

Research Article,

Prevalence of Wasting In Children Less than Five Years Admitted At the Pediatric Ward in Kitale County Referral Hospital

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Abstract:

Background: Wasting refers to a child who is too thin for his or her height. Wasting is as a result of sudden or acute malnutrition, where the child does not get enough calories from food and hence faces an immediate risk of death. **Objective:** To assess the prevalence of wasting in less than five years children admitted in the pediatric ward in Kitale County Referral Hospital. **Design:** This was a descriptive cross-sectional study **Setting:** Kitale County Referral Hospital pediatric ward. **Subjects/Participants:** All children under 5 years of age admitted in the pediatric ward in Kitale County Referral hospital **Results:** The prevalence of severe wasting was 14.2% and 18.4% for moderate wasting. The overall diet quality was inadequate due to budget for patient food and low priority for nutrition as part of medical treatment and failure to adhere to the hospital menu.

Conclusion: All children aged 6-60 months admitted should be provided with the recommended toto diet. The ministry of health should deploy more qualified nutrition personnel to this facility who will be involved in taking anthropometric measurements for the children on admission, regularly after admission and upon discharge from the hospital to enable them capture malnourished children in the hospital.

Introduction:

Wasting refers to a child who is too thin for his or her height. Wasting is as a result of sudden or acute malnutrition, where the child is not getting enough calories from food and faces an immediate risk of death. Normally, a healthy child is supposed to gain 2-3kg of body weight every year. A child whose weight-for height measurement is less than two standard deviation (-2 SD) is considered to be wasted (1). Wasting can be divided into two, moderate wasting and severe wasting according to WHO. Severe wasting occurs when the child's weight-for-height measurement is less than 3 standard deviations (-3 SD) and/or mid upper arm circumference (MUAC) less than 115mm and/or bilateral pitting edema. Moderate acute wasting is defined as

moderate wasting and/or MUAC greater than or equal to 115mm less than 125mm (2). Children who become wasted is usually as a result of a combination of both infections and diets that do not cover nutritional needs. The main underlying causes are i) poor access to appropriate, timely and affordable health care, ii) inadequate caring and feeding practices for example, exclusive breastfeeding or low quantity and quality of complementary food, iii) poor foods security, iv) lack of sanity environment including access to safe water, sanitation and hygiene services (3). To manage moderate wasting in children 0-24 months, essential nutrition actions should be implemented such as proportion and support of breastfeeding, nutrition counseling for families

regarding complimentary feeding practices and provision of food supplements. For older children, the focus should be on improving family foods (diversity, quality and safety). Moderately wasted children should also have access to health services and be treated for any medical conditions they might have. In management of severe wasting with feeding, if aged < 6 months EBM (Expressed breast milk) or term formula is used or use diluted F100-to each 100mls F100 add 35mls clean water. When appetite returns (and edema much improved) change from F75 to F100 at 130mls/kg (the same volume as F75 no edema) in the transition phase (about 2 days). If F100 is not available it is changed to RUTF (ready to use formula) for transition phase. After transition phase RUTF is used that has 500kcal in 92g packets for rehabilitation. All vitamins, minerals and iron are in RUTF (4).

Materials and methods:

Study Design: A descriptive cross-sectional study.

Study Area: The study was carried out in Kitale County Referral Hospital situated at the town region, the capital of Trans-Nzoia County. Kitale is an agricultural town in northern rift valley situated between Mount Elgon and Cheranganyi hills at an elevation of around 1900metres (6200ft). The population is 106,187 as of 2009 census. Economically, Kitale town is dependent on agriculture that is, cash crops, substance farming and livestock farming.

Study population: Study population was all children under 5 years of age admitted in the pediatric ward in Kitale County Referral hospital approximated at 148 children per month from previous studies where the total number admitted between December 2013 and December 2016 was 5306 children.

Sample size:

The sample size was determined by using the Fischer method (Fischer, et al., 1991) $n = z^2 pq / d^2$

n=desired sample size

z=standard normal deviate set at 1.96 which corresponds to 95% confidence interval

p=children below 5 years who are estimated to be wasting in Kenya are 7% (KDHS, 2008-2009)

q=1-P (denote children not wasting (93%))

d=degree of accuracy desired set at 0.05 or 5% for the study

n is therefore = $\frac{1.96^2 \times 0.07 \times 0.93}{0.05^2} = 100$

The desired sample size was 100

Sampling method:

A systematic sampling was used. In a month, it was assumed the average number of children five years of age and below who are admitted in Kitale County Referral hospital was 148.

