Nutritional status and associated factors among children under five years: World Vision Urban Development Programme in Negombo

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Acknowledgments

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ARI	Acute Respiratory Infections
BMI	Body Mass Index
CHDR	Child Health Development Record
CI	Confidence Interval
CMR	Crude Mortality Rate
GAM	Global Acute Malnutrition
GN	Grama Niladhari
GCE(OL)	General Certificate of Education (Ordinary Level)
IEC	Information, Education, Communication
IYCF	Infant and Young Child Feeding
LBW	Low Birth Weight
MAM	Moderate Acute Malnutrition
MRI	Medical Research Institute
MUAC	Mid Upper Arm Circumference
NGO	Non Governmental Organization
NRP	Nutrition Rehabilitation Programme
PHM	Public Health Midwife
RHA	Rural Health Assisstant
RHV	Rural Health Volunteer
SAM	Severe Acute Malnutrition
UNICEF	United Nations Education Fund
WFP	World Food Programme
WV	World Vision Lanka LTD

EXECUTIVE SUMMARY

A cross sectional survey was carried out on a representative sample of children under five years in the 4 Grama Sevaka divisions in Negombo Divisional Secretary area, in Sri Lanka in which the World Vision programmes have been implemented since 1998.The study aimed to identify the nutrition status of children under five years of age and pregnant women, to study the determinants of the nutritional status of children under five years and to make the recommendations based on the observations of this study

A total of 235 children were included in the study and they were identified using simple random sampling. In addition, all pregnant mothers in the 4 Grama Sevaka areas (84) were identified to be included in the study.

Field level data collection included three components: obtaining data using an interviewer administered questionnaire, taking anthropometric measurements and collection of capillary blood samples for assessment of haemoglobin (Hb) levels. Data collection was done by trained field investigators. Constant supervision and monitoring of all field activities, editing of questionnaires was carried out to ensure quality of data.

The overall prevalence of wasting or global acute malnutrition (GAM) in the study area 9.6%, of which 9.2% is moderate acute malnutrition (MAM) and 0.4% is severe acute malnutrition (SAM).Prevalence of stunting was 14.4% with 13.0% with moderate stunting and 1.4% severe stunting. Percentage of underweight children was 15.3% with none of them belonging to the severe category. Comparison with the prevalence data of the country reported in the National Food Security Survey (NFSS) 2009 showed that prevalence of GAM (11.7%) and SAM (1.9%) was higher than the reported figures in this study.

Prevalence of anaemia among under five children (19.1%) is lower than the prevalence reported in the NFSS 2009 (25.2%) with the prevalence of low birth weight (LBW) of 13.9% also being also lower than the reported data from NFSS 2009 (18.1%). LBW percentage was marginally higher among males and there was a decline in the prevalence with increasing levels of maternal education.

Assessment of the nutritional status of pregnant women showed that only 2 mothers had a height less than 145 cms, 21.4% of mothers were undernourished (Mid Upper arm circumference (MUAC) ≤ 23) and a similar percentage of mothers had haemoglobin levels below 11 gms/dl.

Morbidity pattern among under five children showed the percentage of children with respiratory infections and diarrhoea to be 27.1% and 6.6% respectively. These percentages differed from those reported in NFSS.

Only a few children in the age group up to 6 months were given any items other than breast milk. Among those in the age group 6 – 23 months, water was the commonest item given (36.7%) and 20 – 25 % was given flour preparations, fish and related foods, sugary foods and foods with condiments. As age increased more of the children were given a variety of food items.

Three fourths of the total number of children (73.8%) aged 6-23 months has received a minimum acceptable diet, which was lower among girls compared to boys. Minimum dietary diversity was 100% in the sample. Among the breastfed children the percentage having minimum meal frequency was lower (72.6%) than the non breastfed children (81.8%).

Of the children, 96% had a Child Health Development Record and 97.7% had age appropriate immunization. However, lesser percentages (65%) were given de worming tablets within the previous 6 months with the percentage received a vitamin A mega dose was 58.7%.

Nearly all households had access to a safe water supply with 89.1% having piped water inside the house/compound. Nearly all (98.3%) households had access to a flush latrine. However, practices related to cleanliness related to cooking and feeding the children, needs improvement.

The main source of income for 49.5% of the population was fishing and related activities. Home gardening was undertaken by 14.6% of the households with livestock being available only in 8% of the households. Of the total household expenditure, 23.6% were spent on food with 76.4% on non food items.

Rice and other cereals, coconut, fish, sugar and dairy products have been consumed almost on all days during the preceding week. Bread consumption was less frequent and so was the meat consumption. In nearly all instances, the food items were purchased. In 65.6% of the households food stocks or money available for purchase was only for a week's supply.

Actions aimed at further reduction of GAM and Moderate Acute Malnutrition needs to be considered with the focus on improving dietary practices, reduction of morbidity and improvement of practices related to personal hygiene. Improving food consumption of children under 2 years needs special attention to reduce the prevalence of stunting to acceptable levels.

Anaemia among children under five years needs attention in future programmes. Innovative approaches need to be considered to promote consumption of iron rich food along with household level production with home gardening, and introduction of micronutrient supplementation programme as necessary.

There is a need to focus the eating habits among pregnant women and improve the consumption of iron rich food and regular iron supplementation. Field level staff needs to focus on promoting these practices.

Income generation activities should be linked either directly or indirectly with promoting appropriate food consumption patterns.

CHAPTER 1

Background

Negombo Mangrove Urban Development Programme (UDP) is only the urban area development programme of World Vision, the work in which started in 1998; Negombo is an urban Divisional Secretariat Division (DSD) in Gampaha District, one of the three districts of the Western Province of Sri Lanka. Out of a total 39 Grama Niladari Divisions (GND), 4 Grama Niladari Divisions (GND) were included in the World Vision programme.

Negombo is situated in the coastal belt of Sri Lanka and is directly affected by the South West Monsoon. It is a traditional fishing town and belongs to the low country wet zone area with the median temperature ranging from 27–30°C and an annual rainfall of 2000mm.

Boundaries of Negombo are marked on one side by the sea and another side by the lagoon. The positioning of the International Air Port and the Free-Trade zone close to the UDP area has resulted in a positive economic and social impact on the population of the area. The Negombo lagoon, the beach belt, and the mangrove add beauty to the area.

The total population in the target community of Negombo Area Development programme (4 GNDs) is 12,768 and there are 3040 families resident in these areas. The average number of members per household was 4.4. According to the percentage distribution of population by age and gender, the male: female ratio is 49.2: 50.8, those in the 5-18 years and 19-49 years age categories accounts for 29.1% and 49.6% respectively (TDI survey, 2006).

A majority of the target community are Roman Catholics, constituting 98%. Other 2% include Muslims, Hindus and Buddhists. When the population is considered according to their ethnic group, 84% are Sinhalese, 3.9% Moors and 11% Tamils.

The main income source of the people in the area is derived from fishing (both inland and marine fishing) or fishing related activities with about 90% of the total population of the target community earning their main living through such activities.

Other sources of income for the population include working in the garment industry, daily wage earners, self employed community members or domestic helpers working locally or overseas. Apart from these sources, there is a small percentage of the population engaged in activities related to the tourist industry as the area is known as an attractive tourist destination. The average monthly income of people in the area is about US $ 100.

In Negombo UDP, the school attendance and school dropout rate of children is relatively low. There is no gender difference among children attending schools. However, there is a significant difference in the age groups between 16 to 18 due to employment opportunities rather than continuing higher studies. The percentage of total number of male and female children enrolled for A/L examination were 39.9% and 22% respectively (TDI survey, 2006).

Road network and existing public transport facilities, electricity, and sanitary facilities are satisfactory. The Negombo Divisional Secretariat area has one District Government Hospital. The distance from the target communities to the Hospital is approximately 0.75 kilometres.

In addition, there are few Private Hospitals as well. It can be considered that the community has easy access to standard medical facilities within a reasonable period of time.

OBJECTIVES OF THE STUDY:

1. To identify the nutrition status of the children under five years of age and pregnant women.
2. To study the determinants of the nutritional status of children under five years.
3. To make the recommendations based on the observations of this study to explore the opportunities for sustainability and future partnership in health and nutrition sector.

CHAPTER 2

Method

A cross sectional survey was carried out on a representative sample of children under five years.

2.1. Study population

The study population included the total population of the 4 Grama Niladari divisions in which the world vision programmes have been implemented since 1998.

2.2 Sampling

2.2.1. Sample size determination

The sample size required is based on the estimated prevalence for each nutritional indicator, the desired precision, and a non-response of 5% (including refusals) at the individual levels for children 0-59 months of age, and pregnant women. The sample size was based on the highest underweight prevalence for children. All pregnant women in the area were included in the survey. Lists of children between 0-59 months were obtained and simple random samples were drawn.

The Fisher's formula for estimating the minimum sample size for prevalence descriptive studies was used as follows:

$$n= [Z\alpha/2 \; (p)(1-p)/\delta^2 \;]/(1-\eta)$$

Where

$Z\alpha/2$	= The value corresponding to the 95% confidence level
P	= The target prevalence = 18%
δ	= The allowable error = 5%
η	= Non-response rate = 5%

N=238 children under five years.

2.2.2. Sampling procedure

The sampling frame for the study was the list of children between 0-59 months in each WV operated villages in 4 Negombo Grama Niladari (GN) in Gampaha district obtained from the relevant area Public Health Midwives (PHMs). They were: Wellaweediya, Pitipana, Siriwardanapura, Munnakkaraya.

In addition to identification of a sample of under five children using the above method, all pregnant mothers in the 4 Grama Sevaka areas were identified to be included in the second component of the study.

2.3. Field level implementation

Field level data collection included three components; data collection using an interviewer administered questionnaire, taking anthropometric measurements and collection of capillary blood samples.

2.3.1. Training of survey teams

Data collection was done by the trained members of the three teams. The training was conducted by the staff of the Nutrition Department of the Medical Research Institute (MRI). All team leaders were from MRI and they were responsible for quality checks at the field level.

The training was conducted over a period of 2 days of classroom instruction and practice and one day of pre-testing all survey procedures, including interviews and anthropometric measurement. The inputs included basic introduction to nutrition and an explanation on the objectives and the methodology of the survey and practical training on measuring techniques. Each question in the questionnaire was discussed in detail.

2.3.2. Selection of subjects

As described above, the study population was drawn from residents in households in the 4 GN divisions in the WV operated Negombo DS division. Exclusion criteria applied were: not having a physical disability that would affect either height or weight measurement, those who declined consent or whose guardians/parents have declined consent to any portion of the survey, including collection of biological specimens.

