INCREASE IN UNDERNUTRITION AMONG CHILDREN AGED 6-59 MONTHS IN KAMORIONGO VILLAGE, NANDI COUNTY, KENYA

Nabie, M. M, Onyango, D. A. O, & Wakoli, A. B.
University of Eastern Africa Baraton, **KENYA**

ABSTRACT

Malnutrition affects a large proportion of children aged 6-59 months in the developing world. It can manifest itself as either undernutrition or overnutrition. Undernutrition encompasses wasting, underweight and stunting. There has been a notable increase in undernutrition levels over the years in Nandi County. This study sought to determine the factors associated with increase in undernutrition among children aged 6-59 months in Kamoriongo village, Nandi County. The study was a descriptive cross-sectional study. One hundred and one children aged between 6-59 months were purposively selected to participate in the study. Data were collected using a semi-structured questionnaire to elicit information on socio-demographic characteristics and other factors. Anthropometric measurements were determined based on World Health Organization (WHO) standard produces. Food frequency questionnaire was used to collect information on food consumption. An analysis of anthropometric data was done using Emergency Nutrition Assessment (ENA) software to determine the Z-score values. Chi-square was used to determine relationships between the variables at a significance level of 0.05. According to the study, the prevalence of wasting was 15.2%, stunting 39.4% and underweight 47.5%. Factors associated with undernutrition were found to be: mother's level of education, introduction of complementary feeding, child's intake of fruits, vegetables, milk, eggs and meat.

Key Words: Undernutrition, Stunting, Wasting, Underweight, Kamoriongo.

INTRODUCTION
Background Information

Malnutrition affects a large proportion of children aged 6-59 months in the developing world (Friedman, *et al*., 2005). It can manifest itself as either undernutrition or overnutrition. According to the United Nations Children's Emergency Fund (UNICEF, 2009), socio-economic status, gender and culture contribute mostly to undernutritional cases in African countries and mostly sub-Saharan areas.

Undernutrition encompasses stunting, wasting, and deficiencies of essential vitamins and minerals (collectively referred to as micronutrients). Stunting or growth retardation or chronic protein-energy malnutrition (PEM) is deficiency for calories and protein available to the body tissues and it is inadequate intake of food over a long period of time, or persistent and recurrent ill-health. This height-for-age index (stunting) is less sensitive to temporary food shortages and thus seems to be considered as the most reliable indicator. Because studies have shown that wasting is volatile over seasons and periods of sickness and underweight shows seasonal weight recovery and being overweight for some children can also affect weight-for-age index (World Bank, 2009).

Wasting or acute protein-energy malnutrition captures the failure to receive adequate nutrition during the period immediately before the survey, resulting from recent episodes of illness and diarrhea in particular or from acute food shortage. Underweight status is a

composite of the two preceding ones, and can be due to either chronic, acute malnutrition or PEM (World Bank, 2009).

An analysis by Masibo and Makokha (2012) of undernutrition over the years showed an upward trend in Nandi County such that in 2000, stunting level was at 38%, in 2002 44% and 2006 51%. Although various studies have been carried out on undernutrition and its associated factors, little has been done to establish the leading cause of increase in undernutrition levels. Therefore, this study attempted to find out factors that are associated with the increase in undernutrition in Kamoriongo village, Nandi County.

METHODOLOGY

A descriptive cross-sectional study was used to determine the relationship between the variables in this study. The study was conducted in Kamoriongo Village, Nandi County, Kenya. The study population consisted of children aged 6-59 months. The table for determining sample size from a given population by Krejcie, *et al*. (1970) was used to determine the sample size at 95% confidence level and 0.05 level of precision. A sample of 101 children was utilized for this study. Purposive sampling was used to obtain the 101 children.

Semi structured questionnaires were used to collect data from the respondents such as demographic data of the households, child's birth-weight, breastfeeding patterns and duration, type and frequency of food intake, especially protein-energy rich foods and diseases. Anthropometric measurements for the children were determined according to World Health Organization (WHO) standard procedures. They included age (in months), weight (in kilograms), height (in centimeters) and mid-upper arm circumference (in centimeters). A food frequency questionnaire (FFQ) was used to find out how often food items were consumed by the child. A pilot study was carried out to pretest the data collection tools and methods in Kimondi Village, Nandi County, before actual data collection. Adjustments were done accordingly.

