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The factors contributing to undernutrition in children under 5 years of age in Buramba village, Ishaka division, Bushenyi district.

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ABSTRACT

Undernutrition can severely impact a child's health and development, leading to growth problems, increased susceptibility to diseases, and even death. In developing countries, it is estimated that 60% of child deaths under the age of 5 are linked to malnutrition. This study aimed to identify the factors contributing to undernutrition in children under 5 years of age in Buramba village, Ishaka division, Bushenyi district. The research followed a descriptive cross-sectional design, employing quantitative methods for data collection. A total of 381 participants, including mothers and children under five years old, were involved in the study. Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 25.0. The findings revealed that a significant number of children in Buramba village suffered from undernutrition, with 10.76% being underweight, 4.99% wasted, and 19.16% stunted. Several factors were associated with an increased risk of undernutrition among these children, including the mother's parity, marital status, place of delivery, and lack of antenatal care (ANC) visits. Additionally, undernutrition was more prevalent among children of mothers with limited education, those from various occupational backgrounds, those with mothers practicing traditional worship or Islam, and those with lower family incomes. The study highlights the urgent need for nutritional education programs targeted at mothers to improve the nutritional status of vulnerable infants and combat malnutrition. These programs should be implemented with rigorous monitoring and evaluation to ensure their effectiveness in addressing this critical issue.

Keywords: Undernutrition, Balanced diet, Infant mortality, children less than 5 years, Mothers.

INTRODUCTION

Adequate nutrition is vital for healthy growth and development during childhood [1, 2]. Undernutrition is a form of malnutrition characterized by a lack of adequate energy, proteins, and micronutrients to meet basic requirements for body maintenance, growth, and development [3]. Undernutrition includes wasting (low weight-for-height), stunting (low height-for-age), and underweight (low weight-for-age[4]. Malnutrition is regarded as the most important risk factor for illness [5]. According to WHO, 2020, 45% of deaths among children less than 5 years of age are linked to undernutrition and most of them occur in low- and middle-income countries. 47 million children are wasted, 14.3 million are severely wasted and 144 million are stunted while 38.3 million are overweight or obese. In 2016, an estimated 27% of children under the age of 5 years in South Africa were stunted, 44% had a vitamin deficiency, 13% were overweight, and 6% were underweight[6]. According to Ukegbu et al. [7] household food insecurity, low household income, illiterate caregivers, unemployment, inadequate dietary intake, low birth weight, consumption of monotonous diets, poor caregiver's nutritional knowledge, poor access to water and sanitation, poor weaning practices, age of the caregiver, and demographic characteristics of a child (age and gender) influence malnutrition in South Africa. In Uganda, a report released by USAID, [8] , shows that almost one-third of children under 5 years in Uganda are stunted. Stunting increases with age, peaking at 37% among children 18-35 months. The prevalence of wasting (low weight-for-height) nationally is 4% but in the

regions of Karamoja and West Nile, prevalence is 10%. Undernutrition is known to hinder the normal physiological functioning of the body resulting in growth retardation, decreased resistance to disease and infections, and ultimately, ill health and death [9]. It is reported that 60% of deaths among children less than 5 years in developing countries are associated with malnutrition. Undernutrition has a significant association with the birth grade, delivery type, hospitalization history, educational level of parents, parents' job, birth weight, vaccination, and the regular consumption of supplementary vitamins [10]. Also, low birth weight, an episode of diarrhea and the presence of developmental delay, inadequate antenatal visits, faltering growth and not de-worming one's child have been revealed to be associated with malnutrition [11]. Western Uganda has been persistently called the "Food Basket" of the country, but, according to [12] 46% of children below 5 years of age in the Bushenyi district still suffer from malnutrition and associated problems[13]. In light of this, this study evaluated the determinants of under-nutrition among children below 5 years of households in Buramba village of Ishaka division, Bushenyi district.The world today is facing a prevalence of malnutrition with 155 million stunted and 52 million wasted children [14]. It is estimated that 45% of children under 5 years of age die due to malnutrition [15]. Sub-Sahara Africa is reported to contribute to one-third of the global undernourished children with 10% wasted, 39% stunted, and 25% underweight [12, 16]. Although Agriculture is the backbone of Uganda's economy and there is apparently enough food for everyone in the country, malnutrition remains one of the major problems affecting Ugandans. Children below 5 years of age are affected most since they require adequate nutrition for growth and development and mortality due to malnutrition is the highest. Uganda is ranked 13th position by UNICEF based on the number of stunted children in the country with approximately 3 in 10 children under 5 being stunted. Almost half (46%) of children below 5 years were stunted which is comparable to the national prevalence of 47.8% for western Uganda and this is unacceptably high [17]. This study therefore evaluated the determinants of undernutrition among children below 5 years of households in Buramba village of Ishaka division, Bushenyi district.