The child's mother or caretaker was requested to answer the questionnaires. The minimum age of respondents for the survey was 15 years. When respondents felt that they were not able to provide accurate information, houses were revisited. If it was not possible to obtain accurate information on subsequent visits, the responses of those questions were marked as 'not responded'.

2.3.3. Study instruments

Information related to household characteristics, demographics, socio-economic status and food consumption were collected at the household level, using the interviewer administered questionnaire. The data collection tool consisted of three sections.

Section 1 (Respondent) - Head of Household irrespective of gender included questions relating to the household demographics, socioeconomic characteristic and food security.

Section 2 (Individual) included questions related to health status, food consumption, knowledge and behaviour of the children 0-59 months old. This component was administered to the caregiver. Relevant questions were administered to all pregnant women identified for inclusion.

Section 3 (Lab/Anthropometry) included collection of biochemical specimens and taking relevant measurement, on children aged between 6 – 59 months and among pregnant women. Biological specimens, in the form of capillary blood samples, were collected from preschool children aged 6-59 months and from all pregnant women for the estimation of haemoglobin (Hb) level.

2.3.4. Anthropometric measurements

Anthropometric measurments were made by a field investigator with special training and about 10 years of experience in doing measurements using standardized equipment. Weight was measured using Seca electronic scale and height was measured with stadiometer. Instruments were calibrated before the measurement using standard weights. Standard World Health Organization (WHO) protocol for measuring height and weight of children and women were used.

Height and weight measurements were taken on all children aged 0 to 59 months. Mid upper arm circumference (MUAC) was assessed among pregnant women. Children's age was based on birth date from CHDR or birth certificate. Anthropometric indicators of length/height-for-age, weight-for-age and

weight-for-length/height were determined for the children aged 0 to 59 months using 2005 WHO growth standards.

2.3.5 Biochemical measurement
Capillary blood samples were collected using finger pricks and Hemoglobin levels were estimated using Haemocue method.

2.4. Quality assurance

Constant supervision and monitoring of all field activities, editing of questionnaires was carried out by undertaking the following steps:
1. Concurrent crosschecks of the data collected by interviewers in a random sample of households by team leaders.
2. Routine field-editing of all questionnaires by the team leaders.
3. Data cleaning and editing of the completed questionnaires by professional data editors before data entry.
4. Random checks of the data entry of questionnaire (10%) done by separate data entry operators and consistency checks used to detect and correct data entry errors.

2.5. Data analysis

A unique Identification number was used for each household and the person interviewed. Databases for the various data collection instruments were designed for ready merging using unique identifiers. Data were analyzed with SPSS software.

2.6. Ethical considerations

The names of respondents and households were kept strictly confidential and will not be used in the presentation of results or associated with the results in any way or available to anyone except the survey coordinator.

Before the interview, all participants were informed that if they are uncomfortable answering any questions that they can refuse to answer such questions or that they can stop the interview at any time. The sampling process was explained to the participants so that they do not feel that they have been 'singled out'. Prior to obtaining sample of capillary blood informed consent was obtained from the parent of the under five child and from the pregnant women herself as relevant.

All participants were assured that the welfare benefits that they received at the time will not be affected by their agreement/disagreement in participating in the survey. Permission was obtained from the Secretary of Health and the health authorities in the Western Province.

Chapter 3

Results

A total of 235 children under the age of five years were included in the study. However, information presented below pertains to 229 children only due to 6 flagged records during anthropometric analysis. In addition total of 84 pregnant women were identified from the study area and were included in the survey.

3.1. Basic information

3.1.1. Number of members in the household

Among these households, 70.9% had 4 -6 members with 13.7% having less than 3 members. Those with more than 4 members were 15.4%. (Figure 1).

Figure 1: Distribution of households by number of members
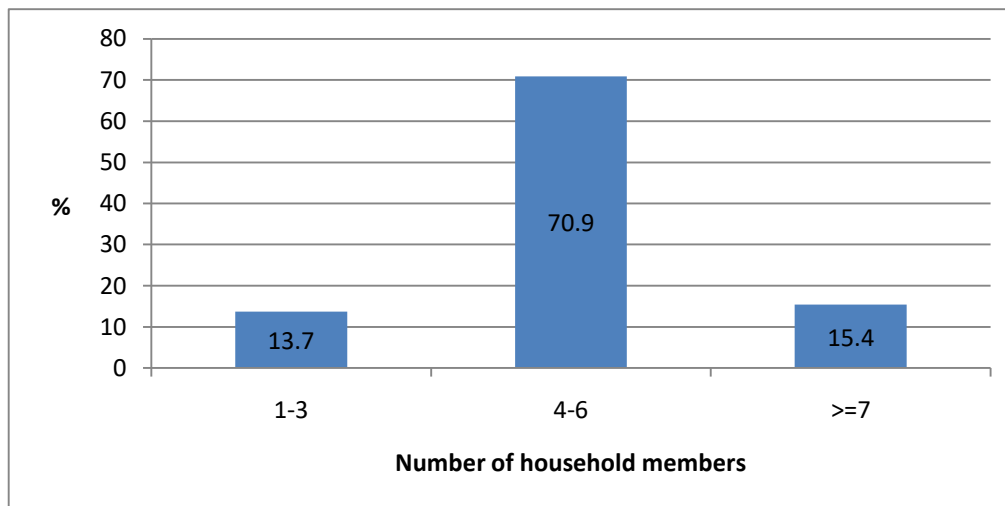
3.1.2. Number of children under five years

As shown in Figure 2, there was one child under the age of 5 years in 82.9 % of households with 2 children in the same age group in 14.9%.

Figure 2: Distribution of households by number of children under five years
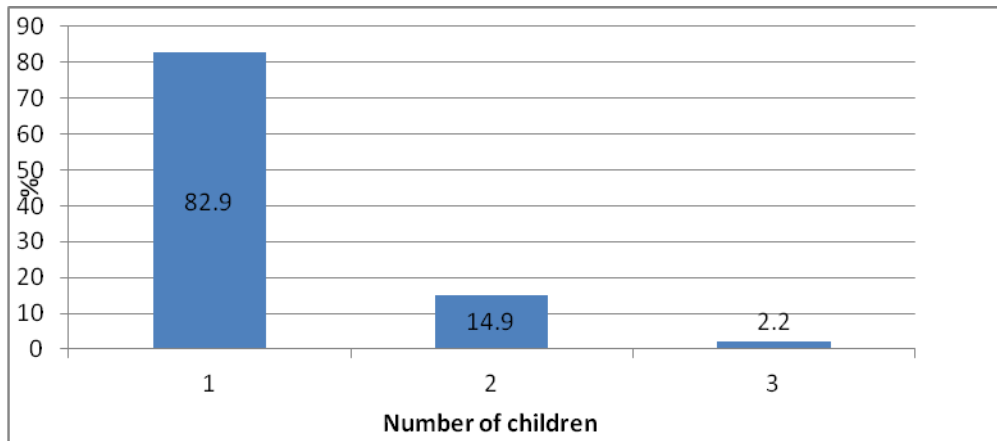
3.1.3. Information on the mother

Information related to the mothers of the children included in the study is presented below.

3.1.3.1. Age distribution

Half of them (50.2 percent) were in the age group 20-29 years with another 47.1% being in the 30 -39 year age group. Those in less than 18 years and over 40 years were very low (Figure 3).

Figure 3: Age distribution of mothers
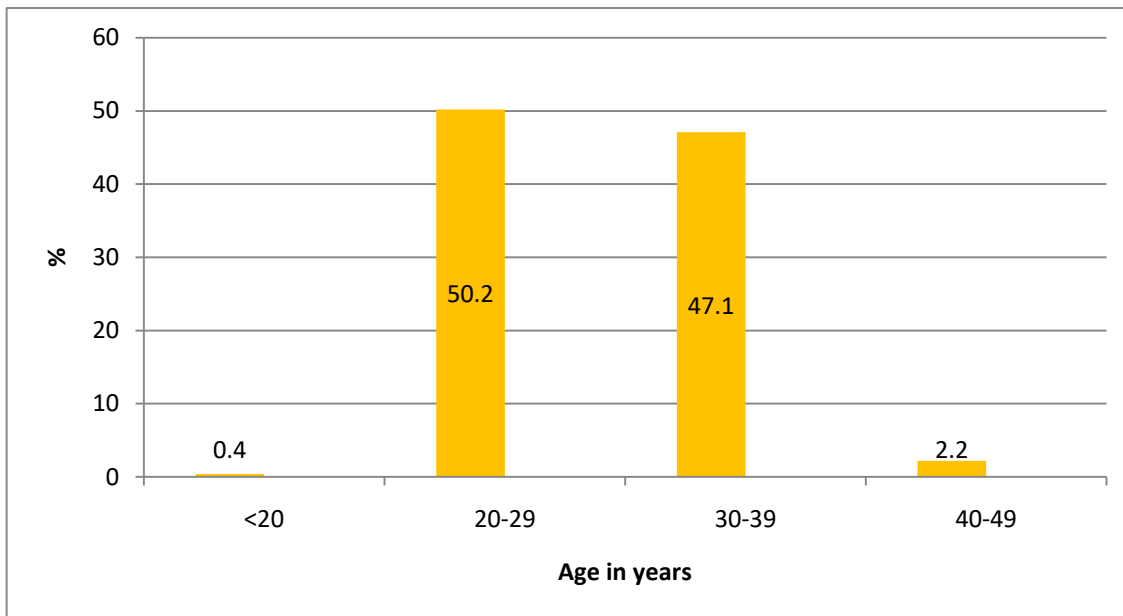
3.1.3.2. Educational level

Nearly half (45.1%) of the mothers have had 11- 13 years of schooling with another 43.4% having had 6 – 10 years.The percentage of mothers with less than 5 years of schooling was relatively low, 11.5% (Figure 4).

Figure 4: Number of years of schooling of mothers

Figure 4: Number of years of schooling of mothers
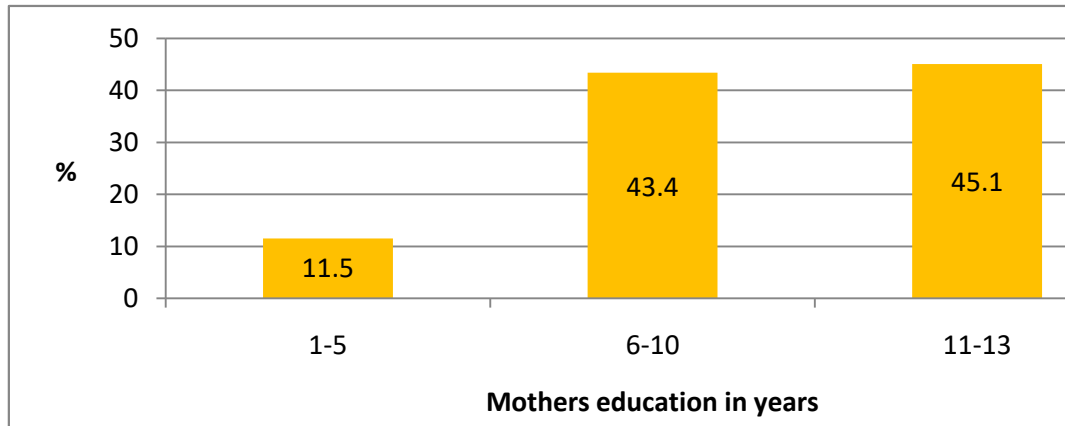
3.1.4. Information on the children

A total of 229 children were included in the survey.