Statistical package for social sciences (SPSS) version 19 was used for data analysis. Descriptive statistics entailed use of proportions. Chi-square test was used to determine the relationship between undernutrition (dependent variable) and various factors (independent variables). AN analysis of anthropometric nutritional data was done using Emergency Nutrition Assessment (ENA) software to generate the Z-score values for height-for-age Z-scores (HAZ), weight-for-age Z-score (WAZ) and weight-for-height/length Z-score (WH/LZ). The cut-off of <-2SD based on WHO recommendations was used to determine undernutrition.

Approval from the Research Ethics Committee (REC) of the University of Eastern Africa, Baraton was obtained before conducting the study. Further permission to conduct the study was sought from the chief of Kamoriongo village. Informed consent was sought from the respondents prior to collecting data. Respondents were informed that their participation was voluntary. Confidentiality was ensured by maintaining participants' anonymity.

RESULTS
Socio-demographic Information

Table 1 shows the socio-demographic profile of the respondents.

Table 1: Socio-demographic characteristics

Characteristics	Percent (%)
Age of respondents	
<20 years	3
20-24 years	20
25-29 years	39
30-34 years	30
>35 years	8
Marital status	
Single	12
Married	88
Number of children 59 months and below	
1 child	21
2 children	2
3 children	3
Religious affiliation	
Protestant	50
Seventh-day Adventist	22
Catholic	28
Level of education	
Primary	86
Secondary	12
Tertiary	2
Occupation	
Student	2
Peasant farmer	47
Business	7
Housewife	43
Family monthly income	
<KES 5000	83
KES 5001 – 10,000	9
KES 10,001 – 15,000	8

*KES – Kenya Shillings

Age And Sex Of Studied Children

Table 2 gives the distribution of age and sex of the children under study.

Table 2: Distribution of age and sex of children (n = 99)

Age	Boys		Girls		Total	
	Number	%	Number	%	Number	%
6-17 months	6	61	5	5.1	11	11.1
18-29 months	21	21.2	13	13.1	34	34.3
30-41 months	8	8.1	7	7.1	17	17.2
42-53 months	10	10.1	11	11.1	20	20.2
54-59 months	8	8.1	7	7.1	17	17.2

Prevalence of Undernutrition

The prevalence of undernutrition was based on the three indicators namely weight-for-age (indicating underweight), height-for-age (indicating stunting), and weight-for-height/length (indicating wasting). Of the studied children, close to a half (47.5%) were underweight, over a third (39.4%) stunted and 15.2% wasted.

Table 3: Undernutrition levels of the studied children

Indicator	<-2 Z-score		=>-2 Z-score	
	Number	Percent	Number	Percent
Underweight	47	47.5	52	52.5
Stunting	39	39.4	60	60.6
Wasting	15	15.2	84	84.8

Exclusive Breastfeeding Practice

From the findings it was reported that 39% of mothers exclusively breastfed their children for 6 months, 37% did it for 3 months and 24% for 2 months.
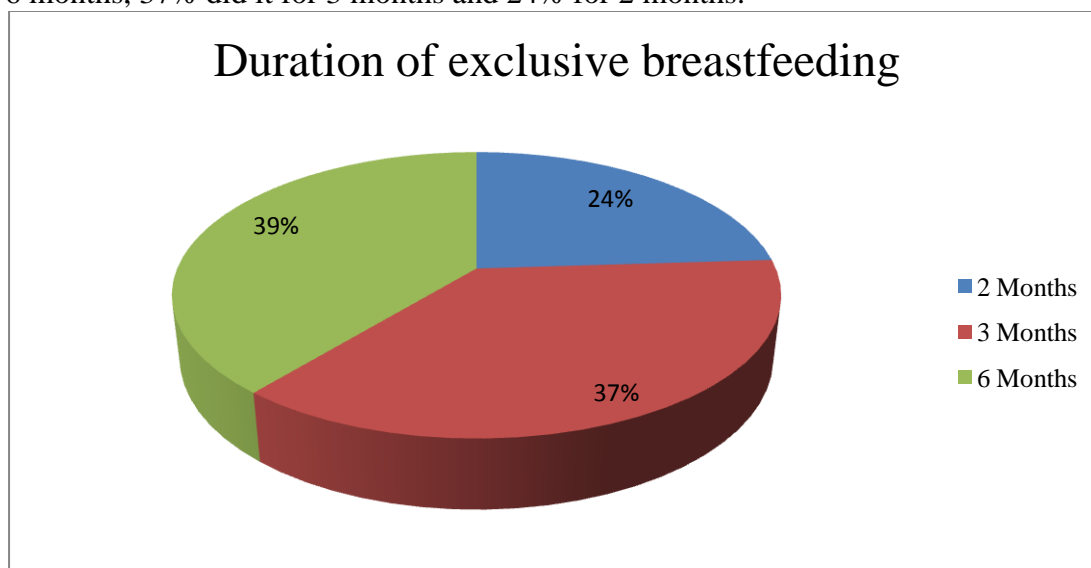

