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Original article

DETERMINANTS OF MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS IN PAGER DIVISION, KITGUM MUNICIPALITY, KITGUM DISTRICT: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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Abstract

Background:

The major objective of the study was to assess the determinants of malnutrition among children under five years in the pager division of Kitgum municipality. The specific objectives of the study were to: determine wasting, establish the feeding practices associated with wasting, and establish socio-economic factors associated with wasting among children under five years at Pager Division Kitgum Municipality.

Methodology:

This study adopted a descriptive cross-sectional study designed for children under five years among households in the pager division Kitgum municipality where 150 mothers of children selected using random sampling were interviewed. Data were collected using questionnaires, analyzed using the Epi Info program, and bi-variate analysis was used to determine the associated factors of wasting among children under five years.

Results:

Results from the study analysis also confirmed how the child caretaker fed the child after six months, the type of food fed to a child at a meal, the amount the child's caretaker earned per month, occupation of the mother, mother's level of education, and the number of children under five years in a household were the most significant factors which affect malnutrition in children who were below 5 years of age in Kitgum Municipality.

Conclusion:

Results from the study confirmed that malnutrition was still high among children under five in the pager division Kitgum Municipality with wasting standing at 17.3% and high among children aged 6-11 months at 6%.

Recommendations:

The study recommended community nutritional interventions to address the root causes of malnutrition in regard to wasting.

Similar community-based studies in the area of child nutrition are needed to determine the root causes of socio-economic and cultural drivers of malnutrition

Further research is needed to obtain an explanation regarding sex differentials with wasting across socio-economic strata

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1. Background to the Study:

Malnutrition is a quiet pandemic affecting millions of people throughout the world. Vulnerable populations, such as children, women (especially expectant mothers), the elderly, and people suffering from a disability disproportionately suffer the effects of malnutrition (Oluwatobi, 2014). In addition, malnutrition exacerbates the cycle of poverty inherent in most underdeveloped countries (Frye & Kristin, 2013). In the 1930's-1970's scholars defined malnutrition as, protein-caloric malnutrition (PCM) and protein-energy malnutrition (PEM) (Barrientos, 2016). The UN advocated the importance of protein deficiency in 1955 by forming the Protein Advisory Group to promote the consumption of "new protein foods" (Schroeder, 2015). Although protein deficiency remains significant, the most current definitions of malnutrition focus on the consumption of the proper amount of multiple micronutrients, such as Zinc, Iron, Iodine, Vitamin A, Folic Acid, and Selenium (Barrientos, 2013). An analysis of global trends in the prevalence of child stunting and underweight, covering the period 2010-2020, showed a decline in stunting from 34% to 25%, and a decline in underweight from 27% to 22% (Onis, 2021). According to UNICEF (2019), the proportion of stunting among children under age 5 in the developing world decreased from 40% to 29% between 2010 and 2018.

Of the stunted 165 million children under 5 years in the world in 2011, 65 million were in Africa. Of the 53 million wasted children globally in 2011, 13.4 million were from Africa, and of the 34 countries that accounted for 90% of the global burden of malnutrition, 22 are in Africa (UNICEF; 2012, WHO; 2012, World Bank; 2012). Malnutrition contributes to nearly half of all deaths in children under 5 years and is widespread in Asia and Africa. Between 2000 and 2016, stunting globally declined from 32.7% to 22.9%, and the number of children affected fell from 198 million to 155 million. In 2006, about two out of every four stunted children lived in South Asia and one in three in sub-Saharan Africa (UNICEF; 2017, WHO; 2017, World Bank; 2017). The World Health Organization (2013) estimates that there are 178 million children that are malnourished across the globe, and at any given moment, 20 million are suffering from the most severe form of malnutrition. Malnutrition contributes to between 3.5 and 5 million annual deaths among under-five children. UNICEF (2015) estimates that nearly 195 million children are suffering from malnutrition across the globe. In 2014, the World Health Organization observed that 60% of the deaths occurring among all under-five children in developing countries were attributed to malnutrition (Murray & Lopez, 2016).

