Review

Determinants of Complementary Feeding and Nutrition Status of Children 6-23 Months in Vihiga County, Kenya

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Abstract

The age 6-23 months is a vulnerable stage of growth mainly due to poor complementary feeding practices. This study aimed to assess the adequacy of complementary foods and explore opportunities of using locally available foods to improve nutrient intake. The research was carried out in four randomly selected districts in Vihiga County, Western Kenya.A cross sectional analytical design was used on a sample of 201 children aged 6-23 months. Actual measurement of the amount of foods consumed was done. Data were analysed using the ENA for SMART, Nutri-survey and SPSS computer software. Most caregivers (78.2%) had low education level of below primary school, were farmers or casual labourer (48.8%) and 77.1% had low levels of income (< 8000 KES). The average household size was 5.71. About 74.6% of infants were breastfed. The average number of meals consumed per day was 4.2. The diet contained more of the starchy foods than the other food groups. Except for protein consumed in adequate amounts by 52%, over 50% did not meet the RDAs for other nutrients including energy. The children consumed a variety of traditional vegetables which were however served as broth. Fruits were not frequently consumed by over 40% of the children. The levels of wasting, stunting and underweight were 3.5%, 15.4% and 7.5%, respectively. The complementary feeding practices did not enable the children to meet the macronutrient and micronutrients requirements. This study recommends use of locally available foods to improve nutrient intake.

Introduction

Adequate nutrition during infancy and early childhood is fundamental to the development of a child's potential [1]. It is well recognized that the period from conception to 23 months of age is a critical window for the promotion of optimal growth, health and behavioral development [2]. Longitudinal studies on infants and children 6-23 months have consistently shown that this is the peak age for growth faltering, deficiencies of certain micronutrients and common childhood illnesses such as diarrhea. After a child reaches two years of age, the physiological effects are irreversible. It is very difficult to reverse stunting which is an indicator of chronic under nutrition [3].

The immediate consequences of poor nutrition during these early formative years include; significant morbidity, mortality and delayed mental and motor development. In the long term, early nutritional deficits are linked to impairment of intellectual performance, work capacity, reproductive outcome and overall health during adolescent and adulthood [4]. Poor breastfeeding and complementary feeding practices coupled with high rates of infectious diseases are the principal proximate causes of malnutrition during the first two years of life [5]. For this reason, it is essential to ensure that caregivers are provided with appropriate guidance regarding optimal feeding of infants and young children

Complementary feeding is the process when breast milk alone is no longer sufficient to meet the nutritional requirements of infants and therefore other foods and liquids are introduced alongside breast milk [5]. This is when malnutrition starts in many infants due to inadequate feeding, contributing significantly to high prevalence of malnutrition among children under five. Minimal information exists on the complementary feeding practices and the nutrition status of children in rural areas. The study aimed to determine the food consumption profile of infant aged 6-23 months and the nutrition status.

Methods

A cross sectional analytical design was used in this study. Fisher formula was used to calculate the desired sample size (Fisher, 1998). The derived sample of 201was equally allocated to four randomly selected divisions. All the age categories of children 6-23 months were included in the sample, namely; 6-8, 9-12, 13-18 and 19-23 months representing all the four divisions in Vihiga County. Anthropometric measurements were taken, which include, weight, height and mid upper arm circumference (MUAC). Measurements were taken thrice using calibrated standard equipment and average calculated. This was analysed using the ENA for SMART software to generate indices like; weight for age, height for age and weight for height.

Dietary intake was done using a 24 hour recall. The approach for undertaking the 24 hour recall was by using the actual cooked foods

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to minimize error in the reporting of amounts of food consumed by the child by the care givers. All the foods normally consumed in the study area were prepared. Household utensils used were availed (some from the homes and some purchased) to a centre convenient to all the respondents. The mothers scooped the actual amount of each food fed to the child, which was then weighed. This data from the 24 hour recall on amount of each ingredient consumed was analysed using Nutri-survey software to determine the amount of each nutrient consumed. This was compared with RDAs to assess for adequacy in consumption. Data from the 24-hour recall on the foods, ingredients, cooking method and amount of each ingredient consumed were computed for analysis. Data were analysed using SPSS software and appropriately interpreted for adequacy.

Results and Discussion

Characteristics of the Children

A total of 201 children were included in the survey. The sample had 48.3% male and 51.7% female children. The mean age of children was 13.85 ±5.38 months.

Characteristics of the Caregivers

The mean age of the caregivers was 29 ± 9.1years. Most of the caregivers who were mainly mothers of the children in the sample were young with majority (65.7%) falling below 30 years of age. The caregivers had low levels of education with most (69.2%) attaining upper primary (Standard 5-8) education. Twenty seven percent (26.9%) of the caregivers were involved in farming and 24.4% were housewives (Table 1).

Generally, most households (40.8%) had a low monthly income of < 4000 KES, with only 12.4% earning > 10,000 KES.

