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Prevalence of Under-nutrition and Associated Factors Among Children Below 5 Years in Bushenyi District, Buramba Ward, Bushenyi Ishaka Municipality

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ABSTRACT

Under-nutrition is a major challenge facing children below the age of five years from middle-class households. Under-nutrition is a direct representation of poverty. Individuals from poor households are predisposed to poor living conditions that may result in diseases and poor health outcomes. This study was designed to investigate the factors contributing to under-nutrition in children below five years in the Bushenyi district. The study was a cross-sectional study design. The findings showed that the overall prevalence of under-nutrition was 11.64%, and underweight, wasting, and stunting were 10.76%, 4.99%, and 19.16%, respectively. The prevalence of stunting in the present study was 19.16%, which means that one in five children in the Buramba ward was stunted due to chronic under-nutrition. The etiology of under-nutrition in Buramba ward, Bushenyi municipality, is multifaceted and interconnected. The nutritional status of children under five years is determined by socioeconomic, cultural, household, maternal, and child-level factors. The effect of socioeconomic factors on underweight, wasting, and stunting is exhibited independently and mediated through maternal and child-level factors. It is logical to conclude that empowering women as well as improving the socioeconomic status of households may contribute significantly to reducing morbidity and mortality from undernutrition. Although our study included only children under five years of age, our findings can be considered to reflect the anthropometric status for the population in Buramba ward in general, since the status of children under five can be considered a good gauge for population-based malnutrition. Therefore, awareness creation on complementary feeding practices and timely initiation at 6 months should be strengthened in the community. Nutritional interventions by the government and Ministry of Health to fight childhood undernutrition should take into consideration policies or strategies that would empower women and address socioeconomic inequalities at the community level.

Keywords: Under-nutrition, Children below the age of five years, Malnutrition, Childhood nutritional outcomes.

INTRODUCTION

Adequate nutrition is vital for healthy growth and development especially during childhood [1]. Under-nutrition 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 [2, 3]. It 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 [6], 45% of deaths among children less than 5 years of age are linked to under-nutrition, and most of them occur in low- and middle-income countries. 47 million children are wasted, 14.3 million are severely wasted, 144 million are stunted, and 38.3 million are overweight or obese. Under-nutrition hinders the normal physiological functioning of the body, resulting in growth retardation, decreased resistance to disease and infections, and ultimately, ill health and death [7, 8]. According to Eze et al. [7], 60% of deaths among children fewer than 5 years in developing countries are associated with malnutrition. He continues that under-nutrition has a significant association with birth grade, delivery type, hospitalization history, educational level of parents, parents' job, birth weight, vaccination, and the regular consumption of supplementary vitamins. According to Mada et al. [9], low birth weight, an episode of diarrhea, the presence of developmental delay, inadequate antenatal visits, faltering growth, and not deworming one child were associated with malnutrition. 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 [4, 10]. According to Mkbize and Sibanda [11], 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. Research conducted on preschool children in a rural area of western Kenya revealed that the prevalence of stunting, underweight, and wasting were 30%, 20%, and 4%, respectively [12]. In Uganda, a report released by USAID [13] 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. Stunting is greater among children in rural areas (30%) than in urban areas (24%) with some regional variations. Stunting ranges from a high of 41% in the Tooro sub-region to a low of 14% in the Teso sub-region. The prevalence of stunting decreases with increasing levels of the mother's education. About 4 in 10 children born to mothers with no education (37%) are stunted compared with 1 in 10 (10%) of children born to mothers with more than a secondary education. Similarly, stunting decreases with increasing wealth quintiles, from 32% among children in the lowest wealth quintile to 17% of children in the highest wealth quintile. The prevalence of wasting (low weight-for-height) nationally is 4%, but in the regions of Karamoja and West Nile, the prevalence is 10%. Western Uganda has been persistently called the "Food Basket" of the country, but, however, according to Abaasa et al. [14], 46% of children below 5 years of age in Bushenyi district still suffer from malnutrition and associated problems. She continues that at the multivariate level, the main risk factors included lack of information on child health feeding and socioeconomic capacity of the household.

