Dietary Diversity and Micronutrient Status of School Children in Chamwino and Kilosa Districts, Tanzania

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1.Introduction

Micronutrient deficiency is a global challenge to nutrition wellbeing, health and economic development. Childhood is a period of rapid growth, during this stage of life micronutrient deficiencies can lead to retarded growth, anaemia and reduced immune function. Poor feeding practices and limited dietary diversity are contributing factors to poor micronutrient status. It is also evident that co-existence of vitamin A, zinc and iron deficiencies prevail in malnourished children.

2.Objective

This study aimed to investigate the micronutrient status (vitamin A, iron, zinc) in relation to the dietary intake of school children aged 5–10 years in selected villages of Chamwino and Kilosa districts in Tanzania.

3.Materials and Methods

The Scale-N project aims to improve nutritional and micronutrients status (vitamin A, iron, zinc) in school-children (5-10 years) in 2 villages in Chamwino and 2 villages in Kilosa districts, Tanzania (scale-N.org). During baseline study, 666 children were randomly recruited to obtain information on demographic characteristics and Household Dietary Diversity Score (HDDS) using questionnaires. Anthropometric screening was done using standard procedures to identify malnutrition and venous blood was collected for the determination of haemoglobin levels (hemocue method) and micronutrient status (serum vitamin A, iron and zinc by enzyme-linked immunosorbent assay and spectrophotometric methods). Data are presented as means (SD) and prevalences and compared using ANOVA, and chi-squared test.

5. Conclusion

- Prevalence of stunting, anaemia and micronutrient deficiencies of iron, zinc and vitamin A are of great concern in the study villages
- Higher dietary diversity score consisting of food groups such as sugar, oil and beverages was associated with higher prevalence of stunting, anaemia and iron deficiencies.
- Pro vitamin A rich vegetables/fruits and animal based foods are highly recommended in order to improve children's micronutrient status in the study villages.

Acknowledgement

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Figure 2. Blood sampling in Mzula village, Chamwino district, Tanzania

4.Results

The prevalence of stunting was high across all the four villages and differences were not significant (Table 1). The households of Kilosa villages had higher HDDS than those in Dodoma mainly contributed by reported consumption of foods such as sugar, fats/oil and beverages (Table 2). Meat/organ, eggs and milk products were the least consumed food groups in all villages (Table 2). There exist high prevalence of anaemia, iron, vitamin A deficiency and low serum zinc among children in the study villages (Figure 1).

Table 1. Household Dietary Diversity and nutritional status of school children (n=666) from selected villages in Chamwino and Kilosa districts, Tanzania

	Chamwino		Kilosa		
	Mzula	Chinoje	Tindiga	Mhenda-Kitunduweta	P-value
Children, N	**167**	**166**	**169**	**164**	
HDDS, mean ± SD*	4.2 ± 1.3[a]	3.0 ± 1.1[b]	**5.7** ± 1.3[c]	**6.2** ± 1.5[d]	<0.001
Underweight, n (%)	23 (13.8)	17 (10.2)	14 (8.3)	22 (13.4)	
Severely underweight	5 (3.0)	6 (3.6)	5 (3.0)	4 (2.4)	0.707
Stunted, n (%)	37 (22.2)	34 (20.5)	37 (21.9)	**44 (26.8)**	
Severely stunted, n (%)	6 (3.6)	8 (4.8)	8 (4.7)	**13 (7.9)**	0.393

