



Complementary feeding practices and nutritional status of children 6 to 24 months: A cross-sectional descriptive study

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ABSTRACT

Background: Complementary feeding refers to a process of introducing the infant to additional sources of nutrition other than the breast milk, usually at the age of six months. Infant and Young Child Feeding guidelines provided by United Nations Children's Fund/ World Health Organization require that children are exclusively breastfed from birth to six months of age when addition foods is introduced to meet the increasing nutritional requirements of the growing child. Proper initiation of the complementary feeding is critical as any deviation may lead to inadequate energy and nutrient intake, leading to sub-optimal growth and development.

Objective: The study aimed to assess complementary feeding practices in relation to nutritional status of children aged 6 to 24 months at the Well baby Clinic at Mbagathi Hospital, Nairobi County.

Material and Methods: A cross-sectional study involving 300 children aged 6 to 24 months was conducted at the Well Baby Clinic at Mbagathi Hospital. Anthropometric measurements were taken using standard procedures and interviewer administered questionnaire was administered to mothers to gather data on complementary feeding practices of study children. Anthropometric data was analyzed using WHO anthro2005 software and descriptive statistics analyzed using SPSS version 20. Results were presented in tables.

Results: Majority (81.7%) of children were first initiated complementary feeding at the recommended age of six months with a mean age of 5.71(\pm 1.033). Almost a quarter (24.3%) of the children were given \leq 3 meals per day with a mean of 4.35 (\pm 1.210) meals per day. 15.3% of the children were wasted (W/H z-score $<$ -2SD), 22% underweight (W/A z-score $<$ -2SD) and 14.3% stunted (H/A z-score $<$ -2SD). Most



complementary foods were Carbohydrates (starchy) based from locally available cereals with limited combination from other food classifications.

Conclusion and recommendation: Despite the impressive rates of compliance with the recommended age of introduction of complementary feeding, malnutrition was high among the children attending the Well Baby clinic at Mbagathi District Hospital. There is need for health care providers to proactively address gaps in complementary feeding practices especially on food diversity, food composition and frequency of meals.

Key words: Complementary feeding practices, malnutrition, food quality, complementary food diversity.

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Introduction

While breastmilk provides adequate nourishment and protection to children from infection for the first six months, children need nutritious and adequate complementary foods thereafter for good health, growth and development [1]. Complementary feeding refers to a process that starts after the sixth month of life when breast milk alone can no longer be sufficient to meet the nutritional requirements of infants and therefore other foods and liquids are needed in addition to breast milk [2]. The period of complementary feeding is generally taken to be 6 to 24 months of age though breastfeeding may continue beyond two years [3, 4]. Save the Children identifies this period as the peak for malnutrition when foods of low nutrient density are used to replace breast milk and incidences of diarrhea become more common [5].

Conversely, when complementary foods are not introduced appropriately growth in children is likely to falter [6]. Appropriate complementary feeding

practices should aim to provide sufficient energy, protein and micronutrients to cover the child's energy and nutrient requirements [7]. The World Health Organization emphasizes the importance of continued breastfeeding during this period as breast milk continues to constitute a significant source of nutrients contributing a half of infant's energy requirement during the first year and a third in second year [8]. In addition, successful complementary feeding requires use of good quality, locally available and affordable foods with adequate nutrients that is supported by supplementation and nutrition education to the mothers [9].

The transition from exclusive breast feeding to complementary feeding is associated with greatest challenge and has high impact on child nutritional status increasing prevalence of malnutrition [10]. The aim of the study was to assess complementary feeding practices and associated factors among children aged 6 to 24 months attending Well baby Clinic at Mbagathi Hospital.



Material and Methods

Study site

The study was carried out at the Well Baby Clinic at Mbagathi Hospital, Nairobi. Mbagathi Hospital is one of the three public hospitals in Nairobi County and is situated in Dagoretti Division about 3 kilometers from the City Centre. Mbagathi hospital provide services at level 4 according to the government of Kenya classification of health care system and has both in and out patients. Services offered in the facility include Maternal Child Health, Reproductive Health, Internal Medicine and General Surgery.

Study population

The study population involved children aged 6 to 24 months attending the clinic for normal health services including routine immunization, growth monitoring and nutrition counseling. Mothers of the children were recruited to provide information on feeding practices of the study children.

Study design

A cross-sectional descriptive study

Sample size determination

The sample size was determined using Fishers Formula (Fishers et Al, 1998) based on a prevalence rate of malnutrition among under-fives of 26% (KDHS, 2014).

