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FACTORS ASSOCIATED WITH UNDER NUTRITION AMONG CHILDREN 2 – 5 YEARS LIVING WITH HIV/AIDS IN BOMBO MILITARY BARRACKS, LUWERO DISTRICT CENTRAL UGANDA. A CROSS-SECTIONAL STUDY DESIGN.

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Abstract

Background:

The HIV epidemic is a major public health concern and is associated with a range of long and short-term health consequences. Children living with HIV/AIDs related illnesses are still among the leading causes of infant mortality. This study sought to determine the factors associated with undernutrition among children 2 to 5yrs living with HIV in Bombo Military Barracks, Luwero District Central Uganda.

Methodology:

The researcher used a descriptive research design to study the study variables. A sample size of 56 participants was selected. Both primary and secondary data sources were used by the researcher. Structured questionnaires, FGDs, and interviews were conducted to collect data, and this data was sorted, edited, coded, and analyzed using SPSS, Dedoose, and WHO Anthro software.

Results:

The findings of the study showed that nutrition status of children is determined by socioeconomic factors and IYCF Practices. More females (60.9%) were enrolled in the study compared to males (39.3%). 6% of girls have a WFH <-3SD, 15% <-2SD, 34% <-1SD and 1% >+1SD. While, 4% of boys have a WFH <-3SD, 9% <-1SD and 26% >+1SD. Children aged between 2 – 3 years are more wasted with a Mean z-Score of -2SD compared to those aged between 4 – 5 years with a mean score of -1SD. This implies that the independent variable directly influences the independent variable.

Conclusion:

Data analysis has as well indicated that most of these children have been breastfed for over 12 months and hence introduced to home-cooked meals at the appropriate time.

Recommendations:

Ministry of health and organizations with nutrition-related programs should take into consideration providing HIV targeted nutrition education.

Keywords: Under Nutrition, Children, HIV/AIDS, Submitted: 2023-05-22 Accepted: 2023-08-16

1. Background of the study:

The HIV epidemic is a major public health concern and is associated with a range of long and

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short-term health consequences. Of the 38 Million PLWLHA worldwide in 2020, 2.78 Million were children 0 – 19 years. Approximately 850 children become infected with HIV and 330 die from AIDS-related causes (UNICEF, 2021).

0.6 Million children 2 – 5 years live with HIV (WHO, 2021). Over two-thirds (approximately 25.4 Million) of the 38 Million PLWHA are in Africa. In 2020, sub-Saharan Africa accounted for 89% of new HIV pediatric infections (UNICEF, 2021). In Uganda, the prevalence of HIV among children 0 – 14 years is 0.5% (Approximately 95,000) (UPHIA, 2017) with the majority of cases rising from central Uganda.

The military is a priority population with particular risk factors for contracting HIV/AIDS related to isolation, often being far from home, working in extremely stressful environments, and lacking independent decision-making power hence sex may be the only outlet these people have to be themselves. By the dictates of their profession, military personnel are at a higher risk of contracting STIs (including HIV/AIDS) than the general population thus exposing their sexual partners. Children are also greatly affected directly and indirectly by HIV/AIDS. They can contract HIV from their mothers during delivery or via breast milk, develop pediatric HIV/AIDS, and die. Additionally, they may lose one or both parents to the disease. There has been significant success in reducing the number of new HIV infections among children since the early 2000s. However, children living with HIV/AIDs related illnesses are still among the leading causes of infant mortality.

Malnutrition and HIV/AIDS are highly prevalent in sub-Saharan Africa as linked to a vicious cycle that increases the risk of mortality, decreases survival rates, and affects the overall clinical outcome and quality of life (Gebru, et al., 2020). Globally, 52 Million children under five years are wasted, 155 Million are stunted and 41 Million are overweight (UNICEF, World Bank; WHO, 2017). Malnutrition is also a major public health problem in African children, with an estimated 38% stunted, 28% underweight, and 9% wasted in both HIV-infected and uninfected children below five years of age (Arinaitwe, Emmanuel, et al, 2012) Similarly in Uganda, 29% of children below five are stunted, 3.6 % are wasted and 10.5 % are underweight (UBOS and ICF, 2016). These statistics vary from urban and rural areas in different regions of Uganda.

The nutritional status of children is an indicator of the level of development and future potential of the community. (Alemneh Kabeta et al, 2017) A well-nourished population has the capacity to be productive and to improve its standard of living through hard work. Furthermore, malnutrition adversely affects the cognitive and learning performance of malnourished children. The general objective was to determine the factors associated with undernutrition among children 2 to 5yrs living with HIV in Bombo Military Barracks, Luwero District Central Uganda.

2. Methodology:

2.1. Research design:

A Descriptive study design was used to relate the factors associated with undernutrition among children 2 – 5 years living with HIV in Bombo Military Barracks, Central Uganda. This design was adopted because it described the factors associated with the nutrition status of the study population as they actually exist.