The world today faces a significant prevalence of malnutrition, with 155 million children stunted and 52 million wasted [9]. Globally, it is estimated that 45% of deaths in children under 5 years of age are due to malnutrition [11]. According to WHO [6], the MDG report stated that 10% of children were wasted, 39% were stunted, and 25% were underweight in the sub-Saharan Africa region. This region contributed to one-third of the global population of undernourished children.

Although agriculture is the backbone of Uganda's economy, and there appears to be enough food for everyone in the country, malnutrition remains one of the major problems affecting Ugandans. Children below 5 years of age are affected the most since they require adequate nutrition for growth and development, and mortality due to malnutrition is at its highest among them. Undernutrition during pregnancy can predispose infants to anemia and other undesirable health outcomes [15-17]. Malaria and diarrhea orchestrated by poor hygiene can heighten the risk of undernutrition in children [18, 19]. Uganda was ranked 13th 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% in western Uganda – an unacceptably high figure [2]. Therefore, this study will focus on investigating the factors contributing to undernutrition in children below five years in the Bushenyi district.

Methodology

Study design

The study was a cross-sectional study design.

Area of Study

The study area was Bushenyi district, located in western Uganda, considering a case study of the Buramba ward of Bushenyi-Ishaka municipality, Ishaka division. Bushenyi district is situated in the Ankole sub-region of western Uganda and covers an area of 942.3 km². The coordinates of the district are 00°33'S 30°01'E / 0.5500°S 30.2000°E. According to estimates from 2014, the population of the district was 234,443 people, with females making up 51.3% of the population, resulting in a population density of 266.8 per km² (691 sq. miles). Bushenyi district shares its borders with Rubirizi district to the northwest, Buhweju to the northeast, Sheema to the east, Mitooma to the south, and Rukungiri to the west. Ishaka, the largest town in the district, is home to KIU, the largest private university in the region, and is located 60 km (32 miles) northwest of Mbarara. The district is divided into 11 sub-counties, 76 parishes, 564 villages, and consists of 3 constituencies.

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Study population

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

Inclusion criteria

All children below 5 years of age, whose parents or guardians have given consent, were included

Exclusion criteria

All children below 5 years of age who were critically ill and whose parents or guardians have not consented to participate were excluded from the study.

Sample size

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

Where 'n' is the required sample size:

- '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).

\[n = \frac{Z^2 \cdot p \cdot (1 - p)}{E^2}\]

Where:

- 'Z' is the standard normal deviation, usually set at 1.96, corresponding to a 95% confidence interval.
- 'E' is the margin of error set at 0.05.

Therefore;

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

$$n=381$$

Data collection methods

The anthropometric data (weight and height) of children were taken using standard procedures as recommended by WHO (2006). 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 into 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/ immunization 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

To determine the factors associated with the prevalence of under-nutrition among children below 5 years in Burambwa ward, Bushenyi-Ishaka Municipality, with the help of a questionnaire. A structured questionnaire with immediate factors (child-level factors), intermediate factors (maternal and environmental factors), and distal factors (socioeconomic and cultural factors) was used, with close-ended questions to gather qualitative data from the selected individuals

Sampling technique

The study will employ a random sampling technique where children under 5 years of age will be considered for the study. The caretakers will answer the questions during the study hence giving each member of the target population an equal and independent chance of being selected for the study. This will ensure that the selected sample is a good representative of the population.

Quality control

Three principal investigators were involved in the data collection process. Before the actual work, training and orientation were provided to the data collectors. The data were collected from each caregiver or parent during the interview. The investigators guided the data collection process, ensuring the correctness and completeness of the questionnaire. The English version of the questionnaire was translated into the Lunyankore version and back-translated into English where necessary to check for its consistency.

Data analysis

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

RESULTS

Socio-demographic-economic characteristics and background of participants

The ages of the children ranged from 0–59 months with a mean age of 28.36 ±17.10 months. Of the total children, 23.9% were less than 12 months old. The majority of children were females (52%), from households with 5–9 members (58%), households with access to improved toilet facilities (59.1%) and boreholes as the drinking water sources (49.3%). About 60.1% of the children lived in households with monthly family incomes between 150,000- 300,000(ugx). The mean age of the mothers was 26.4 years. The majority of mothers attended their first antenatal visit in the first trimester (65.1%) and delivered the index child to a health facility (85.2%). Table 1.

