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Food and nutrition status of households with women living with HIV in Uganda

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A B S T R A C T

This study utilised a national dataset collected from women living with HIV/AIDS in Uganda to understand the Food and Nutrition Security (FNS) status among their households. Descriptive analytical methods were employed to characterise the households in relation to selected domains of FNS- access and utilization. Overall, results indicate that majority (69.3%) of the women in the sample had a normal BMI which could imply good food utilization and thus good FNS and; 22.1% were above the normal range, which could imply they were overweight. However, this may not be entirely true as one could have a normal BMI but have a “hidden hunger” which relates to micronutrient deficiencies. Given the status of the women under study especially those on antiretroviral drugs side effects of weight gain may be experience which could be misconceived as “good nutrition”. Female headed households were reported to be more vulnerable to FNS given the registered low dietary and higher shares of food expenditure on incomes. Similarly, households in the central and western regions reported better physical food access but poor economic food access while the reverse was true for the households in the Northern region. Ironically, urban households registered a low food insecurity in relation to share of food expenditure. As such, it is recommended that intervention strategies for improving food and nutrition security among vulnerable groups should not be a “blanket” or uniform but some categories should be given priority; for instance, HIV^+ headed households and urban households.

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Introduction

Despite considerable global efforts by states and development partners to reduce the effects of HIV/AIDS in the context of Development Goals and other initiatives, it is still a major challenge especially in developing countries. A report by UNAIDS [1] placed Uganda among the fifteen countries that account for 75% of all people living with HIV globally. Statistics for the same period showed an increase in number of persons living with HIV in Uganda from 1.4 Million in 2013 to 1.5 Million in 2015 which indicated an increase in HIV prevalence and burden [2].

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Food and Nutrition Security (FNS) is another key concern for global development. In their 2015 report on status of food security in the world, FAO [3] reported that 795 million people were malnourished globally. A database by ERH [4] initiative ranked Uganda 77th out of 95 countries in terms of undernourishment, making it one of the least nourished nations in the world. A study in Uganda by Diiro [5] reported that rural households had less diverse meals relative to urban ones, demonstrated by their lower mean dietary diversity score of 4.7 in rural areas and 5.4 in urban areas. The higher poverty rates and larger proportion of rural households that spend more than 65 percent of their income on food suggests that these households had more limited access to food. The same study also reported that approximately 24 and 13 percent of the rural women of reproductive age were, respectively, likely to be anaemic and wasted compared to 20 and 8 percent of urban women. Data across the regions in Uganda indicated the Northern and Western to be the most food and nutrition insecure [6].

The interconnectedness between HIV/AIDS and FNS is widely recognised and thus, the importance of relevant policies and strategies in handling them. However, implementation of these policies is constrained with lack of empirical evidence linking HIV/AIDS with Food and Nutrition security. Providing evidence that correlate HIV/AIDS with FNS among vulnerable groups can guide proper policy formulation and development of strategies and practical interventions for reducing effects of Food and Nutrition insecurity among vulnerable groups. The few studies that have investigated FNS among vulnerable groups such as Tsai et al. [7] have focused on resource poor settings and not particularly people living with HIV/AIDS. Recent studies [8,7] on FNS and HIV/AIDS in Uganda have used Household Food Insecurity (HFIS) to measure food security and are limited to less than a handful of districts in Uganda. None of these focus on women living with HIV and their households but the individuals living with HIV/AIDS. The current study used recent national representative dataset to analyse the current FNS situation for households of women living with HIV/AIDS. This study drives its motivation from the importance of women in agriculture and household FNS [9,10,11] as well as the extent of the HIV burden on the women [7]. As such, debility of a woman in a household is likely to have a negative impact on household FNS. The objective of this study was to assess the status of food and nutritional security for households of women living with HIV/AIDS in relation to the variations across household headship, residence and region. It is a national drive through the Ministry of Health to ensure adequate treatment packages for people living with HIV in Uganda. As such, the treatment package which includes ARV medication and counselling sessions on care given to the women, is the same across regions and irrespective of location, rural or urban. The study therefore, hypothesizes that the FNS for the households of women in rural and urban are not different. However, it is also hypothesized that households headed by women have better FNS given their importance in food handling and care in the household.

