RESULTS AND DISCUSSION

Chapter IV

RESULTS AND DISCUSSION

This chapter presents the findings of the research in accordance with the major objective of the study for each of the phases described earlier. The overall objective of the research was to study selected nutrition services of the NGO managed - ICDS in rural Vadodara and to strengthen the system for improved implementation and monitoring of selected services. The focus was especially on strengthening capacity of ICDS to improve Infant and Young Child Feeding (IYCF) practices in the community.

The research findings are presented and discussed under the following heads.

Phase I: Quality of implementation of nutrition related ICDS services managed by an NGO for children under 3 years in rural Vadodara – A Situational Analysis

1 Quality of implementation of ICDS in the NGO system: The Functionary Perspective

1.1 Quality of Care elements related to ICDS services
1.2 Profile of the functionaries and their nutritional status
1.3 Knowledge and perceptions of ICDS functionaries regarding selected ICDS services
1.4 Current implementation of selected ICDS services from observation data
1.5 Knowledge and perceptions of ICDS functionaries regarding IYCF practices

2 The Beneficiary Perspective

2.1 Perceptions of mothers regarding availability and utilization of selected ICDS services
2.2 Resources Available to the Mother for Child Care
- Socio-economic status of the family
- Nutritional status of the mother
- Family support

2.3 Perceptions and Practices of the mothers regarding IYCF
- Breast feeding (BF) and Complementary feeding (CF)
- Health related knowledge and practices
- Feeding during and after illness
- Hygiene care

2.4 Morbidity history of the children.
2.5 Nutritional status of children: Weight, Height and Diet Intake

Phase II: Capacity Building Training Intervention Towards Enhanced Implementation of ICDS in the NGO system

1 Part A: Improving the quality of implementation of nutrition related ICDS services within the NGO System in rural Vadodara

1.1 Lacunae in the NGO implemented ICDS system and interventions implemented
1.2 Modified and improved job functions

1.3 Training of ICDS staff with focus on improving quality of implementation of ICDS services – Pre to Post training assessment

2 Part B: Process and Impact Evaluation of the Intervention

2.1 Process evaluation of the enhanced ICDS after training

2.1.1 Changes in skills of AWWs regarding enhanced implementation of selected ICDS services

2.1.2 Changes in knowledge of ICDS functionaries regarding IYCF practices post intervention

2.1.3 The role of supervisors in monitoring implementation of enhanced ICDS by AWWs

2.2 Impact Evaluation of the intervention on Beneficiaries

2.2.1 Changes in knowledge and perceptions of mothers regarding IYCF practices (Intervened Vs. Control villages)

2.2.2 Impact on nutritional status of children (6-35 months): Height, Weight and Food intake. (Intervened Vs. Control villages)

2.2.3 Views of beneficiaries (Intervened group mothers) regarding changes in availability and utilization of ICDS services

3 Triangulation of qualitative methods (Interviews and Observations) and its significance during Baseline Assessment and Program Evaluation

Phase I: Quality of Implementation of Nutrition Related ICDS Services managed by an NGO for Children Under 3 years in Rural Vadodara – A Situational Analysis

The overall objective of Phase I, in brief, was:

From the functionaries' perspective, to study the management of ICDS services with the focus on quality of implementation of services and the contribution of the NGO in ICDS management: strengths and weakness.

From beneficiaries' perspective, to study the perceptions about availability and utilization of ICDS services; household level IYCF practices and the nutritional status of the (6-35 month) children.

1.1 Quality of Care Indicators Related to ICDS Services

The data related to quality of implementation of nutrition related services is presented in the following pages based on a framework for QOC for child health and nutrition programs adapted from Kanani 1998.

The broad components of the framework are given in Table 4.1.1 below.

