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Factors Associated With The Prevalence Of Under-Nutrition In Pre-School Children In Matisi Peri-Urban Location, Trans-Nzoia District, Kenya

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Abstract

Under-nutrition is a serious problem facing pre-schoolers worldwide and especially in developing countries. Peri-urban populations are normally characterized by difficult socio- economic situations which are likely to have direct or indirect implications on the health of pre-scholars hence may contribute to the prevalence of under-nutrition. The purpose of this study was to determine the prevalence of under-nutrition of pre-schoolers and the associated risk factors. The study used a cross-sectional survey of pre-scholars from Matisi peri-urban location, Trans- Nzoia district. Children's anthropometric measurements including body weight, height, and MUAC were taken. Interviewer administered questionnaires were used to gather socio- demographic and environmental factors of the pre-scholars. Data was analyzed using SPSS version 16.0. Chi square test and logistic regression were used to find associations between factors and under-nutrition. Epi- Info version 3.5.1 was used to analyze anthropometric data which generated z scores (SD). Results were considered significant at 5% α-level. The results obtained were;- the mean age (in months) was 38±10.7. Majority (95.2%) of the children were immunized. Prevalence of Under-nutrition (stunting, underweight and wasting) was (24%), (21.6%) and (5.3%) respectively. Children who were fed colostrums had 96.6% less chances of stunting and those who had completed immunization had 83.3% less likely to be stunted (p=0.010, OR 0.034, 95%CI 0.003–0.443: p=0.019 OR 0.167, 95% CI 0.037 – 0.747) respectively. Preschoolers who had suffered fever two weeks prior to the study (p=0.032 OR 3.660, 95% CI 1.118-11.982) were four times likely to be stunted and mothers with a high parity were twice likely to have stunted children. Complete immunization and fecal waste disposal site were associated with underweight (p= 0.028 OR 0.205 95% CI 0.05-0.844 and p=0.002 OR 3.7 95% CI 1.601-8.911) respectively. We therefore conclude the most prevalent forms of under-nutrition were stunting and underweight. The government and partners should put emphasis on the importance of complete immunization, proper disposal of fecal waste, proper child feeding methods. There is also need for slum upgrading projects and residents should be assisted to start Income Generating Activities to raise their living standards.

Key words: Peri-urban, pre-school, Prevalence, Under-nutrition

1.1 Introduction

Under-nutrition is a serious public health problem facing children worldwide particularly the developing countries and the causes are multi factorial (UNICEF, 2003). Key findings from Faruque *et al.,* (2008) show that almost 90% of malnourished children are from developing countries. Recent data from the World Health Organization showed that about 60% of all deaths, occurring among children aged less than five years in developing countries, could be attributed to under-nutrition (WHO, 2002). UNICEF (1998) estimated that 226 million children are stunted, 67 million are wasted, and 183 million are underweight globally. A UNICEF Report (2003) indicates that 32%, 8% and 27% of infants and young children below five years worldwide are stunted, wasted and underweight respectively. United Nations; Administrative Committee Coordination/Sub- Committee on Nutrition report (UN/ACC/SCN) (1997a) indicated that 10% of African children were wasted although with variations between countries and within age groups and with children below two years of age are most severely affected. Regionally, the report shows North Asia is highest 45% in stunting followed by Sub-Saharan Africa with 40%, and Latin America least affected 16% (UNICEF, 2003).

Prevalence of stunting in DVCs range as high as 64.2%. More than 70% of children with protein-energy malnutrition live in Asia, 26% in Africa, and 4% in Latin America and the Caribbean (Ergin *et al*., 2007). Within the Sub-Saharan Africa 35% and 29% of preschool children are stunted and underweight respectively (Leenstra *et al*., 2005). A UNICEF report (2003) shows lower levels of stunting in Guinea 20%, Togo 22%, and Ghana 26% and Chad 28%. High levels of stunting were recorded in Zambia 59%, Ethiopia 52%, Malawi 49% and Madagascar 49% (United Nations, 1997). According to WHO Bulletin (2002) the highest level of stunting is found in East Africa where on average 48% of pre school children were affected. Key findings from Turyashemererwa *et al.,* (2009) in peri-urban Kabarole, Uganda found out that stunting was by far the most prevalent under-nutrition problem in the study area, with almost half 41.6% of the children stunted. The overall prevalence of under-weight and wasting was 15.7% and 3.4% respectively.