Material and methods

Sampling strategy

The study employed both purposive and random sampling techniques to select a representative sample. For ease of reaching the target sample, a list of health centres affiliated to Joint Clinic Research Centre (JCRC) in different districts of Uganda were obtained. Health centres at Level IV were purposively sampled since they are the major targets by government support for Antiretroviral Therapy (ART) treatment and so assumed to register higher numbers of HIV positive patients. From this list, eight clinics were randomly selected around the four regions of Uganda; Central, Northern, Eastern and Western covered by 32 districts.

The research team notified the Ministry of Health and the Local Government authorities on the purpose and design of the study and sought consent in advance. Visits to the clinics were made on appointments through JCRC. At the clinics, the team first explained to the medical staff the objectives and design of the study after which the field work team was introduced to patients waiting for their medical appointments by the medical staff. This was followed by the team leaders providing a description of the study to potential participants. Once participation was agreed and written consent sought, respondents were interviewed on the clinic grounds. Each respondent was given the opportunity to ask questions and/or seek further clarification at the end of each interview. Female HIV positive patients with at least 15 years of age and attending the clinic on the day of appointment were approached for participation in the study. From each of the 32 clinics, 100 women were randomly targeted for selection and recruited for this study. However, during recruitment process into the study, in some clinics more women expressed their interest to participate and the research team did not turn them down for fear of not getting the required numbers in some areas which brought the total number of women to 4254 and these are considered for this study.

Data collection and analysis

The study was cross sectional and used both qualitative and quantitative primary data collected from selected women living with HIV/AIDS through face-to-face interviews. Data collected included age, sex and education level of the targeted woman as well as the household head, characteristics of other household members, employment status of the women, household size, nutritional knowledge, and household expenditure. Others included income from farm and non-farm activities, land owned and agricultural production. To further ensure quality, the filled questionnaires were cross-checked for

consistency and validity while still in the field such that any gaps or missing information in the questionnaires were addressed accordingly.

This study employed a descriptive analytical method to characterise the households of women living with HIV. Frequencies, t-tests and ANOVA were generated and used to profile the women and their households using STATA computer software. During data analysis, three main categorizations were used; location by region and residence type and household headship. For location, this study categorised the women and their households by region; Northern, Eastern, Central and western depending on the district where the woman comes from. The same sample of women was categorised into rural, peri–urban and urban depending on the location of clinic attended. For headship, the households were categorised first into male and female headed households. Then, within these two categories they were separated by HIV status of the household head resulting into 4 headship categories; HIV^{+}female headed, HIV^{-} female headed, HIV^{+}male headed, and HIV^{-}male headed households for HIV positive female headed, HIV negative female headed, HIV positive male headed, HIV negative male headed households respectively .

Empirical strategy

Given the available data, this study focused on two domains of FNS; access and utilization to assess the status of FNS in households of women living with HIV. Indicators used to measure food access included Household Dietary Diversity Score (HDDS) and share of food expenditure while BMI was used to measure utilization [12,13]. Measurement strategies used in this study are described below.

HDDS is a qualitative measure of food consumption that reflects household access to a variety of foods, and is also a proxy for nutrient adequacy [14,15]. A dietary diversity tool was developed to reflect a simple count of food groups that a household has consumed over the preceding 24 h period. The tool inquired about 12 food groups; cereals, roots and tubers, vegetables, fruits, meat-poultry, eggs, fish and seafood, pulses-legumes-nuts, milk and milk products, oil-fat, spices and sugar-honey. A single point was awarded to each of the food groups consumed over the reference period giving a maximum sum total HDDS of 12 points. Following Coates et al. [16] and Mekuria et al. [17], households were categorised into three dietary diversity groups; i) Low; with HDDS less than or equal to 4, ii) medium; with HDDS of greater than 4 but less than or equal to 8 and; iii) high; with HDDS of greater than 8 but less than or equal to 12.

Share of food expenditure as another indicator of food access measures the proportion of food consumption on the total income and as such captures monetary value of food obtained from all possible food sources such as purchases, value of own production gifts and in-kind payment [18]. It considers that the propensity of people closer to the edge of poverty, spend a greater proportion of their income on food. The higher the percentage spent on food by a household, the more vulnerable to food and nutrition insecurity. Due to lack of or unreliable data on income, a number of studies [19,20] have used total consumption expenditure which includes both food and non-food expenditures as a proxy to income. This study however, used total household income from different sources. While no internationally agreed on thresholds exist, this study categorised the households into different food security categories following suggestions by Smith and Subandoro [21]. These are: 1) very vulnerable and extreme food insecurity (spending over 75% of their income on food); 2) high food insecurity (spending 65–75%); 3) medium food insecurity (spending 50–64.9%); and 4) low food insecurity (spending $<$50%).

