

# Prevalence of Risk Factors of Under-Nutrition Among Children 1 to 5 Years in Eastern, Sri Lanka

Thilini Herath<sup>1,\*</sup>, Josepha Joseph<sup>2</sup>

<sup>1</sup>Department of Primary Health Care, Faculty of Health-Care Sciences, Eastern University, Batticaloa, Sri Lanka

<sup>2</sup>Department of Supplementary Health Sciences, Faculty of Health-Care Sciences, Eastern University, Batticaloa, Sri Lanka

## Email address:

herathhmt@gmail.com (T. Herath), josepha\_joseph@yahoo.com (J. Joseph)

\*Corresponding author

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**Abstract:** Global studies have shown that under-nutrition, results for at least half of all childhood death worldwide and it has identified as a major cause of morbidity and mortality in children under five years of age. According to the UNICEF conceptual framework, there is a multifactorial causality for under-nutrition. The objective of this study was to assess the prevalence of risk factors of under-nutrition among children aged one to five years in the Batticaloa Medical Officer of Health area in Eastern province of Sri Lanka. A cross-sectional study was carried out among 1-5 year old in the Batticaloa Medical Officer of Health area (n=500) recruited using multistage cluster sampling method. Data were collected from mothers by using an interviewer administered questionnaire. Data were analyzed by using descriptive statistics using SPSS V20. More than 50% of the children had gotten infections during past two weeks prior to the data collection and had an exposure to child abuse. Similarly, more than 50% of the children had parents whose education levels up to primary or less, a father who consumes alcohol and a mother who exposed to intimate partner violence. The majority of mothers (more than 50%) showed a satisfactory level of knowledge on essential nutrients to the child. But, in contrast to that, a similar percentage of the children were fed animal source food, legumes, dark green leaves, yellow color vegetables and yellow color fruits one time per day. Nutrition interventions should be targeted on high prevalent factors and further research is needed to investigate the causes of knowledge and practice gap in relation to child feeding.

**Keywords:** Under-Nutrition, Risk Factors, Sri Lanka

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## 1. Introduction

Global studies have shown that under-nutrition, results for at least half of all childhood death worldwide [1-3]. Consequences of under-nutrition are ranged from growth failure, intellectual impairment and lower resistance to infections to risk to develop some chronic disease [4]. Hence this has been recognized as a leading cause of death, disability, and ill health among children under five years and thus this problem is a vital challenge to public health and global development [5-7]. South Asia has the highest levels of underweight affecting 46% of all under 5 children in the region [8]. A literature review on under-nutrition in Sri Lanka reveals that the prevalence of underweight, stunting and wasting levels are 21.2%, 17.3% and 14.7%,

respectively [9] and it considers as a significant public health problem in Sri Lanka despite other maternal and child health indicators reported good achievements in the recent past.

According to the UNICEF conceptual framework, there is a multifactorial causality for under-nutrition [10]. These factors range from child related factors to wider societal factors. However, the magnitude of these risk factors of under-nutrition among under five children vary across different local settings. Therefore, it is a prompt response to assess the problem at community level using a community based descriptive cross sectional study to determine the prevalence of risk factors. So this determination will be an important measure to design appropriate locally relevant strategies which can be helpful in reducing the problem. Further, available research evidence on under-nutrition in Sri

Lanka is limited to prevalence estimates and analytical studies. Though there are few national studies those also had done by excluding both North and Eastern provinces due to the prolonged civil war.

So, given the lack of research studies on risk factor prevalence of child under-nutrition in Eastern province, we conducted the present study to assess the prevalence of risk factors of under-nutrition among children aged 1 to 5 years in the Batticaloa Medical Officer of Health (MOH) area in Eastern province of Sri Lanka. This study will be useful for the Sri Lankan public health system to sanitize potential health disparities and their magnitude by planning appropriate, effective and sustainable health promotion interventions to achieve health equity.

