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# Prevalence and Associated Factors for Protein Energy Malnutrition in Children below 5 Years Admitted at Jinja Regional Referral Hospital

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### ABSTRACT

The number of malnourished children in Busoga is on the increase as shown by records at Jinja Referral Hospital have shown. Four (4) out of the ten (10) children admitted to the hospital are severely malnourished. To combat the problem of protein-energy malnutrition in this community, risk factors associated with it must be identified. A quantitative crosssection study approach was conducted in order to determine the factors influencing malnutrition among children under five years visiting the paediatric ward at JRRH. The study was conducted among children under five years visiting the pediatric ward at Jinja Regional Referral Hospital, with 150 respondents considered. Data was collected through a researcheradministered questionnaire specifically tailored to meet the objectives of the study and supported by anthropometric measurements and clinical evaluation and diagnoses. The demographic features of participants included females (58%) and males (42%). About 48% of the under-fives admitted to the paediatric ward at the hospital were aged between 13 and 36 months, followed by those above 36 months (38%) and the least were 12 months and below (14%). The prevalence of PEM was 16% with children aged between 13–36months contributing the highest cases of PEM (56%). The Children who had not been fully immunized were found associated with increased cases of PEM. A child's immunization status was found to be of great importance as a high number of children that did not suffer from PEM were fully immunized. Most caregivers were peasant farmers (50%), aged between 25 and 29 years (40%), and who lived in a rural area (84%), on an average monthly income of between 100,000 -500,000 UGX (73%) and monthly food expenditure of 50,000UGX or more. The prevalence of Protein Energy Malnutrition among under-five children admitted at JRRH was 16%, which warrants immediate mitigating measures.

**Keywords:** Protein-energy malnutrition, Malnourished children, Paediatric ward, Poor immunization status, Suboptimal breastfeeding and feeding practices.

## INTRODUCTION

Malnutrition is defined as either an excess of macro and micronutrients (overnutrition) or a deficiency of those nutrients (under-nutrition), which has obvious detrimental effects on human body structure and function and causes specific physical and clinical results [1]. Malnutrition is described as "the cellular mismatch between the supply of nutrients and energy and the body's demand for them guarantee development, to maintenance, and particular functions" by the World Health Organization (WHO) [2]. The young population is most affected. especially those under the age of five, as

proper nutrition is essential for their optimum growth and development [3]. Children are at risk because of their vulnerability and reliance on adults to eat, and the most serious hazard to their health is malnutrition because it is invisible [4]. Children who are malnourished. in contrast to famine, rarely display visible symptoms since they experience lesser types [5]. Protein Energy Malnutrition is one type of malnutrition that affects children (PEM). Α series of related disorders known protein-energy as malnutrition. such marasmus. as kwashiorkor, and intermediate phases of