3.1.4.1. Distribution by age

As shown in Figure 5, a majority, 27.1% of the children were in the age group 36 – 47.9 months with another 25.8% in the age group 24 -35.9 months. Only 4.8 % of the children were below 6 months of age with the percentage in the highest age group (48 - 59.9) also being relatively low, 5.7%.

Figure 5: Distribution of under 5 children by age

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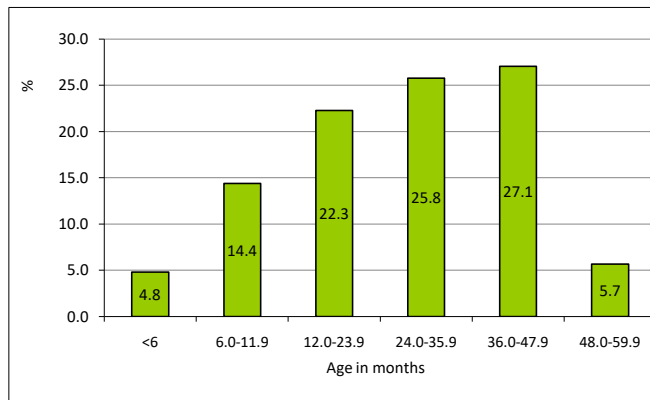
3.1.4.2. Distribution by sex

There was a marginal preponderance of females among the children, 51.7% (Figure 6).

Figure 6: Distribution of under 5 children by sex
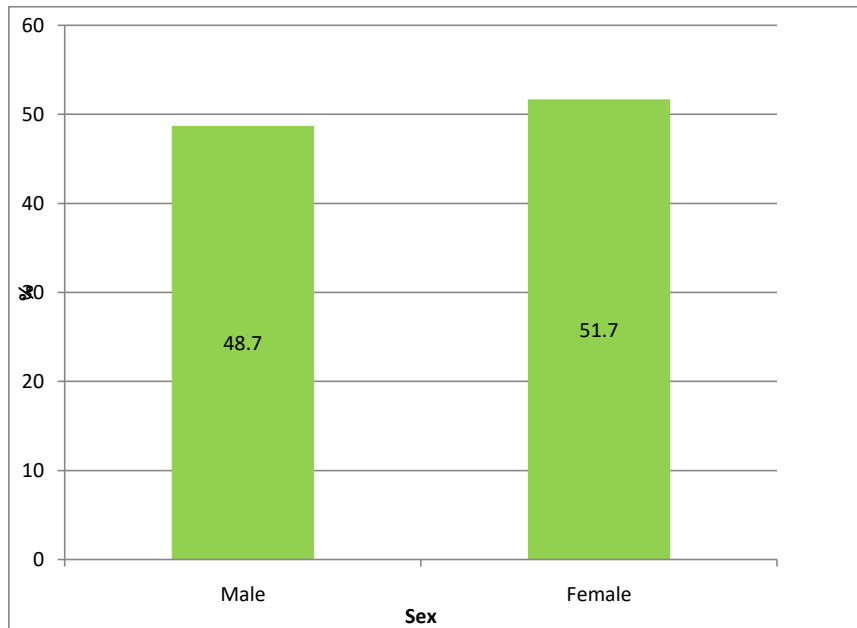
3.1.5. Housing structure

Basic information on the structure of the houses is presented in Table 1. The number of houses for which such information was available was varied.

Of all houses, 81.1 % had their floors made of cement with another 17.5 % with floors made of tiles or terazzo. Only a few houses had other forms of flooring. Tiles was the commonest form of roofing used with 60% of the houses having tiled roofs with another 20 % having roofs with asbestos and 10% had concrete roofs. In 60.8% of houses, the walls were made of brick or cabook with 32.6 % having walls made of cement blocks and another 5.7%, with those made of wood.

About half the houses (53.6%) had 2 bedrooms with 31.4% having only one room and 11.9% having more than two rooms. Nearly all houses (91.2%) had separate kitchens. Only 2.2% of the houses used solar power.

Table 1: Distribution of households by housing characteristics

	No	%
Flooring Material		
Cement	185	81.1
Tile or Terrazzo	40	17.5
Wood	1	0.4
Other	3	0.9
Roofing material		
Tiles	137	59.8
Asbestos	46	20.1
Concrete	23	10.1
Corrugated sheet	16	7.0
Cadjan	4	1.7
Other	3	1.3
Type of wall		
Brick/ Cabok	138	60.8
Cement block	74	32.6
Wood	13	5.7
Other	2	0.9
No of Bedrooms		
0	7	3.2
1	69	31.4
2	118	53.6
3	25	11.4
4	1	0.5
Separate Kitchen		
Yes	206	91.2
No	20	8.8
Availability of Electricity(N=229)		
Yes	210	91.7
No	19	8.3
Solar power		
Yes	5	2.2
No	223	97.8

3. 2. Nutritional status

3.2.1. Prevalence of wasting, stunting and underweight

As shown in Figure 7, the indicators of under-nutrition included in the assessment were stunting, wasting and underweight. Of the total group 14.4 percent were stunted (below -2SD scores for height for age) , 9.6 percent wasted (below -2SD score for weight for height) and 15.3 percent underweight (below -2SD score for weight for age) with the percentages of severe stunting (below -3SD scores for height for age), wasting (below -3SD score for weight for height) and underweight (below -3SD score for weight for age) being1.4 percent, 0.4 percent and 0 percent respectively .

Figure 7: Prevalence of wasting, stunting and underweight
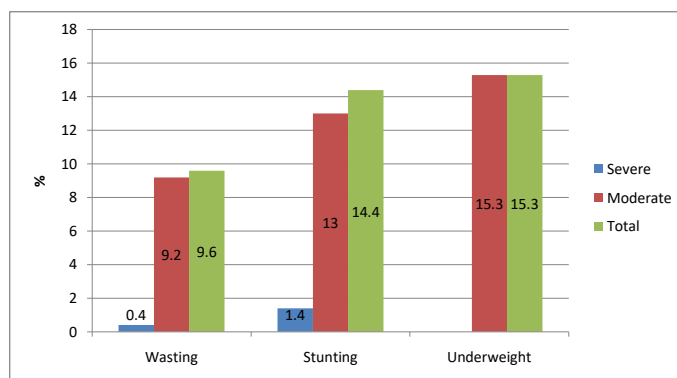
Prevalence of stunting was lowest in the 6-11 months age group and showed an increasing prevalence up to the age of 24-35 months and then a decline in the older age groups. Data on wasting shows that the highest prevalence in the 6-11 months age group and showing a decline in the higher age groups (Table 2).

The prevalence of underweight does not show a consistent pattern with increasing age, with the prevalence in the age group 12 – 23 months being 17.6 % and the highest prevalence of 18.2 % in the 6-11 month age group.

Table 02: Prevalence of under nutrition: stunting, wasting and underweight by background characteristics

Background Characteristic	Weight-for-height (%) Wasting			Height-for- age (%) Stunting			Weight-for-age (%) Underweight			Total No of Children	
	<-3SD	<-2SD	≥-2SD	<-3SD	<-2SD	≥-2SD	<-3SD	<-2SD	≥-2SD	No	%
Age of child (months)											
<6	0 (0.0)	1 (9.1)	10 (90.9)	0 (0.0)	2 (18.2)	9 (81.8)	0 (0.0)	1 (9.1)	10 (90.9)	11	4.8
6-11	1 (2.9)	5 (15.2)	28 (84.8)	0 (0.0)	3 (9.1)	30 (90.9)	0 (0.0)	6 (18.2)	27 (81.8)	33	14.4
12-23	0 (0.0)	5 (9.8)	46 (90.2)	1 (1.9)	9 (17.6)	42 (82.4)	0 (0.0)	9 (17.6)	42 (82.4)	51	22.3
24-35	0 (0.0)	4 (6.8)	55 (93.2)	2 (3.3)	13 (22.0)	46 (78.0)	0 (0.0)	8 (13.6)	51 (86.4)	59	25.8
36-47	0 (0.0)	6 (9.7)	57 (90.3)	0 (0.0)	6 (9.7)	56 (90.3)	0 (0.0)	10 (16.1)	52 (83.9)	62	27.1
48-59	0 (0.0)	1 (8.4)	11 (91.6)	0 (0.0)	0 (0.0)	13 (100.)	0 (0.0)	1 (8.3)	12 (91.7)	13	5.7
Sex of child											
Male	1 (0.9)	9 (8.0)	103 (92.0)	3 (2.6)	22 (19.6)	90 (80.4)	0 (0.0)	19 (17.0)	93 (83.0)	111	48.9
Female	0 (0.0)	13 (11.1)	104 (88.9)	0 (0.0)	11 (9.4)	106 (90.6)	0 (0.0)	16 (13.7)	101 (86.3)	117	51.1
GN Divisions											
Munnakkaraya	0 (0.0)	3 (5.0)	56 (95.0)	2 (3.3)	12 (19.7)	47 (77.0)	0 (0.0)	10 (16.9)	49 (83.1)	59	25.8
Siriwardanapura	0 (0.0)	6 (9.0)	60 (91.0)	1 (1.5)	10 (14.9)	56 (83.6)	0 (0.0)	9 (13.7)	57 (86.3)	66	28.8
Pitipana	0 (0.0)	2 (9.0)	20 (91.0)	0 (0.0)	3 (13.6)	19 (86.4)	0 (0.0)	0 (0.0)	22 (100)	22	9.6
Wellaweediya	1 (1.2)	11 (13.3)	71 (85.5)	0 (0.0)	8 (9.8)	74 (90.2)	0 (0.0)	16 (19.5)	66 (80.5)	82	35.8
Mother's education											
Primary	0 (0.0)	4 (15.4)	22 (84.6)	0 (0.0)	6 (23.1)	20 (76.9)	0 (0.0)	7 (26.9)	19 (73.1)	26	11.5
Secondary	0 (0.0)	10 (10.2)	88 (89.8)	3 (3.0)	20 (20.4)	78 (79.6)	0 (0.0)	19 (19.4)	79 (80.6)	98	43.4
Passed O' Level	1 (0.9)	8 (7.8)	94 (92.2)	0 (0.0)	6 (5.9)	96 (94.1)	0 (0.0)	9 (8.8)	93 (91.2)	102	45.1
Monthly household income											
< 9,000	0 (0.0)	0 (0.0)	16 (100)	0 (0.0)	3 (18.8)	13 (81.2)	0 (0.0)	3 (18.8)	13 (81.2)	16	7.0
9,000 - 13,999	0 (0.0)	4 (11.4)	31 (88.6)	0 (0.0)	3 (8.6)	32 (91.4)	0 (0.0)	7 (20.0)	28 (80.0)	35	15.3
14,000 - 19,999	1 (2.2)	6 (13.6)	38 (86.4)	1 (2.2)	10 (22.7)	34 (77.3)	0 (0.0)	8 (18.2)	36 (81.8)	44	19.2
20,000 - 31,999	0 (0.0)	8 (9.0)	81 (91.0)	2 (2.2)	14 (15.7)	75 (84.3)	0 (0.0)	12 (13.5)	77 (86.5)	89	38.9
≥ 32,000	0 (0.0)	4 (8.9)	41 (91.1)	0 (0.0)	3 (6.7)	42 (93.3)	0 (0.0)	5 (11.1)	40 (88.9)	45	19.7
Wealth Index											
Lowest	0 (0.0)	4 (8.7)	42 (91.3)	0 (0.0)	7 (15.2)	39 (84.8)	0 (0.0)	6 (13.0)	40 (87.0)	46	20.1
Second	1 (2.1)	3 (6.4)	44 (93.6)	0 (0.0)	8 (17.0)	39 (83.0)	0 (0.0)	10 (21.3)	37 (78.7)	47	20.5
Middle	0 (0.0)	3 (6.7)	42 (93.3)	2 (4.5)	6 (13.3)	39 (86.7)	0 (0.0)	6 (13.3)	39 (86.7)	45	19.7
Forth	0 (0.0)	6 (13.0)	40 (87.0)	1 (2.2)	5 (10.9)	41 (89.1)	0 (0.0)	6 (13.0)	40 (87.0)	46	20.1
Highest	0 (0.0)	6 (13.3)	39 (86.7)	0 (0.0)	7 (15.6)	38 (84.4)	0 (0.0)	7 (15.6)	38 (84.4)	45	19.7
Overall	**1 (0.4)**	**22 (9.6)**	**207 (90.4)**	**3 (1.3)**	**33 (14.4)**	**196 (85.6)**	**0 (0.0)**	**35 (15.3)**	**194 (84.7)**	**229**	**100.0**