Malnutrition among under-five children is one of the most important public health problems in developing countries especially in Sub-Saharan Africa (Gulati, 2010) and about 35% of under-five deaths in the world are associated with malnutrition. An estimated 230 million under-five children are believed to be chronically malnourished in developing countries. Similarly, about 54% of under-five deaths are believed to be associated with malnutrition in developing countries. In Sub-Saharan Africa, 41% of under-five children are malnourished and deaths from malnutrition are increasing daily in the region. Malnutrition continues to be a significant public health problem throughout low-income countries, particularly in Sub-Saharan Africa and South Asia (Kimokoti and Hamer, 2018).

In Uganda, Malnutrition has remained a priority component of the national minimum health care packages (NMHCP) of the Ministry of Health. In Uganda, 29 percent of children under age five are stunted (have low height-for-age), while 4 percent are acutely malnourished or wasted (have low weight-for-height) according to the most recent Demographic and Health Survey (DHS) (UBOS and ICF, 2018). The country has an average population of about twenty-five million people, where Children aged 0-4 years are about 18.8% with an under-five mortality rate of about 125 per 1000 live births (Isabirye, 2017). The country produces a wide range of

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crops including cereals such as maize, millet, and sorghum; root crops such as cassava, sweet potatoes, and Irish potatoes. It produces animal products from dairy and animals, poultry, sheep, goats, pigs, rabbits, and edible insects. Inland freshwater bodies provide large families of fish, however (Boerma, 2016) pointed out that malnutrition can be caused by inappropriate food preparation, harmful cultural practices, illiteracy, and poverty.

Further, in Uganda, malnutrition remains a serious health and welfare problem affecting the under-five children to whom it contributes significantly to mortality and morbidity. Almost one-third of children under five years in Uganda are stunted. Stunting increases with age, peaking at 37 percent among children 18–35 months. Stunting is greater among children in rural areas (30 percent) than in urban areas (24 percent) with some regional variations. The prevalence of stunting decreases with increasing levels of the mother's education. About four in ten children born to mothers with no education (37 percent) are stunted compared with one in ten (10 percent) of children born to mothers with more than a secondary education. Similarly, stunting decreases with increasing wealth quintiles, from 32 percent among children in the lowest wealth quintile to 17 percent of children in the highest wealth quintile. The prevalence of wasting (low weight-for-height) nationally is 4 percent but in the regions of Karamoja and West Nile, the prevalence is 10 percent. Anemia, which reflects several micronutrient deficiencies, infections, and even genetic traits in malaria-endemic areas, affects more than half of children under five years and one in three women. Regional differences in anemia prevalence among women range from 17 percent in the Kigezi sub-region to 47 percent in the Acholi sub-region (UBOS and ICF, 2018). Indeed the story may not be different for the districts of Kitgum in Uganda. Malnutrition in Uganda starts at infancy and rises steeply, peaking at about two years when about 50% of toddlers are stunted and from the UDHS findings, Northern (40%) and South Western Uganda (50%) regions are more affected than other regions. Malnutrition among children is an outcome of many interrelated factors including environmental factors, and socio-economic factors, among others (UBOS, 2017).

In Kitgum District, malnutrition contributes to poor health which aggravates diseases; reduces productivity, and compounds poverty (Uganda Food and Nutrition Policy, 2003). Some of the interventions which have been in place to reduce malnutrition include a multisectoral approach to improve the nutrition status of under-fives in the district. Vitamin A supplementation and food fortification programme were launched as a partnership between the government and private sectors (UNICEF, 2020). Despite all these interventions, the prevalence of under-five malnutrition is still high in Kitgum. Over (35% of) under-fives are stunted (6%) are wasted (and 20%) are underweight totaling (61%). Factors such as weaning practices, diseases, sanitation, water, and low income-level are said to be major contributors to malnutrition (UNICEF, 2020). If the above factors are properly addressed, they will play a major role in tackling the issue of malnutrition thus combating high infant and childhood mortality rates in the World, Sub-Saharan Africa, Uganda, and Kitgum where the research will be conducted. There is no study known to the researcher that has assessed and documented determinants of malnutrition among children under-five years in the pager division of Kitgum municipality of Uganda. This study, therefore, focused on finding out factors associated with malnutrition among under-fives in the Pager division, Kitgum municipality, Kitgum district.

2. Methodology:

2.1. Research Design:

This study adopted a descriptive cross-sectional study designed for children under five years among households in the pager division, Kitgum municipality where mothers of children were interviewed. This study area was chosen due to its convenience to the researcher in terms of accessibility, familiarity and also the high prevalence level of over and under malnutrition among children under five years of age.

