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NUTRITIONAL STATUS OF CHILDREN AGED 6 T0 59 MONTHS IN COMMUNITY BASED EDUCATION AND SERVICE CENTRES (COBES) IN WESTERN KENYA

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ABSTRACT

Protein-energy malnutrition remains a major global problem. In Kenya, the prevalence of stunting and underweight has remained stable for over a decade. In Western Kenya the prevalence has remained at 30% stunting, 20% underweight and 6% wasting. Community Based Education and Service (COBES) centres are annually used by Moi University College of Health Sciences for community diagnosis of various health problems including malnutrition. The objective was to determine the prevalence of malnutrition in children aged 5 to 59 months in selected COBES health centres in Western Kenya. Cross-sectional studies were carried out between March and May 2008 in 7 out of 15 COBES centres in Western Kenya. Cluster sampling technique was used with each health centre as the sampling unit. Anthropometric measurements were performed on all children aged 6-59 months within the households sampled. The sample size depended on the number of cases seen in the households within the period of study. A total of 70 households per Health Centre were sampled. Any child between 6 months and 59 months of age in each household was sampled for nutritional status assessment. Anthropometric measurements were done on a total of approximately 700 children in the seven Health Centres: (Stunting-HAZ<-2, Wasting-WHZ <-2, underweight –WAZ<-2 and MUAC, < 12.5mm). The nutritional status of the children was determined using the WHO recommended Z-score values as well as the Kenya Government Ministry of Health recommended charts based on anthropometric measurements . Analysis of the data was carried out using Epi-info 2000 computer software. Meteitei showed the highest malnutrition prevalence (53% HAZ, 15% WHZ, 27% WAZ and 18.1 MUAC) whereas Chulaimbo showed the lowest prevalence (7% HAZ, 3% WAZ). The other centres showed mixed prevalence. The reason for high prevalence in Meteitei could not be immediately ascertained but one of the possibilities could be dependence on tea and sugarcane as major cash crops at the expense of food crops. Prevalence of malnutrition in Chulaimbo was the lowest probably due to mixed farming practised in the area or successful health education in the population. The nutritional status of the children studied was within the normal range in the rest of the Centres.

Key words: Nutritional Status, COBES, Western Kenya

INTRODUCTION

Protein-energy Malnutrition (PEM) affects a large proportion of children under the age of 5 years in the developing world [1]. The prevalence of PEM varies greatly from region to the other: Two Global sub-regions of Eastern and Western Africa show significant increases in prevalence unlike South Asia which shows a slow drop in undernutrition by half by the year 2000 [2,3,4]. World Health Organization (WHO) has estimated that 32.5% of all pre-school children under 5 years of age are malnourished [5, 6]. Globally, Kenya was ranked 47 out of 144 countries for PEM based on Height for Age (Stunting) by the year 2003 [1]. In sub-Saharan Africa, the prevalence stands at 55.2% [1]. In Kenya, the prevalence stands at 30% stunting [7], while in Western Kenya it is at 30% stunting, 20% underweight and 5% wasting [8]. With the above background on malnutrition state, it was thought appropriate to assess the malnutrition status amongst many other parameters, in areas used for the Community Based Education and Service programme as a suitable framework for the assessment. Community Based Education and Service (COBES) is the training of health professionals at the Moi University, College of Health Sciences in the community. It is a College -wide activity that involves all of College members (Staff and students) [9,10,11]. It incorporates theory, Clinical and Field activities. It is carried out from the first year of study to the fifth year for Degree of Bachelor of Medicine and Surgery (MBChB) programme and first year to fourth year for the BSc Nursing and Bachelor of Dental Surgery Programmes. In the second year of study, COBES incorporates community diagnosis where a number of health problems in the community are diagnosed including nutritional status of children under five years of age. A total of 21 Health centres were initially identified for COBES 2 placement, namely: Chulaimbo, Kabuchai Makunga, Matayos, Mbale, Miteitei and Mosoriot, [Map 1]. Due to logistical reasons, not all of them are used at once for each year. Only some are selected for COBES 2 placement. In this study only 7 centres that are representative of all the centres were randomly selected for use for assessment of nutritional status.

No documented data on nutritional status is available from these areas of COBES placement. In addition, nutritional status varies from one year to another due to changing climatic conditions that oscillate between floods to severe drought. The present study, therefore, specifically looked at prevalence of malnutrition in COBES health centres. This kind of work has been carried out on annual basis but not comprehensively documented.