METHODOLOGY

Study design

The study was a descriptive cross-sectional study. A quantitative method was used to collect data[18]. **Area of Study**

The study was conducted in Buramba ward of Bushenyi district located in western Uganda.

Study population

The study population was children under 5 years of age (<59 months) in the Buramba ward of Ishaka division in Bushenyi-Ishaka municipality.

Inclusion criteria

All mothers of children below 5 years of age who consented.

Exclusion criteria

All mothers of children below 5 years of age who were critically ill and mothers of children below 5 years of age who did not consent to participate.

Sample size Determination

The sample size was determined using Fisher's formula of 1998[19] as shown below.

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

Where; n is the required sample space

Z is the standard normal deviation usually set at 1.96 which corresponds to a 95% confidence interval

P is the estimated prevalence of malnutrition in children below 5 years of age (<59 months) which is 46% in the Bushenyi district according to (Kikanfuda, 2014)

E is the margin of error set at 0.05

Therefore; $n = \frac{1.96^2 \times 0.46(1-0.46)}{0.05^2}$

$n = 381$

Prevalence of under-nutrition in children under five

Anthropometric data (Weight and height) of children were taken using standard procedures as recommended by WHO [20]. Weight was measured using calibrated digital scales. Height was measured using a calibrated mobile stadiometer for children of walking age and a portable infantometer for children aged <2 years. The data were entered in the WHO Anthro program to calculate Z-scores for height-for-age (HAZ), weight-for-height (WHZ) and weight-for-age (WAZ) using WHO reference values. The age of the child was obtained from the child's health care card/ immunisation card where available and/or from the parents or guardians. Results were reviewed along with the patient to ensure participation in the study and documented accordingly.

Factors associated with under-nutrition in children under five.

A structured questionnaire was to determine the factors associated with the prevalence of under-nutrition among children below 5 years in Buramba ward Bushenyi-Ishaka Municipality.

Sampling Technique

The study participants of children under 5 years of age were randomly sampled. The mothers or caretakers were administered a questionnaire by reading the questions for them to give the right response accordingly.

Quality Control

Three Research Assistants were recruited to assist in data collection and language translation. The principal investigator trained the research assistants on the objectives of the study and the right way to collect the data. The investigator guided the data collection process, correctness, and completeness of the questionnaire.

Data analysis

Data were entered into Microsoft Excel spreadsheets and analyzed using Statistical Package for Social Sciences (SPSS) version 25 (SPSS Inc., USA). Calculators were used to analyse data and it was presented in the form of tables and bar graphs.

Ethical Consideration

A letter for data collection was obtained from the Faculty of Clinical Medicine & Dentistry and taken to the LC1 who gave further permission for household visits to collect data. After explaining the purpose of the study to each study participant in the households, informed consent was obtained from the participants before participating in the study.

RESULTS

Characteristics of Index Child

The majority 346 (90.8%) of children who participated in this study were reported to have had a birth weight greater than 2500g. Most 198 (52%) and 194(50.9%) of the children were females and fell in the age bracket 12-36 months respectively (Table 1).

Table 1. Characteristics of Index Child in Buramba Village

Variable			Frequency n=381	Percentage
		Index child characteristics		
Age (months)				
<12			91	23.9
12-36			194	**50.9**
37-59			96	25.2
Sex				
Male			183	48.0
Female			198	**52.0**
Birth weight				
<2500g			35	9.2
>2500g			346	**90.8**

Prevalence of Under-nutrition among Children under five Years

Results in Table 2 showed that 41(10.76%), 19(4.99%) and 73(19.16%) of the children below five years were respectively underweight, wasted and stunted.

TABLE 2: PREVALENCE **OF UNDER-NUTRITION AMONG CHILDREN UNDER FIVE YEARS IN BURAMBA VILLAGE**

Variable	Underweight		Wasting		Stunting	
Children < 5 years n =381	Normal 340(89.24%)	Underweight 41(10.76%)	Normal 362(95.01%)	wasted 19(4.99%)	Normal 308(80.84%)	Stunted 73(19.16%)

Maternal factors associated with undernutrition of children below five years

The majority 362(95%) of the participants in this study were married, 327(85.8%) delivered their children in the health facility and 248(65.1%) reported that their first antenatal visit was during their first trimester. Most 191(50.1%) of the participants fell in the age bracket 20-29 years, 168(44.1%) had 1-2 children and 101(26.5%) had 2 ANC visits before delivery of the index child (Table 3).

