International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

Maternal Socio-Economic Status, Complementary Feeding Practices and Nutrition Status of Children Ages 6-23 Months in Kuria West, Migori County, Kenya

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ABSTRACT

The nutrition status, health and survival of children 6-23 months of age are enhanced when fed in accordance with the World Health Organization's (WHO) feeding recommendations. Gender disparities in socio-economic status of women contribute to high rate of morbidity and mortality of infants and children of ages 6-23 months. The study therefore was to determine the maternal socio-economic status and its relationship with their complementary feeding practices and nutrition status of children ages 6-23 months in Migori County. This was a cross-sectional study in which 217 child-mother pairs were selected using systematic random sampling. A researcher administered questionnaire, focus group discussion guide and key informants interview guide were used to collect data. Data was entered and analyzed using SPSS version 20. Data on complementary feeding practices was analyzed using Nutri Survey. Data on anthropometry was analyzed using ENA for SMART and WHO 2006 growth standards cut offs was used to determine the nutrition status of children. Majority of the respondents (88.1%) were married, (54.2%) completed primary level of education and subsistent farmers (33.3%). Less than half (32.3%) of children met the minimum acceptable diet. Overall, 28.9% of the children were stunted, 9% underweight and 5.5% wasted. Minimum acceptable diet was associated with maternal level of education, main source of income and average monthly income. Underweight was found to be associated with minimum acceptable diet (p=0.048). The Infant and Young Child Nutrition Behaviour Change Communication approach currently used should emphasize the importance of minimum meal frequency and dietary diversity.

Key Words: Complementary Feeding, Socio-economic status, Nutrition status

INTRODUCTION

Background to the study

Complementary feeding is the process of gradually introducing an infant to adult diet at six months of life, when breast milk is no longer adequate to meet the child's nutritional requirements. [1] This period is considered to be of greatest vulnerability to malnutrition, infections and deaths if adequate nutritional demand for the growing child is not met. [2,3] Appropriate complementary feeding includes timely introduction of adequate, safe and appropriate diet, continued breastfeeding, dietary diversity of at least four or more food groups out of seven food

groups per day and a daily minimum meal frequency of two to three times for breastfed infants 6–8 months of age; three to four times for breastfed children 9-23 months of age and four to five times for non-breastfed children 6–23 months of age. [1,4]

Worldwide, malnutrition accounts to approximately 10% of all deaths among children below five years of age. [6] Although the global prevalence of child stunting decreased from 40% in 1990 to 25% in 2013, the WHO Africa region has seen an increase from 48% to 25% stunted children during this period. [7] According to the Kenya Demographic Health Survey (KDHS) 2014, 45% of 6-23 months old children receive required minimum dietary diversity, 58% of these 6-23 months receives minimum meal frequency and the 30% of these receives the minimum acceptable diet as recommended. [8] According to the Migori County Multiple Indicator Cluster Survey (MICS) 2011, about 63% of children 6-23 months age group are adequately fed while 43% of these are receiving solid, semi-solid and soft foods the minimum number of times. [9]

Global statistics for surviving undernourished children indicate that approximately 171 million children are stunted, 60 million overall are wasted, and 100 million are underweight. [10] In East Africa, prevalence of stunting and wasting of less than 5 years was 12.1% and 15.6%, respectively. [11] Improved complementary feeding is a preventive intervention whose timeliness is to mitigate decline in length-for-age before the cumulative deficits of stunting become irreversible after age 2 years. [12] In Kenya, children less than 5 years who are underweight constitute 11%, the stunted are 26% and wasted are 4%. [8] Improving Infant and Young Child Feeding (IYCF) practices in children 0–23 months of age is therefore critical to improved nutrition, health and development. [13]

Maternal level of education and Wealth Index has been associated with nutrition outcomes among children in studies in various settings in Kenya. [14, 15] In Migori County, gender disparities in education and economic status of women contribute to high rate of morbidity and mortality of children 6-23 months of age. [9] The main economic activity is subsistence agriculture where women are almost 80% of the work force. [9, 16] It is with this background that this study was conducted to establish the complementary feeding practices and nutrition status and their relationship with maternal socio-economic status, among children 6-23 months of age.

MATERIALS AND METHODS

Research design and study location

The study adopted a cross-sectional analytical design. The study was conducted in Kuria West Sub-county, Migori County. Bukira East location was the study location because of its multi-ethnic population. The main economic activity in the area is subsistence agriculture where women form 80% of the farm work force. Households in this area lack access to clean and safe water and sanitation facilities. [9, 16] There is however, limited literature on the association between maternal socio-economic status, complementary feeding practices and nutrition status of children 0-23 months of age in Migori County in particular.

Target population

The study targeted mothers and their children 6-23 months of age who had been residents of Bukira East location for at least six months prior to the study.

Sample size determination and sampling technique

The sample size was calculated using the Yamane (1967) Formula. [39] A sample size of 217 mother and child pairs participated in the study. Bukira East location was selected purposively because of its multi-ethnic population. Mother and child pairs were selected using systematic random sampling method based on the Kenya Bureau of statistics sampling framework. [17] In each of the two sub-locations, about 108 households were randomly selected and visited.

Members of the Focus Group Discussions (FGDs) were also selected using simple random sampling technique.