Table 4.1.1 Components and Indicators of QOC in ICDS*

Components	Indicators of Quality of Care
▪ **Optimal use of resources:** Money, human power and material resources are efficiently managed with a focus on human resource development	
Knowledge and competence of service providers: Training, awareness of workers regarding the program	**Training of ICDS AWWs** - Timeliness of training - Content and training methods
Implementation	**Implementing services as per guidelines with available resources**
Monitoring and Supervision	**Monitoring-Supervision ensures** - Inclusion of QOC indicators in management information system (records, reports) - Assessing quality of implementation by AWW and coverage of the services
▪ **Adequate coverage of eligible children**	▪ Each AWC enrolls and offers services to all eligible children (0-3years) as per norms ▪ Children below 3 years and those in grade II, III and IV malnutrition are adequately covered
▪ **Services offered:** **Client needs are met** in a timely manner, services are culturally appropriate and seek to reduce gender bias against girls	▪ Regular availability of ICDS services ▪ Utilization of services by beneficiary families ▪ There is no gender bias in delivery of services by AWW at the AWC; proactive efforts by AWW to reach girl child ▪ Rate of utilization of services for girls and boys ▪ Monthly monitoring data is desegregated by gender
▪ **Services meet Short term and Long term goals** - There is balance between short-term and long-term goals of the services	▪ Short term goal of ICDS - provision of services (SF, GM) to all beneficiaries ▪ Long term goal - empowerment of women, and effective implementation of NHE service
▪ **Impact:** Awareness of optimal nutrition-health care practices; reduction in childhood morbidity and malnutrition	▪ Improvement in awareness among mothers regarding child health and nutrition ▪ Improvement in IYCF and child care practices and in nutrient intake of children through complementary foods ▪ Number and duration of episodes of illness (diarrhoea, cold and fever) ▪ Increase in proportion of children in Normal and grade I

*Adapted from Kanani (1998)

This is to be used as std?

Has this been discussed in Review? Use in study?

As mentioned in the previous chapter on methodology, several research tools were used to validate and strengthen the data such as interviews of functionaries, continuous unstructured observations, spot observations and secondary data review.

As given in the framework the results that are presented below cover various dimensions of

Quality of Care such as availability and utilization of services, quality of implementation, monitoring and supervision and impact on beneficiaries (knowledge regarding IYCF and child care, morbidity and nutritional status).

1.2 Profile of the Functionaries and Their Nutritional Status

As the table below indicates, a majority of AWWs (75%) were educated upto secondary level (10^{th} std.) or more, and had more than 5 years of work experience (65%).

Table 4.1.2 Profile of AWWs (N=20)

Profile	Percentage %
▪ More than 5 years of work experience at AWC	65
▪ Training attended before joining the AWC	30
▪ Training attained within - One year - 1 to 3 years	 50 50
▪ Received theory as well as practical training	100

Training: Only one third of AWWs had received training prior to joining their jobs. About 50% received training as late as 1-3 years after joining as an AWW. This training was offered by the Government for the AWWs of rural areas at Anganwadi Training Center in Vadodara district. The topics covered during the training program were preschool education, functions of AWW, how to organize NHE, immunization, how to weigh children and plot their growth curves. Apart from classroom teaching, AWWs also received a block placement for field training where they had to observe AWC activities and learn to actually carry out their job functions in a field situation. None of the functionaries received refresher training during their job tenure. A majority of the AWWs (80%) reported to receive one day training on growth monitoring where they learnt to accurately plot the weights of children on growth charts and identify the grades of malnutrition among children. Other one day training programs were on improving pre school education. None of these short training courses covered topics on nutrition or health care.

Further, there was no pre-service training for the supervisors. They learnt their job functions through on job training given by the coordinator recruited by the NGO, who helped them to monitor the AWC activities. Even later there was no refresher training imparted.

Nutritional Status of AWWs

Those who are taking care of the vulnerable groups themselves need to be in normal nutritional status and in good health.

Was this the case with the AWWs of this study?

On request, besides the sampled AWWs the remaining 20 AWWs were also included in this assessment. The mean age of AWWs was 32 years and it ranged from 22 to 49 years as it included freshers as well as experienced AWWs. To assess the nutritional status of AWWs, their height, weight and Hemoglobin (Hb) levels were measured. Results indicated that AWWs suffered from weight deficits. Nearly one fourth (23%) weighed less than 40 kg whereas only 8% AWWs had height less than 145 cm. Almost half were under nourished, with 40% AWWs having BMI <18.5. Along with low BMI levels these AWWs also suffered from anemia. The mean Hb level was 11.7 gm/dl. More than half (55%) were anemic (Hb<12 gm/dl). Thus, the nutritional status of ICDS AWWs was poor and needed attention.

Table 4.1.3 Anthropometric measurements of AWWs (N=40)

Indicators	Values AWWs (N=40)	MOTHERS (N=115)
Mean Height (cm) Height <145cm	152 cm 7.5%	149.7 ± 0.5 13%
Mean weight (kg) Weight <40 kg	45.7 kgs 22.5%	41.6 ± 0.6
Mean BMI BMI <18.5	19.88 40%	18.5 ± 0.3 58.3
Mean Hemoglobin Hb <12gm/dl	11.7 gm 55%	

1.3 Knowledge and Perceptions of ICDS Functionaries Regarding Selected ICDS Services

As Table 4.1.4 reveals, nearly half of the AWWs stated that Growth Monitoring (GM) helps in detecting increase or decrease in weight of the child and grade of malnutrition. However, nobody mentioned that its main objective was to prevent increase in prevalence of malnutrition. Hence, GM was mainly for detecting malnutrition and managing severe grades rather than preventing it. None of the AWWs stated the use of growth chart for counseling the mothers. Although a majority (60-80%) of them were aware of the procedure of GM, very few mentioned the accuracy and care to be taken while weighing the child.

