

Nutrition assessment of preschool and pregnant women in Welikanda DS area

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Acknowledgments

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LIST OF ABBREVIATIONS

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 Assistant
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 Welikanda Divisional Secretary area, in Sri Lanka in which the World Vision programmes have been planned to implement since 2013. 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 376 children were included in the study and they were identified using cluster sampling technique. In addition, all pregnant mothers in the area (85) 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 24.2%, of which 20.7% is moderate acute malnutrition (MAM) and 3.5% is severe acute malnutrition (SAM). Prevalence of stunting was 14.7% with 12.0% with moderate stunting and 2.7% severe stunting. Percentage of underweight children was 31.0%. 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 21.0% 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 3.5% of mothers had a height less than 145 cms, 21.2% 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 62.2% and 9.5% respectively. These percentages much higher from those reported in NFSS.

About 30.0% of 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 (92.9%) and 60-71 % was given Rice and rice preparations, potatoes and tubers, fruits and vegetables, fortified food items and sugary food. Meat consumption was very low. As age increased more of the children were given a variety of food items.

Nearly half of the total number of children (59.8%) aged 6-23 months has received a minimum acceptable diet. Minimum dietary diversity was 82.1% in the sample. Among the breastfed children the percentage having minimum meal frequency was higher (74.0%) than the non breastfed children (50.0%).

Of the children, 97.8% had a Child Health Development Record and 97.6% had age appropriate immunization. However, lesser percentages (28.5%) were given iron supplements. 77.9% of children were dewormed within the previous 6 months with the percentage received a vitamin A mega dose was 85.5%.

Nearly one third of households did not have access to a safe water supply with 39.9% taking drinking water from unprotected well. Nearly 79.8% 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 32.4% of the population was farming and related activities. Home gardening was undertaken by 64.1% of the households with livestock being available in 22.6% of the households. Of the total household income, 20.3% were spent on food with 64.5% on non food items.

Rice and other cereals, coconut and sugary items have been consumed almost on all days during the preceding week. Meat and bread consumption was less frequent. Majority of the households had purchased the food items. In 56.6% 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 and families with undernourished mothers.

CHAPTER 1

Background

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 Walikanda area and hence was used as baseline data for monitoring the impact of already established World Vision Lanka catered interventions.

In addition, such a nutritional assessment survey coupled to focus their attention on targeted interventions for correcting the underlying causes or determinants through their many interventions where health is not the primary concern, such as income generation, education, ECCD, livestock development and agriculture etc.

2 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 Walikanda 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:

$$n = [Z_{\alpha/2}^2 (p)(1-p) / \delta^2] / (1-\eta)$$

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

Thirty Grama Niladari (GN) areas in Walikanda area was selected using population proportion to sampling size.

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 30 GN areas selected.

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

No	Name of the GN division	Cluster No
R 261	Sevanapitiya	1
R 262	Sevanapitiya	2
R 262	Mahawawa	3
R 263	Karapola	4
R 264	Karapola	5
R 266	Navasenapura	6
R 267	Navasenapura	7
R 268	Navasenapura	8
R 269	Navasenapura	9
R 267	Katuvanvila - W	10
R 268	Katuvanvila - E	11
R 269	Katuvanvila - E	12
R 270	Katuvanvila - E	13
R 271	Katuvanvila - E	14
R 272	Sadunpitiya	15
R 273	Sadunpitiya	16
R 274	Manikwala	17
R 277	Susireegama	18
R 279	Makulpukuna	19
R 281	Kadawathamaduwa	20
R 282	Mahindagama	21
R 283	Mahindagama	22
R 284	Mahindagama	23
R 285	Mahindagama	24
R 286	Mahindagama	25
R 287	Mahindagama	26
R 288	Mahindagama	27
R 289	Mahindagama	28
R 290	Mahindagama	29
R 284	Kudapokuna	30

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. Field 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 and obtained anthropometric measurements.

2.3.1. Training of survey teams

A one day 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 Welikanda 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 0-59 months old (administered to mothers / care givers)

2.3.4. Anthropometric measurements

Anthropometric measurements 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. The children below the -3SD of weight-for-height was taken as cut off values to estimate severe acute under nutrition (SAM) and moderate acute under nutrition ((MAM) between -3SD and -2SD of weight-for-height according to the recommendations made by WHO (1995). The children below the -3SD of weight-for-age was taken as cut off values to estimate severe underweight and moderate underweight between -3SD and -2SD of weight-for-age. The children below the -3SD of height-for-age was taken as cut off values to estimate severe stunting and moderate stunting between -3SD and -2SD of height-for-age. 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.

Chapter 3

Results

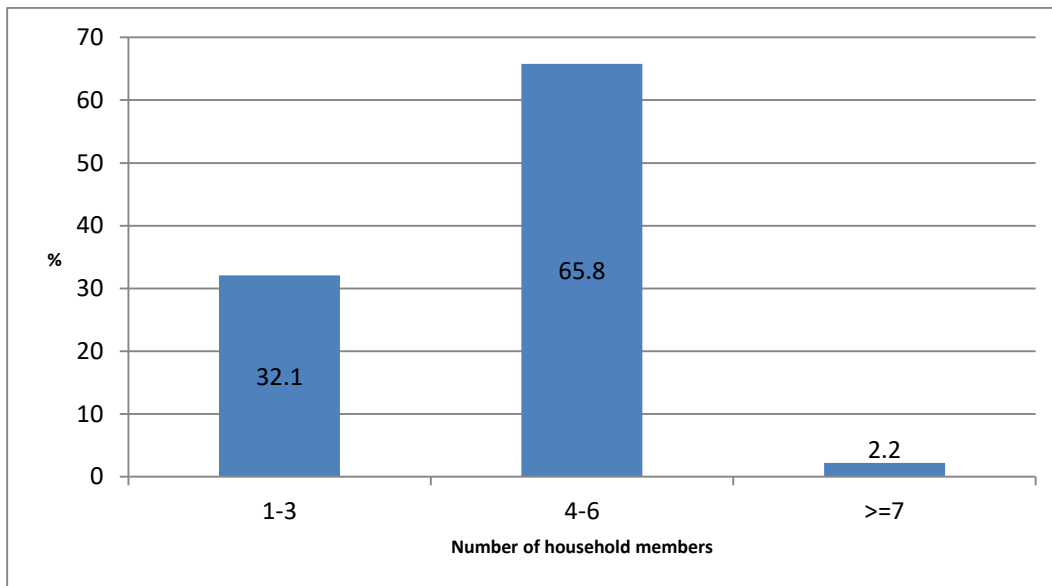
A total of 376 children under the age of five years were included in the study. However, information presented below pertains to only 368 children due to 8 flagged records during anthropometric analysis. In addition a total of 85 pregnant women were identified from the study area and were included in the survey.

3.1. Basic information

3.1.1. Number of members in the household

Among these households, 32.1% had 1-3 members and 65.8% had 4-6 members. Only 2.2% of households had more than 6 members (Figure 1).

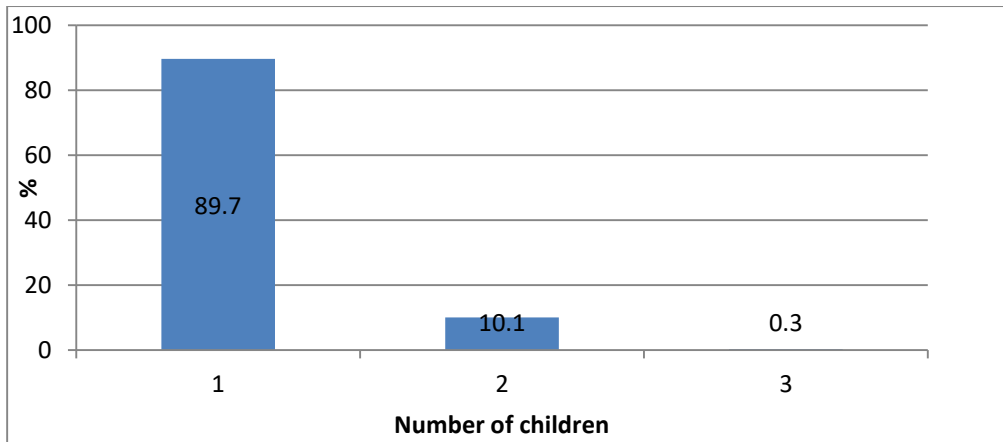
Figure 1: Distribution of households by number of members



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 89.7 % of households with 2 or 3 children in the same age group in 10.4%.