Data collection procedures and techniques

The standard IYCF practices questionnaire (WHO, 2010a) was adopted and modified to collect information on socio-demographic and socio-economic characteristics and complementary feeding practices in terms of dietary diversity and feeding frequency. A Focus Group Discussion (FGD) guide was used to elicit information on how maternal socio-economic status affects food choices, complementary feeding practices and nutrition status of children. A Key Informant Interview (KII) guide was used to collect information on the IYCF practices, existing IYCF interventions, challenges to IYCF and any training for mothers of children 6-23 months of age on IYCF. The test re-test method was used to ensure the questionnaire produce the same results. This was by use of Cronbach correlation formula where the reliability coefficient more than 0.7 and was considered adequate. [18]

Two research assistants, a male and a female were recruited to participate in carrying out the study. They underwent a four days training facilitated by the researcher on the study objectives and research ethics. The children anthropometric data was collected using standard procedures as stipulated in the guidelines by WHO to determine the nutrition status of the children. [1] Each FGD was composed of 10-15 mothers with children 6-23 months who were not part of the interviewed sample. KIIs were conducted with selected persons including Nutritionists and Community Health Volunteers (CHVs). The observer (research assistant) ensured that the tape recorder was working and observed and recorded the non-verbal cues among the FGDs and KIIs participants.

Data analyses and presentations

The Statistical Package for Social Sciences was used for all data analyses. Children nutrition status was analysed using ENA for SMART then interpreted using the Z-scores. [1] Dietary intake was analysed using Nutrisurvey based on WHO recommendations. [5] Descriptive statistics was used to describe socio-demographic and economic characteristics of mothers, complementary feeding practices, morbidity prevalence and child nutrition status.

Chi-square test was used to test for associations between categorical data such as maternal level of education where primary level cut-off was applied, type of occupation and source of income using Principal Component Analysis cutoffs in relation to complementary feeding practices, morbidity and child nutrition status. T-test and Analysis of Variance was used to test for significant differences and associations between continuous variables such as weight-for-length, length-for-age and weight- for- age. Content analysis was conducted for the FGDs and KIIs and were transcribed verbatim, read through several times by the researcher, coded, then categorized into themes. The data was summarized to groups of data using a combination of tabulated description, graphical description and statistical commentary.

Logistical and ethical considerations

Research clearance was sought from Graduate School of Kenyatta University. Ethical clearance from Kenyatta University Ethical Review Committee, research permits from National Commission for Science, Technology and Innovation; and Kuria West Sub-County administration respectively. A signed or thumb printed informed voluntary consent was sought from all participants were assured confidentiality maintenance during and after the study.

RESULTS

Demographic characteristics of the households

A total of 201 mothers/caregivers representing the same number of households took part in the study with children 6-23 months of age whose mothers were

available and had valid data for all the variables examined during the study period.

Table 1: Demographic characteristics of the households

	N=201		
Characteristics	n	%	Mean±SD
Gender of Household head			
Male	175	87.1	
Female	26	12.9	
Responsibility of providing food			
Father	140	69.7	
Mother	32	15.9	
Other relative	21	10.4	
Both mum and dad	8	4.0	
Main decision maker on food cooked			
Father	8	3.9	
Mother	186	92.5	
Other relative	5	2.5	
Both mum and dad	2	0.9	
Mean Household size			5.42 ± 1.90
Mean household No. of children 0-18years			3.09 ± 1.80
Mean No. of children below 5 years of age per households			1.53 ± 0.63

The average household size was 5.42 ± 1.90 and the mean number of children below 5 years per household was 1.53 ± 0.63. In majority of the households, the father (73.1%) was the main decision maker of family income and bore the responsibility of providing food for the household (69.7%) (Table 1).

Maternal socio-economic status

Table 2: Maternal socio-economic status

N=201		
Characteristics Mean ±SD	n	%
Maternal/caregivers' age in complete years		
15-19	20	10.0
20-24	67	33.3
25-29	65	32.3
30-34	32	15.9
35-39	12	6.0
40-44	5	2.5
Mean age 27.2±5.99 years		
Marital status		
Married	177	88.1
Single	18	9.0
Separated	3	1.5
Divorced	2	1.0
Widowed	1	0.5
Maternal level of education		
University	10	5.0
College	14	7.0
Secondary	64	31.8
Primary	109	54.2
No formal education	4	2.0
Maternal occupation		
Farming	67	33.3
Small scale trade	57	28.4
Unemployed	36	17.9
Casual labour	22	10.9
Employed(salaried)	19	9.5

In this study, the majority of the mothers (88.1%) were married while 11.9% were single, separated or widowed. Most of the mothers (54.2%) had completed primary level of education while 31.8% had attained secondary level (Table 2). Only 12% had post-secondary level of education. With regard to livelihoods, 33.3% of the mothers were engaged as subsistent farmers, 28.4% operated small scale businesses, while 10.9% were wage laborers. The rest (17.9%) indicated having no form of employment (Table 2).

Complementary feeding practices

Introduction of solid, semi-solid or soft foods

All the children 6-23 months (100%) had received solid, semi-solid or soft foods the previous day, indicating that all children had been introduced to complementary foods. From the FGDs, participants indicated that early introduction of infants to other foods besides breast milk was a common practice and that EBF was rarely practiced. This was common during peak seasons for farm work such as during planting and during harvesting to enable less frequent breastfeeding.

