Nutrition assessment of preschool and pregnant women in Vakarai DS area

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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 Vakarai Divisional Secretary area, in Sri Lanka in which the World Vision programmes have been planned to implement since 2012. 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 389 children were included in the study and they were identified using cluster sampling technique. In addition, all pregnant mothers in the area (110) 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 levels. Data collection was done by trained field investigators. Constant supervision and monitoring of all field activities, editing of questionnaires were carried out to ensure quality of data.

The overall prevalence of wasting or global acute malnutrition (GAM) in the study area 24.7%, of which 20.5% is moderate acute malnutrition (MAM) and 4.2% is severe acute malnutrition (SAM).Prevalence of stunting was 16.2% with 13.3% with moderate stunting and 2.9% severe stunting. Percentage of underweight children was 33.4%. 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 lower than the reported figures in this study.

Prevalence of low birth weight (LBW) was 28.8% higher than the reported data from NFSS 2009 (18.1%). LBW percentage was higher among females and there was a decline in the prevalence with increasing levels of maternal education.

Assessment of the nutritional status of pregnant women showed that 6.4% of mothers had a height less than 145 cms, 55.4% of mothers were undernourished (Mid Upper arm circumference (MUAC) $\leq$ 23).

Morbidity pattern among under five children showed the percentage of children with respiratory infections and diarrhoea to be 63.1% and 4.4% respectively. These percentages much higher from those reported in NFSS.

About 10.9% of children in the age group up to 6 months were given any items other than breast milk within first 3days of life. Among those in the age group 6 – 23 months, water was the commonest item given (97.3%) and 77.4 % was given rice, bread and rice flour preparations. As age increased more of the children were given a variety of food items.

Nearly one third of the total number of children (32.4%) 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 higher (30.1%) than the non breastfed children (14.3%).

Of the children, 96% had a Child Health Development Record and 95.8% had age appropriate immunization. However, lesser percentages (35.5%) were given de worming tablets within the previous 6 months with the percentage received a vitamin A mega dose was 69.8%.

Nearly three fourth of households did not had access to a safe water supply with 70.6% taking drinking water from unprotected well. Nearly 79.3% households had access to a sanitary latrine. However, practices related to cleanliness related to cooking and feeding the children, needs improvement.

The main source of income for 40.1% of the population was fishing and related activities. Home gardening was undertaken by 34.5% of the households with livestock being available in 45.9% of the households. Of the total household expenditure, 37.1% were spent on food with 62.9% on non food items.

Rice and other cereals and coconut have been consumed almost on all days during the preceding week. Meat and pulses consumption was less frequent. Half of the households had purchased the food items. In 51.2% of the households food stocks or money available for purchase was only for a week's supply.

Actions aimed at further reduction of Severe and Moderate acute malnutrition (MAM) needs to be considered with the focus on starting a therapeutic feeding, feeding for MAM children, improving feeding during illnesses, encouragement for exclusive breastfeeding, community rehabilitation programme to prevent malnutrition, 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.

There is a need to focus the eating habits among pregnant women, improve the consumption of iron rich food, regular iron supplementation and provision of supplementary food for underweight pregnant women. Field level staff needs to focus on promoting these practices with monitoring of weight gain during pregnancy for early identification for appropriate actions.

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

CHAPTER 1

Background

The Vakarai Area Development Programme is located in the Koralaipattu North Divisional Secretary (DS) area of the Northern part of Batticalloa District, Eastern province in Sri Lanka. It is located 299 Km away from capital city of Colombo, and 60 km away from the town of Batticaloa. The programme impact area covers 550 square kilometres which is about 20.9% of the total land area of the district. The area can be geographically contextualized as a flat, coastal, inland area showing lowland flood plain characteristics.

The programme impact area is bordered by the Verugal DS from North, Bay of Bengal from the East, Koralipattu central DS from South and Polonnaruwa district from the West. The programme impact area corresponds to the third level of local government, which is called a Divisional Secretariat. The programme impact area covered approximately 550 square kilometers and its total population was 23,616 including Tamils, Muslims & Sinhalese. The majority belonged to the Tamil community.

The climate of the impact area is tropical, and semi-arid. The land in this area is mostly used for agricultural purposes.

A nutrition survey was urgently necessary to measure the extent and severity of malnutrition among children under five years to plan appropriate short term, medium and long term interventions before starting the new programme cycle. The result of the nutrition survey provided an update on the nutritional status of the population in Vakarai area and hence was used as baseline data for monitoring the impact of already established World Vision Lanka catered interventions.

In addition, the assessment survey was coupled to focus its attention on interventions targeted for correcting the underlying causes or determinants where health was not the primary concern. This included income generation, livestock development and agriculture etc.

Objectives of the study

General objective:

To determine the health and nutrition status of children less than five years of age in the community and to identify relevant underlying factors.

Specific objectives:

1. To assess the nutritional status of children between the age of 0 to 59 months and pregnant women.
2. To describe the determinants of the health and nutritional status of the area's population.

3. To identify factors affecting the food security at community and household level.
4. To explore the opportunities for sustainability and future partnerships in health and nutrition sector.
5. To develop suitable interventions (short term /long term) to address identified issues in the area.

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 household populations in Vakarei area, having children between 0-59 months and/or pregnant women.

2.2. Sampling

2.2.1. Sample size determination

The sample size required was 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.

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 = 20%

δ = The allowable error = 5%

η = Non-response rate = 5%

N=257 children under five years.

It was a cluster sample and design effect was used as 1.5.

A total sample size was 390.

Considering the small number, all pregnant women in the area all were included in the survey.

2.2.2. Sampling procedure

All Grama Niladari (GN) areas in Vakarai area were included due to the fact that all 16 GN areas in Vakarei DS division of Sri Lanka were taken up for programme planning by World Vision Lanka.

The sampling frame for the study was the list of GN division and the population of children between 0-59 months in each area which was obtained from the World Vision main office. Table 1 shows the details of the total of 16 GN areas were operated by WV.

Table 1: Distribution of the GN divisions in Vakarai DS division by population

Serial No	G.N.Division Code	G.N.Division	Families	Population	Age Group	
					0 – 04	05 – 14
1	211	Mankerni Centre	190	695	79	182
2	211A	Kayankerni	338	1105	109	215
3	211B	Punnai East	643	1701	152	444
4	211C	Panichankerni	640	2150	240	511
5	211D	Vattavan	374	1227	159	253
6	211E	Mathurankerani	193	578	45	74
7	211F	Kirimichai	375	1454	276	229
8	211G	Mankerani South	238	763	121	126
9	212	Vakarai Central	159	470	32	106
10	212A	Vakarai North	679	2290	308	330
11	212B	Uriyankattu	607	2150	245	549
12	213	Kateravely	668	2519	225	461
13	213A	Palchenai	572	2515	348	601
14	213B	Kaddumurivu	179	670	60	196
15	213C	Puchakeny	480	1662	386	465
16	213D	Ammanthanavely	501	1667	160	401
Total			**6836**	**23616**	**2945**	**5143**

This was a 30 cluster survey and clusters were selected using population proportion to sampling technique. Thirteen children from each cluster were selected, starting from a randomly selected starting point. Data collection team moved to the next household which faced the front door of the selected household until the required numbers of children were met in the cluster.

2.3. Feild level implementation

Information related to household characteristics, demographics, socio-economic status, food consumption, maternal and child health was collected at the household level.

Three teams collected data in the field. Each team was responsible for completing 10 clusters.

Each team was provided with one vehicle to mobilize. The Team consisted of;

- 1 Team Supervisor / Team leader,
- 3 Enumerators,
- 1 Anthropometrist,

This team;

Obtained the consent for participation,

Administered the survey interviews,

Obtained anthropometric measurements.

2.3.1. Training of survey teams

Two days training workshop was organized to train the Team Supervisors / leaders and Enumerators. This training workshop focused on the conceptual clarity of the instruments, field data collection procedures, and management of other aspects of the project. The training agenda covered the following points: Purpose of the Project, Responsibilities of each party, Interviewing techniques, Definition and technical aspects of different methodologies and terminologies, Enumeration procedures and use of interview tools, Explanation of the questionnaires, question by question, Practice using simulated interviews, Field practices (mock interviews), Critique of field practice, On the field quality checks, Questionnaire review for completeness, Quality Control and Quality Assurance, On the field quality checks and How to handle final data.

2.3.2. Selection of subjects

As described above, the study population was drawn from residents in households of the Vakarei DS division. Exclusion criteria applied were: having a physical disability that would affect height or weight measurement, those who declined consent to any portion of the survey, in the case of pregnant women or those whose guardians/parents have declined consent in the case of children.

If eligible occupants of a house were not present upon first visit, one recall visit to the household was made.

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 child's mother or caretaker was requested to answer the questionnaires in the case of children. 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'.

The data collection tool consisted of three sections.

Section 1 Head of Household *:* irrespective of gender or the main caregiver: including questions relating to the household demographics, socioeconomic characteristic and food security.

Section 2 Individual: including questions related to health status, food consumption, knowledge and behaviours of the following target groups:

- pregnant women
- children 0-59 months old (administered to caregiver)

Section 3 Anthropometry: including collection of anthropometric measurements of the following target groups:

- pregnant women
- children 6-59 months old (administered to mothers / care givers)

2.3.4. Anthropometric measurements

Anthropometric measurments were made by a field investigator with special training and about 10 years of experience in obtaining measurements using standardized equipment. Weight was measured using UNICEF 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 was used.

Height/length and weight measurements of all children aged 0 to 59 months was obtained. Mid upper arm circumference (MUAC) was assessed among pregnant women. The 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 all children aged 0 to 59 months using 2006 WHO growth standards.

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 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

Data was entered in the EPI INFO software package and analyzed using the SPSS software. Distribution of categorical variables was computed and frequencies and percentages were reported. The mean and standard deviations of quantitative variables were calculated. For variables with multiple responses, percentage rankings of the most frequent responses were presented. In univariate analysis, the association of undernutrition with each dependent variable was assessed. Variables were categorized into socially meaningful categories, wherever required.