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



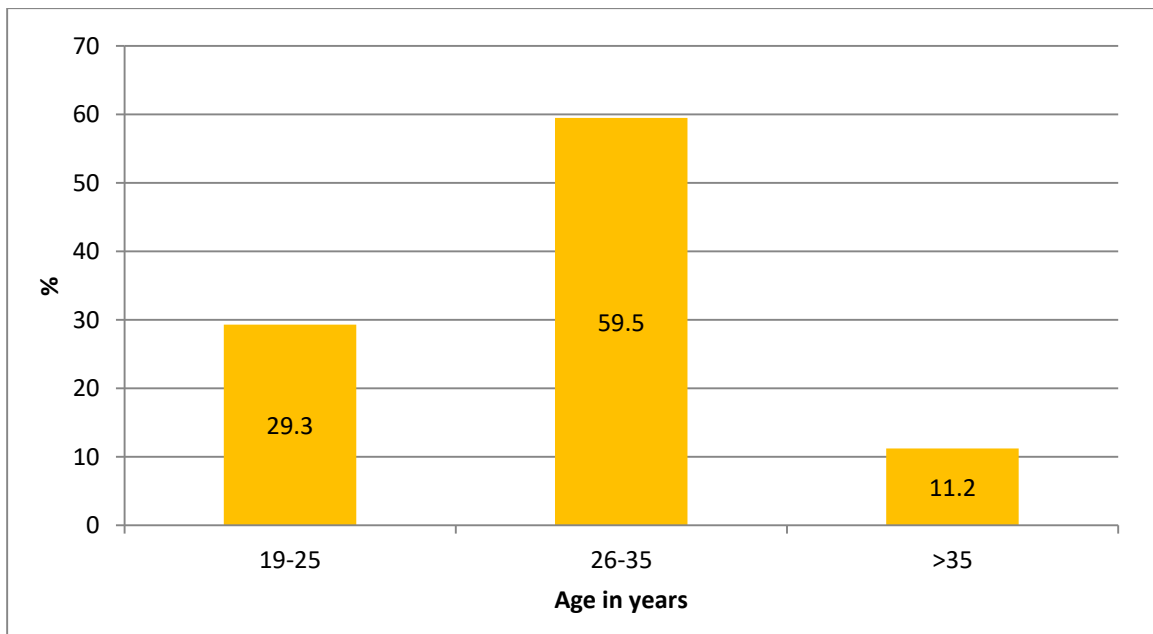
3.1.3. Information on the mother

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

3.1.3.1. Age distribution

Nearly one third of mothers (29.3%) were in the age group 19-25 years with another 59.5% being in the 26-35 year age group. Those who were over 35 years were 11.2% (Figure 3).

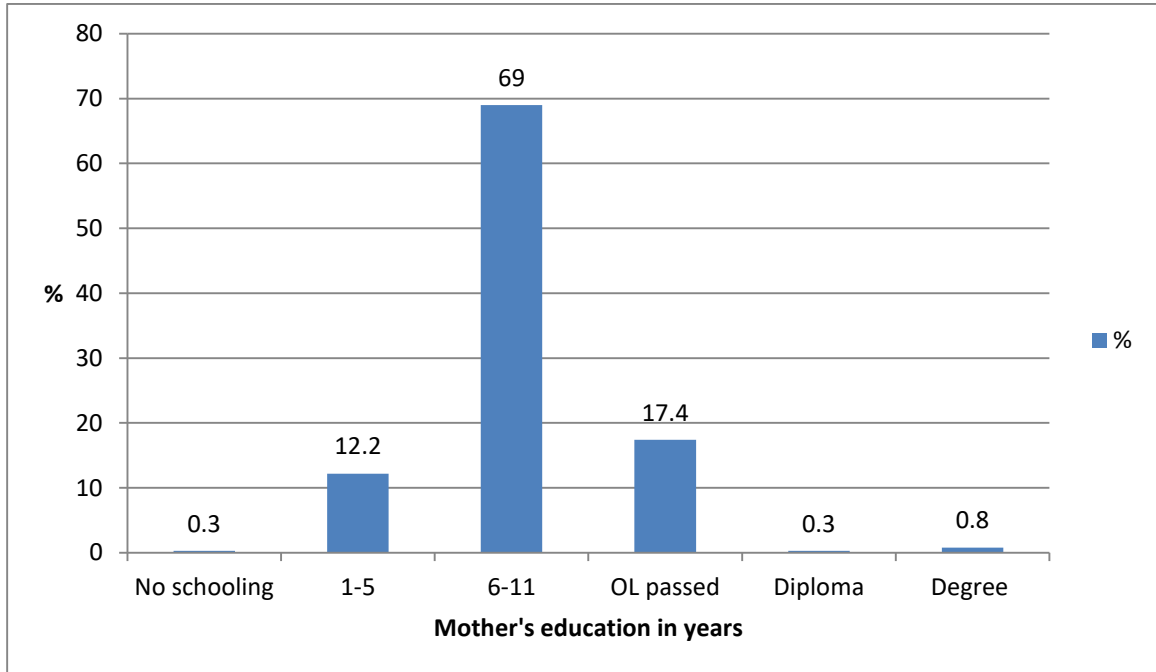
Figure 3: Age distribution of mothers



3.1.3.2. Educational level

Nearly two thirds (69%) of the mothers have had 6-11 years of schooling while another 17.4% have passed Ordinary Level examination. The percentage of mothers with no schooling was 0.3% (Figure 4).

Figure 4: Number of years of schooling of mothers



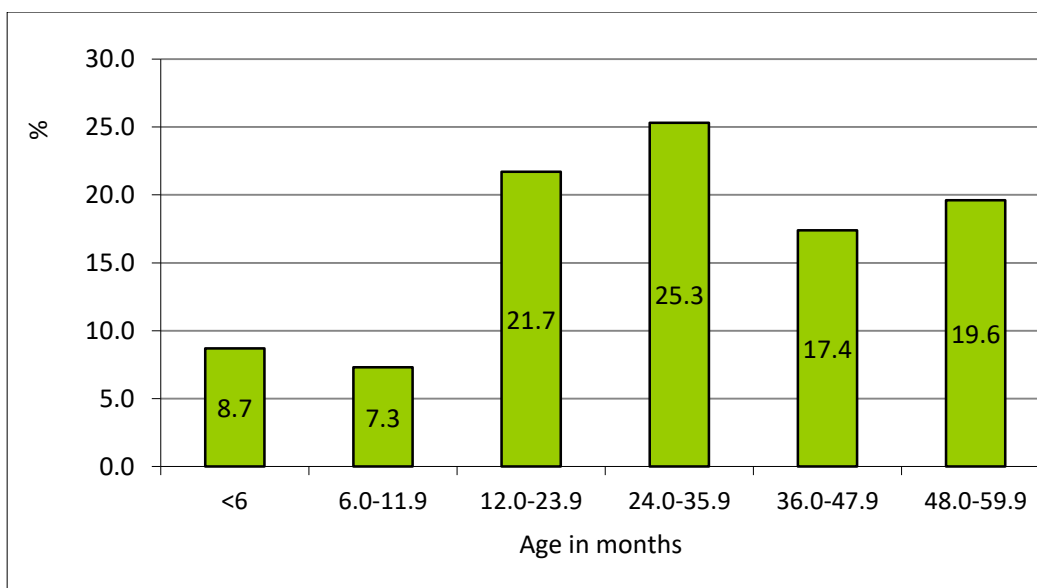
3.1.4. Information on the children

A total of 368 children were included in the final analysis.

3.1.4.1. Distribution by age

As shown in Figure 5, 21.7% , 25.3%, 17.4% and 19.6%, of the children were included in the age groups 12-23, 24-35, 36-47 and 48-60 months respectively. Only 7.3% 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, 8.7%.