Table 4.1.4 Knowledge of AWWs Regarding Selected ICDS Services

Responses of the AWWs	N=20	%
Growth Monitoring (GM)		
Objectives of GM		
▪ To know whether child is gaining or losing weight	13	65
▪ To know the grade of malnutrition of the child	10	50
▪ If child is malnourished advise the mother to give nutritious food; take child to the doctor; send child regularly to AWC	7	35
Procedure of GM		
▪ Use salter scale for 1-3 year children	16	80
▪ Hang the scale and trouser properly; check the zero mark	2	10
▪ See that the child is steady and not crying	4	20
▪ Take weight and mark in the register	12	60
▪ Fill the growth card	12	60
▪ Do the gradation	12	60
▪ Prepare the MPR and submit to supervisor	3	15
Ensure that both boys and girls are covered during GM	20	100
Supplementary Feeding (SF)		
Objectives of SF		
▪ Child receives SF at AWC which he may not be getting at home	16	80
▪ To improve the nutritional status of the child; for growth and development	8	40
▪ Child avails all the other ICDS services when he comes to AWC for SF	5	25
Change in health status of children due to SF		
▪ Child's nutritional status improves; gains weight	13	65
▪ Child learns to eat	6	30
Records maintained		
▪ Number of children present in AWC	18	90
▪ Amount of ingredients used for food supplements	18	90
▪ Note which recipe is cooked	8	40
▪ Record of the food stock	5	25
Nutrition Health Education (NHE)		
Objectives of NHE		
▪ To improve the nutritional status of children by improving IYCF practices	14	70
▪ To improve the food intake of pregnant and lactating women	8	40
▪ To increase awareness regarding immunization		
▪ To increase utilization of ICDS services	4	20
▪ To remove food taboos and false beliefs	3	15
	2	10
Benefits of NHE		
▪ Improvement in health status of: the child	12	60
the mother	4	20
▪ Increased awareness regarding family planning	4	20
▪ Increased awareness regarding immunization	3	15
▪ Improvement in personal hygiene	3	15
▪ Increased school enrollment rate	3	15

Responses of the AWWs	N=20	%
Topics covered under NHE		
▪ Immunization	10	50
▪ IYCF practices	9	45
▪ Diet and nutrition	7	35
▪ Utilization of FS service at AWC	6	30
▪ Growth monitoring	4	20
▪ Preschool Education service at AWC	4	20
Change in health status of the beneficiaries due to NHE		
▪ Improved health status of the child; weight gain	11	55
▪ Decreased mortality and morbidity in children	7	35
▪ Improved health of the mothers	3	15

As regards objective of Supplementary Feeding (SF) service, majority (80%) stated that children received extra supplements. Few also believed that children attended AWCs as SF was distributed to them. All of them agreed that SF had a positive impact on health of the children and more than half (60%) reported weight gain and improvement in nutritional status.

AWWs had little knowledge about objectives of NHE service. Though a majority of them mentioned the objective as improving nutritional status of children by improving IYCF practices, none of them stated that it is to enhance the capability of the mother and to empower them to look after their own health and health and developmental needs of their children and family. According to them all topics under NHE were covered e.g. improving IYCF practices, health, immunization and utilization of AW services. *However, the observation data revealed a contrasting picture; the NHE service was the poorest of all services.*

1.4 Current Implementation of Selected ICDS Services (Continuous Monitoring observations and Spot observation)

Continuous unstructured observations (N=5 observations) were carried out for the entire AWC duration each time to see and document the type of activities as well as sequence and quality of activities. Illustrative examples of two such observations of the type and sequence of activities at AWC are given below in Box 4.1.1 and Box 4.1.2. These were compared with the expected job functions as given in 'The Handbook for Anganwadi workers' (NIPCCD 2006).

Do the AWWs perform their expected AWC activities efficiently?

According to 'The Handbook for Anganwadi Workers' (NIPCCD 2006), an AWW should plan and organize activities at AWC in such a manner that all the ICDS services are delivered covering all the beneficiaries in the community.

- An Anganwadi is expected to run an AWC for $4^{1/2}$ hours.
- An AWW should open and close AWC on time.
- An AWW and the helper should reach AWC before time for: cleaning of the Anganwadi, making arrangements for drinking water and for imparting PSE activities, and cooking supplementary food (if required) or keeping the food ready for distribution.