Sampling Frame and sampling technique

Systematic random sampling was used to enroll 300 children to the study. Every morning the research team assigned randomly one child to act child number 1 and thereafter every alternative child who met the inclusion criteria was enrolled. Mothers of enrolled children were recruited as participants. The study took place from November 2015 to January 2016.

Ethical consideration

Ethical approval to conduct the study was obtained from Scientific and Ethical Review Unit (SERU) at the Kenya Medical Research Institute (KEMRI). Authority to conduct the study at Mbagathi Hospital was obtained from Hospital Management. All participants signed a written consent form after they were explained the purpose of the study and agreed to participate.

Data collection

Weight and height measurements of the children were taken from children using standard procedures

Feeding practices were assessed using a semi-structured questionnaire administered to the mothers of study children.

Data Analysis

Anthropometric data were analyzed using WHO Anthro 2005, Beta version Feb 17th 2006 software



recommended for children 6 to 59 months, SPSS version 20 for numerical and categorical data to generate descriptive statistics. Chi-square test of association and Odds Ratio (OR) were computed to determine degree of association. 95% confidence interval and p-value <0.05 were used to determine statistical significance.

Results

Demographic characteristics of study population

The study at Mbagathi hospital aimed to assess complementary feeding practices of children aged 6 to 24 months attending the Well baby Clinic. A total of 300 child/mother pairs were enrolled into the study. Overall there were 51% boys and 49% girls in the study with a minimum age of 6 months and maximum of 24 months with a mean of 11.85 (± 4.561). Mothers

age in years age ranged from 17 to 49 years with a mean of 26.99(± 5.21).

Feeding characteristic of study children

Table 1 presents children feeding characteristics. At least all children 300 (100%) participating in the study had received other forms of foods in addition to breastmilk at the time of study. Most of the children (81.7%) were first initiated to complementary foods at the recommended age of six months. The earliest a child was introduced to alternative food was at 3 weeks and the latest was at 8 months with a mean of 5.71(± 1.033). Three quarters (75.7%) of the children were given more than three meals per day while 24.3% were given three meals in a day or less. The least number of meals per day was 1 (0.7%) and highest number of meals give to a child per day were 10 (0.3%) with a mean of 4.35(± 1.210) meals per day and a mode of 4 meals.

Table 1: Complementary feeding practices of study children

Variable Description	N	%	Mean	Min	Max
Age of child at introduction of complementary foods (months)					
< 6	55	18.3	5.71(± 1.033)	1	8
≥ 6	245	81.7			
Frequency of meals given to study child per day					
≤ 3 MEALS	73	24.3	4.35(± 1.210)	1	10
>3 MEALS	227	75.7			



Commonly used complementary foods given to study children

As shown in Table 2, most children were fed on carbohydrate rich food comprising of porridge (94.6%), mashed potatoes (80.3%), and mashed bananas (76.3%). Milk was the most common source of protein (74%) while 69% were given mashed fruits contributed. There was a low consumption of meat

(16.6%) and vegetables (30.6%). Infant formula was the least consumed possibly due to cost implications. Dietary diversification requires that a child is fed from four food group: grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables which was not the practice at the clinic limiting nutrients available for the children.

Table 2: Foods given to study children in the previous 24 hours

Variable Description	Frequency	Percentage%	95% Confidence Limits
Porridge	284	94.6	91.5 -96.6
Mashed Potatoes	241	80.3	75.4 – 84.4
Mashed Bananas	229	76.3	71.2 – 80.7
Milk	222	74.0	68.7 – 78.6
Mixed Fruits	207	69.0	63.5 – 73.9
Ugali (thick porridge)	94	31.3	26.3 – 36.7
Vegetables	92	30.6	25.7– 36.1
Pumpkin	69	20.0	15.8 – 24.8
Rice	50	16.6	12.8 – 21.3
Infant Formula	19	6.3	4.0 – 9.6

Mother's opinion on complementary feeding of study children

Table 3 presents assessment of mother's opinion towards complementary feeding. Majority of mothers (90.7%) agreed that children below six months should only be given breastmilk while 9.3%