Table 3: Maternal factors associated with undernutrition of children below five years in Buramba Village

Variable	Frequency	percentage
Age of mother (years)		
<20	156	40.9
20-29	191	**50.1**
30-39	30	7.9
>39	4	1
Marital Status		
Married	362	**95.0**
Single	15	3.9
Separated	3	0.7
Divorced	1	0.4
Parity		
1-2	168	**44.1**
3-4	136	35.7
>4	77	20.2
Place of delivery		
Home	54	14.2
Health facility	327	**85.8**
Timing of first antenatal care visit		
None	11	2.9
First trimester	248	**65.1**
Second trimester and above	122	32.0
Number of ANC Visits		
1	89	23.4
2	101	**26.5**
3	98	25.7
>3	93	24.4

Socio-economic Factors Associated with Nutrition among Children below 5 Years

The majority 324(87.5%) of the participants were Muyankole by tribe and 347(91.1%) produced their own food. Most 263(69%) of the participants own permanent houses, 266(69.8%) were Christians and their average family income was between 150,000-300,000 Ugx. Most 221(58%) of the partners had attained a secondary level of education and more with a household size of 5-9 people, 202(53%) own their businesses and 183(48%) of the mothers only attain primary education (Table 4).

Table 4: Socio-economic Factors Associated with Undernutrition among children below 5 years in Buramba village

Variable	Frequency	Percentage
Mother's education level		
No formal education	42	11.0
Primary	183	**48.0**
Secondary and above	156	40.9
Mother's occupation		
Peasant	141	37.0
Business owned	202	**53.0**
Civil servant	19	5.0
Others	19	5.0
Tribe		
Munyankole	324	**87.5**
Mukiga	26	6.8
Mukunjo	10	2.6
Muganda	19	5
Others	2	0.5
Household Size		
<4	125	32.8
5-9	221	**58.0**

>9	35	9.2
Source of Food		
Own production	347	**91.1**
Purchase	27	7.1
Food aid	7	1.8
Type of Housing		
Temporary	8	2.1
Semi-permanent	110	28.9
Permanent	263	**69.0**
Mother's Religion		
Traditional	31	8.1
Muslim	84	22
Christian	266	**69.8**
Husband/partner's education level		
No formal education	118	31.0
Primary	42	11.0
Secondary and above	221	**58.0**
Monthly family income (ugx)		
<150,000		
150,000-300,000	46	12.1
>300,000	229	**60.1**
	106	27.8

Table 5 Bivariate and Multivariate Analysis of factors associated with undernutrition of children under 5 years.

	Underweight		Wasting		Stunting	
Variable	**AOR**	**[95% CI]**	**AOR**	**[95% CI]**	**AOR**	**[95% CI]**
Age of mother at birth(years)						
<20	0.180	[0.008-3.940]	0.622			
20-29	0.072	[0.003-1.514]	0.422	[0.038-10.070]	0.007	[.000-2.718]
30-39	0.222	[0.008-6.548]	0.444	[0.026-6.735]		
>39	1			[0.023-8.711]	0.004	[.000-1.278]
					-	-
Marital status of the mother						
Married	0.082	[0.012-1.740]	0.551			
Single	1.23	[0.442-3.743]	2.345	[0.021-2.173]	0.003	[0.000-2.133]
Separated	0.812	[0.222-3.167]	1.562			
Widowed	1			[0.713-5.671]	0.07	[0.000-1.772]
				[0.454-4.562]	2.33	[0.787-5.443]
Parity						
1-2	2.218	[0.583-4.432]	1.571	[0.600-4.109]	3.942	[0.366-5.585]
3-4	4.263	[1.155-6.739]	1.943	[0.811-4.651]	2.259	[0.666-5.727]
>4	1					
Timing of first antenatal care visit						
None	0.978	[0.148-6.446]	1.032			[0.309-4.565]
First trimester	0.346	[0.041-2.928]	0.372			[0.010-3.808]