2.6. Ethical considerations

The project was discussed with the Provincial and District Director of Health Services and their approval was obtained.

Before the interview, all participants were informed that if they felt uncomfortable answering any questions that they could refuse to answer such questions and that they could stop the interview at any time. The sampling process was explained to the participants so that they did not feel that they have been 'singled out'.

All participants were assured that the welfare benefits that they received at the time will not be affected by their agreement/disagreement to participate in the survey

Written consent was obtained from all the participants of the study. The consent form explicitly outlined the aims and objectives of the study and emphasized the detail given to the maintenance of strict confidentiality of the participants.

Ethical committee approval was obtained from Medical Research Institute's ethical review committee.

Chapter 3

Results

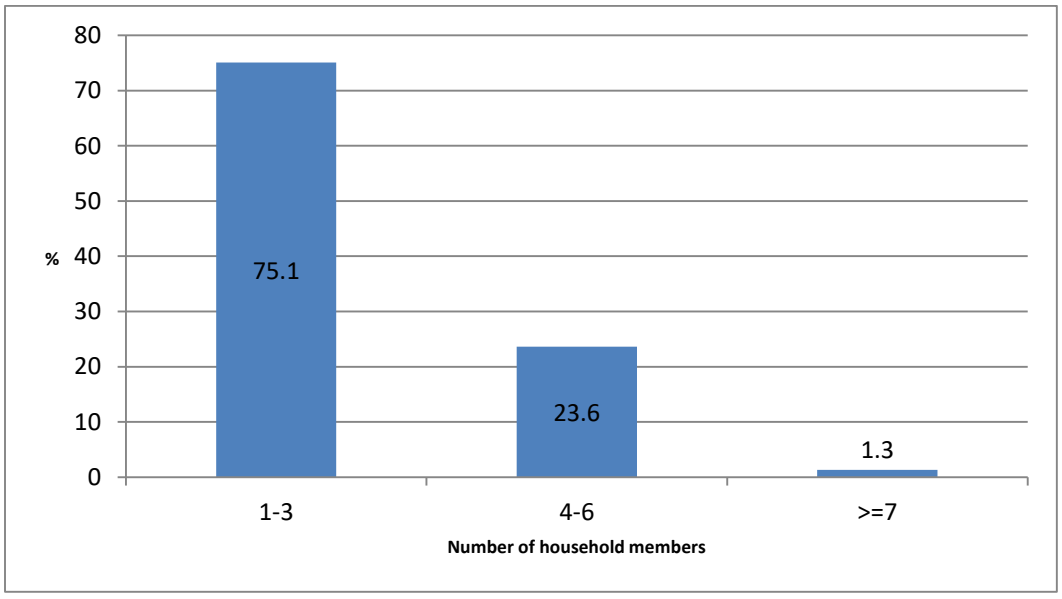
A total of 389 children under the age of five years were included in the study. However, information presented below pertains to only 377 children due to 11 flagged records during anthropometric analysis. In addition a total of 110 pregnant women were identified from the study area and were included in the survey.

3.1. Basic information

3.1.1. Number of members in the household

Among these households, 75.1% had 1-3 members and 23.6% had 4-6 members. Only 1.3% of households had more than 6 members (Figure 1).

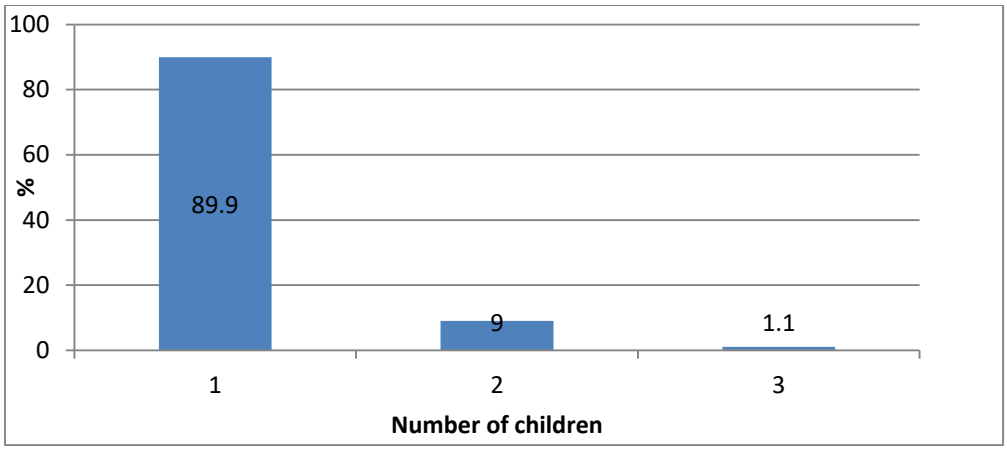
Figure 1: Distribution of households by number of members



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 89.9 % of households with 2 children in the same age group in 9.0%.

Figure 2: Distribution of households by number of children under five years



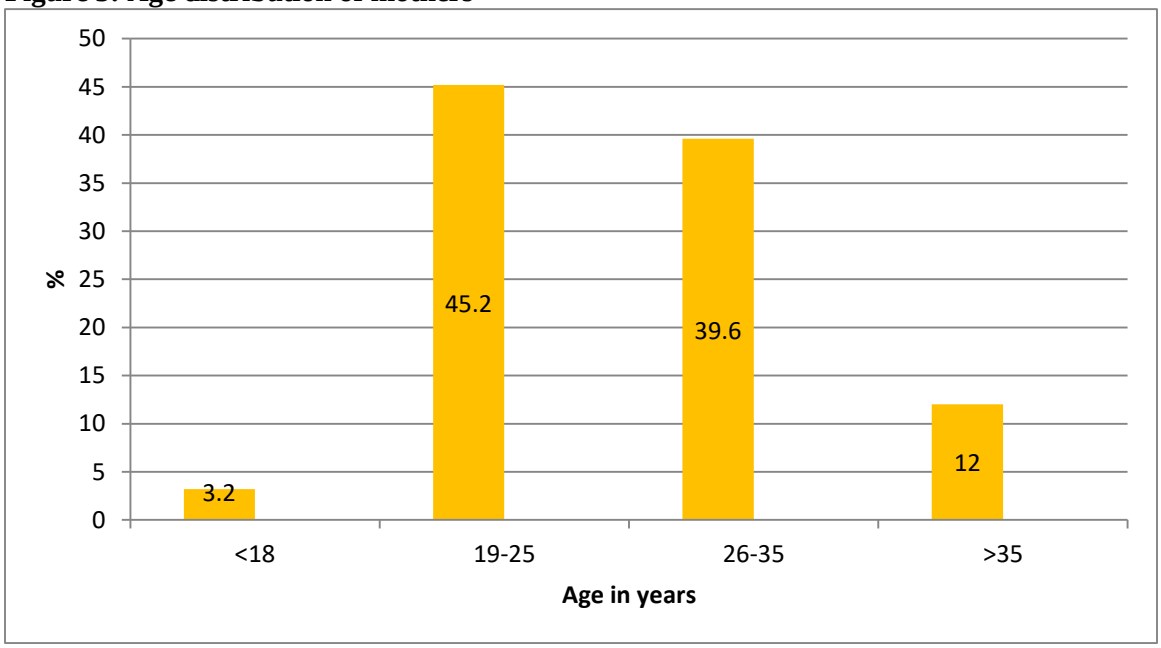
3.1.3. Information on the mother

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

3.1.3.1. Age distribution

Nearly half of them (44.8%) were in the age group 19-25 years with another 47.1% being in the 26-35 year age group. Those who were less than 18 years and over 35 years were 3.2% and 11.9% respectively (Figure 3).

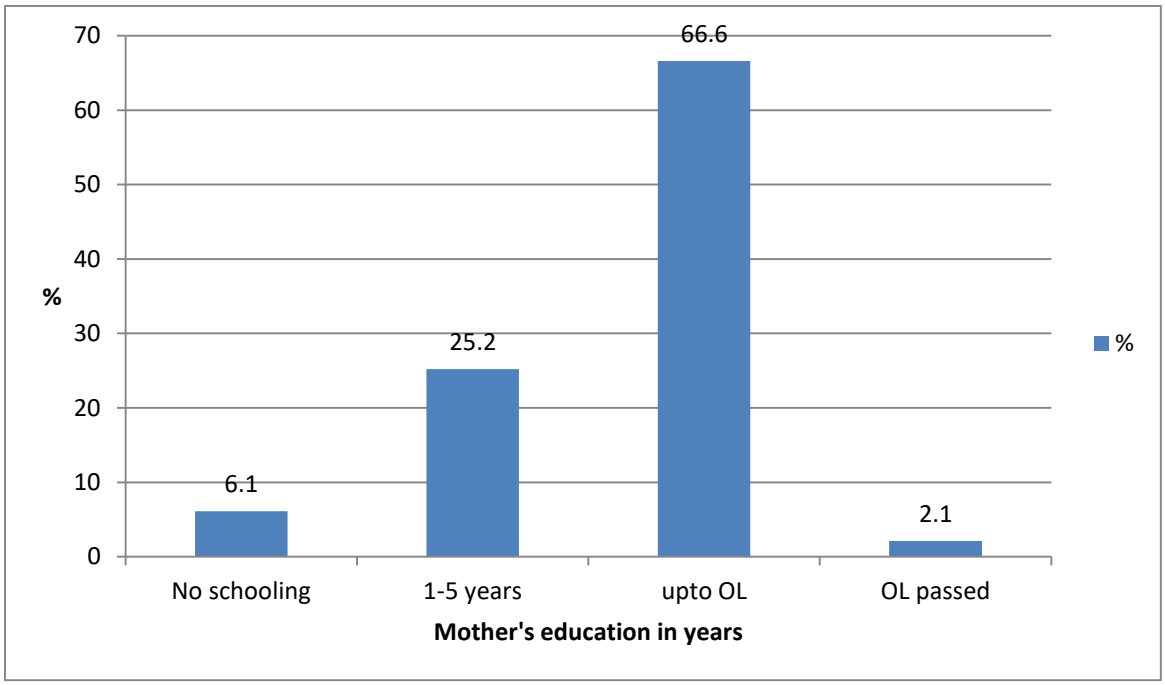
Figure 3: Age distribution of mothers



3.1.3.2. Educational level

Nearly two thirds (66.6%) of the mothers have had 6-10 years of schooling while another 25.2% have attended a school for 1-5 years. The percentage of mothers with no schooling was 6.1% (Figure 4).