The Daily Activities at AWC should be:

a) Inspection of children for cleanliness
b) Organizing Supplementary Nutrition for children, expectant and nursing mothers.
c) Washing hands of children before and after taking Supplementary Food
d) Organizing Preschool Education activities
e) Treatment of common childhood illnesses & minor ailments
f) Referral Services as and when required
g) Conducting Home Visits
h) Record Keeping

Expected Time for Daily Activities at AWC

An AWW should adhere to the time allotted for health, nutrition and education activities so that all the services are provided to the beneficiaries.

Daily Tasks	Expected Time
Preschool Education	2 Hours (120 min)
Preparation and Distribution of Supplementary Nutrition	1/2 Hour (30 min)
Treatment of Common Childhood Illnesses/ Ailments & Referral	1/2 Hour (30 min)
Filling up Records and Registers	1/2 Hour (30 min)
Making 2-3 home visits	1 Hour (60 min)
TOTAL	**$4^{1/2}$ Hours (270 min)**

Some of the consistent findings of our observations on the daily tasks and time spent on each activity compared to the expected functions are given below.

Table 4.1.5 Findings of Unstructured Observations on Routine Activities Conducted at AWC

Daily tasks (expected job functions)	Activities conducted	Quality of service	Time spent (on average)
▪ Preschool Education activities	✓	PSE was not conducted for any fixed time duration; the AWWs had no predecided sequence of activities for each day. Younger children below 3 years were neglected (no motor development skills were taught)	1 hour
▪ Preparation and Distribution of	✓	Helper prepared the SF; AWW did not have to spend time for this	20min

Daily tasks (expected job functions)	Activities conducted	Quality of service	Time spent (on average)
Supplementary food to beneficiaries		service. Standard measurements were not used (for measuring the raw ingredients and for distribution). Very few pregnant and lactating mothers came for SF.	
▪ Treatment of common childhood illnesses & minor ailments	x	There was no case observed where the mother came for treatment of her ill child	-
▪ Referral Services	x	No case observed	-
▪ Conducting Home Visits for NHE	x	During the whole observation period no home visits were made by the AWW for imparting NHE to the women	-
▪ Record Keeping	✓	After the children left the AWC, the AWWs filled records and registers either in AWC or at her own home. Some even conducted this task at home in the morning and came late to AWC. Few AWWs left the children to play on their own and filled registers neglecting PSE activities.	1 hour
▪ Inspection of children for cleanliness (personal hygiene, washing hands of children before and after taking SF)	x	AWWs did not inspect the personal hygiene of children nor did she teach them good hygiene practices	-
		Total Time spent	**2hours 20 min**

Note: On week days from Monday – Friday, the AWC was expected to function from 10.30 am-3 pm and on Saturday from 8 am-12.30 pm. However, it was disheartening to note that these timings were never followed. AWCs never started on the scheduled time and they always closed before time. Hence instead of $4^{1/2}$ hours AWCs functioned only for $2^{1/2}$ - 3 hours.

Box 4.1.1 A Typical Day at AWC (Weekday)	
11.25 am	Investigator visits AWC and takes permission from helper to observe the activities.
11.30 am	Children are still arriving at the AWC. AWW is not present. All the children are busy eating their own snacks. Children use doya and katoris for taking water from the pot.
11.35 am	AWW arrives at AWC. She makes them recite poems, perform action songs with exercise. Helper cooks supplementary food – *muthiya*. She does not use any standard measurements and takes approximate quantity of flour for preparing *muthiya*. Quantity to be cooked on the present day is decided on the previous days attendance.
11.45 am	All children are taken outside. One girl cleans the whole room.
12.00 pm	AWW makes all children stand in a circle. Children run around the tiffins kept in the centre.

12.15 pm	Older children are made to recite the names of alphabets, animals, birds, numbers, fruits and vegetables
1.00 pm	AWW takes lot of time in managing children. Children are not disciplined. Children below three years are neglected. Majority of these children play on their own, few cry or go off to sleep.
1.15 pm	3-4 older children serve water to the younger ones as instructed by the AWW.
1.30 pm–1.40 pm	AWW and helper make all children sit in a circle, recite prayer and distribute SF in steel plates. Food is served using a ladle but the serving size is not fixed. Few finish the first serving and ask for the second. Second helping is given in their tiffins. After children finish eating, AWW gives IFA tablets to all. But majority of them start running away, so AWW cannot distribute it systematically. She does not take the attendance. Some eat it, some throw it away, and some drop it on the way. AWW does not keep track of who missed the iron supplement.
1.45 pm	All children leave. Two elder girls pick up the plates and sweep the room. None of the pregnant or lactating mothers come for SF. Helper leaves AWC early so her daughter serves the snack. She does not wash the plates, just wipes them and puts them back.
1.50 pm	AWW locks the AWC and leaves. She does not go for home visits.