## 2. Materials and Methods

A cross sectional study was carried out from January 2015 to December 2015 in the Batticaloa MOH area. The study population consisted of children aged one to five years and their mothers. The total sampling frame was approximately 6650 [11]. The sample size required to estimate a prevalence of 17.5% (Demographic and Health Survey 2006/07, [9] had found this figure for stunting among children under five years in Sri Lanka), with a 95% confidence interval. The exact sample size of this study was 443 according to the WinPepi statistical software (version 2.68) by considering the sampling method as cluster sampling, acceptable difference 0.05 and design effect as 2. According to the calculation 30 clusters were needed with a cluster size of 15 to achieve the calculated sample size. A field weighing post was considered as a cluster for this study. So the total sample size was 450 (30\*15) for this study. A final sample size of 495 was calculated after adjusting for an estimated non response rate of 10%. This value was rounded to 500. A multi stage sampling technique was carried out to select the sample. Exclusion criteria included genetic disorders and chronic medical conditions for the child and psychiatric disorders and disability of the mother. Birth & immunization register (EPI 379) maintained by the Public Health Midwife (PHM) was used to select children randomly within the selected cluster. The data were collected from the mother of the selected child at their homes. The mothers of the children were informed about the purpose of the study and invited to participate through the PHM of the selected area. Prior notice was given before visiting in their homes and two attempts were taken if the mother was unable to meet.

A pretested validated interviewer administered questionnaire, developed by the investigators was used to obtain data on selected risk factors based on the past global and local literature. This study examined prevalence of following risk factors. *Socioeconomic factors*: mother's education level up to primary or less, father's education level up to primary or less, a monthly family income below 25,000 rupees; *Dietary factors*: a period of exclusive breast feeding less than 6 months, commencement of complementary feeding after 7 months, feeding practices on the selected

child; *Child factors*: a birth weight below 2.5 kg, infections during past 2 weeks, exposure of the child to abuse; *Maternal factors*: multiple birth, mother's age below 22 years at child birth, mother's knowledge on child nutrition, maternal exposure to Intimate Partner Violence (IPV); *Household factors*: extended family set up, more than 2 under five children per household, not having mass media exposure, tobacco smoking father, alcohol consuming father. Child health development record was used to gather secondary data on infant's birth factors including birth weight. Trained data collectors were used to interview the mothers. Descriptive statistics were used to do the statistical analysis by using the Statistical Package for Social Science (SPSS version 20).

Ethical approval for conducting the study was granted from the ethical review committee of the Faculty of Health-Care Sciences, Eastern University. Informed written consent was obtained from mothers of the selected child prior to data collection. Standard measures were taken to ensure confidentiality of data.

## 3. Results

The response rate was 100% in this study and probably due to support from the PHMs for the data collection process.

### 3.1. Characteristics of the Study Population

Of the 500 children, about 33.5% of the children were belonged to 12-23 months age group and the mean age of the study population was 31.38 months (SD +/- 12.9) and 52.6% were females. Most of the children were Sri Lankan Tamils (88.4%) (Table 1).

**Table 1.** Distribution of the basic socio demographic characteristics of study sample.

Socio-demographic characteristic	Number (Total=500)	Percent
Age in months		
12-23	168	33.5
24-35	150	29.9
36-47	111	22.2
48-59	71	14.2
Sex		
Female	263	52.5
Male	237	47.3
Ethnicity		
Sinhala	2	0.4
Sri Lankan Tamil	443	88.4
Indian Tamil	5	1.0
Sri Lankan Moors	12	2.4
Muslim	38	7.6

### 3.2. Prevalence of Risk Factors of Under Nutrition

This study considered 18 risk factors which were selected from past literature. More than 50% of the children's parents educated up to primary or less. But the exclusive breastfeeding rate for first 6 months was good and there were only 2.4% of mothers who didn't follow the standard feeding

practice on breast feeding. Low birth weight rate was 16.8%. There were more than 50% children who got infections during the past 2 weeks prior to the data collection and had

an exposure to child abuse. More than 50% of the children had a father who consumes alcohol and a mother who exposed to IPV (Table 2).

