

Nutritional Status of under 5 Year-Old Children and its Relationship with Maternal Nutrition Knowledge in Weeraketiya DS division of Sri Lanka

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ABSTRACT. *The present study was conducted in the Weeraketiya divisional secretariat division of the Hambanthota district of Sri Lanka to determine the nutritional status of preschool children and to identify maternal knowledge regarding micronutrients and child feeding practices. The study sample consisted of 1102 families having 1219 children below 5 years of age. A population based cross-sectional study was carried out. An interviewer-administered, pre-tested questionnaire was used to collect information related to nutritional knowledge of the mother/caregiver during household visits. Heights and weights of the children were measured using properly calibrated equipment. Trained volunteers were used for taking measurements and administering the questionnaire. Nutritional status was determined using Epi Info software and data analysis was performed using the SPSS software. The prevalence of stunting (11.8%) in this community was lower than the national prevalence of stunting (18%). Prevalence of wasting (42.7%) and underweight (41.2%) was higher than national prevalence (15% and 21.6%, respectively). Wasting increased with the age and was the highest in the 49–60 month age group (50.2%). Prevalence of low birth weight (14.5%) was lower than the National average figure of 17.1%. The low birth weight had a positive relationship with the current undernutrition status of the child. Based on WHO criteria, Weeraketiya has a very high prevalence of wasting and underweight and low prevalence of stunting. Maternal educational status was not associated with the prevalence of undernutrition. Breastfeeding and complementary feeding practices were satisfactory but maternal knowledge regarding micronutrients, child feeding during illnesses and management of diarrhoea was poor. Low birth weight shared a relationship with the prevalence of wasting and underweight condition of the children in this community.*

INTRODUCTION

Child malnutrition is the most pressing problem of the world, damaging both children and the nations (de Onis *et al.*, 2000). Significant proportion of deaths of young children worldwide is due to malnutrition and efforts to reduce malnutrition should be a policy priority (Caulifield *et al.*, 2004). The level of childhood malnutrition is exceptionally high in South Asia, ranging from 45-48% in India, Bangladesh and Nepal, 38% in Pakistan and 30% in Sri Lanka. The underlying causes of malnutrition vary from poverty, low levels of education and poor access to health services (Khan and Bano, 2007).

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Undernutrition caused by protein energy malnutrition and micronutrient (iron, iodine and vitamin A) deficiencies among children, have been identified as major nutritional problems in Sri Lanka (Wikramanayake, 1997). Anthropometric indices represent the cumulative effect of access to food, nutrition practices, health, education of parents and environmental health conditions. Therefore, the nutritional status is a powerful indicator of nutrition security and well being of an individual and reflects the nutritional and poverty situation of a household. The nutritional status of pre-school children is a sensitive indicator, because children are most vulnerable to nutritional imbalances.

According to Sri Lanka Demographic and Health Survey (2006/7), 21.6 % of children under 5 years in Sri Lanka were underweight, 15% children were wasted and 18% children were stunted (Department of Census and Statistics in collaboration with Ministry of Health, 2008). Although inadequate food intake is a basic cause of undernutrition, several other factors such as living standards, water and sanitation, birth weight, birth interval and parity, weaning practices and mother's education have been identified as contributing to incidence of malnutrition among the preschool children.

This study was conducted to determine the nutritional status of children under-5 years of age in all 26 GN (Grama Niladhari) divisions of the Weeraketiya Divisional Secretariat (DS) division and to evaluate the knowledge of the mother with regard to micronutrients and child feeding practices including breastfeeding, complementary feeding and feeding during illness.

MATERIALS AND METHODS

Location of the Study:

This study was conducted during October-November 2007 in Weeraketiya DS division in the Hambanthota district which belongs to the Dry Zone of Sri Lanka. It has 123 villages comprising 85 GN divisions. The total population in the area was 62,201 and they belonged to 1322 families.

Study Sample:

The study sample comprised all households having children 0-5 years of age from all 26 GN divisions of the Weeraketiya DS division (1123 households, 1232 children).

