

## **Undernutrition in Under-Five Children at Rugazi Health Centre IV, Ryeru Sub-County, Southwestern Uganda: Prevalence, Clinical Patterns, and Associated Factors**

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### **ABSTRACT**

Undernutrition remains a significant contributor to child mortality globally, accounting for over 50% of annual deaths among children under five. This study aimed to assess the prevalence, clinical patterns, and determinants of undernutrition in children under five years old attending Rugazi Health Centre IV in Ryeru Sub-County, Bunyaruguru County, Rubirizi District, Southwestern Uganda. Employing a cross-sectional descriptive design, data was gathered from 361 out of 374 children in this demographic. The findings revealed alarming statistics, with 56.2% of the studied children classified as undernourished. Clinically, 27.1% were found to be wasted, indicating acute malnutrition, while 72.9% maintained normal weight for their length. The study noted that 16.6% fell within the moderately wasted category and 6.1% were severely wasted. Additionally, 19.1% were moderately stunted, while 8.0% were severely stunted. Factors contributing to undernutrition included maternal age, education, employment status, breastfeeding practices, and issues such as single parenthood, separation/divorce, or living with step-parents. Notably, exclusive breastfeeding for the first six months appeared as a protective factor against wasting. This research underscores the prevalence of undernutrition among children under five in this region, highlighting the need for targeted interventions addressing socio-economic and maternal factors while promoting optimal breastfeeding practices to mitigate this pressing health challenge.

**Keywords:** prevalence, clinical patterns, under nutrition

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### **INTRODUCTION**

Malnutrition is defined as the cellular disparity between the supply of nutrients and energy and the body needs to ensure growth and maintain specific functions and includes both under nutrition and over nutrition [1-5]. It is an overarching term that includes three different factors; stunting, wasting and underweight. These three factors all have the same cause in common; they are induced by a deficiency of certain nutrients such as proteins and micronutrients [6-9]. Stunting is a chronic form of under nutrition which reflects prolonged period of insufficient nutrient intake and assimilation. It's also an indicator of overall societal socio-economic conditions [10]. Wasting on the other hand is an acute form of undernutrition, an indicator of body

tissue and fat mass deficit resulting from insufficient nutrient intake within a short-period of time. It's often used as an educated guess of the general population health [11-12].

By the year 2000, it was that 182 million pre-school children which was one third of children less than five years old in developing countries were stunted and approximately 27% were estimated to be underweight [13] and the Ugandan government has put in place tremendous efforts in reducing the prevalence of malnutrition in the country through effective nutrition programs which act directly on feeding practices. In 2011, a statement of political commitment to improve nutrition, signed by the Minister of Health on behalf of the President and

nutrition was included in Uganda's 5-year National Development Plan (NDP) [14]. During my rotation on the paediatric ward at KIU-TH, I realized that the majority of the under nourished children admitted came from Rubirizi district and therefore I decided to carry out this study and find

out the actual prevalence, clinical patterns and factors associated with undernutrition among children under five years of age attending Rugazi Health Centre IV Ryeru Sub-County Bunyaruguru county- Rubirizi District-South western Uganda.

## METHODOLOGY

### Study design

The research design was a cross-sectional descriptive analytical study design. This design entailed information or data that was gathered and represented the population at a particular time.

### Study area

The study was done at Rugazi Health Centre IV located in Rubirizi town council Rubirizi district opposite St. Micheal Secondary School playground, approximately 500metres along Mbarara-Kasese highway.

### Study population

The study population included children under 5 years of age with their mothers or caretakers attending Rugazi Health Centre IV Ryeru Sub-County Bunyaruguru county- Rubirizi District-South western Uganda.

### Inclusion criteria

Children <5 years of age whose mother or responsible caretaker consented to participate in the study and who attended Rugazi Health Centre IV at the time of conducting the study.