Minimum meal frequency

All of the breastfed children aged 6-8 months (n=37) attained the MMF of 2 meals a day while 78.4% (n=88) of the breastfed children aged 9-23 months met the MMF requirement of 3 meals a day.

However, only 10.7% of non-breastfed children aged 6-23 months met the MMF of 4 meals a day. Overall, 56.7% of the children attained their requirements for MMF based on both their age and breastfeeding status (Figure 1).

The participant in the FGDs generally felt that if food was available, then a child should be fed "as frequently as they are hungry". High food prices; poverty/ lack of money to buy food; occupations which keep mothers were some of the reasons given for failure to attain the MMF amongst mothers in the FGDs.

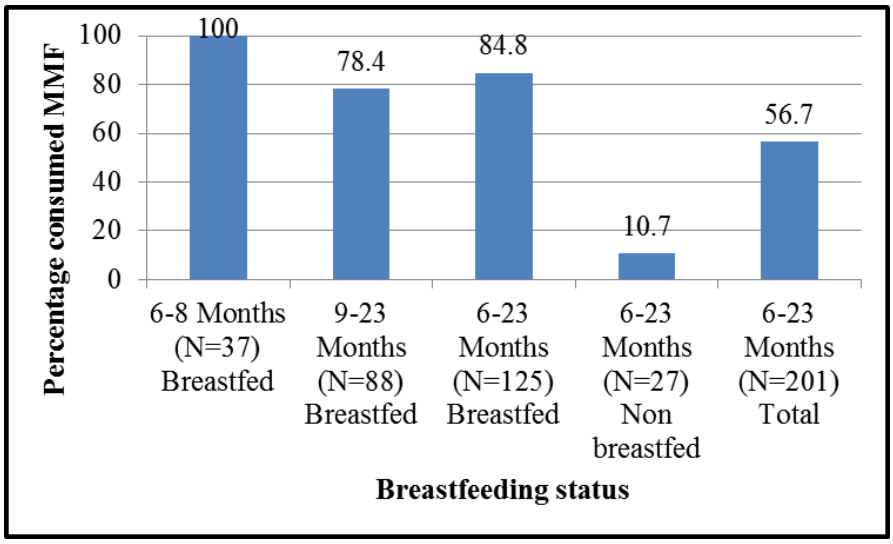

Figure 1: Proportion of children meeting minimum meal frequency by age and breastfeeding status

Dietary diversity of the study children

In the current study, mothers were requested to state what their children consumed the previous day which were then categorized into 7 food groups as recommended by WHO. [3] These comprised of: grains, roots and tubers; legumes and nuts; dairy products; eggs; vitamin-A rich fruits and vegetables; other fruits and vegetables and flesh foods (beef, fish, poultry and organ meats). A cut-off of at least 4 out of the 7 food groups was used to determine the minimum dietary diversity. [19]

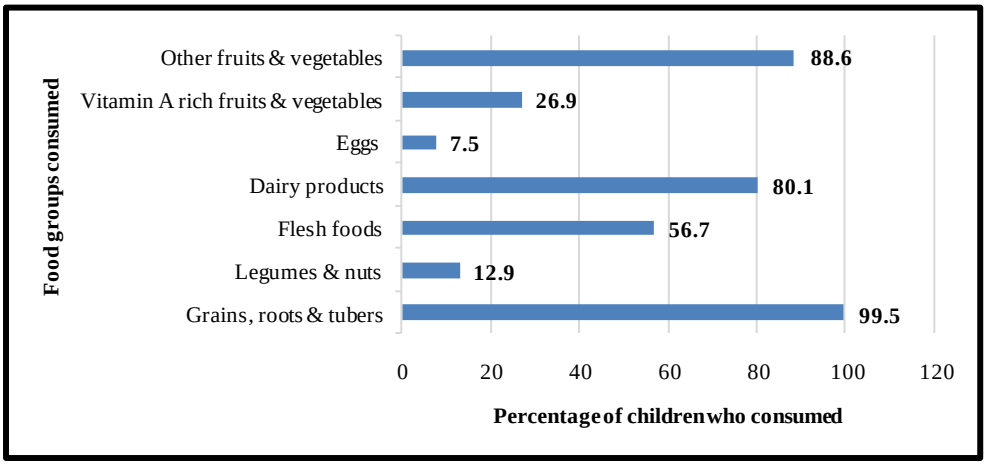

Figure 2: Children's consumption of foods by food groups

The most consumed food group was grains, tubers and roots consumed which was consumed by 99.5% of the sampled population. Consumption of proteins was

highest from dairy products (80.1%) and least from eggs (7.5%). The prevalence of the intake of Vitamin A rich fruits and vegetables was 26.9%. Iron rich food intake (flesh meats) was by 56.7% of the children while the rate of consumption of other fruits was relatively higher (88.6%) (Figure 2).

Food consumption patterns

In this study, the food groups consumed were grouped into seven key categories, adopted from the World Health Organisation. [3] Mothers in the FGD reported that porridge, tea with milk, rice, beans, Dagaa, Mandazi, Pawpaw, Banana, Oranges and sukuma wiki were the foods most commonly fed to children 6-23 months old. The frequency of consumption of flesh foods was low with less 4% consuming meat on a daily basis. Maize (flour) was the most consumed food among the category of cereals roots and tubers with 87% of the respondent having consumed it on a daily basis in the week preceding the study (Table 3).