The average number per day based on this was;

$148 \div 20 = 7.4$, rounded off to 7

This in daily average multiplied by 20 working days gave the expected population as;

$7 \times 20 = 140$

The calculated sample size was 100 and thus the sampling interval was given as:

$140 \div 100 = 1.4$

Thus every 2nd child was taken to participate in the study.

The simple random sampling method was used to get the first child. This involved rolling papers written numbers 1 or 2. Whoever picked the paper number 2 was taken to be the first child by chance. Every second child was taken to participate in the study.

Inclusion and exclusion criteria

Inclusion criteria:-

1. Children aged 6-59 months admitted in the pediatric ward in Kitale county referral hospital were included in the study.

Exclusion criteria:-

2. The study participants who are seriously ill.

3. Those that is not available at the ward during the time of the survey.

Data Collection:

Data were collected using a structured questionnaire and anthropometric measurement. Weight of children between 0-5 years of age was measured. Length of children 2-23months was measured using a length board to the nearest 0.1cm while standing without their shoes on.

Data Processing and analysis:

Anthropometric data collected such as age, weight and height was entered in MS EXCEL. The data was checked for consistency and completeness. A cross tabulation between anthropometric data, clinical observation with other variable such as morbidity, household population, education level of parent, etc. was done using a chi square to identify their relationship and how they contribute to wasting.

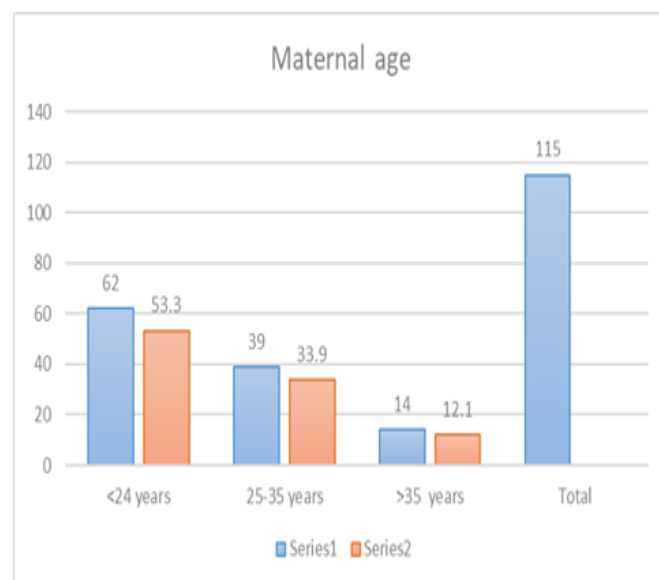
Ethical considerations:

Ethical clearance was sought from the college of health sciences (COHES) of Jomo Kenyatta University of Agriculture and Technology. Approval was sought from the Kitale County Referral Hospital ethics committee. Verbal consent from the parents or care givers of study subjects was obtained and objectives of the study explained to them to allow the children to participate in the study. Privacy and confidentiality of collected information was ensured at all levels.

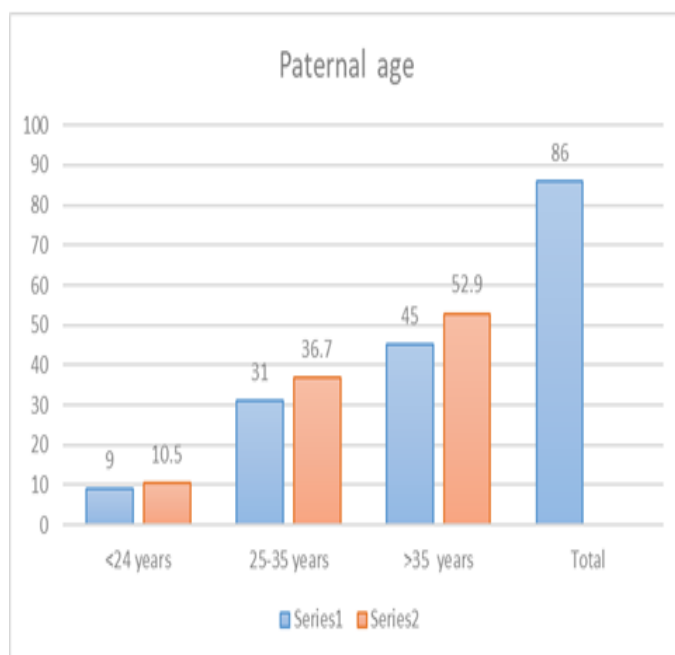
Results:

Out of the 115 children participating in the study, six died while in the study. From this mortality cases, 66.6% were of children aged 6-12 months and again of the 6 cases, 66.6% all had a component of malnutrition in them. All the six children who died were girls. The range of ages of mothers covered in the study was from 16 to 49 years. The mean age was 25.43 with a mode of 19. Most of the mothers, 62 (54%), were between the age of 15 and 24 years thus representing more

than half of the entire sample. Only 14 mothers were over 35 years (Figure 1).