Figure 4: Number of years of schooling of mothers



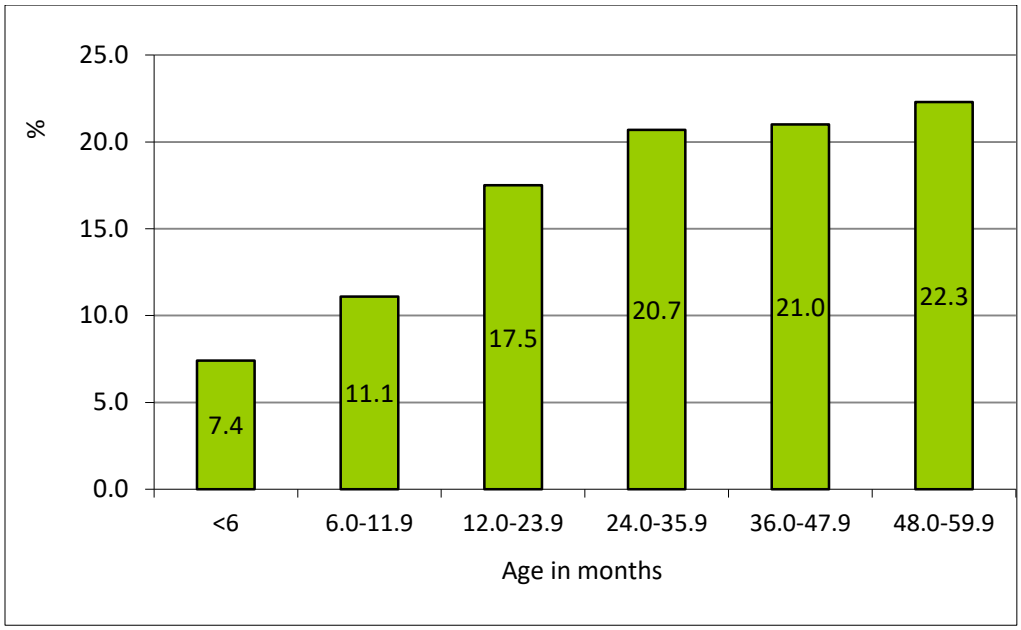
3.1.4. Information on the children

A total of 377 children were included in the survey.

3.1.4.1. Distribution by age

As shown in Figure 5, 20.7% , 21.0%, 22.3%, of the children were included in the age groups 24-35, 36-47, 48-60 months respectively. Only 11.1% of the children were between 6-11 months of age and the percentage of children below 6 months of age was also a relatively low, 7.4%.

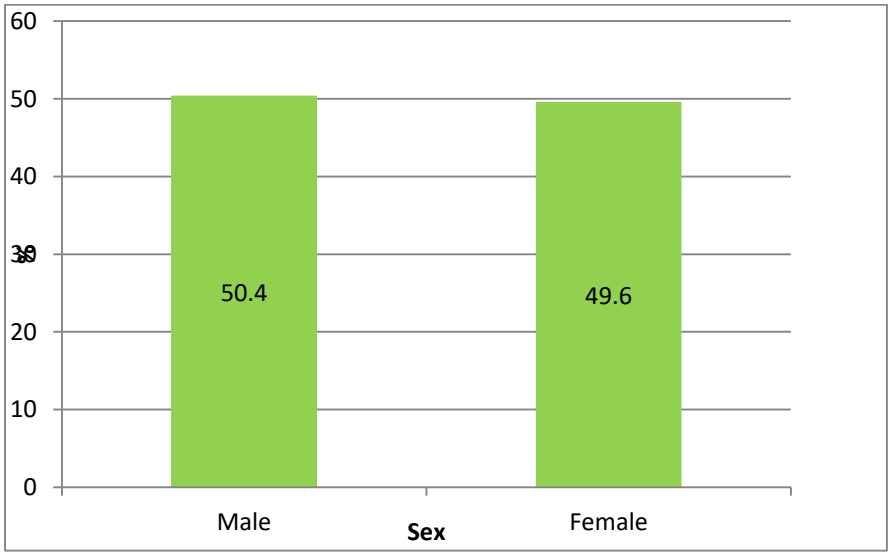
Figure 5: Distribution of children under 5 by age



3.1.4.2. Distribution by sex

There was a marginal preponderance of males among the children, 50.4% (Figure 6).

Figure 6: Distribution of children under 5 by sex



3.1.5. Housing structure

Basic information on the structure of the houses is presented in Table 2. Of all houses, 88.6% had their floors made of cement while another 5.3 % had floors made of Mud/cow dung. 2.1% and 0.5% had floors made of Tiles and wood respectively. Only about 3.4% of houses had other forms of flooring.

Table 2: Distribution of households by housing characteristics (n=377)

Characteristics	No	%
Flooring Material		
Mud cowdung	20	5.3
Wood	2	.5
Cement	334	88.6
Tile	8	2.1
Other	13	3.4
Roofing material		
Tiles	280	74.3
Asbestos	1	.3
Tarsheet	10	2.7
Cadjan	50	13.3
Other	36	9.6
Type of wall		
Cadjan	35	9.3
Hard boards	11	2.9
Brick/ Cabok	167	44.3
Cement block	139	36.9
Other	25	6.6
No of Bedrooms		
0	33	8.8
1	99	26.3
2	208	55.2
3	32	8.5
4	5	1.3
Separate Kitchen		
Yes	309	82.0
No	59	15.6
No response	9	2.4
Availability of Electricity		
Yes	91	24.1
No	286	75.9
Solar power		
Yes	34	9.0
No	343	91.0

Tiles were the commonest form of roofing used with 74.3% of the houses having tiled roofs. Another 13.3 % had roofs made of Cadjan and 2.7% had tar sheet roofs. Asbestos roofs were seen

among 0.3% of the houses while 9.6% of houses had other forms of roofing.

In 44.3% of houses, the walls were made of brick or cabok while 36.9 % and 9.3% had walls made of cement blocks and Cadjan respectively.

More than half the houses (55.2%) had 2 bedrooms. 26.3% had only one room and 9.8% had more than two rooms. Most houses (82%) had separate kitchens. Electricity was only available to 24.1% of households and interestingly 9% of the households used solar power.

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 16.2 percent were stunted (below -2SD scores for height for age), 24.7 percent wasted (below -2SD score for weight for height) and 33.4 percent were underweight (below -2SD score for weight for age) with the percentages of severe stunting (below -3SD scores for height for age), severe wasting (below -3SD score for weight for height) and severe underweight (below -3SD score for weight for age) being 2.9 percent, 4.2 percent and 5.8 percent respectively.

According to the WHO classification, very high level of wasting, low level of stunting and moderate level of underweight was found in the Vaharaei area.

Figure 7: Prevalence of wasting, stunting and underweight

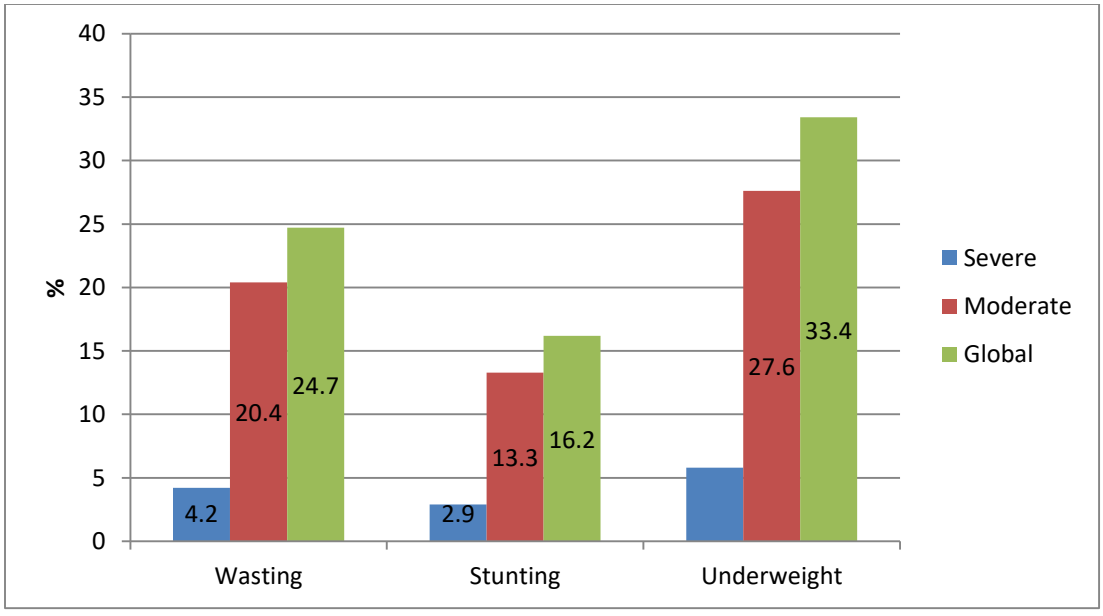


Table 3: Nutritional status of children in the sample with background characteristics