Based on this, information, the prevalence of malnutrition was determined in COBES centres in Western.

Objectives

The broad objective of the study was to determine the nutritional status of children in selected representative Health Centres where Moi University students go for COBES placement during their second year of study for community diagnosis fieldwork. The specific objectives were to determine the nutritional status of underfives in selected COBES Centres and to determine the prevalence of malnutrition in the selected Centres.

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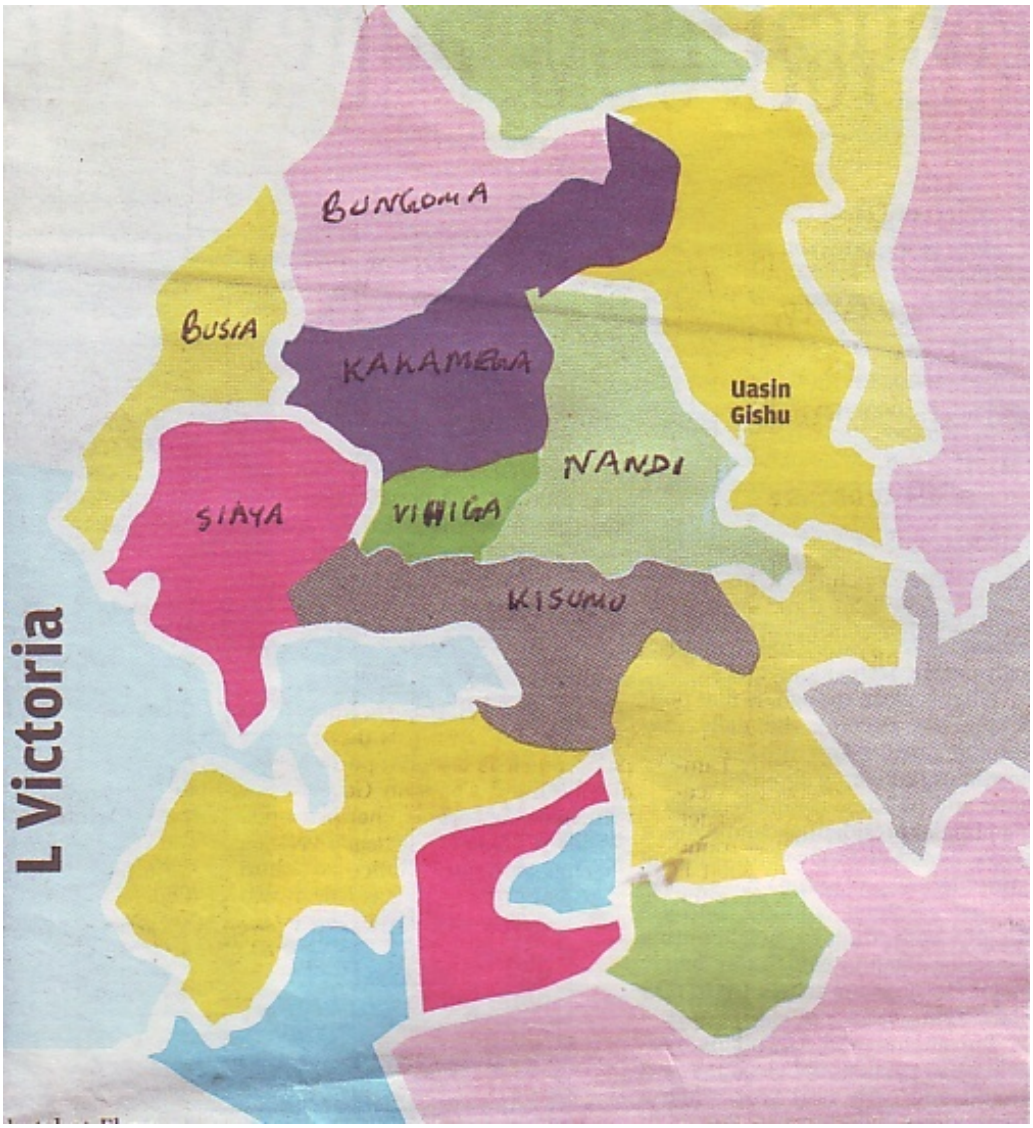
MATERIALS AND METHODS

Study area and population

The study was carried out in selected COBES Centres in Western Kenya between March and May 2008. Approximately 700 children were sampled during the study from seven centres.