Table 1. Socio-demographic-economic characteristics and background of participants

Variable/Category	Number	Percentage
Age(months)		
<12	91	23.9
12-36	194	50.9
37-59	96	25.2
Sex		
Male	183	48
Female	198	52
Immediate factors		
Birth weight		
<2500g	35	9.2

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>2500g	346	90.8
Birth order		
1-2	175	45.9
3-4	107	28.1
>4	99	2.6
Fever and cough in the last 2 weeks		
Yes	122	32
No	259	68
Diarrhoea in the last 2 weeks		
Yes	53	13.9
No	328	86.1
The immunisation status of the child		
Completed	206	54.1
Not completed	168	44.1
Not immunized	7	1.8
Breast fed		
Yes	374	98.2
No	7	1.8
If yes, how long?		
<6months	8	2.1
6months- 1year	346	90.8
1-2 years	27	7.1
If no, why?		

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Mother ill	3	42.9
Child ill	1	14.3
Inadequate milk	3	42.9
Complementary feeding initiation		
<6months	38	10
6months- 1year	341	89.5
1-2years	2	0.5
Intermediate factors		
Age of mother at birth(years)		
<20	156	40.9
20-29	191	50.1
30-39	30	7.9
>39	4	1
Timing of first antenatal care visit		
None	11	2.9
First trimester	248	65.1
Second trimester and above	122	32
Place of delivery		
Home	54	14.2
Health facility	327	85.8
Received anti-malarial prophylaxisdrugs		
Yes	346	90.8
No	35	9.2

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Parity		
1-2	148	38.8
3-4	126	33.1
>4	107	28.1
Household size		
<4	125	32.8
5-9	221	58
>9	35	9.2
Type of toilet facility		
Unimproved	156	40.9
Improved	225	59.1
Source of food		
Own production	347	91.1
Purchase	27	7.1
Food aid	7	1.8
Source of drinking water		
Well	118	31
Borehole	188	49.3
Tap	57	15
Rainwater	18	4.7
Type of housing		
Temporary	8	2.1
Semi-permanent	110	28.9

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Permanent	263	69
Distal factors		
Mother's tribe		
Munyankole	324	87.5
Mukiga	26	6.8
Mukonjo	10	2.6
Muganda	19	5
Others	2	0.5
Mother's religion		
Traditional	31	8.1
Muslim	84	22
Christian	266	69.8
Mother's education level		
No formal education	42	11
Primary	183	48
Secondary and above	156	40.9
Husband/partners education level		
No formal education	118	31
Primary	42	11
Secondary and above	221	58
Mother's occupation		
Peasant	141	37
Business owned	202	53

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Civil servant/NGO staff	19	5
Others	19	5
Monthly family income(ugx)		
<150,000	46	12.1
150,000-300,000	229	60.1
>300,000	106	27.8
Marital status of the mother		
Married	362	95
Single	15	3.9
Separated	3	0.7
Widowed	1	0.4

Prevalence and distribution of underweight, wasting and stunting in children under five years by age and sex. From Table 2, the prevalence of underweight, wasting and stunting was 10.76%, 4.99% and 19.16% respectively. There were significant differences between groups for all three forms of undernutrition by child's age category. The highest prevalence of underweight (11.86%), wasting (8.79%) and stunting (27.08%) was found among children aged 12–36, <12 and 36-59 months, respectively. Female children (16.67%) were less prone to stunting than their male counterparts (20.77%).

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Table 2

Variable	Underweight				Wasting				Stunting			
	Normal	%	Underweight	%	Normal	%	Wasted	%	Normal	%	Stunted	%
All children	340	89.24	41	10.76	362	95.01	19	4.99	308	80.84	73	19.16
Age												
<12	81	89.01	10	10.99	83	91.21	8	8.79	80	87.91	11	12.09
12-36	171	88.14	23	11.86	186	95.88	8	4.12	158	81.44	36	21.95
37-59	88	91.67	8	8.33	93	96.88	3	3.13	70	72.92	26	27.08
Sex												
Male	162	88.52	21	11.48	175	95.63	8	4.37	145	79.23	38	20.77
Female	178	89.90	20	10.10	188	94.95	10	5.05	165	83.33	33	16.67

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Determinants of underweight, wasting and stunting in children under five Years. Determinants of underweight among children under five years.

