed about the study's purpose, procedures, potential risks, and benefits prior to providing written informed consent. Confidentiality was strictly maintained through anonymized coding, and respondents were free to withdraw at any time without affecting access to program services. The study was conducted in accordance with research ethics principles, including autonomy, beneficence, non-maleficence, and justice.

To minimize social desirability bias, interviews were conducted in private settings, respondents were assured that their answers would not affect their eligibility for government assistance, and questionnaires were administered using neutral, non-judgmental language by trained data collectors who were not directly involved in ATENSI aid distribution.

RESULTS

Table 1 shows the general characteristics of the study respondents. Among the 110 PLHIV included in the study, the largest proportion were aged 26–35 years (36.4%). Males predominated in the sample, accounting for 63.6%, while females represented 36.4%. Regarding household income, the majority of respondents (86.4%) reported earning less than IDR 3,000,000 per month. This economic vulnerability was compounded by employment status, as nearly half of the respondents (45.5%) were unemployed or not working, indicating limited and unstable income sources. Slightly more than half of the respondents (54.5%) were employed. In terms of household size, 50% of respondents lived in households with 4–6 members, followed by 31.8% in households of 1–3 members and 18.2% in households with seven or more members. This indicates that limited household income must often be shared among several individuals, which substantially increases the risk of household food insecurity and weakens the capacity to meet adequate daily nutritional needs. These findings provide a detailed overview of the socio-demographic profile of PLHIV receiving ATENSI food assistance at WPA Turen.

Table 2 presents the distribution of nutritional status among PLHIV according to household food security and ATENSI assistance. Among the respondents, 60.9% had normal nutritional status, 23.6% were underweight, and 15.5% were overweight. Among respondents living in food-secure households (n = 45), 30 individuals (approximately 66%) had a normal BMI, regardless of whether ATENSI assistance was perceived as adequate or inadequate. This pattern suggests that stable access to food at the household level plays a dominant role in maintaining normal nutritional status.

In contrast, a visible shift toward underweight status was observed among respondents experiencing moderate to severe food insecurity, particularly when ATENSI assistance was perceived as inadequate. In these groups, the proportion of underweight individuals exceeded or approached that of

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those with normal BMI, indicating that chronic food access constraints substantially increase the risk of malnutrition among PLHIV. In this study, the category of "adequate" or "inadequate" ATENSI assistance refers to respondents' subjective perception of whether the one-time food package distributed annually was sufficient to meet their household food needs, taking into account the number of household members sharing the food. These findings indicate that household food security plays a more consistent role in shaping nutritional outcomes than short-term food assistance alone among PLHIV at WPA Turen.

Table 1. General Characteristics of Respondents (n = 110)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	≤25	15	13.6
	26–35	40	36.4
	36–45	35	31.8
	>45	20	18.2
Gender	Male	70	63.6
	Female	40	36.4
Household Income	< IDR 1,500,000	50	45.5
	IDR 1,500,000–3,000,000	45	40.9
	> IDR 3,000,000	15	13.6
Occupation	Employed	60	54.5
	Unemployed / Not working	50	45.5
Household Size	1–3 persons	35	31.8
	4–6 persons	55	50.0
	≥7 persons	20	18.2

Table 2. Distribution of Nutritional Status of PLHIV by Household Food Security and ATENSI Assistance (n = 110)

Household Food Security	ATENSI Assistance	Underweight (n, %)	Normal (n, %)	Overweight (n, %)	Total (n)
Food secure	Adequate	3 (6.7%)	20 (44.4%)	8 (17.8%)	31
	Inadequate	2 (4.4%)	10 (22.2%)	2 (4.4%)	14
Mild insecurity	Adequate	4 (7.3%)	10 (18.2%)	3 (5.5%)	17
	Inadequate	6 (10.9%)	10 (18.2%)	2 (3.6%)	18
Moderate insecurity	Adequate	2 (3.6%)	5 (9.1%)	1 (1.8%)	8
	Inadequate	6 (10.9%)	10 (18.2%)	2 (3.6%)	18
Severe insecurity	Adequate	1 (1.8%)	1 (1.8%)	0 (0%)	2
	Inadequate	2 (3.6%)	1 (1.8%)	0 (0%)	3
Total		26 (23.6%)	67 (60.9%)	17 (15.5%)	110

The Chi-square analysis indicated that household food security was significantly associated with the nutritional status of PLHIV ($\chi^2 = 18.45$, df = 6, p = 0.005). Individuals living in food-insecure households were more likely to be underweight. In contrast, ATENSI assistance did not show a significant association with nutritional status ($\chi^2 = 2.87$, df = 2, p = 0.238), suggesting that the yearly food aid may not be sufficient to influence BMI substantially in this population. Notably, the chi-square value for household food security (18.45) was substantially higher than that for ATENSI assistance (2.87), emphasizing that internal household conditions—such as income stability, employment, and household size are much stronger predictors of nutritional status than the current annual food assistance model.