The most pressing form of malnutrition in Kenya is Protein-Energy Malnutrition (PEM), which largely affects infants, pre-school and school children (Ngare and Mutunga, 1999). Key findings from CBS *et al*., (2003) indicate that under-nutrition significantly contributes to morbidity and mortality in children. At the national level 31% of the children under five years of age are stunted, while the proportion of severely stunted is 11%. A high proportion of male children less than five years are stunted 33%, compared to 28% female children. Under-five mortality rates remain above 100 per 1,000 live births while infant mortality rates are well above 60. At provincial level, Coast province had the highest (35%) of the stunted children while Nairobi had the lowest (19%) (CBS *et al*., 2003). The 5th Nutrition Survey in Kenya indicated that in Rift Valley Province, stunting level was 32.6%, wasting 8.2% and underweight 23.7%. Trans Nzoia district had stunting level of 29.8%, wasting 9.1% and underweight 23.7%. The level of stunting in Trans Nzoia district was less than that of Rift Valley Province while wasting was slightly higher and underweight remained at the same level. At the national level 6% of under fives are wasted with just over 1% being severely wasted. Wasting is markedly higher in N.E. province where 28% of under fives are wasted. One fifth of Kenyan children are underweight, with 4% classified as severely underweight (Republic of Kenya, 1996).

Inadequate intake of micro nutrients particularly vitamin A, B, C and zinc is likely to lead to high levels of morbidity, which may affect the physical and mental development and this may in turn lead to under-nutrition in the pre-schoolers (FAO, 2005).

1.2 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 also chosen purposively due to its peri-urban slum characteristics and Kipsongo and Shanti villages were chosen randomly.

1.2.1 Inclusion and exclusion criteria:

Any parents to the child aged 24-60 months and gave a written consent and their children and were residents of Kipsongo and Shanti during study period were enrolled in the study. Parents of children who refused to consent or whose children had malformations or chronic illnesses and ages could not be ascertained were excluded from the study.

1.2.2 Data collection procedures:

Data was collected using interviewer administered questionnaires to determine socio demographic factors.
Environmental conditions were determined by a checklist.

1.2.3 Data analysis:

The data was cleaned, coded, entered and analyzed using SPSS V. 12.0. 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 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 was categorized as either underweight, stunted or wasted respectively. MUAC was also used to determine if a child was malnourished or not and children below 12.5 cm were categorized as malnourished (Gibson, 1990).

The study was reviewed and approved by Institutional Research and Ethics Committee (IREC) of Moi University before commencing. Written permission was obtained from Matisi location chief.

1.3 Results:

1.3.1 Description of the study sample

Data was collected from a total of 208 respondents of which 188(90.4%) females. The mothers mean age was 26.38 for with ± 6 SD. Majority (81.7%) of the mothers were married. Most (92.8%) of the mothers had 1-6 births and most of

the households (94.2%) had between 1-8 members. Close to half (49%) of the households had between 5-8 members. Half (51%) mothers and fathers had primary education. A good number (34.6%) of the fathers and mothers engaged in small business. Half (50.5%) of mothers were housewives while majority (40%) of fathers were businessmen. The main sources of income for the households was business (37.5%) and employment (24%) which is characteristic of what is found in peri-urban communities. Half of the respondents spent less than Kshs.1000-2999 (14.3-42.8 US dollar) per month and less than Kshs 100 per day. Most (74%) of the population lived in rented houses

Slightly below a third (29.8%) of the population used river/ streams as a source of their drinking water and none uses rain water. Over half (65.4%) of the respondents had their water source distance to be less than 500m from their residence.

Most of the population (83%) do not treat their drinking water and (73%) of the population disposed their kitchen wastes anywhere. A quarter (25.5%) of the respondents did not own a latrine. Slightly over half (51.4%) of the children were male and (48.6%) were females and their mean age was 38.07 ± 10.7 SD (months).

Table 1 Prevalence of under-nutrition in the pre-school children.

Variables	**Undernourished**	**N=208 (%)**
Height-for-age	Normal (> -2SD) Moderate stunting (< -2SD) Severe stunting (< -3SD)	158 (76) 24 (11.5) 26 (12.5) {24%}
Height-for-weight	Normal (> -2SD) Moderate wasting (< -2SD) Severe wasting(< -3SD)	197 (94.7) 11 (5.3) 0 (0) {5.3%}
Weight-for-age	Normal (> -2SD) Moderate underweight(< -2SD Severe underweight (< -3SD)	163 (78.4) 37 (17.8) 8 (3.8) {21.6%}
MUAC	Malnourished (<12.5cm) Normal (>12.5cm)	7 (3.4) 201 (96.6)

1.3.2. Selected child characteristics and undernutrition

1.3.2.1 Undernutrition by sex (gender) and age

Male children were at an increased risk of stunting and underweight compared to female children probably due to the biological vulnerability of the male sex. Female children were at an increased risk of wasting compared to male children. There was no association in the level of stunting, wasting and underweight and sex of the children all p value of > 0.05. The age of the child was significantly associated with underweight (all $p<0.05$) among the children.