Child's age, birthweight and mother's parity category were significant determinants of underweight after controlling for confounding by the other factors. Underweight was more prevalent among children aged 12–36 months (AOR = 1.291, 95% CI: 0.329–5.063) and least in those below 12 months (AOR = 0.388, 95% CI: 0.061–2.473) compared to children aged 37-59 months. Relatively, low weight at birth was associated with a lower odd of underweight (AOR = 0.724, 95% CI: 0.151–3.475). Increasing parity of the mother is associated with increasing odds of underweight as evidenced in parity 1-2 and 3-4 (AOR = 2.218, 95% CI: 0.583-8.432 and AOR = 4.263, 95% CI: 0. 1.155-15.739, respectively).

Determinants of wasting among children under five years

In the final model, the child's age, birthweight, timing of antenatal visits, mother's educational level, and wealth index were found to be significantly associated with wasting. Comparatively, wasting was more prevalent among children in the age groups of 12–36 months (AOR = 8.308, 95% CI: 0.284-242.929) and those below 12 months (AOR = 3.745, 95% CI: 0.099-141.742). Also, children from households with monthly family income below 150,000/= were likely to be more wasted (AOR = 8.340, 95% CI: 0.248-280.621) compared to those from households earning 150,000-300,000/= monthly wasted (AOR = 3.077, 95% CI: 0.461-20.561). However, first antenatal visit in first trimester (AOR = 1.067, 95% CI: 0.010-112.808), male sex (AOR = 0.017, 95% CI: .000-0.738), own food production (AOR = 0.599, 95% CI: 0.001-460.402), lack of formal education of the husband/partner (AOR = 0.028, 95% CI: 0.002-0.366) were associated with a lower odds of wasting.

Determinants of stunting among children under five years in Ghana

Independently, the mother's parity, birth weight, the birth order of the child, and the mother's education were identified as determinants of stunting. Stunting was more prevalent among children whose mothers have parity 3-4 births (AOR = 1.943, 95% CI: 0.811-4.651), and 1-2 births (AOR = 1.571, 95% CI: 0.600-4.109). Relatively, children born with low birth weight were 1.2 times more likely to be stunted (AOR = 1.201, 95% CI: 0.402-3.592). Also, birth order of 1-2 was associated with 1.2 times the odds of stunting (AOR = 1.267, 95% CI: 0.473-3.390). Mothers without formal education were associated with 5 times higher odds of stunting (AOR = 5.382, 95% CI: 1.715-16.887) compared with those having primary education times (AOR = 1.042, 95% CI: 0.498-2.177).

Table 3

Variable/Category	Underweight	Stunting	Wasting
Variable/Category	AOR[95% CI]	AOR[95% CI]	AOR[95% CI]
Age(months)			
<12	0.388[.061-2.473]	0.063[0.016-0.238]	3.745[0.099-141.742]

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12-36	1.291[.329-5.063]	0.218[0.085-0.557]	8.308[0.284-242.929]
37-59 (ref)			
Sex			
Male	0.226[0.35-1.464]*	0.284[0.081-0.989]	0.017[.000-0.738]
Female (ref)			
Immediate factors			
Birth weight			
<2500g	0.724[0.151-3.475]	1.201[0.402-3.592]	9.419[0.503-176.426]
>2500g (ref)			
Birth order			
1-2	2.398[0.559-10.288]	1.267[0.473-3.390]	287.260[8.510-9696.397]
3-4	1.380[0.418-4.554]	1.004[0.435-2.319]	2.629[0.183-37.824]
>4 (ref)			