2.2. Study population:

The study population was 65 children 2 – 5 years living with HIV attending the ART clinic at Bombo Military Hospital. The age of 2 – 5 years was suitable for this study because research has shown this age group has not been given much attention in research and hence requires more exploration.

2.3. Sample size determination:

The sample size was fifty- six participants purposively selected from those attending the ART clinic at Bombo Military Hospital and additional participants were selected as key informants that is, the nutritionist, public health officer, and nurses. The Yamane, Taro (1967:886) Formula

was used to determine the sample size to be studied. This method was suitable for descriptive studies.

N= Where, n = sample size
N = population under study
E = margin error which is 0.05
Confidence interval of 95%.
n= n= 56 participants.

2.4. Sampling techniques and procedures:

Probability and Non- Probability sampling techniques were used to obtain the sample population. Purposive sampling is a non – probability sampling technique chosen because the study population was clearly defined. Simple random sampling is a probability sampling method that was also used to obtain the sample population. Simple random sampling was used to eliminate bias in choosing samples.

2.5. Data collection methods:

Primary and secondary data collection methods were used to collect data. Primary data collection methods included formal and informal interviews with the use of questionnaire guides and focus group discussions. Interviews with key informants were conducted. Secondary data sources were obtained by reviewing existing literature from journals, blogs, and reports about factors associated with the nutritional status of children 2 – 5 years living with HIV.

2.6. Questionnaire survey:

A well-structured questionnaire guide was used to collect data on respondents' demographics, anthropometric measurements, and IYCF practices to determine the nutritional status of these children (2 – 5 years).

2.7. Data collection instruments:

These were the tools that the researcher used for collecting all relevant data related to the study objectives

2.7.1. Questionnaire guide:

The questionnaire guide was self-administered and the first section of the questionnaire focused on the socio-demographic characteristics of the respondents, while section two captured anthropometric measurements to determine nutritional status. Section three assessed the socio-economic factors and IYCF Practices.

2.8. Quality control:

This section clearly explained how the validity and reliability of the research instruments would be obtained before data collection from the actual study population.

2.8.1. Validity of data:

Contents of the instruments were discussed with the research supervisor to check for accuracy and relevance to the study. Upon thorough discussions, a consensus was reached on items to be included in the final structure of the instruments to ensure the validity of the data to be collected.

2.8.2. Reliability of data:

The Cronbach's Alpha coefficient was used to test for reliability. The instruments were given to individuals to give their opinion on the relevance of the questions using a five (5) point Likert Scale.

2.9. Data collection procedure:

Before the commencement of data collection, an introductory letter from the university was obtained to permit the researcher to collect data. Data was collected using all three instruments (i.e. questionnaire guide, interview guide, and FGD guide). The data collected was in line with the study objectives. Both the researcher and research assistants were in charge of data collection from the study area and the respondents were identified, that is key informants and mother-baby pairs attending the ART clinic at Bombo Military Hospital.

2.10. Data analysis:

Both qualitative and quantitative methods of data analysis were used to derive meaningful information from the data collected relevant to the study.

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2.10.1. Quantitative data:

Structured questionnaires were used to collect data. The data was sorted, edited and coded, and analyzed using SPSS software and WHO Anthro software. Descriptive statistics were used to examine study variables. Statistical tools such as frequency distribution tables and graphs were used to describe and present the demographic characteristics and nutrition status of study participants.

2.11. Measurement of variables:

The nutrition status was indicated as normal, underweight, SAM/MAM. The participants were weighed using a standardized weighing scale, height taken using a length/height board and measurements were recorded in kilograms (kg) and centimeters (Cm) respectively. The nutritional status was determined using a WHO reference card recorded as less than minus two standard deviations (<-2SD) or less than minus three standard deviations (<-3SD) while factors associated with nutritional status were determined in three dimensions of basic, underlying, and immediate.

2.12. Ethical considerations:

The respondents were informed about the purpose of the study, and they were invited to participate in the research. Dates and times for answering questionnaires, participating in FGDs, and interviews were negotiated with the participants. This was the first stage for building a trusting relationship with the respondents.

Confidentiality and anonymity were discussed with the participants. They were assured that the information collected will be purely used for academic purposes. Participants were not required to indicate their names or contact information on the questionnaire.

Since educational research focuses primarily on human beings, the rights, and welfare of the subjects who participated in the study were protected. An introduction letter to conduct the research had been obtained from the university to introduce the researcher to the respondents and assure them of the purpose of the study.

3. Data Presentation, Analysis, and Interpretation :

3.1. Response Rate:

The study purposed to collect data from 56 children aged between 2-5 years living with HIV attending ART Clinic at Bombo Military Hospital and the researcher managed to reach the 56 participants accounting for 100% response rate.