*Table 2. Prevalence of risk factors of under nutrition among the sample.*

Risk factor category	Risk factor	Number Total (500)	Percent
Socioeconomic	Mother's education level up to primary or less	322	64.3
	Father's education level up to primary or less	335	66.9
	A monthly income below 25,000 rupees	224	44.9
Dietary	A period of exclusive breastfeeding less than 6 months	12	2.4
	Commencement of complementary feeding after 7 months	211	42.1
	A birth weight below 2.5 kg	84	16.8
Child	Infections during past 2 weeks	280	55.5
	Child exposure to abuses	393	78.4
	Multiple birth	1	0.2
Maternal	Mothers age below 22 years at child birth	103	20.6
	Maternal exposure to IPV	332	66.3
	Extended family set up	115	23
Household	More than 2 under 5 children per household	33	6.6
	Not having mass media exposure	45	9.0
	Tobacco smoking father	160	31.9
	Alcohol consuming father	337	67.3

### 3.3. Knowledge Among Mother's on Children Nutrition

Table 3 shows that the knowledge of the mother on each essential nutrient to child was satisfactory. Most of the mothers (85.2%) knew that iron is essential and 67.9% mothers had the ability to name at least two iron source foods. Though 69.7% of mothers knew that vitamin A is essential to the child only 18% of the mothers had the ability to name at least two vitamin A sources. Similarly, only 25.1% of the mothers had the ability to name at least two calcium sources, though 71.5% mothers had the knowledge of the calcium requirement of the child.

*Table 3. Knowledge among mother's on children nutrition.*

Knowledge Category	Number Total (500)	Percent
Knowing about essential nutrients		
Iron	427	85.2
Calcium	358	71.5
Vitamin A	349	69.7
Protein	442	88.2
Carbohydrate	449	89.6
Ability to recognize at least 2 food sources of the following		
Iron	340	67.9
Calcium	126	25.1
Vitamin A	90	18.0
Protein	288	57.5
Carbohydrate	317	63.3

### 3.4. Feeding Practices of the Selected Children

Most of the children (66.9%) were given animal source food for one time per day. Similarly, most of the children fed legumes (71.5%), dark green leaf (60.7%), yellow color vegetables (66.9%), and yellow color fruits (75%) one time per day. Most of the children (79.4%) were not fed nuts and seeds for following day. But 51.7% children consume high salty instant food frequently and 43.7% children consume sugar dense food frequently (Table 4).

*Table 4. Feeding practices on the selected children.*

Component	Number Total (500)	Percentage
Animal Source food*		
Once a day	335	66.9
Twice a day	149	29.7
All 3 meals	2	0.4
Not given	14	2.8
Legumes		
Once a day	358	71.5
Twice a day	52	10.4
All 3 meals	4	0.8
Can't say	4	0.8
Not given	82	16.4
Dark green leaves		
Once a day	304	60.7
Twice a day	44	8.8
All 3 meals	9	1.8
Can't say	10	2.0
Not given	133	26.5
Yellow color vegetables**		
Once a day	335	66.9
Twice a day	36	7.2
All 3 meals	2	0.4
Can't say	2	0.4
Not given	125	25.0
Yellow color fruits***		
Once a day	376	75.0
Twice a day	25	5.0
All 3 meals	2	0.4
Can't say	3	0.6
Not given	94	18.8
Nuts and seeds		
Once a day	63	12.6
Twice a day	20	4.0
All 3 meals	4	0.8
Can't say	7	1.4
Not given	406	81.0
High salt dense instant food		
Frequently	259	51.7
Sometimes	189	37.7
Rarely	46	9.2
Never	6	1.2
High sugar dense instant food		

Component	Number Total (500)	Percentage
Frequently	219	43.7
Sometimes	255	50.9
Rarely	22	4.4
Never	04	0.8

\*Fish/Meat/egg

\*\*Pumpkin/Carrot/Yellow Sweet Potatoes

\*\*\*Papaya/Mango

## 4. Discussion

Our findings are not directly comparable with previous studies conducted in Sri Lanka as no study had been done to assess prevalence of risk factors of under-nutrition. Also, our study sample was not limited to children from birth to two years as most of the local studies had been done, though birth to two years is the critical age for future growth, health and development of the child [10]. We can discuss our study findings in a light of some limitations. Our study was cross sectional in nature and it was limited to one MOH area. This would reduce the potential of generalizing the findings to the whole district. Further, this study didn't evaluate the nutritional indicators and statistically significant factors for causing under-nutrition in the Batticaloa MOH area. Even though current feeding practices were assessed, our study was not used World Health Organization recommended Infant and Young Child Feeding (IYCF) guidelines to assess feeding practices of the child between 12-23 months. So the study findings can't be compared with studies which used these guidelines.