Methodology:

A population based cross-sectional study was designed. Heights and weights of the children were measured following standard methods and using properly calibrated equipments (Salter 920/986 digital weighing scale, Seca 364 Infant weighing scale, Seca 210 length measuring mat, Seca 210 mechanical height measuring tape and standard height board) to assess the nutritional status. The birth weight was taken from the Child Health and Development Record (CHDR) card. The services of trained volunteers were sought in administering the questionnaire and taking anthropometric measurements. The inter-individual variability of measurements was minimized by ample training given prior to the survey. The accuracy and reliability of measurements were verified by observing a random sample in the field while taking measurements.

An interviewer-administered pre-tested questionnaire was used to collect information related to knowledge regarding major nutritional problems prevailing in the community and child feeding practices of mothers, during household visits.

Data Analysis:

Data was coded and entered into a computer database, summarized and presented descriptively. Z-scores were calculated for height-for-age (HAZ), weight-for-height (WHZ) and weight-for-age (WAZ) using Epi Info software. Prevalence of stunting, wasting and underweight was determined using <-2 of HAZ, WHZ and WAZ, respectively of the CDC/NCHS (2000) reference standards. The figures therefore represent moderate and severe undernutrition for each category. Relationships among nutritional variables, birth weight and parental education were analyzed using Spearman’s Chi square test using SPSS software.

RESULTS AND DISCUSSION

Characteristics of the study sample

The study sample consisted of 1219 children aged 0-5 years with a similar distribution of boys and girls (boys 625, girls 594). The distribution of the sample according to the age and gender is given in Table 1.

Table 1. Distribution of study sample by age and gender

Age (months)	0-6	7-12	13-24	25-36	37-48	49-60
Boys	57	76	137	117	132	106
Girls	46	57	130	136	124	101
Total	103	133	267	253	126	207

Nutritional status

The data on overall nutritional status of the sample is given in Table 2. Of the children under-5 years old (n=1219), only 41% had satisfactory nutritional status and 59% had some form of malnutrition. Majority of them were wasted (42.7%). The prevalence of underweight and stunting among these children was 41.2% and 11.8% respectively. There was no significant gender difference in the prevalence of undernutrition. The prevalence of wasting and underweight was higher, and stunting was lower than the national average values. According to the classification criteria for assessing severity of growth deficits by prevalence ranges among children under 5 years of age (de Onis and Blossner, 1997) the prevalence of wasting and underweight could be ranked as ‘very high’ and stunting could be ranked as ‘low’ in the Weeraketiya DS division.

Table 2. Nutritional status of children (0-60 months) by gender

Nutrition Category	Male		Female		Total	
	No	%	No	%	No	%
Stunting	83	13.	61	10.3	144	11.8
Wasting	263	42.1	258	43.4	521	42.7
Underweight	258	41.3	244	41.1	502	41.2
Overweight/Obese	12	1.9	17	2.9	29	2.4
Normal	254	40.6	250	42.1	504	41.3
Total	625	51.3	594	48.7	1219	100

* Stunting, wasting and underweight were categorized as ≤ -2 of HAZ, WHZ and WAZ respectively of the CDC/NCHS 2000 reference values. Figures therefore represent moderate and severe undernutrition for each category. Overweight or obese were categorized as $WAZ \geq 1$.

Table 3 shows a breakdown [percentage, mean and 95% confidence interval (CI)] of Z-scores for mild, moderate and severe forms of stunting, underweight and wasting, and also for the normal group under each indicator. The data for overweight or obese (weight/age z-score ≥ 1.0) children are also presented.

Most of the stunted children were either mildly (26%) or moderately (8%) stunted and severely stunted children were very low (4%). However, a considerable amount of severe malnutrition was found among wasted (19%) and underweight (14%) children in addition to mild- and moderate malnutrition.