Box 4.1.2 A Typical Day at AWC (Saturday)	
9:30 am	No activities are performed at AWC. There are very few children in AWC. Children are playing by their own. AWW immediately starts reciting poems when she sees investigator entering AWC. Investigator takes permission from AWW to observe the AWC activities.
9:50 am	Helper instructs children to go outside on the ground and starts cleaning AWC
10:00 am	AWW makes children play frog race. Half children take part in the frog race and remaining half eat their tiffins.
10:30 am	More children start arriving at AWC. Total strength becomes 42 children. AWW is not able to attend to all children. Children below 3 years are neglected. There is no discipline and no structured time plan for different activities. AWW makes them exercise. When investigator inquires about AWC working hours, AWW replies "on week days when AWC timings are from 10-3pm children come at 11, but on Saturdays timings are from 8-11 in morning and children come at 9 or 10 and never at 8. Many come at the usual afternoon time at 11 take *nashta* and go. Mothers have to fill water, cook for their husbands so they send their children only after they are free".
10:40am	Children make a circle and form a train. AWW recites "*chuk chuk*" poem and children enjoy.
10:55am	AWW shows picture cards to children from the ICDS kit
11.00am	Helper gives water to children
11.05am	Few older children recite songs and others listen or eat their tiffin.
11.10am	Children are taken out to wash hands. All of them dip their hands together in the bucket. Neither helper nor AWW teach children about personal hygiene (how to wash their hands). Children just dip their hands in water and wipe them on their dirty clothes.
11.20 – 11.35am	Supplementary food served to all children using a ladle. There is unequal distribution of snack and helper decides the quantity according to the child's capacity to eat. No standard measurements used. Children are given second helping. Some children finish off the snack at AWC while the others take it home.
11.40am	Children start leaving AWC. Older girls are instructed to take the plates and vessels outside the AWC to wash. Few older girls wash all plates. Helper complains "we do not have soap to wash vessels so we use mud".
11.45am	AWW locks the AWC. AWW does not go for home visits.

Was adequate attention ~~was~~ given to all beneficiary groups; how was the attendance and utilization of ICDS services?

3-6 years: Children came to AWC for preschool education and SF

Children below 3 years: Young children came only for snacks. These children came to AWC with their elder siblings; played on their own, ate their tiffin and went off to sleep.

Pregnant and lactating mothers: This was the most neglected group. AWW did not conduct home visits or NHE group meetings to create awareness on the importance of each ICDS service and its benefits. This kept women away from AWCs. Mothers only came to drop and pick up their children.

Spot Observation Data on Functioning of ICDS AWCs

Spot observations of the nutrition related services were made at all 40 AWCs and they added valuable insights regarding quality of implementation.

Given below are the highlights of what was observed for each specific ICDS activity as it was being carried out. As regards the quality and sequence of activities carried out at AWCs, 28 spot observations corroborated and complemented the continuous unstructured observations presented above.

Routine activities carried out in the AWCs during Anganwadi hours (N=28 spot observations)	
- AWW did not pay attention; children were crying - Few children went off to sleep - Some AWWs kept shouting and made children sit quietly but did not conduct any activity - AWWs did not pay any special attention to children below 3 years of age - Many children were seen sitting idle and eating snacks (*mumra*, biscuits etc.) brought from home	n=21
▪ At a few places AWWs filled registers at home and arrived late at the AWC	n=8
▪ A few AWWs were busy with their own kids or in filling up the registers in the AWC. Children came, played on their own and went back home without participating in any constructive activity	n=3
▪ In some AWCs, AWWs distributed supplementary food before the allotted time and sent children home early	n=5
▪ Children were sent home early as the AWC was used as an immunization center by the PHC	n=3
▪ In some cases, during 1:45pm - 2:30pm there were no children at AWCs. Reasons given were "children feel hungry and sleepy so SF is served before time", or "there was a wedding, funeral or *shrimant* in the village so children were left early"	n=10