Figure 1: Duration of exclusive breastfeeding

It was found that during the introduction of complementary feeding, the foods that were introduced to the child by their mothers included: mashed potatoes and bananas, Weetabix, porridge, mashed beans with soup and finally mashed paw-paw and avocado among other fruits (Figure 2).
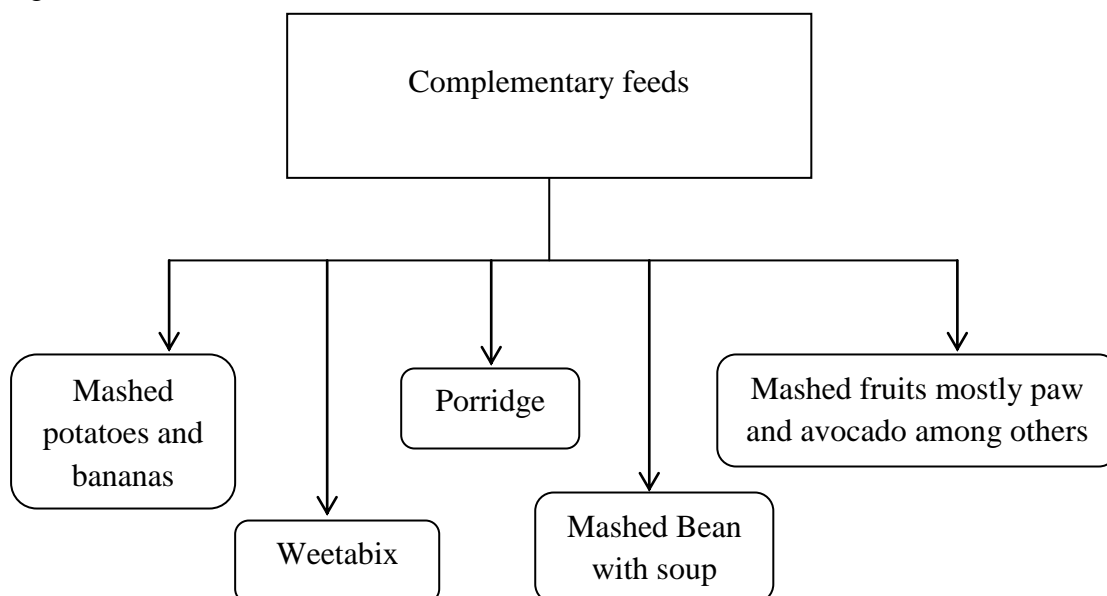

Figure 2: Foods that were started on complementary feeding

Child's Food Intake

Table 4 shows common foods that children under study took on a daily basis which included fruits, vegetables, and milk and milk products.

Table 4: Daily food intake for studied children

Food	None(%)	Once(%)	Twice(%)	Thrice(%)
Fruits	3	39	42	16
Vegetables	11	30	49	10
Milk and milk products	7	40	44	9

Table 5 shows weekly consumption of beans and other legumes, eggs, and meat among the studied children.

Table 5: Weekly food intake for studied children

Food times(%)	None(%)	Once(%)	Twice(%)	Thrice(%)	=>4
Beans and other legumes	11	9	20	31	29
Eggs	89	9	2	--	--
Meat	87	11	2	--	--

Common Diseases

Table 6 below shows the prevalence of the common diseases among 6-59 months children in the previous 6 months.

Table 6: Common diseases in the previous 6 months

Disease	Yes	No	Number of occurrences	
			<times	> times
Malaria	38	62	29	4
Diarrhea	45	55	39	6
Typhoid	22	78	14	4

Factors Associated With Undernutrition

Table 7 shows the relationships that were found between several factors and undernutrition.

Table 7: Factors associated with undernutrition

Variable	x^2-value	p-value
Mother's level of education	9.612	0.047
Introduction of complementary feeding	159.564	0.000
Child suffered from malaria	6.842	0.033
Child suffered from typhoid	8.421	0.015
Child's fruit intake	6.086	0.048
Child's vegetable intake	13.435	0.037
Child's milk intake	25.051	0.000
Child's egg intake	23.512	0.001
Child's meat intake	19.332	0.001
Child's beans & other legume's intake	13.704	0.090

There was a significant ($p<0.05$) association between undernutrition with the mother's level of education, introduction of complementary feeding, common diseases that the child experienced 6 months prior to the study and child's food intake of fruits, vegetables, milk,

eggs, and meat. However, child's intake of beans and other legumes was not associated with undernutrition.

