

Factors Associated With Malnutrition among Children Under Five Years of Age at Level IV Hospital in Kiambu County, Central Kenya

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Abstract

Introduction

Malnutrition is a notable contributor of child morbidity and mortality hence affecting the socioeconomic development of the family unit. Children under five years of age health is a great indicator of a country's economic and health status

AIM: To assess the factors associated with malnutrition among children less than five years in Tigoni Hospital, Kiambu County in Central Kenya

Study design: Descriptive cross sectional study design was used

Place and duration of the study: The study was conducted in Tigoni sub-county Hospital, Kiambu County, Kenya during the months of January to May 2019.

Methodology: Systematic random sampling method was used and data collected through face to face interviews guided by a self-administered structured questionnaire and anthropometric measurements of weight, height and MUAC. Data was analyzed quantitatively using SPSS and presented using figures, tables, graphs and pie charts. P value of <0.05 was considered statistically significant.

Results: The study showed that the prevalence of malnutrition was at 33.3%. Wasting was the most prevalent type of malnutrition at 15.8%. The research results revealed that malnutrition was high (58%) in children under one year of age

Conclusion: Malnutrition was found to be of high prevalence in this age group. Proper feeding programs and deworming medical education need to be done to parents and caregivers of children less than five years to reduce these cases of children malnutrition.

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I. Introduction

Malnutrition is the deficiency, excess or imbalance in ones intake of nutrients (Gudu et al., 2020). It encompasses two classes that is undernutrition (stunting, wasting, and underweight) and over nutrition (overweight and obesity).The health of children under five years of age is a great indicator of a country's economic and health status (Mkhize & Sibanda, 2020)

Globally, it is approximately that 151 million, 101 million, 51 million, 38 million children below 5 years of age were stunted, underweight, wasted and overweight respectively with this burden higher in developing countries especially in Africa with exception of overweight (Unicef, 2018). Malnutrition is the major cause of mortality in under five children and is estimated to cause 3.1 million child deaths annually with 35% of these deaths being in children under five years of age (De Vita et al., 2019). This makes malnutrition a great public health concern globally. In Kenya, 26%, 4% and 11% of under-fives were stunted, wasted and underweight respectively (KDHS, 2014).

There has been efforts to deal with malnutrition in Kiambu county but despite these efforts the rates of malnutrition remains high in the county (Wabwoba & Wakhungu, 2013).

II. Methods And Materials

2.1 Study setting

The study was carried out in Tigoni sub-county hospital MCH which is located in Limuru sub –county, Kiambu County.Tigoni sub-county hospital. The hospital has a catchment population of 23,984.

2.2 Study design, sampling technique and sample size

The study adopted a descriptive cross-sectional study design. The study had a sample size of 114 children. Systematic random sampling technique was used.

2.3 Data collection tools

Data collection was done by use of self-administered structured questionnaire and anthropometric measurements of weight, height and MUAC.

Weighing was done using seca® 384 Digital Baby Scale. The procedure was performed three times and the mean recorded as the weight of the child. Height was measured using a portable wooden audiometer. Mid upper arm circumference was measured using a MUAC tape that is color coded with red/yellow/green. The circumference was recorded to the nearest 0.1centimeter (millimeter). The measurements were taken twice and the average of the two readings recorded as the mid upper arm circumference.

2.4 Data analysis

Data collected in the study was sorted, coded and entered in a computer using SPSS Study findings are presented using figures, tables, pie-charts and graphs.

2.5 Ethical consideration

Ethical approval was sought from Kenyatta National Hospital/University of Nairobi Ethics and Research Committee (approval number...UP898/12/2018). A research permit was also obtained from the National Commission for Science, Technology and Innovation(NACOSTI REF NO...NACOSTI/P/19/).Permission to carry out the study was sought from the Limuru sub- County Director of Health and Tigoni sub- County Health Executive Committee. Consent was sought from the parent(s) or guardian(s) to allow the mother/guardian-child pair to participate in the study. Participation was voluntary.

