

Nutritional status and its determinants in Sri Lankan under five children

Renuka Jayatissa, Moazzem Hossain, Dulitha Fernando, Chavi Uduwaka,
Ranbanda Jayawardana, Prasanna Indrajith

Department of Nutrition
Medical Research Institute

Corresponding author

Dr. Renuka Jayatissa
Consultant Medical Nutritionist
Department of Nutrition
Medical Research Institute
Colombo 08.
renukajayatissa@ymail.com

Abstract

Background. In Sri Lanka after ending of long standing conflicts, there is an opportunity to address prevailing nutritional problems through targeted programmes. It is important first to have reliable information on the nutrition status of the population and the factors affecting it.

Objective. To assess the nutritional status and prevalence of anaemia of children under five years and to identify the factors associated with.

Methods. This study was a nationally representative study using a multistage, stratified, cluster sampling method, randomly selected, one district from each province, 21 households from the randomly selected 30 Gramaniladari areas from each district. An interviewer administered questionnaire was introduced for mothers' of children below five years. Weight, height and haemoglobin were measured. WHO growth standard was used.

Results. A total of 2865 children under five years were studied. Overall, 19.2% were stunted, 11.8% wasted, 21.6% underweight, 25.8% were anaemic and 18.2% were born with low birth weight. Stunting was the greatest in Nuwara Eliya (OR=4.40) compared with Colombo municipality area, similarly with underweight (OR=1.19). Severe stunting and wasting was seen the greatest in the estate sector compared with urban (OR=1.62). Prevalence of anaemia was seen the greatest during the latter half of infancy and declining with increasing age (OR=0.22). The prevalence of low birth weight was seen greater in girls when compared with boys (OR=0.67).

Conclusions. Under-nutrition among preschool children continues to be a public health problem in Sri Lanka. Need to address it urgently for sustainable development.

Introduction

In many developing countries, undernutrition is widespread, where close to a billion people have been estimated to be suffering from undernutrition¹. It has

been estimated that the highest rates of child undernutrition, worldwide, are those in South Asia¹. This is a major drain on the establishment of developing countries as undernourished children need unconditional care from their parents and are less physical and intellectually productive as adults. It has been estimated that around 12 million low birth weight (LBW) births occur per annum as well as suffer cognitive abnormalities and are stunted as adults¹. Adequate iron intake has been shown to be vital for brain development, yet more than 40% of children (0-4 years) in developing countries suffer from anaemia², where dietary iron deficiency seems to be the main cause³. Food security plays a vital role in determining the outcome of ones nutritional status. Households facing food insecurity are more likely to demonstrate high levels of child undernutrition and mortality due to nutritional and non-nutritional deficiencies⁴. Moreover, it is a violation of a child's human rights.

Over the past decade, Sri Lanka has made substantial progress in improving basic health indicators⁵. However, child under-nutrition remains a major public health problem, despite improvements in many health indicators. According to the recent Demographic and Health Survey (DHS), 2006/7, 17% of under five children are born with low birth weight, while the prevalence of wasting, stunting and underweight were 15%, 18% and 22%, respectively⁶.

Mapping the most vulnerable populations, in terms of the prevalence of under-nutrition, will assist in identifying interventions and targeting mechanisms. This study aims at providing information on the nutritional status of children under the age of five years and associated factors, with special emphasis on food security.

Methods

A cross sectional cluster sampling method was used to randomly select one district to represent all nine provinces of Sri Lanka. Clusters were defined at the

level of a Grama Niladhari (GN) division, the smallest administrative unit in Sri Lanka. The first cluster was identified randomly, followed by identification of 30 clusters per district, using probability proportionate in sampling technique.