Map 1: Map showing the counties in which COBES centres are found in western Kenya

The study areas were all within western Kenya stretching from the border of Kenya and Uganda represented by Bungoma and Busia to Nyanza represented by Kisumu, and western Rift Valley represented by Uasin Gishu (Map1).

The general climate is composed of two rainy seasons occurring in March to May for the long rains and October to December for the short rains. Soil is fertile and supports production of various crops such as maize, sugarcane, potatoes, cassava, beans and millet among many others. However overdependence on cash crops such as sugarcane and tea has been implicated as a risk factor for malnutrition in some areas. Livestock farming is also prevalent in some areas with both dairy and beef cattle being reared. Others include sheep, goats and chicken.

In terms of health, malaria has been documented to be the most prevalent health problem in most areas. HIV-AIDS is also prevalent in many areas such as Busia and Kisumu and has been reported to be related to malnutrition [1, 12]. Malnutrition has been reported, in unpublished reports, to be prevalent in many areas especially the period just before harvest but no documented report is available in the study area.

Study design

Cross-sectional surveys were carried out in all the health centres simultaneously. Cluster sampling technique was used with each health centre as the sampling unit.

Anthropometry:

Anthropometric parameters were determined according to standard WHO procedures [6,13]. The parameters considered included Age (in months), Weight (Kgs), Height (cms) and the mid-upper arm circumference (cms). Children aged between 6 months and 24 months were selected for the surveys. Children were undressed and weighed in plastic weighing pants to the nearest 10 grams using a 10 Kg ± 10g hanging weighing scale (Salter, UK). Weight of older children, 25 months and 59 months wearing light clothes only was taken to the nearest 100gms, using a 25Kg ± 100g hanging weighing scale (CMS,UK). The weighing scales were calibrated daily. Standing height was measured in children from 2 years of age to the nearest 0.1cm, using a tape measure. Those who could not stand were weighed lying horizontally on a flat surface. Height and length measurements were taken when children were barefoot and after removal of headgear, using heightometers (wooden horizontal measuring boards graduated in centimetres to determine the height with a sliding head bar) or a measuring tape. This was done to determine values for z-scores (HAZ) used as a measure of stunting. Mid-upper Arm Circumference (MUAC) was measured to 0.1 cm using specialised non-stretchable measuring tapes (Zerfuss insertional tapes, Ross Ltd, USA) [14].

Clinical Malnutrition:

This involves assessment of both nutritional and clinical status of children. Three types were noted: Kwashiorkor that is characterized by bipedal oedema and other symptoms like flaky hair. Marasmus was clinically diagnosed by wasted body and loose skin. Finally, there was Marasmic Kwashiorkor that exhibited both symptoms of Kwashiorkor and Marasmus.

Qualified medical staff including clinical officers and nurses at each of the health centres assessed the clinical nutritional status of the children, classifying them as Marasmic, Kwashiorkor or Marasmic/ Kwashiorkor.

Analysis of anthropometric nutritional data:
This was carried out using Epi-info 2000 computer program to determine the Z- score values from anthropometric data [15, 16]. The z-scores (< -2SD) values were determined from the age, height and weight measurements giving the height for age (HAZ), weight for age (WAZ) and weight for height (WHZ) values using reference data from the US based National Centres for Health Statistics (NCHS) as well as WHO. Children were classified as stunted, underweight or wasted if HAZ, WAZ or WHZ was < -2HAZ, < -2WAZ or < -2WHZ or severe if the values are < -3Z.

Ethical considerations
Verbal consent was sought from the guardians of the children prior to taking anthropometric measurements. Prior to commencement of community diagnosis programme of COBES 2 of Moi University, permission was sought from the Institutional Research and Ethics Committee of Moi University School of Medicine. Permission was also sought from District Medical Officers of Health through the Dean, School of Medicine, from the counties under which the COBES Health Centres fall.

RESULTS

Clinical malnutrition
The results showed Meteitei to have the highest prevalence of 18% for Kwashiorkor, Marasmus and Marasmic Kwashiorkor while Makunga showed the least prevalence of 4%. Only two other centres were analysed for clinical malnutrition: Mosoriot and Chulaimbo which also double as Academic Model for Prevention and Treatment of HIV (AMPATH) centres (Table 2 and Figure 1)

Anthropometry
Various centres showed mixed prevalence values: Kabuchai showed moderate stunting rate of 13.6 % and severe stunting at 12.7%, moderate underweight of 4% and severe underweight at 2,5%. Makunga showed moderate stunting at 9.7% and severe stunting at 4.9%, moderate underweight prevalence was 8% while severe underweight was 4.9% (Tables 1(i-vii).