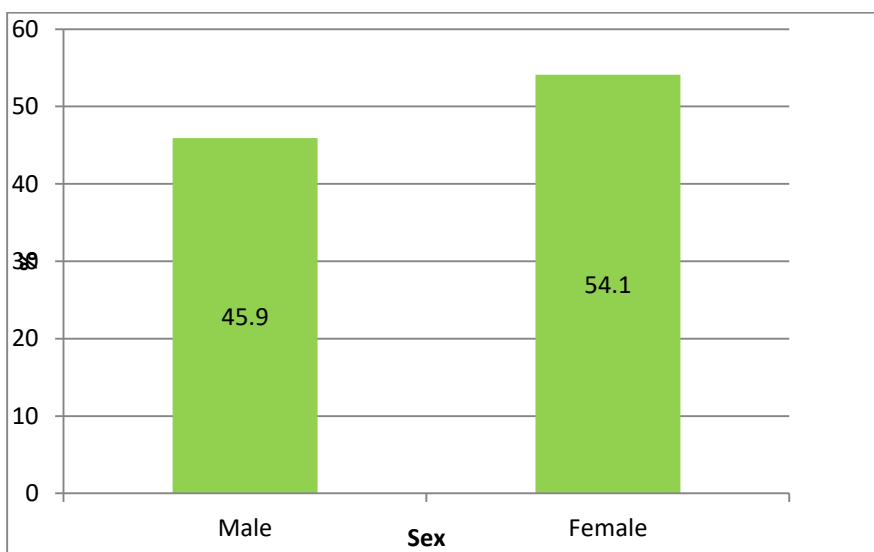
Figure 5: Distribution of children under 5 by age



3.1.4.2. Distribution by sex

There was a marginal preponderance of females among the children, 54.1% (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, 85.6% had their floors made of cement while another 10.6% had floors made of Mud/cow dung. About 3.7% of houses had other forms of flooring.

Table 2: Distribution of households by housing characteristics (n=376)

Characteristics	No	%
Flooring Material		
Mud cowdung	40	10.6
Wood	3	0.8
Cement	322	85.6
Tile	3	0.8
Other	8	2.1
Roofing material		
Tiles	188	50.0
Asbestos	134	35.6
Tarsheet / Corrugated sheet	39	10.4
Cadjan / Thatch	10	2.7
Other	5	1.3
Type of wall		
Cadjan	7	1.9
Mud	47	12.5
Brick/ Cabok	306	81.4
Cement block	8	2.1
Other	8	2.2
No of Bedrooms		
0	5	1.3
1	133	35.4
2	157	41.8
3	65	17.3
4	14	3.7
5	2	0.5
Separate Kitchen		
Yes	319	84.8
No	57	15.2
Availability of Electricity		
Yes	267	71.0
No	109	29.0
Solar Power		
Yes	10	2.7
No	366	97.3

Tiles were the commonest form of roofing used with 50% of the houses having tiled roofs. Another 35.6% had roofs made of Asbestos and 10.4% had tar sheet roofs. Cadjan roofs were seen among 2.7% of the houses while 1.3% of houses had other forms of roofing.

In 81.4% of houses, the walls were made of brick or cabok while 12.5% and 2.1% had walls made of Mud and Cement block respectively.

More than two thirds of the houses (41.8%) had 2 bedrooms. 35.4% had only one room and 21.5% had more than two rooms. Most houses (84.8%) had separate kitchens. Electricity was only available to 71% of households and interestingly 2.7% 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 14.7 percent were stunted (below -2SD scores for height for age), 24.2 percent wasted (below -2SD score for weight for height) and 31.0 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 2.7 percent, 3.5 percent and 6.0 percent respectively.

Moderately wasted (below -2SD score for weight for height), stunted (below -2SD score for height for age) and underweight (below -2SD score for weight for age) children were 20.7%, 12.0% and 25.0% respectively.

Figure 7: Prevalence of wasting, stunting and underweight

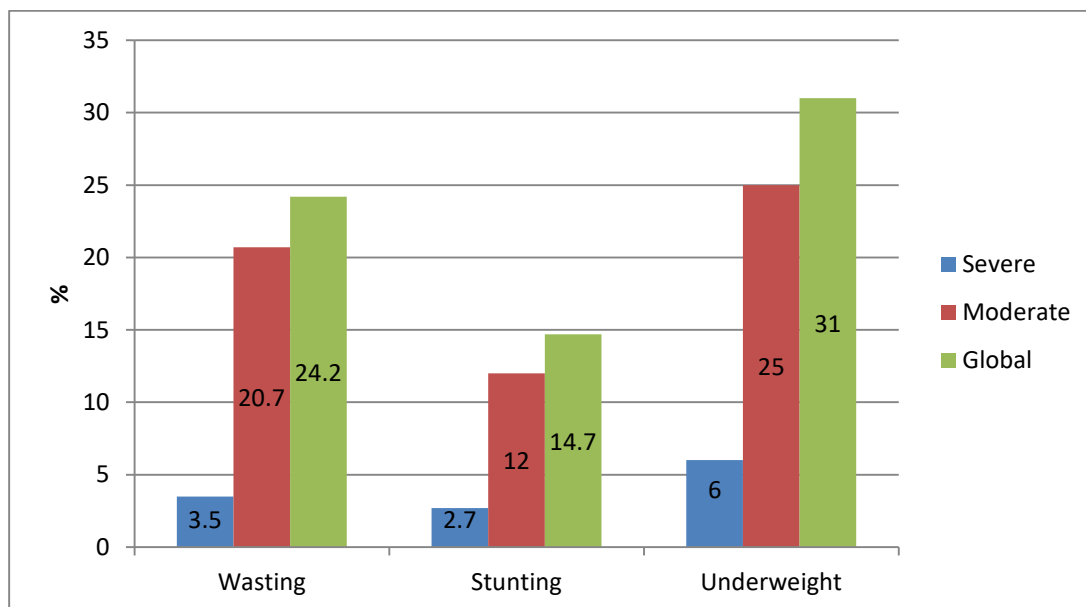


Table 3: Nutritional status of children in the sample with background characteristics

Background Characteristic	Weight-for-height (%)			Height-for-age (%)			Weight-for-age (%)			Total No of	
	SAM	MAM	Global	Severe	Moderate	Global	Severe	Moderate	Global	No	%
Age of child (months)											
<6	0 (0.0)	6 (20.0)	6 (20.0)	0 (0.0)	4 (13.3)	4 (13.3)	1 (3.3)	3 (10.0)	4 (13.3)	30	8.2
6-11	5 (16.7)	1 (3.3)	6 (20.0)	2 (6.7)	1 (3.3)	3 (10.0)	4 (13.3)	3 (10.0)	7 (23.3)	30	8.2
12-23	2 (2.5)	16 (19.8)	18 (22.2)	4 (4.9)	9 (11.1)	13 (16.0)	5 (6.2)	18 (22.2)	23 (28.4)	81	22.0
24-35	1 (1.1)	20 (22.1)	21 (23.1)	4 (4.4)	13 (14.3)	17 (18.7)	4 (4.4)	25 (27.5)	29 (31.9)	91	24.7
36-47	2 (3.1)	8 (12.5)	10 (15.6)	0 (0.0)	7 (10.9)	7 (10.9)	2 (3.1)	14 (21.9)	16 (25.0)	64	17.4
48-59	2 (2.8)	21 (29.2)	23 (31.9)	5 (6.9)	10 (13.9)	15 (20.8)	6 (8.3)	29 (40.3)	35 (48.6)	72	19.6
Sex of child											
Male	6 (3.6)	38 (22.5)	44 (26.0)	8 (3.5)	27 (16.0)	35 (20.7)	10 (5.9)	48 (28.4)	58 (34.3)	169	45.9
Female	6 (3.0)	34 (17.1)	40 (20.1)	7 (4.7)	17 (8.5)	24 (12.1)	12 (6.0)	44 (22.1)	56 (28.1)	199	54.1
Mother's education											
no schooling	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1	0.3
Primary	2 (4.4)	11 (24.4)	13 (28.9)	4 (6.7)	5 (11.1)	97 (20.0)	4 (8.9)	15 (33.3)	19 (42.2)	45	12.2
Secondary	7 (2.8)	50 (19.7)	57 (22.4)	8 (3.1)	32 (12.6)	40 (15.7)	14 (5.5)	63 (24.8)	77 (30.3)	254	29.9
Passed O' Level	3 (4.4)	10 (14.7)	13 (19.1)	3 (4.4)	7 (10.3)	10 (14.7)	4 (5.9)	14 (20.6)	18 (26.5)	68	39.7
Monthly household income											
< 9,000	9 (8.6)	24 (22.9)	33 (31.4)	6 (5.7)	18 (17.1)	24 (22.9)	12 (11.4)	31 (29.5)	43 (41.0)	105	28.5
9,000 - 13,999	0 (0.0)	10 (19.2)	10 (19.2)	3 (5.8)	6 (11.5)	9 (17.3)	4 (7.7)	11 (21.2)	15 (28.8)	52	14.1
14,000 - 19,999	2 (2.3)	21 (23.9)	23 (26.1)	3 (3.4)	10 (11.4)	13 (14.8)	4 (4.5)	25 (28.4)	29 (33.0)	88	23.9
20,000 - 31,999	1 (1.1)	11 (12.6)	12 (13.8)	2 (2.3)	7 (8.0)	9 (10.3)	1 (1.1)	19 (21.8)	20 (23.0)	87	23.6
≥ 32,000	0 (0.0)	6 (16.7)	6 (16.7)	1 (2.8)	3 (8.3)	4 (11.1)	1 (2.8)	6 (16.7)	7 (19.4)	36	9.8
Overall	12 (3.3)	72 (19.6)	84 (22.8)	15 (4.1)	44 (12.0)	59 (16.0)	22 (6.0)	92 (25.0)	114 (31.0)	368	100.0

Prevalence of wasting was highest in the 48-59 months age group (34.7%) and showed the highest prevalence of severe wasting (16.7%) in the 6-11 months age group. Data on stunting shows that the highest prevalence is in the 48-59 months age groups (19.5%).