III. Results

3.1 DEMOGRAPHIC CHARACTERISTICS OF CHILDREN INCLUDED IN THE STUDY

Data was collected from a total of 114 children through interviews with their caregivers. The mean age of children in the study was 58 weeks. 49% of the sample constituted children <48 weeks, 29% 48-92 weeks, 14% 93-140 weeks and 8% 140 – 240 weeks

3.2 FACTORS ASSOCIATED WITH MULNUTRITION

Table 1: Immunization and breastfeeding practices

Characteristics	Total	Maln n (%)	Normal n (%)	P-value	Statistic
Child fed before initiating breastfeeding					
Yes	9(8.8)	3(33.3)	6(66.7)	0.442	Chi=0.239,df=1
No	93(91.2)	24(25.8)	69(74.2)		
Time of initiating breastfeeding					
<30 Min	57(50.4)	16(28.1)	41(71.9)	0.547	Chi=2.127,df=3
30 Min- <1hr	25(25)	9(36)	16(64)		
1hr- 6hrs	18(18)	4(22.2)	14(77.8)		
>6hrs	13(11.5)	2(15.4)	11(84.6)		
No. times child is fed					
2-3 times	20(18)	7(35)	13(65)	0.620	Chi=0.955,df=2
3-4 times	37(33.3)	11(29.7)	26(70.3)		
>4 times	54(48.7)	13(24.1)	41(75.9)		
Who feeds the child					
Parent	92(82.9)	22(23.9)	70(76.1)	0.149	Chi=5.338,df=3
Self	8(7.2)	4(50)	4(50)		
Caretaker	10(9.9)	3(30)	7(70)		
Child ever Immunized					
Yes	107(95.5)	30(28)	77(72)	0.203	Chi=1.915,df=1
No	5(4.5)	0(0)	5(100)		
Last time immunized					

Factors Associated With Malnutrition Among Children Under Five Years Of Age At Level Iv ..

<3 months	44(40)	18(40.9)	26(59.1)	0.03*	Chi=7.009,df=2
3-6 months	24(21.8)	5(20.8)	19(79.2)		
>6 months	42(38.2)	7(16.7)	35(83.3)		
Measles vaccine					
Yes	71(63.4)	19(26.8)	52(73.2)	0.47	Chi=0.82,df=1
No	41(36.6)	12(29.3)	29(70.7)		
Vitamin A					
Yes	76(61.9)	21(27.6)	55(72.4)	0.547	Chi=0.016,df=1
No	34(38.1)	9(26.5)	25(73.5)		
Iron Supplements					
Yes	21(19.1)	7(33.3)	14(66.7)	0.369	Chi=0.34,df=1
No	89(80.9)	24(27)	65(73)		
Foods not allowed to eat					
Yes	8(7.3)	2(25)	6(75)	0.640	Chi=0.011,df=1
No	101(92.7)	27(26.7)	74(73.3)		
Age at complementary feeding					
<6 months	34(30.4)	7(20.6)	27(79.4)	0.230	Chi=0.956,df=1
>=6 months	78(69.6)	23(29.5)	55(70.5)		

3.3 Last time of immunization

The last time child was immunized was categorized into three categories; less than three months, three to six months and more than six months. A greater percentage of children reported having been immunized in less than three months prior to the interview (40%), 38% were immunized last more than six months prior to the date of interview and those who had been immunized between three to six months constituted 22%. Children who had been immunized in less than three months had the highest prevalence of malnutrition at 41%, followed by those immunized in three to six months 21% and greater than six months were 17%. Further analysis revealed a significant association with malnutrition with $p < 0.05$, p -value 0.03* (chi=7.009, df=2).

Table 2: Housing and household characteristics

The table below gives a summary of results from analysis of housing and household characteristics with malnutrition status in Tigoni.

Characteristics	Total	Maln n (%)	Normal n (%)	P-value	Statistic
Type of Roofing					
Iron Sheets	102(89.5)	28(27.5)	74(72.5)	0.350	Chi=3.28,df=3
Grass Thatched	1(0.9)	1(100)	0(0)		
Tiles	7(6.1)	1(14.3)	6(85.7)		
Tiles Cardboard	4(3.5)	1(25)	3(75)		
Type of walls					
Mud	2(1.8)	2(100)	0(0.0)	0.036*	Chi=10.281,df=4
Bricks	63(55.3)	12(19)	51(81.0)		
Timber	21(18.4)	7(33.3)	14(66.7)		
Iron	26(22.8)	10(38.5)	16(61.5)		
Other	2(1.8)	0(0)	2(100)		
Type of Floor					
Earth	5(4.4)	5(100)	0(0.0)	0.001*	Chi=14.888,df=2
Cemented	106(93)	26(24.5)	80(75.5)		
Tiles	3(2.6)	0(0)	3(100)		