### Exclusion criteria

Children <5 years attending Rugazi Health Centre IV whose mother or responsible care taker consented to participate. Children >5 years attending Rugazi Health Centre IV

### Sample size determination

The sample size was determined using the Kish Leslie (1965) formula below

$$n = \frac{Z^2 P (1-P)}{E^2}$$

Where n=estimated minimum sample size required,

p=proportion of a characteristic in a sample (42%by UDHS 2011)

Z=1.96(for 95% confidence interval)

E=Margin of error set at 5%

According to the study findings, majority 144(40.1%), 73(20.3%), and 70(19.5%) were aged 13-24 months, 0-12 and 25-36

$$n = \frac{(1.96)^2 * 0.42(1-0.42)}{(0.05)^2}$$

n=374

### Sampling procedure

Systematic random sampling was used to select eligible mothers' /care takers of under-five children. The mothers or caretakers was selected starting with the first ones in the line. If the mother or caretaker does not have an eligible child or parent/caregiver refuses to be interviewed or has no caregiver available, replacement sampling was done by continuing to the next mother or caretaker.

### Data analysis

Data collected was analyzed using SPSS version 20. The data was cleaned and checked for errors using the software. Descriptive analytical analysis techniques were applied to present the trends of the data. These included frequencies and percentages which was presented in table and figure forms where appropriate.

### Ethical considerations

Ethical clearance and approval was obtained from the KIU- Research Ethics Committee (KIU-REC) to ensure that the study adheres to the acceptable ethical guidelines. Permission was sought from the District health officer(DHO) before undertaking this research.in addition, the purpose of the study was explained to the participants and informed consent obtained from them before participating. In order to ensure confidentiality, the names of the respondents will not be taken.

The research results were shared through feedback meetings with the facility in charge before it is made available to other people. Confidential information will not be shared.

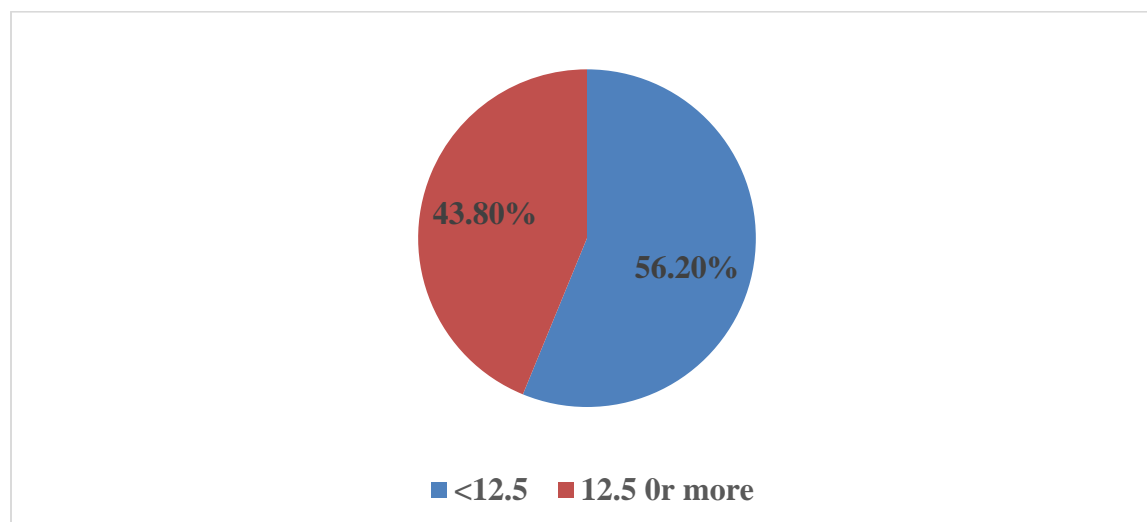
## RESULTS

months old respectively; while only 8(2.2%) were 49-59 months old. Similarly, majority 217(60.4%) and 205(57.3%) were

living away from Bunyaruguru County and males by gender respectively.