Body Mass Index (BMI) was used as an indicator for food utilization and its calculation was done by dividing the weight of the women by their height in square meters. Thresholds used under this study included; 1) normal (18–24.9); 2) over weight (obese $>$24.9); and 3) poor (BMI $<$18) ([22,23].

Ethical considerations

This study is part of a bigger research project called NOURISH funded by Irish Aid in Uganda which sought to assess the effect of different information interventions on selected outcomes. Ethical approval for the research project was provided by Uganda National Council and Science and Technology (UNCST). Before field data collection, the research team provided a description of the study to potential participants. Once participation was agreed on, written consent was obtained from the respondents after assuring them confidentiality of their identities and the information provided.

Results and discussions

Socio-economic characteristics of women living with HIV/AIDS and their households in Uganda

This study categorised the women and their households into residency (rural, peri–urban and urban) and regions (central, North, West and East) categories and compared them according to selected socio-economic characteristics. The variables considered included child dependency ratio, age and sex of household head, education, land size owned, incomes and employment status. These are some of the variables considered to influence FNS outcomes [24,25]. Results from the study (Table 1) showed significant differences ($p \leq 0.05$) among the women categories in relation to age, education and employment status. The only variable where the categories were not significantly different was marital status whereby 43% of the sampled women were married.

Table 1
Socio-economic characteristics of the women and their households by residence.

Characteristic	Pooled sample	Rural	Peri-urban	Urban
Woman's characteristics				
Age of woman (years)	37.02 (10.47)	36.87^a (10.49)	37.80^b (10.68)	35.36^c (9.73)
Years of education of woman	5.20 (2.65)	4.73^a (2.18)	4.94^a (2.32)	6.17^b (3.32)
Married woman (%)	0.43 (0.50)	0.44 (0.50)	0.44 (0.50)	0.41 (0.50)
Employed (%)	0.68 (0.47)	0.61^a (0.49)	0.69^b (0.46)	0.73^b (0.44)
Working for a wage (%)	0.46 (0.50)	0.39^a (0.49)	0.50^b (0.50)	0.45^c (0.50)
Self-employed (%)	0.28 (0.45)	0.27^a (0.44)	0.25^a (0.43)	0.35^b (0.48)
Household Characteristic				
Child dependency ratio	1.14 (1.10)	1.11^a (1.02)	1.23^b (1.16)	0.94^c (0.99)
Household size (number)	4.45 (2.13)	4.67^a (2.11)	4.52^a (2.05)	4.04^b (2.25)
Age of household head (years)	41.98 (12.93)	43.40^a (13.52)	42.52^a (12.92)	39.04^b (11.73)
Education of HHd (years)	2.13 (1.09)	2.06^a (1.01)	2.00^a (1.00)	2.51^b (1.28)
Land size owned (Acres)	2.61 (1.80)	2.22^a (1.71)	2.43^b (1.73)	3.49^c (1.78)
Livestock units (TLU)	0.40 (0.63)	0.43^a (0.62)	0.44^a (0.65)	0.30^b (0.58)
Annual household incomes ('000 Ush)	1365 (1373)	1,256^a (1292)	1,282^a (1307)	1,691^b (1556)
HH headed by +ve female (proportion)	0.55 (0.50)	0.48^a (0.50)	0.54^b (0.50)	0.60^c (0.50)
HH headed by -ve female (proportion)	0.06 (0.23)	0.08^a (0.27)	0.05^b (0.22)	0.03^b (0.18)
HH headed by +ve male (proportion)	0.26 (0.44)	0.27 (0.45)	0.26 (0.44)	0.23 (0.42)
HH headed by -ve male (proportion)	0. 15 (0.35)	0.16 (0.37)	0.14 (0.35)	0.13 (0.34)

Figures in parentheses are standard deviations; letter a, b, c indicate significance in the differences where those with same letter are not significantly different. Also; HH =household; HHd =Household head; +ve = positive; and -ve = negative.