Prevalance of wasting among females (11.1%) was higher than that of the males, compared to 8.0% among males while that for stunting among males was about twice that among the females. Prevalence of underweight also show a difference between the sexes, 17% among males and 13.7% among females.

All three indicators, prevalence of wasting, stunting and underweight showed a marked decline with increasing level of education of the mother. However, it was noted that mothers of 26 children had only primary education, indicating the need to be cautious in interpreting these findings.

No consistent pattern was seen in the prevalence of wasting, stunting and underweight in relation to income level, with the lowest prevalence seen in the highest income group and highest in the income group of Rs.9,000 – 19,999. However, the numbers belonging to the lower income groups were relatively small.

Highest prevalance of wasting, stunting and underweight were seen in Wellaweediya (13.3 %), Munnakkaraya (9.7 %) and Wellaweediya (19.5%).

There is no consistent pattern seen in the prevalance of wasting, stunting and underweight.

3.2.2. Anaemia

Prevalence of anaemia (children with Hb level < 11.0g/dl) among the total group was 19.1% with this percentage being comparatively high among the age groups, 6 months to 35.9 months, the highest being in the age group 12 – 35.9 months (Table 3).

However, a sharp decline in the prevalence was seen in the age groups 36 months upwards. However, the number of children in the age group 48 – 59.9 months included in this assessment was only 12; hence interpretations of these findings have to be made cautiously.

A higher prevalence of 41.5% was seen among the female children compared to that among the males, 23.3%. In general terms, the prevalence of anaemia in relation to educational level of the mother shows that there is a decline in the prevalence with increasing levels of maternal education. The lowest prevalence was seen among the children of mothers who have had only primary level education, the observation requiring cautious interpretation as the number of such mothers was only 26.

No consistent pattern was seen in the prevalence of anaemia in relation to income level, with the lowest prevalence seen in the lowest income group and highest in the income group of Rs.20,000 - 31,999. However, the numbers belonging to the lower income groups were relatively small.

Highest prevalance of anaemia is observed in Wellaweediya (26.7 %) and the lowest is in Pitipana (14..3 %). Highest percentage of stunted children were anaemic (29%) compared to wasted (14.3%) and underweight (20.6%) children.

Table 03: Prevalance of anaemia among children under 5 years, by background characteristics

Background Characteristic	% children with anaemia (Hb < 11.0g/dl)	Number of children
Age of child (months)		
6-11.9	26.8	35
12-23.9	36.6	51
24-35.9	29.3	57
36-47.9	7.3	61
48-59.9	0.0	12
Sex of child		
Male	23.3	103
Female	41.5	113
Nutritional status of the child		
Wasted	14.3	21
Stunted	29.0	31
Underweight	20.6	34
GN Divisions		
Munnakkaraya	15.5	58
Siriwardanapura	14.5	62
Pitipana	14.3	21
Wellaweediya	26.7	75
Mother's education (n=213)		
Primary	20.0	26
Secondary	45.0	90
Passed O' Level	35.0	97
Monthly household income		
< 9,000	7.3	15
9,000 - 13,999	22.0	33
14,000 - 19,999	14.6	41
20,000 - 31,999	39.0	84
≥ 32,000	17.1	43
Wealth Index		
Lowest	26.8	44
Second	22.0	43
Middle	24.4	44
Forth	14.6	43
Highest	12.2	42
Overall	**19.1**	**216**

3.2.3. Low birth weight (LBW)

Of all children included in the study, 13.9 % were of low birth weight; with this percentage being comparatively higher in the cohorts aged between 12-35.9 month age groups. Highest percentage was seen in the cohort aged 48 – 59.9 months and among male children (Table 4). Mean birth weight for the total sample was 2.89 kg.

The prevalence of low birth weight showed a decline with increasing maternal educational status, though the differences were marginal. However, there is no consistent pattern seen in the prevalence of LBW with income levels.

Table 04. Prevalence of low birth weight, and mean birth weight among children born in the 5 years preceding the survey, by background characteristics

Background Characteristic	Birth Weight			
	< 2500g (%)	≥ 2500g (%)	Mean (kg)	SD
Age of child (months)				
0-5.9	1 (9.0)	10 (91.0)	3.20	0.51
6-11.9	5 (15.2)	28 (84.8)	2.78	0.59
12-23.9	9 (17.6)	42 (82.4)	2.86	0.49
24-35.9	8 (14.5)	47 (85.5)	2.92	0.44
36-47.9	6 (10.0)	54 (90.0)	2.94	0.44
48-59.9	2 (15.4)	11 (84.6)	2.76	0.35
Sex of child				
Male	16 (14.4)	95 (85.6)	2.94	0.51
Female	15 (13.4)	97 (86.4)	2.85	0.45
Mother's education				
Primary	5 (20.0)	20 (80.0)	2.81	0.53
Secondary	13 (13.5)	83 (86.5)	2.88	0.41
Passed O' Level	13 (13.1)	86 (86.9)	2.92	0.53
Monthly household income				
< 9,000	0 (0.0)	16 (100)	2.99	0.38
9,000 - 13,999	5 (14.7)	29 (85.3)	2.94	0.38
14,000 - 19,999	4 (9.1)	40 (90.9)	2.94	0.46
20,000 - 31,999	14 (16.1)	73 (83.9)	2.87	0.49
≥ 32,000	8 (19.0)	34 (81.0)	2.83	0.58
Overall (n=223)	**31 (13.9)**	**192 (86.1)**	**2.89**	**0.48**

3.3 Determinants of Nutritional Status

3.3.1. Prevalance of diarrhoea

As shown in table 5, 6.6% of all children reported having had diarrhea which is comparative to the findings from the National Nutrition and Food Security survey in 2009. A reduction in the prevalence was seen with increasing level of maternal education. Of the mothers 42.8% agreed that more fluid has to be given to children with diarrhea. A substantial percentage of mothers, 60.3% said that 'Jeevani' has to be given to children with diarrhea with the percentage saying that water has to be given was 75.5%.

Table 05. Prevalence of diarrhoea among children under 5 years in the past 2 weeks, and related information

Background Characteristic	%	No. of children
Diarrhoea		
Yes	6.6	15
No	91.7	210
No response	1.7	4
Amount of fluid given during diarrhoea		
Less	21.0	48
Same amount	27.9	64
More	42.8	98
No response	8.3	19
Type of fluid given during diarrhoea*		
Water	75.5	173
Home made fluid	49.8	114
Jeevani	60.3	138
Consumption of food during diarrhoea		
Less	28.8	66
Same amount	50.7	116
More	11.8	27
No response	8.7	20

(*multiple responses)

Regarding feeding of the children, nearly 62.5% said that the children have to be given the same amount or more food during a diarrhoea episode.

3.3.2. Prevalence of acute respiratory infections (ARI) and other illnesses

Of all children, 33% had reported having 'cough and fever' (ARI) within the previous 2 weeks and difficulty in breathing in 27.1% (Table 6). This value is comparative to the results from National Nutrition and Food Security Survey in 2009.

Of the above group 46% had taken treatment, a majority of them from a private physician (79.4%). Of the total group 12% had other illnesses among whom commonest illnesses reported being cold (28.6%) and cough (21.4%). 71.2% of the mothers said same amount of food or more given than usual.