Background Characteristic	Weight-for-height (%)			Height-for- age (%)			Weight-for-age (%)			Total No of	
	<-3SD	<-2SD	≥-2SD	<-3SD	<-2SD	≥-2SD	<-3SD	<-2SD	≥-2SD	No	%
Age of child (months)											
<6	1 (3.6)	2 (7.1)	26 (92.9)	1 (3.6)	1 (3.6)	27 (96.4)	1 (3.6)	2 (7.1)	26 (92.9)	29	7.4
6-11	1 (2.4)	5 (11.9)	37 (88.1)	0 (0.0)	3 (7.1)	39 (92.9)	0 (0.0)	10 (23.8)	32 (76.2)	12	11.1
12-23	4 (6.1)	16 (24.2)	50 (75.8)	4 (6.1)	16 (24.2)	50 (75.8)	7 (10.6)	26 (39.4)	40 (60.6)	66	17.5
24-35	4 (5.1)	18 (23.1)	60 (70.9)	1 (1.3)	11 (14.1)	67 (85.9)	6 (7.7)	25 (32.1)	53 (67.9)	78	20.7
36-47	3 (3.8)	27 (34.2)	52 (65.8)	4 (5.1)	15 (19.0)	64 (81.0)	4 (5.1)	33 (41.8)	46 (58.2)	79	21
48-59	3 (3.6)	25 (29.8)	59 (70.2)	1 (1.2)	15 (17.9)	69 (82.1)	4 (4.8)	30 (35.7)	54 (64.3)	84	22.3
Sex of child											
Male	6 (3.2)	46 (24.2)	144 (75.8)	10 (5.3)	31 (16.3)	159 (83.7)	14 (7.4)	63 (33.2)	127 (66.8)	190	50.4
Female	10 (5.3)	47 (25.1)	140 (74.9)	1 (0.5)	30 (16.0)	157 (84.0)	8 (4.3)	63 (33.7)	124 (66.3)	187	49.6
Mother's education											
no schooling	3 (13.0)	11 (47.8)	12 (52.2)	2 (8.7)	7 (30.4)	16 (69.6)	3 (13.0)	11 (47.8)	12 (52.2)	23	6.1
Primary	4 (4.2)	19 (20.0)	76 (80.0)	6 (6.3)	20 (21.1)	75 (78.9)	8 (8.4)	33 (34.7)	62 (65.3)	95	25.2
Secondary	9 (3.6)	62 (24.7)	189 (75.3)	3 (1.2)	34 (13.5)	217 (86.5)	11 (4.4)	81 (32.3)	170 (67.7)	251	66.6
Passed O' Level	0 (0.0)	1 (12.5)	7 (87.5)	0 (0.0)	0 (0.00)	8 (100.)	0 (0.0)	1 (12.5)	7 (87.5)	8	2.1
Monthly household income											
< 9,000	12 (5.1)	56 (23.9)	178 (76.1)	7 (3.0)	42 (17.9)	192 (82.1)	16 (6.8)	81 (34.6)	153 (65.4)	234	62.7
9,000 - 13,999	2 (3.2)	19 (30.2)	44 (69.8)	1 (1.6)	9 (14.3)	54 (85.7)	4 (6.3)	21 (33.3)	42 (66.7)	63	16.9
14,000 - 19,999	2 (4.3)	12 (26.1)	34 (73.9)	2 (4.3)	9 (19.6)	37 (80.4)	1 (2.2)	16 (34.8)	30 (65.2)	46	12.3
20,000 - 31,999	0 (0.00)	4 (16.0)	21 (84.0)	0 (0.00	0 (0.00)	25 (100)	0 (0.00)	5 (20.0)	20 (80.0)	25	6.7
≥ 32,000	0 (0.00)	0 (0.000	5 (100.0	1 (20.0	0 (0.00)	4 (80.0)	1 (20.0)	1 (20.0)	4 (80.0)	5	1.3
Overall	**16 (4.2)**	**93 (24.7)**	**284 (75.3)**	**11 (2.9)**	**61 (16.2)**	**316 (83.8)**	**22 (5.8)**	**126 (33.4)**	**251 (66.6)**	**377**	**100.0**

Prevalence of wasting was lowest in the <6 months age group and showed an increasing prevalence up to the age of 36-47 months and then a decline in the older age groups. Data on stunting shows that the highest prevalence is in the 12-23 months age group. The prevalence of underweight is highest in the age group 36-47 months and lowest in the group <6 months.

Prevelence of wasting among females (25.1%) was slightly higher when compared to the prevalence of 24.2% among males. In contrast to wasting, the prevalence of stunting was 16.3% among males and 16.0% among females. The prevalence of underweight among males and females respectively were 33.2% and 33.7% showing minimal gender variation.

All three indicators, prevalence of stunting and underweight showed a marked decline with increasing level of education of the mother. But wasting failed to show a similar pattern consistently.

No such consistent pattern was seen in the prevalence of wasting, stunting and underweight in relation to income level, but the lowest prevalence was seen in the highest income group of Rs.9, 000 – 19,999.

Table 3.1. Nutritional status by GN Divisions

GN Divisions	**Wasting**			**Stunting**			**Underweight**		
	Severe	**Moderate**	**Global**	**Severe**	**Moderate**	**Global**	**Severe**	**Moderate**	**Global**
Mankerni South	15.4	30.8	46.2	7.7	0.0	7.7	7.7	23.1	30.8
Ammantanaweli	2.9	17.1	20.0	0.0	14.3	14.3	5.7	17.1	22.8
Kadimuriuvu	0.0	38.5	38.5	0.0	0.0	0.0	0.0	7.7	7.7
Katraveli	0.0	27.0	27.0	2.7	16.2	18.9	5.4	27.0	32.7
Kayenkerny	0.0	27.3	27.3	0.0	0.0	0.0	0.0	54.5	54.5
Kirimichai	2.6	21.1	23.7	5.3	7.9	13.2	2.6	18.4	21.0
Mankernicenter	15.4	23.1	38.5	7.7	30.8	38.5	7.7	69.2	76.9
Panichankerny	19.2	15.4	34.6	0.0	15.4	15.4	3.8	30.8	34.6
Palchenai	3.8	30.8	34.6	0.0	19.2	19.2	7.7	46.2	53.9
Puchakerny	2.0	13.7	15.7	3.9	7.8	11.7	3.9	25.5	29.4
Punnai East	0.0	15.4	15.4	0.0	30.8	30.8	0.0	46.2	46.2
Uriyankattu	2.9	17.6	20.5	8.8	11.8	20.6	8.8	32.4	41.2
Vakarai North	2.6	7.9	10.5	2.6	15.8	18.4	10.5	13.2	23.7
Vakarai central	6.2	25.0	31.2	0.0	31.2	31.2	18.8	25.0	43.8
Vattavan	0.0	30.8	0.8	0.0	0.0	0.0	0.0	23.1	23.1
Total	**4.2**	**20.4**	**24.6**	**2.9**	**13.3**	**16.2**	**5.8**	**27.6**	**33.4**

Table 3.1 shows the distribution of wasting, stunting and underweight in different GN areas. It should be interpreted cautiously due to low sample sizes.

3.2.2. Low birth weight (LBW)

Of all children included in the study, 28.8% had low birth weight; this percentage was highest in the cohorts aged 48 – 59.9 months. Overall, Low birth weight was higher among female children. (Table 4). Mean birth weight for the total sample was 2.81kg.

Table 4: 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	3(11.1)	24(88.9)	3.05	0.514
6-11.9	13(31.0)	29(69.0)	2.86	1.028
12-23.9	21(32.8)	43(67.2)	2.73	0.458
24-35.9	17(22.7)	58(74.4)	2.85	0.438
36-47.9	20(28.2)	51(71.8)	2.77	0.473
48-59.9	27(37.5)	45(62.5)	2.73	0.516
Sex of child				
Male	42(23.6)	136(76.4)	2.70	0.498
Female	59(34.1)	114(65.9)	2.91	0.622
Mother's education				
No school	9(47.4)	10(52.6)	2.69	0.577
Primary	29(34.9)	54(65.1)	2.73	0.515
Secondary	62(25.6)	180(74.4)	2.83	0.595
Passed O' Level	1(14.3)	6(85.7)	3.03	0.377
				0.573
Monthly household income				
< 9,000	59(27.6)	155(72.4)	2.83	0.629
9,000 - 13,999	24(39.3)	37(60.7)	2.68	0.465
14,000 - 19,999	11(25.6)	32(74.4)	2.84	0.525
20,000 - 31,999	4(16.7)	20(83.3)	2.73	0.374
≥ 32,000	1(20.0)	4(80.0)	2.82	0.414
Overall (n=351)	**101(28.8)**	**250(71.2)**	**2.81**	**0.574**

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

3.3 Determinants of Nutritional Status

3.3.1. Prevalance of diarrhoea

As shown in table 5, 16.4% of all children reported having had diarrhoea. This is higher than the national prevalence which was 6.1%. Of the mothers only 14.6% stated that more fluid was given

to children with diarrhea. When the knowledge of mothers was assessed, it shows that alarmingly, 47.7% of mothers admitted to have provided less fluid than normal during the episode of diarrhea. 36.1% of mothers provided government recommended homemade fluid to the child and 46.2% of mothers provided ORS. A substantial percentage of mothers, 82% said that water was given to the child during the episode of diarrhea.

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

Background Characteristic	%	No. of children
Symptoms of Diarrhoea		
Yes	62	16.4
No	311	82.5
No response	4	1.1
Amount of fluid given during diarrhoea		
Less	180	47.7
Same amount	141	37.4
More	55	14.6
No response	1	.3
Water		
yes	308	82
no	68	18.0
Government recommended home made		
yes	136	36.1
no	240	63.7
ORS		
yes	174	46.2
no	202	53.6
During diarrhoea food as usual		
Less	201	53.3
Same	140	37.1
More	30	8.0
Restricted some food items	4	1.1

Regarding feeding of children, nearly 53.3% said that the children were given less food than usual during the diarrhea episode. 37.1% of mothers had provided the same amount of food during the episode and 8% of mothers claimed to have provided more food.