The prevalence of underweight is highest in the age group 48-59 months (48.6%) and lowest in the group <6 months (13.3%).

Prevalence of wasting among boys (27.8%) was higher when compared to the prevalence of 21.1% among girls. In contrast to wasting, the prevalence of stunting was 17.8% among males and 12.1% among females. The prevalence of underweight among males and females respectively were 34.3% and 28.1% showing gender variation.

All three indicators, prevalence of stunting, wasting and underweight show a declining trend with increasing level of mother's education.

Prevalence of stunting showed a marked decline with increasing level of income. No such consistent pattern was seen in the prevalence of wasting, and underweight in relation to income level but the lowest prevalence of underweight was seen in the highest income group of Rs. \geq 32,000.

3.2.2. Low birth weight (LBW)

Of all children included in the study, 21.0% had low birth weight; this percentage was highest in the cohorts aged 36 – 47.9 months. Overall, Low birth weight was higher among female children. (Table 4). Mean birth weight for the total sample was 2.84kg. Increasing pattern of mean birth weight of children showed with increasing level of income. However, there is no consistent pattern seen in the prevalence of LBW with income levels.

Table 4: Prevalence of low birth weight, and mean birth weight among children born in the 5 years preceding the survey, by background characteristics (n=367)

Background Characteristic	Birth Weight			
	< 2500g (%)	≥ 2500g (%)	Mean (kg)	SD
Age of child (months)				
0-5.9	8 (26.7)	22 (73.3)	2.75	0.43
6-11.9	4 (13.3)	26 (86.2)	2.88	0.50
12-23.9	18 (22.2)	63 (77.8)	2.88	0.48
24-35.9	13 (14.3)	78 (85.7)	2.83	0.46
36-47.9	17 (27.0)	46 (73.0)	2.83	0.48
48-59.9	17 (23.6)	55 (76.4)	2.83	0.45
Sex of child				
Male	30 (17.8)	139 (82.2)	2.86	0.43
Female	47 (23.7)	151 (76.3)	2.83	0.50
Mother's education				
No school	0 (0.0)	1(100.0)	2.95	0.0
Primary	9 (20.5)	35 (79.5)	2.81	0.44
Secondary	54 (21.3)	200 (78.7)	2.82	0.45
Passed O' Level	14 (20.6)	54 (79.4)	2.92	0.52
Monthly household income				
< 9,000	24 (23.1)	80 (76.9)	2.78	0.41
9,000 - 13,999	12 (23.1)	40 (76.9)	2.84	0.51
14,000 - 19,999	17 (19.3)	71 (80.7)	2.84	0.46
20,000 - 31,999	17 (19.5)	70 (80.5)	2.85	0.48
≥ 32,000	7 (19.4)	29 (80.6)	2.95	0.52
Overall (n=351)	77 (21.0)	290 (79.0)	2.84	0.47

3.3 Determinants of Nutritional Status

3.3.1. Prevalance of diarrhoea

As shown in table 5, 9.5% of all children reported having had diarrhoea. Of the mothers only 36.4% stated that more fluid was given to children with diarrhoea. Alarminglly, 23.1% of mothers admitted to have provided less fluid than normal during the episode of diarrhea. 50.3% of mothers provided government recommended homemade fluid to the child and 60.3% of mothers

provided ORS. Nearly half of mothers, 45.1% 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	35	9.5
No	333	90.5
Amount of fluid usually given during diarrhoea		
Less	85	23.1
Same amount	149	40.5
More	134	36.4
Amount of Breast milk usually during diarrhoea		
Less	120	32.6
Same amount	189	51.4
More	59	16.0
Given usually Water during diarrhoea		
yes	166	45.1
no	202	54.9
Government recommended home made fluid usually given during diarrhea		
yes	185	50.3
no	183	49.7
Given usually ORS (Jeevani)		
yes	222	60.3
no	146	39.7
Amount of food usually given during diarrhoea		
Less	131	35.6
Same	175	47.6
More	19	5.2
Restricted some food items	43	11.7

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.

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	229	62.2
No	139	37.8
Difficulty in breathing with cough and illness		
Yes	136	37.0
No	232	63.0
Difficulty in breathing with cough and Fever		
Yes	136	37.0
No	232	63.0
Seek treatment outside the home		
Yes	136	100
No	0	0.0
Place of taken treatment		
Government health facility	30	22.1
Private physician	92	67.6
Ayurvedic doctor	13	9.6
Pharmacy	1	0.7
Any other illness during last 2 weeks		
Yes	66	17.9
No	302	82.1
Type illness		
Allergy	11	16.7
Cold and cough	5	7.6
Fever	36	54.5
Urine infections	4	6.1
Other	10	15.1
During illness food as usual		
Less	139	37.9
Same amount	182	49.5
More	14	3.8
Restricted some food items	33	9.0
Seek care for illness		

Govt hospital	304	82.6
Govt health centre	8	2.2
Govt health post	2	0.5
Private hospital / clinic	21	5.7
Private physician	24	6.5
Private pharmacy	3	0.8
Other private medical	6	1.6

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

Of all children, 62.2% had reported having ‘cough and fever’ (ARI) within the previous 2 weeks and difficulty in breathing was reported in 37.0% (Table 6).

Of the above group all had taken treatment, a majority of them from a private physician (67.6%). Of the total group 17.9% had other illnesses. Majority had fever. 37.9% of the mothers said less food than usual was given. While 49.5% of all mothers provided the same amount of food only a 3.8% of mothers had provided more food than usual. More than two third (82.6%) of mothers mentioned that they usually 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

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.

Table 07. Infant and young child feeding practices		
Characteristics	No	%
When did you put child to the breast		
Within a hour	350	95.1
After one hour	15	4.1
Not given	8	0.8
In first 3 days after delivery something else was given before		
Yes	25	6.8
No	343	93.2
Types of food given during first 3 days		
Plain water	6	18.2
Sugar	6	18.2
Herbal tea	5	15.2
Juice /Coconut water	3	9.1
Milk	7	21.2
Infant formula	5	15.2
Other	1	3.0
Types of food given during first 6 months		
Breast milk	348	94.6
Plain water	108	29.3
Infant formula	52	14.1
Any porridge or gruel	52	14.1
Solid or semisolid foods	63	17.1
Vitamin or mineral supplements, medicine, ORS	62	16.8

Feeding practices during the first 6 months showed that 94.6% were given breast milk, 29.3%, plain water and 14.1%, infant formula. Among this group 17.1% were given solid/semi solid /soft food and 16.8% have been given vitamin preparations. It must be noted that 14.1% were given porridge or gruel. It can be inferred that exclusive breastfeeding during the 1st 6 months of life has not been thoroughly followed through.

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, 96.7% were being breast fed including a 19.4% 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	29 (96.7)	1 (3.3)	9.86 (3.8)	5.48 (2.6)	0.23 (0.6)
6.0-11.9	30 (100.0)	0 (0.0)	6.27 (3.6)	4.73 (2.6)	3.03 (1.4)
12.0-23.9	74 (91.4)	7 (8.6)	6.0 (3.2)	4.85 (3.3)	3.4 (1.6)
24.0-35.9	68 (74.7)	23 (25.3)	5.07 (4.0)	3.41 (2.3)	3.65 (1.4)
36.0-47.9	24 (37.5)	40 (62.5)	3.29 (3.2)	2.54 (2.6)	3.77 (1.5)
48.0-59.9	14 (19.4)	58 (80.6)	2.64 (2.5)	1.71 (1.5)	3.33 (1.0)
Total	239 (64.9)	129 (35.1)	5.77 (3.9)	4.09 (2.9)	3.22 (1.6)

Frequency of breast feeding also declined with increasing age ranging from a mean number of times of 9.86 feeds per day in the under 6 months age group to 2.64 feeds 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 3.03 among the 6 – 11.9 month age group to 3.33 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 0.23.

