Child Feeding Practices and the Prevalence of Under-Nutrition among Preschoolers Living in Matisi Peri-Urban Location, Trans-Nzoia County, Kenya

Magaju, P. K.
University of Eldoret
tymagaju@yahoo.com

Mbagaya, G. M.
University of Eldoret
mbagaya@hotmail.com

Shipala, E. M.
Masinde Muliro University of Science and Technology
evamulunji@gmail.com

Abstract

Peri-urban populations are normally characterized by difficult socio-economic situations which are likely to have direct or indirect implications on the child feeding practices, health and the prevalence of under-nutrition among the pre-schoolers. The study aimed at determining the prevalence of under-nutrition in pre-school children and the associated feeding practices in Matisi peri-urban location. A cross-sectional survey design was used. Mother – preschooler pairs (n= 208) were recruited from Matisi peri-urban location, Trans- Nzoia county. The population was peri-urban based and in a slum setting. Children's anthropometric measurements (weight, height, and MUAC) were taken. Interviewer administered questionnaire gathered socio- demographic and feeding practices data. Data was analyzed using SPSS version 16.0. Chi-square test and logistic regression showedassociations infeeding practiceson the prevalence of under-nutrition. Epi-Info version 3.4.3 analyzed anthropometric data into (SD) indices (HAZ, WHZ and WAZ). The results show that the mean age, weight and height was 38±10.7, 13.7± 2.4 and 91±9.2 months, kg and cm, respectively. Under-nutrition by stunting, underweight and wasting was (24%), (21.6%) and (5.3%) respectively. Children who were fed colostrum had 96.6% less chances of stunting compared to those who were not (p=0.010, OR 0.034, 95%CI 0.003-0.443). Breastfeeding, protein, iron, vitamin C and A intake are significant factors associated with under-nutrition among the pre-schoolers. The government should emphasize proper child feeding methods and consumption of the recommended amount of nutrients. Slum upgrading projects and residents assisted to start Income Generating Activities by the Non Governmental Organizations.

Keywords: *Feeding Practices, Peri-Urban, Prevalence, Under-Nutrition*

Introduction

Child feeding practices are of paramount importance in determining a child's nutritional status and overall health in future. Feeding practices vary with age, educational level, culture, socio-economic status and the motivational level of the mother (Bloss *et al*., 2004). Most cultures would prefer to breastfed their infants for various reasons. Breastfeeding is of utmost importance for the infants and young children's survival and health because of its components which are precisely necessary for growth and brain development (LINKAGES, 1999; UNICEF, 2002). Breast milk provides immunological protection for infants and is a source of energy and growth nutrients. Breast milk gives rise to healthy, satisfying intimate relationships between the mother and the baby not wholly procurable by complementary feeding. Lack of breastfeeding often causes growth failure in the first six months and severe under-nutrition in the first year of life (UNICEF, 1998). Many studies have shown positive associations between breastfeeding and nutritional status of the children however, public health efforts which focus only on prolonged breastfeeding (>12 months) alone in developing countries will not ensure adequate early childhood growth unless proper complementary feeding is practiced (Onyango *et al*., 1998).

From the mother's recall, this study investigated if the pre-schoolers had been given colostrum, length of breastfeeding and age of introduction to complementary foods and also if associations existed with under-nutrition. Studies have shown that after the first year of life, when breastfeeding no longer meets the infants' nutrient needs and complementary foods are inadequate, there is likely to be an increase in the prevalence of under-nutrition (Tara, 1988; UNICEF, 2002; UN, 1997). Under-nutrition in pre-school children in low income peri-urban communities has its onset during complementary feeding stage and results mainly from poor feeding practices and poor health practices. Studies also show that delayed initiation of breast-feeding, deprivation from colostrum and improper weaning are significant risk factors for under-nutrition among under-fives (Kumar *et al*., 2006).