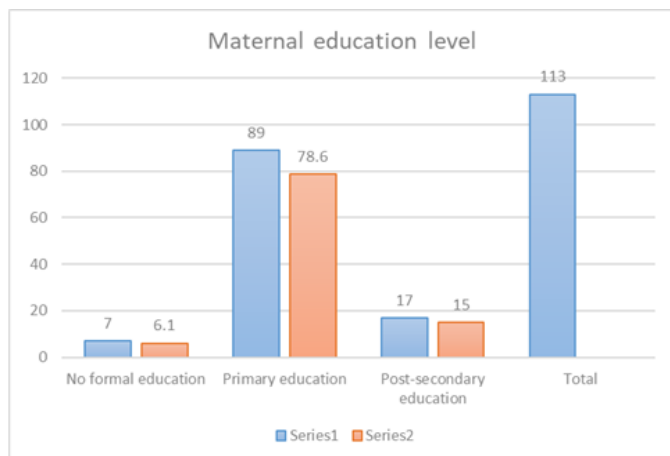


The ages of the fathers ranged from 20-69 years old whereby more than half of the fathers in the study were 35years of age. Mean age of fathers was 36.5 years and a mode of 27. Only nine (11%) were less than 24 years and 31 (37%) were between 25-35years old (Figure 2).

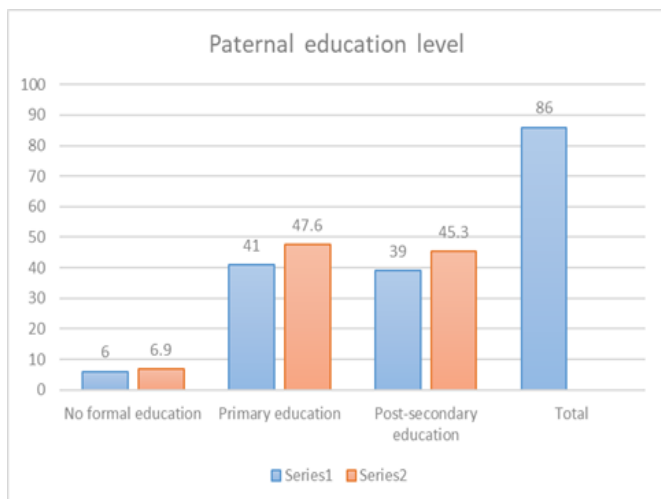


Maternal and paternal education level:

Eighty percent (80%) of the mothers in the study had attained only primary education, and only 17 (14%) had post-secondary education while only seven (6%) had no formal education (Figure 3).

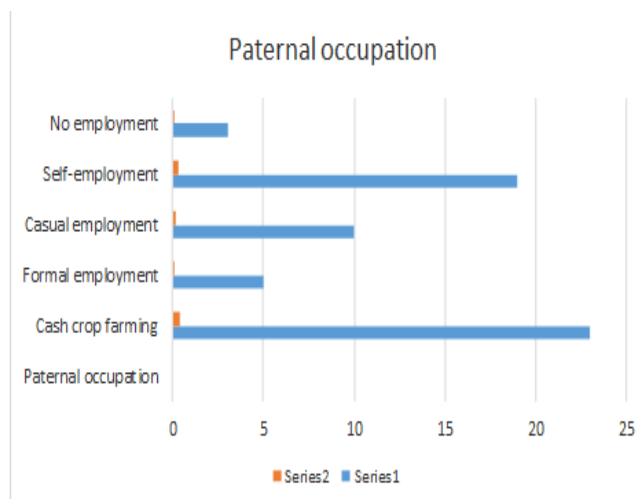


Of all the fathers in the study, 39 (45%) had post-secondary education while 41 (48%) had only primary education and only six (7%) had no formal education (Figure 4).