The women in the current study had an average age of 37 years with 5.2 years of education. Majority were not married and 68% were employed mainly working for a wage. Urban households registered significantly younger and more educated women compared to the households in the other location categories. There was no significant difference between education levels of the rural and peri–urban women although those in peri–urban were significantly older and more educated. The urban settings had a significantly ($p \leq 0.05$) higher proportion (73%) of women engaged in any form of employment followed by the peri–urban (69%) and then the rural (61%). Furthermore, a significant difference among women was observed in relation to type of employment across residence type. The peri–urban recorded a significantly higher proportion (50%) of those engaged in employment for wages or salary followed by the urban. Interestingly, the urban category registered the highest proportion (35%) of women engaged in self-employment. Although earlier studies have also indicated that urban areas are known to offer better education and employment opportunities than rural areas [26,27], the reverse was true for most rural households, where help with domestic chores or small-scale income generating activities is needed thus probably explaining the trends. Similar results have been observed in other developing economies such as Asia [27].

At household level, it was observed that urban households had significantly smaller sizes and their household heads were younger and more educated. The peri–urban households registered a significantly ($p \leq 0.05$) higher dependency ratio followed by the rural and then urban. The land size owned by households under urban category was significantly higher at 3.49 acres followed by peri–urban (2.43A) and rural (2.22A) categories. Livestock unit equivalents were recorded to be significantly higher among peri–urban (0.44) compared to that of the urban (0.30) households but not significantly different among the rural (0.43). Results of this study also indicate that income increased as one tended towards the urban category and the difference was significant among the urban and the other 2 categories. The proportion of HIV^+ female headed households significantly increased as one tended from rural to urban settings across gender categories. Although the proportions were small, results indicate that the rural households had more HIV^- headed household although the difference was only significant among HIV^- female headed households.

The same women and household characteristics were compared across the four regions as reflected in Table 2. The study observed that women in the western region were significantly younger than their counterparts in the other regions. The Eastern region on the other hand registered the oldest and most educated women. The women in the central region were more educated than those in the western and northern region and the same region had the least percentage (39%) of married women. The northern had the highest proportion (81%) of women in employment mainly working for a wage or salary while the eastern women were the least employed.

Households in the northern region registered the largest sizes (5 persons) and child dependency ratios but these were not significantly different from those of the eastern region. On the other hand, households in the central and western regions registered the smallest family sizes as well as dependency ratios. Household heads in the eastern region were significantly older than those in the other categories, with the youngest in the northern region. In terms of education, household heads in the central region registered better education levels. Land size owned and livestock units owned were significantly higher among the central households followed by the north and then west. Significantly highest household incomes were registered in the central with the north registering the lowest. The sample in this study showed that households in central had highest proportion (61%) of HIV^+ female headed households; the north registered the highest proportion of HIV^+ male headed households while the eastern region registered the highest proportion of HIV^- headed households.

Table 2
Socio-economic characteristics of the women and their households by region.

Characteristic	Central	North	West	East
Woman's characteristics				
Age of woman (years)	38.15^a (10.68)	37.71^a (10.77)	35.93^b (10.08)	39.42^a (10.70)
Years of education of woman	5.78^a (3.20)	4.50^b (2.06)	5.60^c (2.48)	5.90^a (2.69)
Married woman (%)	0.39^a (0.49)	0.45^b (0.50)	0.44^b (0.50)	0.45^b (0.50)
Employed (%)	0.63^a (0.48)	0.81^b (0.39)	0.65^a (0.48)	0.54^c (0.50)
Working for a wage (%)	0.33^a (0.47)	0.69^b (0.46)	0.42^c (0.50)	0.29^a (0.50)
Self-employed (%)	0.34^a (0.48)	0.21^b (0.41)	0.28^c (0.45)	0.28^{ab} (0.45)
Household Characteristic				
Child dependency ratio	1.10^a (1.15)	1.37^b (1.18)	1.03^a (1.01)	1.21^{ab} (1.15)
Household size (number)	4.21^a (2.34)	4.75^b (2.04)	4.37^a (2.06)	4.65^b (2.11)
Age of household head (years)	42.23^a (12.94)	41.27^a (11.69)	41.92^{ab} (13.54)	44.19^{ac} (12.213)
Education of HHd (years)	2.41^a (1.20)	2.00^b (1.03)	2.07^b (1.06)	2.07^c (1.11)
Land size owned (Acres)	3.05^a (1.83)	2.55^b (1.56)	2.50^b (1. 86)	2.38^b (1.87)
Livestock units (TLU)	0.60 (0.75)	0.45^a (0.62)	0.32^a (0.57)	0.31^b (0.54)
Annual household incomes ('000 Ush)	1,621^a (1508)	986^b (1141)	1,434^c (1371)	1,480^{ac} (1466)
HH headed by +ve female (proportion)	0.61^a (0.49)	0.57^a (0.50)	0.51^b (0.50)	0.53^{ab} (0.50)
HH headed by -ve female (proportion)	0.04^a (0.21)	0.02^a (0.15)	0.07^b (0.26)	0.53^a (0.50)
HH headed by +ve male (proportion)	0.21^a (0.40)	0.29^b (0.45)	0.27^b (0.44)	0.19^a (0.34)
HH headed by -ve male (proportion)	0. 15^a (0.35)	0.12^a (0.36)	0.15^a (0.50)	0.21^b (0.41)