3.2. Demographic characteristics of the respondents:

The demographic characteristics of the children analyzed include; gender, age, birth weight, and birth order.

The demographic characteristics of the parents or guardians analyzed include; gender, age, level of education, employment status, marital status, religion, and number of children.

3.3. Descriptive Statistics:

Descriptive statistics were conducted following each specific objective to obtain the nutrition status of children 2 – 5 years, the socio-economic factors of the parents, guardians, or caregivers, and the IYCF Practices of these children.

3.4. Nutrition Status of children (2-5) years living with HIV:

The first objective of the study was to assess the nutrition status of the study population. Using a structured questionnaire guide, the anthropometric measurements of the children were taken during ART clinic visits. The measurements taken included weight, Height, and MUAC. The nutritional status of the sample population was presented as WFH, WFA, and HFA as seen in Figures 1, 2, and 3.

3.5. Socio-Economic factors of care givers:

The second objective of the study was to assess the socio-economic factors of the caregivers in influencing the nutrition status of their children living with HIV.

Parents or guardians were as well asked to disclose the number of people who were living with them in the same household under a given age interval. The results are shown in Table 3.

Table 1: **Socio-Demographic Characteristics of the children.**

Variable	Category	Frequency	Percentage
Gender	Male	22	39.3%
	Female	34	60.7%
	Total	**56**	**100.0%**
Age	2-3	18	32.1%
	4-5	38	67.9%
	Total	**56**	**100.0%**
Birth Weight	<2.5	4	7.2%
	2.5-3.5	46	82.1%
	≥3.6	6	10.7
	Total	**56**	**100.0%**
Birth Order	1-4	37	66.1%
	5-10	16	28.5%
	11-15	3	5.4%
	Total	**56**	**100.0%**