Table 3. Breakdown of z-scores for different nutritional categories

Degree of Nutrition	Stunting (height-for-age)		Underweight (weight-for-age)		Wasting (Weight-for-height)	
	%	mean z-score (95% C.I.)	%	mean z-score (95% C.I.)	%	mean z-score (95% C.I.)
Severely Malnourished	3.7	-4.50 (-4.95 to -4.04)	13.7	-3.80 (-3.91 to -3.68)	19.0	-3.92 (-4.06 to -3.78)
Moderately Malnourished	8.2	-2.40 (-2.45 to -2.35)	27.5	-2.47 (-2.50 to -2.44)	23.7	-2.48 (-2.51 to -2.44)
Mildly Malnourished	25.9	-1.43 (-1.46 to -1.40)	29.9	-1.53 (-1.56 to -1.50)	27.4	-1.50 (-1.53 to -1.47)
Adequately Nourished	62.2	0.27 (0.17 to 0.36)	26.5	-0.25 (-0.31 to -0.19)	29.9	-0.05 (-0.14 to 0.04)
Overweight Or obese		N/A	2.4	-1.53 (1.46 to 2.15)		N/A

* Severely malnourished = ≤ -3 SD; moderately malnourished = ≤ -2 SD to > -3 SD; mildly malnourished = ≤ -1 SD to > -2 SD, adequately nourished = < 1 SD to > -1 SD. Overweight = $WAZ \geq 1$. N/A = not applicable

The prevalence of undernutrition by age indicates that overall undernutrition increases with age in both sexes (Table 4). The prevalence of wasting, which was the biggest problem in this community, was considerably high already during the first 6 months of age in both sexes (27%) and after the first year it almost doubled. The prevalence of underweight was comparatively low (8%) during the first 6 months but increased almost 4-folds after the first 6 months and doubled further after one year. The stunting, on the other hand, was very low

(4%) in the first 6 months and it also increased more than 2-fold after one year, in both sexes. All three forms of undernutrition showed higher values after the age of 1 year, in both sexes. Wasting was the most striking form of undernutrition in either sex, and its prevalence was around 50% in older children (49-60 months).

Table 4. Prevalence of undernutrition in children by age and gender

Age (months)	0-6	7-12	13-24	25-36	37-48	49-60
Stunting (%)						
Boys	5.3	7.9	12.4	17.9	16.7	13.2
Girls	2.2	1.8	9.2	16.9	9.7	11.9
Total	3.9	5.3	10.9	17.4	13.3	12.6
Wasting (%)						
Boys	28.1	22.4	43.1	42.7	50.8	50.9
Girls	26.1	28.1	44.6	47.8	46.0	49.5
Total	27.2	24.8	43.8	45.5	48.4	50.2
Underweight (%)						
Boys	5.3	31.6	51.1	47.9	41.7	47.2
Girls	10.9	21.1	53.8	48.5	36.3	45.5
Total	7.8	27.1	52.4	48.2	39.1	46.4

Prevalence of low birth weight

The percentage low birth weight (14.5%) reported in the present study is lower than the national average figure of 17% (Annual Health Bulletin, 2006). Gender comparison revealed that girls had a slightly higher prevalence of low birth weight than boys (Table 5).

Table 5. Birth weight of the under-5 children in the study sample

Birth weight category	Boys		Girls		Total	
	No	%	No	%	No	%
Normal	548	87.7	494	83.2	1042	85.5
Low	77	12.3	100	16.8	177	14.5
Total	625	100	594	100	1219	100

Birth weight has a direct relationship with the current nutritional status of the child as shown in Table 6. Wasting and underweight were significantly high among children with low birth weights.

Education of the parents

The maternal educational status in this community was satisfactory as the majority (62%) of mothers had studied up to G.C.E. (O/L) and another 19% had studied up to G.C.E. (A/L). Also there were mothers with university degrees (3.0%). Mothers with no schooling (1.5%) or only primary education (7.3%) were very small. The educational status of the father was no better than that of the mother (Table 7).

When the educational level of the parents was compared with the nutritional status of the child, no significant relationship was found between parents' educational level and the nutritional status of the child (Table 8).

Table 6. Birth weight and the current nutritional status of the child

Nutritional Indicator*	Birth weight		Probability
	Low #	Normal	
HAZ			
Normal	136 (85)	833 (88)	0.218
Stunted	24 (15)	109 (12)	
WHZ			
Normal	59 (37)	563 (60)	< 0.0001
Wasted	101 (63)	379 (40)	
WAZ			
Normal	66 (41)	577 (61)	< 0.0001
Underweight	94 (59)	365 (39)	

* HAZ \leq -2 (stunted), WHZ \leq -2 (wasted) and WAZ \leq -2 (underweight). The figure within the parenthesis is the percentage from the total no. of children under each birth weight category. # Birth weight < 2500 g.