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marasmic-kwashiorkor, are referred to as such. These conditions are generally brought on by a "food gap" between intake and requirement [6]. PEM, often known as the First National Nutritional Disorder, is regarded as a major nutritional issue [7]. In order to plan and implement prompt interventions at all relevant levels, it is crucial for the health system to identify Protein Energy Malnutrition at an early [8]. PEM. or protein-energy stage malnutrition, is a serious public health issue in Uganda and other developing nations, particularly in Sub-Saharan Africa, which has the second-highest rate of undernourished children after India [9]; [10]. Malnutrition is thought to be responsible for roughly 2.3 million deaths of children under the age of 59 months per year in developing nations, or about 41% of all deaths in this age range. About 3 million young lives are lost each year as a result of undernutrition, which causes about half of all deaths in children mal the age of five [11]. Children who are undernourished have a higher chance of dying from common diseases, these infections occur more frequently and are more severe, and longer thev take to heal [12]. Undernutrition and infection can interact to cause a potentially fatal cycle of declining health and undernutrition [13]. Along with stunted growth, poor nutrition during the first 1,000 days of life can also affect a child's capacity to think clearly and do well in school and at work [14]. According to [15], malnutrition contributed to almost 45% of all fatalities children under the age of five, in supporting the negative effects of it on children's survival. PEM can manifest in expectant and nursing moms as well, which may have an impact on the development, nutritional health, and survival rates of their unborn children, newborns, and babies [16]. Several risk variables, including socioeconomic status, biological characteristics, environmental factors, the presence of free radicals, and host's age, are linked to the the development of PEM [8],[17]-[20]. Lack of breast-feeding and the use of diluted formula are some socioeconomic, biological, and environmental factors, as well as improper complementary feeding, crowding and poor child-spacing in families, ignorance, illiteracy, a lack of health education (awareness), poverty, concurrent infections, and family discord, among others [21],[18],[22]-[25]. According to records from Jinja Referral Hospital, there are increasingly more malnourished children in Busoga. Of the ten (10) youngsters taken to the hospital, four (4) are significantly underweight [26]. Risk factors for protein-energy malnutrition must be recognized in order to address the issue in this population. The risk factors linked to the cases documented at the Jinja Regional Referral Hospital, however, are mostly unknown. Since children under the age of five who are hospitalized to the pediatric wards of Jinja Regional Referral Hospital are the focus of this study, it seeks to identify the case fatality rate as well as the numerous risk factors for the development of PEM. This will give the crucial details on how to get involved in finding long-term solutions to this issue. not just for the Jinja community but for the entire country of Uganda. Protein Energy Malnutrition is a global public health problem [6]. Almost half of the children under the age of five years' deaths are as a result of PEM. Most of the brunt being borne by the poor under-fives in developing countries of Sub-Saharan Africa [27]. PEM is still a huge problem in Uganda 18 years after the MDGs of 1990 to 2015, MDG1 and MDG4 in particular, that targeted to reduce hunger by half and reduce by two thirds, the under-five mortality rate respectively come the year 2015 [28]. Three vears after the Sustainable Development Goals (SDGs) of 2015 - 2030 replaced the MDGs, Uganda is

2015 - 2030 replaced the MDGs, Uganda is still way behind as far as attainment of the MDGs is concerned [29]. Many regions in Uganda have reported high rates of malnutrition, even Western Uganda, a region believed to be Uganda's food basket, is second only to Karamoja in stunting rates. It is ironical that cases of PEM are still wreaking havoc in "The Pearl of Africa", the land of milk and honey [30]; [31]. So, many factors could be attributed to the current state of affairs in Uganda given the so many predisposing factors to

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INOSR APPLIED SCIENCES 10(2):32-45, 2023 PEM [32]. Malnutrition burden in Jinja has been so high that tackling malnutrition will be among the key components of the Jinja District Five Year Development Plan of 2011 [33]. A study into PEM is thus warranted in order to evaluate the successes of the Jinja's five-year development plan and if interventions are to be formulated that would get Uganda

## Study design

A quantitative cross section study approach was conducted in order to determine the factors influencing malnutrition among children under five years visiting the pediatric ward at JRRH.

## Area of Study

The Jinja Regional Referral Hospital served as the study's site. One of Uganda's thirteen regional referral hospitals is Jinja Hospital. It is also one of the fifteen hospitals that have been approved as internship hospitals, allowing Ugandan medical school graduates to complete a year-long internship under the supervision of consultants and experts in the designated fields of medicine and surgery.

## Study population

The study was conducted among children under five years visiting the pediatric ward at Jinja Regional Referral Hospital.

#### **Inclusion criteria and rationale** All children under five years visiting the pediatric ward at JRRH whose caretakers agreed to participate in the study.

## Exclusion criteria

Children of care takers who declined to participate in the study and children under five years with any case of intrauterine growth retardation were excluded from the study.