Table 1: Characteristics of the caregivers

	N (201)	%
Caregivers' age in years: Mean (sd)	29.0 (9.107)	
Caregivers' age distribution		
16-20 years	30	14.9
21-25 years	59	29.4
26-30 years	45	22.4
31-35 years	33	16.4
36-40 years	17	8.5
41-45 years	8	4.0
>46 years	9	4.5
Caregivers' education level		
None	8	4.0
Std 1-4	10	5.0
Std 5-8	139	69.2
Secondary incomplete	25	12.4
Secondary complete	14	7.0
Tertiary	5	2.5
Caregivers' occupation		
None (Housewife)	49	24.4
Formal employment	4	2.0
Business	31	15.4
Farmer	54	26.9
Casual labour	44	21.9
Unemployed	19	9.5

Infant and Young Child Feeding Practices

Among the respondents who participated in this study 74.6% (150) breastfed their infants as determined by the 24hr recall. The profile of caregivers who were breast feeding the children as determined by a 24 hour recall is shown in Table 2.

Table 2: Proportion of children who were breastfeeding

Age (months)	n (201)	%
6-8	44	21.9
9-12	38	18.9
13-18	36	17.9
19-23	32	15.9

The study noted that there were more children aged 6-8 months being breast fed than in other age categories. Most children were breastfed on demand since they were with the mothers most of the time. Almost all (98.5%) the children consumed other foods other than breast milk as only 3 (1.5%) were on breast milk only.

Household Dietary Diversity Score

In this study a household dietary diversity score (HDDS) of 12 food groups was used to determine the food intake of the children... The average HDDS score was 4.72 (Table 3). This was within the recommended intake of more than five food groups among children (WHO, 2006).

Table 3: Dietary diversity among children in Vihiga County

		Age categories (Months)				Total
		6-8	9-12	13-18	19-23	
Dietary diversity	≤ 4 foods	27	21	19	17	**84**
	≥ 4 foods	23	29	31	34	**117**
	Total	**50**	**50**	**50**	**51**	**201**
Mean Dietary diversity score		4.38	4.61	4.91	4.98	**4.72**

Children aged 19-23 months consumed a more diversified diet compared to those aged 6-8 months. As noted, this could be attributed to the fact that the children aged 6-8 months were being breastfed more than the older children.

Table 4: Number of meals and food intake as per age categories

Age (months)	Mean
6-8	3.9±0.91
9-12	4.1±0.71
13-18	4.6±0.98
19-23	4.1±1.2

The mean meal frequency was between 4-5 which is acceptable according to the WHO recommendation of three main meals and at least two snacks.

As it emerged from the assessment, many children were fed from the family pot. The diet contained more of the starchy foods like maize meal, rice, potatoes and less of the other food groups especially fruits and vegetables. Although the assessment shows a variety of vegetables Table 6 in the children's diet, it was noted that most of the children were only given the vegetable broth.

Table 5: Consumption of food groups as per age categories

Food group	6-8 Mon. (n=50)	9-12 Mon. (n=50)	13-18 Mon. (n=50)	19-23 Mon. (n=51)	
Carbohydrates	50	50	50	51	201
Proteins	31	34	30	36	131
Fruits	14	14	18	21	67
Vegetables	46	47	48	48	189

Table 6: Consumption of vegetables and fruits per day

Vegetables	%	Fruits	%
Kales (N=163)	23.4	Oranges (N= 89)	17.9
Cabbage (N=148)	22.4	Avocado (N=148)	55.2
Spinach (N=31)	10.0	Pawpaw (N=31)	11.4
Carrots (N=39)	4.5	Pineapple (N=29)	13.9
Tomatoes (N=159)	45.8	Ripe bananas(N=139)	58.2
Brinjals (N=28)	1.0	Passion fruits (N=105)	44.8
Cow peas leaves (N=142)	63.2	Guavas (N=153)	50.7
Fresh peas (N=27)	5.5	Mangoes (N=53)	23.4
Mrenda (N=133)	58.2	Loquats (N=113)	6.5
Saga (N=54)	20.9	Water melon (N=18)	4.0
Slender leaves (N=31)	14.4	Lemon (N=28)	3.0
Pumpkins (N=133)	55.7		
Pumpkin leaves (N=142)	56.2		
Amaranth (N=153)	52.2		
Onions (N=188)	5.5		
Capsicum (N=69)	4.0		
Mitoo (N=146)	59.7		
Managu (N=29)	10.0		
Nderema (N=114)	43.8		

Multiple responses were allowed. Seasonality was not factored in, but it could be assumed that the most consumed vegetables and fruits were those that were mostly available at the time of study

Table 7: Proportion of children that meet the Recommended Daily Allowance

	n (201)	%
Energy (Kcal)	17	8.5
Proteins	105	52.2
Fat	35	17.4
Cholesterol	42	20.9
Fibre	41	20.4
Vitamin A	89	44.3
Vitamin B1	79	39.3
Vitamin B2	80	39.8
Vitamin B6	132	65.7
Vitamin C	114	56.7
Vitamin E	81	40.3
Sodium	198	98.8
Potassium	201	100
Calcium	13	6.5
Folic acid	13	6.5
Magnesium	153	76.1
Phosphorus	66	32.8
Iron	22	10.9
Zinc	97	48.3
Chlorine	182	90.5

References for RDI: FAO, 1996

Nutrients Intake of the Children

All children who participated in the study (100%) had adequate intake of potassium, almost all children consumed sodium (98.8%) and chlorine (90.5%). The proportion of children who consumed nutrients that meet the RDAs of Vitamin B6, Vitamin C and magnesium were 65.7%, 56.7 and 76.1% respectively (Table 7).