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

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

Background Characteristic	No. (%)	No. of children
Has been ill with a cough		
Yes	238	63.1
No	139	36.9
Difficulty in breathing		
Yes	202	53.6
No	175	46.4
Seek treatment outside the home		
Yes	251	66.6
No	126	33.4
Place of taken treatment		
Government health facility	225	59.7
Private physician	82	21.8
Pharmacy or medicine sellar	24	6.4
Other	45	11.9
Any other illness during last 2 weeks		
Yes	110	29.2
No	266	70.6
During illness food as usual		
Less	210	58.2
Same	134	37.1
More	14	3.9
No response	3	0.8
Seek care for illness		
Govt hospital	274	72.7
Govt health centre	27	7.2
Village health worker	3	.8
Private hospital / clinic	16	4.2
Private physician	21	5.6
Private pharmacy	17	4.5
Mobile clinic	1	.3
Traditional practitioner	1	.3
No response	17	4.5

Of all children, 63.1% had reported having 'cough and fever' (ARI) within the previous 2 weeks and difficulty in breathing was reported in 53.6% (Table 6).

Of the above group 66.6% had taken treatment, a majority of them from a government health facility (59.7%). Of the total group 29.2% had other illnesses. 55.7% of the mothers said less food than usual was given. While 35.5% of all mothers provided the same amount of food only a 3.7% of mothers had provided more food than usual. More than two third (72.7%) of mothers mentioned that they seek care for illness of the children from Government hospitals.

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	%
When did you put child to the breast		
Within a hour	340	90.2
After one hour	29	7.7
Not given	8	2.1
In first 3 days after delivery something else was given before		
Yes	41	10.9
No	336	89.1
Types of food given during first 3 days		
Plain water	16	4.2
Sugar	10	2.7
Salt water	1	.3
Herbal tea	12	3.2
Milk	7	1.9
Infant formula	2	.5
Other	1	.3
Types of food given during first 6 months		
Breast milk	333	88.3
Plain water	299	79.3
Infant formula	116	30.8
Any fortified commercially available infant and young child food	76	20.2
Any porridge or gruel	96	25.5
Solid or semisolid foods	130	34.5
Vitamin or mineral supplements, medicine, ORS	123	32.6

As shown in Table 7, 90.2% of the babies were breastfed within one hour of birth. A similar percentage (89.1%) was not given any other fluids before breast feeding within 3 days of delivery. Only 2.1% of the babies were not given breast milk. Among those who were given other fluids were 8.3% and the fluid given greatly varied.

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, 92.9% were being breast fed including a 2.4% in the age group 48 – 59.9 months. In the intermediate age groups, the percentage given breast milk declined with increasing age (Table 8).

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
	Yes (%)	No (%)	Mean (SD)	Mean (SD)	Mean (SD)
0-5.9	26 (92.9)	1 (3.6)	8.61 (5.984)	6.79 (5.391)	1.14 (1.799)
6.0-11.9	40 (95.2)	1 (2.4)	8.76 (4.918)	6.05 (3.748)	2.24 (1.358)
12.0-23.9	61 (92.4)	5 (7.6)	7.02 (4.633)	4.30 (2.212)	3.18 (1.831)
24.0-35.9	38 (48.7)	40 (51.3)	2.87 (3.623)	2.03 (2.285)	3.08 (1.384)
36.0-47.9	12 (15.2)	67 (84.8)	.89 (1.783)	.75 (1.382)	3.10 (1.194)
48.0-59.9	2 (2.4)	82 (97.6)	.67 (1.338)	.62 (1.171)	3.19 (1.349)
Total	**179 (47.5)**	**196 (52.0)**	**3.76 (4.79)**	**2.64 (3.317)**	**2.89 (1.559)**

Feeding practices during the first 6 months showed that 88.3% were given breast milk, 79.3, plain water and 30.8%, infant formula. Among this group 34.5% were given solid/semi solid /soft food and 32.6% have been given vitamin preparations. It must be noted that 20.2% were given commercially available foods. Exclusive breastfeeding rate for 6 months of age was 40.9%. It can be inferred that exclusive breastfeeding during the 1st 6 months of life has not been thoroughly followed through. Frequency of breast feeding also declined with increasing age ranging from a mean number of times of 8.61 feeds per day in the under 6 months age group to 0.67 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 2.24 among the 6 – 11.9 month age group to 3.19 among the 48.0-59.9 month age group. It is worth noting that the 0-5.9 month age group also showed a mean number of times of 1.14.

3.3.3.3. Food items given during the preceding 24 hours

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 – 23 months, water was the commonest item given (97.6%). Among this group, children were given rice and preparations (77.4%), fish and related foods (50.9%), sugary foods (61.9%), foods with condiments (41.7%) and vegetables or fruits (56.1%) (Table 9).

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

	% within age groups in months		
Characteristic	**< 6**	**6-23**	**24.0 - 59.0**
Water	12.5	97.6	99.2
Infant formula	28.6	37.3	17.3
Medicinal water	28.6	16.9	12.0
Sugar/Glucose water	0.0	41.0	60.9
Jeevanee	0.0	2.4	3.8
Cereals (Nestum,Cerilac,Samposa, Thriposa)	0.0	22.9	19.4
Rice cunjee	0.0	30.1	13.5
Rice,Bread, rotti, pittu, dosai or other foods made from grains	0.0	77.4	89.5
Pumpkin, Carrots or sweet potatoes, yellow vegetables	0.0	55.4	40.6
White potatoes, white yams, manioc, cassava, or any roots	0.0	34.9	28.6
Any dark green leafy vegetables such as kankun, etc	0.0	40.5	45.9
Ripe mangoes or ripe papayas	0.0	25.3	25.6
Any other fruits or vegetables	0.0	56.1	66.4
Liver, kidney, heart or other organ meats	0.0	4.8	3.0
Chicken	0.0	7.2	12.0
Any meat such as beefs, pork, lamb, goat or duck	0.0	2.4	4.5
Eggs	0.0	26.5	29.9
Fresh or dried fish, shellfish, canned fish or seafood	0.0	65.1	71.6
Any foods made from cowpea, green gram, black gram or lentils	0.0	41.7	45.9

Coconut, peanuts or other nuts	0.0	37.3	68.4
Milk	0.0	45.8	76.9
Cheese, curd, yogurt or other milk products	0.0	35.7	34.3
Any oil fats, butter or foods made with any of these	0.0	36.1	59.0
Any sugary foods such as chocolates, sweets, candies, cakes or biscuits	0.0	61.9	83.6
Condiments for flavour, such as chillies, spices, herbs or fish powder	0.0	57.1	85.8
Micronutrient powder	0.0	9.8	6.1

Among those in the older age group, 24- 59.9 months, 99.2% had been given water, rice and preparations (89.5%), sugary foods (83.6%) and foods containing condiments (85.8%). This group were given fruits/vegetables (66.4%), fish and related products (71.6%), coconuts and other nuts (68.4%) and milk (34.3%).

Of the total sample of children, 50.7 % of the children consumed some form of animal foods during the previous week.

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	23.5	0.0	100.0	22.2	18
9-11	28.6	0.0	100.0	26.1	23
12-14	40.0	0.0	100.0	40.0	20
15-17	50.0	0.0	100.0	47.1	17
18-20	15.4	0.0	100.0	15.4	13
21-23	18.8	33.3	100.0	21.1	19
Sex of child					
Male	29.2	20.0	100.0	28.3	53
Female	30.9	0.0	100.0	29.8	57
Overall	**30.1**	**14.3**	**100.0**	**32.4**	**110**

As shown in Table 10, only three fourth (32.4%) of children aged 6-23 months has received a minimum acceptable diet. This rate was low in boys (28.3%) compared to girls (29.8%). The

total sample had minimum dietary diversity (100%). Among the breastfed children the percentage having minimum meal frequency was higher (30.1%) than the non breastfed children (14.3%).

3.3.4. Use of health services

As shown in Table 11, 96% of the children had a CHDR, 95.8% had received age appropriate immunization, 69.8% had received Vitamin A mega dose. Only 35.5% of all children had received worm treatment in the preceding 6 months. 55.4% of all children were currently taking Iron.

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	95.2	95.5	97.4	93.7	96.4	96.0
Vitamin A megadose	57.1	66.7	69.7	70.5	78.5	66.7	69.8
De-worming tablets past 6 months	3.6	16.7	34.8	38.5	39.2	47.6	35.5
Currently taking Iron supplements	32.1	54.8	56.1	62.8	50.6	60.7	55.4
Age appropriate immunisation	96.4	95.2	95.5	97.4	93.7	96.4	95.8
Number of days taken for growth monitoring during last 6 months							
Mean (SD)	3.11 (1.449)	4.95 (1.413)	4.73 (1.622)	3.95 (1.823)	3.22 (1.939)	3.21 (2.060)	3.82 (1.926)
% children 0-59 months who attended at least 2 sessions of growth monitoring in past 6 months							88%

For the total sample of children the number of visits for growth monitoring of children showed a total mean number of 3.82 visits. The highest number of visits (4.95) was seen among the 6-11.9 age group.

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 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, 92% 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	**91.8**	**346**
Relationship with PHM		
Very good	58.4	220
Average	39.5	149
Very little	8	2.1
Received health and nutrition awareness during last 3 months	**57.6**	**217**
Services provider of above awareness*		
Doctor	22.8	86
Nurse	34.2	129
Midwife	27.9	105
PHI	22.0	83
TV	4.0	15
Radio	2.4	9
Newspaper / magazine	1.1	4
Education programme	0.8	3
Volunteer	0.5	2
No one	0.3	1

(*multiple responses)

57.6% of the mothers had received information pertaining to health and nutrition. Among this group, most of them had received such information from the nurse, the other main source being

the Midwife. Relationship with PHM was reported as very good by 58.4% of mothers with another 39.5% 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 (70.6%) of the households, the main source of drinking water was from an unprotected well and another 10.3% obtained water form a protected well while 6.4% obtained water from a tube well or borehole. Around 67.5% of households had the water source 5 minutes away. While 16.5% and 14.9% of households had water sources 5-10 minutes away and 10-30 minutes away respectively.

49.1% of households boiled water before drinking while 26.8% and another 26.8% of households used bleach/chlorine or used a filter to clean water respectively.