Figures in parentheses are standard deviations; letter a, b, c indicate significance in the differences where those with same letter are not significantly different.

Household food and nutritional status among women living with HIV/AIDs

This study assessed Food and Nutrition Security for the households of women living with HIV by categorizing them according to region (Northern, Eastern, Central and western), residency (rural, peri–urban and urban) and headship (HIV$^+$female headed, HIV$^-$ female headed, HIV$^+$male headed, and HIV$^-$male headed households) and comparing selected indicators across these categories.

Dietary composition of foods consumed by households of women living with HIV

Food diets for the households of women in the sample mainly consisted of pulses, roots and tubers, cereals and vegetables (Fig. 1).

It is noticeable that the protein rich foods are on the lower side of the graph across the study sample implying that the diets of households in the sample were less dominated by protein-rich food groups but more of energy rich food groups. The probable reason for this low intake of protein-based foods could be related to the fact that protein-based foods such as fish and meats are generally expensive not only is Uganda but Africa as well [28,29,30]. Similar results were reported by earlier studies in Uganda [14] and Tanzania [31]. However, Mugisha et al. [25] reported cereals to be second to legumes. In addition, the results of the current study indicate that intake of foods rich in animal sources was significantly low. Overall, only 46% of the sampled households consumed milk, 45% consumed meats while 21% consumed eggs. This is common in developing countries as evidenced by similar results from previous studies such as Jebessa et al. [32] in Ethiopia.

Food and nutrition security situation for households of women living with HIV by region

The study observed interesting results on status of FNS across regions in Uganda as summarised in Table 3. The results show that the central region had a significantly ($p \leq 0.001$) higher dietary diversity score followed by the eastern and western. However, both the central and western regions registered the highest proportions of income spent on food. The central region spent a significantly higher ($p \leq 0.001$) proportion (64.2%) of their income on food compared to their counterparts in other regions. The implication here is that the western and central regions have access to a diversified diet but they may be vulnerable to FNS probably due to related food prices. The households in the North on the other hand, may not have access to a variety of foods and thus compromising on the quality of foods eaten. Lastly, it was observed that majority (69.30%) of the women in the sample across all regions registered a normal BMI which could imply good food utilization and thus good FNS. It is also indicated in the results that 22.1% were above the normal range, which could imply they were overweight. However, this may not be entirely true as one could have a normal BMI but have a "hidden hunger" which relates to micronutrient deficiencies [33]. Given the status of the women under study especially those on antiretroviral drugs side effects of weight gain may be experience which could be misconceived as "good nutrition" [34,35]. Furthermore, the central and northern regions significantly recorded the highest and lowest BMI respectively.

The profiles of households and women according to selected FNS indicators in Table 3 above. Across regions, majority of the women fell under the normal BMI range: the northern registered the highest proportion (75.32%) followed by the western (68.51%) and the eastern (67.24%). The central region had the highest proportion (28%) of women under the overweight category followed by the western (26%) and the Eastern (20%). On the contrary, the northern region registered highest proportion of underweight women at 16%.