Own Land					
Yes	32(28.8)	11(34.4)	21(65.6)	0.190	Chi=1.231,df=1
No	79(71.2)	19(24.1)	60(75.9)		
Source of Water					
Community tap	91(79.8)	24(26.4)	67(73.6)	0.685	Chi=1.488,df=3
Stream	2(1.8)	0(0)	2(100)		
Borehole	19(16.7)	6(31.6)	13(68.4)		
Other	2(1.8)	1(50)	1(50)		
Type of Toilet					
Pit Latrine	81(71.1)	21(25.9)	60(74.1)	0.398	Chi=0.227,df=1
Flash Toilet	33(28.9)	10(30.3)	23(69.7)		
No. of Rooms					
Single	79(79.8)	21(26.6)	58(73.4)	0.479	Chi=0.094,df=1
Multiple	20(20.2)	6(30)	14(70)		
No of people living in the house					
<4 People	45(39.5)	10(22.2)	35(77.8)	0.228	Chi=0.928,df=1
>=4 People	69(60.5)	21(30.4)	48(69.6)		
No. of children <5 years old					
<=2 Children	108(94.7)	30(27.8)	78(72.2)	0.479	Chi=0.354,df=1
>2 Children	6(5.3)	1(16.7)	5(83.3)		
Source of food					
Bought	96(84.2)	25(26)	71(74)	0.354	Chi=0.407,df=1
Home grown	18(15.8)	6(33.3)	12(66.7)		

3.3 Type of walls

Results from this study showed that more than half (55%) of the children lived in homes with brick walls, 23% in iron walls, 18% in homes made of timber walls while 2% in homes made of mud walls and 2% in other types of walls. The prevalence of malnutrition was 39%, 33% and 19% among children who lived in homes made of iron sheets, timber and brick walls respectively. Further analysis revealed a significant association between type of wall and child malnutrition ($p < 0.05$, p -value 0.036 ($\chi^2 = 10.281$, $df = 4$)).

3.4 Type of Floor

A greater percentage 93% of children lived in homes with cemented floors, only 3% from homes with tiled floor and 4% in homes with earth floor. All the children who lived in homes with earth floor were malnourished and among those who lived in homes with cemented floors, 25% suffered child malnutrition. None of the children living in tiled floor houses suffered malnutrition. Further analysis revealed a significant association between type of floor and malnutrition ($p < 0.05$, p -value 0.001 ($\chi^2 = 14.888$, $df = 2$)).

3.5 Multiple Logistic Regression

A multivariable logistic regression was fitted to examine c factors associated with child malnutrition at Tigoni hospital. Only the variables that were significant with the chi square test of association were included in the model. The variables included; type of walls, type of floor, last time since immunization and the intervening variables (Diarrhea and Rti). The dependent variable was malnutrition coded as 0= not malnourished and 1= malnourished.

The model is given as follows;

$$\ln \left(\frac{Y_i}{1 - Y_i} \right) = \beta_0 + \beta_1 \text{type of floor} + \beta_2 \text{Type of walls} + \beta_3 \text{Last time since immunization} + \beta_4 \text{Diarrhea} + \beta_5 \text{RTI}$$

The table below gives a summary of results from the logistic regression;

Table 3: Multiple Logistic regression

	OR	Lower Limit	Upper Limit	p-value
Type of Walls				
Mud	Ref			
Bricks	0.363	0.112	1.176	0.091
Timber	0.493	0.107	2.277	0.0366*
Iron	1			
Other	1			
Last Time Immunized				
<3 Months	Ref			
3-6 Months	0.392	0.113	1.362	0.141
>6 Months	0.169	0.046	0.630	0.008
Child had diarrhea				
Yes	Ref			
No	0.315	0.081	1.226	0.096
Child had RTI				
Yes	Ref			
No	0.914	0.287	2.911	0.879

After adjusting for the effects of the intervening variables and time since last immunization, children living in houses with timber walls were 51% (OR=0.493; 95%ci [0.107; 2.277]) less likely to be malnourished compared to those who lived in houses made of mud walls. Children who lived in houses made of brick walls were 64% (OR=0.36; 95% CI[0.112; 1.176]) less likely to be malnourished compared to children living in houses made of mud walls.