In 60.5% of households, there were sanitary toilets and another 18.8% with flushing facilities linked to a septic tank. Both these types of toilets use a flushing mechanism. Of the total group, 19.9% shared their toilets and nearly all (78.1%) of toilets were used by 1 – 5 households. 18.6% of households did not have toilets.

On inquiring into hygienic practices among mothers, it was shown that 80.4% washed their hands with soap after using the toilet and 85.1% 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 71.9%, 72.4% and 63.1% respectively.

Table 13: Percent of households by main source of drinking water and toilet

Characteristics	**No**	**%**
Type of water		
Piped into dwelling	7	1.9
T**ank and canal water**	9	2.4
If tap inside house put	7	1.9
piped to compound	13	3.4
public tap	8	2.1
tube well or borehole	24	6.4
protected well	39	10.3
unprotected well	266	70.6
no response	3	0.8
Time to bring water		
less than 5 min	253	67.5
5-10 min	62	16.5
10-30 min	56	14.9
more than 30 min	4	1.1

How do you clean water		
boiling	185	49.1
bleach / chlorine	101	26.8
strain through a cloth	75	19.9
use a water filter	101	26.8
solar disinfection	8	2.1
stand and settle	35	9.3
other	1	0.3
do not know	2	0.5
T**oilet facility**		
Flush to septic tank	71	18.8
Flush to pit latrine	228	60.5
Pit latrine	1	0.3
other	7	1.9
No facility	70	18.6
T**oilet facilit shared with other households**		
Yes	75	20.1
No	299	79.9
No of **household use t**he **toilet**		
1-5	57	78.1
6.-10	12	16.4
>10	4	5.5
W**ash hand after using toilet**		
Always with soap	303	80.4
Sometimes with soap	39	10.3
Not using soap	33	8.8
do not wash	1	0.3
no answer	1	0.3
W**ash your hand before eating**		
Always with soap	271	71.9
Sometimes with soap	62	16.4
Without soap	42	11.1
do not wash	2	0.5
W**ash your hand before feeding the child**		
Always with soap	273	72.4
Sometimes with soap	58	15.4
Without soap	45	11.9
do not wash	1	0.3

Wash hands after cleaning child's stool		
Always with soap	321	85.1
Sometimes with soap	27	7.2
Without soap	28	7.4
do not wash	1	0.3
Wash your hand before cooking		
Always with soap	238	63.1
Sometimes with soap	73	19.4
Without soap	65	17.2
Do not wash	1	0.3

Only 54.1% 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, 22% received assisstance from a programme by World Vision. The services received varied widely as shown in Table 14. Majority (57%) received awareness programme on well/water faccilities and another 57% on home gardening. Also another 43% had recieved awareness education on health and nutrition.

Table 14. Participation in World Vision assisted programmes

Characteristics	**%**	**No. of children**
Obtained assisstance from World Vision	22	83
Type of services received*		
Awareness education on he alth and nutrition	43	11.4
toilet facilities	35	9.3
well / water facilities	57	15.1
Health and Medical support	38	10.1
Small scale enterpriise development programmes	16	4.2
Animal husbandary	23	6.1
Home gardening	57	15.1
Support to education	33	8.8
support to agriculture	12	3.2

(*Multiple responses received)

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	21(22.6)	72(77.4)	93(100.00)
Stunting	16(26.2)	45(73.8)	61(100.00)
Underweight	31(24.6)	95(75.4)	126(100.00)

Table 15 shows that 22.6%, 26.2% and 24.6%, of children who were wasted, stunted and underweight in the sample respectively had participated in a world vision assisted programme.

3.4. Nutritional status of pregnant women in the study area

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

Table 16 : Basic information on pregnant mothers (n=110)

Characteristics	No.	%
Period of amenorrhoea in weeks		
<12	**14**	**13.1**
12-24	**48**	**44.9**
25-36	**35**	**32.7**
>36	**10**	**9.3**
Parity		
1	41	37.3
2	42	38.2
≥ 3	27	24.5
No. of living children		
0	42	38.2
1	47	42.7
2	14	12.7
>=3	7	6.4
Number who received tetanus toxoid		
1 dose	65	59.1
2 doses	16	14.5
3 doses	0	0.00
Not given	28	25.5
No response	1	0.9
Taken deworming tablets		
Yes	65	59.1
No	41	37.3
No response	4	3.8

	Mean	SD
Average antenatal visits	4.68	3.73

A total of 110 pregnant women were identified in the households included in the study. Of this group, 37.3% were primi Para and 24.5% 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, 74% had received tetanus toxoid injections, with 59.1 % among this group having received one dose of toxoid at the time of the study. The percentage who had received de worming tables was 59.1% and the average number of antenatal visits was 4 per mother.

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 7 mothers with a height less than 145 cms. Of the group, 56.4% of mothers were identified as being undernourished (with MUAC <23).

Table 17: Nutritional status of pregnant women

	No.	%
Height of the mother in cms		
< 145	7	6.4
≥ 145	103	93.6
Mid upper arm circumference in cms		
≤ 23 (Undernourished)	62	56.4
>23	48	43.6

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

3.5.1. Antenatal care and eating habits during pregnancy.

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, 83.3% among those who responded, had received antenatal care from a doctor, 63.1% from a nurse and 65.5% from a midwife, indicating that they had received antenatal care from more than one source (Table 18)

When in**q**uired about their eating habits,7.6% of them said that they consumed food on more occasions during the day compared to the non pregnant period with a 67.1% saying that they consumed less.

Table 18: Antenatal care, eating habits during pregnancy

	No.	%
Type of person provided antenatal care*		
Doctor	314	83.3
Nurse/Sister	238	63.1
Midwife	247	65.5
Other	7	1.9

Eating habits during pregnancy compared to non pregnant period		
Less often	253	67.1
Same amount	92	24.4
One more time per day	23	6.1
Two more times per day	1	0.3
Three more times per day	5	1.3
	Mean	**SD**
Mean number of weeks for iron supplements were taken during pregnancy	17.68	14.132

(*multiple responses)

The mean number of times, a given food item was consumed in the household during the previous 24 hours is given in Table 18. Rice or other cereals, have been consumed almost on all 3 meals. Meat, pulse and fish consumption was less frequent.

Food item	Mean No. of times	SD
Cereals	2.97	1.384
Pulses	0.73	0.877
Fish	1.5	1.386
Meat	0.22	0.626
Eggs	0.62	0.846
Milk	1.42	1.316
Vegetables	1.84	1.317
Fruits	1.48	1.131
Coconut oil	1.55	1.238
Coconut	2.98	1.157
Sugar /Jaggary	2.32	1.496
Special food	0.1	0.357

3.5. 2. Natal and postnatal care

For 83.6% of the mothers, a doctor had been in attendance during delivery with 80.1% having had the help of a nurse and 31.0% having had the assistance from a midwife. It is likely that more than one category of health staff had been on assistance during delievery (Table 19).

92.8% of mothers delivered at a health facility. Considering care practices 91.7% of neonates were placed with skin to skin contact and in 80.1% of them the cord was cleaned and dried. Among all mothers, 50.7% had received Vitamin A mega dose within 4 weeks. On average, a mother had received 2.06 postnatal visits. Average number of days of taking iron supplements by mothers during the lactation period was 17.68 days.

Table 20: Assistance during delivery and postnatal period

Characteristics	No.	%
Type of person who assisted the delivery*		
Doctor	315	83.6
Nurse/Sister	302	80.1
Midwife	117	31
Other	352	93.4
Place of delivery		
Deliver in Health facility	346	92.8
Care during delivery		
Skin to skin contact	343	91.7
Cleaned and dry cord	301	80.1
Postnatal care		
Received Vitamin A megadose within 4 weeks	190	50.7
	Mean	**SD**
Average postnatal visits received	2.06	2.374
Average days of taking iron supplements during lactation	10.31	19.904

(*multiple responses)

3.5.3. Family planning

Of all mothers, 78.1% were using a method of family planning at the time of the survey. Among the users, injections (DMPA) was the commonest method used by 65.3% with another 23.7% using oral contraceptives. Of the group, 6.7% had opted for permanent methods (Table 20).

Table 21: Current use of family planning method.

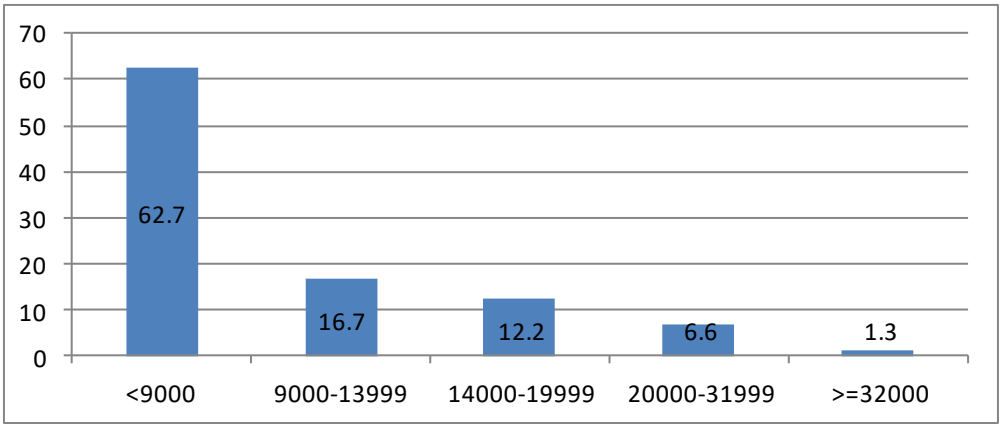
Method of Family Planning	%	No.
Oral contraceptives	**23.7**	**71**
Injections(DMPA)	**65.3**	**196**
Norplant	**0.3**	**1**
Loop	**3.3**	**10**
Condom	**0.3**	**1**
Permanent methods	**6.7**	**20**
Other	**0.3**	**1**

3.6. Food Security and Related Factors

3.6.1. Median income

Median household income per month was Rs. 6,000 and ranged between Rs. 300 to 65,000 (Figure 8). Majority (62.7%) were in income group of <9,000 and only 1.3% were having more than Rs 32,000 per month.