2.2. Study Population:

The study was conducted among children under five years in Pager Division in Kitgum Municipality.

2.2.1. Inclusion criteria:

The study included all households with children under five years of age, all children under five years of age of the intended population whose caretakers accepted to give consent, parents, and caretakers of children under five years of age living in Pager Division Kitgum Municipality.

2.2.2. Exclusion criteria:

The study excluded households with children above five years of age in Pager Division in Kitgum Municipality and those children outside the Pager Division Kitgum Municipality.

2.3. Sample Size Determination:

The sample size of this study was determined using the Leslie Kish survey sampling formula given by;

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

Where no is the sample size, Z is the value from standard normal distribution corresponding to a desired confidence level of 95%, thus in this study, the value of Z=1.96, p is the proportion of children below five years of age who are wasted in Kitgum District, estimated at 13% (0.13), e is the desired level of precision, set at 5% (0.05); by substitution, the no is 174 mother or caregiver-child pairs as indicated in the calculation below.

$$1.96^2 \times 0.13\ (1 - 0.13)n = (0.05)^2$$

$$\mathbf{n_o = 174}$$

The advantage of the Leslie Kish survey sampling formula was that it helped in yielding a representative sample for proportions of a large sample.

2.4. Sampling Techniques and Procedures

Before actual data collection, a household survey was conducted to register households with children below five years of age in the Pager Division in Kitgum Municipality. The eligible households were given numbers. The total list of numbers of all registered eligible households was entered in the computer Excel sheet and the computer was commanded to randomly select 174 households. The researcher and research assistants moved from household to household and a child's mother or caregiver was interviewed from each selected eligible household. When more than one child below the age of five years was found in a household, each mother or caregiver-child pair was interviewed independently and when all children below the age of five in a household belong to one mother or caregiver, the researcher and research assistants considered the mother or caregiver and the youngest child. When the research team failed to find the child's mother or caregiver at the household on the date of data collection, the team proceeded to the next household taking the direction of the front of the household. This continued until a sample size of 174 child-mother or caregiver pairs were interviewed.

2.5. Data Collection Methods:

In this study, primary data was collected by the use of questionnaires while secondary data was collected by reviewing existing literature such as journals and reports about determinants of malnutrition (wasting) among children under 5 years.

2.5.1. Questionnaire Survey:

A questionnaire survey was a data collection method used to collect quantitative data over a large sample or number of respondents because it offered fast, efficient, and inexpensive means to gather large amounts of information. A well-structured questionnaire guide was used to collect data on respondents' demographics and anthropometric measurements to determine the status of waste among these children.

2.6. Data Collection Instruments:

This study used a questionnaire guide to collect the data.

2.6.1. Questionnaire Guide:

The data was collected using a close-ended structured questionnaire in line with the specific objectives of the study, the data was collected by the principal investigator himself and three research assistants. The questionnaires were filled out by the child's guardian/caretaker.

2.7. Quality Control:

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

2.7.1. Validity:

Validity is the extent to which research results can be accurately interpreted and generalized to other populations based on the samples interviewed. It's the extent to which research instruments measure what they are intended to measure (Oso & Onen, 2009). To establish validity, the instruments were given to the supervisor to establish the relevance of each item in the instruments to the objectives and rate each item on the instrument as very relevant (4), quite relevant (3), some relevant (2) and not relevant (1). Validity was calculated using Content Validity Index (C.V.I) and the result was 0.815 which was above 0.7. This indicated that the items in the research instrument were valid.

2.7.2. Reliability:

To establish reliability, the instruments were pre-tested areas using inter-observer reliability, involving 10% of the sample size (17 questionnaires) to complete them. The findings from each observer were graded as reliable (I) or non-reliable (0). Cronbach alpha was used to calculate the reliability index of the study instrument

Cronbach alpha was used to calculate reliability index of the study instrument (a) given by:

$$\frac{N.C}{V + (N - 1).C}$$

Where a= reliability index (0.70 and above will be accepted)

C=the average inter-item covariance among the items

N =Number of items

V= the average variance.

The reliability of the instruments was computed and found to be at 0.803 which was above 0.70 and therefore was accepted to make conclusions in the study.

