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Factors Affecting Nutrition Status of Children below five Years Attending the HIV/AIDs Clinic at Hoima Regional Referral Hospital

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ABSTRACT

Globally there are 104 million children under five years of age with underweight and 171 million stunted. At the same time, it was found that about 43 million children under five were overweight or obese. About 90% of stunted children live in 36 developing countries including Uganda and children under two years of age are the most affected by undernutrition. Malnutrition is usually indicated by growth failure and contributes to 3.5-5 million annual deaths among under-five children. The study generally aimed at analysing the nutritional status and associated socio-economic factors among children aged below 5 years attending the ART clinic at Hoima Regional Referral Hospital (HRRH). Specifically, the study was to determine how HIV increases the risk of undernutrition in children infected with HIV; determine the prevalence of malnutrition among HIV-positive children below 5 years, and also determine the socio-economic factors associated with malnutrition among HIV-positive children below 5 years of age. A cross-sectional and descriptive design was used in the study. The sample population was attained by simple random sampling with a sample size of 210 respondents being targeted. The study found that malnutrition is one of the major challenges affecting under-five children in districts who attend treatment in the HRRH ART clinic. The common form of malnutrition included stunting, wasting and underweight. Results from the analysis confirm that the age of a child and maternal occupation was one of the most significant determinants of malnutrition. The study, therefore, underscores the age groups prone to malnutrition challenges as well as the particular occupations among women that could pose a risk of malnutrition to under-five children. This then gives a focus to policymakers in the designing of strategies aimed at combating malnutrition among children below five years attending ART clinics.

Keywords: Underweight, Malnutrition, Undernutrition, HIV/AIDs, children under 5 years.

INTRODUCTION

World Health Organization (WHO) defined malnutrition as the result of a deficiency of protein, energy, minerals as well as vitamins leading to loss of body fats and muscle tissues [1]. It is a major public health concern in Uganda that affects both children and adults. Worldwide, by 2010 it was found that about 104 million children under five years of age were underweight and 171 million stunted. At the same time, it was found that about 43 million children under five were overweight or obese. About 90% of stunted children live in 36 developing countries including Uganda and children under two years of age are the most affected by undernutrition [2]. The Ugandan Bureau of Statistics (UBOS) documents that the most common aspects of undernutrition in Uganda are wasting 5%,

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underweight 14%, stunting 33% and anemia 50% [3]. Malnutrition among young children and mothers according to the government of Uganda has significant economic costs for the malnourished individuals, their households and communities, and the nation as a whole, stemming from the need to deal with an increased disease burden and other physical and mental problems related to malnutrition [3]. Anemia is one of the most significant symptoms of undernutrition [4-6]. HIV/AIDs and related to it are more pronounced in Sub-Saharan Africa [7-9]. According to the Ministry of Health (MoH), a global estimate of about 2.6 million children live with AIDS, 220,000 are newly infected, and 150,000 die due to AIDS [10]. The two rounds of the AIDS Indicator Survey show that HIV prevalence in the general population in Uganda increased from 6.4% in 2004/5 to 7.3% by 2011. This tally with the 2013 HIV estimates which show that HIV prevalence stabilised around 7.4% in 2012/2013. In Uganda, about 147,394 children live with AIDS, 9,472 are newly infected, and 8,935 die due to HIV/AIDS [10]. Though progress has been made to reduce HIV; produce sufficient food nationally to meet the needs of the population; and experience a significant reduction in poverty levels from 39 percent in 2002 to 23 percent in 2009–2010 in Uganda, the levels of malnutrition among women and young children have improved only minimally. Some indicators, like micronutrient deficiency, have even worsened over the past two decades, and child malnutrition in Uganda remains largely a 'hidden problem'. Malnutrition increases the risk of morbidity and mortality, compromises immunity among children infected with HIV, increases expenditure on health care, reduces economic productivity for the caregivers, and leads to malnutrition of other family members due to reduced care [11,12]. However, the specific determinants of malnutrition among children exposed to seeking HIV care services from the HIV clinic in Hoima Regional Referral Hospital are not clearly known. Hoima district has an HIV prevalence of 5.6% and a malnutrition rate of 45%. No studies have been conducted on the topic. This study, therefore, was aimed at establishing the prevalence and the socioeconomic factors associated with the nutritional status of HIV-positive children below five years attending the HIV clinic in Hoima Regional Referral Hospital.

METHODOLOGY

Study Design

A cross-sectional and descriptive study design was used. The study was facility-based and primary data obtained from both the mothers/caretakers of the HIV children who met the criteria of the study.