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 (95.5%). Among this group, children were given rice and preparations (69.6%), fish and related foods (58.0%), sugary foods (71.4%), foods with condiments (59.8%) and vegetables or fruits (71.4%) (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

Characteristic	% within age groups in months		
	< 6	6-23	24.0 - 59.0
Breast milk	96.7	92.9	47.4
Water	6.7	95.5	99.1
Infant formula	16.7	45.5	46.6
Medicinal water	13.3	17.0	24.4
Sugar/Glucose water	6.7	40.2	41.9
Jeevanee	0.0	0.9	3.8
Cereals (Nestum,Cerilac,Samposa, Thripasa)	0.0	60.7	62.4
Rice cunjee	3.3	25.0	22.6
Rice,Bread, rotti, pittu, dosai or other foods made from grains	0.0	69.6	85.5
Pumpkin, Carrots or sweet potatoes, yellow vegetables	3.3	55.4	50.9
White potatoes, white yams, manioc, cassava, or any roots	3.3	65.2	60.7
Any dark green leafy vegetables such as kankun, etc	0.0	55.4	64.1
Ripe mangoes or ripe papayas	0.0	25.9	36.3
Any other fruits or vegetables	3.3	71.4	81.6
Liver, kidney, heart or other organ meats	3.3	5.4	15.0
Chicken	0.0	14.3	23.1
Any meat such as beefs, pork, lamb, goat or duck	3.3	9.8	12.8
Eggs	3.3	42.9	41.0
Fresh or dried fish, shellfish, canned fish or seafood	3.3	58.0	79.1
Any foods made from cowpea, green gram, black gram or lentils	0.0	60.7	61.5

Coconut, peanuts or other nuts	6.7	33.9	52.6
Milk	6.7	39.3	62.0
Cheese, curd, yogurt or other milk products	3.3	33.0	41.5
Any oil fats, butter or foods made with any of these	0.0	42.9	56.8
Any sugary foods such as chocolates, sweets, candies, cakes or biscuits	0.0	71.4	79.9
Condiments for flavour, such as chillies, spices, herbs or fish powder	3.3	59.8	71.8
Micronutrient powder	0.0	12.5	14.5

Among those in the older age group, 24- 59.9 months, 99.1% had been given water, rice and preparations (85.5%), sugary foods (79.9%) and foods containing condiments (71.8%). This group were given fruits/vegetables (81.6%), fish and related products (79.1%), coconuts and other nuts (52.6%) and milk (62.0%).

Of the total sample of children, 71 % 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					
6-11	82.8	100.0	73.3	60.0	30
12-17	78.4	50.0	89.7	74.4	39
18-23	63.2	40.0	81.4	46.5	43
Overall	74.0	50.0	82.1	59.8	112

As shown in Table 10, only half (59.8%) of children aged 6-23 months has received a minimum acceptable diet. 82.1% of the total sample had minimum dietary diversity. Among the breastfed children the percentage having minimum meal frequency was higher (74.0%) than the non breastfed children (50.0%).

Exclusive breastfeeding rate among infants under 6 months of age was 70% and continued breastfeeding rate among children 12-15 months of age was 100%.

3.3.4. Use of health services

As shown in Table 11, 97.8% of the children had a CHDR, 97.6% had received age appropriate immunization, 85.5% had received Vitamin A mega dose. Reason for not taking child to obtain

age appropriate immunization was due to sickness of the child. Only 77.9% of all children had received worm treatment in the preceding 6 months. 28.5% 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	100.0	97.5	98.9	95.3	97.2	97.8
Vitamin A megadose	-	90.0	88.9	84.6	82.8	83.3	85.5
De-worming tablets past 6 months	-	-	66.7	86.8	81.2	76.4	77.9
Currently taking Iron supplements	10.0	30.0	24.7	28.6	31.2	37.5	28.5
Age appropriate immunisation	100.0	100.0	98.8	98.9	95.3	94.4	97.6
Number of days taken for growth monitoring during last 6 months							
Mean (SD)	3.03 (1.5)	5.93 (0.6)	5.77 (0.8)	5.31 (1.3)	4.83 (1.7)	5.00 (1.5)	5.13 (1.5)
% children 0-59 months who attended at least 2 sessions of growth monitoring in past 6 months							98.6

Nearly 97% of children were taken to the nearest child welfare clinic and 68.8% were received advice related to growth, 79.6% were given nutrition advices and 59% were received advice related to child feeding. 81.2% of clinics were situated less than 5km radius. 31.8%, 45.9% and 22.3% of mothers took less than 15 minutes,15-30 minutes and more than 30 minutes to reach the clinic. 88.9% of mothers stated that weighing post were within 5 km radius of their residence.

For the total sample of children the number of visits for growth monitoring of children showed a total mean number of 5.13 visits. The highest number of visits (5.93) was seen among the 6-11.9 age group.

Out of all children in the sample 98.6% of them were attended at least 2 sessions of growth monitoring in the past 6 months.

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

Characteristics	%	No. of children
Obtained area family health services for the child or you	94.3	347
Relationship with PHM		
Very good	70.1	258
Fairly	29.6	109
Very little	0.3	1
Received health and nutrition awareness during last 3 months	88.3	325
Services provider of above awareness*		
Doctor	36.6	119
Nurse	17.5	57
Midwife	85.8	279
PHI	12.9	42
TV	34.5	112
Radio	16.9	55
Newspaper / magazine	16.0	52
Education programme	16.6	54
Volunteer	14.7	47
Other	3.7	12
No one	0.3	1

(*multiple responses)

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, 94.3% had obtained the family health services of the area for the child.

88.3% 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 doctor. Relationship with PHM was reported as very good by 70.1% of mothers with another 29.6% 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.

Table 13: Percent of households by main source of drinking water and toilet		
Characteristics	No	%
Type of water		
Piped into dwelling	34	9.0
pipd to compound /plot	39	10.4
public tap	9	2.4
tube well or borehole	7	1.9
protected well	150	39.9
unprotected well	123	32.7
Tank and canal water	13	3.5
Cart with samll tank	1	0.3
Time to bring water in mnutes		
less than 5	192	51.1
6-10	67	17.8
11-30	109	29.0
more than 30	8	2.1
How do you clean water		
boiling	101	26.9
bleach / chlorine	28	7.4
strain through a cloth	136	36.2
use a water filter	126	33.5
solar disinfection	3	0.8
stand and settle	17	4.5
other	8	2.1
do not know	3	0.8
Toilet facility		
Flush to septic tank	67	17.8
Flush to pit latrine	233	62.0
Pit latrine	34	9.0
Flush to somewhere else	1	0.3
No facility / Bush Field	41	10.9

Toilet facilit shared with other households		
Yes	61	16.2
No	315	83.8
No of household use the toilet		
< 2	48	78.7
3.-5	13	21.3
Wash hand after using toilet		
Always with soap	311	82.7
Sometimes with soap	46	12.2
Not using soap	17	4.5
do not wash	1	0.3
no answer	1	0.3
Wash your hand before eating		
Always with soap	180	47.9
Sometimes with soap	111	29.5
Without soap	84	22.3
do not wash	1	0.3
Wash your hand before feeding the child		
Always with soap	248	66.0
Sometimes with soap	75	19.9
Without soap	49	13.0
do not wash	2	0.5
No answer	2	0.5
Wash hands after cleaning child's stool		
Always with soap	328	87.2
Sometimes with soap	30	8.0
Without soap	18	4.8
Wash your hand before cooking		
Always with soap	140	37.2
Sometimes with soap	83	22.1
Without soap	138	36.2
Do not wash	14	3.7
No answer	1	0.3

In a majority (39.9%) of the households, the main source of drinking water was from protected well and another 32.7% obtained water from an unprotected well while 10.4% obtained water from a piped to compound. Around 51.1% of households had the water source 5 minutes away. While 17.8% and 29.0% of households had water sources 5-10 minutes away and 10-30 minutes away respectively.

26.9% of households boiled water before drinking while 36.2% and another 33.5% of households used to strain through a cloth or used a filter to clean water respectively.

In 62.3% of households, there were toilets that use flushing into a pit linked to the toilet and another 17.8% with flushing facilities linked to a septic tank. Both these types of toilets use a flushing mechanism. Of the total group, 16.2% shared their toilets and nearly all (78.1%) of toilets were used by 1 – 5 households. 10.9% of households did not have toilets and 9% used pit latrines.

On inquiring into hygienic practices among mothers, it was shown that 82.7% washed their hands with soap after using the toilet and 87.2% 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 47.9%, 66.0% and 37.2% respectively.

Only 27.6% 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) .