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Fever and cough in the last 2 weeks			
Yes	0.613[0.246-1.528]	1.545[0.760-3.141]	0.450[0.078-2.586]
No (ref)			
Diarrhoea in the last2 weeks			
Yes	1.349[0.442-4.116]	3.140[1.352-7.291]	0.883[0.102-7.605]
No (ref)			
The immunisation statu sof the child			
Completed	0.064[0.004-1.034]	0.312[0.032-3.054]	
Not completed	0.061[0.004-1.051]	0.213[0.021-2.187]	
Not immunised (ref)			
Breastfed			
Yes	1.173[0.082-16.844]	1.005[0.090-11.270]	0.515[0.004-68.815]
No (ref)			
Complementary feeding initiation			
<6months	0.035[0.000-3.531]		
6months- 1year	0.015[0.000-1.550]		
1-2years (ref)			

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Intermediate factors			
Age of mother atbirth(years)			
<20	0.180[0.008-3.940]	0.622[0.038-10.070]	0.007[.000-2.718]
20-29	0.072[0.003-1.514]	0.422[0.026-6.735]	0.004[.000-1.278]
30-39	0.222[0.008-6.548]	0.444[0.023-8.711]	
>39(ref)			
Timing of first antenatal care visit			
None	0.978[0.148-6.446]	1.032[0.192-5.559]	20.882[0.309-1410.565]
First trimester	0.346[0.041-2.928]	0.372[0.058-2.381]	1.067[0.010-112.808]
Second trimester andabove(ref)			
Place of delivery			
Home	2.697[0.977-7.443]	1.213[0.502-2.930]	0.200[.012-3.292]
Health facility (ref)			
Received anti-malarial prophylaxis			

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drugs			
Yes	1.191[0.202-7.035]	0.680[0.211-2.197]	0.439[0.011-17.451]
No (ref)			
Parity			
1-2	2.218[0.583-8.432]	1.571[0.600-4.109]	6.942[0.366-131.585]
3-4	4.263[1.155-15.739]	1.943[0.811-4.651]	9.259[0.666-128.727]
>4(ref)			
Household size			
<4	1.764[0.349-8.901]	0.931[0.292-2.964]	1.475[0.087-25.036]
5-9	1.517[0.303-7.586]	0.826[0.265-2.579]	0.202[0.009-4.613]
>9 (ref)			
Type of toilet facility			
Unimproved	0.655[0.280-1.533]	0.827[0.433-1.582]	0.116[0.015-0.882]

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Improved(ref)			
Source of food			
Own production	0.644[0.033-12.484]	1.639[0.128-20.931]	0.599[0.001-460.402]
Purchase	0.705[0.028-17.532]	1.139[0.076-17.180]	1.083[0.001-1187.620]
Food aid(ref)			
Source of drinking water			
Well		0.702[0.131-3.751]	
Borehole		1.162[0.212-6.359]	
Tap		0.772[0.140-4.276]	
Rainwater (ref)			
Type of housing			
Temporary	5.373[0.551-52.367]	0.476[0.038-5.956]	
Semi-permanent	0.9[0.333-2.433]	0.315[0.138-.717]	1.332[0.196-9.060]
Permanent(ref)			
Distal factors			
Mother's tribe			

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Munyankole		0.234[0.013-4.236]	0.002[0.000-0.409]
Mukiga		0.212[0.009-4.901]	0.001[0.000-0.336]
Mukonjo		0.485[0.037-6.400]	
Muganda		1.992[0.048-81.798]	
Others (ref)			
Mother's religion			
Traditional	3.284[0.547-19.695]	2.010[0.493-8.188]	305.701[8.188-11414.031]
Muslim	1.147[0.427-3.085]	1.168[0.545-2.504]	0.621[0.083-4.638]
Christian (ref)			
Mother's educationlevel			

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No formal education	3.178[0.753-13.406]	5.382[1.715-16.887]	125.946 [2.490-6369.542]
Primary	2.207[0.749-6.505]	1.042[0.498-2.177]	48.137[-2.331-994.213]
Secondary an dabove(ref)			
Husband/partner'seducation level			
No formal education	0.301[0.11-0.825]	1.129[0.549-2.324]	0.028[0.002-0.366]
Primary		1.093[-0.376-3.171]	0.356[0.027-4.771]
Secondary an dabove(ref)			
Mother's occupation			
Peasant	9.405[0.434-203.602]	6.465[0.649-64.398]	6.125[0.023-1609.006]
Business owned	10.645[0.558-202.996]	11.562[1.227-108.904]	4.513[0.022-930.179]