Promotion and protection of optimal infant feeding practices are required to improve nutritional status of children hence minimize the risk of under-nutrition (Lindblade *et al*., 2003; Kumar *et al*., 2006). WHO (2002) recommends weaning to begin at 6 months. The introduction of solid foods at around six months of age enables infants to meet their changing nutritional needs (Kumar *et al*., 2006). However, introducing solid foods before six months is undesirable for a number of reasons, including vulnerability of the gut to allergic sensitization, increased risk of diarrhoeal diseases in areas where hygiene is poor and

lack of maternal security is high (DOH, 1994; Mbagaya *et al*., 2004; Ergin *et al*., 2007; Faruque *et al*., 2008).

Evidence indicates that regular support from knowledgeable professionals is effective in improving complementary feeding practices. However, evidence from a study carried out in Western Kenya showed that weaning practices are handed down to mothers through family and friends particularly in rural areas and in a few cases in peri-urban areas. The influence of maternal grandmothers of infants is particularly strong and their knowledge is intuitive rather than informed (Bloss *et al*., 2004). It was found out that children who were introduced to foods early had an increased risk of being underweight. A study in Busia, Kenya found out that early complementation with starchy gruels was associated with stunting (Onyango *et al*., 1998). Finally studies have shown that early introduction to solid food might be due to young motherhood, lower socio-economic status and lack of further/higher education levels (Bloss *et al*., 2004).

Stunting, wasting and underweight have featured more prominently in studies in developing countries (Eicher & Clark, 1985; WHO, 1995; Friedman, 2005; CBS, 2003). A study of pre-school children in peri-urban Kabarole Uganda revealed that stunting was highly prevalent with 41.6% of the children stunted. Under-weight and wasting were 15.7% and 3.4% respectively (Turyashemenerwa *et al*., 2009). In a Kenya Demographic Health Survey stunting was reported to be 30%, wasting 6% and underweight 23% (CBS *et al.,* 2003). A study carried out in Kangemi and Gichagiperi-urban areas of Nairobi among under five, the prevalence of stunting, wasting and underweight was reported to be 27.1%, 4.9% and 12.1% respectively (Gobane, 2004). A comparison in the two peri-urban areas of Uganda and Kenya shows that stunting and underweight are higher in Kabarole, Uganda compared to in Kenya but not for wasting.

Materials and Methods

A cross sectional study was carried out in Matisi location, Trans-Nzoia District, Kenya in Kipsongo and Shanti villages between October and December 2008. The participants were 208 randomly selected pre-school child (24-60 months) – mother pairs. Matisi location was chosen purposively due to its peri-urban slum characteristics and Kipsongo and Shanti villages were chosen randomly from other villages.

Inclusion and Exclusion Criteria

Parent to the child aged 24-60 months who gave a written consent (signing or finger print) and their child and were residents of Kipsongo and Shanti for at least six months prior to the study were enrolled in the study. Children who had malformations or chronic illnesses or their ages could not be ascertained were excluded from the study.

Data Collection Procedures

Data was collected using interviewer administered questionnaires to determine socio demographic factors. A 24 hour recall was also completed and was used to determine the feeding practices of the child. Anthropometric measurements (weight, height and MUAC) were taken.

Data Analysis

Data was cleaned, coded, entered and analyzed using SPSS V. 16.0. Frequency tables, means, and standard deviations were used to summarize the data. Chi-square test of association and logistic regression (binary) were used to determine the significant variables affecting nutritional status (under - nutrition) of pre-schoolers. A p-value of <0.05 was considered statistically significant. Epi Info V.3.4.0 generated Z scores (SD) for the nutritional status and children below - 2 SD were categorized as either underweight, stunted or wasted (Gibson, 1990). The study was reviewed and approved by Institutional Research and Ethics Committee (IREC) of Moi University before commencing. Written permission was sort from Matisi location chief.