Table 7. Educational level of the parents in the study sample

School grade	Mother		Father	
	No.	%	No.	%
No schooling	17	1.5	16	1.5
Primary (1-5)	80	7.3	156	14.2
6-8	82	7.4	195	17.7
9-11	684	62.1	552	50.1
12-13	206	18.7	164	14.9
Tertiary	33	3.0	19	1.7
Total	1102	100	1102	100

Table 8 Parents' education and the nutritional status of the child

Variable	Total	Prevalence of undernutrition #					
		Stunting		Wasting		Underweight	
		No.	%	No.	%	No.	%
Mother's education							
Up to grade 8*	179	21	11.7	75	41.9	73	40.8
Grade 9-11	684	80	11.7	310	45.3	297	43.4
Grade 12 and above	239	32	13.4	95	39.7	89	37.2
p-value			0.778		0.290		0.523
Father's education							
Up to grade 8*	367	39	10.6	163	44.4	163	44.4
Grade 9-11	552	72	13.0	248	44.9	235	42.6
Grade 12 and above	183	22	12.0	69	37.7	61	33.3
p-value			0.545		0.214		0.077

*No schooling also included. # HAZ \leq -2 (stunting), WHZ \leq -2 (wasting), WAZ \leq -2 (underweight).

Maternal knowledge regarding vitamin A

According to survey findings vitamin A deficiency has been identified as a severe public health problem in the study province (Medical Research Institute, 1998). The knowledge of

the mother regarding the importance of vitamin A was not satisfactory as evident by following responses: only about 74% of the respondents in the study have heard of the importance of vitamin A in the diet; about 41% did not know that vitamin A causes blindness; 58% did not know that it can cause night blindness; 61% did not know its link with Bitot's spots; 47% did not know its effect on disease resistance and 40% did not know that it causes growth retardation. Table 9 indicates that the majority of the respondents were able to correctly identify dark green leaves (92%), yellow fruits (85%), yellow-colored vegetables (82%) and animal products like egg, fish and meat (82%) as good sources of vitamin A. These results indicate that vitamin A rich foods are known to the majority of the population.

Knowledge, attitudes and practices regarding iodine

The knowledge of the subjects regarding the iodine nutrition was not satisfactory. Although about 74% of the respondents knew that the goiter was caused by iodine deficiency only 6% knew that it was food related, 12% stated that they did not know the cause of goiter while another 6% said that it was caused by heredity (Table 9).

When asked about how the salt in the kitchen was stored, 40% of the respondents stated that they keep it in a dark colored glass bottle while 32% replied that it was kept in a white glass bottle. Some 20% of mothers mentioned that they were using covered coconut shells. From the foregoing it could be concluded that the awareness about iodine is inadequate among the respondent families. However, the prevalence of goiter was reported to be low in the Southern province compared to seven other provinces in the country. According to the National Iodine Nutrition Status Survey (Medical Research Institute, 2006), total goiter rate (grades 1+2) and the median urinary iodine concentration among 6-9 year-old school children in the Southern province were 0.5% and 145 µg/l, respectively. These figures are better than the National average (total goiter rate 3.8%, median urinary iodine concentration 154 µg/l) and indicate that goiter is not a public health significant problem in the province.

Knowledge, attitudes and practices regarding iron

It was revealed that only 74% of the mothers have heard or known about anemia as shortage of blood and others (26%) did not know about it. The majority of the mothers (59%) in the study took haematinic (blood-forming) drugs during the last pregnancy and about 41 % had not taken them. Those who took drugs have taken them daily (92%) as prescribed. The reason given by those who had not taken them was that it gave a bad taste/smell. As shown in Table 9, majority of the mothers knew that iron helps the baby to be healthy (70%) but only about 16% knew that iron tablets reduce anemia/iron deficiency. Yet another 11% of mothers did not know the importance of iron/ folic tablets during pregnancy).