2.8. Data Collection Procedure:

A systematic procedure during data collection was followed by the researcher. The researcher ensured the acquisition of a letter from Uganda Christian University to introduce him to the leaders and community members Pager Division in Kitgum Municipality to enable him to seek the acceptance of the management and leadership of the selected sub-counties to access and interact with proposed respondents.

2.8.1. Data Analysis:

A quantitative method of data analysis was used to derive meaningful information from the data collected from the study.

2.8.2. Quantitative Data:

Data collected was edited, coded, and entered into the Epi Info7 software nutrition module to generate measurement indices of weight-for-age, height-for-age, and weight-for-height. Child variables including weight, height/length, sex, and age were entered in the Epi Info7 software nutrition module to generate measurement indices of weight-for-age, height-forage, and weight-for-height. The indices generated were compared with standard reference values for WHO Child Growth Standards and CDC 2000 to obtain the Z-scores. This was done automatically by the Epi Info program. One index was used that was wasting among children below five years of age. Wasting refers to a low weight-for-height and is a measure of acute malnutrition; it's an indicator of short-term fluctuation in nutritional status. Children whose weight-for-height Z-scores were below minus 2 standard deviations were regarded as wasted. On the other hand, data from the questionnaire were analyzed by use of frequencies and percentages.

2.9. Measurement of Variables:

A thorough general and systemic examination was done, and vital signs were taken. Diagnosis of undernutrition was based on weight/height or length and MUAC as explained below.

2.9.1. Weight measurements:

Infants under two years of age were weighed using a 25kg Salter hanging scale (CMS) Weighing equipment, High Holborn, London United Kingdom) while those above two years of age were weighed while standing on the measuring board. The scales were adjusted to zero before each measurement. The child's weight was recorded to the nearest 100 grams and was then measured daily during the morning before the ward round. The reference which was applied was the WHO chart of wasting which compares Weight/length or weight/height and states the grade of malnutrition.

2.9.2. Length / Height measurements:

In patients up to the age of 24 months, length was measured using a length board in the recumbent position by two examiners. For those above 24 months and who were able to walk, height was measured while standing using a height meter. Weight for height/length and Z score of less than -1 was indicated as mild -2 was indicated as moderate and -3 was indicated as severe wasting.

2.10. Ethical Considerations:

Ethical approval for the study was obtained from the Research and Ethics Committee of Uganda Christian University. Permission was also obtained from the office of the L.C III at the sub-county under study then proceeded to the respective parishes for the researcher to start data collection from the villages. Permission was also obtained from the L.C. I chairpersons who introduced the researcher to the villages.

The participants were interviewed in a private place, respecting the respondents and their information without sharing any personal information. While the confidentiality issues were addressed by keeping the data collected from the respondents confidential, the data was anonymous and the information given was used for only research (academic purposes). Information about respondents was collected during the study and put away and no one but the researcher was able to see it.

To get signed letters of informed consent from the respondents, the researcher and research assistants introduced themselves to the participants and all the procedures involved in the study and explained to the participants the purpose of the study, the information about the criteria for selecting who to participate in the study, procedures followed and any risks and benefits which was involved. The participants were also informed that their participation was voluntary, and they were free to terminate their participation at their own will at any point in time they were guided on whom to contact in case of any inquiry, the respondents understood and consented.

All respondents were treated equally without giving a particular group priority. Simple random sampling was used to select the research site; all of the respondents were given equal chances of being selected for the study. In the course of the study, the respondents were treated with utmost respect and honor. The respondents had the right to make the decisions and their decisions were respected as it was entitled to them.

3. Analysis and Presentation of Findings:

3.1. Response rate:

The response rate of the study is presented in Table 1

From Table 1, 150 questionnaires were returned out of 174 distributed, which represented a response rate of 86.2% of the original sample. All the returned questionnaires were answered well and were used for further data analysis. This response rate was believed to be good enough since it was over and above the 50% recommended by Amin (2005).

3.2. Demographic information of the respondents:

This section presents the demographic information of children and their caretakers.

Table 1: **Response rate**

Tool	Population	Actual Response	Percentage (%)
Questionnaire	174	150	86.2

Source: Primary data (2022)

3.3. Demographic information of the children:

The demographic information of the children who participated in the study was in terms of gender and age of the child as presented in Table 2.