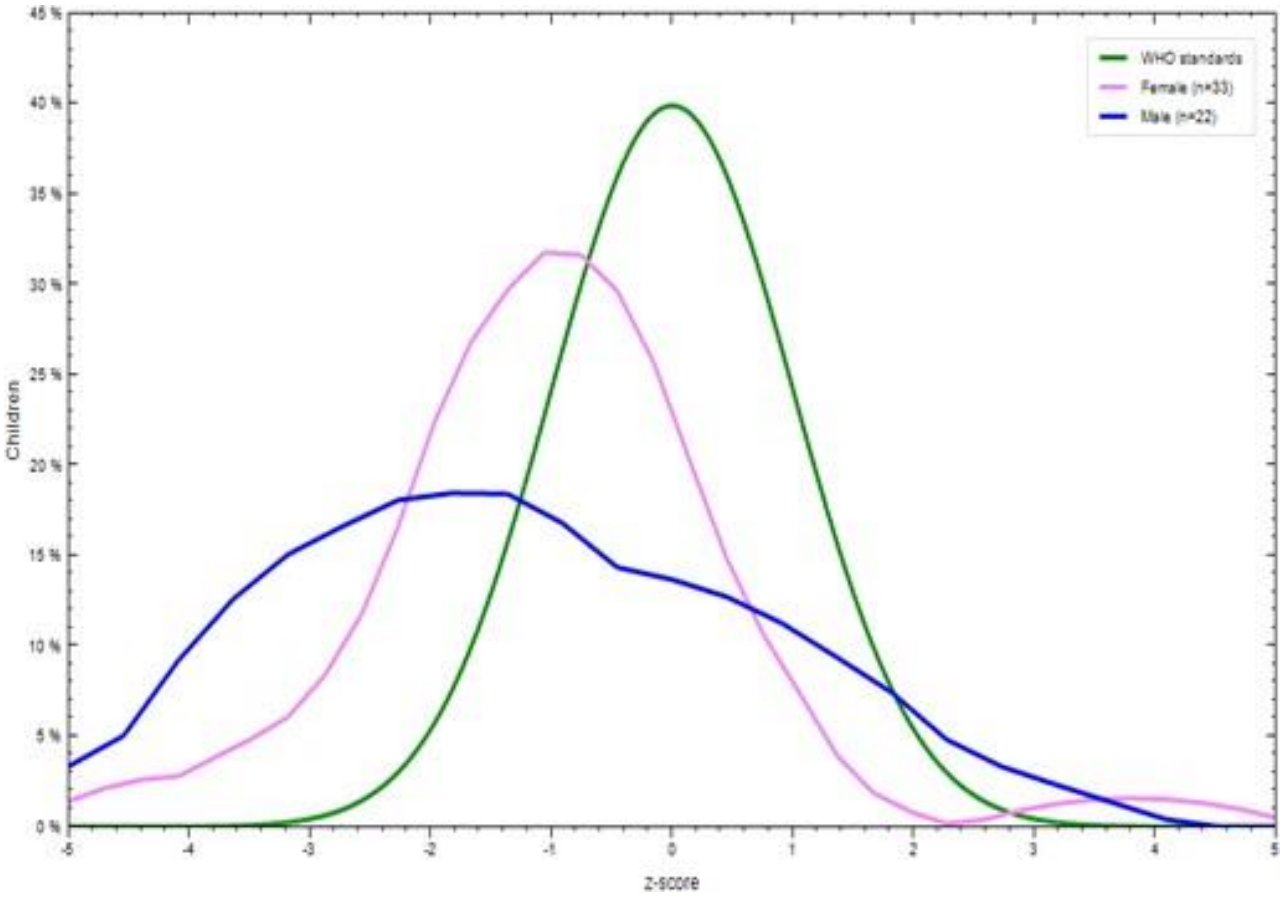

Figure 1: **Showing Weight –For-Height Z-Scores by Gender of the children.**

Table 2: **Socio-Demographic Characteristics of the Guardians or Parents.**

Variable	Category	Frequency	Percentage
Gender	Male	12	21.4%
	Female	44	78.6%
	Total	**56**	**100.0%**
Age	<15	7	12.5%
	16-24	8	14.3%
	25-34	22	39.3%
	35-45	13	23.2%
	>45	6	10.7%
	Total	**56**	**100.0%**
Marital Status	Single	16	28.6%
	Married	27	48.2%
	Divorced	9	16.1%
	Widowed	4	7.1%
	Others	0	0.0%
	Total	**56**	**100.0%**
Education Level	Never Went To School	5	8.9%
	Primary	11	19.6%
	Secondary	18	32.2%
	Tertiary	8	14.3%
	University	12	21.4%
	Others	2	3.6%
	Total	**56**	**100.0%**
Employ-ment Status	Employed	40	71.4%
	Unemployed	16	28.6%
	Total	**56**	**100.0%**
Religion	Roman Catholic	11	19.6%
	Muslim	9	16.1%
	Protestant	20	35.7%
	Others	16	28.6%
	Total	**56**	**100.0%**
Number of Children	1-4	39	69.6%
	5-10	17	30.4%
	11-15	0	0.0%
	Others	0	0.0%
	Total	**56**	**100.0%**