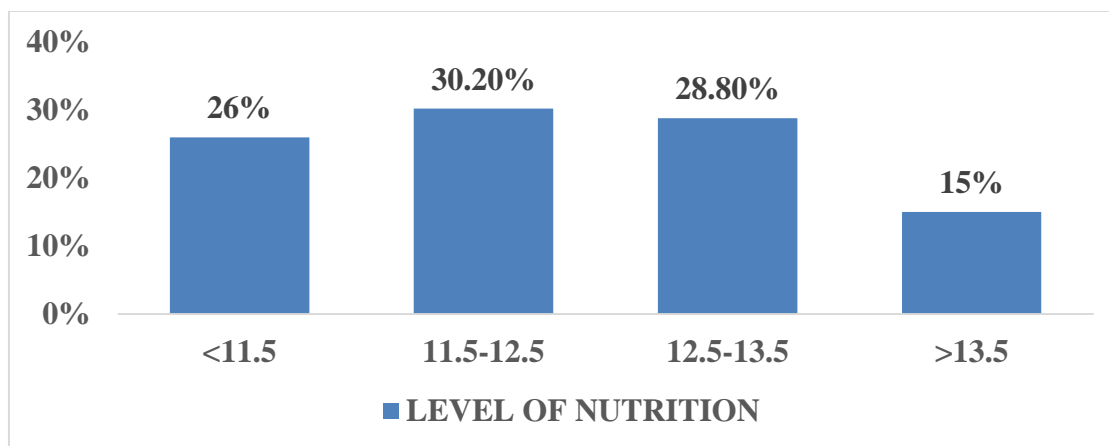
**Table 1: Socio-demographic Characteristics of the Children under study**

Variables	Frequency (n=)	Percentage (%)
<b>Age (months)</b>		
0-12	73	20.3
13-24	144	40.1
25-36	70	19.5
37-48	64	17.8
49-59	8	2.2
<b>Place of Residence</b>		
Within	142	39.6
Away	217	60.4
<b>Gender</b>		
Male	205	57.3
Female	153	42.7



**Figure 1: Level Nutrition among the study participants**

According to the study findings, majority counterparts (43.8%) were normally (56.2%) of the children were undernourished where as their nourished.



**Figure 2: Level Nutrition among the study participants**

According to the study findings, 94(26%) were <11.5 cm, while 54(15%) were >13.5 cm; 109(30.2%) and 104(28.8%) were 11.5-12.5 and 12.5-13.5 cm respectively.

Out of the 361 children whose mother/care takers were interviewed, 82(22.7%) were stunted while 279(77.3%) had normal height for their age. 98(27.1%) were wasted whereas 263(72.9%) were

found to have had a normal weight for their length. Wasting was considered when weight for length was 60(16.6%) SD-1 to SD-2 for moderately wasted and 22(6.1%) SD-3 for severely wasted. Similarly, Stunting was considered when Height for Age was 69(19.1%) SD-1 to SD-2 for moderately stunted and 29(8.0%) SD-3 and more for severely stunted.

**Table 2: The clinical patterns associated with undernutrition among children <5 years attending Rugazi Health Centre IV**

Variable	Frequency	Percentage	Stunted		Wasted	
			Yes	No	Yes	No
<b>Height for Age</b>						
Median/Normal	279	77.3%				
SD-1 to SD-2	60	16.6%				
SD-3 and more	22	6.1%				
			82(22.7%)	279(77.3%)		
<b>Weight for Length</b>						
Median/Normal	263	72.9%				
SD-1 to SD-2	69	19.1%				
SD-3 and more	29	8.0%				
					98(27.1%)	263 (72.9%)

According to the study findings, despite majority 324(93.6%) cared for by their mothers while 22(6.4%) were only guardian/care takers, many 19(51.4%) are step parents to these children. Majority 289(88.9%) of the mothers were 25 years old or more at their last birthday whereas a considerable number; 36(11.1%) were young than 25 years of age. Majority 312 (86.4%) had attended ANC during pregnancy. Though many 164(45.4%) recall going for ANC at a gestation age of 3to6months. Generally, the mothers were

mostly 210(58.8%), followed by 118(33.1%), 21(5.9%) and 8(2.2%) corresponding to mothers aged 18-27 years followed by 28-37 years, <18 and >37 years respectively. However, majority 325(90.0%) of the parents (Guardians) were living together (married/cohabiting) while only 36(10.0%) were single/Separated/widowed parents. Of which majority, 169(46.8%) had only primary level of education and 99(27.4%) never attended school at all; only 27(7.5%) reached tertiary education.