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Civil servant/NGO staff	1.535-[0.040-59.562]	1.604[0.141-18.251]	19.959[0.069-5798.040]
Others(ref)			
Monthly family income(ugx)			
<150,000	8.222[1.353-49.951]	1.629[0.408-6.509]	8.340[0.248-280.621]
150,000-300,000	1.349[0.443-4.109]	0.789[0.370-1.680]	3.077[0.461-20.561]
>300,000(ref)			
Marital status of the mother			
Married			
Single			
Separated			
Widowed(ref)			
The goodness of fit test	Nagelkerke R Square = 0.359, p-value = 0.891	Nagelkerke R Square = 0.263, p-value = 0.050	Nagelkerke R Square = 0.526, p-value = 0.917

DISCUSSION

Prevalence of under-nutrition (underweight, wasting and stunting) in children under five years

The findings showed that the overall prevalence of under-nutrition was 11.64%, and underweight, wasting, and stunting were 10.76%, 4.99%, and 19.16%, respectively. The prevalence of stunting in the present study was 19.16%, which means that one in five children in the Buramba ward was stunted due to chronic under-nutrition. This is attributed to the ignorance of parents regarding the amount of food they should give to their infants, as well as the frequency and duration of feeding, despite the abundance of food in the community. These rates of under-nutrition are lower than those reported in 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 to improve 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. These strategies may have contributed to the reduction in the prevalence of undernutrition in children under five years in Uganda [7, 20]. Comparatively, food crises, limited access to arable land for agricultural purposes, and adverse climatic conditions have constrained progress in tackling undernutrition in Niger, Burundi, Ethiopia, and Mozambique, partly accounting for the differences in the prevalence rates of undernutrition between Uganda and these other countries.

Factors associated with under nutrition in children under five

The findings also revealed that a child's age is a determinant of underweight, wasting, and stunting. The risk of being underweight increases from the age of 6 months and may be related to the fact that most children in the Buramba ward are breastfed in early life until at 6 months when they transition from exclusive breastfeeding to consuming family foods in addition to breastfeeding, which in most cases is characterized by challenges. Furthermore, as the age increases from 24 months, the risk of wasting is reduced. On the other hand, stunting becomes evident in children after 12 months but peaks around 37–59 months old. Relatively, male children were more likely to be stunted before the age of 3 years. However, female children were more likely to experience wasting than their male counterparts. These findings have been corroborated by other studies. The high levels of stunting after 12 months may be explained by repeated exposure to nutritional insults from the prenatal period (first 1000 days). Boys also showed 1.25 times more risk of being stunted compared with girls. This is in accordance with a meta-analysis of the nutritional status of children under five in Africa, which concluded that boys are significantly more sensitive than girls to under-nutrition and suggests that this is due to a biological predisposition. A likely reason for this inequality could be that there is better care and feeding for infant girls than boys in Buramba ward. Nevertheless, the positive association between male sex and stunting has remained controversial. A meta-analysis on gender and stunting concluded that boys in sub-Saharan Africa were more likely to be stunted in early childhood than girls; this could be due to differences in behaviors, gender inequalities, and the biological susceptibility of males to morbidity in early infancy [21]. However, wasting results from inadequate intake of quality food, and it has been reported elsewhere that in food-insecure households, undernutrition is more likely to manifest in female children relative to males. The birth order of the children showed a higher risk of being wasted for those born as a first or second child (AOR = 287.260, 95% CI: 8.510-9696.397) compared with those born as the third or later (AOR = 2.629, 95% CI: 0.183-37.824), probably because mothers have had more experience and practice in how to feed and take care of their children. Low birth weight was associated with an increased risk of stunting and wasting (AOR=1.201, 95% CI: 0.402-3.592) and (AOR=9.419, 95% CI: 0.503-176.426) respectively, which supports findings from a study in Bangladesh [22]. A child born with low birth weight has already suffered from intrauterine growth retardation and is undernourished at the time of birth. This undernourished infant may continue to be undernourished in early childhood, even in the presence of favorable conditions, as these conditions may not be sufficient to fully compensate for the initial damage caused to the child at birth.