Matayos showed a moderate underweight of 36%. This was the only parameter taken at this centre. Meteitei showed stunting value of 53%, underweight of 27.6% and wasting at 15%. Chulaimbo in Nyanza showed moderate stunting prevalence of 7%, and severe stunting at 4.5%, moderate underweight at 3% and severe underweight at 1.6%, moderate wasting was at 11% while severe wasting was at 3.6%. Mosoriot in Nandi showed moderate stunting at 9.5% and severe stunting at 7%, moderate underweight at 3% and severe underweight at 1.6%, moderate wasting was at 11% while severe wasting at 3.6%. Mbale in Vihiga showed moderate stunting at 32%, moderate underweight at 16% and moderate wasting at 4.3%.

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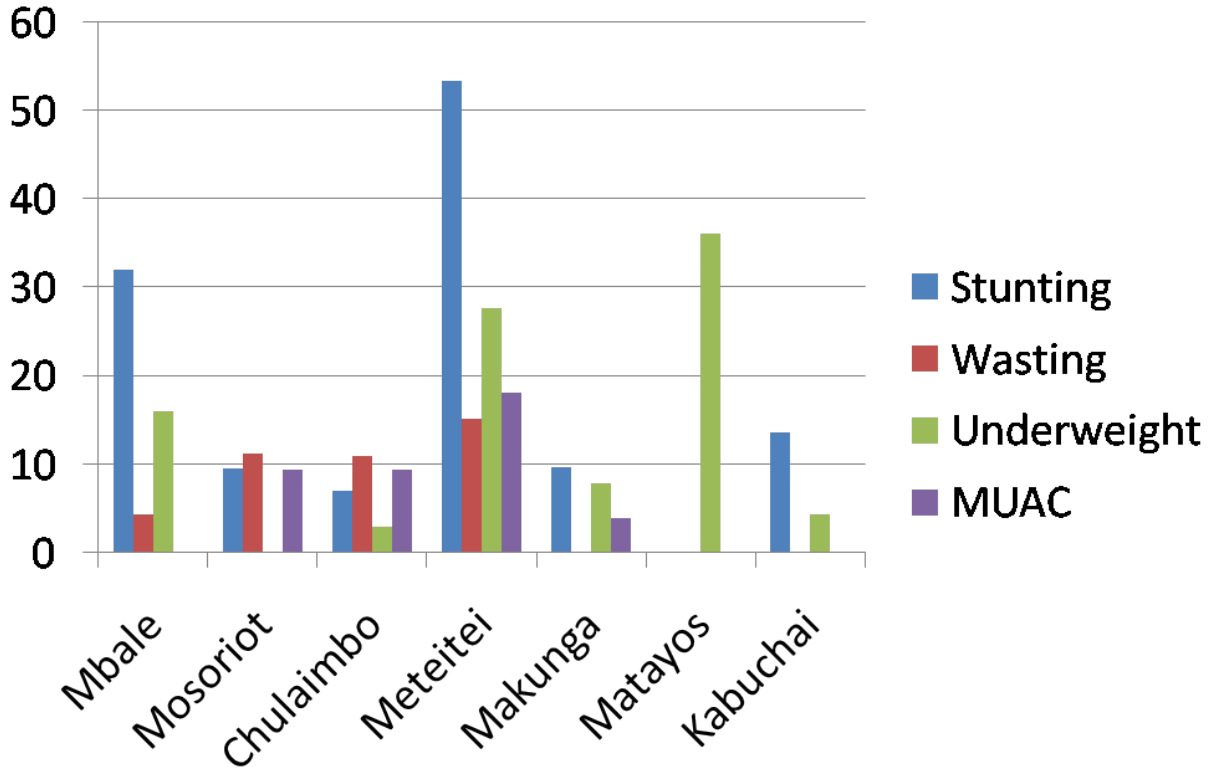

Figure 1: Percentage (%)- Y axis, Nutritional status of children < 5 years in selected COBES Health Centres-X axis