Beans were most popular among the legumes with over half of the children having consumed the food at least three times in the week. The other types of legumes i.e. green peas and green grams were rarely consumed with 98% and 76.6% of the study children never having consumed the foods in the week immediately preceding the study (Table 3).

Table 3: Frequency of consumption of foods by food groups

Food groups	**N=201**				
	Daily	4-6 times	2-3 times	Once	Never
Flesh foods	%	%	%	%	%
Beef	3	10	25.9	48.8	12.4
Poultry	0.5	1.5	3	25.4	69.7
Fish	2	23.4	25.4	37.8	11.4
Liver	1	1	4	20.4	73.6
Organ meat	0.5	3	6	14.9	75.6
Grains, roots and tubers					
Maize flour	87.1	8	3.5	0.5	1
Millets	37.8	4.5	9.5	7.5	40.8
Sweet potatoes	12.9	26.4	17.4	17.9	25.4
Cassava	11.4	2.5	9	12.4	64.7
Rice	38.3	25.9	12.9	13.4	9.5
Sorghum	46.3	5.5	7.5	7	33.8
Chapati	2.5	3.5	16.4	43.3	34.3
Irish potatoes	21.4	14.4	27.9	22.4	13.9
Others	-	7.5	14.9	7	70.6
Legumes and nuts					
Beans	8	19.4	30.3	30.8	11.4
Green grams	2	3	4	14.4	76.6
Green peas	-	0.5	0.5	1	98.0
Dairy products					
Milk	84.6	4	5	3.5	3
Cheese	-	-	-	0.5	99.5
Yoghurt	3	4	3.5	5.5	84
Eggs	1	13.9	33.8	33.8	17.4
Vitamin A rich fruits and vegetables					
Carrots	11.4	2.5	5	17.4	63.7
Spinach	5	3.5	11.9	25.9	53.7
Sukuma wiki	48.8	27.9	13.4	8	2
Pawpaw	6	13.4	24.4	35.8	20.4
Mango	4.5	4.5	13.4	34.8	42.8
Avocado	19.9	16.4	34.3	21.4	8
Other fruits and vegetables					
Onion	93	0.5	1	-	5.5
Banana	38.8	25.9	14.9	14.9	5.5
Tomatoes	95.5	1	2.5	-	1
Passion	1.5	2.5	5.5	11.9	78.6
Cabbage	4	7	17.9	41.3	29.9
Oranges	4	24.9	29.4	34.9	8
Others	-	14.9	22.4	49.8	12.9

The study found milk is a major component of the diet of majority of the study population with 84.6% of the study children having consumed milk on a daily

basis in the week preceding the study period (Table 3). Among the vitamin A rich fruits and vegetables, sukuma wiki (collard greens) were most consumed with 48.8% having consumed the vegetables on a daily basis. The consumption of tomatoes and onions were the most consumed with 95.5% and 93% of the participants, respectively, (Table 3).

Minimum acceptable diet

In the study, 32.3% of children met the minimum acceptable diet while 67.7% did not meet the recommended minimum acceptable diet (Figure 3). This means a number of children are still not getting adequate diet with regard to quality and quantity.

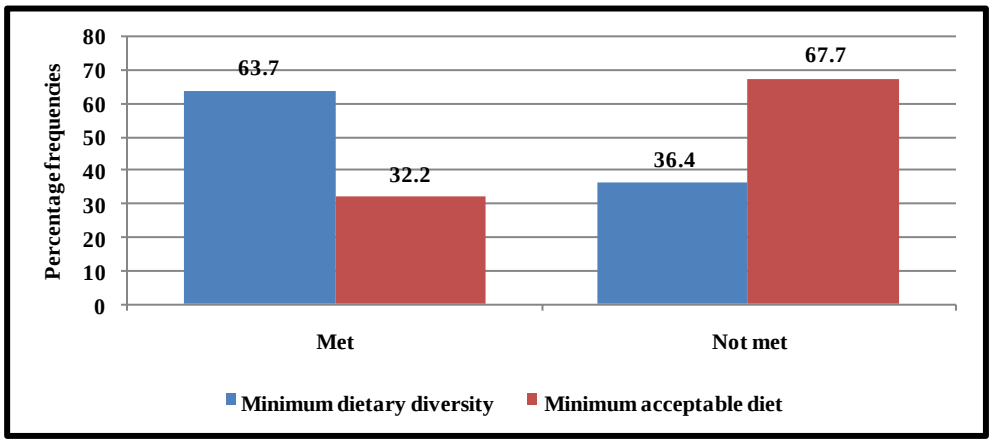

Figure 3: Percentage frequencies of minimum dietary diversity and minimum acceptable diet

When FGD participants were asked about the challenges to proper complementary feeding, the general sentiment expressed was that mothers engaged in income generating activities and therefore not able to practice appropriate complementary feeding practices. One participant said "unajua sasa hauwezi kuchukua muda yote kuangalia mtoto, lazima utoke kuenda kutafuta ama sivyo nyumba yote italala njaa hata huyo mwenye unajaribu kumshugulikia" (you know, now you cannot spend all your time looking after the child, you must go out to fend for the family or else the whole house will go without food including the one you are trying to attend to).

Nutrient intakes

The study findings shows that majority, 94%, 84.6% and 82.1% of the children are meeting their RDI for protein, fat and iron, respectively. Proteins are the most supplied nutrients from the diets with a mean intake of 12.26 ± 1.013 g/day (Table 4).