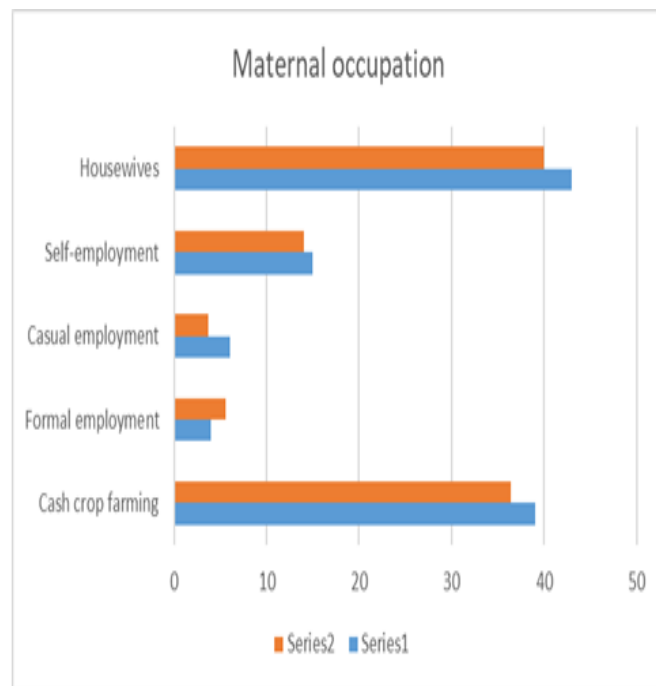


Maternal and paternal occupation:

At least three (5%) of the fathers had no employment, five (8.3%) had formal employment, 19 (31.6%) were self-employed, ten (16.6%) were casual laborers and only 23 (38.3%) were farmers.



About half of the study mothers, 43 (40%), were housewives, 39 (36.4%) were farmers, 15 (14%) were self-employed while only four (5.6%) had formal employment (Figure 5).



Marital status:

Less than 10% of the mothers were widowed or divorced while around 20% of the mothers were single and never married. About 70% of the mothers were married (Figure 6).

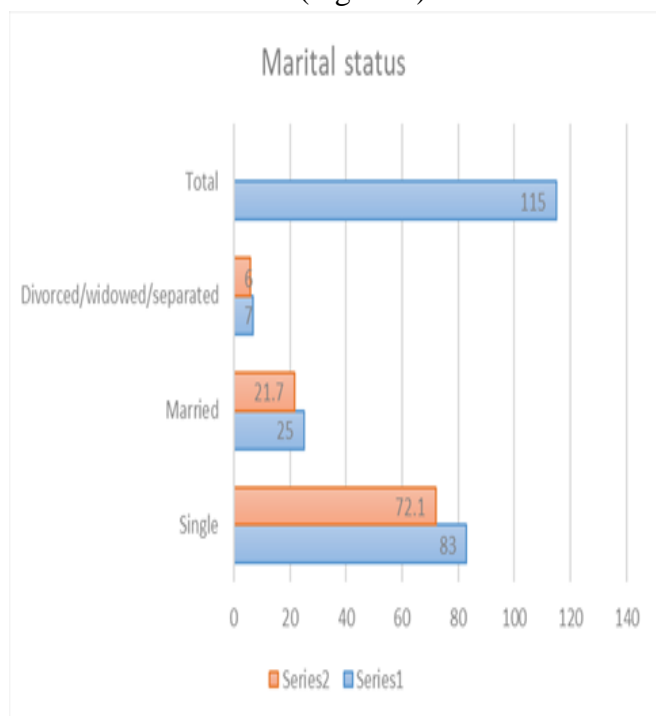


Table 1: Demographic characteristics of the parents

Socio-demographic characteristics	No	%
Maternal age		
<24 years	62	53.3
25-35 years	39	33.9
>35 years	14	12.1
Total	115	
Education level		
No formal education	7	6.1
Primary education	89	78.6
Post-secondary education	17	15.0
Total	113	
Maternal occupation		
Cash crop farming	39	36.4
Formal employment	4	5.6
Casual employment	6	3.7
Self-employment	15	14
Housewives	43	40
Total	107	
Marital status		
Single	83	72.1
Married	25	21.7
Divorced/widowed/separated	7	6
Total	115	
Paternal age		
<24 years	9	10.5
25-35 years	31	36.7
>35 years	45	52.9
Total	86	
Education level		
No formal education	6	6.9
Primary education	41	47.6
Post-secondary education	39	45.3
Total	86	
Paternal occupation		
Cash crop farming	23	38.3
Formal employment	5	8.3
Casual employment	10	16.6
Self-employment	19	31.6
No employment	3	5
Total	60	

Demographic characteristics of the study children:

The ages of the children in the study ranged from 6 months to 59 months. The mean age of the children was 18 months with a mode of 6 months and SD of 14. The ratio of male to female children in the study was 1:1.

