

Nutritional status and associated feeding practices among children aged 6-24 months in a selected community in Sri Lanka: A cross sectional study

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Abstract: Background: In Sri Lanka, nutritional indicators are static compared to other health indicators. Under nutrition among children less than five years remains a common public health problem. Poor nutritional status of children is associated with various factors which are preventable. Purpose of this study was to determine the nutritional status of children aged 6-24 months in a selected health unit area and to describe the associated feeding practices. Methods and materials: A cross sectional study was conducted among mothers of 428 children attending 24 randomly selected field weighing posts in Akuressa health division, for routine growth monitoring. Nutritional status of the children was assessed with anthropometric measurements and WHO growth charts. Other data were collected using an interviewer-administered questionnaire. Results: Prevalence of stunting, wasting and underweight in the sample was 17%, 17.1% and 21.3% respectively. Mean age of exclusive breast feeding was 5.8 months and prevalence of exclusive breast feeding for 6 months was 88.8%. Mean age of starting complimentary feeding was 6 months and majority (75.5%) started semisolids as the first food. A majority (75.8%) of the mothers practiced proper feeding during infections. Wasting was significantly associated with male gender ($p<0.01$), increasing age of the child ($p<0.05$) and late introduction of fat and oils into the diet (after 8 months of age) ($p<0.001$). Underweight was associated with male gender ($p<0.001$), increasing age ($p<0.05$) and late introduction of fat and oils into diet (after 8 months of age) ($p<0.05$). Stunting was only associated with male gender ($p<0.05$). Conclusion: Under nutrition among children is common in this age group. Some of the feeding practices are associated with poor nutritional status and these practices should be improved with effective interventions.

Keywords: Stunting, Wasting, Underweight, Sri Lanka

1. Introduction

Every year, ten and half million children under 5 years of age die worldwide and 98% of these deaths occur in developing countries [1]. Fifty percent of child deaths in developing countries are related to malnutrition potentiating effects[2]. The vast majority of underweight children live in developing regions, mainly in Asia and Africa[3]. According to WHO global database on Child Growth and Malnutrition very high levels of childhood underweight were found in 12 African countries and 13 Asian countries including Sri Lanka [3]. Sri Lanka has achieved targets in

reducing the number of children who die from preventable causes [4]. The country is on track to achieve Millennium Development Goals related to child mortality, maternal health and HIV and AIDS. Under five mortality currently stands at 15 deaths per 1,000 live births, almost all children are immunized, HIV prevalence is under 0.1% and the maternal mortality ratio is 33.4 per 100,000 births in 2008 [4]. Though current Sri Lankan child health indicators are in par with some developed countries, improvement of nutritional status of children under five years of age is very slow and the

country was unable to achieve its goals in reducing underweight, stunting and wasting [5]. According to the Demographic and Health Survey (DHS) 2006/07, prevalence of stunting was 18 %, wasting was 15 % and underweight was 22 % in Sri Lanka [6]. WHO, UNICEF, World Bank joint estimates reported the prevalence of stunting, wasting and underweight, 19%, 12% and 22% respectively in 2009[7]. Factors responsible for malnutrition particularly in children under five years of age include birth weight, birth interval, parity, age [8,9,10] and sex of child [11], socio economic conditions [8,13, 14], living standards, water and sanitation, food intake, weaning practices and mother's education [8, 15]. However, dietary inadequacy is certainly the basic cause of malnutrition in preschool age children, and many of the above identified factors directly or indirectly contributes to the incidence of malnutrition[15]. Both chronic and acute malnutrition starts to develop during the weaning period and rise sharply in the second year of life[15]. In addition, diarrheal diseases are identified as a common cause of malnutrition in this age group[15].

Feeding practices in early life are important as they determine health and development of an entire lifetime [16]. In the growth and development of a child, the impact of feeding practices is more significant than lack of food [17]. In 1994 the WHO recommended that exclusive breast feeding can meet all the infant's energy and nutrient requirement for at least six months and at the age of six months thought to be appropriate for commencing complimentary feeding. WHO & UNICEF (1995) stated that breast feeding should be continued with the complimentary foods at least for the first two years of life. Feeding of the child during childhood infections especially diarrhea is important because inadequate feeding during illnesses increases the risk of under nutrition of children [18].