Table 06. Prevalence of ARI and other illnesses during last 2 weeks among children under 5 years

Background Characteristic	No. (%)	No. of children
Presence of cough and fever		
Yes	32.7	75
No	66.4	152
No response	0.9	2
Difficulty in breathing		
Yes	27.1	62
No	70.7	162
No response	2.2	5
Taken treatment		
Yes	45.9	105
No	48.5	111
No response	5.7	13
Place of taken treatment		
Government health facility	19.0	24
Private physician	79.4	100
Pharmacy	0.8	1
Other	0.8	1
Presence of any other illness		
Yes	12.2	28
No	87.8	201
Type of illness		
Cold	28.6	8
Cough	21.4	6
Food ingestion	7.1	2
Fever	3.6	1
Other (skin rash, tooth ache etc.)	14.3	4
Amount of food given		
Less	20.5	47
Same amount	65.5	150
More	5.7	13
No response	8.3	19

3.3.3. Young child feeding practices

3.3.3.1. Feeding soon after birth and during early neonatal period

Table 07. Infant and young child feeding practices

Characteristics	No	%
Time of the breastfeeding after birth		
Within a hour	209	91.3
After one hour	14	6.1
Not given	6	2.6
Given any other fluid before breastfeeding within 3 days of delivery		
Yes	19	8.3
No	210	91.7
Type of fluid*		
Plain water	2	10.5
Sugar water	4	21.0
Infant formula	8	42.1
No response	5	26.4
Type of food given to child during the first 6 months		
Breast milk	217	95.2
Plain water	87	38.0
Infant formula	29	13.3
Commercially available baby food	12	5.5
Porridge or gruel	14	6.5
Solid or semi solid or soft food	37	17
Vitamin preparations, ORS and medicines	21	9.8
Exclusive breastfeeding rate		81.8

As shown in table 7, 91.3% of the babies were breastfed within one hour of birth. A similar percentage (91.7%) was not given any other fluids before breast feeding within 3 days of delivery. Only 2.6% of the babies were not given breast milk . Among those who were given other fluids were 8.3% and the commonest feed was infant formula (given to 42.1%)

Feeding practices during the first 6 months showed that 95.2 % were given breast milk, 38%, plain water and 13.3%, infant formula. Among this group 17 % were given solid/semi solid /soft food and 9.8 % have been given vitamin preparations. It must be noted that 5.5 % were given commercially available foods.

3.3.3.2. Current breastfeeding practices and frequency of meals

Information on the current feeding practices by age of the child is given in Table 8. In the under 6 month age group, all children were breast fed with none in the age group 48 – 59.9 months. In the intermediate age groups, the percentage given breast milk declined with increasing age (Table 8).

Frequency of breast feeding also declined with increasing age ranging from a mean number of times of 6.9 feeds per day in the under 6 months age group to none in the 48 – 59.9 age group. A similar pattern was seen in the frequency of 'night breast feeding'.

Frequency of giving solid, semi solid or soft food increased with increasing age , the mean number of times ranging from 2.7 among the 6 – 11.9 month age group to 3.4 among the 48.0-59.9 month age group.

Table 08 – Type of feeding during yesterday by age groups					
Age group	Currently breastfed		Frequency of breastfeeding	Frequency of night breastfeeding	Frequency of solid, semi solid or soft food than liquids	Total No. of children
	Yes (%)	No (%)	Mean (SD)	Mean (SD)	Mean (SD)	
0-5.9	11 (100)	0 (0.0)	6.91 (3.99)	5.36 (3.10)	-	11
6.0-11.9	31 (93.9)	2 (6.1)	4.30 (1.64)	4.87 (2.19)	2.74 (1.13)	33
12.0-23.9	42 (82.4)	9 (17.6)	4.67 (3.79)	4.21 (2.29)	3.16 (1.36)	51
24.0-35.9	24 (40.7)	35 (59.3)	3.46 (1.79)	3.50 (1.71)	3.29 (1.35)	59
36.0-47.9	10 (16.1)	52 (83.9)	2.62 (0.74)	2.78 (1.20)	3.26 (1.05)	62
48.0-59.9	0 (0.0)	13 (100)	0.0 (0.0)	0.0 (0.0)	3.42 (1.38)	13
Total	**118 (51.8)**	**110 (48.2)**	**4.38 (2.97)**	**4.25 (2.27)**	**3.17 (1.24)**	**229**

3.3.3.3. Food items given during the preceding 24 hours

Only a few children under 6 months of age were given foods other than breast milk. However, older children were given a wide range of food items within the preceding 24 hours and the percentage given each food item varied widely. Among the children in the age group 6 – 23months, water was the commonest item given (36.7%). Among this group, 20 – 25 % of the children were given cereals and preparations, fish and related foods, sugary foods, foods with condiments and vegetables or fruits. (Table 9).

Among those in the older age group, 24- 59.9 months, more than half had been given water, cereals and preparations, sugary foods and foods containing condiments. Between 40 – 50 % of this group were given fruits/vegetables, fish and related products, coconuts and other nuts and milk.

Table 09. Percentage of children aged 6-59 months, who were given food items belonging to the different food groups, on the day preceding the interview, by age groups

Characteristic	% within age groups in months		
	< 6	6-23	24.0 - 59.0
Water	0.5	36.7	58.8
Infant formula	0.9	14.0	10.4
Medicinal water	0.9	6.3	7.2
Sugar/Glucose water	0	15.3	36.5
Jeevanee	0	0.9	2.3
Cereals (Nestum,Cerilac,Samposa, Thriposa)	0	8.5	11.7
Rice cunjee	0	11.3	8.1
Rice,Bread, rotti, pittu, dosai or other foods made from grains	0	29.1	52.0
Pumpkin, Carrots or sweet potatoes, yellow vegetables	0	20.7	23.9
White potatoes, white yams, manioc, cassava, or any roots	0	13.1	17.1
Any dark green leafy vegetables such as kankun, etc	0	15.2	26.9
Ripe mangoes or ripe papayas	0	9.5	14.9
Any other fruits or vegetables	0	20.7	40.1
Liver, kidney, heart or other organ meats	0	1.8	1.8
Chicken	0	2.7	7.2
Any meat such as beefs, pork, lamb, goat or duck	0	0.9	2.7
Eggs	0	9.9	17.9
Fresh or dried fish, shellfish, canned fish or seafood	0	24.2	42.6
Any foods made from cowpea, green gram, black gram or lentils	0	15.7	27.4
Coconut, peanuts or other nuts	0	14.0	41.0
Milk	0	17.0	45.7
Cheese, curd, yogurt or other milk products	0	13.4	20.5
Any oil fats, butter or foods made with any of these	0	0.4	0
Any sugary foods such as chocolates, sweets, candies, cakes or biscuits	0	23.2	50.0
Condiments for flavour, such as chillies, spices, herbs or fish powder	0	21.4	51.3
Micronutrient powder	0	3.6	3.6

Of the total sample of children, 84.8 % of the children consumed some form of animal foods during the previous week.

As shown in Table 10, only three fourth (73.8%) of children aged 6-23 months has received a minimum acceptable diet. This rate was low in girls (70.9%) compared to boys (79.3%). The total sample had minimum dietary diversity (100%). Among the breastfed children the percentage having minimum meal frequency was lower (72.6%) than the non breastfed children (81.8%).

Table 10. Minimum meal frequency, dietary diversity, and minimum acceptable diet in children 6-23 months, by background characteristics

Background characteristic	Minimum meal frequency		% with minimal dietary diversity (≥4 groups)	Percentage of minimum acceptable diet	Total no. of children
	Breastfed	Non-Breastfed			
Age group in months					
6-8	75.0	-	100.0	75.0	12
9-11	68.4	100.0	100.0	71.4	21
12-14	71.4	100.0	100.0	71.4	7
15-17	73.3	100.0	100.0	76.5	17
18-20	50.0	100.0	100.0	60.0	10
21-23	91.7	60.0	100.0	82.4	17
Sex of child					
Male	80.8	66.7	100.0	79.3	29
Female	68.1	87.5	100.0	70.9	55
Overall	**72.6**	**81.8**	**100.0**	**73.8**	**84**

3.3.4. Use of health services

As shown in Table 11, 97.7% of the children had a CHDR, 96% had received age appropriate immunization, 58.7% had received Vitamin A mega dose with a marginally higher percentage (65%) having received de worming tablets. Only 8% of the children were taking iron tablets at the time of the study. Of the 9 children who did not complete their immunisation only 2 of them were sick and there was lack of awareness among mothers of 3 children. Number of visits for growth monitoring of children varied from a mean of 3.09 days among the under 6 months group to 5.2 days in the 12- 23.9 month age group. For the total sample of children, the number of days was 4.3. Out of all children in the sample 88% of them were attended at least 2 sessions of growth monitoring in the past 6 months.

Table 11. Percentage distribution of children who received Vitamin A mega dose supplement, de-worming tablets, vaccination and availability of CHDR, by age groups

Characteristics	Percentage of children in each age group (months)						Total
	<6	6-11.9	12.0-23.9	24.0-35.9	36.0-47.9	48.0-59.9	
Availability of CHDR	100.0	93.5	100.0	98.2	100.0	84.6	97.7
Vitamin A megadose	-	50.0	82.4	50.8	61.3	41.7	58.7
De-worming tablets past 6 months	-	-	70.0	79.7	80.6	84.6	65.0
Currently taking Iron supplements	22.2	6.2	6.0	5.1	11.3	7.7	8.0
Age appropriate immunisation	90.9	96.9	94.1	96.6	96.8	100.0	96.0
Number of days taken for growth monitoring during last 6 months							
Mean (SD)	3.09 (1.30)	5.21 (1.34)	5.22 (0.99)	4.09 (1.60)	3.72 (1.76)	3.11 (2.09)	4.32 (1.66)
% children 0-59 months who attended at least 2 sessions of growth monitoring in past 6 months							**87.8%**

Table 12 provides information on the pattern of service use and availability for the children. The number of mothers of children, from whom such information was available, varied. Of the total group, 85% had obtained the family health services of the area for the child.

Table 12. Health and nutrition services, awareness, relationship with area PHM

Characteristics	%	No. of children
Obtained area family health services for the child	84.7	194
Relationship with PHM		
Very good	71.6	164
Average	25.3	58
Very little	2.6	6
No PHM	0.4	1
Received health and nutrition awareness during last 3 months	46.7	107
Services provider of above awareness*		
Doctor	15.9	17
Nurse	8.4	9
Midwife	63.6	68
PHI	7.5	8
TV	56.1	60
Radio	8.4	9
Newspaper / magazine	14.0	15
Education programme	12.1	13
Volunteer	3.7	4

(*multiple responses)

Half of the mothers had received information pertaining to health and nutrition. Among this group, most of them had received such information from the midwife, the other main source being the television programmes. Relationship with PHM was reported as very good by 72% of mothers with another 25.3% saying that such relationships were 'average'.

3.3.5. Environmental sanitation and hygienic practices

Information on the source of water and toilet facilities at the household level and those on some basic hygienic practices are presented in Table 13.

In a majority (62.9%) of the households, the main source of drinking water was piped water inside the dwelling with another 26.2% having piped water in the compound. Around 99% of households had year-round access to improved water sources.

In 77.7% of households, there were toilets that use flushing into a pit linked to the toilet and another 14.4% with flushing facilities linked to a septic tank. Both these types of toilets use a flushing mechanism. Of the total group, 15.4% shared their toilets and nearly all toilets were used by 1 – 5 households. Only 1.7% of households did not have toilets.