Table 4: Mean dietary intake of selected food nutrients per day

Nutrients(N=201)	Recommended value 6-11(12-23)	Mean intake	Std. Deviation	Percentage of RDIs met
Energy (kcal/day)	630-900	1058.13	607.56	63.2
Protein (g/day)	11(13)	12.26	1.013	84.6
Fat (g/day)	30	27.11	16.12	94.0
Carbohydrates (g/day)	95(130)	174.35	94.34	77.1
Vitamin A (µg/day)	500*(300)	362.49	397.33	37.8
Vitamin B12 (µg/day)	0.5*(0.9)	0.49	1.23	14.9
Vitamin C (mg/day)	50*(15)	37.27	33.78	61.7
Calcium (mg/day)	260*(700)	360.61	217.72	26.4
Iron (mg/day)	11(7)	8.59	78.13	82.1
Zinc (mg/day)	3(3)	2.43	2.17	33.3

* Adequate Intakes (AI)

Almost 40% of children are not meeting their dietary energy requirements. Vitamin B12 was the most commonly undersupplied nutrient in the diets of the children with only14.9% meeting their RDIs for the vitamin (Table 4).

Nutrition status (weight-for-height) based on Z scores

The findings shows that global wasting rate in this study was 5.5% where 11.0% (5) children were between the months of 18 to 23, between the months of 6 to 17 were only 3.9 % (6) (Table 5).

Table 5: Prevalence of malnutrition indices based on z-scores by age category

Indicators		Age categories		
		6-17 Mon (N=152)	18-23 Mon (N=49)	Total (N=201)
		n (%)	n (%)	n (%)
Wasting	Severe (<-3 z-score)	0(0.0)	2(4.1)	2(1.0)
	Moderate (>= -3 and <-2 z-score)	6(3.9)	3(6.9)	9(4.5)
	Normal (> = -2 z score)	146(96.1)	44(89.8)	190(94.5)
Stunting	Severe (<-3 z-score)	18(11.8)	8(16.3)	26(12.9)
	Moderate (>= -3 and <-2 z-score)	29(19.1)	3(6.1)	32(15.9)
	Normal (> = -2 z score)	105(69.1)	38(77.6)	143(71.1)
Underweight	Severe (<-3 z-score)	2(1.3)	3(6.1)	5(2.5)
	Moderate (>= -3 and <-2 z-score)	12(7.9)	1(2.0)	13(6.5)
	Normal (> = -2 z score)	138(90.8)	45(92.0)	183(91.0)

The majority 94.5% (190) were normal of which 96.1% (146) were between the months of 6-17 whereas 89.8% (44) were between the months of 18-23 of age (Table 5). The global stunting rate was 28.8% (58). Furthermore, 15.9% (32) were moderately stunted, while 12.9% (26) were severely stunted. Stunting is more pronounced at the age between 6-17 months (30.9) (Table 9).

In this study, 2.5 % (5) were severely underweight and the majority 91.0 % (183) of the children was normal (Table 5). Underweight is mainly a consequence of inadequate diet and frequent infection leading to deficiencies in calories, proteins, vitamins and Minerals [3]. The findings were that more boys 35.7 % (27.5 – 44.7 95% C.I) than girls 19.8 % (12.7 – 29.4 95% C.I) were stunted. Almost double the percentages of boys 11.3% (6.7-18.4 95% C.I) were underweight compared to girls 5.8% (2.5-12.9 95% C.I). Similarly, more boys 7.8% (4.2-14.2 95% C.I) than girls 2.3% (0.6-8.1 95% C.I) were wasted (Figure 4).

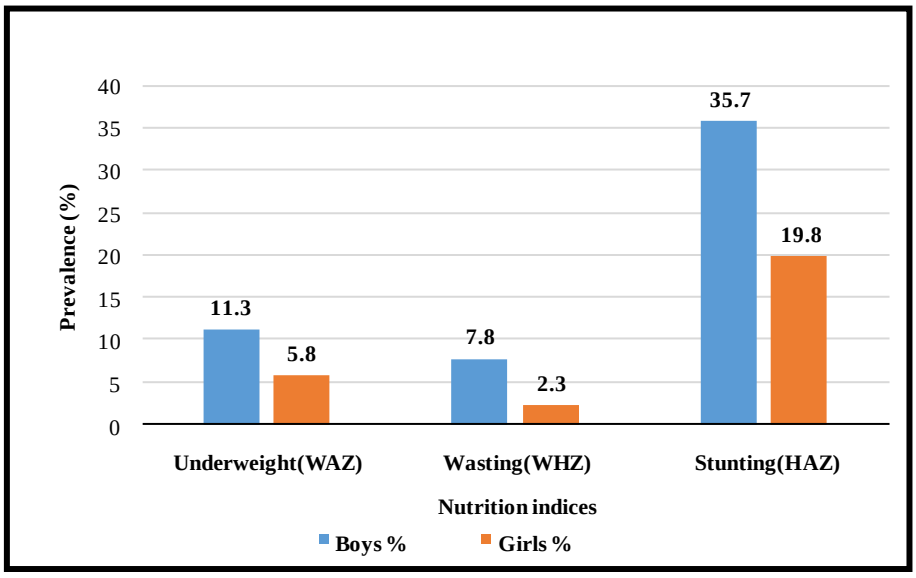

Figure 4: Global malnutrition by gender category

Association between complementary feeding practices and demographic and socio-economic characteristics