Inappropriate feeding during early childhood, due to lack of knowledge of mothers about appropriate foods stands out as a major determinant of childhood malnutrition [19]. Since under nutrition is a major public health problem in Sri Lanka which mainly affects children under 5 years of age and also the main cause for morbidity and mortality of children in this age group, evidence on nutritional status and its associated factors and the feeding practices are essential for planning proper interventions to overcome this challenge. The aim of this study was to determine the nutritional status of children aged 6-24 months in health division Akuressa in Southern Sri Lanka, the common feeding practices and the association of nutritional status with these feeding practices.

2. Methodology

A cross sectional study was conducted among 428 mother-child pairs living in Akuressa health division in Matara district, Sri Lanka. Study participants were selected using cluster sampling and field weighing post (FWP) was identified as a cluster. Due to logistic issues, 24 (out of 72) clusters were randomly selected and 18 children in the age group of 6 months to 2 years attending selected FWP for

regular growth monitoring and their mothers were recruited as study subjects. Average number of children (from all age groups) registered in each FWP was 50. From each FWP, 18 eligible children were selected and if more than 18 children attended on the day of data collection, required number of children was randomly selected from the register. Children who have congenital abnormalities (ex: congenital heart diseases, congenital problems in palate or the gastro intestinal tract) and those suffering from chronic illnesses were excluded from the study.

Two study instruments were used for data collection. A data sheet was used to record anthropometric measurements (height/length and the weight) of the child. A pretested, interviewer-administered questionnaire was used to collect data on basic characteristics of the mother, child and the feeding practices. Feeding practices related to nutritional status such as exclusive breast feeding, duration of partial breast feeding, formula feeding, age of starting complimentary feeding, type of food first introduced, age of introducing leafy vegetables, oils and food items of animal origin, method of giving feeds and feeding during illnesses were collected. Trained health volunteers with previous experience of working in field weighing posts and in field clinics conducted the interviews. Weight and the length were measured by a Public Health Midwife and a volunteer, who were trained on these procedures and also on calibration of the instruments. Standard instruments were used to take the anthropometric measurements.

Three indicators were used to assess nutritional status by using anthropometric measurements; weight for age, height/length for age and weight for height. Cut off of these measurements to determine the nutritional status was based on the WHO reference values for children 6-24 months. The measurements of weight for age, height/length for age and weight for height, that are falling below -2 standard deviations (SD) from the median value for the reference population was considered as underweight, stunting and wasting respectively.

Data was analyzed using SPSS 15.0 version. Descriptive statistics including mean, standard deviation were obtained. All analysis was done with the test of significance (p value, Chi-square). Ethical clearance for the study was obtained from institutional review board of faculty of medicine, university of Sri Jayawardenepura, Sri Lanka.

3. Results

Response rate of the study was 100%. The mean age of the mothers participated in the study was 30.4 (SD±6.2) years and that of children was 14.8(SD ±6.0) months. Majority (98.8%) of mothers were Sinhalese. Over 30% of the mothers have completed advance level examination. Only 8.4 % mothers were employed. Approximately 25% of families had a low monthly income. Table 1 describes the basic characteristics of the study subjects and the nutritional status of the children.

Of the children 52.1% were males and 11.4% had low

birth weight (<2500 g). The majority of children (98.8%) have had age appropriate immunization.

Nutritional status of children was classified according to the WHO Growth standards (WHO 2005). The most prevalent form of under-nutrition was underweight (21%) and the prevalence of stunting and wasting in the study sample was 17.3 % and 17.1% respectively (Table 1). Less than 1% of the children were overweight / obese according to the growth standards.

Table 1. Basic characteristics of the study sample and the nutritional status of children

Basic characteristic	Number(428)	%
Age of the child (in months)		
6 – 11	161	37.7
12-17	100	23.4
18-24	167	38.9
Mean age 14.8SD±6		
Sex		
Male	223	52.1
Female	205	47.9
Birth Order		
1	190	44.4
2	151	35.3
3	61	14.3
4	24	5.6
>4	2	0.5
Birth weight		
<2500 g	49	11.4
≥2500 g	379	88.6
Immunization		
Age appropriate	427	98.8
Not age appropriate	1	1.2
Nutritional status*Normal	153	64.3
Under weight	90	21.0
Stunting	74	17.3
Wasting	73	17.1
Over weight	3	0.7

3.1. Feeding Practices Adopted by Mothers

The distribution of milk feeding practices in the sample is described in Table 2.