3.4. 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=85)

Characteristics	No.	%
Period of amenorrhoea in weeks		
<12	13	15.7
12-24	31	37.3
25-36	29	34.9
>36	10	12.0
Parity		
1	26	30.6
2	35	41.2
≥ 3	24	28.3
No. of living children		
0	6	10.0
1	34	56.7
2	18	30.0
≥3	2	3.3
Number who received tetanus toxoid		
1 dose	46	2.4

2 doses	17	54.1
3 doses	2	20.0
Not given	20	23.6
Taken deworming tablets		
Yes	70	82.4
No	15	17.6
No response		
	Mean	SD
Average antenatal visits	3.2	1.8

A total of 85 pregnant women were identified in the households included in the study. Of this group, 30.6% were primi Para and 28.3% were of parity 3 or higher. Of the multipara, 30.0% mothers had two living children and 56.7% had only one living child (Table 16).

Of the total group, 76.5% had received tetanus toxoid injections, with 54.1 % among this group having received two dose of toxoid at the time of the study. The percentage who had received deworming tablets was 82.4% and the average number of antenatal visits was 3.2 per mother (Table 17).

Table 17. Health and nutrition services, awareness, relationship with area PHM

Characteristics	%	No. of children
Received health and nutrition awareness during last 3 months	71.8	61
Services provider of above awareness*		
Doctor	18.8	16
Nurse	9.4	8
Midwife	68.2	58
PHI	9.4	8
TV	30.6	26
Radio	7.1	6
Newspaper / magazine	15.3	13
Education programme	9.4	8
Volunteer	3.5	3
Other	1.2	1
No one	1.2	1

(*multiple responses)

Table 17 provides information on the pattern of service use and availability for the pregnant women. The number of pregnant women, from whom such information was available, varied. Of the total group, 71.8% was received health and nutrition awareness during last 3 months..

Among this group, most of them had received such information from the midwife, the other main source being the doctor.

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 18). There were 3 mothers with a height less than 145 cms. Of the group, 21.2% of mothers were identified as being undernourished (with MUAC <23) and 16.5% were anaemic.

Table 18: Nutritional status of pregnant women

	No.	%
Height of the mother in cms		
< 145	3	3.5
≥ 145	82	96.5
Mid upper arm circumference in cms		
≤ 23 (Undernourished)	18	21.2
>23	77	78.8
Anaemia (haemoglobin <11g/dl)		
Anaemic	14	16.5
Not anaemic	71	83.5

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, 87.2% among those who responded, had received antenatal care from a doctor, 42.5% from a nurse and 78.1% from a midwife, indicating that they had received antenatal care from more than one source (Table 19)

When inquired about their eating habits, 38.8% of them said that they consumed food on more occasions during the day compared to the non pregnant period with a 34.0% saying that they consumed less. 93.6% of them had received worm treatment and 90.7% received tetanus toxoid.

Table 19: Antenatal care, eating habits during pregnancy

	No.	%
Type of person provided antenatal care*		
Doctor	326	87.2
Nurse/Sister	159	42.5
Midwife	292	78.1
Other	96	25.7
Eating habits during pregnancy compared to non pregnant period		
Less often	128	34.0
Same amount	10	27.1
One more time per day	42	11.2
Two more times per day	52	13.8
Three more times per day	52	13.8

Taken worm treatment	93.6	353
Received Tetanus Toxoid	90.7	341
	Mean	SD
Average days of taking iron supplements during pregnancy	28.34	5.7

(*multiple responses)

3.5. 2. Natal and postnatal care

For 86.7% of the mothers, a doctor had been in attendance during delivery with 69.7% having had the help of a nurse and 47.1% having had the assistance from a midwife. It is likely that more than one category of health staff had been on assistance during delivery (Table 20).

Table 20: Assistance during delivery and postnatal period

Characteristics	No.	%
Type of person who assisted the delivery*		
Doctor	326	86.7
Nurse/Sister	262	69.7
PHM	177	47.1
Other	26	6.9
Place of delivery		
Deliver in Health facility	362	96.3
Care during delivery		
Skin to skin contact	362	96.3
Cleaned and dry cord	329	87.5
Postnatal care		
Received Vitamin A megadose within 4 weeks	255	67.8
	Mean	SD
Average postnatal visits received in first 6 weeks	2.64	1.5
Average days of taking iron supplements during lactation	20.21	33.6

(*multiple responses)

96.3% of mothers delivered at a health facility. Considering care practices 96.3% of neonates were placed with skin to skin contact and in 87.5% of them the cord was cleaned and dried. Among all mothers, 67.8% had received Vitamin A mega dose within 4 weeks. On average, a mother had received 2.634 postnatal visits. Average number of days of taking iron supplements by mothers during the lactation period was 20.21 days.

3.5.3. Family planning

Of all mothers, 73.1% were using a method of family planning at the time of the survey. Among the users, injections (DMPA) was the commonest method used by 48.4% with another 17.1% using loops. Of the group, 8.0% had opted for permanent methods (Table 21).

Table 21: Current use of family planning method.		
Method of Family Planning	%	No.
Oral contraceptives	14.5	40
Injections(DMPA)	48.4	133
Norplant	4.7	13
Loop	17.1	47
Condom	6.2	17
Permanent methods	8.0	22
Other	1.1	3

3.6. Food Security and Related Factors

3.6.1. Median income and type of income

Median household income per month was Rs. 15,000 and ranged between Rs. 1000 to 100,000 (Figure 8). Nearly one third (28.7%) were in income group of <9,000 and only 9.6% were having more than Rs 32,000 per month.

Figure 8: Distribution of the total income of the households

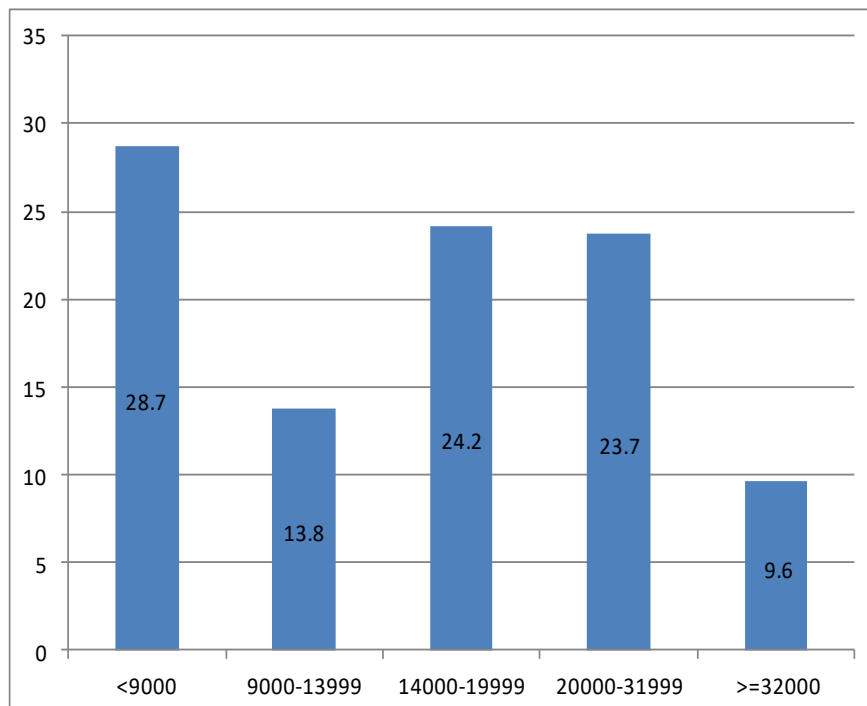


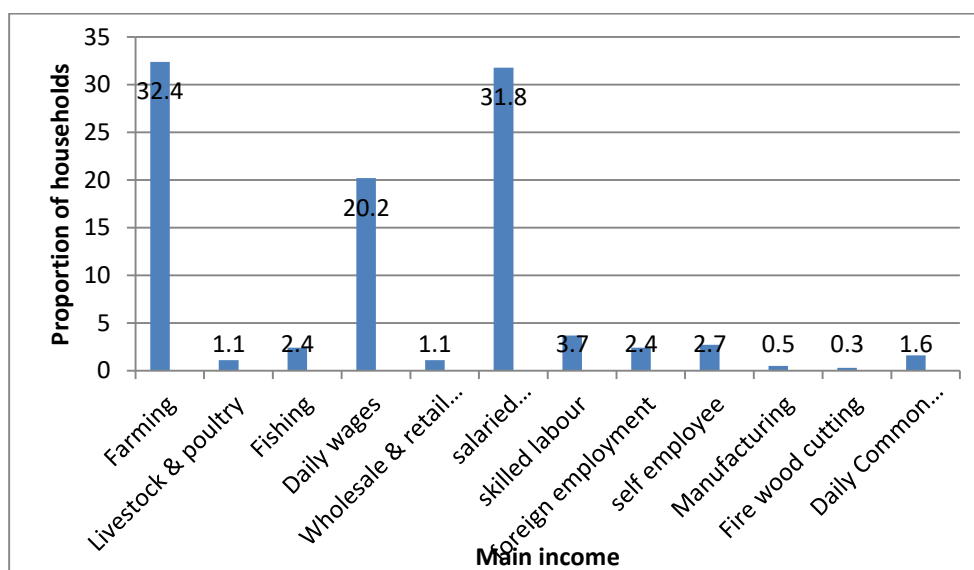
Table 22: Type of income		
Type of income	%	No.
Daily regular	9.6	36
Daily irregular	19.7	19.7
Weekly	6.9	6.9
Monthly	39.9	39.9
Seasonal	23.9	23.9
No of household members earning		
1	88.8	334
2	9.0	34
3	1.3	5
4	0.8	3