The sample size was calculated on the basis of the main target variable, which was acute under-nutrition of under five children (0-59 months). The estimated sample size per district was 617 households totalling to 6170 households in 10 study areas. A systematic random sampling technique was used within each cluster to identify 21 households. A household was defined as persons routinely sharing food from the same cooking pot and living in the same compound or physical location. The selected study districts were Jaffna, Trincomalee, Kurunegala, Anuradhapura, Nuwara Eliya, Badulla, Ratnapura, Hambantota, and Colombo as two separate areas: Municipal Council (CMC) area and Colombo Regional Director of Health Services area

The household survey included the administration of a pre-tested questionnaire to the head of the household, assessment of the nutritional status of all children aged 0 to 59 months using anthropometric indicators. Weight was measured using seca electronic weighing scales and height or length was taken using height boards. Food consumption was assessed by 24-hour and 7-day recall for specific foods. Measurement of haemoglobin levels was carried out on all children aged 6-59 months using haemocue method. All the interviewers were trained and supervised continuously.

Three indices of physical growth that describe the nutritional status of children were assessed according to WHO growth standards⁷; Height-for-age (HAZ), Weight-for-height (WHZ) and Weight-for-age (WAZ) Z-scores. Children with HAZ, WHZ and WAZ below -2 standard deviation (SD) from the reference population were considered stunted, wasted and underweight, respectively. Similarly, those who were <-3 SD were considered severely stunted, wasted and underweight, respectively. Those with WHZ >+2 SD were considered overweight.

Results

The final sample studied consisted of 2865 children under five, of them; 23.4%, 67.2% and 9.4% were in the urban, rural and estate sectors, respectively (Table 1). Overall, 19.2% were stunted, 11.8% wasted, 21.6% underweight, 25.2% were anaemic and 18.1% were low birth weight.

Compared to CMC, the districts which had significantly higher risk of having stunted children were: Nuwaraeliya (OR=4.40), Badulla (OR=3.70), Trincomalee (OR=3.00), Ratnapura (OR=2.77) and Colombo (OR=2.40) (Table 2). Children in estate sector had 1.6 times higher risk than the urban sector, but the adjusted odds ratio was not statistically significant. Households with seven or more members (OR=2.23) or 3 or more children (OR=6.12) were found to have a higher risk for stunting. Compared to 6-11 months aged children, those in the older age categories showed an increased risk of stunting. Birth weight more than 2500 grams were strongly predictive of a lower risk (OR=0.43) of stunting (or inversely, LBW was associated with higher risk (OR= 2.33) of stunting).

The likelihood of wasting was significantly low in families with two children less than five years (OR=0.47) and richest wealth quintiles (OR=0.37) (Table 2). Risk for wasting significantly increased with increasing age of child. Female children had lower risk (OR=0.69) of wasting than males. Birth weight more than 2500 grams were strongly predictive of lower risk (OR=0.41) of wasting. (or inversely, LBW was associated with higher risk (OR= 2.44) of wasting).

Table 3 presents the risk estimates for underweight. The risk of underweight was high among families with seven or more members (OR=2.06), and with the increasing age of child. Children in the households of richest wealth quintile (OR=0.39) were found to have lower risk for underweight. Birth weight more than 2500 grams were strongly predictive of lower risk (OR=0.36) of underweight (or inversely, LBW was associated with higher risk (OR= 2.78) of underweight).

Children in the Jaffna district had a significantly higher risk of anaemia. Girls had a significantly lower risk for anaemia (OR=0.67) compared with boys. Children in households of richest wealth quintile (OR=0.56) were found to have lower likelihood for anaemia. Risk of anaemia shows a significant decline with increasing age of the children, and did not show any association with the birth weight of child. Compared to urban sector, children in the rural and estate sectors had significantly lower risk for anaemia.

Figure 1 shows the birth weight of children born within the five years preceding the survey. The overall LBW prevalence was shown to be 18.1%. The mean birth weight for the total group was 2.89 ± 0.51 kg with no clear pattern observed between age groups, district and maternal educational levels as shown in Table 4. The prevalence was higher among girls than boys. A marked inter-sectoral difference was seen with the highest prevalence seen in the estate sector (38.3%) followed by the urban sector (15.7%).