Table 2. Feeding practices adopted by the mothers

Exclusive Breast feeding duration (No. of months)	Number (n=428)	%
1	2	0.5
3	14	3.3
4	23	5.4
5	7	1.6
6	377	88.1
7	5	1.2
Current Breast Feeding		
Yes	407	95.1
No	21	4.9
Mean duration of current breast feeding = 14.5 months	SD ±4.56	
Formula feeding		
Yes	79	18.5
No	348	81.3
Reason for starting formula		
1 Inadequate breast milk	11	14.1
2 Reduced weight	20	25.6
3 working mother	18	23.1

4 Child not eating	14	16.7
5 Mother became pregnant	5	6.4
6 other	11	14.1

Approximately 88% of mothers (n=377) breast fed their children exclusively for 6 months and 95% of the mothers (n=407) were breast feeding their children at the time of the study. The majority (81.5%; n=348) had not introduced formula milk for their babies before 12 months of age. Of the mothers who started formula milk, 25% did so due to poor weight gain of the child. Other reasons were working mother (23.1%; n=18), inadequate breast milk (14.1%; n=11), child is not eating (16.7%; n=14), mother became pregnant (6.4%; n=5). Approximately 14% of the mothers who introduced formula milk to their infants (14.1%; n=11) reported that they were advised to do so by a medical personnel or relatives etc.

Proportion of mothers started complimentary foods for their children at the age of six months, was 75.2% (n=322). However none of them started complimentary feeding before 4 months of age. The majority of the mothers (99.5%; n=426) fed their children with the cup and the spoon, according to the recommendations. Mashed rice was the first food given to most children (75.5%, n=323) and the rest were given rice congee. Mean age of introducing food of animal origin into child's diet was 6.67(SD±2.3) months. Introduction of animal origin food, distribution of age and the type is described in Table 3.

Table 3. Age of introduction of animal origin foods to the children's diet

Type of food	Number (N=411)	%
Animal origin foods		
Fish		
1.6m- 7m	275	66.9
2.8m- 11m	114	27.7
3.12m <	9	2.2
4. Not introduced	13	3.2
Mean age=6.67 months SD ±2.3		
Meat		
1.6m- 7m	125	30.4
2.8m- 11m	151	36.7
3.12m <	49	11.9
4. Not introduced	86	21.0
Total	411	100.0
Mean age=6.46 months SD± 4.2		
Egg		
1.6m- 7m	129	31.3
2.8m- 11m	221	53.8
3.12m <	19	4.6
4. Not introduced	42	10.3
Total	411	100.0
Mean age=6.98 months SD± 0.38		
Sprats		
1.6m- 7m	346	84.1
2.8m- 11m	44	10.7
3.12m <	3	0.7
4. Not introduced	18	4.5
Total	411	100.0
Mean age=6.06 months SD± 2		

Oils were introduced into child's diet at the age of 6-7 months by nearly half of the mothers in the sample, however, oils were not started at the age of 12 months by 11.2% (n=48)

of mothers. Mean age of introduction of oils was 6.95 months.

Respiratory tract infections were the commonest type (30.8%; n=132) of infection reported among the children in this sample, followed by gastroenteritis (5.6 %, n=24). A history of recurrent illnesses was observed in 41.6%. A majority (75.8%; n=135) of children were properly fed by the mothers during infections (with adequate water, normal diet and with continuous breast feeding).

3.2. Nutritional Status and Associated Factors

The prevalence of stunting, wasting and underweight were significantly higher among boys than among girls (21.1%, 22.4% and 31.4% versus 13.2%, 11.2% and 9.8% respectively, $p < 0.05$). The highest prevalence of stunting (18.8%), wasting (26.5%) and underweight (28.2%) was found in 18-24 months age group. Prevalence of wasting and underweight increased significantly with the increasing age ($p < 0.05$). Stunting and underweight was commoner in lower income category compared to the higher income groups, however the relationship between income and the nutritional status was not statistically significant ($p > 0.05$). A higher prevalence of wasting, underweight and stunting was

observed among children of unemployed mothers than the employed mothers.