Results

Sex, Age and Birth Weight of the Children

Slightly over half 107 (51.4%) of the children were males and 101 (48.6%) were females. The mean age was 38.07 ± 10.7 SD (months). Children's age distribution was as follows; majority 101(48.6%) were between 24-35 months, 65(31.3%) were 36-48 months and 42(20.2%) were 49-59 months. From the mother's recall, the mean birth weight of the children was 3.4 ± 2.9 (kg) though more than half 116 (55.8%) of the children were not delivered in a hospital or health facility. Therefore, their exact birth weight was not known as they were first taken to health facilities two weeks or more after birth. More than half 135(65%) of the respondents claimed that health facilities were too expensive and 42(20%) indicated that they trusted the Traditional Birth Attendants (TBAs).

Methods of Infant Feeding

None of the children was breastfeeding at the time of the interview. From recall information almost all children 200(96.2%) were given entire first breast milk (colostrum) after birth. The 114 (55%) that did not give colostrum claimed that it was not enough and 94(45%) were sick after birth. More than three quarters 185(88.9%) of the children were breastfed on demand. More than three quarters 163(78.4%) were breastfed for a period of 1-2 years. Close to half 100(48.1%) of the children were introduced to complementary foods at six months and only 14(6.7%) were introduced in ≤ two months as shown in Table 1. Mothers gave reasons for introducing foods before 6 months of age as another pregnancy in 62(30%), insufficient milk 104(50%) among others. The most common complementary foods given to the children included porridge made from sorghum, millet and maize meal flour, avocados, mashed potatoes and bananas, milk, tea, pawpaw, vegetable soup and *'ugali'* (a stiff porridge made up of maize/millet/sorghum flour). More than three quarters 164(78.8%) enriched their children's porridge With Milk, Eggs, Sugar, Salt, Lemon or Orange Juice.

Table 1. Child's feeding methods

Variable	n=208	(%)
Duration of breastfeeding		
≤ 6 months	8	(3.8)
6months-1 year	13	(6.3)
1-2 years	163	(78.4)
≥2 years	24	(11.5)
Age of complementary feeding		
≤ 2 months	14	(6.7)
2-5 months	94	(45.2)
≥6 months	100	(48.1)

Majority 185 (88.9%) of the children had mothers as their primary caregiver although grandmothers 13 (6.3%), neighbours 6(2.9%) and siblings 4(2%) also took care of the children in the absence of the mother. The mean weight was 13.1± 2.4 SD kg, height was 91± 9.2 SD cm and MUAC was 15± 1.3 cm.

Height for Age (stunting): More than three-quarters, 158(76%), of the children had the expected height for their age and 50(24%) were stunted. Over a tenth, 24(11.5%), of the children were moderately stunted and 26(12.5%) were severely stunted as shown in Table 2.

Weight for height (wasting): Most, 197(94.7%), of the children were normal and only 11(5.3%) were moderately wasted. None of the children was severely wasted. Using MUAC, only 7(3.4%) were wasted.

Weight for age (underweight): Over three-quarters, 163(78.4%), of the children had normal weight while 45(21.6%) were underweight. About 37(17.8%) of the children were moderately underweight and 8(3.8%) were severely underweight as shown in Table 2.

Table 2. Under-nutrition in the children

Variables	Undernourished	n=208	(%)
Height-for-age	Normal (> -2SD)	158	(76)
	Moderate stunting (< -2SD)	24	(11.5)
	Severe stunting (< -3SD)	26	(12.5)
Height-for-weight	Normal (> -2SD)	197	(94.7)
	Moderate wasting (< -2SD)	11	(5.3)
	Severe wasting(< -3SD)	0	(0)
Weight-for-age	Normal (> -2SD)	163	(78.4)
	Moderate underweight(< -2SD	37	(17.8)
	Severe underweight (< -3SD)	8	(3.8)
MUAC	Malnourished (< 12.5cm)	7	(3.4)
	Normal (>12.5cm)	201	(96.6)

Prevalence of Under-nutrition by Methods of Feeding

The results of the study showed that there was an association between children who were given colostrum and stunting ($p<0.0001$) and underweight ($p=0.016$). There was an association between length of breastfeeding and stunting ($p<0.001$), but not in wasting and underweight ($p>0.05$). The study did not find associations between the age of introduction to complementary foods and under-nutrition indices. Most, 149(71.6%), mothers claimed to feed their children 3-5 times a day. The frequency of feeding the child was associated with wasting ($p= 0.041$) with all children that were fed > five times not wasted.