About 7% percent of mothers in the entire sample were taking tea or coffee with meals. Mothers knew that taking tea or coffee just after main meals was not good. However, regarding fruit consumption the majority (84%) stated that they eat when fruits were available and only 16% had the correct practice of taking fruits with main meals (Table 9). Whether this was due to ignorance or the unavailability of fruits at the correct time, need to be explored.

Table 9. Mothers knowledge and practices regarding micronutrients

Variable	Number responded	Yes	
		Number	Percentage
Foods rich in vitamin A	802		
Dark green leaves		735	92
Yellow fruits		680	85
Dark yellow vegetables		656	82
Eggs/meat/fish		656	82
Causes of goiter	1102		
Iodine deficiency		819	74
Food related		69	06
Contamination of food/water		30	03
Pregnancy		32	03
Hereditary		70	06
Iron folic acid tablets	1102		
Increase strength		528	48
Reduce anaemia/iron deficiency		173	16
Help baby to be healthy		767	70
Time of taking tea/coffee	1099		
Just after main meals		72	07
Not after meals		1027	93
Time of eating fruits	1099		
With main meals		175	16
When available		924	84

Mothers' knowledge regarding handling a sick child

The knowledge and practices of the mother regarding safeguarding the health and nutrition of the sick child were not satisfactory. Only a small percentage (19%) of the mothers knew that special attention was needed on feeding and that the child should be encouraged to have more food during illness. Some mothers (28%) reported giving home treatments and bringing the child to the healthcare professional when the condition is severe (Table 10).

Management of diarrhoea

As reported by mothers, home-made fluids (36%), drugs (33%) and ORS packets (24%) were the treatments given for the management of diarrhea in children. The child feeding practices during diarrhoea is given in Table 11.

Mothers' knowledge on the management of diarrhoea in children was not satisfactory. During diarrhoea, 30% of children had received less breast milk or no breast milk at all while liquids were restricted for 35% and eating was restricted for 40% of the children by their mothers.

Table 10. Mothers' knowledge regarding handling a sick child (n=1102)

Variable	Yes	
	Number	Percentage
Feeding during illness of the child:		
Food should be restricted	07	01
No special attention is needed on feeding	887	80
Child should be encouraged to have more food	208	19
Handing a sick child:		
Immediately the child should be brought to a healthcare professional with or without home treatment	564	51
Monitor the condition of the child first and the child - brought to a healthcare professional	308	28
Home treatment given and child brought to a healthcare-professional when the condition severe	230	21

Table 11. Child feeding practices during diarrhoea (n=1102)

Feeding practice	Less than usual (%)	No change (%)	More than usual (%)	Not given at all (%)
Breastfeeding	05	65	05	25
Quantity of drinks given	15	40	25	20
Quantity of food given	25	45	15	15

Knowledge and practices regarding child feeding

Mothers' knowledge and practices regarding breastfeeding and complementary feeding were satisfactory as shown by the data in Table 12.

Table 12. Knowledge and practices regarding child feeding (n=1102)

Specific knowledge /practice	No. of families	Percentage
Knowledgeable about exclusive breastfeeding period	907	82
Breastfeeding started within 1 hour after delivery	950	86
Knowledgeable about the value of colostrums	1036	94
Breastfeeding duration more than 6 months	1003	91
Introduction of water after the 4 th month	856	78
Introduction of other liquid foods at the correct time	799	73
Introduction of semisolid foods at the correct time	905	82

CONCLUSIONS

Of the children under-5 years old, only 41% had satisfactory nutritional status and 59% had some form of malnutrition. Majority of them were wasted (42.7%). The prevalence of underweight and stunting among these children were 41.2% and 11.8%, respectively. Low birth weight had a positive relationship with the current undernutrition of the child.

Mothers were better educated than fathers in this community. Parental educational status was not associated with the prevalence of underweight or low birth weight in children.

The knowledge about micronutrients (vitamin A, iron and iodine) was not adequate. The knowledge of the mother about management of diarrhoea and feeding during illnesses was unsatisfactory while that of breastfeeding and complementary feeding was satisfactory.

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