## Sample size determination

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

# $n = (Za/2)^2 p(1-p)$

 $e^2$ Where n is the required sample size, p is the approximate prevalence rate malnutrition among children under five years at JRRH, and e is the permissible error in the estimate. The value of p was taken as 0.1429, according to Suberu, (2020). Therefore, by considering 95% back on track on matters MDGs and SDGs especially MDG 1 and MDG 4 which will ultimately lead to the realization of the Sustainable Development Goals (SDGs) of 2015 - 2030 [34]. This research will assess the prevalence and risk factors associated with PEM among under-fives admitted in the paediatric wards of Jinja Regional Referral Hospital (JRRH).

## METHODOLOGY

confidence interval ( $Z\alpha/2=1.96$ ), marginal error (d) of 5%, the minimum calculated sample size was 188 respondents. However, due to limited time and financial constraints, the researcher was able to include only 150 respondents.

### Sampling procedure

A Consecutive sampling technique was used whereby study subjects were recruited as they came and met the inclusion criteria.

### Dependent variables.

PEM among children under five years.

## Independent variable.

Socio-demographic factors like age, marital status, occupation, education, religion.

## Data collection method and tools.

Data was collected chiefly through a researcher-administered questionnaire specifically tailored to meet the objectives of the study and supported by anthropometric measurements and clinical evaluation and diagnoses. Data collected was tallied, tabulated and charted in a way that will reflect the study objectives.

#### Data entry and cleaning.

The data in the questionnaire was checked for completeness, cleaned and sorted to eliminate obvious inaccuracies and omissions. The data was then coded and entered into a computer.

## Data analysis

The qualitative data collected was statistically analyzed and documented using Microsoft Excel and Word version 2019 which was then analyzed. The analyzed data was presented in form of tables and graphs which formed a basis for discussion and conclusions.

## Quality control

To ensure quality control the researcher conducted a pre-test using 10

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INOSR APPLIED SCIENCES 10(2):32-45, 2023 questionnaires in the target population and data was collected before the actual

study to help in reconstruction of the questionnaire where necessary.

RESULTS

Table 1: Summary of child related factors						
Child factors	Frequency (n=150)	Percentages (%)				
Sex of child						
Male	6	53 42				
Female	8	37 58				
Age of child (months)						
≤12	2	21 14				
13-36	7	72 48				
37-59	5	57 38				

According to Table 1, the demographic characteristics of participants comprised females (58%) and males (42%). Around 48% of the under-fives admitted to the hospital's paediatric unit were between the ages of 13 and 36 months, with those older

than 36 months accounting for 38% and those younger than 12 months accounting for 14%. The majority of hospitalized under-fives (60%) were in the care of their mothers.

 Table 2: The proportion of malnourished children based on child related factors

Parameter	Total (n=24)	Percentage (%)	
Sex of child			
Male	10	42	
Female	14	59	
Age of child(months)			
≤12	4	18	
13-36	13	56	
37-59	6	26	
Immunization status			
Fully immunized	6	27	
Not fully immunized	18	73	

According to Table 3, 16% of all admissions were due to protein energy deficiency. It is clear that children aged 13-36 months provided the greatest number of instances of PEM (56%), followed by those aged 37-59 months (26%). PEM cases were less common in children aged 12 months and less (18%). Table 4 shows that children who had not been adequately vaccinated were related with an increase in PEM cases. The vaccination status of a child was discovered to be quite important, since a large proportion of children who did not suffer from PEM were completely immunized.

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Exclusive breastfeeding, nursing on demand, feeding on specially prepared meals, and feeding away from other siblings were shown to be related with a reduction in PEM instances, as indicated in Table 5. In the case of under-five PEM, however, age at weaning, total breastfeeding length, and number of daily meals were shown to be statistically insignificant. Those who only had two feeds per day, on the other hand, were shown to be more impacted by PEM (51%), than those who had more meals per day. At weaning, the most prevalent meals were cow milk, beans, vegetable soup, oatmeal, banana, and matoke mash.