**Table 3: The Caregiver/Maternal related factors associated with undernutrition among children <5 years attending Rugazi Health Centre IV**

Variables	Frequency (n=)	Percentage (%)	P-Value	OR [95% C.I]
<b>Next of Kean</b>				
Mother	324	93.6	0.004*	0.393(0.235-0.657)*
Care-giver	22	6.4	Ref	1
<b>Relationship to the child</b>				
Father	13	35.1	0.166	0.513(0.200-1.318)
Stepparent	19	51.4	0.789	0.823(0.198-3.425)
Grandparent	5	13.5	Ref	1
<b>Age in years at last Birthday</b>				
Young age (< 25 years)	36	11.1	<0.001*	---
Old age (≥ 25 years )	289	88.9	Ref	1
<b>Maternal Age</b>				
<18	21	5.9	0.080	0.258(0.057-1.175)
18-27	210	58.8	0.203	0.468(0.145-1.507)
28-37	118	33.1	0.278	0.255(0.022-3.015)
>37	8	2.2	Ref	1
<b>Attended ANC when you are pregnant</b>				
Yes	312	86.4	0.048*	0.27(0.07-1.03)
No	31	8.6	Ref	1
<b>Timing of antenatal clinic when pregnant</b>				
1to3months	126	34.9	0.372	6.53(0.11-401.62)
3to6months	164	45.4	0.703	0.58(0.04-9.26)
6to9months	34	9.4	0.451	3.50(0.136-0.35)
I don't know	9	2.5	Ref	1
<b>Current marital status</b>				
Living alone	36	10.0	0.298	3.27(0.35-30.46)
Living together	325	90.0	Ref	1
<b>Education Level</b>				
No education	99	27.4	0.694	2.32(0.04-154.85)
Primary education	169	46.8	0.770	0.61(0.02-17.17)
O' Level	12	3.3	0.726	2.15(0.03-155.36)
A' Level	54	15.0	<0.001*	0.01(---)
Tertiary education	27	7.5	Ref	1
<b>Employed?</b>				
Yes	281	78.9	0.021*	2.468(1.353-4.503)*
No	75	21.1	Ref	1
<b>Type of job</b>				
Farming	248	68.7	0.001*	0.341(0.198-0.588)*
Trading	6	1.7		1.847(1.054-3.238)*
Others	24	6.6	Ref	1
<b>If Farmer, state</b>				
Subsistent	214	84.3	0.046*	3.37(1.81-14.07)
Semi-Commercial	40	15.7	Ref	1
<b>If Trader/ Tradesman/Public/Civil Servant, do you have a regular cash income/ are you a salaried worker</b>				
Yes, professional teacher, accountant, administrator - nurse,	27	75.0	0.609	2.00(0.14-0.14)

Yes, clerical/secretarial	9	25.0	Ref	1
<b>Receive any form of financial subvention</b>				
Yes	21	6.1	0.675	0.897(0.540-1.490)
No	323	93.9	Ref	1
<b>If yes, in what form</b>				
Regular	16	32.0	0.698	0.855(0.394-1.855)
Casual	33	66.0	Ref	1
* Significant, P-Value=<0.05; OR=Odds Ratios; Ref=Reference category				

Socioeconomically, majority 281(78.9%) were employed while a considerable number 75(21.1%) number were unemployed. Of the farmers, majority 248(68.7%) farmers and only 6(1.7%) were in trade business. Similarly, the farming is mostly, 214(84.3%) subsistence with only 40(15.7%) practice semi-commercial farming. To do with the public servants/traders, they were mostly 27 (75.0%) professionals such as teachers, nurse, accountant, and/or administrators. Nonetheless, only 21(6.1%) receive some form of financial subvention, and mostly

(66.0%) casual while only (32.0%) receive regularly.