Table 2: Distribution of study children by age and sex:

Age(months)	Boys		Girls		Total	
All=115	No.	%	No.	%	No.	%
6-11	27	47.4	30	51.7	57	49.6
12-23	7	12.3	12	20.7	19	16.5
24-35	13	22.8	5	8.6	18	15.7
36-47	6	10.5	6	10.3	12	10.4
48-60	4	7.0	5	8.6	9	7.8
Total	57	100	58	100	115	100

Nutritional status of the children:

The prevalence of moderate wasting WHZ <-2SD was 18.4% with children aged 24-35 months mostly affected with a prevalence of 44.4% and lowest among the children age 6-11 months with a prevalence of 19.6%. The prevalence of severe wasting WHZ <-3SD among the children was 14.2%. This was highest among children aged 24-35 months with a prevalence of 33.3% and was followed closely with children aged 48-60 months with a prevalence of 28.6%. The prevalence was lowest among children aged 6-11 months.

Table 3: Prevalence of wasting:

Age groups	N	Weight for length/height (%) z scores	
		< -3 SD (%)	< -2SD (%)
All=115	106	14.2	18.4
6-11	51	7.8	19.6
12-23	19	10.5	21.1
24-35	18	33.3	44.4
36-47	11	9.1	36.4
48-60	7	28.6	42.9

Mothers who were widowed, divorced and separated had the highest proportion of children who were wasted with 28.6% severely malnourished and 14.3% moderately malnourished. Married mothers followed with 18.8% of the children severely malnourished and about 12.5% moderately malnourished. Children of the youngest mothers in the study were more severely and moderately, 21.3% and 14.8% respectively. The older mothers in the study of more than 35 years had 16.7% children with severe malnutrition and 16.7% with moderate malnutrition. The prevalence of wasting was highest among children whose mothers had only

attained primary education at 19.5% for severe wasting and 13.8% for moderate wasting. Mothers who had attained secondary and post-secondary education had 12.5% with severe malnutrition and 6.3% with moderate malnutrition. Most of the severely wasted children belonged to the fathers who had no formal education at 33.3% while those who had attained post-secondary education at 24.3%.

Child morbidity and mortality:

The most common illnesses reported for the study children admitted at Kitale county referral hospital were malaria (62.6%), respiratory tract infections (27.3%) and anemia (22.6%), malnutrition mainly kwashiorkor, marasmus and marasmic kwashiorkor (21.7%), diarrhea and vomiting (12.1%), convulsions and meningitis (8.7%) and other illnesses.

Table 4: Child morbidity patterns:

Disease/ Illness	Frequency	(n=115)%
Malaria	72	62.6
RTI, Pneumonia, Bronchitis	30	27.3
Anemia	26	22.6
Malnutrition	25	21.7
Diarrhea and vomiting	14	12.1
Convulsions	10	8.7
Meningitis	10	8.7
Fever	5	4.3
ISS/HIV	4	3.5
Dehydration	4	3.5
TB	3	2.6
Sepsis	2	1.7
Dysentery	1	1
Delayed milestones	1	1
Dermatitis	1	1
Helminthic infections	1	1
Diabetes	1	1
Congestive cardiac failure	1	1

Child mortality:

Out of 115 children recruited in the study, six (5.2%) deaths were recorded at the time of study. Four out of six of these cases were of children aged 6-12 months. Out of the six cases, 66.6% were diagnosed with malaria and severe malnutrition, severe kwashiorkor in immune suppression, marasmic kwashiorkor, asthma and

malaria, anemia diarrhea cases all had a component of malnutrition. All the six children who died were girls.

Food consumption in pediatric ward:

The food consumption pattern of the children admitted at Kitale county referral hospital pediatric ward indicated that both the food provided in the hospital and that was brought from home was not balanced because it mainly consisted of carbohydrate foods. The same meals were served every day and the meals were irregular. Breakfast would be served between 7:30am and 8:00am, while lunch was served between 12 noon and 1pm. Similarly dinner was served at different times between 5:30pm and 6:30pm. There was a general observation by nutritionists that the food prepared in the pediatric ward was not adequate, was of poor quality and could not aid the quick recovery of sick children.