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Table 3: Proportion of malnourished children based on Breastfeeding and Feeding practices

Variables	N	%
Exclusive breastfeeding		
Yes	3	13
No	21	87
Frequency of breastfeeding per day		
On demand	3	12
1 to 2 times	5	22
3 to 5 times	7	31
6 to 8 times	6	25
>8 times	2	9
Weaning		
Before 24 months	18	76
After 24 months	6	24
Why did you decide to introduce other foods?		
Advised at the clinic	4	15
Child was old enough	16	65
I felt that breast milk will be no longer adequate	4	17
Others	1	3
Which food did you first introduce to the child?		
Cow milk	12	52
Formula	6	25
Porridge	3	13
Others	2	10
How is this child`s food served and eaten		
Together with other children in one plate	16	67
Individually	5	22
Others	3	11
Frequency of feeding per day		
Two meals per day	12	51
Three meals per day	6	23
Four meals daily	3	14
More than four meals	3	12

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Variables	Freq (n= 24)	%
Age of mother at birth	••••	
<20	7	29
20-29	10	40
30-39	6	25
40+	1	6
Education level		
None	10	43
Primary	5	21
Secondary	5	19
Tertiary/university	4	17
Marital status		
Married	18	77
Single	2	9
Separated	3	11
Widowed	1	3
Occupation		
Peasant farmer	12	50
Business	4	17
Civil servant/NGO staff	3	14
Others	4	19
Number of Siblings in the household		
Less than 2	3	13
2 to 4	14	57
5 to 7	5	22
More than 7	2	8
Area of residence		
Urban	4	16
Rural	20	84
Average monthly income		
Below 100,000 UGX	4	17
100,000 - 500,000 UGX	18	73
Above 500,000 UGX	2	10
Monthly food expenditure		
Below 50,000 UGX	2	9
50,000 - 100,000 UGX	13	56
Above 100,000 UGX	8	35

According to table 4, the majority of households (57% of families) included two to four siblings, who were raised by their married parents (77%). The majority of caregivers were peasant farmers (50%),

The study's findings showed that 16% of children under the age of five had protein energy malnutrition. These results confirm

between the ages of 25 and 29 (40%), living in rural areas (84%), with an average monthly income of between 100,000 and 500,000 UGX (73%) and spending at least 50,000 UGX per month on food.

#### DISCUSSIONS

past claims that malnutrition is still a significant issue in sub-Saharan nations, particularly in Uganda [35]; [36]; [5]; [37].

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INOSR APPLIED SCIENCES 10(2):32-45, 2023 The research supported Suberu's (2020) most recent findings from a study he conducted at a Ugandan Hospital. However, the outcome of this investigation is marginally below the 30% prevalence level stated in a prior study by [36]. The outcome may be related to the success of recent initiatives taken to reduce malnutrition [38]. Otherwise, it may also vary as a result of regional variation in economy, agricultural practice or food security within Uganda. When comparing male and female children under the age of five. PEM was shown to affect male children more frequently than female children. This gender disparity was also noted by other studies with under-five males being more negatively impacted by PEM than their female counterparts [39]: [40]; [36]; [41]. Similar to this, [8] recently observed that PEM in Tanzania affected males more severely than females. This preference might result from the fact that male children engage in more energetic than female youngsters, which play requires and expends more energy [24]. These results concur with those of other African studies [1], [41]-[44], [3] that discovered males are more impacted by environmental stress than girls, and a study conducted in Kwara state, Nigeria [45], which discovered male children were more likely to experience malnutrition because female children received more attention than their male counterparts. A smart mother knows what her children eat and how important it is to give them a balanced diet and also knows where to go for medical help if her children exhibit PEM symptoms and signs [8]. In this study, it was discovered that children with illiterate moms were more likely to suffer from malnutrition than children with mothers who had post-secondary or university degrees. The results above are consistent with earlier study, which showed that the risk of malnutrition decreased with the mother's education level [4]; [46]; [47]; [48]. According to the study, educated women are more aware of their children's nutritional demands since they receive better health care. Additionally, the outcomes were in line with those of [49]. In this study, it was also discovered that poor