Discussion

This study was carried out with the objective of identifying the most vulnerable populations in relation to their nutritional status. The prevalence of wasting,

stunting, underweight, anaemia and low birth weight in children less than five years of age was assessed in this study. A wide range of factors associated with under-nutrition in these children was studied, based on the UNICEF Impact Framework⁸. In the framework, undernutrition and child death are viewed as manifestations of a multi-sectoral development problem that can be analysed in terms of: basic, underlying and immediate causes^{8,9}.

In Sri Lanka, although both stunting and underweight have been gradually decreasing, wasting has remained at a level, which has been relatively unchanged for the last 30 years (ref). In the current study, there was a significant upward trend in the prevalence of stunting, wasting and underweight with increasing age. The highest prevalence of anaemia showed during the first six months of life followed by a sharp consistent decline with increasing age. Female children had a significantly lower risk of wasting and anaemia, compared with males. Risk of stunting, wasting and underweight were significantly higher among children with low birth weight. Children belonging to the highest wealth quintile were less likely to be stunted, wasted, underweight and anaemic. Risk of stunting was significantly higher in households with seven or more members or three or more children, while that of wasting was only associated with being a member of a family with three or more children and underweight with seven or more.

A vast number of previous studies in the past have recognised the detrimental effects of under-nutrition¹⁰. One study in economically deprived rural area in Indonesia found that iron-deficient anaemic children had lower achievement test scores during an evaluation compared with non-anaemic children¹¹. Many studies have tracked low birth weight infants into their adulthood and have found a higher susceptibility to coronary heart disease, non-insulin dependent diabetes, high blood pressure and cholesterol¹². In developing countries, developmental impairment is a substantial health problem among children, where its effects can be permanent¹³⁻¹⁵.

This study identifies the multi-sectoral issues relevant to the problems of under-nutrition. Hence, there is a need to develop a cohesive multi-sectoral programme

with a special focus on food security. Programmes should focus on vulnerable groups and enhance awareness among public through mass media and strengthen behaviour modification changes to improve dietary diversity. Attention should be paid to develop and implement specific interventions aimed at reduction of low birth weight, stunting, wasting and underweight. Specific health related programmes should be in place to reduce the problem of anaemia in infants to be considered with specific guidance given to health care personnel.

References:

1. Behrman J.R, Alderman H, Hoddinott J. Health, human capital and economic growth. Cambridge, MA: MIT Press. 2004; 1-32.

2. Administrative Committee on Coordination/Sub-Committee on Nutrition (ACC/SCN), 4th Report on the World Nutrition Situation. New York: United Nations, in collaboration with the International Food Policy Research Institute, Washington D.C. 2000.
3. Margo G, Baroni Y, Green R, Metz J. Anemia in urban underprivileged children. Iron, folate and vitamin B12 nutrition. *American Journal of Clinical Nutrition*. 1977; 30: 947-54.
4. Alberto G, Francesco S. Child malnutrition and mortality in developing countries: evidence from a cross-country analysis. Munich Personal Repec Archives. 2007: 1-41.
5. UNICEF. Nutrition status of children [internet]. New York: UNICEF. [Cited 2011 September 21]. Available from: www.unicef.org/srilanka/overview_1646.htm
6. Department of Census and Statistics and Ministry of Healthcare and Nutrition. Sri Lanka Demographic and Health Survey. 2008 May. 27 p.
7. WHO Multicentre Growth Reference Study Group. WHO Child Growth Standards based on length/height, weight and age. *Acta Paediatrica*, 2006; 450: 76-85.
8. UNICEF. Strategy for Improved Nutrition of Children and Women in Developing Countries. New York: UNICEF. 1990.
9. UNICEF & World Bank. Background papers: World Bank/UNICEF Nutrition Assessment. New York: US. 2002; 1-131.
10. Benson T, Shekar M. Disease and mortality in sub-saharan Africa. 2nd edition [internet]. Washington (DC): World Bank; 2006. Chapter 8, trends and issues in children undernutrition. [Cited 2011 October 02]. Available from: www.ncbi.nlm.nih.gov/books/NBK2301