Area of Study

The study area was Hoima Region Referral Hospital commonly known as Hoima Hospital in Hoima, western Uganda. It is a public hospital funded by the Uganda Ministry of Health and general care in the hospital is free. It is one of the 13 regional referral hospitals in Uganda. It is the referral hospital for the districts of Hoima, Kikube, Kagadi, Bulisa, Masindi and Kiboga. The hospital also serves many more patients from outside the hospital catchment area.

The Study Population

The target population was children aged 5 years and below. The information was used to assess the factors affecting the nutritional status of children below 5 years attending the HIV clinic.

Inclusion criteria; Children below 5 years attending the HIV clinic in Hoima whose parents gave informed consent.

Exclusion criteria; children below 5 years attending HIV clinic whose parents did not give informed consent and all those children 5 years and above.

Sample Size

From the population of the study, the sample size was obtained using the Kish Leslie (1965) formula:

$n=z^2p(1-p)/d^2$

where; n is the estimated minimum sample size required

p is the proportion of a characteristic in a sample (84.5% Babriye, 2009)

z is 1.96 (for a 95% confidence interval)

d is the margin of error set at 5%

Where a total number of 201 respondents was obtained.

$n= 1.96^2*0.845(1-0.845)/0.05^2$

n=201

A sample of 210 was used to include all extremities.

Sampling technique

The probability sampling method was applied and the simple random sampling technique was used.

Data collection

The interview method was used to collect data since it allows the researcher to get information directly from the respondents face-to-face. The researcher already had his structured questions which were prepared in advance.

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Anthropometry

The nutritional status of the participants was assessed and body parameters of height, weight, and age were used. The measurements were then combined together to calculate the anthropometric indices as indicated in Table 1 below.

Data Analysis

Documents such as immunization cards and other medical documents were used to ascertain the age of the children for cases where mothers or caretakers were unsure about the dates of birth or age of their children.

Data Management

Anthropometric data were entered using ENA for smart version 2011. SPSS was used for quantitative data.

Data Analysis

The unit of analysis for the study was children under 5 years to mothers/caretakers attending HIV treatment and using the information obtained from the mothers and caregivers and the key informants.

Quantitative data

Anthropometric data was analyzed using ENA for smart version 2011. World Health Organization (WHO) cut-offs for undernutrition were used to determine the nutritional status of the children. A weight for age Z- score of<-2 standard deviations was used for the study. Children were classified as underweight if their weight for age z-scores was below -2 standard deviation (<-2SD) according to WHO cut-offs.

Qualitative data

Data were obtained from the person/participant who had brought the child to the clinic that day and they included the mother, father, or guardian.

RESULTS

Maternal/caretaker factors

Care received by children varies depending on who gives care. Mothers are thought to offer more care as compared to male caretakers. In this study, a quite large number of respondents/caretakers (81.1%) were females as compared to 18.9% who were males as shown in Table 1 below. The youngest mothers in this study were in the age category 16-20 years constituting the lowest number (2.2%) of respondents while the oldest were in the age category above 36 years which constituted 27.8% of the respondents. The majority of the mothers/caretakers (28.9 %) were aged between 26-30 years (Table 2).

Table 1: Sex of respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Male	39	18.9	18.9	18.9
	female	171	81.1	81.1	100.0
	Total	210	100.0	100.0	

Table 2: Age category of respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	16-20	5	2.2	2.2	2.2
	21-25	37	17.8	17.8	20.0
	26-30	60	28.9	28.9	48.9

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	31-35	49	23.3	23.3	72.2
	>=36	58	27.8	27.8	100.0
	Total	210	100.0	100.0	

Table 3: Marital status of the respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Single	25	12.2	12.2	12.2
	Married	114	54.4	54.4	66.7
	Widowed	28	13.3	13.3	80.0
	Separated	24	20.0	20.0	100.0
	Total	210	100.0	100.0	

In the study about mothers' marital status and under-five child nutrition by Teller and Yimer [13], child malnutrition is significantly associated with marital status, and being a married mother was positively associated with good nutritional status among children under five. The distribution of under-five children according to the marital status of their mother indicates that the majority of the children were born to mothers who were married/cohabiting (54.4%). Quite a large number of the under-five children were born to never married/separated mothers (20%) Table 3. There was quite a high number of children born to single mothers which could have serious implications on under-five child malnutrition since the kind of care that the child receives from the single parent may be compromised compared to those with both parents who will always give their children undivided attention and care. Besides single mothers may not have the advantage of receiving financial support from the father of the child, especially in proper feeding.