higher risks of PEM. This was in line with what [8] discovered in Tanzania's Kigoma District. According to studies, infections can be a primary cause of malnutrition as well as one of its effects [8],[20],[23],[24]. In contrast to the current study, a study by [20] found that the prevalence of PEM was 68.8% among completely immunized individuals. 60.0% among partially immunized individuals, and 33.3% among unimmunized individuals. In a different study conducted in Enugu, Nigeria, it was shown that children who were just partially immunized and those who were not immunized had greater rates of malnutrition than children who were fully immunized (62.07%). [25]. The children in this study who were not exclusively breastfed and who were not fed on demand further demonstrated the link between suboptimal breastfeeding and feeding practices and PEM in children under five. The findings of [36]; [40]; [24] that reported PEM to be a result of inadequate nursing and feeding practices agreed with the results of the current study. It can be concluded that the major cause of PEM in this case is a reduction in nutritional availability. The statistical relevance of domicile in PEM was also demonstrated, with rural residence being linked to higher PEM rates. This outcome was consistent with the findings of [20]; [24]; [25], which noted that urban children had superior nutritional status. This is most likely due to the cumulative effect of a sequence of more favorable socioeconomic situations, which appears to contribute to improved child and mother care practices. Low monthly income and low monthly food spending Swere also linked to increased prevalence of PEM. According to the UBOS and Macro International Inc; (2007), malnutrition rises with child age throughout the first three years of life before decreasing in the fourth and fifth years. The recent study found that the majority of malnourished children (56%) were between the ages of 13 and 36 months. These findings are consistent with those of [50-62], who discovered that vounger children are less likely to become malnourished as a result of breastfeeding

immunization histories were linked to

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INOSR APPLIED SCIENCES 10(2):32-45, 2023 than older children. When children become used to supplementary feeding after weaning, they begin to receive proper nourishment[1].Furthermore, malnutrition rates during delivery were highest in women under the age of 20 (39%) and lowest in mothers aged 30-39 years (4.3%). This is consistent with the findings of [51], who reported that children born to women

Protein Energy Malnutrition was found in 16% of under-five children admitted to JRRH, necessitating prompt intervention. PEM was linked with inadequate breastfeeding and feeding behaviors, child age and gender, low vaccination status, housing, caregiver occupation, and financial difficulties.

### Recommendations

- Health care practitioners should educate the public about other antimalnutrition habits, such as exclusive breastfeeding, and advise parents on how and when to offer extra meals during the children's growth cycle.
- The benefits of exclusive breastfeeding for at least six months should be closely adhered to by parents of children under five, since this practice has been scientifically demonstrated to have no negative effects.
- Additionally, Jinja Regional Referral Hospital management and staff should enhance and/or expand current community outreach initiatives to inform the public about the value of exclusive breastfeeding, optimal child feeding techniques, and childhood immunization in the fight against childhood malnutrition, infections,

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under the age of 20 were 1.22 times more likely to be stunted, wasted, and underweight than children born to mothers above the age of 20. Another study revealed that being 40 or older as a mother is associated with an increased likelihood of having low-birth-weight children [52]-[62].

## CONCLUSION

and deaths along with intensive community childhood immunization in accordance with EPI requirements and guidelines.

- District health care practitioners should educate the public about the importance of healthy eating habits for children under the age of five. They should be educated on the correct foods that make up a balanced diet necessary for children's growth.
- Because young mothers develop throughout pregnancy and childbirth, health care providers should educate the public about the consequences of early pregnancies, which increase the risk of underfive malnutrition.
- Last but not least, the Government of Uganda, through the Ministry of Health. needs to step up awareness-building community regarding childhood malnutrition, feeding breastfeeding and practices, as well as childhood immunization, using all available channels like audio-visual and print media. They should also continue to support these efforts materially, financially, and through staff empowerment.

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