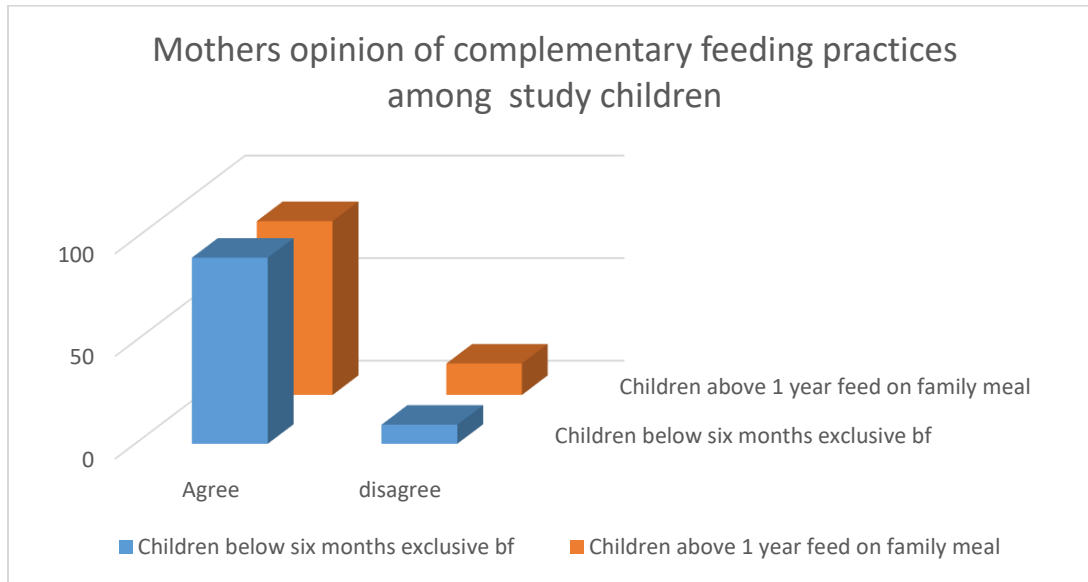
of the study participants felt that children should be given other forms of food in addition to breast milk before they were six months old. At the same time, most mothers (84.7%) were of the opinion that a child at one year should be able to eat from family foods alongside their specially prepared meals including snacks. However, 15.3% of mothers felt



that it is inappropriate to give children family foods. Family meals increase food diversity and nutrients to meet the energy requirement of the growing child. The role of health care providers should aim to

educate mothers on appropriate complementary feeding practices and bridge the gaps between evidence (IYCF) and current feeding practice.

Table 3: Mothers opinion on complementary feeding practices of study children



Analysis of children nutrition status based on complementary feeding characteristics

Cross-tabulation to compare children nutrition status (classified as wasted, underweight and stunted) and defined as children whose anthropometric measurements were <-2 Standard Deviations (SD) from reference population (WHO, 2005) were conducted. The aim of the analysis was to identify complementary feeding practices that increases the odds of the study children suffering from adverse nutrition status. Overall, the rates of malnutrition among study children were wasting (15.3%), underweight (22.0%) and stunting (14.3%).

Wasting and underweight which are acute forms of malnutrition were significantly related to number of meals given to a child per day. Meals frequency of more than 3 times a day was found protective of the child against wasting (OR= 0.430, CI 0.222-0.834, p=0.011) and underweight (OR=0.557, CI 0.306-1.041, p=0.041) respectively.

Stunting which is chronic form of malnutrition was not directly affected by number of meals given to a child per day (p>0.05).The study did not find a significant relationship between age at first initiation of complementary feeding and malnutrition (p>0.05).



Table 4: Nutrition status of study children based on feeding characteristics

Variable	description	Normal	Under-nutrition	OR	95% CI	P-value
Age of child in months at introduction of complementary feeding(N=300)						
WHZ	< 6	43	12	0.577	0.277-1.205	0.14
	≥ 6	211	34			
WAZ	< 6	41	14	0.789	0.400-1.577	0.49
	≥ 6	193	52			
HAZ	< 6	46	9	0.824	0.370-1.835	0.63
	≥ 6	211	43			
Number of meals given to study children per day (N=300)						
WHZ	≤ 3 meals	55	18	0.430	0.222-0.834	0.011
	> 3 meals	199	28			
WAZ	≤ 3 meals	51	22	0.557	0.306-1.014	0.041
	> 3 meals	183	44			
HAZ	≤ 3 meals	60	13	0.703	0.345-1.433	0.33
	> 3 meals	197	30			