Table 4: Education level of the respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	less than primary	44	21.1	21.1	21.1
	primary level	95	45.6	45.6	66.7
	O'level	44	21.1	21.1	87.8
	A Level	14	6.7	6.7	94.4
	above a level	12	5.6	5.6	100.0
	Total	210	100.0	100.0	

Babatunde and Qaim [14] reveal that a mother's education level affects her child's nutrition through her choices and health-seeking skills related to nutrition, hygiene, preventive care, and disease treatment. The percentage

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distribution of under-five children according to the education level of the mother indicates that the majority of the mothers had received primary-level education (45.6%) and quite a few had never been to school (21.1%). Findings further reveal that only 33.4% of the children had mothers/caretakers with secondary education and above Table 4. The level of education could impact child care as many of the mothers/caretakers may lack the basic skills and knowledge to look after their children by offering nutritious feeding. Many such mothers still believe in the traditional way of feeding and would ignore the recommended child feeding and health practices that encourage exclusive breastfeeding for up to at least six months as well as the provision of nutrition supplements and a balanced diet.

Table 5: Total number of people at respondent's home

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1-4	119	56.7	56.7	56.7
	5-8	65	31.1	31.1	87.8
	9-12	16	7.8	7.8	95.6
	>12	9	4.4	4.4	100.0
	Total	210	100.0	100.0	

Table 6: head of the family at respondents' home

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	husband	135	64.4	64.4	64.4
	Wife	75	35.6	35.6	100.0
	Total	210	100.0	100.0	

Table 7: Respondent's main occupation

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Peasant	107	51.1	51.1	51.1
	civil servant	21	10.0	10.0	61.1
	self-employed/ business person	56	26.7	26.7	87.8
	casual worker/part-timer	16	7.8	7.8	95.6
	un-employed	9	4.4	4.4	100.0
	Total	210	100.0	100.0	

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The findings also indicate that the majority of the under-five children had mothers who were peasant farmers (51.1%) as their occupation. Children whose mothers were doing business were also significantly many (26.7%) as well as civil servants (10%) followed by those whose mothers/caretakers were casual/part-time workers (7.8%). There were also a few children whose mothers were unemployed (4%).

Table 8: Main source of food of the respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Farm	135	64.4	64.4	64.4
	purchase from the market	75	35.6	35.6	100.0
	Total	210	100.0	100.0	

According to the United States Department of Agriculture [15], food insufficiency was more problematic in low-income households compared to homes with higher incomes. Consequently, children experiencing food insecurity are more likely to have poorer health, which could affect their academic performance and physical and social development. Based on the study, more than half (64.4%) of the respondents obtained food through farming whereas 35.6% purchased their daily food.

Table 9: Whether the respondent had ever received any nutrition education/counselling

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	yes	133	63.3	63.3	63.3
	no	77	36.7	36.7	100.0
	Total	210	100.0	100.0	

Table 10: Period of time when the respondent last received nutrition education/counselling

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	less than 1 month back	68	32.2	32.2	32.2
	less than 2-4 months back	63	30.0	30.0	62.2
	N/A	79	37.8	37.8	100.0
	Total	210	100.0	100.0	

More than half (63.3%) of the respondents received nutritional education and counseling at the facility of which 32.2% had it in less than the last month as compared to 36.7% who had never received nutrition education and counseling. Nutrition education and counseling help mothers and caretakers make healthy food choices and improve the health status of their children.

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Table 11: Sex of the child

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	male	117	55.6	55.6	55.6
	female	93	44.4	44.4	100.0
	Total	210	100.0	100.0	

	Boys		**Girls**		**Total**		**Ratio**
	no.	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17 months	7	43.8	9	56.3	16	20.0	0.8
18-29 months	13	54.2	11	45.8	24	30.0	1.2
30-41 months	8	50.0	8	50.0	16	20.0	1.0
42-53 months	9	56.3	7	43.8	16	20.0	1.3
54-59 months	6	75.0	2	25.0	8	10.0	3.0
Total	43	53.8	37	46.3	80	100.0	1.2

Table 12: Average child spacing time for the respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	< 24 Months	28	31.1	31.1	31.1
	> 24 MONTHS	62	68.9	68.9	100.0
	Total	90	100.0	100.0	

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Table 13: Average child spacing age for the mothers

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	<20	84	40.0	40.0	40.0
	>20	100	47.8	47.8	87.8
	N/A	26	12.2	12.2	100.0
	Total	210	100.0	100.0	

More than half of the under-five children in the study were male (55.6%) and the majority were aged 18-29 months (30%). Most of the children were of birth intervals equal to or more than 24 months (68.9%) and 31.1% had a birth interval of less than 24 months. The delivery of the majority of children within a birth interval of two years implies that child feeding brings about weaning off breast milk early to give room for the mother to take care of a possible new pregnancy. Based on the above results, it is not by surprise that malnutrition of children under five years has persisted. On the age of the mother at birth, the majority of the children had their mothers (47.8) aged above 20 years while quite a significant proportion was also from children whose mothers at birth were aged below 20 years (40).