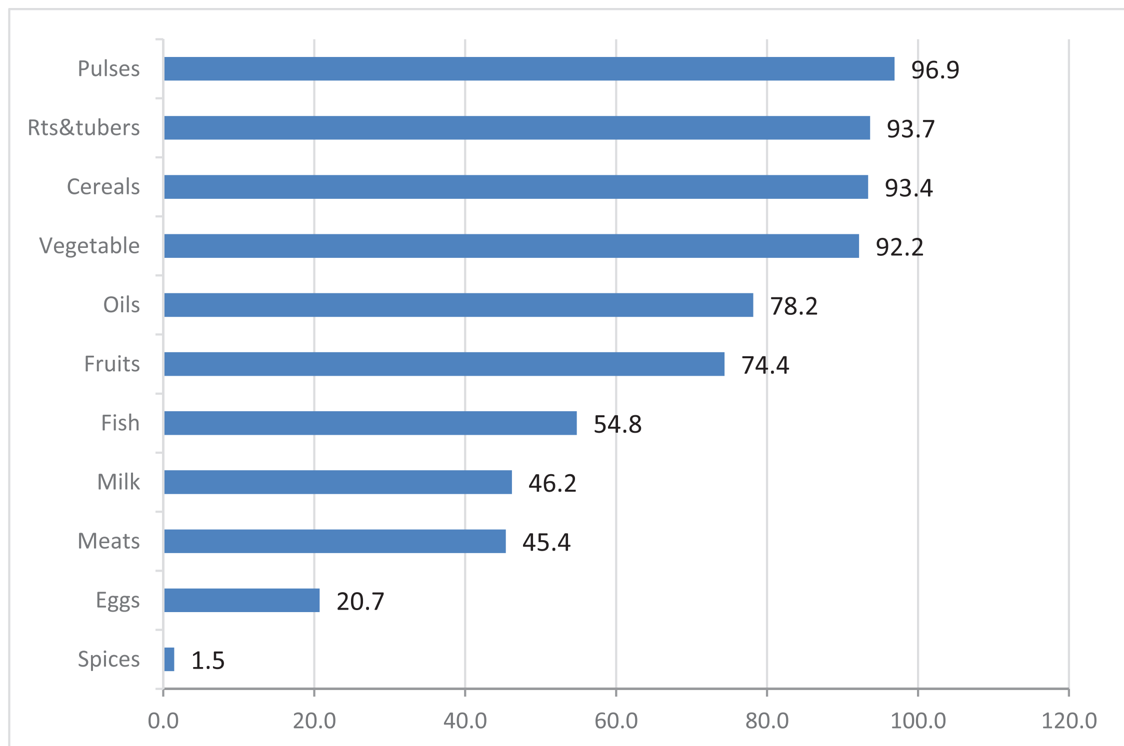

Fig. 1. Percentage response on consumed food groups under the pooled sample.

Table 3
Household food and nutrition security status by region.

FNS Indicator		Central (n = 821)	North (n = 1025)	West (n = 2118)	East (n = 290)	Overall	p-value (X^2)
Body Mass Index (BMI)							
	Value	23.10^a (4.23)	20.72^b (3.14)	23.00^a (4.00)	22.10^c (4.02)	22.40 (4.00)	0.000 (212.1379
Threshold (%)	Under weight	7.67	15.51	5.05	13.10	8.63	
	Normal	64.56	75.32	68.51	67.24	69.30	
	Overweight	27.77	9.17	26.44	19.66	22.07	
Household Dietary Diversity Score (HDDS)							
	Value (score)	3.69^a (0.83)	3.32^b (0.75)	3.48^c (0.82)	3.52^c (0.79)	3.49 (0.81)	0.000 (62.1201)
Threshold (%)	Low	74.54	88.68	81.68	81.03	81.95	
	Medium	25.46	11.32	18.32	18.97	18.05	
Share of food expenditure							
	Value (%)	64.20 ^{a}(61.54)	22.36^b (35.10)	44.89^c (54.89)	44.71^c (52.51)	43.18 (53.90)	0.000 (250.0517)
Threshold (%)	Very High	35.08	7.80	21.86	21.72	21.02	
	High	2.92	1.66	2.64	3.45	2.52	
	Medium	6.58	3.12	5.52	2.76	4.96	
	low	55.42	87.41	69.97	72.07	71.51	

Figures in parentheses under values are standard deviations; letter a, b, c indicate significance in the differences where those with same letter are not significantly different.

Furthermore, the results indicated the Northern followed by the western region to have the highest percentage of households with low dietary diversity implying that those in the central have better access to a variety of foods and thus likely to have better food and nutrition security. It is further shown that the central region registered the highest proportion of households with medium dietary diversity while the northern had the highest proportion of households with low dietary diversity. Lastly, the Northern region registered the highest proportion (87.4%) of their households falling under the low food insecurity category basing on their share of food expenditure. The central region however showed the highest (35.08%) proportion of their households falling under those with very high food insecurity, followed by the western (21.8%) and the eastern (21.72%). This implies that the northern region is more vulnerable to physical food access while the central and the western regions are more vulnerable to economic food access.