Table 22 shows that one third (39.9%) of households had monthly income. 23.9% and 19.7% had seasonal income and daily irregular income respectively. Majority of households (88.8%) only one household member was earning.

3.6.2. Primary income sources

Farming was the most common income generation activity, this being the main source of income among 32.4% of the population. 31.8% of the population worked in a employment with fixed salary. Daily wages with farming following, with 20.2 % of the households giving this as the main source of income (Figure 9).

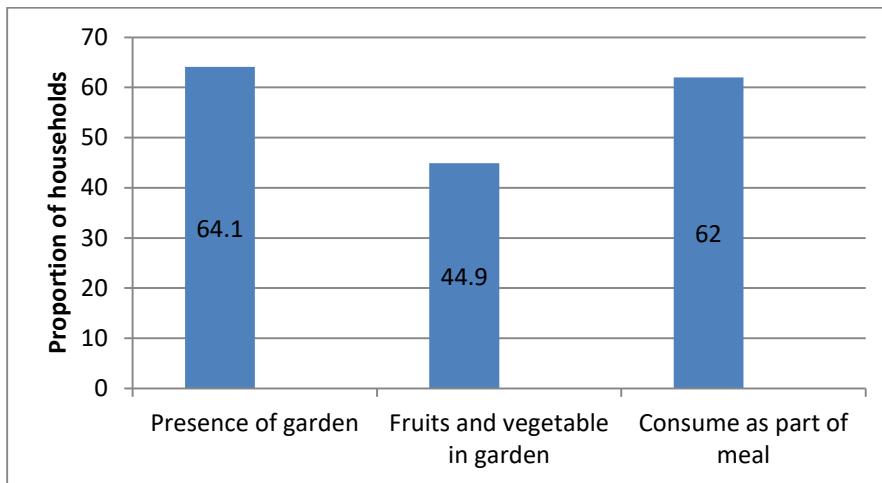
Figure 9: Main income sources



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 (64.1%) had garden space with 44.9% having cultivated vegetables and fruits in their gardens. Among the households, 62% consumed the products from the gardens as a part of the meal.

Figure 10: Households involved in home gardening



3.6.4. Livestock

22.6% of the households had livestock (Table 23). 17.6% of such households used the products as a part of their daily meals, 34.1% and 4% of households used the products 2-5 times a week and once a week respectively. 43.5% of all households did not use the products at all.

Table 23: Ownership to livestock

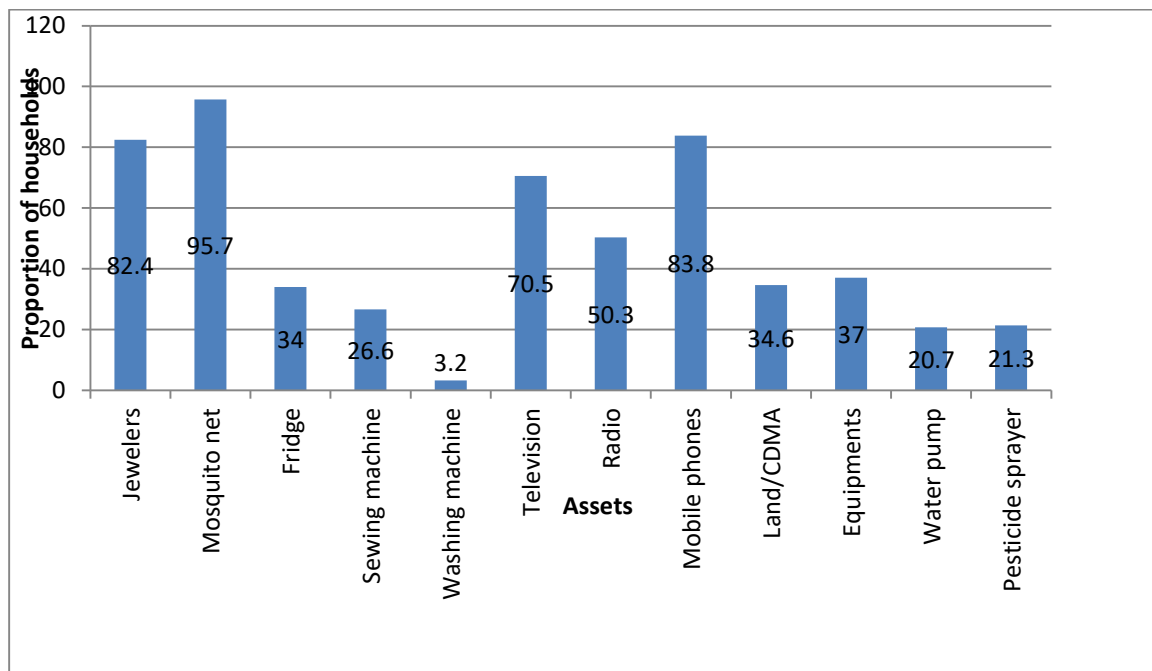
Characteristics	%	No. of households
Presence of livestock	22.6	85
Used for daily meal		
daily	17.6	15
2-5 times a week	34.1	29
weekly	4.7	4
1-2 times a week	0.0	0
none	43.5	37
Type of livestock available	Mean (SD)	
Cows	4.43 (7.02)	46
Poultry	7.96 (8.405)	47
Goats	10.71 (10.468)	7
Pigs	0.0 (0.0)	0
Fish /prawns	0.0 (0.0)	0

Type of livestock and the numbers varied with poultry being the commonest and pigs and fish/prawns, being not available.

3.6.5. ASSETS

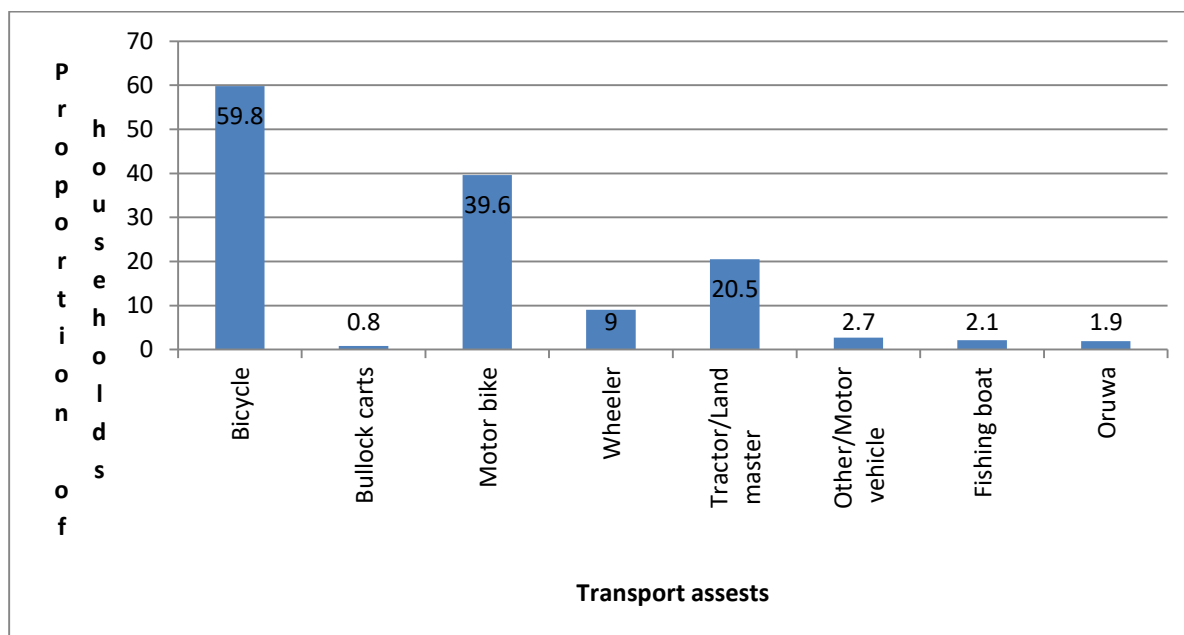
Availability of a number of household items was inquired into. Over 95.7% of the households had mosquito nets 83.8% had mobile phones, and 82.4% had jewellery. Between 70.5% of households had television and 34.6% of households had either Land or CDMA phones. Radio were available in 50.3% of households. However, sewing machines, water pumps, and fridges were available in one third to one fourth of households (Figure 11).