Table 14: MUAC reading of the child

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	YELLOW	23	11.1	11.1	11.1
	GREEN	180	85.6	85.6	96.7
	NA	7	3.3	3.3	100.0
	Total	210	100.0	100.0	

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Based on rapid assessment using the MUAC tapes, 11.1% of the children involved in the study had their MUAC reading falling in the yellow zone of the MUAC tape hence rendering them moderately malnourished as compared to the healthy (85.6%) with their MUAC reading falling in the green zone of the MUAC tape.

Table 15: Challenging sickness for the child

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Diarrhoea	9	4.4	4.4	4.4
	Malaria/fever	19	8.9	8.9	13.3
	cough/Flu	37	17.8	17.8	31.1
	pneumonia	19	8.9	8.9	40.0
	Others(loss of appetite, sore throat or mouth)	9	4.4	4.4	44.4
	none	117	55.6	55.6	100.0
	Total	210	100.0	100.0	

More than half (55.6%) of the children were found not to be having any challenging illnesses while quite a good number (17.8) had suffered cough and flu, followed by malaria (8%), pneumonia (8%), and diarrhoea (4.4%)

Table 16: Period when foods other than breast milk were introduced to the child.

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	o months	2	1.1	1.1	1.1
	1-4 months	91	43.3	43.3	44.4
	5-6 months	100	47.8	47.8	92.2
	more than 6 months	9	4.4	4.4	96.7
	not yet	8	3.3	3.3	100.0
	Total	210	100.0	100.0	

Table 17: Type of foods the respondent gives the child

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		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	cereal porridge	124	58.9	58.9	58.9
	solid staples	54	25.6	25.6	84.4
	milk and milk products	25	12.2	12.2	96.7
	NA	7	3.3	3.3	100.0
	Total	210	100.0	100.0	

Table 18: Number of meals that the respondent's child always has/had

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	2 times	7	3.3	3.3	3.3
	3 times	117	55.6	55.6	58.9
	4 times	63	30.0	30.0	88.9
	5 time	14	6.7	6.7	95.6
	other	9	4.4	4.4	100.0
	Total	210	100.0	100.0	

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	All n = 84	**Boys** n = 46	**Girls** n = 38
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(24) 28.6 % (18.9 - 38.2 95% C.I.)	(16) 34.8 % (21.0 - 48.5 95% C.I.)	(8) 21.1 % (8.1 - 34.0 95% C.I.)

Table 19: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or edema) and by sex

Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(24) 28.6 % (18.9 - 38.2 95% C.I.)	(16) 34.8 % (21.0 - 48.5 95% C.I.)	(8) 21.1 % (8.1 - 34.0 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(14) 16.7 % (8.7 - 24.6 95% C.I.)	(9) 19.6 % (8.1 - 31.0 95% C.I.)	(5) 13.2 % (2.4 - 23.9 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(10) 11.9 % (5.0 - 18.8 95% C.I.)	(7) 15.2 % (4.8 - 25.6 95% C.I.)	(3) 7.9 % (-0.7 - 16.5 95% C.I.)

The prevalence of edema is 0.0 %

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Table 20: Prevalence of the different forms of malnutrition

Prevalence of stunting (<-2 z-score)	Prevalence of underweight (<-2 z-score)	Prevalence of global acute malnutrition (<-2 z-score and/or oedema)
All (65): (27) 41.5%	All (65): (19) 29.2%	All (84): 28.6%
Boys (35): (16) 45.7%	Boys (35): (15) 42.9%	Boys (46): 34.8%
Girls (30): (11) 36.7%	Girls (30): (4) 13.3%	Girls (38): 21.1%