Table 4
Household food and nutrition security status by residence.

FNS Indicator		Rural (n = 1095)	Peri-urban (n = 2221)	Urban (n = 938)	Overall	p-value (X^2)
		Body Mass Index (BMI)				
Threshold (%)	Value	22.44^a (3.74)	21.87^b (3.76)	23.59^c (4.41)		0.000 (110.0231)
	Under weight	6.76	10.45	6.50	8.63	
	Normal	70.78	72.40	60.23	69.30	
	Overweight	22.47	17.15	33.26	22.07	
		Household Dietary Diversity Score (HDDS)				
Threshold (%)	Value (score)	3.52^a (0.83)	3.42^b (0.79)	3.60^c (0.83)		0.000 (31.7214)
	Low	79.09	85.10	77.83	81.95	
	Medium	20.91	14.90	22.17	18.05	
		Share of food expenditure				
Threshold (%)	Value (%)	30.95^a (45.46)	37.87^b (49.92)	70.01^c (62.50)		0.000 (279.0919)
	Very High	13.06	17.33	39.02	21.02	
	High	1.92	2.43	3.41	2.52	
	Medium	3.84	4.82	6.61	4.96	
	low	81.19	75.42	50.96	71.51	

Figures in parentheses under values are standard deviations; letter a, b, c indicate significance in the differences where those with same letter are not significantly different.

Food and nutrition security situation for households of women living with HIV by residence type

According to the results, the urban and rural households registered a significantly ($p \leq 0.05$) higher HDDS compared to their counterparts in peri–urban category (Table 4). The implication here is that the households in the peri–urban settings were likely to have poor food security due to limited access to a variety of nutritious foods.

Results indicated that the urban households recorded a significantly higher share on food expenditure compared to their counterparts in the two categories although the rural households registered a higher proportion compared to the peri–urban. This is likely because of higher food prices in urban areas. Similar result trends were observed in Ethiopia by Worku et al. [36]. It is further shown that the women in the sample had normal BMI across the different categories though significantly different. The women among the urban category had the highest BMI followed by the rural and then the peri–urban households.

Interestingly, further analysis showed that the peri–urban category registered the highest proportion of women with normal BMI range followed by the rural and then urban. The highest proportion of women under the overweight category was recorded under the urban setting while high proportions of underweight women, were registered under the peri–urban followed by the rural. This study indicates that the peri–urban households have the highest percentage (85.10%) of households with low dietary diversity followed by the rural (79.91%) implying that the urban have access to a more diversified diet compared to their counterparts. Similar results were reported for households in Uganda by [5] where the rural households were also shown to consume a more diversified diet. Lastly, this study indicates that majority (81.19%) of the rural households had low food insecurity in relation to share of food expenditure while the urban had the smallest (50.95%) proportion of their households with low food insecurity. A reverse trend is observed for proportion of households which fall under very high food insecurity category.

Food and nutrition security situation for households of women living with HIV by headship

Results for FNS indicators among different household headship categories are indicated in Table 5. Overall results indicate an average household dietary diversity score of 3.49. According to the categorization by Coates et al. [16] and Mekuria et al. [17], this implies that majority of the households had low dietary diversity scores. However, the household of HIV$^-$ women registered a higher but not significant HDDS than their HIV positive female counterparts. It is further shown that the male headed households had a better HDDS than their female headed household counterparts to the extent that there's no significant difference between the HIV$^-$ female headed and the HIV$^+$male headed households. The implication here is that HIV$^-$ headed households are likely to have access to a variety of foods than their counterparts probably because they can provide labour on their farms and off-farm and consequently are likely to have better incomes for access to diverse food varieties because they are more economically productive.

This study observes that HIV$^+$ female headed households registered a significantly ($p \leq 0.001$) higher proportion of food expenditures compared to their other counterparts whose share of food expenditure was not significantly different. Although HIV$^+$ male headed households registered the highest in that group. In addition, a higher proportion is observed among the HIV$^+$women and the same is true for among the HIV$^-$male headed households. The implication here is that HIV$^+$ female headed households have poor economic food access compared to their counterparts. Lastly, across all categories of household headship, the women in the sample registered a normal range (18.5- 24.9) of BMI.