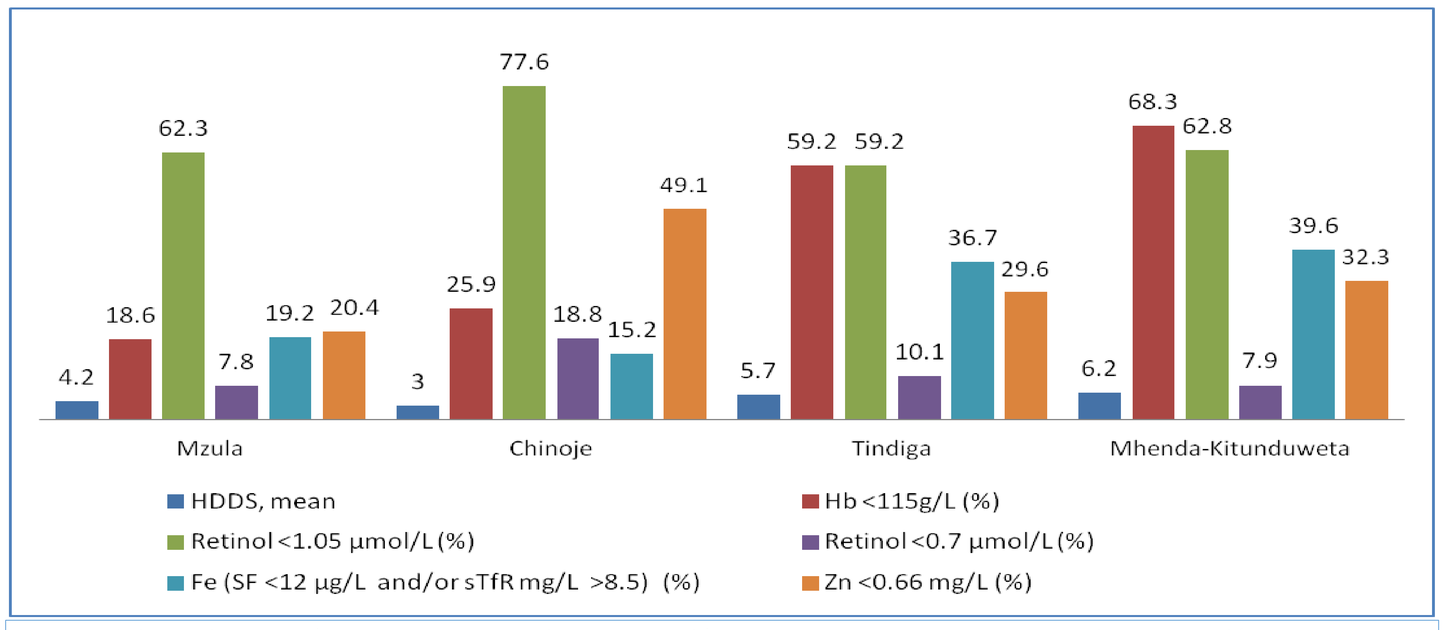
*Average HDDS = Sum (HDDS) / total number of Households[1]; P values: ANOVA or Pearson Chi-Square test; values within a row not sharing a common superscript letter (a,b,c,d) are significantly different at p<0.05.
Underweight=Weight-for-age Z –score < -2 SD and stunting= Height-for-age Z –score < -2 SD

Table 2. Household Dietary Diversity and consumption of different food groups by school children (n=666) from selected villages in Chamwino and Kilosa districts, Tanzania

	Chamwino		Kilosa		P
	Mzula	Chinoje	Tindiga	Mhenda-Kitunduweta	
N	167	166	169	164	
HDDS, mean ± SD*	**4.2 ± 1.3[a]**	**3.0 ± 1.1[b]**	**5.7 ± 1.3[c]**	**6.2 ± 1.5[d]**	<0.001
Bread, rice, grains , n(%)	167 (100)	166 (100)	166 (100)	163 (99.8)	0.382
Potatoes –cassava , **n(%)**	10 (6.0)[a]	2 (1.2)[b]	35 (21.1)[c]	94 (57.3)[d]	<0.001
Vegetables , **n(%)**	160 (95.8)[a]	164 (98.8)[a]	135 (81.3)[b]	114 (69.5)[c]	<0.001
Fruits , **n(%)**	31 (18.6)[a]	28 (16.9)[a]	29 (17.5)[a]	58 (35.4)[b]	<0.001
Beef, pork, -organs, **n(%)**	15 (9)[a]	5 (3)[b]	13 (7.8)[a,b]	31 (18.9)[c]	<0.001
Eggs, **n(%)**	3 (1.8)	0 (0)	2 (1.2)	6 (3.7)	0.069
Fresh / dried fish, **n(%)**	5 (3.0)[a]	2 (1.2)[a]	44 (26.5)[b]	42 (25.6)[b]	<0.001
Beans – nuts, **n(%)**	115 (68.9)[a]	48 (28.9)[b]	119 (71.7)[a]	134 (81.7)[c]	<0.001
Cheese - milk prod. (i)	7 (4.2)	10 (6.0)	4 (2.4)	8 (4.9)	0.374
Oil – butter (j)	103 (61.7)[a]	64 (38.6)[b]	**151 (91.0)[c]**	**155 (94.5)[c]**	<0.001
Sugar, honey (k)	58 (34.7)[a]	9 (5.4)[b]	**124 (74.7)[c]**	**110 (67.1)[c]**	<0.001
Tea, coffee, others (l)	26 (15.6)[a]	2 (1.2)[b]	**124 (74.7)[c]**	**104 (63.4)[d]**	<0.001

*Average HDDS = Sum (HDDS) / total number of Households[1]; P values: ANOVA or Pearson Chi-Square test; values within a row not sharing a common superscript letter (a,b,c,d) are significantly different at p<0.05.

Figure 1. Household Dietary Diversity, anaemia and micronutrient status of school children (n=666) from selected villages in Chamwino and Kilosa districts, Tanzania



Haemoglobin, Hb <115g/L = Anemia, Retinol <1.05 µmol/L = Low Vitamin A status, Retinol <0.7 µmol/L = Vitamin A deficiency, SF <12 or sTfR >8.5 = Iron deficiency (SF=Serum Ferritin, sTfR= soluble transferrin receptor), Zn <0.66 mg/L= Zinc deficiency

Reference

[1] **Swindale** Anne and Paula Bilinsky. (2006). *Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (v.2). Washington, D.C.: FHI 360/FANTA*

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