Children who were still breastfed during our study were at a higher risk of being underweight compared with those who had been weaned. Children are generally, in spite of WHO recommendations, rarely exclusively

breastfed in Buramba, even though breast milk offers the best source of nutrients. Consequently, inadequate breastfeeding practice could explain this higher prevalence of underweight among children who were still breastfed, as described in other studies. In 2012, the World Breastfeeding Trends initiative reported low rates (20%) of exclusive breastfeeding in children up to six months old in Cameroon and that complementary foods were introduced early, as is the tradition in that country. Interestingly, this study showed that having a mother engaged in farming predisposed both to stunting and underweight. In contrast, a study conducted in Ethiopia found that mothers engaged in farming have good access to food, and therefore, have well-nourished children. Children of farming mothers in our study have access to staple foods such as cassava, potatoes, plantains, maize, beans, and groundnuts or carbohydrate-rich foods from farms but did not have access to protein-rich animal foods, i.e., meat and fish, since these are expensive and not always available in Buramba ward. Another explanation is that many people in the household share the same food, resulting in food insecurity, meaning that not everyone will get enough food to eat, especially children. Also, farmer mothers often sell some of the food to afford other household needs, rather than using it for family nutrition. Lack of knowledge regarding adequate food for children can also explain why children of farmer mothers were more stunted than others. 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 (earning 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. Undernutrition is a direct representation of poverty. Individuals from poor households are predisposed to poor living conditions that may result in diseases and poor health outcomes. A lower wealth index is associated with low literacy, lower purchasing capacity, food insecurity, and thus higher rates of under-nutrition [23, 24]. Comparatively, middle-class households are at least financially capable, food-secure, and have better access to healthcare services, which are precursors for optimal childhood nutritional outcomes. The association between an increased wealth index and low rates of under-nutrition has been reported by other studies.

The lack of food for internally displaced populations (IDPs) in encampments can be attributed to several reasons, including inadequate and irregular food supply and limited productivity. It was observed that the main sources of food for IDPs included food rations distributed by WFP. This led to high levels of both chronic and acute malnutrition, reflecting long-standing food shortages experienced by internally displaced populations in the camp settings[25–27]. A husband/partner's influence on a child's nutritional status can be mediated through other factors and not directly. A husband with a low educational status (less than secondary) may not be gainfully employed, resulting in poor household wealth status, food insecurity, and poor general living conditions. Additionally, males are more involved in child care by providing financial and physical support to the woman and are less involved in decision-making regarding appropriate infant and young child feeding practices. Although our study included only children less than five years of age, our findings can be considered to reflect the anthropometric status for the population in Buramba ward in general, since the status of children under five can be considered a good gauge for population-based malnutrition[28]. We suggest that our results can be applied to other settings with similar characteristics in Uganda or other low-income countries. Some strengths and limitations should be taken into account when interpreting the findings of this study. The study participants in this study were women who delivered in the past five years preceding the survey. The extended period, therefore, subjects some parts of the data, such as the timing of the first ANC visits, length of breastfeeding, and antenatal malaria prophylaxis, to recall biases except for the anthropometric measurements.

CONCLUSION

The etiology of under-nutrition in Buramba ward, Bushenyi municipality, is multifaceted and interconnected. The nutritional status of children under five years is determined by socioeconomic, cultural, household, maternal, and child-level factors. The effect of socioeconomic factors on underweight, wasting, and stunting is exhibited independently and mediated through maternal and child-level factors. It is logical to conclude

that empowering women as well as improving the socioeconomic status of households may contribute significantly to reducing morbidity and mortality from undernutrition.

RECOMMENDATIONS

Therefore, as a recommendation, the government should provide access to safe and adequate water to the rural communities as they are usually left out in terms of infrastructure development. Information should be disseminated using mass media and social media about complementary feeding, length of breastfeeding, safe water for drinking, and meal frequency. The community should be encouraged to use drinking water from protected sources. Awareness creation on complementary feeding practices and timely initiation at 6 months should be strengthened in the community. Nutritional interventions by the government and Ministry of Health to fight childhood undernutrition should take into consideration policies or strategies that would empower women and address socioeconomic inequalities at the community level.

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