11. Soemantri AG, Pollitt E, Kim I. Iron deficiency anemia and educational achievement. *The American Journal of Clinical Nutrition*. 1985, 42(6): 1221-8.
12. Barker, D.J.P. *Mothers, babies and health in later life*. Edinburgh, London, New York, Philadelphia, San Francisco, Sydney, Toronto: Churchill Livingstone. 2nd edition. 1998.
13. Ricci JA, Becker S. Risk factors for wasting and stunting among children in Metro Cebu, Philippines. *American Journal of Clinical Nutrition*. 1996; 63: 966-75.
14. Beaton GH, Kelly A, Kevany J, Martorell R, Mason J. Appropriate uses of anthropometric indices in children. ACC/SCN State-of-the-Art Series. Geneva: ACC/SCN, 1990. (Nutrition Policy Discussion Paper no. 7.)
15. Calloway D. *The functional consequences of malnutrition and implications for policy: case studies in Egypt, Kenya and Mexico*. PEW Lecture. Ithaca, NY: Cornell University, 1989.

Table 1. Total number of children aged less than 5 years, by sector and district

Sector/ District	Total Number of individuals	Children < 5 years	
		No	%
Sector			
Urban	7130	671	9.4
Rural	18960	1925	10.2
Estate	1772	269	15.2
District			

Table 1. Total number of children aged less than 5 years, by sector and district

Sector/ District	Total Number of individuals	Children < 5 years	
		No	%
Anuradhapura	2676	253	9.5
Badulla	2869	271	9.4
Colombo RDHS	2780	268	9.6
Colombo MC	3017	292	9.7
Hambantota	2717	293	10.8
Jaffna	2776	286	10.3
Kurunegala	2801	235	8.4
Nuwara Eliya	2789	361	12.9
Ratnapura	2893	270	9.3
Trincomalee	2544	336	13.2
Total	27862	2865	10.3

Table 2. Factors associated with stunting and wasting in children aged 6-59 months

Characteristic	Wasting (weight-for-height<-2Z)		
	OR	95% CI	p-value
Sector			

Table 2. Factors associated with stunting and wasting in children aged 6-59 months

Characteristic	Wasting (weight-for-height<-2Z)			
	OR	95% CI		p-value
Urban	1.00			
Rural	0.87	0.39	1.95	0.728
Estate	0.58	0.15	2.31	0.440
District				
Colombo MC	1.00			
Anuradhapura	0.99	0.31	3.15	0.988
Badulla	0.65	0.21	2.02	0.451
Colombo RDHS	1.59	0.71	3.56	0.263
Hambantota	1.13	0.37	3.49	0.832
Jaffna	0.69	0.19	2.46	0.567
Karunegala	1.26	0.43	3.70	0.678
Nuwara Eliya	0.50	0.13	1.92	0.311
Ratnapura	0.90	0.27	2.97	0.863
Trincomalee	0.80	0.25	2.58	0.713
Higher	0.17	0.01	2.03	0.162
No. of members in Household				
1-3	1.00			
4-6	1.29	0.79	2.09	0.310
≥7	1.45	0.75	2.81	0.271
No. of children less than 5 years				
1	1.00			
2	0.47	0.27	0.81	0.007
≥3				
Wealth Index				
Poorest	1.00			
Lower	0.95	0.53	1.71	0.868
Middle	0.84	0.45	1.56	0.579
Upper	0.85	0.41	1.74	0.655
Highest	0.37	0.16	0.83	0.016
Child's age in months				
<6	1.00			
6-11	2.89	1.04	8.03	0.042
12-23	3.79	1.35	10.64	0.011
24-35	4.82	1.73	13.40	0.003
36-47	5.62	2.01	15.69	0.001
48-59				
Sex of child				
Male	1.00			
Female	0.69	0.49	0.99	0.042
Birth weight of child				
<2500	1.00			
≥2500	0.41	0.27	0.61	0.000

Table 2. Factors associated with stunting and wasting in children aged 6-59 months