Table 3. The Relationship between Household Food Security and the Ministry of Social Affairs' Food Attention Assistance with the Nutritional Status of PLHIV in the Turen WPA

Independent Variable	χ^2	df	p-value
Household Food Security	18.45	6	0.005
ATENSI Assistance	2.87	2	0.238

DISCUSSION

Characteristics of Subjects

The study revealed that the majority of respondents were aged 26–35 years (36.4%) and

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predominantly male (63.6%). This observation aligns with national epidemiological data indicating that young adult males are the most affected group by HIV in Indonesia **(10)** Regarding economic status, most respondents reported household incomes below IDR 3,000,000 per month, with nearly half (45.5%) unemployed. Household sizes were mostly medium to large, with 50% of respondents living in households of 4–6 members, implying higher overall food demand per household. Food security theory emphasizes that limited economic resources and larger household sizes directly affect access to sufficient and nutritious food**(11)**. Additionally, nutritional knowledge and practices among PLHIV influence the utility of food assistance. Inadequate understanding of nutrient-rich foods or ineffective utilization of provided food can limit the impact of interventions, even when food supplies are available**(12)**. The majority of respondents were aged 26–35 years and predominantly male, reflecting the young adult group most affected by HIV in this area. Most had household incomes below IDR 3,000,000, and nearly half were unemployed, indicating economic limitations that increase the risk of food insecurity. Medium to large household sizes further raise total food demands, suggesting that food assistance distribution should be adjusted accordingly. From a per-capita perspective, food assistance that is designed for a single beneficiary is likely to be shared among four to six household members, substantially diluting its nutritional impact on the PLHIV individual. This condition weakens the potential of food aid to improve individual BMI and highlights the importance of adjusting assistance based on household size and dependency ratio. These conditions highlight the need for nutrition interventions that consider age, gender, economic status, and household capacity to support the nutritional status of PLHIV.

Distribution of Nutritional Status of PLHIV by Household Food Security and ATENSI Assistance

The study findings revealed that 60.9% of PLHIV had normal nutritional status, 23.6% were underweight, and 15.5% were overweight. This condition reflects the phenomenon of the double burden of malnutrition, where undernutrition and overnutrition coexist within vulnerable populations. Similar patterns have been reported in Indonesian populations, indicating that dietary imbalance and reliance on low-quality foods contribute to both underweight and overweight conditions. When analyzed by household food security, respondents from food-secure households were more likely to have normal BMI, whereas those experiencing moderate to severe food insecurity had higher rates of underweight. This aligns with existing literature showing that household food insecurity is a key predictor of malnutrition among PLHIV, as limited access to sufficient and nutritious food compromises energy intake and micronutrient adequacy **(13)**.

Regarding ATENSI food assistance, respondents receiving adequate support were more likely to maintain normal nutritional status compared to those receiving inadequate assistance. However, chi-square analysis indicated that the association between ATENSI support and BMI was not statistically significant ($\chi^2 = 2.87$, $p = 0.238$). This observation is consistent with recent studies suggesting that infrequent or insufficient food aid may not substantially alter nutritional outcomes if underlying household food insecurity persists**(11)**. This finding becomes more meaningful when considering that ATENSI food assistance is distributed only once per year. Given that HIV accelerates metabolic degradation and increases daily energy and protein requirements, a single annual food package is unlikely to compensate for chronic caloric and nutrient deficits experienced throughout the year. Therefore, the non-significant association observed in this study likely reflects the structural limitation of the annual assistance model rather than the irrelevance of food support itself.

These findings highlight that while food assistance programs like ATENSI play a supportive role, they are not sufficient alone to ensure adequate nutrition for PLHIV, particularly in households facing chronic food insecurity. Our interpretation is that interventions must be integrated, combining consistent and quantitatively adequate food support with strategies addressing household economic constraints, nutrition education, and personalized dietary planning. By considering both household food security and program adequacy, interventions can more effectively improve the nutritional status of PLHIV.