On inquiring into hygienic practices among mothers, it was shown that 89% washed their hands with soap after using the toilet and 87.8% did so after cleaning the child's stool. However, the percentage of mothers who washed their hands with soap before eating, before feeding the child and before cooking was 56.8%, 76.4% and 54.6% respectively.

Table 13. Percent of households by main source of drinking water and toilet facilities		
Characteristics	**No**	**%**
Type of water		
Piped into dwelling	144	62.9
Piped to compound	60	26.2
Public taps	20	8.7
Tube well	2	0.9
Bottled water	1	0.4
Other	2	0.9
Toilet facility		
Flush to septic tank	33	14.4
Flush to pit latrine	178	77.7
Flush to somewhere else	3	1.3
Pit latrine	11	4.8
No facility	4	1.7
Toilet facilitshared with other households		
Yes	35	15.4
No	194	84.6

No of household use the toilet		
1-5	34	97.1
6.-10	1	2.9
>10	0	0
Wash hand after using toilet		
Always with soap	204	89.0
Sometimes with soap	17	7.5
Not using soap	8	3.5
Wash your hand before eating		
Always with soap	130	56.8
Sometimes with soap	63	27.5
Without soap	36	15.7
Wash your hand before feeding the child		
Always with soap	175	76.4
Sometimes with soap	34	14.8
Without soap	18	7.9
No answer	2	0.9
Wash hands after cleaning child's stool		
Always with soap	201	87.8
Sometimes with soap	20	8.7
Without soap	8	3.5
Wash your hand before cooking		
Always with soap	126	54.6
Sometimes with soap	52	22.9
Without soap	49	21.6
Do not wash	2	0.9
% of mothers or caregivers wash their hands in five critical times using soap	102	44.5

Only 45% of mothers of the group wash their hands using soaps in five critical times (After using toilet, Before eating, Before feeding the child, After cleaning child's stool and before cooking) .

3.3.6. Participation in World Vision Programmes

Of all children, 39.3% received assisstance from a programme by World Vision. The services received varied widely as shown in Table 14. Majority (40.4%) were received awareness programme on health and nutrition.

Table 14. Participation in World Vision assisted programmes

Characteristics	%	No. of children
Obtained assisstance from World Vision	39.3	90
Type of services received*		
Awareness education on health and nutrition	40.4	223
Nutrition programmes	27.0	137
ssistanceFood a	11.2	134
Health and Medical support	25.2	135
Small scale enterpriise development programmes	5.3	132
Animal husbandary	1.5	133
Home gardening	6.0	134
Support to education	44.1	136
Other	28.2	117

(*multiple response)

Table 15: Nutritional status of children 0-59 months in relation to participating in World Vision assisted programmes

Nutritional status	Participated in WV programmes		Total number of children
	Yes (%)	No (%)	
Wasting	6 (6.7)	16 (12.0)	22
Stunting	21 (23.3)	11 (8.3)	33
Underweight	18 (20.0)	17 (12.8)	35
Anaemia	19 (22.9)	20 (15.6)	39

In comparison to those who did not receive assisstance from World Vision, these children showed a lower percentage of wasting (6.7%) in comparison to 12% in other group. But the percentage of stunting and underweight and anaemia showed a higher prevalance in the assissted group in comparison to the other group. This may due to the reason that the programmes may have not targetted these problems. (Table 15).

3.4. Nutritional status of pregnant women in the study area

In addition to the assessment including the under five children, a survey was conducted in the same study area among pregnant women. For this purpose, all pregnant women resident in the households in the study area were identified. Pregnancy status was determined on 'self reporting'.

A total of 84 pregnant women were identified in the households included in the study. Of this group, 35.7% were primi Para and 25% were of parity 3 or higher. Of the multipara, 27.3% mothers had two living children and 60 % had only one living child (Table 16).

Of the total group, 75% had received tetanus toxoid injections, with 73 % among this group having received one dose of toxoid at the time of the study. The percentage who had received de worming tables was 79.8% and the average number of antenatal visits was 3 per mother.

Table 16 : Basic information on pregnant mothers (n=84)

Characteristics	No.	%
Period of amenorrhoea in weeks		
<12	16	19.5
12-24	31	37.8
25-36	27	32.9
>36	8	9.8
Parity		
1	30	35.7
2	33	39.3
≥ 3	21	25.0
No. of living children		
0	35	41.7
1	33	39.2
2	15	17.6
3	1	1.2
Number who received tetanus toxoid		
1 dose	46	54.8
2 doses	16	19.0
3 doses	1	1.2
Not given	21	25.0
Taken deworming tablets		
Yes	67	79.8
No	17	20.2
	Mean	**SD**
Average antenatal visits	3.11	1.76

Nutritional status of the pregnant women was assessed by measuring the height in cms, upper mid arm circumference (MUAC) and assessing the Hb levels (Table 17). There were only 2 mothers with a height less than 145 cms. Of the group, 21.4% of mothers were identified as being undernourished (with MUAC <23) and a similar percentage of mothers had Hb levels below 11 gms/dl.

Table 17: Nutritional status of pregnant women

	No.	%
Height of the mother in cms		
< 145	2	2.4
≥ 145	82	97.6
Mid upper arm circumference in cms		
≤ 23 (Undernourished)	18	21.4
>23	66	78.6
Haemoglobin status in g/dL		
<11.0 (Anaemic)	18	21.4
≥ 11.0	66	78.6

3.5. Information on the pregnancy related care of mothers of children included in the study.

3.5.1. Antenatal care

Among the mothers of the children under 5 years, inquiry was made as to the type of antenatal, natal and post natal services received by them.

A majority, 99.1% among those who responded, had received antenatal care from a doctor, 51.3% from a nurse and 95% from a midwife, indicating that had received antenatal care from more than one source (Table 18)

Nearly half (47.7%) of them said that they consumed food on more occasions during the day compared to the non pregnant women with 18.3% saying that they consumed less.

Table 18: Antenatal care, eating habits during pregnancy

	No.	%
Type of person provided antenatal care*		
Doctor	99.1	226
Nurse/Sister	51.3	117
Midwife	95.0	217
Other	5.2	12
Eating habits during pregnancy compared to non pregnant period		
Less often	18.3	42
Same amount	33.9	77
One more time per day	31.2	71
Two more times per day	11.6	27
Three more times per day	4.9	12
	Mean	**SD**
Average days of taking iron supplements during pregnancy	30.66	25.50

(*multiple responses)

Average no of taking iron supplements during pregnancy was 30.7 days.

3.5. 2. Natal and postnatal care

For 87.8% of the mothers, a doctor has been in attendance during delivery with 69% having had the help of a nurse and 48.9%, assistance from a midwife. It is likely that more than one category of health staff has been on assistance during delievery (Table 19).

All mothers delivered at a health facility. Considering care practices 90.4% of neonates were placed with (skin to skin contact) and in 91.7% of them cord was cleaned and dried.

Among all mothers, 73.8% had received Vitamin A mega dose within 4 weeks.
On an average, a mother has received 4 postnatal visits. Average number of days of taking iron supplements by mothers during the lactation period was 58.3 days.

Table 19: Assistance during delivery and postnatal period

Characteristics	No.	%
Type of person who assisted the delivery*		
Doctor	201	87.8
Nurse/Sister	158	69.0
Midwife	112	48.9
Other	10	4.4
Place of delivery		
Deliver in Health facility	229	100.0
Care during delivery		
Skin to skin contact	207	90.4
Cleaned and dry cord	210	91.7
Postnatal care		
Received Vitamin A megadose within 4 weeks	169	73.8
	Mean	**SD**
Average postnatal visits received	4.04	3.59
Average days of taking iron supplements during lactation	58.27	60.63

(*multiple responses)

3.5.3. Family planning

Of all mothers, 62.6% were using a method of family planning at the time of the survey. Among the users, injections (DMPA) was the commonest method used by 39% with another 20.5% using oral contraceptives. Of the group, 17.8% has opted for permanent methods (Table 20).

Table 20: Current use of family planning method.

| Method of Family Planning (N=146)	%	No.
Oral contraceptives	20.5	30
Injections(DMPA)	39.0	57
Norplant	6.8	10
Loop	7.5	11
Condom	7.5	11
Permanent methods	17.8	26
Other	0.7	1

3.6. FOOD SECURITY AND RELATED FACTORS

3.6.1. Median income

Median household income per month was Rs. 20,000 and ranged between Rs. 2,000 to 150,000 (Figure 8). Majority (38.9%) were in income group of 20,000 – 31,999 and 7% were having less than Rs 9,000 per month.

Figure 8: Distribution of the total income of the households
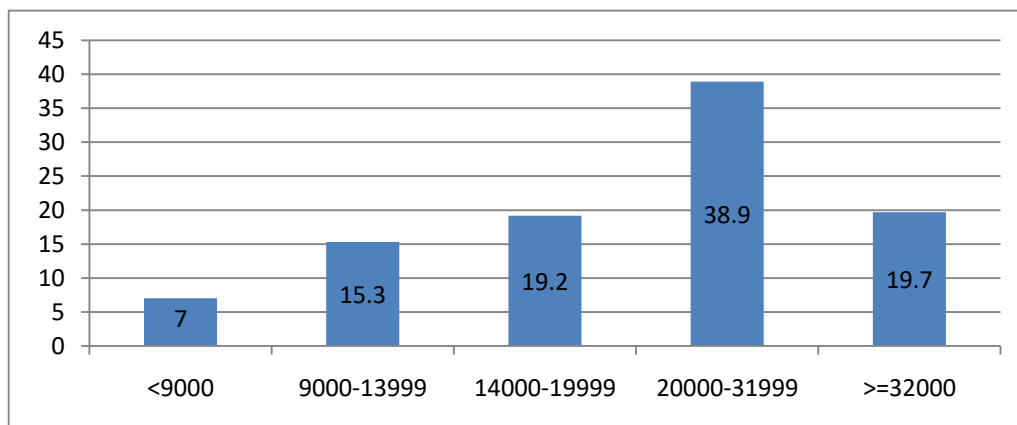
3.6.2. Primary income sources

Fishing was the most common income generation activity, this being the main source of income among 30.6% of the population. A related activity, working as a labourer in fishing boats was the next main source of income for another 18.9% with salaried employment following, with 10.8 % of the households giving this as the main source of income (Figure 9).