Children that are fed on family food are likely to be stunted (76%) and underweight (79%) (p=0.016 and 0.001) respectively according to Table 3.

Table 3. Distribution of under-nutrition by feeding methods

	HAZ (Stunting)		WHZ (Wasting)		WAZ (Underweight)	
	Yes n=50(%)	No n=158(%)	Yes n=11(%)	No n=197(%)	Yes n= 45 (%)	No n=163(%)
Frequency of feeding(food)						
<3 times	11(22)	38(76)	6(12)	43(88)	37(76)	12(24)
3-5 times	35(23)	113(76)	5(3)	144(97)	118(79)	31(21)
>5 times	3(30)	7(70)	0 (0)	10(100)	8(80)	2(20)
p	**0.831**		**0.041**		**0.628**	
If fed on family food						
Yes	155(76)	47(24)	191(95)	11(5)	160(79)	42(21)
No	3(50)	3(50)	6(100)	0(0)	3(50)	3(50)
p	**0.016**		**0.557**		**0.001**	
If child given colostrum						
Given(n=200)	43(86)	157(99.4)	11(100)	189(95.9)	40(88.9)	160(98.2)
Not given(n=8)	7(14)	1(0.6)	0(0)	8(4.1)	5(11.1)	3(1.8)
P	**<0.0001**		**0.495**		**0.016**	
Length breastfeeding						
< year(n=21)	8(16)	13(8.2)	1(9.1)	20(10.2)	4(8.9)	17(10.4)
1-2 years(n=163)	36(72)	127(80.4)	10(90.9)	153(79.2)	34(75.6)	129(79.2)
>2 years(n=24)	6(12)	18(11.4)	0(0)	24(12.2)	7(15.6)	17(10.4)
P	**<0.0001**		**0.365**		**0.100**	
Age of introduction to Complementary feeds						
≤2 months(n=14)	6(12)	8(5.1)	0(0)	14(7.1)	6(13.3)	8(4.9)
2-5 months(n=96)	20(40)	76(48.1)	8(72.7)	88(44.7)	18(40)	78(47.9)
≥ 6 months(n=98)	24(48)	74(46.8)	3(27.3)	95(48.2)	21(46.7)	77(47.2)
P	**0.125**		**0.432**		**0.571**	

When controlling for all other factors, it emerged that children that were not fed colostrum were likely to be stunted as shown in Table 4.

Table 4. Multivariate analysis for stunting

Variables	Stunting	
	OR (95% CI)	P-value
Child characteristics		
Age in months	0.976 (0.943 – 1.009)	**0.147**
Primary caregiver (Others)	0.887 (0.263 – 2.996)	**0.847**
Given colostrum (yes)	0.034 (0.003 – 0.443)	**0.010**
Often breastfed(on demand)	1.508 (0.484 – 4.699)	**0.479**
No. of times fed (at present) (=>3 times)	1.218 (0.537 – 2.759)	**0.637**
Length of breast/feeding(<=6months)	2.331 (0.509- 10.668)	**0.275**
Introd Complementary feeding age (< 2months)	0.802 (0.153 – 4.201)	**0.794**

Table 5. Multivariate analysis for underweight

Variables	Underweight	
	OR(95% CI)	P-value
Child characteristics		
Age in months	1.00 (0.968 – 1.033)	**0.991**
Primary caretaker(Others)	0.854 (0.262 – 2.781)	**0.794**
Given entire breast milk(yes)	0.330 (0.052 -2.093)	**0.240**
Often breastfed(on demand)	2.413 (0.843 – 6.904)	**0.101**
No. of times fed (at present) (=>3 times)	0.821 (0.37 – 1.824)	**0.629**
Length of breast/feeding(<=6months)	1.315 (0.245 – 7.053)	**0.749**
Complementary feeding age (<2months)	1.886 (0.468 – 7.595)	**0.372**