Duration of exclusive breast feeding, duration of partial breast feeding and introduction of formula milk had no significant relationship with stunting, wasting or underweight ($p > 0.05$). Table 4 shows the association between nutritional status and the milk feeding practices.

Stunting and underweight were common in children who received complementary food before completing 6 months. There was no statistically significant relationship between the age of introduction of complementary feeding and the nutritional status (stunting, wasting or underweight) ($p > 0.05$). Wasting and underweight was significantly higher in children those who were not introduced oils before 12 months of age ($p < 0.05$) But late introduction of oily foods was not associated with stunting. ($p > 0.05$).

There was no statistically significant relationship between the introduction of animal origin foods to child's diet and the stunting and underweight ($p > 0.05$). But wasting was significantly high in those who were not received animal origin foods ($p < 0.05$).

Table 4. Nutritional status in relation to milk feeding practices

Feeding Practices	Stunting		Wasting		under	weight
	Yes	No	Yes	No	Yes	No
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Exclusive breast feeding						
<6months	5 (11.4)	39 (88.6)	6 (13.6)	38 (86.4)	8 (18.2)	36 (81.8)
≥6months	69 (18)	315 (82)	67 (17.4)	317 (82.6)	82 (21.4)	302 (78.6)
	$\chi^2 = 1.2$		$\chi^2 = 0.40$		$\chi^2 = 0.24$	
Statistics	df= 1 P= 0.28		df= 1 P= 0.52		df= 1 P= 0.62	
Partial Breast Feeding						
Continued	73 (17.9)	334 (82.1)	69 (17)	338 (83)	87 (21.4)	320 (78.6)
Not continued	1 (4.8)	20 (95.2)	4 (19)	17 (81)	3 (14.3)	18 (85.7)
	$\chi^2 = 2.4$		$\chi^2 = 0.062$		$\chi^2 = 0.6$	
Statistics	df= 1 P= 0.12		df= 1 P= 0.80		df= 1 P= 0.43	
Formula feeding						
Not started	66 (18.9)	283 (81.1)	56 (16)	293 (84)	79 (22.6)	270 (77.4)
Started	8 (10.1)	71 (89.9)	17 (21.5)	62 (78.5)	11 (13.9)	68 (86.1)
	$\chi^2 = 3.47$		$\chi^2 = 1.36$		$\chi^2 = 2.9$	
	df= 1 P= 0.07		df= 1 P= 0.24		df= 1 P= 0.09	

Table 5 shows the association between nutritional status and the complimentary feeding practices

Table 5. Nutritional status in relation to complimentary feeding practices

Feeding Practices	Stunting		Wasting		under weight	
	Yes	No	Yes	No	Yes	No
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Complementary feeding						
<6 months	8 (17.8)	37 (82.2)	7 (15.6)	38 (84.4)	10 (22.2)	35 (77.8)
≥6 months	66 (17.2)	317 (82.8)	66 (17.2)	317 (82.8)	80 (20.9)	303 (79.1)
	$\chi^2= 0.008$		$\chi^2= 1.2$		$\chi^2= 0.43$	
	df= 1		df= 1		df= 1	
	P= 1		P= 0.28		P= 0.83	
Animal origin foods						
Started	72 (17.5)	339 (82.5)	64 (15.6)	347 (84.4)	87 (21.2)	324 (78.8)
Not started	2 (11.8)	15 (88.2)	9 (52.9)	8 (47.1)	3 (17.6)	14 (82.4)
	$\chi^2= 0.0,37$		$\chi^2= 16.1$		$\chi^2= 0.12$	
	df= 1		df= 1		df= 1	
	P= 0.7		P= 0.07		P= 1	
Adding oils						
Added	59 (17.2)	284 (82.8)	45 (13.1)	298 (86.9)	63 (18.4)	280 (81.6)
Not added	74 (17.3)	354 (82.7)	28 (32.9)	57 (67.1)	27 (31.8)	58 (68.2)
	$\chi^2= 0.09$		$\chi^2= 18.9$		$\chi^2= 7.3$	
	df= 1		df= 1		df= 1	
	P= 1		P= 0.000		P= 0.01	