Table 5
Household food and nutrition security status by headship.

	FNS Indicator	Female headed		Male headed		Overall	p-value (X^2)
		HIV$^+$ ($n = 2319$)	HIV$^-$ ($n = 236$)	HIV$^+$ ($n = 1083$)	HIV$^-$ ($n = 616$)		
Body Mass Index (BMI)							
	Value	22.41 (4.08)	22.30 (3.59)	22.37 (3.89)	22.46 (3.79)	22.40 (4.00)	
Threshold (%)	Under weight	9.57	4.24	7.85	8.12	8.63	0.021 (14.9308)
	Normal	67.74	77.97	70.73	69.32	69.3	
	Overweight	22.68	17.8	21.42	22.56	22.07	
Household Dietary Diversity Score (HDDS)							
	Value (score)	3.46^a (0.80)	3.51^{ab} (0.79)	3.51^{ab} (0.82)	3.56^b (0.84)	3.49 (0.81)	
Threshold (%)	Low	83.74	81.78	80.79	77.27	81.95	0.002 (15.1310)
	Medium	16.26	18.22	19.21	22.73	18.05	
Share of food expenditure							
	Value (%)	49.12^a (57.24)	35.44^b (48.73)	36.24^b (48.71)	35.98^b (48.69)	43.18 (53.90)	
	Very High	25.05	14.83	16.71	15.75	21.02	
Threshold (%)	High	3.1	4.66	1.29	1.62	2.52	0.000 (71.5358)
	Medium	4.87	3.81	5.26	5.19	4.96	
	low	66.97	76.69	76.73	77.44	71.51	

Figures in parentheses under values are standard deviations; letter a, b, c indicate significance in the differences where those with same letter are not significantly different.

When looking at FNS indicator thresholds, generally, normal BMI values were observed across headship categories. The highest proportion of women with normal BMI range were observed among HIV$^-$ female headed households followed by HIV$^+$ male headed then HIV$^-$ male headed households. The women under HIV$^+$ female heads registered both the highest proportion of those under weight and overweight categories. This implies that the women under HIV$^+$ female heads were more likely to be experience low FNS than the other categories. This could be attributed by inequalities in genders such as limited access to productive resources like land, low status given low education and income levels, stigma among others [37,38] which further worsen the effect of HIV on their health to engage in economically productive activities that would otherwise have contributed to their access to adequate and nutritious diets.

Basing on household categorizations [17] and [16], this study observed only 2 categories, low and medium dietary diversities with majority falling under low dietary diversity category (Table 3). The HIV$^+$ female headed households registered the highest proportion under those with low dietary diversity and the HIV$^-$ male headed households had the highest proportion (22.73%) of those with medium dietary diversity. The implication here is HIV$^+$ female headed households have poor physical access to food compared to their counterparts. Overall, majority (71.51%) of the households in the sample fell under the low food insecurity category basing on suggested thresholds by Smith and Subandoro [21] since the results indicate that they spent less than 50% of their income on food. However, it is important not to ignore the 25% of the HIV$^+$ female headed households who fell under the category of those who spend more than 75% of their income on food. The implication here is that HIV$^+$ headed households are more vulnerable but HIV$^+$ female headed households are more vulnerable to poor economic food access than their counterparts.

Conclusions and recommendations

This study set out to profile the women living with HIV/AIDS and their households in relation to FNS. The results indicate variations in the FNS domains under consideration. The women are not worse off in relation to utilization because majority registered normal body mass index. However, in terms of both physical and economic access, the results are below average of the desired. It is evident that inequalities in food and nutrition security still exist, specifically with respect to type of residence (rural-urban), geography, and gender. For instance, female headed households are most vulnerable with the HIV+ worse off; northern region registered the least diversified diets thus lowest quality. While the urban households had the most diversified diets, they were also observed to be more vulnerable to economic food access unlike their counterparts in the peri–urban who were more vulnerable to physical food access. In addition, the women in the peri–urban were more likely to be underweight while those in the urban were more likely to be overweight.

From the conclusions above, this study observed that even within HIV$^+$ households, different levels of vulnerability in terms of food insecurity do exist for instance in terms of household headship, location and region. As such, it is recommended that interventions to improve food and nutrition security among vulnerability groups should not be a “blanket” or uniform but some categories should be given priority. For instance, HIV$^+$ headed households, urban households as well as the Northern region need to be prioritised.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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