DISCUSSION

Socio-demographic characteristics of mothers/caretakers

The findings of this study showed that a few teenage mothers had given birth and few of these were still married yet cases of at-risk malnutrition prevailed in these mothers' children. The findings of this study are in agreement with the observation that the age of the mother at birth is related to the nutritional status of their children [16]. Older women (older than 36 years) attending ART treatment represent a significant proportion of the overall female population as well [17]. Similar trends were observed in this study, women below 20 years of age were the minority and those above 36 years of age were the majority. Most of the mothers in this study were aged between 26-30 and those above 36 years. The main occupation of a large number of the respondents was farming (peasant). The United States Department of Agriculture [15], argues that food insufficiency is more problematic in low-income households compared to homes with higher incomes. This is affirmed by the findings of the study where most respondents were dependent on farming and did not have any other sources of income. This could eventually affect the nutritional status of children as they could only have access to macronutrient food sources and were deprived of the micronutrients from foods they could not grow. Marital status is known to influence the quality of care given to the child because both parents are able to contribute to the care of the child by providing the basic needs, psychological support, and general welfare of the child [18]. The findings of this study showed mothers had varied levels of education ranging from no schooling to above A level. Most of the mothers had primary-level education while slightly more than one-quarter had secondary education. Education has an influence on the kind of care a child receives. Maternal level of education in this study had a significant relationship with nutritional status (underweight) though wasting was not common. More children whose mothers had less formal schooling were underweight and wasted.

Nutritional status of children under five years in the HRRH ART clinic

Results indicate that stunting was the most common malnutrition problem (41.5%) among under-five children in the HRRH ART clinic. There was also quite a high prevalence of wasting and underweight among fewer than five children given the fact that the sample of children was not very big. The findings are slightly higher than the Uganda national figures for stunting at 33%, wasting at 5%, and 14% for underweight according to the Uganda Demographic and Health Survey [3].

Relationship between nutritional status of children 6-59 months old and other study variables.

Maternal socioeconomic characteristics and nutritional status of the children.

Mother's education level has been shown to be positively related to the nutritional status of children [14-23]. In this study, the educational level of the mother was not associated with the nutritional status of her child. The converse was true; children belonging to mothers with higher education levels were more likely to be underweight. The lack of a positive relationship between maternal education level and the nutritional status of their child was probably due to the low-resource set-up in their localities and the limited choices for mothers to feed and take care of their children. Marital status as stated by Teller and Yimer [13] that a child's malnutrition is significantly associated with marital status and being a married mother was positively associated with good nutritional status among children under five was affirmed by the findings of the study where most of the children that belonged to the married mothers were found to have a normal nutritional status as compared to the children to the single mothers or those who had separated from their husbands. Some children who were born to mothers less than 20 years of age were found to have a risky nutritional status which is in line with what Yisak *et al.* [16] suggest in their argument that mothers' age at birth has been associated with malnutrition among under-five-year-old children compared to children whose mothers were 20 years and above at birth. Most of them suffered a common illness of cough and flu, yet others suffered serious conditions of tuberculosis and Pneumonia which are probably due to the weakened immune system as a result of the HIV disease. Most of the children found with such infections were found to be malnourished; this was thought to be due to the effect of HIV as it leads to greater nutritional requirements. This increased need may be due to the loss of nutrients as suggested by [19-23].

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Dietary Practices and nutritional status of the children

Achievement of the minimum dietary diversity, minimum meal frequency, and minimum acceptable diet are associated with better nutritional status of children. Children who did not meet these recommendations were more likely to be undernourished. Underweight in this study showed a significant relationship with the three indices. Stunting and wasting did not show any relationship. In this study, most of the children were introduced to complementary feeds mainly cereal porridges at an early age of about four months at a frequency of 3 times on a daily basis.

Summary of Findings

The study found that malnutrition is one of the major challenges affecting under-five children in districts who attend treatment in the HRRH ART clinic. The common form of malnutrition included stunting, wasting, and underweight. Children aged 39-59 months were less likely to be underweight than those aged less than twelve months. Stunting was more common among children of peasant farmers than those of civil servant mothers or even those doing business.

CONCLUSION

Results from the analysis confirm that the age of a child and maternal occupation was one of the most significant determinants of malnutrition. The study, therefore, underscores the age groups prone to malnutrition challenges as well as the particular occupations among women that could pose a risk of malnutrition to under-five children. This then gives a focus to policymakers in the designing of strategies aimed at combating malnutrition among children below five years attending ART clinics.

RECOMMENDATIONS

The study recommends exclusive breastfeeding and proper complementary and supplementary feeding, especially among children aged less than three years infected with HIV. In line with UNICEF and WHO recommendations, there was a need for exclusive breastfeeding during the first six months of life and thereafter semi-solid complementary foods are introduced up to at least two years or more. This will consequently reduce the underweight children who are mostly aged less than three years in Hoima and other surrounding districts attending treatment in Hoima ART clinic. The study also recommends a special arrangement for income-generating activities for mothers/caretakers engaged in cultivation so as to enable them to access foods they cannot cultivate that are thought to be beneficial to the health and nutritional status of the children. This may contribute to a reduction in nutritional deficiencies so as to reduce the different forms of malnutrition such as underweight, wasting, and stunting, especially among children of peasant farmers who were found to have increased levels of malnutrition than the rest of the children with mothers of other occupations.

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