Results in Table 2 indicate that more than half of the children in the study were females (61.3%) and the rest (38.7%) were male. The majority (36%) were aged 24-59 months closely followed by those aged 12-23 months (27.3%), 22.7% were aged 6-11 months and lastly followed by 14% were aged 0-6 months.

3.4. Demographic information of the child caretakers:

The demographic information of the child caretakers was in terms of sex, age, marital status and religion as represented in Table 3.

Results in Table 3 indicate that the majority of the child caretakers (79.3%) were female while 20.7% were male. In addition, the majority of the children in the study had their caretakers 26-35 years old, followed by 21.3% aged 18-25 years and 15.3% with caretakers aged 40-50 years, and lastly 12% with caretakers above 50 years. The marital status of the caretakers was reported that approximately 72% of the respondents were married and 17.3% were single and 10.7% were divorced. In terms of religion, 45.3% of the caretakers were Protestants, 38% were Catholics and 12.7% were born-again Christians and 4% were Muslims.

3.5. Prevalence of wasting among children under five years in Pager Division Kitgum Municipality

The first objective of the study sought to determine waste among children under five years in Pager Division Kitgum Municipality. Results in Figure 1 indicate that the overall prevalence of wasting among children under five years in Pager Division Kitgum Municipality was 26(17.3%) with severe wasting. Among the children screened, the majority 17(11.3%) of the children severely wasted were boys as compared to the girls at 9(6%).

Based on the age of the children, the study found that wasting was severe among children aged 6-11 months (6%), followed by children aged 0-6 months and 24-59 months respectively at (4%) and those aged 12-23 months were at 3.3%.

3.6. s

The second objective of the study sought to establish the feeding practices associated with wasting among children under five years seeking health services in Pager Division in Kitgum Municipality. Results in Table 4 indicate that children who were breastfed less than 6 times were highly wasted (52.9%) as compared to those who were breastfed more than 12 times (10.7%). The study findings further revealed that children who were fed on other feeds 1-3 times a day were highly wasted (28.2%) as compared to those who were fed on other feeds more than 5 times a day (5.7%).

The findings of the study further revealed that child caretakers who fed their children energy-giving food were highly wasted as compared to those who fed their children on body-building food (7.2%). It was further revealed that those caretakers who fed their children on breast milk only (34.6%) were highly wasted as compared to those (10.1%) who fed their children on breast milk and other feeds after six months of their birth. Finally, the findings of the study also revealed that, respondents who fetched water from the river and well had children who were highly wasted (31.8%) as compared to those whose water source was tap and boreholes (13.5%).

Using bivariate analysis, Table 4 further indicates that, how the child caretaker fed the child

Table 2: The demographic information of the children

Parameters	Frequency	Percentage (%)
Gender		
Male	58	38.7
Female	92	61.3
Age of child		
0-6 months	21	14.0
6-11 months	34	22.7
12-23 months	41	27.3
24-59 months	54	36.0

Source: Primary Data (2022)

Table 3: The demographic information of the child caretakers

Parameters	Categories	Frequency	Percentage (%)
Sex	Male	31	20.7
	Female	119	79.3
Age of caretaker	18 -25 years	32	21.3
	26 – 35 years	77	51.3
	40 -50 years	23	15.3
	Above 50 years	18	12.0
Marital status	Single	26	17.3
	Married	108	72.0
	Divorced	16	10.7
Religion	Catholic	57	38.0
	Protestant	68	45.3
	Muslim	6	4.0
	Born again	19	12.7

Source: Primary Data (2022)

after six months and the type of food fed to a child at a meal was found to be statistically and significantly associated with wasting.

3.7. Socio-economic factors associated with wasting among children under five years seeking health services in pager division kitgum municipality

The third objective of the study sought to establish socio-economic factors associated with wasting among children under five years seeking health services at Pager Division health center (III) Kitgum Municipality. Results in Table 5 indicate that most child caretakers who earned between 50,000-100,000sh had children who were highly wasted (36.6%) as compared to those who earned above 200,000shs (4.5%). The findings of the study further indicated that wasting was high among children whose caretakers were housewives (25%) and low among those who were business persons (12.8%).