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)				
	OR	95% CI	p-value	OR	95% CI	p-value		
Sector								
Urban	1.00			1.00				
Rural	0.77	0.46	1.30	0.330	0.87	0.39	1.95	0.728
Estate	1.62	0.70	3.72	0.256	0.58	0.15	2.31	0.440
District								
Colombo MC	1.00			1.00				
Anuradhapura	2.24	0.90	5.55	0.082	0.99	0.31	3.15	0.988
Badulla	3.70	1.55	8.87	0.003	0.65	0.21	2.02	0.451
Colombo RDHS	2.40	1.12	5.14	0.025	1.59	0.71	3.56	0.263
Hambantota	2.44	0.98	6.12	0.056	1.13	0.37	3.49	0.832
Jaffna	2.41	0.96	6.02	0.060	0.69	0.19	2.46	0.567
Karunegala	1.73	0.66	4.49	0.262	1.26	0.43	3.70	0.678
Nuwara Eliya	4.40	1.83	10.57	0.001	0.50	0.13	1.92	0.311
Ratnapura	2.77	1.12	6.85	0.027	0.90	0.27	2.97	0.863
Trincomalee	3.00	1.21	7.43	0.018	0.80	0.25	2.58	0.713
Higher	0.84	0.20	3.59	0.810	0.17	0.01	2.03	0.162
No. of members in Household								
1-3	1.00			1.00				
4-6	1.38	0.89	2.12	0.147	1.29	0.79	2.09	0.310
≥7	2.23	1.26	3.93	0.006	1.45	0.75	2.81	0.271
No. of children less than 5 years								
1	1.00			1.00				
2	0.91	0.59	1.40	0.657	0.47	0.27	0.81	0.007
≥3	6.12	1.07	35.10	0.042				
Wealth Index								
Poorest	1.00			1.00				
Lower	0.79	0.49	1.26	0.320	0.95	0.53	1.71	0.868
Middle	0.74	0.45	1.24	0.252	0.84	0.45	1.56	0.579
Upper	0.75	0.43	1.32	0.316	0.85	0.41	1.74	0.655
Highest	0.54	0.28	1.05	0.071	0.37	0.16	0.83	0.016
Child's age in months								
<6	1.00			1.00				
6-11	3.16	1.55	6.42	0.002	2.89	1.04	8.03	0.042
12-23	2.91	1.43	5.92	0.003	3.79	1.35	10.64	0.011
24-35	2.88	1.38	5.97	0.005	4.82	1.73	13.40	0.003
36-47	2.70	1.30	5.61	0.008	5.62	2.01	15.69	0.001
48-59								
Sex of child								
Male	1.00			1.00				
Female	0.96	0.71	1.30	0.803	0.69	0.49	0.99	0.042
Birth weight of child								
<2500	1.00			1.00				
≥2500	0.43	0.31	0.61	0.000	0.41	0.27	0.61	0.000

Table 3. Factors associated with underweight and anaemia in children aged 6-59 months