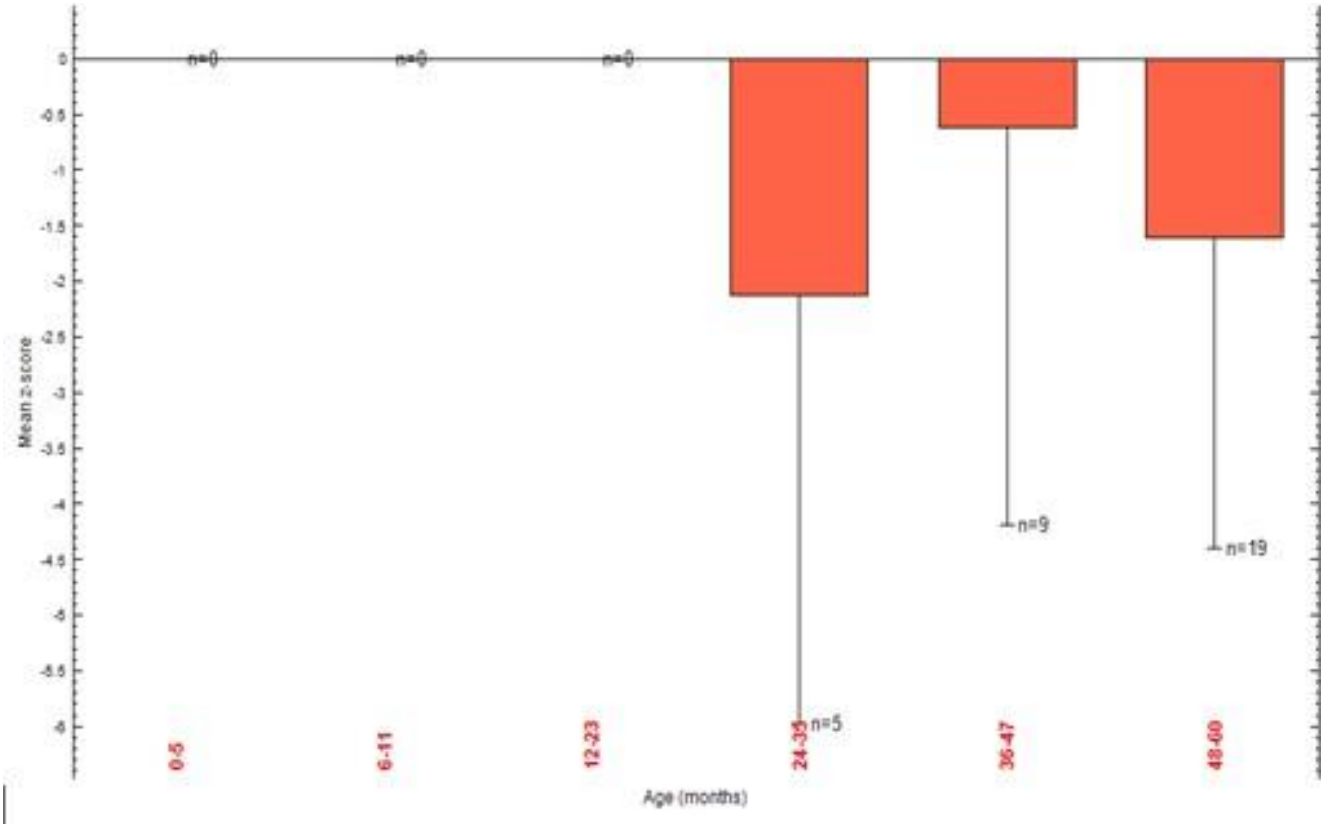

Figure 2: **Figure 2: Showing Height-For-Age Z-Scores for all age groups of the children.**

Table 3: **Number of People Living in a household by age and gender.**

	Age Category (Years)	Frequency	
		Male	**Female**
Valid	0-4	6	4
	5-10	7	5
	11-17	6	4
	18-29	3	16
	30-64	1	1
	65+	1	2
	Total	**24**	**32**

3.5.1. IYCF Practices of children (2-5) years.

The last objective of the study was to determine the IYCF practices and nutrition status of children (2-5) years living with HIV.

Parents or guardians of the study population were asked what the main source of drinking water for their household is. The findings are shown in Figure 4.