Hygiene observations (N=35)	
▪ Majority of the AWCs were kept clean, but drinking water facility was not proper (*doya* not used, limited number of glasses).	n=25
▪ At some AWCs only one glass was kept near the water pot which was used by all the children. This might lead to contamination and spread infections like cough and cold.	n=15
▪ Children at many AWCs were untidy. Nearly 50% children in each AWC came with dirty clothes, or running nose and long and dirty nails. This revealed that mothers were not taught about good hygiene practices by the AWWs.	n=15
Supplementary Feeding service (N=25)	
▪ Very few children stayed in the AWC to eat the whole meal, majority took it home.	n=12
▪ At few AWCs pregnant or lactating mothers came to take the snacks but not regularly.	n=15
▪ Second helping was given only if the children asked, nobody was encouraged to eat more. AWW did not force or encourage the mothers to make their children eat SF at AWC.	n=25
▪ No standard cooking or serving sizes were used which led to insufficient / inadequate quantity of SF being distributed to children than the recommended amount of 60gm raw / 1cup (200ml) cooked snack.	n=25
▪ SF given in tiffins and not in plates in some AWCs.	n=12
▪ Children picked up snacks littered around on the floor and ate it.	n=15
▪ In few AWCs, children were made to wash hands before and after serving food by dipping hands in bucket of water, which was not a correct hygiene practice.	n=8
▪ In some AWCs the helper or any of her family members took away the left over food instead of serving a second helping to the children.	n=10
***Rab* Supplementation program (N=25)**	
▪ The program was poorly implemented (e.g. irregular preparation of *rab*, lack of a standardized recipe, absence of counseling) in all AWCs observed.	n=25
▪ *Rab* was not cooked even once during the whole observation period.	
▪ It was sporadically monitored by the supervisors. Of the few mothers who reported to be aware about this program, none of them were taught how to cook *rab* at home.	
Growth Monitoring (N=8)	
▪ All observations revealed that AWWs did not weigh the children properly (i.e. they did not check the weighing scale to zero mark, did not hang the trouser properly, trousers were torn, child was not stable, child kept crying)	n=8
▪ They were mainly concerned with filling up registers to make the MPR report.	n=8
▪ Salter scales were used for younger children and bathroom scales for older children.	n=8

▪ Infant weighing scale was used to weigh very young infants. But weighing was not done accurately. ▪ One AWW simply copied the values of the previous month in the current month column without weighing half the children. ▪ None of the mothers were shown the Growth chart nor explained about their child's growth and development.	n=2 n=1 n=8
Nutrition Health Education service (N=35) This service was the poorest of all services implemented at the AWCs. In all spot observations: ▪ Nutritional counseling was not given to the mothers at the time of growth monitoring. ▪ No IEC materials like charts or posters were used. ▪ It was disappointing to note that not a single NHEC session was conducted either through a group meeting or home visit over a period of 4 months. *This was confirmed by the responses of the mothers during their interviews. Majority of the mothers reported that they were not aware of the rab supplementation program. They had not even seen the growth chart, which reveals that AWWs made no efforts to impart knowledge or educate the mothers regarding the services available at the AWC nor did they teach them optimal child feeding and care practices.* ▪ However, majority of the AWWs responded that NHEC meetings were held atleast once or twice a month. They also explained the difficulties they faced while conducting such meetings. A few responses were: *"Women do not come, those who come do not understand our messages and we have to explain repeatedly". "Some women don't agree to what we say, we cannot convince them easily, they would only believe in experts like you".* ▪ When inquired about when did they go for home visits, they replied *"ame AWC ma avta ane jata vakhte behno ne salaah api daiye"* (on our way to AWC and while returning back home we advise the mothers). Regarding the information imparted during home visits, they said *"ame emne kahiye ke tamara balak ne vajan karava layi avo, rasi mukava avo, nashto leva muki jao"* (we tell the mothers to bring their children to AWC for growth monitoring, vaccination and supplementary foods). This revealed that home visits were mainly to remind beneficiaries regarding use of ICDS services, whereas knowledge regarding IYCF or any other nutrition-health topic was not imparted to mothers.	n=35
Presence of charts and posters at the AWCs (N=35) ▪ Few AWCs had posters on immunization, pregnancy-lactation and preschool education. This revealed that those AWWs were aware of the importance of disseminating information and knowledge to women. However, none of the AWWs was observed explaining these messages to mothers coming to their AWC.	n=10

Conducting surveys, filling up registers and making monthly progress reports took up about one third of AWWs working hours, leaving them inadequate time for monthly NHE meetings and regular home visits.