Second trimester and above	1			[0.192-3.559] [0.058-2.381]	2.882 1.067	
Place of delivery Home Health facility	 2.697 1	[0.977-3.443]	1.213	[0.502-3.930]	 0.200	[.012-3.292]
Socio-economic factors						
Mother's education level No formal education Primary Secondary and above	 3.178 2.207 1	 [0.753-6.406] [0.749-5.505]	 5.382 1.042	 [1.715-7.887] [0.498-2.177]	 2.946 4.137	 [2.490-4.542] [2.331-6.213]
Household size <4 5-9 >9	 1.764 1.517 1	 [0.349-8.901] [0.303-7.586]	 0.931 0.826	 [0.292-2.964] [0.265-2.579]	 1.475 0.202	 [0.087-2.036] [0.009-4.613]
Mother's occupation Peasant Business Civil servant Others	 3.405 0.645 1.535 1	 [0.434-5.602] [0.558-2.996] [0.040-3.562]	 2.465 3.562 0.604	 [0.649-4.398] [1.227-8.904] [0.141-2.251]	 3.125 4.513 0.959	 [0.023-5.006] [0.022-9.179] [0.069-2.040]
Source of food Own production Purchase Food aid	 0.644 0.705 1	 [0.033-2.484] [0.028-2.532]	 0.639 1.139	 [0.128-2.931] [0.076-3.180]	 0.599 1.083	 [0.001-460.402] [0.041-3.620]
Mother's religion Traditional Muslim Christian	 3.284 1.147 1	 [0.547-5.695] [0.427-3.085]	 2.010 1.168	 [0.493-8.188] [0.545-2.504]	 3.701 0.621	 [1.188-4.031] [0.083-4.638]
Monthly family income(ugx) <150,000 150,000-300,000 >300,000	 3.222 1.349 1	 [1.353-6.951] [0.443-3.109]	 1.629 0.789	 [0.408-6.509] [0.370-1.680]	 3.340 3.077	 [0.248-5.621] [0.461-5.561]

Maternal Factors Associated with Underweight, Wasting and Stunting in Children Under Five Years in Buramba Village

In Table 5, results showed that increasing parity of the mother is associated with increasing odds of being underweight as evidenced in parity 1-2 and 3-4 [(AOR:2.218, 95% CI (0.583-4.432) and (AOR:4.263 95% CI (1.155-6.739)] respectively compared with mothers who have more than 4 children. Children of single mothers have higher odds [AOR: 1.230, 95% CI (0.442-3.743)] of being underweight compared to mothers who were

widows. Children who were delivered at home had higher odds [AOR: 2.697, 95% CI (0.977-3.443)] of being underweight. Children of single mothers and those whose mothers were separated had higher odds [(AOR: 2.345, 95% CI (0.713-5.671)) and (AOR: 1.562, 95% CI (0.454-4.562))] respectively to be wasted compared to those whose mothers were widows. Increasing parity of the mother was associated with increasing odds of wasting as evidenced in parity 1-2 and 3-4. Mothers who had no ANC visits before delivering had higher odds [(AOR: 1.032, 95% CI (0.192-3.559)] compared to those whose timing of first ANC visit was second trimester and above. Children who are delivered at home are more likely [(AOR: 1.213, 95% CI (0.502-3.930)] compared to those delivered in the health facility. Results in Table 5 revealed that children of mothers who were separated, have parity 1-2 and 3-4 and never attended ANC were more likely to be stunted.

Socio-economic Factors Associated with Underweight, Wasting, and Stunting in Children Under Five Years in Buramba Village

Children of mothers with no formal education and those whose education attainment was primary were more likely to be underweight [AOR: 3.178, 95% CI (0.753-6.406) and (AOR: 2.207, 95% CI (0.749-5.505)] compared to those whose mother's education attainment was secondary and above. Peasant mothers and civil servants were more likely to have underweight children [(AOR: 3.405, 95% CI (0.434-5.602)) and (AOR: 1.535, 95% CI (0.540-3.562))] respectively compared to mothers who were into other occupation. Regarding religion, children whose mothers were into the traditional form of worship and Islam had higher odds [(AOR: 3.284, 95% CI (0.547-5.695)) and (AOR: 1.147, 95% CI (0.427-3.088))] respectively compared to those whose mothers were Christians. Monthly family income was associated with underweight as evidenced in mothers whose average income was less than 150,00 ugx and between 150,000-300,000ugx respectively [(AOR: 3.222, 95% CI (1.353-6.951)) and (AOR: 1.349, 95% CI (0.443-3.109))] compared to those whose average income was greater than 300,000ugx (Table 5). Children of mothers with no formal education and attained primary education have higher odds [(AOR: 5.382, 95% CI (1.713-7.887)) and (AOR: 1.042, 95% CI (0.498-2.177))] respectively to be wasted compared to those whose mothers attained secondary education and above. Also, children of peasant and business mothers have higher odds [(AOR: 2.465, 95% CI (0.649-4.398)) and (AOR: 3.562, 95% CI (1.227-8.904))] of wasting compared to mothers of other occupation. The source of food is associated with wasting in children below 5 years as showed in children whose mothers purchase food [AOR: 1.139, 95% CI (0.076-3.180)]. Children of mothers with only primary education and whose household size is less than 4 had higher odds of stunting [(AOR: 4.137, 95% CI (2.331-6.213)) and (AOR: 1.475, 95% CI (0.087-2.036))] respectively.