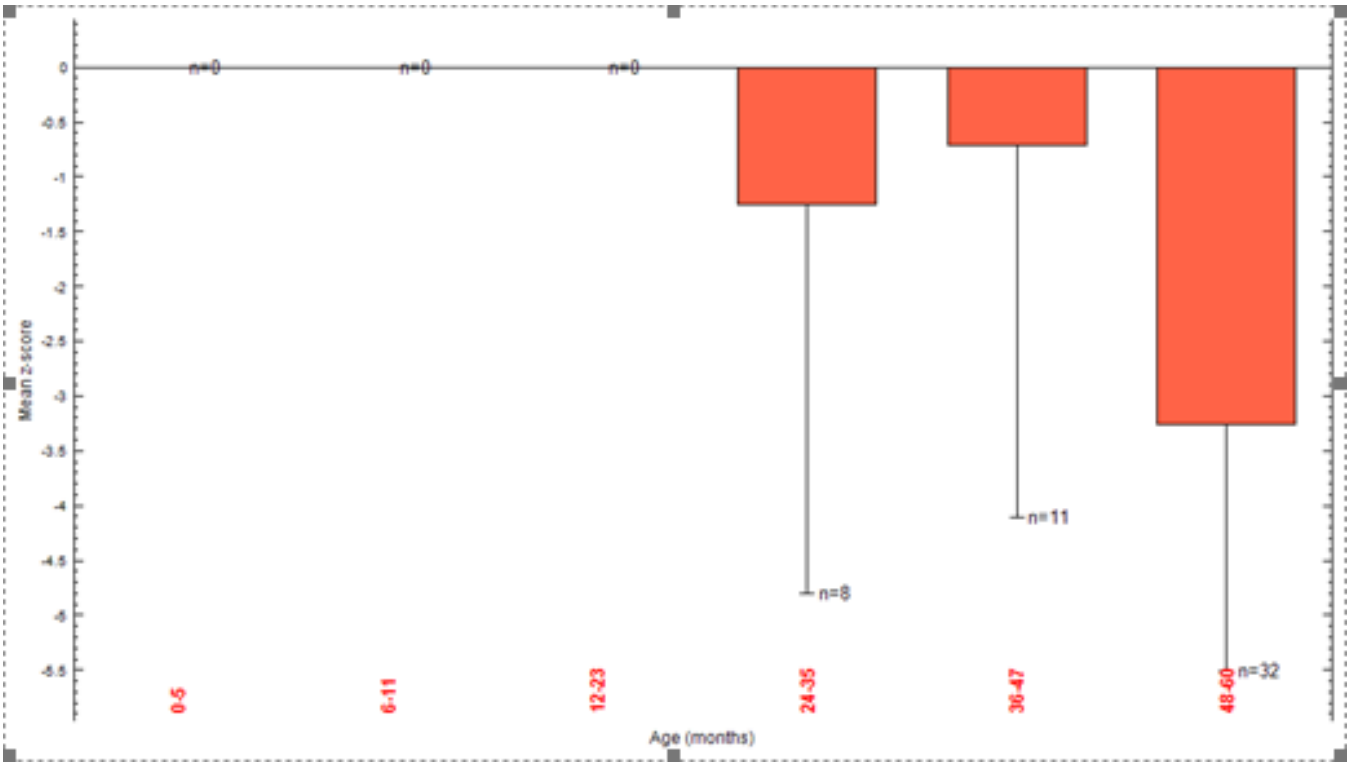

Figure 3: **Sowing Weight-For-Age Z-Scores for all age groups of the children.**

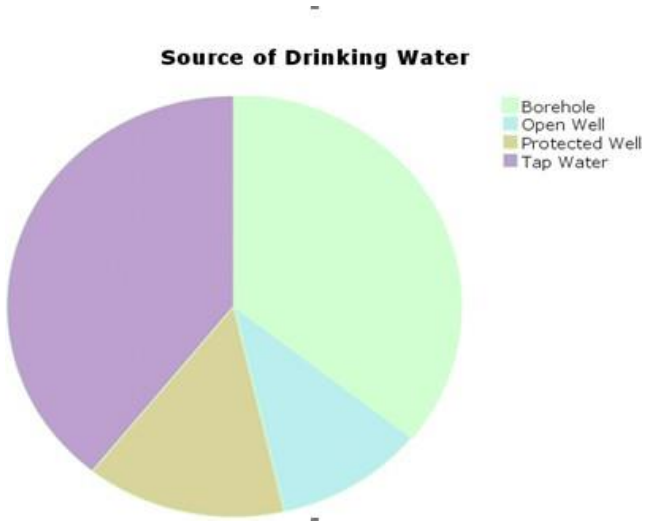

Figure 4: Showing the main source of drinking water.

Parents or guardians of the study population (children 2-5 years living with HIV) were asked whether they treat their drinking water. The responses are shown in table 4.

Those parents or guardians who treat their drinking water were as well asked to indicate what method(s) they used for treating their drinking water and the results are shown in table 5.

Improper human waste disposal leads to transmission of disease-causing micro-organisms into food and water. Parents and guardians were asked to indicate where they dispose of their fecal matter as a household, and the findings are shown in Table 6.

Proper environmental and kitchen waste management is important in preventing food and water contamination. Parents or guardians were asked to mention where they dispose such wastes. The results are shown in table 7.

Breastfeeding is very important for the growth and development of children. It is recommended that children are exclusively breastfed for up to 6 months. However, this duration can change for HIV-positive mothers due to factors such as adherence to ART. Therefore, their children may not be breastfed for the recommended period of time. Parents and guardians were asked how long they had breastfed or how long their children had been breastfed. The duration with which these children

Table 4: **Households that treat their drinking water and those who do not.**

		Frequency	Percent
Valid	No	29	51.8
	Yes	27	48.2
	Total	**56**	**100.0**

Table 5: **Methods used for treating drinking water.**

		Frequency	Percent
Valid	Boiling	15	26.8
	Chlorination	12	21.4
	None	29	51.8
	Total	**56**	**100.0**

Table 6: **Places where households dispose human waste.**

		Frequency	Percent
Valid	Flush Toilet	13	23.2
	Open Pit Latrine	5	8.9
	Portable Latrine	7	12.5
	Ventilated Pit Latrine	31	55.4
	Total	**56**	**100.0**

Table 7: **Places where households dispose environment & kitchen waste.**

		Frequency	Percent
Valid	Open Disposal	8	14.3
	Portable Bin	6	10.7
	Rubbish Pit	42	75.0
	Total	**56**	**100.0**

were breastfed is shown in Table 8.

The introduction of home-cooked meals to a child is recommended at 6 months because breast-milk alone cannot provide the nutrients and energy requirements needed for physiological activity. However, children have been introduced to home-cooked meals before 6 months of age which compromises their nutrition status, especially among children living with HIV. Parents or guardians were asked to indicate when they introduced their children to home-cooked meals and the results are shown in table 9.

Children between 2 – 5 years of age are at a pivotal growth stage where they are either on complementary feeding or completely depending on home cooked meals to support the physiological activities of their growing bodies. Living with HIV even makes them more susceptible to malnutrition hence the need to have more meals.

Parents or guardians where asked how many meals their children have in a day including snacks and the results are shown in table 10.

Children living with HIV are more susceptible to disease and infection because their immunity is already compromised. Parents or guardians were asked whether their child had suffered any illness or injury in the last month. Table 10 shows the results.