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The Relationship between Household Food Security and the Ministry of Social Affairs' Food Attention Assistance with the Nutritional Status of PLHIV in the Turen WPA

Chi-square analysis in this study indicated that household food security was significantly associated with the nutritional status of PLHIV at WPA Turen (χ^2 = 18.45, p = 0.005), whereas ATENSI assistance did not show a statistically significant relationship (χ^2 = 2.87, p = 0.238). These findings suggest that the nutritional status of PLHIV is primarily influenced by household food conditions rather than annual food aid alone. This aligns with previous research indicating that household food insecurity is a major predictor of malnutrition among PLHIV, as limited access to adequate and nutritious foods compromises both energy and micronutrient intake (13). However, the presence of a substantial proportion of overweight respondents (15.5%) indicates a "double burden of malnutrition," where undernutrition and overnutrition coexist within the same vulnerable population. This pattern may reflect reliance on low-cost, energy-dense but nutrient-poor foods, such as refined carbohydrates and fried foods, which are commonly consumed when household purchasing power is limited. Such dietary patterns can lead to excess caloric intake while still failing to meet micronutrient and protein requirements(14).

Household food security can be considered an indicator of the economic and social well-being of families, affecting their ability to consistently provide nutritious foods. Food security theory emphasizes that the availability, access, and utilization of sufficient and safe food are essential components in preventing malnutrition(15). This study found that most PLHIV households had low incomes (< IDR 3,000,000) and medium-to-large family sizes (4–6 members), increasing the risk of insufficient dietary intake. International literature supports that households with low income and many members are more likely to have higher prevalence of underweight among PLHIV(10).

Although the ATENSI program provides regular food assistance, this study indicates that it is insufficient to significantly improve nutritional status. Several studies also highlight that food aid, if inadequate in quantity or frequency and not accompanied by nutrition education or household economic support, has minimal impact on nutritional outcomes(16). A study published in the Journal of Health and Nutrition Research demonstrated that structured nutrition education significantly improved nutritional knowledge and dietary intake, emphasizing that food assistance programs should be integrated with behavioral and educational interventions to achieve sustainable nutritional improvements(17). Moreover, the ATENSI program primarily distributes staple food items such as rice and other starchy foods. While these foods contribute to caloric intake, they may unintentionally promote low dietary diversity when not complemented with adequate protein sources, fruits, and vegetables. This condition may explain the coexistence of underweight and overweight observed in this study, as monotonous, carbohydrate-heavy diets are associated with both micronutrient deficiencies and excessive caloric intake. This underscores the need for multidimensional interventions, integrating adequate food support, economic empowerment, and nutrition education to optimize the effectiveness of assistance programs.

Nutrition interventions for PLHIV should not rely solely on food distribution. Integrated approaches that consider household food security, individual nutritional needs, and family economic capacity are necessary to achieve better nutritional outcomes. Previous studies support this approach, demonstrating that combined interventions food assistance, nutrition education, and economic support are more effective in reducing underweight prevalence among PLHIV (18). Moreover, literature emphasizes that food assistance distribution should account for both quality and quantity, not merely physical availability. High-energy and protein-rich foods can help prevent weight loss and strengthen immunity among PLHIV(19). Recent studies reinforce the critical importance of diet quality and dietary diversity for the nutritional health of people living with HIV (PLHIV). Evidence from Indonesian settings shows that limited dietary diversity, characterized by high consumption of starchy staple foods and low intake of fruits and vegetables, is significantly associated with overweight and poor nutritional quality among vulnerable groups(20). For instance, a cross-sectional study during the COVID-19 era found that over one third of PLHIV had low dietary diversity and around one in five were underweight, underscoring how crises can exacerbate nutritional vulnerability among PLHIV (21).