Clearly, most of the children consumed food with inadequate nutrients implying that the nutrients present in the food did not meet the RDAs. Energy intake was inadequate in 91.5% of the children, inadequate intake of proteins, fat, cholesterol and fiber were found among 47.8%, 82.6%, 79.1% and 79.6% of the children, respectively. The most inadequate nutrients consumption by the children was calcium (93.5%), folic acid (93.5%) and iron (89.1%). Inadequate intake of nutrients could predispose children to conditions such as kwashiorkor, marasmus, protein energy malnutrition and anemia among others consequently interfering with the health and growth of the child. The findings from this survey clearly depict that a large proportion of the children inadequately consume both macro and micronutrients.

Nutrition Status of Children

The malnutrition rates were below the emergency thresholds of 15.0% (WHO, 2006). The levels of acute malnutrition for wasting were poor (3.5%), the levels of acute stunting were 13.4% and those of underweight were at 7.5% (Table 8) probably indicating the negative influence of the inappropriate infant and young child feeding practices.

The rates of malnutrition were higher for stunting and underweight compared to the prevalence in Western region, (where Vihiga is one of the Counties in the region) 23.3% for stunting, 2.6% for wasting and 5.9% for underweight [6]. The nutrition status of the children in Vihiga related well with breast feeding profile of the children. The severe acute malnutrition rate (SAM) was 1.0% which was within acceptable levels (<3%) according to the WHO 2006 standards. When categorized by age groups, more children were found to be malnourished in ages 13-23 than in ages 6-12. This could be associated with reduction in frequency of breast feeding as children grew older as well the sub optimal complementary feeding practices.

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Table 8: Prevalence of malnutrition by age category

		Age categories (months)				Total
		6-8(50)	9-12(50)	13-18(50)	19-23(51)	
Wasting	Severe	0	0	1	1	**2**
	Moderate	1	1	2	1	**5**
	Normal	49	49	47	49	**194**
Stunting	Severe	1	1	1	1	**4**
	Moderate	2	3	8	14	**27**
	Normal	47	46	41	36	**170**
Underweight	Severe	0	0	2	1	**3**
	Moderate	4	3	3	2	**12**
	Normal	46	47	45	48	**186**
	Total	**50**	**50**	**50**	**51**	**201**

*WHO cut off points for wasting using Z scores (<-2 Z scores in populations: <5% acceptable; 5-9% poor; 10-14% serious; >15% critical).

Conclusion

Most of the mothers were breastfeeding their infants as determined by the 24hr recall. This is an indication that mothers are aware of the importance of breastfeeding up to two years. The children however seemed to consume more of the cereals as compared to proteins, this was because most respondents were making either porridge from maize flour which the children would feed on the whole day because of convenience and affordability, as the meal would be cooked once and did not need many ingredients. Most of the children were only given the vegetable broth and therefore this would not be a good source of micro-nutrients.

The malnutrition levels rates were below the emergency thresholds of 15.0%. Overall in Vihiga County the levels of acute malnutrition for wasting were 3.5%, the levels of acute stunting were 13.4% and those of underweight were at 7.5% probably indicating the negative influence of the inappropriate infant and young child feeding practices. These rates are higher than those of Western region where Vihiga County is, which are 23.3% for stunting, 2.6% for wasting and 5.9% for underweight. However these did not meet the recommended WHO threshold of 15% for emergency thus placing these children in at risk category for acute malnutrition.

The nutrition status of the children in Vihiga significantly related (<0.05) with breast feeding profile of the children. The severe acute malnutrition rate (SAM) was 1.0% which was within acceptable levels (<3%) by WHO 2006 standards. The variety of foods consumed by the children as per DDSwas correlated with the nutrition status. The high mean Dietary Diversity Scores of the children had a significant positive relationship (< 0.05) with nutrition status (weight for height Z-score) of the children.

The household income levels could be associated with the quality, quantity and dietary diversity of the food consumed by the children. The findings of this study showed that the complementry feeding practices were poor and this could be attributed to low intake of both macro and micro nutrients by most of the children.

Recommendation

This study recommends the strengthening of community based interventions that will include nutrition education to caregivers on optimal complementary feeding practices with emphasis on appropriate use of the locally available foods.

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