Table 8: **Duration with which children were breastfed.**

	Months	Frequency	Percent
Valid	12	13	23.2
	14	2	3.6
	2	3	5.4
	24	5	8.9
	4	9	16.1
	6	9	16.1
	8	8	14.3
	9	7	12.5
	Total	**56**	**100.0**

Table 9: **Time children were introduced to home cooked meals.**

	Duration in Months	Frequency	Percent
Valid	2-6	16	28.6
	> 6	38	67.9
	< 2	2	3.6
	Total	**56**	**100.0**

Table 10: **Number of meals including snacks had in a day.**

	Number of Meals	Frequency	Percent
Valid	3	27	48.2
	4-5	19	33.9
	<3	10	17.9
	Total	**56**	**100.0**

Table 11: **Children who had an illness or injury in the last month**

		Frequency	Percent
Valid	No	22	39.3
	Yes	34	60.7
	Total	**56**	**100.0**

The parents or guardians whose children had developed an illness or injury in the last month were asked whether they had sought help to manage the symptoms of the illness. Table 12 shows the results of those who sought help and those who did not.

(70.6%) of the parents or guardians who sought help to manage the symptoms of illness or injury were asked whom they had consulted. Figure 5 illustrates the persons whom the parents or guardians had consulted to manage the symptoms of illness or injury.

3.6. Summary of Findings

The main purpose of the study was to determine the factors associated with undernutrition among children 2 to 5yrs living with HIV in Bombo Military Barracks, Luwero District Central Uganda. In this section, the researcher discussed the findings of the study.

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Table 12: **Consulted to manage symptoms of illness or injury.**

		Frequency	Percent
Valid	NO	10	29.4
	Yes	24	70.6
	Total	**34**	**100.0**

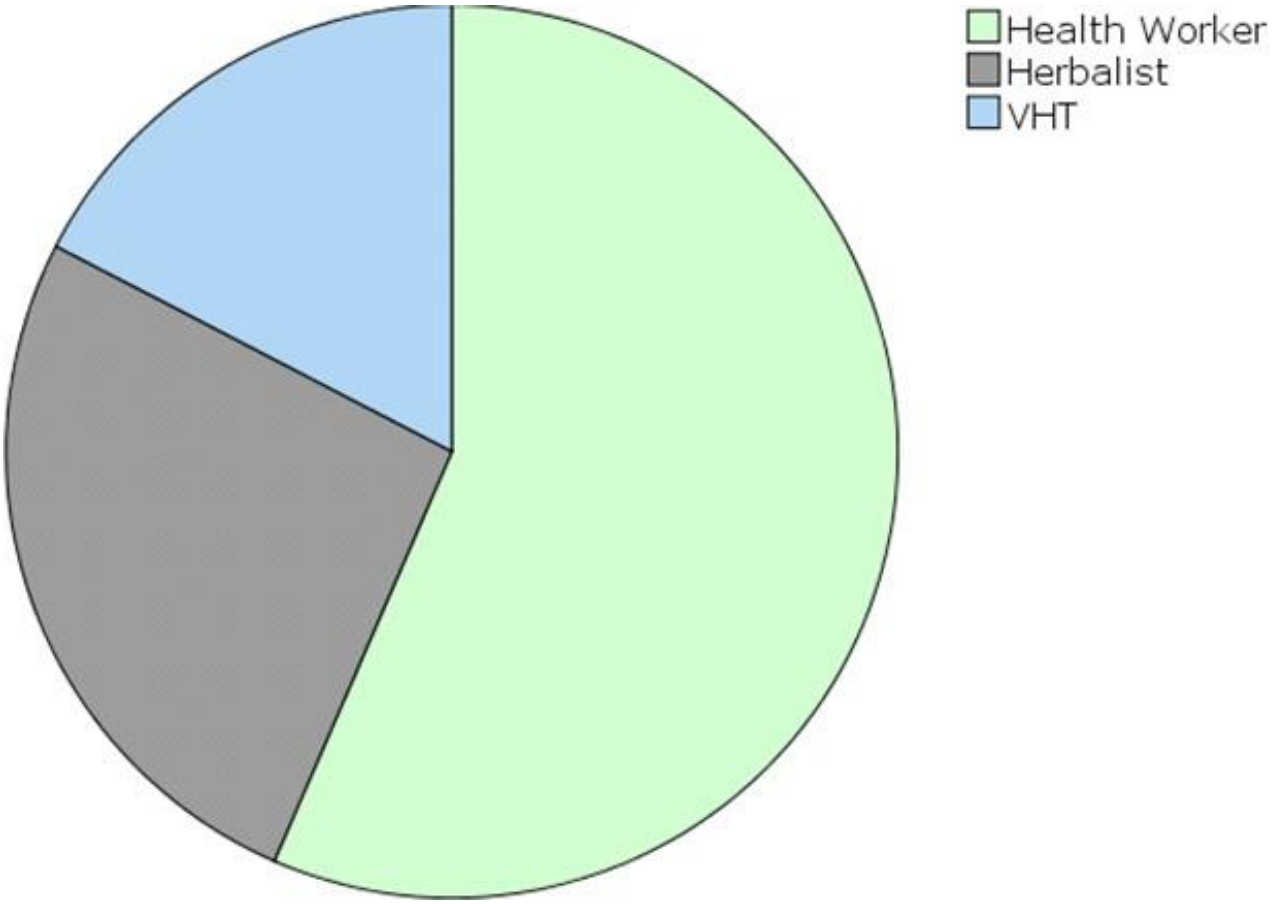

Figure 4: Persons consulted to manage symptoms of illness or injury.