Table 2 Distribution of under-nutrition by sex and age

Gender	Stunting Yes N=50(%)	No n=158(%)	Wasting Yes N=11(%)	No n=197(%)	Underweight Yes N= 45 (%)	No 163(%)
Male	29(58)	78(49.4)	4(36.4)	103(52.3)	25(55.6)	82(50.3)
Female	21(42)	80(50.6)	7(63.6)	94(47.7)	20(44.4)	81(49.7)
P value	**0.314**		**0.304**		**0.775**	
Age groups(months)						
24-35	28(56)	73(46.2)	5(45.5)	96(48.7)	18(40)	83(50.9)
36-48	14(28)	51(32.3)	5(45.5)	60(30.5)	19(42.2)	46(28.2)
49-59	8(16)	34(21.5)	1(9.1)	41(20.8)	8(17.8)	34(20.9)
P value	**0.67**		**0.477**		**0.072**	

1.3.2.3 Undernutrition by child feeding methods

Table 2 indicates that there was a significant association between length of breastfeeding and if the child was feed on colostrums and stunting ($p<0.001$). Underweight and wasting were significantly associated with the child being sick prior to the study and immunization status ($p< 0.05$). No significant was found between the undernutrition and deworming ($p> 0.05$).

Table 3 Undernutrition and feeding methods

Characteristic	Undernutrition					
	Stunting (<-2.0) N=50 (%)	P	wasting (< -2.0) N=11 (%)	P	Underweight (<-2.0) N=45 (%)	P
Given colostrum						
Yes	7 (14)	**<0.001**	0 (0)	**0.495**	5 (11.1)	**0.016**
No	43 (86)		11 (100)		40 (88.9)	
Length of breast feeding						
Less than one year	36 (16)	**<0.001**	7 (63.6)	**0.365**	34 (75.6)	**0.100**
1-2 years	8 (72)		1 (9.1)		4 (8.9)	
More than 2 years	6 (12)		3 (27.3)		7 (15.6)	
Age of introd. Comple. feeds						
< 2 months	24 (48)	**0.125**	8 (72.7)	**0.432**	21 (46.7)	**0.571**
2-5 months	6 (12)		0 (0)		18 (40)	
6 or more months	20 (40)		3 (27.3)		6 (13.3)	
Frequency of feeding (at present)		**0.831**		**0.041**		**0.628**
< 3 times	39 (78)		6 (54.5)		33 (73.3)	
> 3 times	11 (22)		5 (45.5)		12 (26.7)	

1.3.2 Undernutrition by selected maternal factors

Marital status was significantly associated with wasting and stunting (p value <0.05) Stunting and underweight was significantly associated with household headship and parity of the mother ($P< 0.05$).

1.3.3 Undernutrition by environmental health

Wasting was significantly associated with the water source, faecal disposal site, house size and cleanliness of the latrine ($p < 0.05$)

Table 4 Undernutrition and environmental health.

Variable	Undernutrition					
	Stunting N=50 (%)	**P**	**Wasting N=11 (%)**	**P**	**Underweight N=45 (%)**	**P**
Water source						
Un protected well	13 (26)	**0.193**	2 (18.2)	**0.004**	12 (26.7)	**0.079**
Protected well	12 (24)		0 (0)		11 (24.4)	
Streams/ rivers	13 (26)		8 (72.7)		11 (24.4)	
Tap	12 (24)		1 (9.1)		11 (24.4)	
If drinking water is treated						
Yes.	7 (14)	**0.607**	1 (9.1)	**0.504**	7 (15.6)	**0.871**
No.	43 (86)		10 (90.9)		38 (84.4)	
Faecal disposal						
Anywhere	34 (68)	**0.225**	6 (54.5)	**0.023**	27 (60)	**0.012**
Latrine	16 (32)		5 (45.5)		18 (40)	
Size of the house						
1 room	30 (60)	**0.239**	11 (100)	**0.016**	27 (60)	**0.272**
> 1 room	20 (40)		0 (0)		18 (40)	
Cleanliness of latrine						
Clean		**0.759**		**0.035**		**0.173**
Fairly clean	3 (6)		0 (0)		2 (4.5)	
Dirty	17 (34)		1 (9.1)		15 (33.3)	
			10 (90.9)			
Cleanliness of compound		**0.413**		**0.130**		**0.024**
Clean	16 (32)		1 (9.1)		11 (24.4)	
Dirty	34		10 (90.9)		34 (75.6)	

1.3.4 Multivariate analysis

Children who were given entire first breast milk and had completed immunization were less likely to be stunted. Those that had suffered fever and headache were more likely to be stunted. Fecal waste disposal was associated with higher chances of children being underweight.