DISCUSSION

According to WHO (2000, 2002), 32.5% of pre-school children under 5 years of age are malnourished [5, 6]. In Kenya, the major study reporting prevalence of PEM nationally was carried out and still stands to the present moment [7]. Several studies have been carried out since then showing prevalence of malnutrition in different national regions [8, 17]. From the study, Anthropometry showed majority of the children to have normal nutrition based on underweight, stunting and wasting (WAZ > -2, HAZ > -2 and WHZ> -2). This represented about 60% of the children studied. Prevalence of stunting was extremely high in some areas such as Mbale and Meteitei compared to the national and regional values. The results from the other COBES centres were consistent with work earlier reported for the region [8]. Wasting was highest in Meteitei while underweight was highest in Matayos. Prevalence of severe (acute) malnutrition at the COBES Centres at the time of study showed a similar trend to mild or moderate malnutrition, although this was not carried out in all the seven health Centres where data was collected. The National figures for Western Province still stand at 30% stunting, 20% underweight and 5% wasting [7, 8]. It is notable that stunting levels at Mosoriot were slightly higher (9.5%) than Chulaimbo (7%).The reasons for this are not yet clear. This indicates that the nature of malnutrition in these two areas points to both chronic and long- term malnutrition. These results agree with

similar work carried out elsewhere [5]. **Under normal circumstances, this would not have been the result but the special circumstances under which these measurements were taken could explain the results obtained. The results could also be attributed to scarcity of food at some of the centres or due to the acute phase and the prevailing annual drought in the areas studied at that time of the year, representing the long term phase.** The data available to support malnutrition in these areas of COBES placement needs to be regularly updated for proper management and control of this chronic problem in the areas. So many factors may be pointers for the malnutrition trends obtained. Such factors include; Demography, socioeconomic as well as genetics, breastfeeding, immunization, birth weight and other childhood illnesses such as measles, diarrhea, malaria and many others. The population in the Health centres studied should be encouraged to adopt ways that could alleviate their nutritional status [18].

CONCLUSION

The prevalence of malnutrition was high in some centres during the period of study. Meteitei showed the highest malnutrition prevalence of 53%, which poses a major public health concern. The reason could not be immediately evident but one of the possibilities could be dependence on tea as a major cash crop at the expense of food crops. The current national figure for malnutrition stands at 30% as well as in Western province. Prevalence of malnutrition in Chulaimbo was the lowest maybe due to mixed farming practised in the area or successful health education in the population from health centre records. Prevalence in other centres was within the normal range. Improved nutritional practices could be recommended in areas with high malnutrition although poverty is the major cause of the problem in Kenya as well as other developing parts of the world. The way forward would be to include all the COBES health Centres (n=13-15) and standardise all the data collection methods. The COBES programme would go a long way towards alleviation of child malnutrition in areas where health centres are positioned.

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Table 1 (i-vii):
Nutritional status in COBES centres, based on anthropometric measurements

Table 1: (i) Kabuchai

a. Height for Age (HAZ)(< 5 years of age)			
Z score	**Frequency**	**Percentage**	**Interpretation**
> 1.00	7	5.93	Mild
1.00<X>1.00	60	50.85	Normal
-1.00<X>-2.00	20	16.95	Mild stunting
-2.00>X> -3.00	16	13.56	Moderate stunting
X> -3.00	15	12.71	Severely stunted
b. Weight for age (WAZ)			
X>1.00	18	15.25	Overweight
1.00<X>-1.00	52	44.08	Normal
-1.00<X>-2.00	40	33.89	Mildly malnourished
-2.00>X>-3.00	5	4.23	Moderate malnutrition
X>-3.00	3	2.54	Severely malnourished

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Table 1: (ii) Makunga

a.Weight for age(WAZ)			
Z score	**Frequency**	**Percentage**	**Interpretation**
-1> X> -2	16	15.5	Mildly underweight
-2> X>-3	8	7.8	Moderately underweight
-3> X	5	4.9	Severely underweight
Normal	77	74.8	
b.Height for age (HAZ)			
-1> X> -2	13	12.6	Mildly stunted
-2> X>-3	10	9.7	Moderately stunted
-3> X	5	4.9	Severely stunted
Normal	75	72.8	
c. Mid Upper Arm Circumference (MUAC)			
MUAC	**Frequency**	**Percentage**	**Interpretation**
12.5>X	4	3.9	Acute malnutrition
13.5 >X>12.5	10	9.7	Mildly malnourished
X>13.5	80	77.7	Normal

Table 1: (iii) Matayos

Weight for age (WAZ)			
Z-score	**Frequency**	**Percentage**	**Interpretation**
X> 1		3	Overweight
X<-2		36	Underweight
X>-2		61	Normal