Our data indicate more than 50% of the children had parents whose education level up to primary or less. According to several studies maternal education plays a major role and it has a positive impact on reducing child under-nutrition [12-15]. Father's education level is also an important risk factor because in the Sri Lankan context usually father is the bread winner and decision maker of a family [12, 13]. According to our data, 44.9% of the sample belong to a monthly income less than 25,000 rupees. Monthly income is also an important factor because it decides purchasing power of goods. There should be policy level decisions to upgrade the education level of the people and also to enhance their sources of earnings since Batticaloa is a war affected district before 10 years. The health system of Sri Lanka should consider above in developing locally relevant preventive strategies for reducing child under-nutrition.

According to our study more than 50% of fathers consumed alcohol and mothers exposed to IPV. The prevalence of IPV among mothers of under 5 in Bangladesh in 2014 (49.6%) was lower than that for Batticaloa MOH area (66.3%) [16]. Our data indicate a lower prevalence of paternal tobacco smoking (31.9%) than that of Bangladesh during 1996-2006 (49%) [17]. Preventive strategies should also be focused on these types of social causes rather not only focusing on the direct causes since those prevalence values are high. Our data also show that more than 50% of under 5 children had exposed to child abuse and got infections during the past 2 weeks prior to the data

collection. These findings indicate two contrast aspects, the former one being neglected while the latter one is always taken into consideration in preventive activities within Sri Lanka. Further studies are needed to find out possible root causes while health interventions are going on to control the effects of these.

Contrast to data published by Peiris and Wijesinghe [18], our study showed a satisfactory level of knowledge regarding essential nutrients for the under 5 children. The high level of knowledge of Iron, Vitamin A and Calcium may be a result of nutrition counseling of PHMs and because of the updates getting through the mass media. But in Peiris and Wijesinghe, have been reported that maternal knowledge regarding micronutrients was poor among his study sample in Weeraketiya MOH area which is similar in economic and demographic characteristics in the Batticaloa MOH area. Though the people have exposed to conflicts, current health education work by multiple sectors might contribute to high level of knowledge among Batticaloa mothers compared with Weeraketiya mothers in 2010. Same reason can be used to justify the result of having a good rate of exclusive breastfeeding during the first 6 months among the sample.

Our study showed a 16.8% of low birth weight rate among the children and according to past studies lower birth size is significantly associated with under-nutrition in early childhood [12, 13, 19-22].

In this study, we have shown that dietary diversity is poor among aged 1 to 5 year old children in the Batticaloa MOH area because of the mother's current feeding practices. But nearly 50% of children are consuming high salt and sugar dense instant food frequency. Similarly, Bandara et al [23] has also stated that the proportion of infants aged 6-8 months who consumed eggs, fruits and vegetables other than those rich in vitamin A and flesh foods was low in Sri Lanka. Further Senarath et al [24] in his study, which considered only 6-23 months children, has reported that complementary feeding indicators were adequate except in the 6-11 months age group and he recommended that subgroups with inappropriate feeding practices should be the focus of IYCF promotion programs. These results showed the urgent need for timely interventions up on the changing trends of causes of under-nutrition due to rapid urbanization.

The above findings are verified the knowledge on possible causes of childhood under-nutrition and help policy makers to develop locally relevant strategies. Government should also take necessary steps in educating and empowering under 5 families in taking actions towards reducing this issue by improving their capacities on high prevalent risk factors despite of the traditional health education programs.

## 5. Conclusion

Future prevention interventions should be targeted specially for upgrading education level, reducing low birth weight rate, managing infections and reducing alcohol consumption by fathers, preventing child abuse and IPV since they reported a high prevalence rate than other risk

factors in the Batticaloa MOH area. Further studies are needed to find out the causes of knowledge and practice gap in relation to child feeding.

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