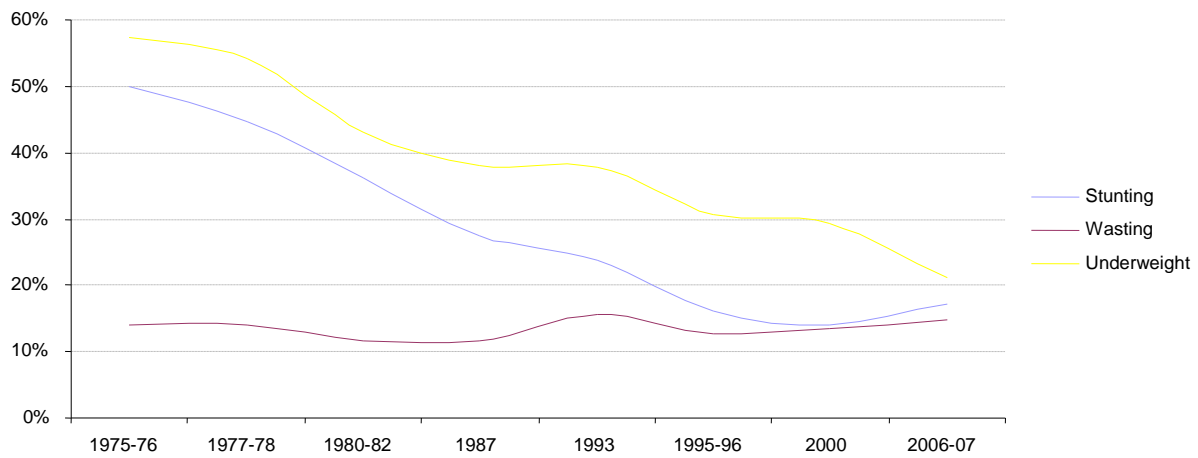
Characteristic	Underweight (height-for-age<-2Z)			Anaemia (Hb<11.0 g/dl)				
	OR	95% CI	p-value	OR	95% CI	p-value		
Sector								
Urban	1.00			1.00				
Rural	0.90	0.52	1.70	0.847	0.42	0.24	0.72	0.002
Estate	0.62	0.25	1.53	0.298	0.35	0.14	0.89	0.028
District								
Colombo MC	1.00			1.00				
Anuradhapura	0.93	0.40	2.18	0.873	1.59	0.75	3.39	0.227
Badulla	1.00	0.43	2.28	0.991	1.61	0.76	3.42	0.072
Colombo RDHS	1.00	0.53	1.91	0.995	0.96	0.52	1.78	0.895
Hambantota	0.97	0.42	2.27	0.952	1.30	0.57	2.98	0.532
Jaffna	0.42	0.17	1.05	0.064	2.52	1.13	5.61	0.024
Karunegala	0.88	0.38	2.05	0.763	0.88	0.39	1.98	0.749
Nuwara Eliya	1.19	0.51	2.76	0.684	1.03	0.44	2.41	0.942
Ratnapura	0.90	0.37	2.20	0.825	2.05	0.94	4.49	0.214
Trincomalee	0.67	0.28	1.60	0.362	1.77	0.80	3.93	0.158
Wealth Index								
Poorest	1.00			1.00				
Lower	0.87	0.56	1.36	0.541	1.12	0.70	1.78	0.641
Middle	0.70	0.43	1.15	0.160	0.88	0.54	1.43	0.604
Upper	0.81	0.48	1.38	0.444	1.05	0.63	1.75	0.859
Highest	0.39	0.21	0.74	0.004	0.56	0.31	1.00	0.052
Child's age in months								
<6	1.00			1.00				
6-11	3.20	1.54	6.66	0.002	0.35	0.22	0.56	0.000
12-23	4.84	2.34	10.02	0.000	0.22	0.14	0.34	0.000
24-35	4.53	2.17	9.45	0.000	0.15	0.09	0.24	0.000
36-47	5.00	2.42	10.32	0.000	0.10	0.06	0.17	0.000
48-59								
Sex of child								
Male	1.00			1.00				
Female	0.89	0.68	1.18	0.435	0.67	0.51	0.89	0.005
Birth weight of child								
<2500	1.00			1.00				
≥2500	0.36	0.26	0.49	0.000	0.77	0.54	1.11	0.158
Maternal Anaemia								
No	1.00			1.00				
Yes	0.90	0.64	1.26	0.535	0.51	0.37	0.70	0.000

Table 3. Factors associated with underweight and anaemia in children aged 6-59 months