4. Discussion

This was a descriptive cross sectional study planned to provide baseline data on existing situation and the magnitude of the child nutritional status and feeding practices adopted by the mothers, for planning of interventions to improve the nutritional status of children. One of the health divisions in southern part of Sri Lanka was selected as the study setting and it had mixed population structure (semi urban, rural and estate). Therefor the findings of the study are more likely to reflect the nutritional status of children and practices of majority of mothers in the rural and suburban areas of the country. To determine the nutritional status of the children six months to two years of age, randomly selected sample was taken from the Field Weighing Posts (FWP) where the almost 99% children of the area were registered for weighing. This made the study a truly representative one and ensured valid application of the findings to the health division.

Main objectives of this study was to determine the nutritional status of the selected children of 6 months to 2 years of age , to describe the feeding practices adopted by the mothers of these children and to find out the association between nutritional status and the feeding practices. Nutritional status was interpreted as stunting, wasting and

underweight (height for age, weight for height and weight for age were <-2SD) in this study. According to the results of this study prevalence of underweight, stunting and wasting were 21.3%, 17.3% and 17.1% respectively. According to the last Sri Lankan DHS survey (2006/07) among under 5 children proportion of underweight was 22%, stunting was 18% and the wasting was 14% at national level [5]. Present study results shows similarities to national figures in 2006 but wasting was higher in present study. Prevalence of stunting in 2009 in Sri Lanka according to the WHO, UNICEF joined data was 19% [7] and it was higher than the present study. Minor differences that can be observed could be due to the differences in age ranges between studies (present study gives prevalence under 2 years of age) and it should be noted that national figures were for the whole country. According to another study done in Sri Lanka among displaced children in North and east showed proportion of stunting, wasting and underweight was 22.8%, 18.3% and 29.5% respectively [20] and these higher values compared to present study can be due to the different socioeconomic background of two study populations.

When comparing the present study results with the global data, according to the UNICEF (2013), global prevalence of stunting, underweight and wasting was 26%, 16% and 11%

respectively and global prevalence of underweight was higher compared to present study and other indicators were lower than the present study. In South East Asia (SEA) region in under 5 years of age, regional prevalence of stunting, underweight and wasting was 39%, 16% and 16% respectively [21]. The prevalence of underweight in present study was lower compared to the prevalence of SEA region but the prevalence of wasting and stunting showed similar to regional figures.

According to the present study the highest prevalence of stunting (18.8%), wasting (26.5%) and underweight (28.2%) was found in 18-24 months age group. Wasting and underweight has increased with the increasing age and this pattern is statistically significant. The results of this study cannot be directly compared with that of DHS Sri Lanka (2006) findings where the stunting was high in 24-36 months of age, wasting was highest in 18-23 months age group and underweight was high in 24-35 months age group [6]. Study done in another health division in same province showed similar pattern of increasing the under-nutrition with increasing age of children [22]. Study done in Northern Province of Sri Lanka showed similar pattern to the present study in increasing stunting and wasting up to the age of 36-47 months but underweight was not showed that pattern [10].

According to the present study the prevalence of stunting, wasting and underweight of boys were higher than girls. This observation is statistically significant ($p < 0.05$). The DHS survey 2006 also showed same relationship between sex and the nutritional indicators, where all three indicators stunting, wasting and underweight were high in males and a relationship between sex and nutritional indicators. But another study done in the Southern part of Sri Lanka showed no significant difference in nutritional status between boys and girls. The studies conducted in Bangladesh [9] and Jamaica [10] showed that the girls were having relatively poor nutritional status than boys. Differences in socio economic background between Sri Lanka and the above countries could be the reason for that.

Present study showed declining of all three indicators with increasing levels of education of the mother and similar relationship was revealed by other two studies done in Sri Lanka: in Southern province [22] and in Northern province [20]. Poor nutritional status was observed among children with unemployed mothers than the employed mothers in the present study and same relationship was shown by another study done on determinants of nutritional status, in Sri Lanka among preschool children [13]. According to the present study stunting (17.5%) and underweight (22.3%) was higher in lower income category (income $< \text{Rs}10000$) compared to the higher income groups and similarly low income was found to be a contributory factor for malnutrition in studies done in Sri Lanka [13]. The results indicate the association between lower income and poor nutritional status.