Number of registers maintained by AWWs

1. Immunization register
2. Survey register
3. Pre school attendance, SF register
4. Food stock register / *patrak*
5. Visitors register , home visit register
6. Growth chart register
7. Birth and death register
8. Referral service register
9. *Mahila mandal* register
10. Monthly Progress Report
11. Medical stock register
12. Family planning register
13. Thrift program, vertical campaign register

Reporting taking away a lot of functionaries work time: AWWs and supervisor completing their MPR reports and registers

Further, ICDS functionaries had to look after a host of vertical campaigns (pulse polio campaign, demographic surveys); many of which were not directly related to primary objectives of ICDS) and which also took away a significant proportion (about one-fifth) of their work time (Table 4.1.6). For time intensive activities like nutrition health education and women's empowerment for better child care (a key objective of ICDS), scanty efforts were made in the time available with the functionaries.

Table 4.1.6 Vertical Campaigns and Major Activities During Study Year

One year of the study period	Vertical Campaigns	Approximate No. of Days Devoted by AWW	Percentage of total working days* (%)
January - March	▪ Pulse Polio National Program ▪ Republic Day Celebration ▪ Survey in their respective areas ▪ Women's Day Celebration	15	6
April - June	▪ World Health Day Celebration ▪ Pulse polio program ▪ Hygiene and Sanitation Week ▪ Cleanliness Drive	13	5

July - September	▪ Health care activities to celebrate Indian Independence day ▪ Sporadic public functions, rallies and campaigns during Breast Feeding and Nutrition Week	17	8
October - December	▪ Children's Day Celebration ▪ *Bal Mela*, Picnics ▪ Pre preparation for Pulse Polio program in January	11	4
	Total No. of Days in a year spent in vertical campaigns	56	23%

* Effective Working Days = 253

Note: Out of 253 working days (excluding holidays and festivals), the AWWs spent 56 days in the above mentioned activities which accounted for 23% (one-fifth) of their work time. Although many of these activities are health and nutrition related, they are sporadic events and are not adequate in themselves to promote behaviour change, for which sustained household level contacts and regular small group meetings are required.

Interview Responses of the Supervisors Regarding ICDS Services and Functioning of the AWCs

Profile of the supervisors: Both the supervisors had a work experience of 3 years with the NGO. They never received any pre job training however, after one year of joining their job they were sent for a 3 month field training program. Till then they learnt and performed their job functions on the job. Further, after the induction training, they never received any refresher training.

Knowledge regarding ICDS services: Both the supervisors had adequate knowledge about the objectives and importance of GM, SF and NHE services.

Monitoring of ICDS services

Growth Monitoring service: As regards GM, both the supervisors stated that

- They call mothers of children in 3rd and 4th grade malnutrition for weight monitoring every month and explain the importance of feeding nutritious food.
- They ask the AWWs to counsel mothers using the growth chart regarding the grades of malnutrition.
- They check the process of weight measurement, plotting on the growth chart and gradation in the registers

Supplementary Feeding service: As regards SF service, both the supervisors stated that

- They monitor the quantity of SF and its coverage.
- They stress on adding drumstick leaves in salty recipes.
- They check the stock of grains, oil and spices
- They instruct the AWWs to give a second helping to all children if there is any left over food.

Rab Supplementation program: As regards *Rab* supplementation, both the supervisors stated that

- They cannot monitor this program regularly in every AWC as it was implemented only once a week. However, they counsel the mothers of severely malnourished children to bring their children for ***rab*** and also prepare it at home.
- There is no standard method of cooking *rab*, hence some make it thin and some make it thick.
- They tell AWWs to call all children between 7-12 months of age for *rab*, however, only the mothers living nearby turn up.

Nutrition Health Education service: As regards NHE service, both the supervisors stated that

- During growth monitoring sessions they counsel mothers regarding introduction of complementary foods and importance of balanced diet for child's growth and development.
- They counsel pregnant women to eat more GLVs and increase the quantity of food intake when they come to take SF.
- They monitor home visits and group meetings by checking AWWs' home visit register (number of visits or meetings and topics covered). However, they cannot go with AWWs to check whether they actually made home visits. Due to reporting and audit work, they had not conducted any *mahila* meeting in any village neither were they informed of any group meeting organized by AWWs.

Difficulties faced during supervision and monitoring of AW services

According to the supervisors:

- There were no growth chart registers with AWWs, hence they could not monitor the growth of each child in AWC.
- AWWs never conducted any group meetings.
- They lacked proper IEC material on all topics related to health and nutrition.
- There was lack of cooperation and community participation. The village folk gathered only when experts from the NGO or medical advisors and doctors visited the village.
- There was less time for field visits and more time had to be devoted for reporting and register work. They had to prepare a consolidated report from all the Monthly Progress Reports (MPRs) submitted by the AWWs and send it to the CDPO. They also had to fill

5-7 *patraks (formats)*: water and sanitation facilities, total mortality rate and birth rate, housing facilities in the villages, education and socio economic status of villages. One supervisor stated "*the NGO should hire one person just to fill in all the reports and registers so that we can dedicate all our time only on field visits for better monitoring and improving quality of implementation of services*".