Regarding the mother's level of education, mothers who had no formal education (48.1%) had children who were more highly wasted than those who had formal education. In addition, wasting was found to be high among children of mothers who had divorced (68.8%). Moreover, most children who had a meal a day (40.7%) were highly wasted than those who had three meals a day (5.4%). Meanwhile, households that had

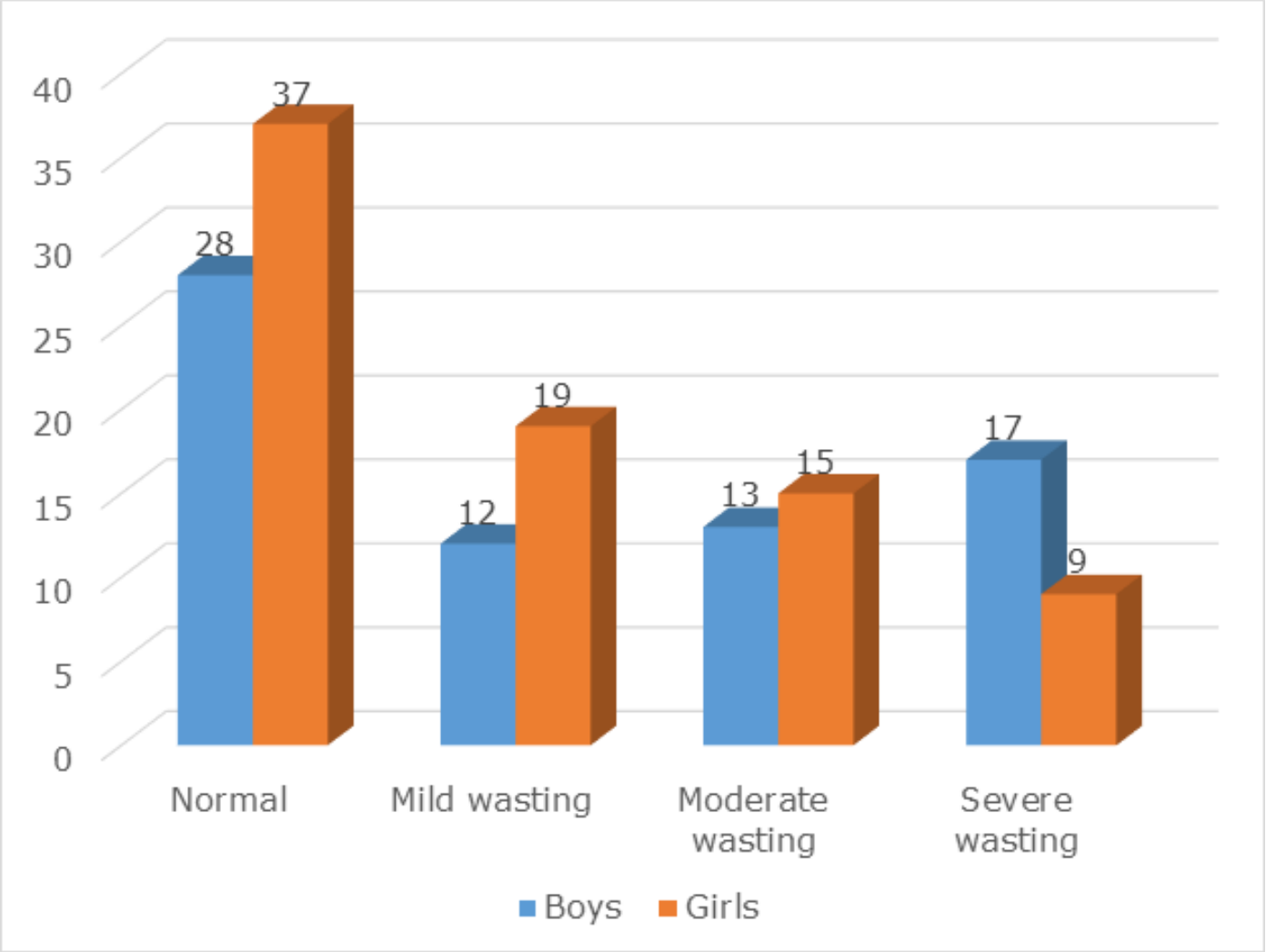

Figure 1: Prevalence of wasting among children under five years (**Source:** Primary Data (2022)

over 7 children under five years (50%) registered a high number of wasted children as compared to those who had 2-3 children under five years at 10.7%. in addition, children who were always fed by other relatives-in-law (32%) were highly wasted than those fed by their mothers (8.9%).