3.6.1. Nutrition status of children 2-5 years living with HIV

Using WHO Anthro software, the nutrition status of children 2-5 years was plotted using anthropometric measurements of weight, and height. Figures 1, 2, and 3 illustrated the WFH, HFA, and WFA Z-scores for both male and female children in the study. However, more females (60.9%) were enrolled in the study compared to males (39.3%). The findings indicate that more females (girls) are underweight, and wasted than the males (boys).

With reference to Figure 2, 6% of girls have a WFH <-3SD, 15% <-2SD, 34% <-1SD, and 1% >+1SD. While, 4% of boys have a WFH <-3SD, 9% <-1SD, and 26% >+1SD.

Figures 2 and 3 illustrated that children aged between 2 – 3 years are more wasted with a Mean z-Score of -2SD compared to those aged between 4 – 5 years with a mean score of -1SD.

These findings can be explained by a study done by (Ndiku, et al., 2018) whose findings concluded that female children are more stunted,

wasted, and underweight than male children although male children have more energy needs than females. This is because of gender inequality in food intake associated with tradition or culture.

3.6.2. Socio-Economic factors and Undernutrition.

A child's nutrition status is strongly determined by social determinants such as gender, and family's socioeconomic conditions. From the findings, many households are headed by females who are single, doing informal jobs yet taking care of about 10 – 15 members. Some of these members are living with HIV which requires additional nutrition needs.

However, (Women's, Children's, and Adolescents' Health, 2022) argued that little is known about how the nutrition of children living in female-headed households differs from that of male-headed households. Although, the children could be affected due to socioeconomic disadvantages due to low wages of women and social or cultural barriers in communities.

(Haidar & Kogi-Makau, 2015) Argued that child undernutrition is not only high among female children but also among female-headed households due to inadequate alternative livelihood options and harmful traditional practices that may have a dual impact on the well-being of mothers and children.

3.6.3. IYCF Practices and Undernutrition.

It is clear that IYCF practices have been socially embedded in the community of parents with HIV-infected children. From the results, the children were optimally breastfed with 67.8% for over 6 months.

Complementary feeding was started at an appropriate time with 67.9% introducing home-cooked meals at 6 months. 83.1% of families have at least three home-cooked meals and snacks daily.

Additionally, the parents or guardians were knowledgeable about proper waste disposal, including seeking health services from professional health workers when children develop symptoms of the disease.

These results are in support of (Purity, et al., 2016) who indicated that children exposed to HIV were more likely to be underweight and wasted because prolonged breastfeeding increases the chances of HIV infection and early initiation of replacement or complementary feeding predisposes these children to undernutrition.

4. Conclusion:

Data analysis has shown that children (2-5) years living with HIV are at risk of malnutrition, while others are malnourished. The majority of these children are in the birth order of 1 – 4 with households having at most 10 members with whom they live. There are more female-headed households than their male counterparts. More parents or guardians are single and are informally employed. Additionally, most parents or guardians have attained secondary education and are between the ages of 25 – 35 years. Fortunately, more households have at least 3 meals in a day though most households do not treat their drinking water. Data analysis has as well indicated that most of these children have been breastfed for over 12 months and hence introduced to home-cooked meals at the appropriate time. Human and environmental waste is properly managed and their health-seeking behaviour is commendable.

5. Recommendations.

Ministry of Health and organizations with nutrition-related programs should take into consideration providing HIV-targeted nutrition education. There is a need to assess the nutrition status of children living with HIV in female-headed households in Uganda.

6. Limitations of the study.

The parents or guardians of the children (2-5) years were reluctant to provide information for the purposes of this study.

7. ACKNOWLEDGEMENT.

Special thanks go to my supervisor Mr. Turumanya Judah who tirelessly guided and assisted me through the course of this study. My heart goes out to the research assistants, and the respondents for fully and willingly participating in this research project. May God bless and reward you abundantly.

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8. List of abbreviation:

AIDS Acquired Immuno Deficiency Syndrome
ART Anti-retroviral Therapy
FGD Focus Group Discussion
HFA Height – for – Age
HIV Human Immuno Deficiency Virus
KAP Knowledge Attitudes and Practices
MAM Moderate Acute Malnutrition
PLWHA People Living with HIV/AIDS
SAM Severe Acute Malnutrition
STIs Sexually Transmitted Infections
USAID United States Agency for International Development
WFA Weight – for – Age
WFH Weight – for – Height
WHO World Health Organization

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