Having adjusted for the intervening variables and type of walls, children who had been immunized more than six months prior to the date of interview were 83% (OR=0.169; 95% CI[0.046;0.630]) less likely to be malnourished compared to those who had been immunized less than three months to the time of survey. Children who were immunized within three to six months prior to the interview were 61% (OR=0.392; 95%CI [0.113; 1.362]) less likely to be malnourished compared to those who had been immunized in less than three months.

3.5 NUTRITIONAL STATUS

Table 4: Nutritional Status of children between 2-208 weeks old in Tigonj

Nutrition Indicator	Nutritional Status	Frequency, n (%)
Weight for Height (WH)(BMI for Age)- Wasting	Not Wasted(0 to <-1SD)	96(84.2%)
	Wasted(<-2SD)	18(15.8%)
Weight for Age (WA)	Underweight (<-2 SD)	7(6.1%)
	Normal (<-1 SD)	97(85.1%)
	Overweight (>2 SD)	10(8.8%)
Height for Age (HA)	Not Stunted (>0 to <-1SD)	109(95.6%)
	Stunted (<-2SD)	3(2.6%)
MUAC (Mid Upper Arm Circumference)- Wasting	Not Malnourished (>13.5 cm)	37(32.5%)
	Malnourished(<=13.5 cm)	77(67.5%)

Weight for Height, weight for age and height for age nutrition indicators were used to classify children as either being malnourished or not malnourished. Out of the 114 participants in the study, a total of 83 participants were classified as not being malnourished while 31 were malnourished.

IV. Discussion, Conclusion And Recommendations

4.1 DISCUSSION

Malnutrition remains a challenge in health among children under five years specifically in developing and low income countries. The consequences of malnutrition among under-five can have lasting negative impacts to child's health and development (Stratton, 2007).

The overall prevalence of child malnutrition in Tigoni area was 33.3% which was approximately half the global prevalence which was 57% reported by the (UNICEF-WHO-World Bank Joint Child Malnutrition, 2012). The nutrition indicators used in this study included; weight for height, weight for age, muac and height for age.

The most common type of malnutrition status in Tigoni area was wasting at a prevalence of 15.8%, followed by underweight at 14.9%, overweight 8.8% and stunting 2.6%. This results contrasted with data for Kiambu County as reported by(KDHS ,2014) whereby stunting was the most common form of malnutrition at a prevalence of 15.7%,followed by underweight at 5.1%.The extremely cold weather of Tigoni area,predisposes the children under five years to infections like pneumonia and these interferes with their feeding thus wasting.

Results from this study also revealed that the prevalence of malnutrition was high among children under 48 weeks (1 year) old 58% compared to children above one year 42%. This is dissimilar to a study by Abel Gebre et al.(2019) in Northeast Ethiopia which revealed that malnutrition was high among children above one year.

Most of the socio demographic, socio economic, feeding practices, immunization and housing factors were not significantly associated with malnutrition among children in Tigoni despite the prevalence analyses across the groups yielding useful information on the state of malnutrition. The results of this study contrasted a study done in Bangladesh which stated that socio demographic and socio-economic factors were significantly associated with child malnutrition (BDHS, 2014).

Type of walls($p < 0.05$, p -value 0.036, χ^2 10.281, $df=4$), last time since immunization with ($p < 0.05$ ($\chi^2=7.009$, $df=2$) and type of floor($p < 0.05$, p -value 0.001, $\chi^2=14.888$, $df=2$) were significantly associated with malnutrition, however, the multivariable analysis showed that the association was weak for these factors except for time since last immunization.

4.2 CONCLUSION

The findings of the study indicated that malnutrition is still an important major public health problem among children under five years age in Tigoni area. The prevalence of malnutrition was slightly high in this region (33.3%). Type of floors, type of walls and time since last immunization

had significantly affected malnutrition status of children even after adjusting for the intervening variables; diarrhoea and upper respiratory tract infection. Moreover, study also revealed that children under the age of 48 weeks (1 year) were the most affected by either form of malnutrition by 32.1%.

4.3 RECOMMENDATIONS

- i. Further research to determine factors associated with malnutrition among children under one year.
- ii. Government authorities to design nutrition therapy focusing more on children under one year.
- iii. Policy makers to aid in planning and budgeting for the nutritional needs of children which would lead to improving solutions.
- iv. Come up with a sensitization strategy in Kiambu county on the importance of immunization within the first three months of life.

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4.5 CONFLICT OF INTEREST

The authors have no conflict of interest.

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