Figure 9: Main income sources
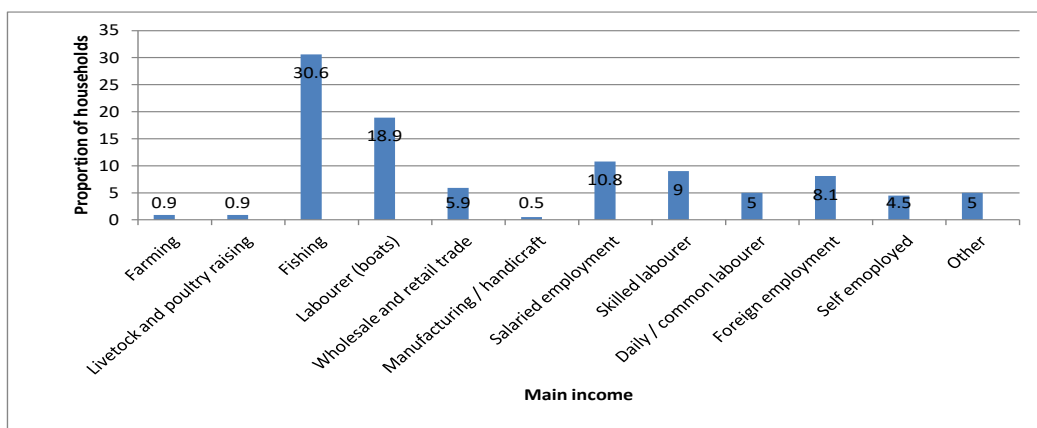
3.6.3. Agriculture

Agriculture was not a main source of income generating activity in the area. As shown in Figure 10, approximately one in five households (18.7%) had garden space with 14.6% having cultivated vegetables and fruits in their gardens. Among the households, 10.1% consumed the products from the gardens as a part of the meal.

Figure 10: Households involved in home gardening
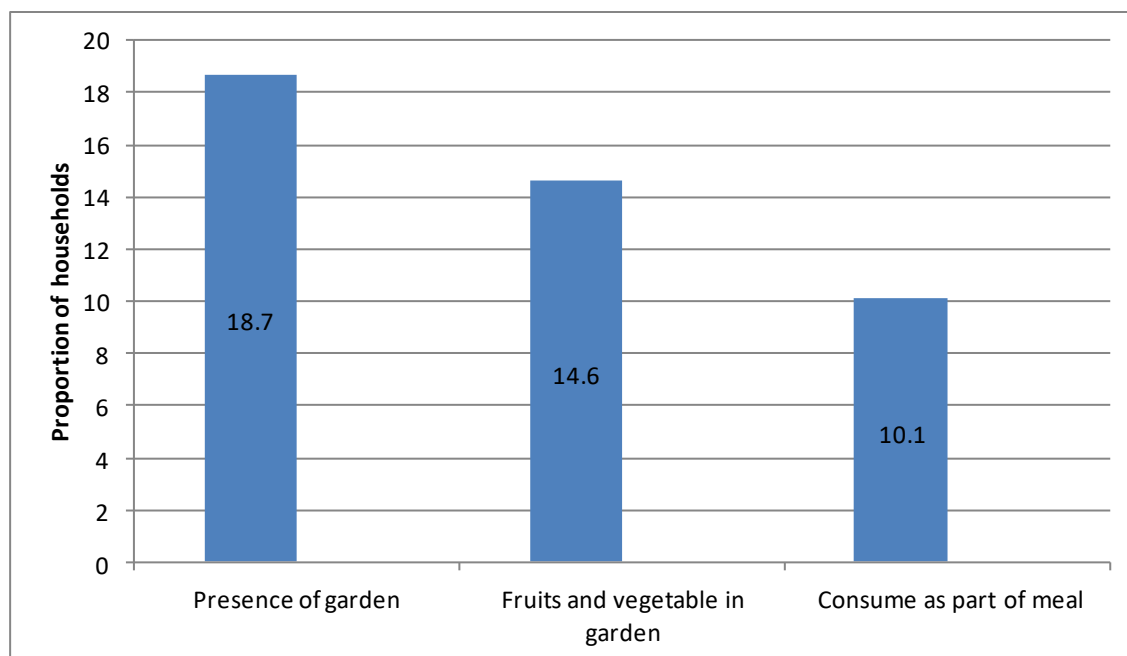
3.6.4. Livestock

Only 8% of the households had livestock (Table 21). One third of such households used the products as a part of their daily meals.

Type of livestock and the numbers varied with cows being the commonest and pigs, being the least common.

Table 21. Ownership to livestock

Characteristics	%	No. of households
Presence of livestock	8.0	18
Used for daily meal	33.3	6
	Mean (SD)	
Type of livestock available		
Cows	7.00 (8.72)	4
Poultry	5.15 (4.12)	13
Goats	2.00 (0.00)	2
Pigs	1.67 (0.58)	3
Fish /prawns	2.00 (0.00)	2

3.6.5. Assets

Availability of a number of household items was inquired into. Over 75% of the households had mosquito nets (91%), television sets, mobile phones and jewellery. Between 50 – 75 % of households had refrigerators and radios. Land phones and sewing machines were available in 25-50% of households. However, washing machines, water pumps, other equipment were available in a much smaller number of households with pesticide sprayers being available only in 3.5 % of households (Figure 11)

Figure 11: Ownership of Assets
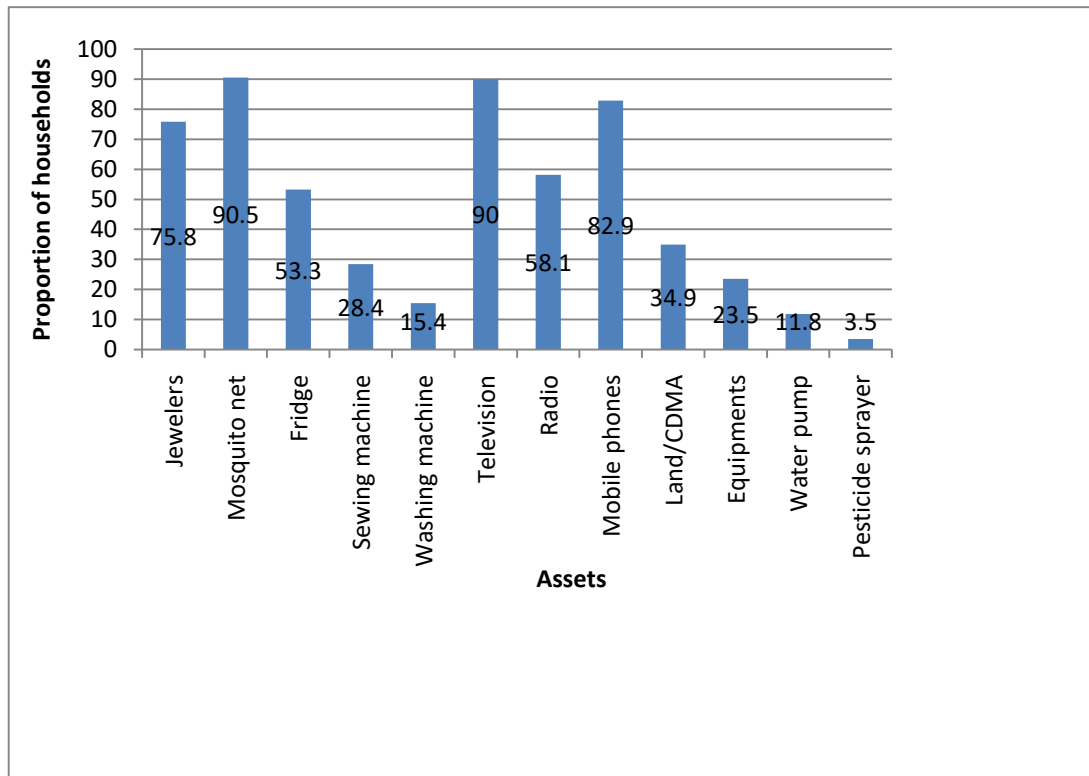
Bicycles were the commonest mode of transport available in 54.1% of households with 35.4% of them having motor bicycles. Other forms of transport facilities were available only in a limited number of households while 20.1% has fishing boats which could be considered as a mode of transport, used for a specific purpose (Figure 12).

Figure 12: Ownership of Transport facilities
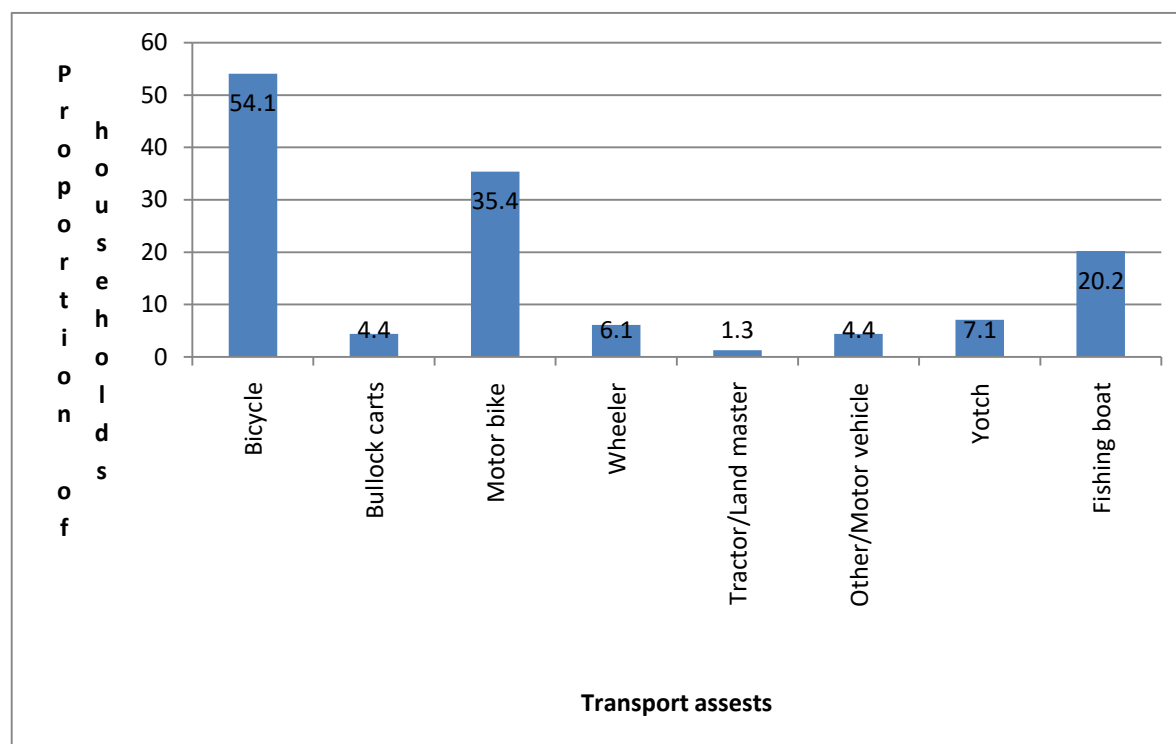
3.6.6. Expenditure

Of the total expenditure, 23.9% were spent on food with 76.1% spent on non food items. On an average, the total amount of expenditure on food during the previous week was Rs. 3,870, the maximum expenditure being on fish and related products (25.8%), rice/wheat flour/ bread (12.9%) and on 'prepared food' purchased from restaurants and stalls (12%). The median expenditure varied widely between the households (Table 22).