Evidence further shows that structured nutritional interventions including food baskets, fortified foods, lipid-based nutrient supplements, or micronutrient supplementation can improve anthropometric

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measures (22) and immunological status (CD4 count) in PLHIV in low- and middle-income countries. Recent studies highlight the critical role of nutrition in maintaining health and immune function among people living with HIV (PLHIV). Evidence from a 2024 randomized controlled trial shows that combining structured exercise with diet therapy significantly improves physical fitness, dietary behavior, and immune parameters in PLHIV (23). Moreover, systematic reviews indicate that nutritional interventions including food baskets, fortified foods, and micronutrient supplementation can improve anthropometric measures (BMI, fat-free mass) and immunological outcomes (CD4 count) among adults with HIV in low- and middle-income countries(22). These findings underscore that adequate dietary support is crucial, in addition to antiretroviral therapy, to enhance overall health and treatment adherence. The COVID-19 pandemic further revealed that disruptions to food access and low dietary diversity exacerbate undernutrition among PLHIV. A 2024 study demonstrated that a substantial proportion of PLHIV had low dietary diversity and a significant prevalence of underweight, emphasizing the need for consistent and high-quality nutrition interventions(21). Beyond mere caloric provision, addressing nutrition-related immunodeficiency is essential, as it can worsen immune suppression and increase susceptibility to opportunistic infections such as tuberculosis (24) Furthermore, systematic reviews have confirmed that weight loss among PLHIV is strongly associated with increased mortality risk, highlighting the importance of sustained nutritional support for survival(25).

Considering that 45.5% of respondents were unemployed and most earned less than IDR 3,000,000 per month, future interventions should incorporate explicit economic empowerment strategies. These may include vocational training, small-scale entrepreneurship programs, or access to micro-finance initiatives to stabilize household income and reduce long-term dependency on food aid. Strengthening household purchasing power is likely to have a more sustainable impact on food security than food assistance alone. Considering the characteristics of the respondents, it can be posited that the majority of PLHIV residing in low-income households with large family sizes are likely to encounter persistent limitations in accessing adequate and nutritionally balanced food. The ATENSI assistance provided by the Social Affairs Office, being distributed only once annually, appears insufficient to sustainably meet the individual nutritional requirements of these populations. Consequently, such limited support may contribute to suboptimal nutritional status, particularly among those who must allocate scarce household resources across multiple members. This observation underscores the necessity for more frequent and sustained nutritional interventions, rather than relying solely on an annual food package. Furthermore, the economic and social vulnerabilities inherent to these PLHIV households are likely to adversely affect dietary patterns and overall diet quality.

Study Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design does not allow for causal inferences between household food security, food assistance, and nutritional status. Second, food security and adequacy of assistance were measured using self-reported questionnaires, which may be subject to recall bias and social desirability bias, particularly given the sensitive nature of poverty and government aid. Finally, dietary intake was not assessed quantitatively, limiting the ability to evaluate actual nutrient consumption. Future longitudinal studies incorporating detailed dietary assessments are recommended to better capture the dynamic relationship between food assistance and nutritional outcomes among PLHIV.

CONCLUSION

Based on the findings of this study, it can be concluded that the nutritional status of PLHIV at WPA Turen is significantly influenced by household food security. Respondents living in food-secure households were more likely to have normal nutritional status, whereas those experiencing food insecurity were more susceptible to being underweight. Although some PLHIV received food assistance through the Social Affairs Office's ATENSI program, the distribution, which occurs only once annually, proved insufficient to substantially impact nutritional status. This is because PLHIV experience chronic metabolic degradation and increased daily energy requirements, which cannot be adequately addressed by a single annual food

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package. Therefore, the limitation of the ATENSI program lies primarily in its lack of frequency and continuity rather than solely in the type of food provided.

Therefore, more sustained nutritional interventions are essential, including the provision of high-protein and high-energy nutrient-dense foods, nutrition education, and the strengthening of household food security. In addition, given that nearly half of the respondents were unemployed and the majority had low household incomes, nutritional improvement should be integrated with socio-economic empowerment strategies such as vocational training or income-generating activities to address the root causes of food insecurity.

Furthermore, this study also indicates the presence of a double burden of malnutrition, in which undernutrition coexists with overweight among PLHIV. This highlights the need for interventions that not only increase caloric intake but also promote dietary diversity and balanced nutrition to prevent both chronic energy deficiency and diet-related overweight. Finally, considering that 50% of respondents lived in households with 4–6 members, future government food assistance programs should be adjusted according to household size rather than provided as a uniform individual package, to ensure that the nutritional needs of PLHIV are met more effectively and sustainably.

DECLARATION OF THE USE OF AI

The authors declare that no artificial intelligence (AI), AI-assisted technologies, or large language models (LLMs) were used in the conception of the study, data analysis, or the drafting, writing, and editing of this manuscript. The only exception is the graphical abstract, which was created using the design platform Illustrae (https://illustrae.co/). The authors take full responsibility for the content and accuracy of the graphical abstract and the entire manuscript.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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