Furthermore, households that hand land for farming had few wasted children (5.1%) than those who did not have (25%). Whereas, those households that kept some animals at home beside growing crops had few (2.9%) wasted children than those who did not keep some animals beside growing crops constituting 46.3%.

Regarding cultural practices, those households that believed in giving newborn water or other feeds before 6 months had (63.2%) wasted children than those who didn't believe in giving newborn water or other feeds before 6 months had wasted children (10.7%). Further, those households that believed in extracting teeth in children registered high numbers of wasted children at 42.9% while those that did not believe in extracting the tooth in children registered low numbers of wasted children at 13.2%. Finally, households that believed in expressing away the first breast milk registered high percentage (55.6%) of wasted children than those who did not subscribe at 14.9%.

Using bivariate analysis, Table 5 further indicates that, the amount the child's caretaker earned per month, their occupation, the mother's level of education, and the number of children un-

Table 4: Feeding practices associated with wasting

Feeding practices associated with wasting	Category	Wasting Wasted, n (%)	P-value
How many times do you breast feed a child per day	Less than 6 times	9(52.9%)	0.207
	6-12 times	8(16.3%)	
	More than 12 times	9(10.7%)	
How many times per day do you feed a child on other feeds?	1-3 times	20(28.2%)	0.131
	3-5 times	4(9.1%)	
	More than 5 times	2(5.7%)	
What type of food do you feed a child at a meal?	Body building food	6(7.2%)	0.022*
	Energy giving	15(27.3%)	
	Fruits and vegetables	5(7.5%)	
How do you feed your child after six months?	Breast feeding only	9(34.6%)	0.041*
	Breast feeding and other feeds	12(10.1%)	
	Only other feeds	5(33.3%)	
What is your source of water?	Bore hole	11(14.1%)	0.328
	River	3(23.1%)	
	Well and spring	5(13.5%)	
	Tap	7(31.8%)	

Source: Primary Data (2022)

der five years in a household were found to be statistically and significantly associated with wasting.

4. Discussions of ftndings:

4.1. Prevalence of wasting among children under five years in Pager Division in Kitgum Municipality:

In this study, the overall prevalence of wasting among children under five years was 26(17.3%). The severity of wasting was high among children aged 6-11 months at 6%. Among children who were screened, the majority (11.3%) were male while 6% were female. This result was an indication that more male children were wasted as compared to females. The results agree with the study done in Kwara state Nigeria (Babatunde, 2015) which reported that more male children were more likely to get malnourished (wasted) due to increased attention paid to the female children, unlike their male counterparts.

4.2. The feeding practices associated with wasting among children under five years seeking health services in Pager Division in Kitgum Municipality:

Based on the bi-variate analysis, findings of the study revealed how the child's caretaker fed the child after six months and the type of food fed to a child at a meal was found to be statistically and significantly associated with wasting. It is important to note that child malnutrition is associated with inappropriate feeding practices that occur mostly in the first two years of life. There is a global and national understanding of the association between child malnutrition and inappropriate feeding practices as observed in

Table 5: socio-economic factors associated with wasting among children under five years

Socio-economic factors associated with wasting	Category	Wasting Wasted, n (%)	P-value
How much do you earn per month?	50,000- 100,000sh	15(36.6%)	0.035*
	120,000-150,000sh	9(13.8%)	
	Above 200,000sh	2(4.5%)	
What is your occupation?	Civil servant	3(18.8%)	0.032*
	Business person	5(12.8%)	
	House wife	8(25.0%)	
	Peasant famer	10(15.9%)	
What is mother's level of education?	Primary	9(13.2%)	0.017*
	Secondary	3(8.8%)	
	tertiary institution	1(4.8%)	
	None	13(48.1%)	
Marital status of child's caretaker	Single	9(34.6%)	0.025*
	Married	6(5.6%)	
	Divorced	11(68.8%)	
How many times do you have meals in a day?	Once a day	11(40.7%)	0.078
	Twice a day	5(25%)	
	Three times a day	3(14.9%)	
	More than three times a day	7(5.4%)	
How many children under five years do you have in this house hold?	2-3	3(10.7%)	0.045*
	4-5	2(11.1%)	
	5-6	5(7.9%)	
	6-7	9(33.3%)	
	Above 7	7(50.0%)	
Who feeds the child every day?	The mother	8(8.9%)	0.365
	Baby sitter	6(28.6%)	
	Grandmother	4(30.8%)	
	Other relatives in law	8(32.0%)	
Do you have land for growing crops?	Yes	6(5.1%)	0.459
	No	8(25.0%)	
Do you also keep some animals at home beside growing crops?	Yes	4(2.9%)	0.315
	No	6(46.3%)	
In this home, do you believe in giving new born water or other feeds before 6 months?	Yes	14(10.7%)	0.097
	No	12(63.2%)	
In this home, do you believe in extracting tooth in children?	Yes	9(42.9%)	0.209
	No	17(13.2%)	
In this home, do you believe in expressing away the first breast milk	Yes	5(55.6%)	0.068
	No	21(14.9%)	