Chi square test was used to test for associations between complementary feeding and demographic and socio-economic characteristics. The

complementary feeding in terms of meal frequency was significantly associated with maternal occupation**.** The attainment of the minimum dietary diversity among the children was found to be significantly associated with several demographic and socioeconomic characteristics, including Maternal age ((χ^2= 12.30, P value= 0.032), Mother's level of education ((χ^2= 14.01, P value= 0.007), Main source of income ((χ^2= 10.27, P value= 0.016), Average monthly income ((χ^2= 18.46, P value= 0.001), Husband occupation ((χ^2= 14.13, P value= 0.007), HH Size ((χ^2= 22.96, P value= 0.006) and No. of children in HH ((χ^2= 25.64, P value= 0.001). In contrary, Maternal occupation (χ^2= 8.83, P value= 0.07), Marital status (χ^2= 5.42, P value= 0.247) and number of under five years children in the household (χ^2= 4.14, P value= 0.246) were not associated with meeting the minimum dietary diversity (Table 6).

Table 6: Association between meeting minimum dietary diversity and demographic and socio-economic characteristics

DV	IV	df	χ^2	p-value
Minimum Dietary Diversity	Maternal age	5	12.302	0.032*
	Mother's occupation	4	8.634	0.071
	Mother's level of education	4	14.007	0.007*
	Main source of income	3	10.270	0.016*
	Average monthly income	4	18.455	0.001*
	Husband occupation	4	14.126	0.007*
	Marital status	4	5.423	0.247
	HH Size	9	22.955	0.006*
	No. of children in HH	7	25.637	0.001*
	No. of under 5s in HH	3	4.144	0.246

*significant at p<0.05

The meeting of minimum acceptable diet was significantly associated with maternal level of education (χ^2= 10.95, p-value= 0.027), main source of household income, (χ^2= 13.93, p-value= 0.003), average monthly household income (χ^2= 8.52, p-value= 0.044) and the occupation of the husband (χ^2= 14.95, P value= 0.005) and the age of the child (χ^2 =45.31, p-value < 0.001). However, there was no association between the MAD and maternal age (χ^2= 6.53, P value= 0.176), marital status (χ^2= 4.46, P value= 0.347), occupation (χ^2= 5.70, P value= 0.223) as well as household characteristics including household size (χ^2= 9.36, P value= 0.405), number of children in the household (χ^2= 5.31, P value= 0.622) and number of under five children in the household ((χ^2= 5.46, P value= 0.141) (Table 7)

Table 7: Association between meeting minimum acceptable diet and demographic and socio-economic characteristics

DV	IV	df	χ^2	p-value
Minimum Acceptable Diet	Maternal age	5	6.53	0.176
	Maternal marital status	4	4.46	0.347
	Mother's Occupation	4	5.70	0.223
	Maternal level of education	4	10.95	0.027*
	Main source of income	3	13.93	0.003*
	Average monthly income	4	8.52	0.044*
	Husband occupation	1	14.95	0.005*
	HH size	9	9.36	0.405
	No. of children in HH	7	5.31	0.622
	No. of under 5s in HH	3	5.46	0.141
	Child age	17	45.31	<0.001*

*significant at p<0.05

Association between nutrition status and demographic and socio-economic characteristics

Chi square test was used to test for associations between nutrition status and demographic and socio-economic characteristics. No significant association (P >0.05) was found between wasting (WFH) and all the demographic and socio-economic characteristics tested (Table 8). Stunting

Table 8: Association between nutrition status and demographic and socio-economic characteristics

Nutrition status	Characteristic	χ^2	P value
Wasting (WFH)	Mothers age	9.675	0.469
	Marital status	4.55	0.804
	Household income	2.135	0.344
	Mother's level of education	7.545	0.479
	Mother's ccupation	7.038	0.533
	Husbands occupation	13.747	0.089
Stunting (HFA)	Mothers age	12.176	0.273
	Marital status	4.874	0.771
	Household income	7.803	0.020*
	Mother's level of education	15.429	0.026*
	Mother's occupation	8.174	0.417
	Husband occupation	4.326	0.827
Underweight (WFA)	Maternal age	10.38	0.408
	Maternal marital status	0.52	0.773
	Mother's Occupation	11.45	0.178
	Maternal level of education	7.71	0.462
	Main source of income	19.63	0.003*
	Husband occupation	20.20	0.010*
	Household Income	14.70	0.045*

(HFA) was found to be significantly associated with mother's level of education (χ^2= 15.429, P value= 0.026) and the income

(χ^2= 7.803, P value= 0.020). However, no significant relationship was found between mother's age, marital status and mother's occupation (Table 8).

The WFA of the study children was found to be significantly associated with the household's main source of income (χ^2= 19.63, p-value= 0.003), level of monthly income (χ^2= 14.70, p-value= 0.045) and the occupation of the respondents' husband (χ^2= 20.20, p-value= 0.010). However, no significant relationship was found between the children's WFA and maternal age (χ^2= 10.38, p-value= 0.408), marital status (χ^2= 0.52, p-value= 0.773), occupation (χ^2= 11.45, p-value= 0.178) and level of education (χ^2= 7.71, p-value= 0.462) (Table 8).