However, majority 289 (80.1%) breast fed exclusively for the 1<sup>st</sup> 6 months whereas a considerable number 24(6.6%) were less than 6 months exclusively breast fed. Though majority 171 (47.4%) still currently breastfeeding and a considerable number 113 (31.3%) had breast fed for over a year. Also, categorically majority 167 (46.3%) practiced Exclusive for some time then mixed, 22(6.1%) had completely mixed feeding whereas 138(38.2%) had a fully exclusive breastfeeding.

**Table 4: Child related Factors associated with undernutrition among children <5 years attending Rugazi Health Centre IV**

Variables	Frequency (n=)	Percentage (%)	P-Value	OR [95% C.I]
<b>Exclusive breast feeding duration</b>				
1 <sup>st</sup> 6 months	289	80.1	0.473	2.268(0.242-21.287)
<6 months	24	6.6	0.168	5.885(0.473-73.144)
6 months-1 year	25	6.9	0.433	2.624(0.235-29.323)
>1 year	16	4.4	0.770	0.673(0.048-9.512)
Not sure	5	1.4	Ref	1
<b>Breastfeeding Status</b>				
currently breastfeeding	171	47.4	0.004	0.393(0.235-0.657)*
0 to 3 months	7	1.9	0.263	1.562(0.715-3.410)
3 to 6 months	13	3.6	0.433	0.487(0.080-2.944)
Through 1 <sup>st</sup> 6 months	14	3.9	0.149	0.134(0.009-2.057)
6 months to 1year	19	5.3	0.849	0.823(0.110-6.150)
Over 1 year	113	31.3	0.585	0.563(0.072-4.428)
Not sure	22	6.1	Ref	1
<b>Exclusive breastfeeding or mixed feeding</b>				
Exclusive	138	38.2	<0.001*	0.393(0.334-0.747)*
Mixed	22	6.1	0.377	0.677(0.285-1.609)
Exclusive then mixed	167	46.3	0.128	2.634(0.756-9.171)
Not sure	28	7.8	Ref	1
* Significant, P-Value=<0.05; OR=Odds Ratios; Ref=Reference category				

## DISCUSSION

According to the study findings, majority (56.2%) of the children were undernourished. Similarly, prevalence of undernutrition was 1.1% and was higher among boys than in girls (7.7% vs. 3.9%). In the same study, low child birth weight was statistically associated with undernutrition. However, it adds to the WHO 2006 Growth Standards, complementing the 2006 UDHS reported a prevalence of underweight of 16 percent for children under 5. According to a study made in North western Uganda by Legason et al. [15] was more common among the age group 6-17 months (1.2%) and decreased with age.

According to the study findings, 26% were <11.5 cm, while 15% were >13.5 cm; 30.2% and 28.8% were 11.5-12.5 and 12.5-13.5 cm respectively. This complements the Global journal of pure and applied sciences Vol.24, (2018), in which it was found that, of the 162 million children under five years who were stunted, 36% of

In this study, the prevalence of undernutrition stands at 56.2% within those who were undernourished; 22.7% were stunted with 19.1% moderately stunted and 8.0% severely stunted whereas 27.1% were wasted with 16.6% moderately wasted and 6.1% severely wasted.

them resided in Africa while 56% were found in Asia and It was also observed that an estimated 60 million under-five children in developing countries were found to be stunted out of which 11 million were Nigerian children. The severity of childhood malnutrition was observed to steadily increase from 11% in 2003 to 18% in 2013 for wasting; 24% in 2003 to 29% in 2013 for underweight, although there was a decline from 42% in 2003 to 37% in 2013 for stunted children. Socioeconomically, majority were employed while a considerable number was unemployed. Of these, more than a half were farmers and only a few were in trade business. Similarly, the farming is mostly subsistence with only a limited number practice semi-commercial farming and these are almost all were professionals/civil servants. Nonetheless, only 6.1% receive some form of financial subvention, and mostly 66.0% casual while only 32.0% receive regularly.

## CONCLUSION

However, Majority of the mothers were breastfeeding and this was a protective factor to wasting whereas failure to observe exclusive breastfeeding for at least the 1<sup>st</sup> 6 months, poor/late ANC attendance, living with step parents, parental unemployment and parental separation/divorce/being single motivates undernourishment.

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