DISCUSSIONS

Prevalence of under-nutrition in children under five years in Buramba Village

Findings in this study showed that 41(10.76%), 19(4.99%), and 73(19.16%) of the children below five years were respectively underweight, wasted, and stunted. The findings of this study are low when compared to the rates reported from other countries in Africa, such as Niger, Burundi, Ethiopia, and Mozambique. Over the past decade, the Government of Uganda and the Ministry of Health (MoH) have taken concentrated steps in improving maternal, and child health and nutrition through the implementation of free antenatal care services, iron and folate supplementation for pregnant women, and school feeding activities[21–23]. These strategies may have contributed to the reduction in the prevalence of undernutrition in children under five years in Uganda. Comparatively, food crises, limited access to arable land for agricultural purposes, and adverse climatic conditions have constrained progress in tackling under-nutrition in Niger, Burundi, Ethiopia, and Mozambique; accounting partly for the differences in the prevalence rates of under-nutrition between Uganda and other countries[22, 24].

Maternal Factors Associated with Under-nutrition in Children under five

In this study, increasing parity of the mother, mothers of single marital status, home delivery, and lack of ANC visit is associated with increasing odds of being underweight. The findings of this study agreed with a study by Bhowmik et al. [25].

Socio-economic Factors Associated with Under-nutrition in Children under five

Children of mothers with no formal education and those whose education attainment was primary, children of peasant mothers and civil servants, children whose mothers were into the traditional form of worship and who are Islam, children whose mother's monthly family income was less than 150,000 Ugx and between 150,000-300,000ugx and children of mothers with no formal education and attained primary education were associated with under-nutrition. Interestingly, this study showed that having a farmer mother predisposed to both stunting and underweight. In contrast, a study conducted in Ethiopia found that farmer mothers have good access to food, and therefore have well-nourished children. Children of farming mothers from our study have access to food such as cassava, potatoes, plantain, maize, beans, and groundnuts or carbohydrate food from farms, but did not have access to protein animal food, i.e. meat and fish, since these are expensive and not always available in Buramba ward. Another explanation is that there are many people in the household sharing the same food, resulting in food insecurity meaning that not everyone will get enough food to eat, especially children. Also, farmer mothers used to

sell some of the food in order to afford other needs of the household, rather than using it for the family nutrition. Lack of knowledge regarding adequate food for children can also explain why children of farmer mothers were more stunted than others[26]. When food is available, it might be the father who gets the largest portion in accordance with Banyankore culture and thus children might lack adequate food intake, resulting in stunting. Also, children from middle-class households (150,000 -300,000) were less likely to be stunted whereas primary-level paternal education was associated with an increased risk of wasting and stunting respectively. Under-nutrition is a direct representation of poverty [27–29]. Individuals from poor households are predisposed to poor living conditions that may result in diseases especially anemia, malaria, and intestinal disturbances [30-33]. A lower wealth index is associated with low literacy, lower purchasing capacity, food insecurity and thus higher rates of under-nutrition [34]. Comparatively, middle-class households are at least financially capable, food-secured and have better access to health care services, which are precursors for optimal childhood nutritional outcomes. The association between increased wealth index and low rates of under-nutrition has been reported by other studies.

CONCLUSION

There is undernutrition among children below five years old in Buramba village. Parity, marital status, place of delivery, and lack of ANC visits were associated with increasing odds of undernutrition among children less than five years old in Buramba village. Children of mothers with no formal education and those whose education attainment was primary, children of peasant mothers and civil servants, children whose mothers were into the traditional form of worship and who are Islam, children whose mother's monthly family income was less than 150,000 Ugx and between 150,000-300,000ugx and children of mothers with no formal education and attained primary education were associated with undernutrition.

RECOMMENDATIONS

There was a need for feeding education to mothers which would help to improve nutrition habits among needy infants mainly to control malnutrition. This should be done under good monitoring and evaluation. The government should support and provide incentives to agricultural populations to increase food availability and diversity to curb under-nutrition in the whole country. Information should be disseminated using mass media and social media about complementary feeding, length of breastfeeding, safe water for drinking and meal frequency. Nutritional interventions by the government and Ministry of Health to fight childhood under-nutrition should take into consideration policies or strategies that would empower women, and address socioeconomic inequalities at the community level.

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