The non food expenditure given in this table is likely to have been spending within the previous month not necessarily during the previous week. This was mainly on repayment of debts and on paying house rent. These expenses also showed a wide range as shown by the 25th and 75th percentile values.

Table 22: Average proportion of expenditure on food and non food items during last week

Food and non food items	Median (Rs.)	25th and 75th percentile (Rs.)	% out of total
Food items			
Rice/ Wheat flour /Bread	500.00	350.00-750.00	12.9
Pulses / Dhal / Gram	100.00	55.00-200.00	2.6
Fish/dried fish/tined fish/meat/	1000.00	543.75-1500.00	25.8
Milk, milk powder, Curd, Yoghurt and other milk products	350.00	260.00-520.00	9.0
Vegetables including leaves	280.00	200.00-500.00	7.2
Fruits	200.00	150.00-350.00	5.2
Fat and oil	160.00	80.00-200.00	4.1
Coconut and coconut products(except oil)	245.00	180.00-280.00	6.3
Sugar / Jaggary	150.00	100.00-200.00	3.9
Prepared food (food and drinks from restaurants and stalls)	465.00	250.00-962.50	12.0
Special nutritional food	100.00	50.00-200.00	2.6
All other food items	200.00	150.00-350.00	5.2
Total food items	**3870.00**	**2902.00-5143.00**	**100.0**
Non food Items			
Payments on debts	4500.00	2000.00-8700.00	36.6
House rent	3500.00	2000.00-5000.00	28.5
Education	1350.0	500.00-2525.00	10.9
Consumable households items (e.g. soap, candles, matches, detergent)	500.00	300.00-1000.00	4.1
Cooking fuel /firewood /Gas	1500.00	810.00-2300.00	12.2
Transportation and communications (busses, phones etc.)	800.00	400.00-1500.00	6.5
Livelihood inputs (tools seeds)	1500.00	500.00-4000.00	12.2
Alcohol/Beer/Toddi / Tobacco/Beetle nuts	1000.00	500.00-2400.00	8.1
Gift to others	1725.00	875.00-3000.00	14.0
Water	350.00	200.00-600.00	2.8
Electricity	600.00	400.00-1500.00	4.9
Medicine and health	1000.00	500.00-2000.00	8.1
All other non-food items	1100.00	500.00-2625.00	8.9
Total non food items	**12300.00**	**7244.00-18980.00**	**100.0**

3.6.7. Food consumption

The mean number of days, a given food item was consumed in the household during the previous week is given in Table 23. Rice and other cereals, coconut, fish, sugar and dairy products have been consumed almost on all days. Bread consumption was less frequent and so was the meat consumption.

Table 23: Household food consumption pattern during last week

	Mean no. of days	SD
Food items		
Rice and other cereals (wheat millet etc)	6.89	0.71
Tubers (potato sweet potato, cassava etc)	2.29	1.63
Bread / Chapti / Roti	3.62	2.35
Pulses / Dhal	3.07	1.88
Fish	6.10	1.64
Meat (beef, pork, chicken)	1.35	1.10
Eggs	2.77	1.92
Dairy (curd liquid milk;, powder milk etc	6.08	2.16
Coconut products, palm oil, vegetable oil, fats etc.	6.48	1.46
Vegetables including leaves	6.47	1.42
Fruits	4.41	2.41
Sugar / Jaggary	6.80	1.04
Alcohol / Beer / Toddi	2.06	2.52

3.6.8. Food sources

As shown in table 24, for almost all types of foods, the commonest source was by purchasing with 10% of households having fish, through their own efforts.

Table 24: **Main food source in households**

Food groups	Main food sources (%)						
	Own production	Purchased	Exchange of goods or services	Borrowed	Received as gifts	Food aids	Other
Rice and other cereals (wheat millet etc)	0.4	99.6	0.0	0.0	0.0	0.0	0.0
Tubers (potato sweet potato, cassava etc)	0.0	100	0.0	0.0	0.0	0.0	0.0
Bread / Chapti / Roti	1.5	98.5	0.0	0.0	0.0	0.0	0.0
Pulses / Dhal	0.0	91.6	0.4	0.0	0.0	0.0	0.0
Fish	10.0	88.7	0.0	0.0	0.9	0.5	0.0
Meat (beef, pork, chicken)	1.5	98.5	0.0	0.0	0.0	0.0	0.0
Eggs	0.0	98.9	0.0	0.0	1.1	0.0	0.0
Dairy (curd liquid milk, powder milk etc	0.0	99.5	0.0	0.0	0.0	0.0	0.5
Coconut products, palm oil, vegetable oil, fats etc.	0.5	99.1	0.0	0.0	0.0	0.0	0.5
Vegetables including leaves	0.0	99.1	0.0	0.0	0.4	0.4	0.0
Fruits	0.0	99.5	0.0	0.5	0.0	0.0	0.0
Sugar / Jaggary	0.0	99.1	0.0	0.0	0.0	0.0	0.9
Alcohol / Beer/ Toddi	0.0	99.1	0.0	0.0	0.9	0.0	0.0

3.6.9. Food stocks

Inquiry as to the availability of food stocks in the household or money to buy food showed that in 63.3% of the households such food stocks or money was available only for a week's supply, with this percentage being 21.0% when the period for which food/money was available was for 2 weeks to one month. In 10.5% of households, there were no food stocks available.

Table 25: Food stocks in households

Food stock or money to buy food last	No.	%
Less than one week	145	63.3
Two weeks to one month	48	21.0
1 month to 3 months	3	1.3
More than three months	1	0.4
No Food	24	10.5
No response	8	3.5

Chapter 4

CONCLUSIONS

This study shows that overall prevalence of global acute malnutrition (GAM) in the study area 9.6%, of which 9.2% is moderate acute malnutrition (MAM) and 0.4% is severe acute malnutrition (SAM).Prevalence of stunting was 14.4% with 13.0% with moderate stunting and 1.4% severe stunting. Percentage of underweight children was 15.3% with none of them belonging to the severe category. Comparison with the national prevalence data reported in the NFSS 2009 showed that prevalence of GAM (11.7%) and SAM (1.9%), which was higher than the reported figures in this study 9.6% to 0.4% respectively.

Prevalence of anaemia among under five children reported in the study (19.1%) is much lower than the national prevalence reported in the NFSS 2009 (25.2%).
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Prevalence of low birth weight (LBW) of 13.9%, was lower than the national level data from NFSS 2009 (18.1%). This percentage was marginally higher (14.4%) among males compared to 13.4% among females. There was a decline in the prevalence with increasing levels of maternal education with no clear pattern in relation to monthly household income.

Assessment of the nutritional status of all pregnant women resident in the study area showed that only 2 mothers had a height less than 145 cms, 21.4% of mothers were identified as being undernourished   (with MUAC $\leq$ 23) and a similar percentage of mothers had Hb levels below 11 gms/dl. National Prevalence of anaemia among pregnant women reported in the NFSS 2009 was 16.7%, lower than the figures reported in the present survey.

Overall percentage of children with fever plus cough/cold and diarrhoea were 32.7% and 6.6% respectively. Compared with the data from the NFSS 2009 reported prevalence of respiratory illness of 17% and diarrhea of 7% shows that the prevalence of respiratory illnesses are much higher in the present study. However, the seasonal differences should be considered in interpreting these data.

Only a few children under 6 months of age were given foods other than breast milk. Among those in the age group 6 – 23months, water was the commonest item given (36.7%) and 20 – 25 % were given flour preparations, fish and related foods, sugary foods and foods with condiments.

The total sample had minimum dietary diversity (100 %) .Only three fourth (73.8%) of children aged 6-23 months has received a minimum acceptable diet. This rate was low in girls (70.9%) compared to boys (79.3%). Among the breastfed children the percentage having minimum meal frequency was lower (72.6%) than the non breastfed children (81.8%).

Of the children, 96% had a CHDR and 97.7% had age appropriate immunization. However, deworming tablets were given only to 65% of the children within the previous 6 months with the percentage having received a vitamin A megadose was 58.7%.

Nearly all households had access to a safe water supply with 89.1% having piped water inside the house/compound. Nearly all (98.3%) households had access to a latrine which uses a flush mechanism..

Percentage of mothers washing their hands with soap after using the toilet and after attending to a child's stool was high, ranging between 88-89% while those who washed their hands before cooking and feeding the child was much lower ranging between 55 – 57%.

The main source of income for 49.5% of the population was fishing and related activities. Home gardening was undertaken by 14.6% of the households with livestock being available only in 8% of the households.

Of the total expenditure, 23.6% were spent on food with 76.4% on non food items.

Rice and other cereals, coconut, fish, sugar and dairy products have been consumed almost on all days during the preceding week. Bread consumption was less frequent and so was the meat consumption. In almost all instances, the food items were purchased.

In 65.6% of the households   food stocks or money available for purchase was   only for a week's supply.

Chapter 5

Recommendations

Actions aimed at further reduction of Global Acute Undernutrition and Moderate Acute Undernutrition needs to be considered with the focus on improving dietary practices, reduction of morbidity and improvement of practices related to personal hygiene. Improved the food consumption of children under 2 years needs special attention to reduce the prevalence of stunting to at least less than 10%.

Anaemia among children under five years needs attention in future programmes. Innovative approaches need to be considered to promote consumption of iron rich food along with household level production with home gardening, and introduction of micronutrient supplementation programme as necessary.

Breastfeeding should be focussed and complementary feeding practices should be improved with locally available recipes to achieve the minimum acceptable diet.

Special attention to be given to reduce the acute respiratory tract infections among children by providing specific educational messages.

There is a need to focus the eating habits in pregnant women and the consumption of the iron rich food and the need for regular iron supplementation. Field level staff needs to focus on promoting these practices. It is important to observe the compliance to iron tablets provided by the Ministry of health free of charge.

Income generation activities should be linked either directly or indirectly with food intake and consumption. It is important to link with direct and indirect programmes conducted by other sectors such as poverty alleviations, Samurdhi, Divinaguma etc.

Convene a meeting with health authorities and other relevant stakeholders to disseminate the study findings to prioritize the activities to be conducted during the next three years.

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