Source: Primary Data (2022)

the nutrition policies of Uganda and India (MoH and MAAIF, 2015). According to a study done by Engebretsen, Wamani, Karamagi, Semiyaga, Tumwine, and Tylleskar (2013) in eastern Uganda 99% of the mothers breastfed. By 6 months none of the mothers practiced exclusive breastfeeding practice and at 3 months only 7% exclusively breastfed.

The socio-economic factors associated with wasting among children under five years seeking health services at Pager Division health center (iii) Kitgum Municipality

Based on the bi-variate analysis, findings of the study revealed that the amount the child's caretaker earned per month, the occupation of the mother, the mother's level of education, and the number of children under five years in a household were found to be statistically and significantly associated with wasting.

The findings of the study revealed that wasting was high among children of mothers who had no formal education. The above results correlate with studies done (Babatunde, 2011) which suggested that the higher the education level of the mother, the lower the rate of malnutrition. The study suggested that educated mothers are better aware of the nutrition requirements of their children by providing improved health care. The results also corresponded with those from (UDHS; 2016).

The findings of the study revealed a high level of wasting among mothers who had divorced. The results show almost a constant pattern of malnutrition (wasting) in line with the findings in Ethiopia in a study by Teller (2010), which found that under-five malnutrition was higher among unmarried rural and separated women compared to married ones.

The results on maternal occupation showed a positive correlation with other previous studies whereby 25% were housewives. It is common for non-working mothers to fail to provide complementary feeds including protein foods since most of them cannot afford them (Olwedo, 2018).

5. Conclusion:

Results from the study confirmed that malnutrition was still high among children under five in the pager division Kitgum Municipality with wasting standing at 17.3% and high among children aged 6-11 months at 6%. Results from the study analysis also confirmed how the child caretaker fed the child after six months, the type of food fed to a child at a meal, the amount the child's caretaker earned per month, occupation of the mother, mother's level of education, and the number of children under five years in a household were the most significant factors which affect malnutrition in children who were below 5 years of age in Kitgum Municipality.

6. Recommendations:

The study put forward the following recommendations:-

1. The study recommended community nutritional interventions to address the root causes of malnutrition regarding wasting among children under 5 years within the Kitgum District where the food volume is adequate
2. Further research is therefore needed to confirm and/or obtain an explanation regarding sex differentials with wasting across socio-economic strata in future studies in the study area as wasting was found to be highly prevalent among boys as compared to girls.
3. Similar community-based studies in the area of child nutrition are needed to determine the root causes of socio-economic and cultural drivers of malnutrition in Kitgum District and Uganda as a whole.

7. List of Abbrivations:

PCM – protein calories malnutrition
WHO – world health organization
PEM – protein energy malnutrition
UDHS – Uganda demographic health survey
UN – united nation
MAM – moderate acute malnutrition
UNICEF – united nation children fund
SAM - sever acute malnutrition

NMHCP – national minimum health care package
RUTF –ready to use therapeutic feeds **UBOS** – Uganda bureau of statistics
ITC – inpatient care
OPD – out patient department
OTC – out patient care
IPD – inpatient department
KDHS – kitgum demographic health survey
WHZ – weight for height z- score.
WAZ – weight for age z- score
MOH – ministry of health
HA height for age
FAO – food and agricultural organization
SDGs – sustainable development goals
HIV – human immune virus
SD – standard deviation

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