DISCUSSION

Most mothers in Kamoriongo Village, Nandi County are farmers (47%) and housewives (43%) with only 7% as business persons and 3% as students. The monthly income of most of them is 83% earning KES. 5000 or less, 9% had an income of between KES. 5,000 and KES. 10,000 and 8% reported earning from KES. 10,000 to KES. 15,000. This indicates some level of poverty in the village. This is in line with United Nations Children's Emergency Fund (UNICEF, 2009), which states that "Socio-economic status, gender and culture contributes mostly to under nutritional cases in African countries and mostly Sub-Saharan areas." Also according to UNICEF, (2009) 30-40% of under nutrition cases affects the poor. It states that unemployment and low wages are presenting factors that lead to families eating cheaper food, which is less nutritious leading to weight loss and malnutrition. This could therefore be a reason for the increasing undernutrition rates in Kamoriongo Village, Nandi County, Kenya.
A mother is the principal provider of the primary care that her child needs during the first six months of its life. The type of care she provides influences a child's health. From the study findings only 39% of mothers exclusively breastfed their children for six months. Further, introduction of complementary feeding was found to be significantly associated with undernutrition. These results agree with Burchi, Fanzo and Frison's study (2011) which found that lack of adequate breastfeeding leads to malnutrition in infants and young children. From the study findings, there was no variety in consumption of foods among the studied children in the study area. These findings agree with Burchi, Fanzo, Frison's (2011) study which stated that deriving too much of one's diet from a single source, such as eating almost exclusively corn or rice, can cause malnutrition. This may either be attributed to lack of education on proper nutrition or from only having access to a single food source.

The study showed a significant relationship between Undernutrition and common diseases: malaria, typhoid and diarrhea. This agrees with a study by El. Badry and Mahgoub (2006) that in developing countries, infectious diseases, such as diarrheal diseases (DD) and acute respiratory infections (ARI) are responsible for most nutrition-related health problems. Mandell *et al*., (2010) also mentioned that diarrhea and other infections can cause malnutrition through decreased nutrient absorption, decreased intake of food, increased metabolic requirements, and direct nutrient loss.

CONCLUSION

In conclusion, the prevalence of undernutrition in Kamoriongo village, Nandi County is high with underweight standing at 47.5%, stunting 39.4%, and wasting 15.2%. The factors found to be associated with undernutrition include: mother's level of education, introduction of complementary feeding, common diseases that children suffered prior to the study, child's intake of fruits, vegetables, milk, eggs, and meat which was affected by the poverty rate.

REFERENCES

Burchi F, Fanzo J, Frison E (February 2011). "The role of food and nutrition system approaches in tackling hidden hunger".*Int J Environ Res Public Health;* 8 (2): 358–73.

El-Badry, A.A. and Mahgoub, A.M. (2006). Parasitic diarrhea in hospitalized children: Community or hospital-acquired. *Egypt J. Med. Sci.,* 27:955-962.

Friedman JF, Kwena A, Mirel LB, Kariuki SK, Terlouw DJ, Phillips-Howard PA, Hawley WA, Nahlen BL, Ya Ping Shi and FO TerKuile (2005). Risk factors for Protein-Energy Malnutrition among young children in an area of intense perennial malaria transmission in Western Kenya: Results of cross sectional survey. *American Journal of Tropical Medicine*; 73(4): 698-704.

Krejcie, Robert V.; Morgan, Daryle W. (1970). Determining Sample Size for Research Activities. *EducPsycholMeas*, 30, 3, 607-10, Aut '70

Mandell, Doughlas, and Bennett (2010). Principles and Practice of Infectious Diseases 7th Edition. Philadelphia, PA: Churchil.

Masibo PK, Makoka D, (Jun 14, 2012). Trends and determinants of undernutrition among young Kenyan children: Kenya Demographic and Health Survey; 1993, 1998, 2003 and 2008-2009.

World Bank: *World Development Indicators 2009*. Washington DC: the World Bank; 2009.

UNICEF: Young Child Survival and Development, Ysenburg, 2009.

Livingstone/Elsevier.pp. Chp 93.