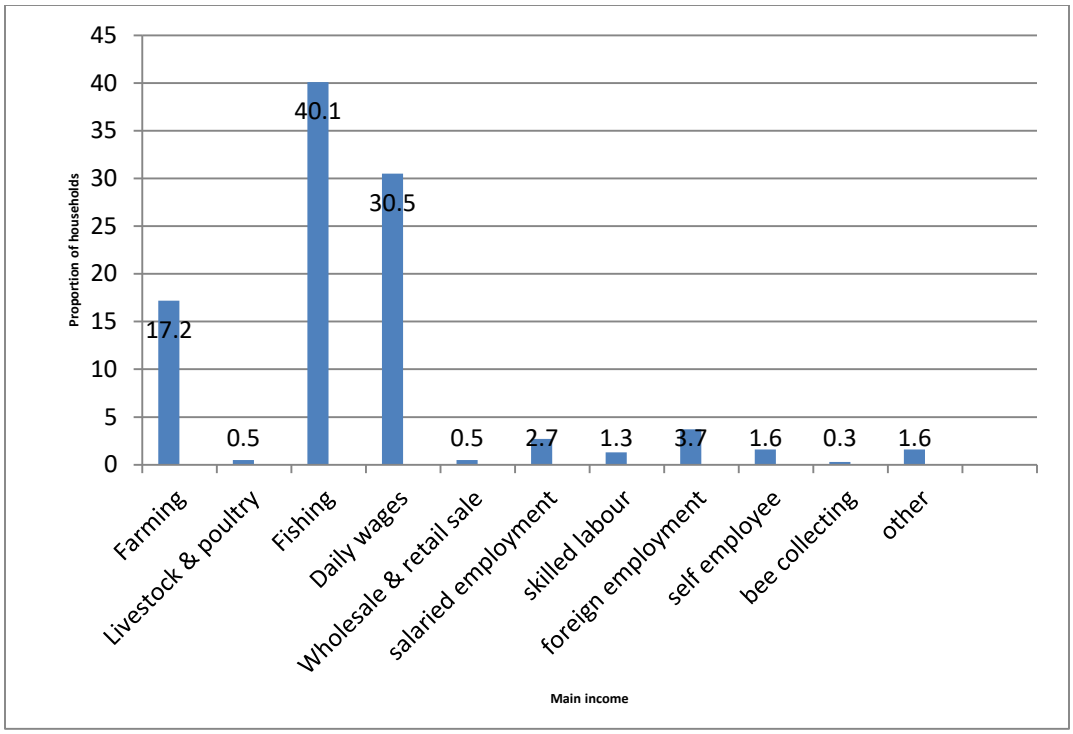
Figure 8: Distribution of the total income of the households



3.6.2. Primary income sources

Fishing was the most common income generation activity, this being the main source of income among 40.1% of the population. 30.5% of the population worked on daily wages with farming following, with 17.2 % of the households giving this as the main source of income (Figure 9).

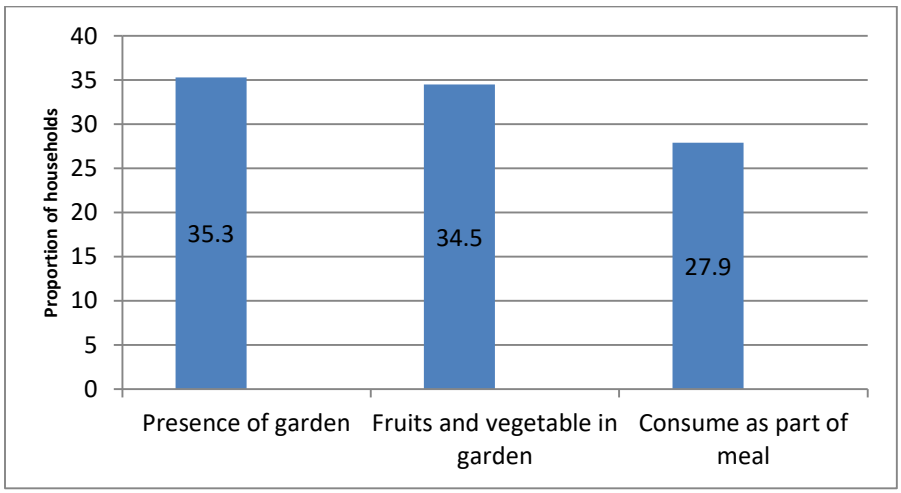
Figure 9: Main income sources



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 three households (35.3%) had garden space with 34.5% having cultivated vegetables and fruits in their gardens. Among the households, 27.9% consumed the products from the gardens as a part of the meal.

Figure 10: Households involved in home gardening



3.6.4. Livestock

45.9% of the households had livestock (Table 21). 58% of such households used the products as a part of their daily meals, 54% and 27% of households used the products 2-5 times a week and once a week respectively. 22% of all households did not use the products at all.

Type of livestock and the numbers varied with poultry being the commonest and pigs and fish/prawns, being the least common.

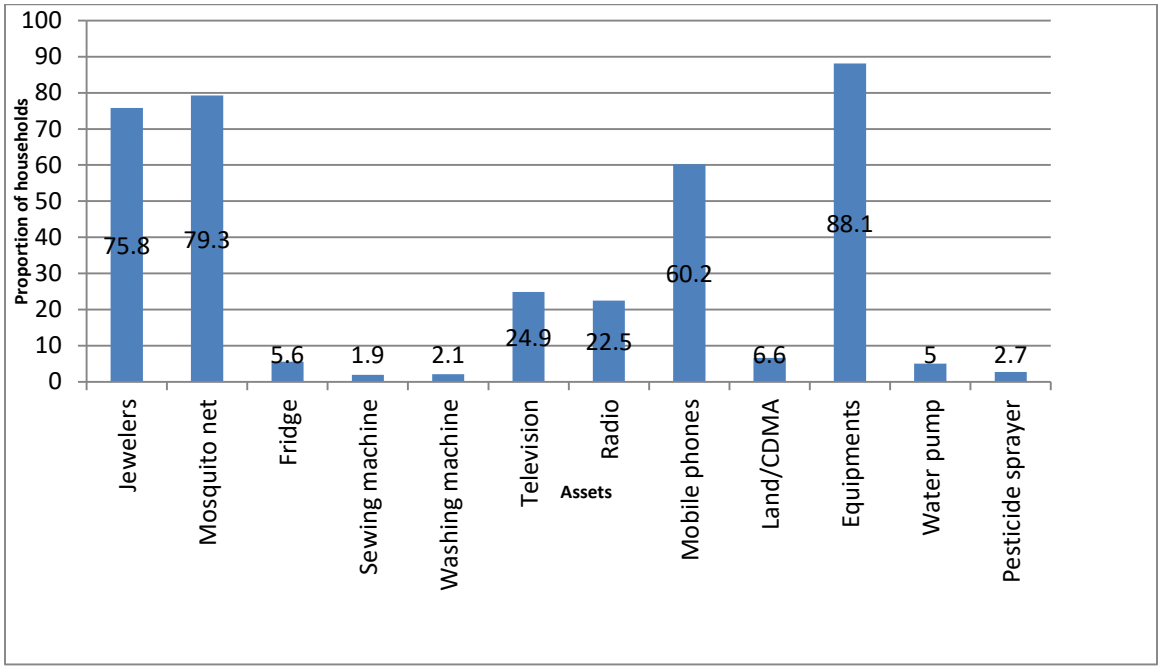
Table 22: Ownership to livestock

Characteristics	%	No. of households
Presence of livestock	**45.9**	**173**
Used for daily meal		
daily	58	15.4
2-5 times a week	54	14.3
weekly	27	7.2
1-2 times a week	11	2.9
none	22	5.9
	Mean (SD)	
Type of livestock available		
Cows	1.42 (2.95)	59
Poultry	5.77 (7.19)	125
Goats	0.99 (4.34)	26
Pigs	0.01 (0.153)	1
Fish /prawns	0.01 (0.153)	1

3.6.5. ASSETS

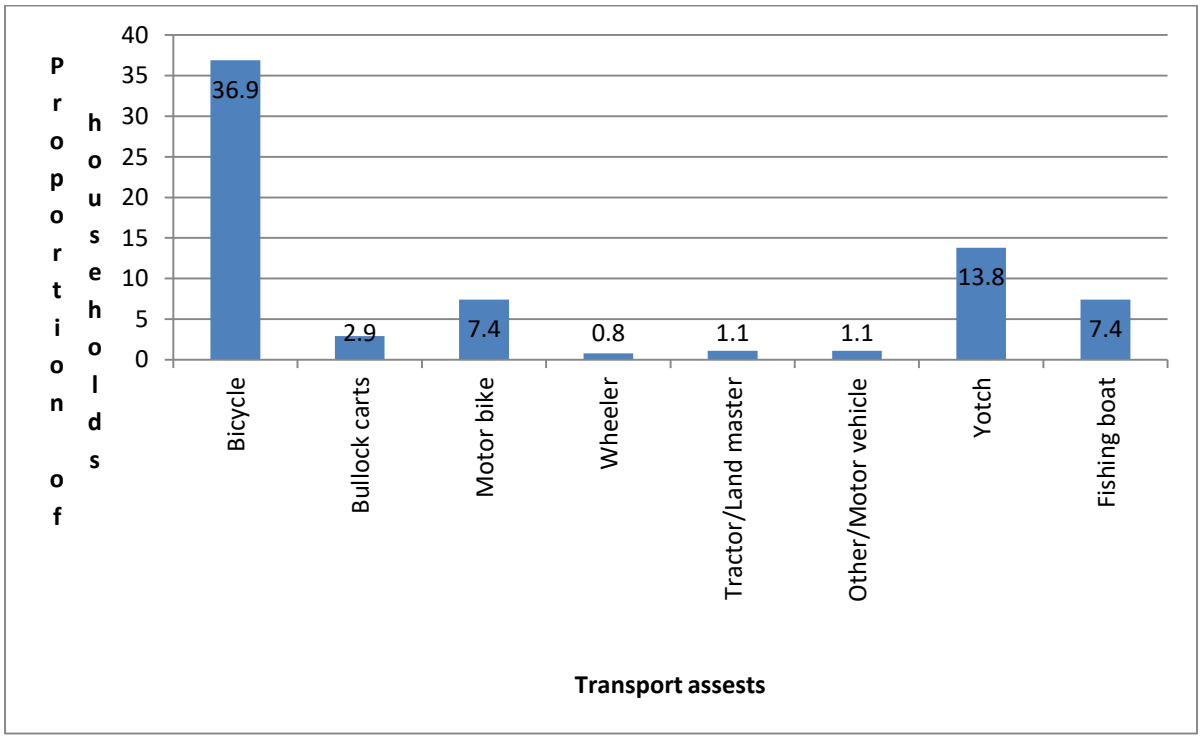
Availability of a number of household items was inquired into. Over 79.3% of the households had mosquito nets 88.1% had equipments**,** and 75.8% had jewellery. Between 60.2% of households had mobile phones and 6.6% of households had either Land or CDMA phones**.** Television and radio were available in 24.9% and 22.5% of households. However, sewing machine washing machines, water pumps, and fridges were available only in a much smaller number of households.