Table 5 Predictors of stunting and underweight

Factors	Stunting		Underweight	
Child characteristics	**OR(95% CI)**	**P-value**	**OR(95% CI)**	**P-value**
Age in months		**0.147**	1.00(0.968 – 1.033)	**0.991**
Primary caretaker(Others)	0.976(0.943 – 1.009)	**0.847**	0.854(0.262 – 2.781)	**0.794**
Given entire first breast milk(yes)	0.887(0.263 – 2.996)	**0.010**	0.330(0.052 -2.093)	**0.240**
Often fed(at night)	0.034(0.003 – 0.443)	**0.479**	2.413(0.843 – 6.904)	**0.101**
No. of times fed (at present) (=>3 times)	1.508(0.484 – 4.699)	**0.637**	0.821(0.37 – 1.824)	**0.629**
Length of breast/feeding(<=6months)	1.218(0.537 – 2.759)	**0.275**	1.315(0.245 – 7.053)	**0.749**
Complementary feeding age (< 2months)	2.331(0.509- 10.668)	**0.794**	1.886(0.468 – 7.595)	**0.372**
	0.802(0.153 – 4.201)			
Sickness of child				
Fever and headache	3.660(1.118 – 11.982)	**0.032**	1.613(0.519 – 5.007)	**0.408**
Respiratory tract infection	3.306(0.896 – 12.190)	**0.073**	2.752(0.820 – 9.239)	**0.101**
Vomiting and diarrhoea	2.961(0.763 – 11.492)	**0.117**	1.850(0.491 – 6.961)	**0.363**
Action taken				
Took to health facility	0.565(0.179 – 1.784)	**0.330**	0.986(0.326 – 2.975)	**0.979**
Bought drugs	0.376(0.095 – 1.493)	**0.164**	1.220(0.330 – 4.514)	**0.766**
Deworming(Yes)	0.714(0.321 – 1.584)	**0.407**	0.711(0.312 – 1.619)	**0.416**
Complete immunization(Yes)	0.167(0.037 – 0.747)	**0.019**	0.205(0.05 – 0.844)	**0.028**
Environmental factors				
Source of water				
Unprotected	1.598(0.632 – 4.042)	**0.322**	1.621(0.611 – 4.301)	**0.332**
Protected	0.689(0.262 – 1.813)	**0.451**	0.572(0.199 – 1.645)	**0.300**
Stream	0.548(0.205 – 1.469)	**0.232**	0.434(0.147 – 1.283)	**0.131**
Feacal disposal(anywhere)	2.090(0.933 – 4.681)	**0.073**	3.777(1.601 – 8.911)	**0.002**

1.4 Discussion

The prevalence of stunting, wasting and underweight were within range of other study findings done by (Waihenya *et al.,* 1996; Gobane, 2004; Mbagaya *et al.,* 2004; CBS *et al.,* 2003). The study found out that children that were not fed with colostrum and breastfed for < 1 yr. were likely to be stunted which consistent with a study by (Onyango *et al*., 1998) in rural Kenyan toddlers in Western Kenya.

Children that had incomplete immunization were stunted and underweight which agrees with a study by Bloss *et al*., (2004) that found out that vaccination protected against stunting. Disease symptoms two weeks prior to the study were associated with wasting which is consistent with a study by (Magadi, 1995).

Children of mothers whose parity was > three had higher rates of stunting compared to those of mothers whose parity was < three which is consistent with a study by (Thuita *et al*., 2005).

Children from households that dispose faecal waste anywhere were at a high risk of wasting (11.3%) and underweight (34%) which is consistent with studies by (Vitolo *et al.,* 2008 and Mbagaya *et al.,* 2004).

1.5 Conclusion

From the findings of the study we conclude that;- Three forms of under-nutrition are prevalent in Matisi location. These are stunting, wasting and underweight. And the study also reveals that breastfeeding, immunization, disease symptoms, parity, feacal waste disposal site, are significant factors associated with under-nutrition among the pre-schoolers.

1.6 RECOMMENDATIONS

We strongly Emphasis for giving the first breast milk (colostrum) after birth and prolonged breastfeeding should be taught through community based seminars and chief barazas. Secondly Ministry of Public Health and Sanitation through division of immunization and disease control should ensure that all children are fully immunized. Thirdly the government and NGO's should assist residents to begin IGA's so that they could become economically empowerment. Fourthly Studies to evaluate the impact of the nutritional interventions on the prevalence of under-nutrition in Peri-urban slums needs to be done to evaluate their efficiency. Also Municipal council needs to provide enough treated drinking water. And finaly Slum upgrading projects needs to be set to be set by Government and or NGO's

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1.8 Conflict of Interest

I have no conflict of interest as this was my MPH thesis.

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