Discussion

WHO and UNICEF recommend introduction of nutritionally-adequate and safe complementary (solid) foods at 6 months together with continued breastfeeding up to 2 years of age or beyond [11]. The study prevalence of initiation of complementary foods of 81.7% compares well with WHO recommendation of more than 80% [12]. Similar results were reported by Udoh *et al* where prevalence of complementary

feeding among 6-8 months in Nigeria was 85.4% [13] but contradict other studies conducted among similar population [14, 15, and 16]. Ample evidence underscore the importance of timely and appropriate introduction of complementary foods for infant and young children as it promotes growth, maintain good nutrition and general health during a period of rapid nutritional requirements [5, 8, 11 and 16]. Determinants of appropriate complementary feeding



studies have shown that adequate ante-natal care and increased post-natal contacts, nutrition education and continued monitoring of complementary feeding practices are proven practices that enhance compliance with complementary feeding practices guidelines among similar population [17].

An aptitude assessment to evaluation mothers' attitude towards complementary feeding revealed that most mothers (90.7%) agreed that complementary feeding should be initiated first at six months. A small number of mothers (9.3%) however felt that breastfeeding alone is not enough and reasons given were lack of adequate breast milk or child crying which is interpreted as hunger compelling the mother to initiate early weaning. This group of mothers need to be targeted for education and information on complementary feeding based on Infant and Young Children Feeding (IYCF) guidelines [5].

Furthermore, the study found an apparent gap between high percentage of first initiation complementary feeding (81.7%) at six months and the anthropometric measurement which deluded to existence of high prevalence of malnutrition with wasting estimated at 15.3%, underweight 22% and stunting at 14.3%. This can be partly explained by the quality of complementary foods which were basically carbohydrates based with porridge accounting for 94.7%, mashed potatoes 80.3%, and mashed bananas 76.3%. Milk which was the most common form of

protein had a consumption of 74.3%, mixed mashed fruits constituted 69.3% and minimal use of animal and plant protein including legumes. These findings resonate well with report by Udoh et al [13] where poor diet diversity comprising mainly of starch is common among low income group. Tassa et al found that complementary feeding in most developing countries is characterized by poor quality food content contributing to malnutrition [17]. Complementary feeding guidelines emphasize the importance of complementary foods comprising of 7 food groups; grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables [18]. Moreover, nutritional education of mothers bringing children to Well Baby Clinics should be founded on evidence and form the bases for nutritional counseling to counteract the deep-rooted child feeding practices.

The high malnutrition rates observed can equally be attributed to minimum meal frequency. Though minimal meal frequency is defined as 2-3 meals for children 6-8 months, 3-4 meals for children 9-11 months and 3-4 meals including 1-2 snacks per day [20] for this study, minimum meal frequency was defined as more than three meals per day including snacks. This was due to lack of clear definition of what constitute a meal and a snack for the study population. The study found a significant relationship



between meal frequency (≥ 4) protective of children against wasting (OR=0.430, $P < 0.011$) and underweight (OR=0.557, $p < 0.041$). Acute malnutrition results from recent food deprivation and therefore reduced meal frequency would lead to limited energy levels increasing risk of adverse nutritional consequences. The ability of the infant to utilize complementary foods require maturation of the digestive system and therefore children should be fed with small quantities of high energy and micronutrients density and the amount increased gradually as child matures to meet nutritional requirements [19]. Consequently, the role of health care provider is to bridge the gap between mother's current nutritional knowledge of complementary feeding and scientific evidence based on IYCF to enhance children nutrition status.

Conclusion

Complementary feeding is an important transition phase in child life where breast milk is no longer adequate to meet nutritional requirements of the growing infant and young children. Infant and Young Child feeding guidelines should be used to provide the base for nutrition education at the Well Baby Clinic in order to boost maternal capacity to meet nutritional demand of children 6 to 24 months of age.

Recommendations

- Nutrition education to improve care givers understanding of the intricate that are involved in the transition from milk based diet to a more diverse in order to meet nutritional requirement of the infant during the complementary feeding period.
- Promotion of locally available and nutritionally appropriate foods based on WHO classification of food sources recommended for infant and young child feeding.
- Promotion of appropriate behavior change that address the gaps in knowledge of child feeding practices specifically on meals frequency, consistency and varieties.

Limitation of the study

This is a hospital based study therefore generalization is limited to study setting

The study relied on recall for dietary information from the mother which is subject to recall bias.

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Authors' contribution to the study

CWS conceptualized the study, proposal development, data analysis and manuscript.

YK supervised the development of study proposal, methodology and design

FK supervised data analysis and approved the manuscript.

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