Discussion

Under-nutrition and Child's Feeding Methods

It is recommended that children be breastfed for one year and beyond (WHO, 1995) as found earlier in the literature that breast milk is necessary for growth and brain development (Linkages, 1999). The study found an association between the length of breast feeding and stunting which is consistent with a study by Onyango *et al*. (1998) in rural Kenyan toddlers. More than a third (38%) of the children that were breastfed for less than one year were stunted. A high level of stunting and underweight, 7(87.5%) and 5(62.5%) respectively, was found among the children who were not fed with colostrum. This is in agreement with a study by Kumar *et al.* (2006) which showed that initiation of breast-feeding after six hours of birth and deprivation from colostrum were significant risk factors for underweight and stunting.

WHO (1995) recommends that children be introduced to complementary foods at 6 months. Supplementing breast milk before six months of age is unnecessary and discouraged because of the likelihood of contamination, which may result in the risk of diarrhoeal diseases, reduced energy density and loss of maternal security (Mbagaya *et al*., 2004), bearing in mind that this study was done in a peri-urban slum. The results of this study found out that 108(52%) of the children were introduced to complementary foods before the age of 6 months. This study did not find association in the age of introduction to complementary feeding and the prevalence of under-nutrition although a study by (Mbagaya *et al*., 2004) found an association. This was probably due to the fact that mos,t 200(96.2%), of the study children were fed on colostrum and so had strong immunity early in life. Studies on early introduction to weaning foods show that children that were introduced to foods early had an increased risk of being underweight (Bloss *et al*., 2004; Ogunba, 2004). It is also documented that inappropriate infant and young child feeding practices especially in places where hygiene and sanitation are poor like in slums is a major cause of under-nutrition among the under-fives (Ergin *et al*., 2007; Faruque *et al*., 2008).

Almost three–quarters, 149(71.6%), of the children were fed 3-5 times a day as is recommended by (Linkages, 1999). Children require small portions of nutritious foods regularly. The high prevalence of under-nutrition may have resulted from other factors like in sufficient quantities and quality of the diets provided. Children that were fed on family meals were likely to be stunted and underweight because it might have been difficult to enrich those foods before they were fed to the children hence were not able to take nutritious foods (Faruque *et al*., 2008).

The study reveals that the infant's complementary foods were enriched, yet there were high cases of under-nutrition. This may have resulted from illnesses which increase the nutrient needs and also leads to nutrient losses.

Conclusion

There three forms of under-nutrition in Matisi location. These are: stunting, wasting and underweight. The study reveals that duration of breastfeeding, length of breast feeding and if children were given colostrum or not are significant factors associated with under-nutrition among the pre-schoolers.

Recommendations

The Municipal council should provide enough treated drinking water to the residents, Hygiene education should be taught through the chief '*Barazas'* by the Ministry of public Health and Sanitation and health. A longitudinal study to find out other factors associated with under-nutrition should be carried out. Slum upgrading projects like waste management projects should be set up by government and NGO's. The Government and NGO's should assist the residents to begin Income Generating Activities to get empowered.

Acknowledgements

We sincerely thank the entire research team, family and co-authors for their enabling efforts to complete this paper.

References

Bloss, E., Wainaina, F., & Bailey, R. C. (2004). Prevalence and predictors of underweight, stunting and wasting among children aged under 5 in Western Kenya. *Tropical Pediatrics, 50*(5), 260-70.

CBS, National Council for Population and Development, Ministry of planning and National Development (2003). *Kenya Demographic and Health Survey.* Nairobi, Kenya. Macro International Inc. Calverton, Maryland USA.