Considering the feeding practices adopted by the mothers, majority (88.1%) of the babies exclusively breast fed for six months. Compared to DHS survey 2006 (76% exclusive breast fed up to 6 months) proportion of breast feeding in

present study was high. According to the results of a cross sectional descriptive study which was carried out at Boralasgamuwa MOH area in 2004 showed exclusive breast feeding rate at four months and beyond was 52%. Only 3.6% being exclusively breast fed for five and six months [13]. The proportion of exclusive breast feeding was improved to present level in Sri Lanka after introducing WHO recommendations of six months exclusive breast feeding in the country and with the effort of the public health field staff in promoting breast feeding. Even after introduction of complimentary feeding, most mothers continued breast feeding during first two years. The results of present study showed a majority (95.1%) of mothers continued breast feeding at the time of the interview and that was similar to the DHS 2006 data (91% continued breast feeding up to 12 months) and to the study done in the dry Zone of Sri Lanka, where 94.7% mothers continue breast feeding at 9 months and 93.5% at 12 months. Exclusive breast feeding prevalence in developing countries was 39% and in SEA was 45% in 2010 [24] and when comparing the data with other countries according to the UNICEF statistics exclusive breast feeding rates were low most of the SEA countries (India, Nepal and Maldives were 46%, 70% and 48% respectively) [21]. According to the present study no statistically significant relationship was found between nutritional status and the duration of exclusive breast feeding for 6 months duration. Study done in Honduras where low income primi parae who had breast fed for four months as well as mothers of infants whose birth weight 1.5 to 2.5 Kg showed no significant differences in weight or length gain between those fed exclusively on breast milk for six months and those fed complimentary feeds plus breast feeding during 4-6 months period [18]. In the present study prevalence of formula milk usage before 12 months was only 18.5%. According to a study done in Sri Lanka, prevalence of formula usage was 28% and formula milk introduction at 3 months was 55% with mean age was 4 months [26]. Present study shows high exclusive breast feeding prevalence and less prevalence in starting milk formulas, may be because of strengthened public health advices and due to banding of formula milk advertising in the country.

According to the present study majority of mothers (75.2%) started complementary foods at the age of 6 months. 5.1% started at the age of 4 months and 4% started at the age of 5 months. Mean age of starting complementary feeding was 6 months and $SD \pm 0.68$. According to the DHS survey report (2002), nearly three fourth of infants were receiving supplementary foods in addition to the breast milk. Semi solids are started around four to five months and solid food increases thereafter. It is 29.7% at 4-5 months, 60.5% at 6-7 months and 74.6% at 8-9 months respectively [6]. Although WHO recommended the age of starting of complementary foods as 6 months in 1994, the feeding practices changed slowly with time. This difference could be due to the changes in feeding practices in 2002 and at present. According to the UNICEF statistics most of the African countries introduced semisolids and solids at the age of 6-8 months (Ghana 75%,

Malawi 86%) but rates were low in Asian countries compared to Sri Lanka (India 56%, Nepal 66%)[25]. Though WHO recommended to start complimentary food at the completion of 6 months differences of starting age of complimentary feeding in various countries could be the reason for observed difference in rates. Types of complementary foods given vary with the cultural and socioeconomic factors. Although complementary feeding was started at the correct time, level of nutrition depend on the quality and the quantity of foods given and frequency of meals. Present study a majority (75.5%) started mashed rice and 18.9% started rice congee as the first food. But according to DHS survey 2006 one third of children started receiving congee on a regular basis[6]. Present study shows improvement of age of starting complementary foods and first food from congee to mashed rice and that could be due to the nutritional advices given by the public health staff and due to the advices given in Child Health Development Record and also can be due to improvement in maternal education level.