Figure 11: Ownership of Assets



Bicycles were the commonest mode of transport available in 59.8% of households with 39.6% and 20.5% of them having motor bicycles and tractor or land master respectively. Other forms of transport facilities were available only to a limited number of households. 2.1% 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, 20.3% was spent on food with 64.5% being spent on non food items. On an average, the total amount of expenditure on food during the previous week was Rs. 3,045.00, the maximum expenditure being on vegetables (3.3%), fish / dried fish / tinned fish / meat (1.3%) and on coconut and products (1.7%). 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.)	25 th and 75 th percentile (Rs.)	% out of total
Food items			
Rice/ Wheat flour /Bread	300.00	100.00-6700.00	2.0
Pulses / Dhal / Gram	200.00	100.00-300.00	1.3
Fish/dried fish/tined fish/meat/	450.00	201.25-700.00	3.0
Milk, milk powder, Curd, Yoghurt and	200.00	60.00-4500.00	1.3
Vegetables including leaves	500.00	250.00-737.50	3.3
Fruits	200.00	100.00-300.00	1.3
Fat and oil	200.00	100.00-200.00	1.3
Coconut and coconut products (except oil)	250.00	150.00-350.00	1.7
Sugar / Jaggary	150.00	100.00-200.00	1.0

Prepared food (food and drinks from restaurants and stalls)	0.00	0.00-200.00	0.0
Special nutritional food	0.00	0.00-200.00	0.0
All other food items	300.00	150.00-500.00	2.0
Total food items	3045.00	2230.00-4582.50	20.3
Non food Items			
Payments on debts	1500.00	0.00-5200.00	10.0
House rent	0.00	0.00-0.00	0.0
Education	325.00	0.00-1000.00	2.7
Consumable households items	500.00	300.00-1000.00	3.3
Cooking fuel /firewood /Gas	0.00	0.00-100.00	0.0
Transportation	500.00	200.00-1200.00	3.3
Communications	250.00	100.00-500.00	1.7
Livelihood inputs (tools seeds)	0.00	0.00-2000.00	0.0
Alcohol/Beer/Toddi / Tobacco/Beetle nuts	0.00	0.0-300.00	0.0
Gift to others	0.00	0.0-500.00	0.0
Water	0.00	0.0-0.0	0.0
Electricity	250.00	0.00-500.00	1.7
Medicine and health	600.00	3.00-1350.00	4.0
All other non-food items	200.00	0.0-575.00	1.3
Total non food items	9675.00	4700.00-18500.00	64.5

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)	6.89	0.628
Tubers (potato sweet potato, cassava etc)	2.09	1.246
Bread / Chapti / Roti	1.37	1.623
Pulses / Dhal	2.82	1.704
Fish	4.19	2.243
Meat (beef, pork, chicken)	0.93	1.101
Eggs	2.09	1.996
Dairy (curd liquid milk, powder milk etc)	3.48	3.109
Coconut products, palm oil, vegetable oil	6.61	1.308
Vegetables including leaves	5.43	1.95
Fruits	2.74	1.874
Sugar / Jaggary	6.59	1.452
Alcohol / Beer / Toddi	0.39	1.304

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	Not consumed or not responded
Rice and other cereals (wheat millet etc)	54.0	45.7	0.0	0.3	0.0	0.0	0.0	0.0
Tubers (potato sweet potato, cassava etc)	7.2	82.4	0.0	0.8	0.8	0.0	0.0	8.8
Bread / Chapti / Roti	1.9	58.5	0.0	0.0	0.5	0.0	0.0	39.1
Pulses / Dhal	1.3	94.4	0.5	0.0	0.3	0.0	0.0	3.5
Fish	4.5	1.2	0.3	0.3	0.3	0.0	0.0	3.5
Meat (beef, pork, chicken)	0.8	53.5	0.3	0.0	0.5	0.0	0.0	44.9
Eggs	7.4	66.2	0.3	0.8	0.8	0.0	0.0	24.8
Dairy (curd liquid milk, powder milk etc)	2.1	64.6	0.0	0.0	0.0	0.3	0.3	32.7
Coconut products , palm oil , vegetable oil	6.6	92.0	0.0	0.0	0.3	0.0	0.0	1.1
Vegetables including leaves	16.5	82.4	0.0	0.0	0.8	0.0	0.0	0.3
Fruits	6.9	84.3	0.0	0.3	0.6	0.0	0.3	7.7
Sugar / Jaggary	98.7	0.0	0.0	0.0	0.0	0.3	0.3	0.8
Alcohol / Beer/ Toddi	0.0	11.7	0.0	0.0	0.8	0.0	0.0	87.5

3.6.9. Food stocks

Inquiry as to the availability of food stocks in the household or money to buy food showed that in 56.6% of the households such food stocks or money was available only for a week's supply, with this percentage being 10.1% when the period for which food/money was available was for 2 weeks to one month. In 1.6% of households, there were no food stocks available.

54% of households did not have inadequate food for needs of the family during the last one year, which was more prominent in December (0.4%), November (24.2%) and January(22.9%) months.

Table 26: Food stocks in households

Food stock or money to buy food last	No.	%
Less than one week	213	56.6
one week to two weeks	112	29.8
Two weeks to one month	38	10.1
1 month to 3 months	5	1.3
More than three months	2	0.5
No Food	6	1.6
Inadequate food for family needs during last year		
Yes	203	54.0
No		
Percentage of households had inadequate food for family in different months		
January	86	22.9
February	64	17.0
March	22	5.9
April	12	3.2
May	9	2.4
June	24	6.4
July	24	6.
August	52	13.8
September	33	8.8
October	36	9.6
November	91	24.2
December	152	40.4

Chapter 4

CONCLUSIONS

This study shows that overall prevalence of global acute malnutrition (GAM) in the study area 24.9%, of which 20.7% is moderate acute malnutrition (MAM) and 3.5% is severe acute malnutrition (SAM). Prevalence of stunting was 14.7% with 12.0% with moderate stunting and 2.79% severe stunting. Percentage of underweight children was 31.0% with 6.0% 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 21.0%, was higher than the national level data from NFSS 2009 (18.1%). This percentage was higher (23.7%) among females compared to 17.8% among males. There was a decline in the prevalence with increasing levels of monthly household income with no clear pattern in relation to mother's education.

Assessment of the nutritional status of all pregnant women resident in the study area showed that only 3.5% mothers had a height less than 145 cms, 21.2% of mothers were identified as being undernourished (with MUAC ≤ 23) and 16.55 were anaemic.

Overall percentage of children with fever plus cough/cold and diarrhoea were 62.2% and 9.5% 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 30% 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 (95.5%) and 60.7% were given fortified food such as Nestum, Cerelac, Samposha etc.

Children between 6-23 months of age had minimum dietary diversity (82.1%). Only half (59.8%) of children aged 6-23 months has received a minimum acceptable diet. Among the breastfed children the percentage having minimum meal frequency was higher (74.0%) than the non breastfed children (50.0%).

Of the children, 97.8% had a CHDR and 97.6% had age appropriate immunization. However, deworming tablets were given only to 77.9% of the children within the previous 6 months with the percentage having received a vitamin A megadose was 85.5%.

Nearly 63.6% of households had access to a safe water supply with 39.9% having water from a protected well. Nearly 80.1% 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 83-87% while those who washed their hands before cooking and feeding the child was much lower ranging between 48 – 66%.

The main source of income for 32.4% of the population was farming. Home gardening was undertaken by 35.3% of the households with livestock being available only in 22.6% of the households.

Of the total income, 20.3% were spent on food with 64.5% on non food items.

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

In 56.6% of the households food stocks or money available for purchase was only for a week's supply and 54% of households did not have adequate quantity of foods during the last year which was worse in month of December.

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 and anemic women. 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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