Table 1: (iv) Meteitei

a. Height for age (HAZ)			
Z- score	**Frequency**	**Percentage**	**Interpretation**
X>-2.00	49	46.7	Normal
X<-2.00	56	53.3	Stunted
Total	105	100	
b. Weight for age (WAZ)			
X>-2.00	76	72.4	Normal
X<-2.00	29	27.6	Underweight
Total	105	100	
c. Weight for height (WHZ)			
X>-2.00	89	84.8	Normal
X<-2.00	16	15.2	Wasted
Total	105	100	
d. Mid upper arm Circumference (MUAC)			
MUAC < 12.5	**Frequency**	**Percentage**	**Interpretation**
<12.5	19	18.1	Acute malnutrition
12.5-13.5	22	21	Mid malnutrition
>13.5	64	60.9	Normal
Total	105	100	

Table 1: (v) Chulaimbo

a. Height for age (HAZ)		
Z-score	**Percentage**	**Interpretation**
X>1.00	6.3	Mildly obese
1.00<X>-1.00	72.7	Normal
-1<X>-2.00	9.5	Mildly stunted
-2.00>X>-3.00	7.0	Moderately stunted
b. Weight for age (WAZ)		
X>1.00	4.7	Overweight
1.00<X>-1.00	82.3	Normal
-1<X>-2.00	8.4	Mild malnutrition
-2.00>X>-3.00	3.0	Moderate malnutrition
X>-3.00	1.6	Severe malnutrition
c. Weight for height (WHZ).		
X>1.00	7.4	Mild malnutrition
-1<X>-2.00	77.8	Normal
-2.00>X>-3.00	11.2	Moderate malnutrition
X>-3.00	3.6	Severe malnutrition
d. Mid upper arm circumference.		
MUAC	**Percentage**	**Interpretation**
12.5>X<13.5	9.4	Clinical malnutrition
13.5<X>12.5	11.7	Mild malnutrition
X>13.5	78.9	Normal

Table 1: (vi) Mosoriot

a. Height for age (HAZ)		
Z-score	**Percentage**	**Interpretation**
x>1.00	6.3	Mildly Obese
-1<x>2.00	72.7	Normal
-200>x>-3.00	9.5	Mildly stunted
x>-3.00	7.0	Severely stunted
b. Weight for age (WAZ)		
x>1.00	4.7	Overweight
1.00<x>-1.00	82.3	Normal
-1.00<x>-2.00	8.4	Mild malnutrition
-2.00>x>-3.00	3.0	Moderate malnutrition
x>-3.00	1.6	Severe malnutrition
c. Weight for height (WHZ)		
x>-1.00	7.4	Mild
-1.00<x>-2.00	77.8	Normal
-2.00>x<-3.00	11.2	Moderate
x>-3.00	3.6	Severe
d. Mid upper arm circumference (MUAC).		
MUAC	**Percentage**	**Interpretation**
12.5>x<13.5	9.4	Clinical malnutrition
13.5<x>12.5	11.7	Mild
x>13.5	78.9	Normal

Table 1: (vii) Mbale

a. Height for age (HAZ)		
Z-score	**Percentage**	**Interpretation**
X<-2.00	32	Stunted
X>-2.00	68	Normal
b. Weight for height (WHZ)		
X<-2.00	4.3	Wasted
X>-2.00	95.7	Normal
c. Weight for age (WAZ)		
X<-2.00	16	Underweight
X>-2.0	84	Normal

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Table 2: Summary of the comparative anthropometric measures for stunting, wasting, underweight and MUAC and severe cases, in brackets, for seven COBES centres for the period March to May, 2008

Z-Score	Mbale	Mosoriot	Chulaimbo	Meteitei	Makunga	Matayos	Kabuchai
HAZ< -2(%)	32	9.5	7.0 (4.5)	53.3	9.7 (4.9)	-	13.6 (12.7)
WHZ <-2(%)	4.3	11.2	11.0	15.2	-	-	-
WAZ < -2(%)	16	3 (1.6)	3.0 (1.6)	27.6	7.8 (4.9)	36	4.3 (2.5)
MUAC < 12.5(%)	-	9.4	9.4	18.1	3.9	-	-

Meteitei in Nandi showed high prevalence rates for stunting underweight and wasting while Chulaimbo in Nyanza showed low prevalence rates for stunting, underweight and wasting

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