Participants who had casual labour as the main source of income were 5.39 more likely to have underweight children as compared to those who were in small scale business (OR=5.39; C.I: 1.57-8.50; p-value=0.007) (Table 9).

Table 9: Relationships between socio-economic status and underweight of children

Nutrition status	Parameter Estimates	Sig.	OR	95% C.I for Exp (B)	
				LB	UB
Underweight (WFA)	Main source of income				
	Intercept	0			
	Formal employment	0.719	0.66	0.07	6.22
	Farming	0.92	0.92	0.20	4.30
	Casual labour	0.007*	5.39	1.57	8.50
	Small scale business	.	.	.	.
	Husband occupation				
	Intercept	0.001			
	Unemployed	0.049*	9.31	1.02	94.10
	Employed/salaried	0.859	0.78	0.05	12.89
	Small scale trade	0.495	2.18	0.23	20.32
	Casual labour	0.046*	8.72	1.04	72.94
	Farmer	.	.		
	Household income category				
	Intercept	0			
	Category 1< Ksh 15000	0.045*	1.76	0.39	8.03
	Category 2> Ksh 15000	.	.		

Those husband in causal labour were 8.72 times likely to have underweight children than those in farming (OR=8.72; C.I: 1.04-72.94; p-value=0.046,). Similarly, those who were unemployed were 9.31 times more likely to have underweight children than those who were farming (OR=9.31.00; C.I: 1.02-94.10 p-value=0.049). Participants who had an average monthly income of less than KSH 15000 were 1.76 times more likely to have underweight children than those with an average monthly income of above KSH 15000 (p-value=0.045, OR=1.76) (Table 9).

Association between complementary feeding practices and nutrition status of children

The nutrition status (underweight/ WFA) was significantly associated with attainment of minimum acceptable diet (χ^2= 5.38, p-value = 0.048). Wasting/WFH (χ^2= 4.577, p-value = 0.101) and stunting/HFA (χ^2= 0.524, p-value = 0.770) however, were not significantly associated with minimum acceptable diet (Table 10).

Table 10: Relationship between complementary feeding practices versus nutrition status

CF practices	Nutrition status	χ^2	P value
MAD	Wasting(weight for height)	4.577	0.101
	Stunting(Height for Age)	0.524	0.770
	Underweight(Weight for Age)	5.38	0.048*
MDD	Wasting(weight for height)	3.028	0.231
	Stunting(Height for Age)	0.475	0.625
	Underweight(Weight for Age)	6.302	0.043*
MMF	Wasting(weight for height)	6.516	0.392
	Stunting(Height for Age)	0.117	0.128
	Underweight(Weight for Age)	2.581	0.413

*significant at p<0.05

DISCUSSION

Socio-economic status of mothers/ caregivers of children ages 6-23 months

Majority of the mothers (88.1%) were married and this influences the complementary feeding practice and nutrition status by pool together resources

which allows for greater disposable income that could go towards food allocations. Most of the mothers (54.2%) had completed primary level of education while 43.8% had attained secondary level and above. This is contrary to both county and the national level. In Migori County, 24.0% and 11.0% had completed primary education and secondary education level and above, respectively, whereas nationally, 25% of women had completed primary education and 27% had attained secondary level of education and above. [8]

Education levels have been positively correlated with the levels of nutrition knowledge, access to information regarding childcare practices and healthcare behaviour of mothers which have a bearing on the morbidity and nutrition status. [20] Occupation and income are closely linked and have both been shown to influence dietary practices and nutrition status through various pathways. [21] In the current study, most of the respondents reported farming (33.3%) and small scale trade (28.9%) as their main occupation. This is similar to the findings in the 2014 KDHS; most of the women (59%) are employed in either agriculture or domestic service. The other notable occupations include professional, technical, or managerial (14%); sales and services (14%); and unskilled manual labour (10%). There is a great deal of variation by background characteristics. [8]

Complementary feeding practices

Introduction of solid, semi-solid or soft foods

In this study, about 98.5% of children had ever been breastfed which compared similarly to those reported in the Kenya national survey (99%). However, the continues breastfeeding rates of 57% and 37% fell below the national rates of 90% and 53% for continued breastfeeding at 1 year and 2 years, respectively. This is in agreement with the findings in a study conducted in urban slums in Kenya. [22] All mothers introduced complementary feeding foods to their children timely; all the children 6-8 months (100%) had received solid, semi-solid or soft foods the previous day. During the FGDs, participants indicated that early introduction of infants to other foods besides breast milk was a common practice and that exclusive breastfeeding was rarely practiced. Some reported to have introduced other foods as early as when their babies were one month old. The finding on early introduction of complementary feeding is in agreement with those of other studies conducted in informal settlements in Kenya. [23,24] These findings are also comparable to those reported in a study in Ethiopia. [25] Mothers tended to introduce their children to solid foods during peak seasons for farm work such as during planting and during harvesting to enable less frequent breastfeeding.