Characteristic	Underweight (height-for-age<-2Z)			Anaemia (Hb<11.0 g/dl)				
	OR	95% CI	p-value	OR	95% CI	p-value		
Sector								
Urban	1.00			1.00				
Rural	0.90	0.52	1.70	0.847	0.42	0.72	0.002	
Estate	0.62	0.25	1.53	0.298	0.35	0.14	0.89	0.028
District								
Colombo MC	1.00			1.00				
Anuradhapura	0.93	0.40	2.18	0.873	1.59	0.75	3.39	0.227
Badulla	1.00	0.43	2.28	0.991	1.61	0.76	3.42	0.072
Colombo RDHS	1.00	0.53	1.91	0.995	0.96	0.52	1.78	0.895
Hambantota	0.97	0.42	2.27	0.952	1.30	0.57	2.98	0.532
Jaffna	0.42	0.17	1.05	0.064	2.52	1.13	5.61	0.024
Karunegala	0.88	0.38	2.05	0.763	0.88	0.39	1.98	0.749
Nuwara Eliya	1.19	0.51	2.76	0.684	1.03	0.44	2.41	0.942
Ratnapura	0.90	0.37	2.20	0.825	2.05	0.94	4.49	0.214
Trincomalee	0.67	0.28	1.60	0.362	1.77	0.80	3.93	0.158
Wealth Index								
Poorest	1.00			1.00				
Lower	0.87	0.56	1.36	0.541	1.12	0.70	1.78	0.641
Middle	0.70	0.43	1.15	0.160	0.88	0.54	1.43	0.604
Upper	0.81	0.48	1.38	0.444	1.05	0.63	1.75	0.859
Highest	0.39	0.21	0.74	0.004	0.56	0.31	1.00	0.052
Child's age in months								
<6	1.00			1.00				
6-11	3.20	1.54	6.66	0.002	0.35	0.22	0.56	0.000
12-23	4.84	2.34	10.02	0.000	0.22	0.14	0.34	0.000
24-35	4.53	2.17	9.45	0.000	0.15	0.09	0.24	0.000
36-47	5.00	2.42	10.32	0.000	0.10	0.06	0.17	0.000
48-59								
Sex of child								
Male	1.00			1.00				
Female	0.89	0.68	1.18	0.435	0.67	0.51	0.89	0.005
Birth weight of child								
<2500	1.00			1.00				
≥2500	0.36	0.26	0.49	0.000	0.77	0.54	1.11	0.158
Maternal Anaemia								
No	1.00			1.00				
Yes	0.90	0.64	1.26	0.535	0.51	0.37	0.70	0.000

Table 4. Prevalence of low birth weight and mean birth weight among children born in years preceding the survey, by background characteristics

Background characteristic	Birth Weight				Number of children
	< 2500g (%)	≥ 2500g (%)	Mean (kg)	SD	
Age of child (months)					
0-5	17.5	82.5	2.87	0.45	252
6-11	14.5	85.5	2.93	0.53	275
12-23	16.0	84.0	2.92	0.55	580
24-35	21.1	78.9	2.86	0.51	579
36-47	19.4	80.6	2.87	0.50	480
48-59	18.4	81.6	2.91	0.49	468
Sex of child					
Male	15.6	84.4	2.94	0.51	1293
Female	20.6	79.4	2.85	0.51	1341
Residence					
Urban	15.7	84.3	2.94	0.55	637
Rural	16.8	83.2	2.91	0.49	1801
Estate	38.3	61.7	2.58	0.46	196
District					
Anuradhapura	19.0	81.0	2.89	0.49	237
Badulla	22.6	77.4	2.81	0.58	261
Colombo RDHS	16.1	83.9	2.92	0.45	261
Colombo MC	16.1	83.9	2.91	0.52	280
Hambantota	21.5	78.5	2.89	0.49	279
Jaffna	16.6	83.4	2.99	0.55	277
Kurunegala	16.9	83.1	2.91	0.45	219
Nuwaraeliya	27.1	72.9	2.72	0.44	255
Ratnapura	14.0	86.0	2.85	0.41	257
Trincomalee	12.7	87.3	3.00	0.59	308
Mother's education					
No schooling	17.5	82.5	2.85	0.42	57
Primary	26.3	73.7	2.78	0.52	171
Secondary	20.6	79.4	2.88	0.54	759
Passed O' Level	17.0	83.0	2.91	0.52	819
Higher	14.4	85.6	2.95	0.47	500
Wealth index quintile					
Poorest	24.5	75.5	2.79	0.55	559
Second	20.7	79.3	2.83	0.47	487
Middle	16.3	83.7	2.92	0.52	504
Fourth	15.1	84.9	2.95	0.48	498
Richest	14.2	85.8	2.97	0.50	486
Overall	18.1	81.9	2.89	0.51	2634



Source: MRI database and DHS 1989, 2001, 2006/07

Figure 1. Trends in under nutrition among under-five children in Sri Lanka