Department of Health (DOH) (1994). *Committee on the Medical Aspects of Food Policy (COMA) report on weaning and the weaning diet.* London: HMSO.

Eicher, J., & Carl, K. (1985). *Agricultural Research for African Development: Problem and Priorities for 1985-2000*. Paper presented at a World Bank Conference at Bellagio, Italy.

Ergin, F., Okyay, P., Atasoylu, G., & Beser, E. (2007). Nutritional status and risk factors of chronic malnutrition in children under five years of age in Western city of Turkey. *Turkish Journal of Pediatrics*, *49*(3), 283-289.

Faruque, A., Ahmed, A. S., Ahmed, T., Munirulislam, M., Hossain, M. I., Roy, S., Alam, N., Kabir, I., & Sack, D. (2008). Nutrition: Basis for Healthy children and mothers in Bangladesh. *Journal of Health, Population and Nutrition*, *26*(3), 325-339.

Friedman, J. F., Kwena, A. M., Minel, L. B., Kariuki, S. K., Terlouw, D. J., Phillips-Howard, P. A., Hawley, W. A., Nahlen, B. L., YaPingsh. I., & Terkuile, F. O. (2005). Malaria and Nutritional Status Among Preschool Children: Results from cross-sectional Survey in Western Kenya. *The American Society of Tropical Medicine and Hygiene*, 73(4), 698-704.

Gibson, R. (1990). *Principles of Nutritional Assessment.* Oxford University Press. pp. 166-171.

Gobane, D. C. (2004). *Prevalence of malnutrition and its associated factors among children aged 6-59 months living in Kangemi and Gichagi Sub-locations Nairobi, Kenya* (M.Sc. Nutrition Thesis). University of Nairobi.

Kumar, D., Goel, N. K., Mittal, P. C., & Misra, P. (2006). Influence of infant –feeding practices on nutritional status of under five children. *Indian Journal Pediatric, 73*(5), 417-21.

Lindblade, K. A., Odhiambo, F., Rosen, D. H., & Decock, K. M. (2003). Health and nutritional status of orphans < 6 years old cared for by relatives in Western Kenya. *Tropical Medical International Health, 8*(1), 67-72.

LINKAGES (1999). Recommended Feeding and Dietary Practices to improve Infant and Maternal Nutrition. *Linkages, 1*, 1-7.

Mbagaya, G. M., Odhiambo, M. O., Oniang'o, R. K. (2004). Dairy production: A nutrition intervention in a sugarcane growing area in Western Kenya. *African Journal of Food Agriculture Nutrition and Development, 4*(1).

Ogunba, B. O. (2004). Protein energy malnutrition in complimented breast-fed babies: Implications of the timing of complimentary feeding. *Nutrition of Food Science*, *34*(5), 206-209.

Onyango, A., Koski, K. G., & Tucker, K. (1998). Food diversity versus breast feeding choice in determining anthropometric status in rural Kenyan toddlers. *International Journal Epidemiology*, *27*(3), 484-9.

Tara, G., Poonal, P., & Bakshi, M. (1988). *Selected socio-economic, environmental, Maternal, and child factors associated with the nutritional status of infants and toddlers*.

Turyashemenerwa, F. M., Kikafunda, J. K., & Agaba, E. (2009). Prevalence of early childhood malnutrition and influencing factors in peri-urban areas of Kabarole District, Western Uganda. *African Journal of Food and Agriculture Nutrition and Development (AJFAND), 9*(4).

UNICEF (1998). *The State of the World's Children.* New York: UNICEF.

UNICEF (2002). *The State of the World's Children*. New York: UNICEF.

United Nations (1997). *Child under-nutrition, Tropical enteropathy, toilets and handwashing*. Center for Human Nutrition, *374*, 1032-35.

WHO (1995). The World Health Organization's Infant-feeding Recommendations. *Bulletin, 73*, 165-174. Geneva: WHO.

WHO (2002). The role of The Health Sector in Food and Nutrition. *Technical Report Series No. 66***.** Geneva: WHO.