Discussion:

The morbidity findings reflected UNICEFs report that 70% of most childhood illnesses in developing countries are as a result of five diseases or a combination of acute respiratory infections, diarrhea, malaria, malnutrition and measles (5). Malaria was the leading cause of morbidity among the study children. Acute respiratory illnesses were associated with a 10-20% reduction in the child's food intake. This could be due to a reduction in the child's appetite. The study established varying degrees of malnutrition at 14.2% for severe wasting and 18.4% for moderate wasting, which was higher than a similar study done in Trans-Nzoia-county, done among 300 household farm laborers that showed 10% of children under 5 were wasted, while according to KDHS 2014, 4% of children under 5 are wasted in Kenya (6). In this study children were fed on a monotonous diet. Lack of variety in foods consumed has been found to result in long term sensory specific satiety. By continuing to eat the same foods, one ends up reducing their overall food intake. This could explain why 50% of the children never ate any

meals served in the hospital besides the illness also played a role in reducing appetite. Maternal characteristics investigated in this study were age, education, occupation and marital status. Most of the mothers were young with over 50% of mothers below 24 years. This age distribution was expected since only mothers with children aged less than 5 years were included in the study. There was no significant association between maternal age and the nutritional status of the children, a higher proportion of children with wasting belonged to the youngest mothers in the study. The maternal education level in the study population was relatively low with only 15% of the mothers attaining secondary education. The gap observed on prevalence of wasting from uneducated mothers or those with a primary education compared to those with a secondary and post-secondary education, remains high. Education could make a difference by empowering the mother's decision on the type of nutrition. The small number of mothers who were engaged in formal employment (5%) could be explained by the fact that maternal education levels were quite low with only 15% of the mothers having attained secondary and post-secondary education. This low level of education could explain why 40% of mothers in the study are housewives. There was no significant association between maternal employment and nutritional status of children. Although there were no significant association between nutritional status among the study children and paternal age, the prevalence of wasting was higher among children of older fathers over 35 years than the younger fathers. This can be attributed probably to large household size since the older fathers also had more children than the younger ones because of high productivity rate as partners continue to live together. Hence the children have to share food with other household members and this reduces the quantity and quality of food therefore access. The proportion of fathers who were not gainfully employed (29%) and the low proportion of fathers who had formal employment (5%)

could be explained by the fact that the study population was residing upcountry, which is a rural area with fewer job opportunities. The youngest children in the study were more wasted in the study. Children aged 24-35 months were at a higher risk of wasting compared to children in other age groups. This is contrary to KDHS 2008/09 findings that wasting is highest (11%) in children aged 6-8 months and lowest (4%) in children aged 36-47 months (7). More boys than girls were suffering from wasting and the prevalence of wasting was higher among boys than girls. These findings can be accounted for through physiological reasons. Physiologically, girls grow more precociously than boys. Some studies show that girls are genetically more robust than boys. There is also some evidence that there is an increment of fat in preparation for the growth spurt. The increase of fat is greater for girls than boys.

Conclusion:

In conclusion, the prevalence of severe wasting was 14.2% and 18.4% for moderate wasting which was higher than that of a similar study done in Kitale County among household farm laborers which showed that 10% were wasted. The top five illnesses responsible for children's admissions were malaria, respiratory tract infections, anemia, malnutrition, diarrhea and vomiting. Malaria was the highest cause of morbidity among the study children and was significantly found to be associated with the nutritional status of the children. The overall diet quality was inadequate. This could be due to inadequate budget for patient food and low priority for nutrition as part of medical treatment and failure to adhere to the hospital menu.

Recommendation:

The hospital should select a quality assurance team consisting of a clinician, nurse and a nutritionist to actively participate in identification and management of children with wasting admitted in the facility and the trained medical

staffs should be involved in sensitizing the population on basis of IMCI.

All children aged 6-60 months admitted should be provided with the recommended tototo diet. Feeding frequency should also be increased in line with guidelines for feeding sick children. The ministry of health should deploy more qualified nutrition personnel to this facility who will be involved in taking anthropometric measurements for the children on admission, regularly after admission and upon discharge from the hospital to enable them capture malnourished children in the hospital. Qualified nutrition personnel should also be involved in supervising food preparation and services in the kitchen and ensure that the hospital menu is adhered to strictly. There is need for further studies among the same population looking at the quantitative aspect of the children's diet.

Acknowledgements:

To Dr. Joseph Kutto for incredible assistance in study methodology, analysis and reading this work, I extend my gratitude to the entire Kitale County Referral Hospital staff and management team and also the caregivers in the pediatric ward for their cooperation and support during the data collection exercise.

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