Minimum meal frequency

The current study established that 10.5% of non-breastfed children met the recommended minimum meal frequency (MMF) of at least 4 main meals a day while 84.8% of breastfed children met the MMF as per the WHO recommendations based on age and breastfeeding status. [5] These results significantly vary from those of the national survey which reported that 56.7% of the non-breastfed children and 49.6% of the breast fed children were fed the minimum number of times in the previous 24 hours. [8]

The relatively high energy requirements of children aged 6-23 months old and their limited stomach capacity challenge their ability to meet nutrient needs, particularly if only a few meals are offered each day. [26] The overall percentage of children meeting MMF based on both age and breastfeeding status of 56.7% reported by current study compares well with 60% reported in Isiolo County, Kenya. [27] These results were also lower compared to the values of 82% reported in Kirinyaga County, Kenya. [28] Other study conducted in Ethiopia found that the age of children, household economic status, residence and sources of information on IYCF nutrition are associated with meal frequency. [29]

Dietary diversity of the study children

The recommended minimum dietary diversity (MDD) for a child aged 6 - 23 months children is consumption of foods from at least 4 food groups of the seven food groups over a period of 24 hours. [5] Current study reports a low mean DDS (3.72 ± 1.64) below the cutoff with 36.8% of children from the study area are not consuming foods from at least 4 food groups and are therefore prone to micronutrient deficiencies. The findings are in agreement with those found in various studies in Kenya; in Korogocho slum and in Isiolo County. [23, 27] Current findings are however above the DDS of 2.4±0.25 reported among children of similar age category in Kitui County Kenya. [30]

The consumption of grains, roots and tubers was highest (99.5) whereas eggs and vitamin A rich fruits and vegetables were low; 7.5% and 26.7%, respectively. This is consistent with the proposition that cereals and tubers are the most common complementary food across sub-Sahara Africa. [26] These findings are comparable with those found in the studies conducted in Kahawa West, Kenya and in Adis Ababa, Ethiopia. [31, 32] Low consumption may be attributed to household food insecurity, high cost of foods, or inadequate nutritional knowledge.

Majority of the children met their RDAs for protein (84.6%) iron (82.1%), energy (63.2%) and vitamin C (61.7%): this resulted in a higher mean intake of these nutrients than the RDAs for their age. Findings from the current study indicate that 36.8% of the children are not meeting their dietary energy needs. Furthermore, only 37.8%, 32.3% and 26.4% of the children are meeting their daily needs for vitamin A, Zinc and calcium, respectively. These results appear to concur with the findings of studies in Metropolitan Quetzaltenango, Guantemala in rural Kenya, who reported that the most problematic nutrients are the minerals: Vitamin A, calcium, iron and zinc. [33, 34]

Minimum acceptable diet

In this study, the proportion of the study children attaining the minimum acceptable diet (MAD) was 32.3%. These findings imply that over two thirds (67.7%) of children in the study area are not adequately fed and so are at the risk of malnutrition if immediate interventions are not instituted to address the underlying factors. These values are more or less similar to 33.9% and 29.3% prevalence reported by two Ethiopian studies, [25,35] respectively. In rural Northern Ghana, it was also found that only 27.8% of the children ages 6-23 months were receiving the minimum acceptable diet. [36] This falls within the range of the current findings.

The WHO recommended minimum acceptable diet relates to achieving the minimum dietary diversity and the minimum meal frequency for breastfed and non-breastfed children aged six to 23 months of age. [3] In Kenya, only 22 percent of children are fed in accordance with the three recommended infant and young child feeding practices. [8] The low achievement of the minimum acceptable diet is largely contributed to by the minimum meal frequency and low dietary diversity.

The national survey revealed that even lower percentage of Kenyan children (21.8%) actually receives minimum acceptable diet requirements. [8] At the age of 6 months, breast milk alone is no longer sufficient to meet all the nutritional demands of the actively growing infant. Adequate supply of all nutrients is of paramount importance to satisfy the nutritional requirements. [37]

Nutrition status of children ages 6-23 months in Kuria West

The current study has revealed higher rates of malnutrition in the study area than both the county and national weighted averages. In the study area, the global wasting rates were 5.5% (3.1-9.5 95% C.I) with more boys (7.8%) than girls (2.3%) while wasting rates are 4.0% reported for both county and national prevalence. [8] In Zambia, wasting represents the failure to

receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition. [38] Global stunting prevalence was found to be 28.9% (23.0- 35.5 95% C.I) with more percentage of boys (35.7%) than girls (19.8%) being stunted. Current findings for stunting levels are higher than for both county (26.4%) and national (26.0%). Stunting reflects failure to receive adequate nutrition over a long period of time and can also be affected by recurrent and chronic illness. On the other hand, the underweight rates of 9.0% (5.7-13.7 95% C.I) in the current study fall above county but below the national rates of 8.6% and 11.0%, respectively. More boys (11.3%) than girls (5.8%) were found to be underweight. These findings are similar to those found in Isiolo County. [27] This is contrary with the findings in a study among Ghanian children in the same age category reported that 20.5%, 11.5% and 21.1% of the study population were stunted, wasted and underweight, respectively. [36]

CONCLUSIONS

The study established that there was no significant relationship between the three variables; maternal socio-economic status and complementary feeding practices, maternal socio-economic status and nutrition status, and complementary feeding practices and nutrition status.

ACKNOWLEDGEMENT

We extend our appreciation to the study participants for allowing us to carry out this study. Special thanks go to the research assistants who ensured high quality data was collected amidst all the challenges in the study area.

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How to cite this article: Nyakundi LN, Chege P, Ogada I. Maternal socio-economic status, complementary feeding practices and nutrition status of children ages 6-23 months in Kuria west, Migori county, Kenya. Int J Health Sci Res. 2019; 9(12):217-231.

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