Figure 11: Ownership of Assets



Bicycles were the commonest mode of transport available in 36.9% of households with 7.4% of them having motor bicycles. Other forms of transport facilities were available only to a limited number of households. 7.4% had 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, 37.1% was spent on food with 62.9% being spent on non food items. On an average, the total amount of expenditure on food during the previous week was Rs. 1,980.00, the maximum expenditure being on rice/ wheat flour / bread (25.3%), fish / dried fish / tinned fish / meat (13.1%) and on vegetables including leaves (12.6%). The median expenditure varied widely between the households (Table ***22***).

Table 23*:* 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**	260.00-700.00	25.25
Pulses / Dhal / Gram	**100.00**	40.00-195.00	5.05
Fish/dried fish/tined fish/meat/	260.00	95.00-500.00	13.13
Milk, milk powder, Curd, Yoghurt and	120.00	0.00-250.00	6.07
Vegetables including leaves	250.00	120.00-400.00	12.6
Fruits	100.00	0.00-200.00	5.05
Fat and oil	50.00	0.00-120.00	2.5
Coconut and coconut products(except oil)	150.00	75.00-250.00	7.5
Sugar / Jaggary	200.00	110.00-250.00	10.1
Prepared food (food and drinks from restaurants and stalls)	100.00	0.00-200.00	5.05
Special nutritional food	00.00	0.00-100.00	0.00
All other food items	150.00	0.00-300.00	7.5
Total food items	**1980.00**		37.1
Non food Items			
Payments on debts	0.00	0.00-0.00	0.0
House rent	0.00	0.00-0.00	0.0
Education	250.00	0.00-0.00	7.4
Consumable households items	500.00	400.00-1000.00	14.9
Cooking fuel /firewood /Gas	0.00	0.00-0.00	0.0
Transportation and communications	400.00	200.00-600.00	*11.9*
Livelihood inputs (tools seeds)	300.00	0.00-500.00	8.9
Alcohol/Beer/Toddi / Tobacco/Beetle nuts	0.00	0.00-0.00	0.0
Gift to others	100.00	0.00-500.00	2.9
Water	0.00	0.00-0.00	0.0
Electricity	0.00	0.00-0.00	0.0
Medicine and health	300.00	0.00-500.00	8.9
All other non-food items	1500.00	175.00-5000.00	*44.7*
Total non food items	**3350.00**		**62.9**

The non food expenditure given in this table is likely to have been spent within the previous month not necessarily during the previous week. This was mainly on all other non food items. These expenses also showed a wide range as shown by the 25th and 75th percentile values.

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, and sugar have been consumed almost on all days. Meat consumption was less frequent and so was the pulse consumption.

Table 24*:* Household food consumption pattern during last week

	Mean no. of days	**SD**
Food items		
Rice and other cereals (wheat millet etc)	6.93	0.573
Tubers (potato sweet potato, cassava etc)	2.23	1.674
Bread / Chapti / Roti	2.16	2.167
Pulses / Dhal	1.97	1.659
Fish	4.82	1.912
Meat (beef, pork, chicken)	0.59	0.988
Eggs	2.36	2.138
Dairy (curd liquid milk;, powder milk etc	2.72	3.158
Coconut	6.82	0.880
Coconut oil	4.34	2.449
Vegetables including leaves	3.82	2.125
Fruits	2.76	2.258
Sugar / Jaggary	5.78	2.437
Alcohol / Beer / Toddi	0.41	1.346

3.6.8. Food sources

As shown in Table 24, for almost all types of foods, the commonest source was by purchasing with 44.6%, 43.5% and 25.7% of households having rice, fish and coconut respectively through their own efforts.

Table 25 : Food Sources

Food groups	Main food sources (%)							
	Own production	Purchased	Exchange of goods or services	Borrowed	Received as gifts	Food aids	Other	no response
Rice and other cereals (wheat millet etc)	44.6	54.6	0.0	0.0	0.3	0.0	0.0	0.5
Tubers (potato sweet potato, cassava etc)	8.5	73.2	0.0	0.0	1.6	0.0	0.0	16.7
Bread / Chapti / Roti	1.1	67.6	0.0	0.3	0.5	0.0	0.0	30.5
Pulses / Dhal	2.1	74.3	0.0	0.0	0.3	0.0	0.0	23.1
Fish	43.5	25.3	0.0	0.0	1.6	0.3	0.0	2.4
Meat (beef, pork, chicken)	2.4	32.6	0.0	0.0	0.0	0.0	0.0	65.0
Eggs	17.2	58.1	0.0	0.0.	0.0	0.0	0.0	24.7
Dairy (curd liquid milk, powder milk etc	3.2	47.7	0.0	0.0	0.8	0.3	0.5	47.5
Coconut	25.7	72.7	0.0	0.0	0.3	0.0	0.3	1.1
Coconut oil	6.1	85.1	0.0	0.0	0.0	0.0	0.0	8.8
Vegetables including leaves	8.5	82.5	0.0	0.0	0.8	0.0	0.0	8.2
Fruits	6.6	73.2	0.5	0.0	0.0	0.0	0.5	19.1
Sugar / Jaggary	0.8	87.0	0.3	0.0	0.0	0.0	0.0	11.9
Alcohol / Beer/ Toddi	0.0	12.7	0.0	0.0	0.3	0.0	0.0	87.0

3.6.9. Food stocks

Inquiry as to the availability of food stocks in the household or money to buy food showed that in 51.2% of the households such food stocks or money was available only for a week's supply, with this percentage being 23.3. % when the period for which food/money was available was for 2 weeks to one month. In 1.3% of households, there were no food stocks available.

Table 26: Food stocks in households

Food stock or money to buy food last	No.	%
Less than one week	193	51.2
one week to two weeks	88	23.3
Two weeks to one month	69	18.3
1 month to 3 months	18	4.8
More than three months	1	0.3
No Food	5	1.3
No response	3	0.8

Chapter 4

CONCLUSIONS

This study shows that overall prevalence of global acute malnutrition (GAM) in the study area 24.7%, of which 20.5% is moderate acute malnutrition (MAM) and 4.2% is severe acute malnutrition (SAM). Prevalence of stunting was 16.2% with 13.3% with moderate stunting and 2.9% severe stunting. Percentage of underweight children was 33.4% with 5.5% 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 lower than the reported figures in this study 24.7% to 4.2% respectively.

Prevalence of low birth weight (LBW) of 28.8%, was higher than the national level data from NFSS 2009 (18.1%). This percentage was higher (34.1%) among females compared to 23.6% among males. 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 6.4% mothers had a height less than 145 cms, 56.4% of mothers were identified as being undernourished (with MUAC $\leq$ 23).

Overall percentage of children with fever plus cough/cold and diarrhoea were 63.1% and 16.4% 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.

About 11% of 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 (97.6%) and 65% were given fish and related foods.

The total sample had minimum dietary diversity (100 %). Only one third (32.4%) of children aged 6-23 months has received a minimum acceptable diet. This rate was high in girls (29.8%) compared to boys (28.3%). Among the breastfed children the percentage having minimum meal frequency was higher (30.1%) than the non breastfed children (14.3%).

Of the children, 96% had a CHDR and 95.8% had age appropriate immunization. However, deworming tablets were given only to 35.5% of the children within the previous 6 months with the percentage having received a vitamin A megadose was 69.8%.

Nearly 71% of households had no access to a safe water supply with 10.3% having water from a protected well. Nearly 79% 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 80-85% while those who washed their hands before cooking and feeding the child was much lower ranging between 63 – 72%.

The main source of income for 40.1% of the population was fishing and related activities. Home gardening was undertaken by 35.3% of the households with livestock being available only in 45.9% of the households.

Of the total expenditure, 37.1% were spent on food with 62.9% on non food items.

Rice and other cereals, coconut, and sugar have been consumed almost on all days during the preceding week. Pulse consumption was less frequent and so was the meat consumption. Half of households have purchased the food items.

In 51.2% 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 severe acute undernutrition and moderate acute undernutrition needs to be considered as a priority. It should be focused on improving exclusive breast feeding practices, improving dietary practices, reduction of morbidity and improvement of practices related to personal hygiene. There is an urgent need in implementing a community rehabilitation programme to improve the feeding during illnesses. Improved the food consumption of children under 2 years needs special attention to reduce the prevalence of stunting to at least less than 10%.

Breastfeeding should be focused 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 and diarrhea among children by providing specific educational messages.

There is a need to focus the eating habits in pregnant women and the supplementary food to be given to underweight mothers. Regular monitoring of the weight gain in pregnancy is needed for early recognition and appropriate actions.

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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