Animal origin foods should be added to child's diet at the age of 6m to 7 m according to the WHO recommendation[27]. According to the present study only 30.4% introduced meat, 31.3% eggs and 66.9% fish, at the age of 6-7 months. But 95% mothers introduced animal origin foods before the age of 12 months and mean ages of introducing fish, meat, eggs and sprats were 6.7, 6.5, 6.9 and 6.1 months respectively. Present study shows an improvement in the age of starting of animal foods compared to the DHS 2006 data where the proportion of introducing animal origin foods were 67.2%, in the age group of 6-23 months[6]. Introduction of eggs was delayed compared to other animal foods and age of introduction of animal origin foods was not significantly related with the nutritional status. Mean age of starting leafy vegetables was 6 months and the oils were 6.7 months according to the present study and proportion of mothers started leafy vegetables at the age of 6-7 months was 96% and oils were 51.2%. Most of the mothers were reluctant to add oils into child's diet when they start complimentary feeding. Late introduction of oils had a statistically significant relationship with the nutritional status.

According to the present study 99.5% used cup and spoon for feeding instead of bottle and teat. Similarly a cross sectional descriptive study done at peri-urban clinics (Boralasgamuwa area) in 2005 on feeding practices of mothers showed that majority of the mothers use cup and spoon when giving complementary foods[23]. In present study 41.4% of children have got recurrent infections and from those who had infections, 52.6% were respiratory tract infections and 9% were gastroenteritis. The studies conducted in Jordan [28], in Brazil [29] showed that frequent episodes of diarrhea as well as respiratory infections were proximate determinants of malnutrition. Study done in Sri Lanka it was found that incidence of diarrhea and respiratory infections were common in underweight children [30] while another study revealed that becoming ill or having diarrhea and fever were not associated with malnutrition[31]. Present study revealed similar results, respiratory tract infections was

commonest and the children were fed properly during infections. Childhood infections were not significantly associated with poor nutritional status. The reason could be the proper feeding practices during infections.

According to the present study duration of exclusive breast feeding, duration of partial breast feeding, introduction of formula feeding, age of starting complimentary foods, type of food started first and introduction of animal origin foods, leafy vegetables were not significantly related to the nutritional status but gender of the child, age of the child and late introduction (after 12 months) of oils in to the diet showed significant relationship with the nutritional status of children. According to the study done in Ethiopia educational level, occupation of mother, parity and having ANC follow up were found to be independent predictors of timely initiation of complementary feeding[32]. Another study revealed maternal age, child age and keeping livestock were found significantly associated with early introduction of complementary feeding[33]. Differences of associated factors of nutritional status between countries could be due to the disparities in socio economic status, literacy level of females and the cultural conditions.

5. Conclusion

Study shows high prevalence of all nutritional indicators. These figures showed similarity with the national figures but wasting was higher than the national level. All three nutritional indicators were significantly higher in males than the females concluded that the male children are having higher risk of developing under nutrition. The highest prevalence of all nutritional indicators was found in 18-24 months age group. Wasting and underweight has increased with the increasing age. Stunting and underweight was higher in lower income category (income <Rs10000). Higher prevalence of wasting, underweight and stunting was observed among children with unemployed mothers than the employed mothers. Under-nutrition is common in low socio economic conditions.

Exclusive breast feeding was continued for 6 months by majority of mothers, mean age of breast feeding was 5.8 months that indicated the successfulness of the breast feeding promotion program in Sri Lanka. But Still because of various reasons mothers start formula milk for their babies before the child's sixth month, commonest reason for starting formula milk was the reduced weight gain of the child.

The improvement in introducing semisolid foods in proper time can be observed in this study but the massages should be strengthened further to motivate mothers to start semisolids at proper age. Introduction of animal origin foods was satisfactory but mean age of introduction was later (6.67) than the recommended (6 months) by the child health program in Sri Lanka. Proportion of mothers not introduced meat was relatively higher than fish and sprats. Most mothers introduced leafy vegetables to their child but only half of mothers have introduced foods containing oils. Feeding with cup and spoon has become popular than the bottle feeding

which is an improvement in proper feeding practices. Respiratory tract infections and gastroenteritis were common among children but nutritional status of child was not affected due to proper feeding practices during infections. Problems in feeding practices such as delay in introducing some essential food items into child's diet were associated with the poor nutritional status of children in this age group and there is a need of interventions to address this problem.

To improve the proper feeding practices, health education of mothers on breast feeding and complimentary feeding practices need to be strengthened and simple, understandable, proper nutritional massages through public health staff will be provided to the community. Behavioral change communication might be more useful than the information, education and communication method as the behavior and attitudes of the care givers affect their feeding practices.

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