Table 4.1.7 Monthly Work Schedule of Supervisors

Job Functions	No. of Days in a month spent on different job functions
Pagar (Salary) meeting	1
Monthly Progress Report meeting	2
Taluka Panchyat meeting	1
Patrak 4 (Format) corrections	1
Patrak 7 and *patrak* 9 correction	2
Medical Checkup / Referral service at any one AWC	1
3 days vertical campaigns or holidays due to festivals	3
2 Second Saturdays and 4 Sundays	6
Total No. of Days in a month not spent on field visits	**17**
Remaining days in a month	13*
*Each supervisor made 2 AWC visits everyday on these 13 days. Hence, on an average the supervisors could visit each AWC only once in a month which was very little time to monitor and improve the quality of implementation of services.	

Direct observation data: Routine job functions of Supervisors as performed in the field

- Supervisors did perform several of their expected job functions, but provided little guidance to the AWWs to improve quality of implementation of a few services.
- They monitored supplementary feeding service efficiently (quality of SF, coverage of SF to all beneficiaries) but did not standardize the recipes; consistency in serving size was not monitored.
- They were not found guiding AWWs regarding the process of conducting effective NHE during growth monitoring at any point during the formative research phase.
- They checked the home visit registers but did not accompany the AWWs for home visits on any occasion.
- Writing reports and filling registers took more than 50% of their work time.

1.5 *Knowledge and Perceptions of ICDS Functionaries Regarding IYCF Practices*

As table 4.1.8 reveals, a majority of the AWWs interviewed believed that the child should be fed breast milk immediately after birth.

Table 4.1.8 Perceptions of Anganwadi Workers Regarding IYCF and Care Practices

Responses	(N=20)	%
How long after birth should a child be put to breast?		
▪ 1 hour / immediately	18	90.0
Age of Exclusive Breast Feeding (not even water)		
▪ <6 months	8	40.0
▪ 6 months	12	60.0
Age of initiating water feeding		
▪ <6 months	17	85.0
Age of initiating complementary foods (CF)		
▪ <6 months	6	30.0
▪ 6 months	11	55.0
Benefits of Complementary feeding		
▪ Child becomes healthy	11	55.0
▪ Physical and mental growth and development of the child takes place	10	50.0
Harmful effects of delayed feeding		
▪ Child will become malnourished and will not gain weight; growth and development will slow down	17	85.0
▪ Child will not learn to eat	5	25.0
CF which are 'good' for the child		
▪ Vegetables	13	65.0
▪ Fruits	12	60.0
▪ *Khichadi*	11	55.0
▪ Cereals & pulses	10	50.0
▪ *Rotla – rotli*	8	40.0
Reasons why these foods are 'good'		
▪ They help in faster growth and development	5	25.0
▪ Child will not feel hungry	4	20.0
▪ Don't know	8	40.0
Best ways to feed the child		
▪ Encourage the child to finish up the meal	19	95.0
▪ Sit with the child; feed at regular intervals	13	65.0
Causes of child's illness		
▪ Unhygienic conditions / environment	18	90.0
▪ Consumes less food / inappropriate food	15	75.0
Treatment during illness		
▪ Doctors treatment	19	95.0
▪ Take child to AWW	10	50.0
▪ Give good food to the child	9	45.0
If child is ill and receiving CF, then mother should feed her child same as before	19	95.0
Give reasons for same as before		
▪ If not given food child will become weak and loose weight; will not be able to walk	12	60.0
▪ Will recover fast	3	15.0

Responses	(N=20)	%
Causes of malnutrition		
▪ Food deficiency	16	80.0
▪ Illness and infection	11	55.0
▪ Less care by the mother	5	25.0

Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

More than half (50-90%) were aware of: the advantages of colostrum "yellow milk provides immunity to the child to fight against diseases" (*pilu dhavan to balak ne rog same ladva ni shakti aape*); initiation of CF at 6 months; foods that are healthy for the infants (fruits and vegetables, *khichadi* and pulses); benefits of CF and harmful effects of delayed feeding. However, they lacked knowledge regarding age of EBF, initiation of water and quantity of food to be given in each meal. According to half of them, a child below one year of age should be fed 1-2 tsp (5-10ml) in each meal, which is too little to meet daily requirements of all nutrients from CF. According to 95% AWWs, their understanding of active feeding was: encouraging the child to eat and feeding the child at regular intervals. Unhygienic conditions and inappropriate foods were reported as major causes of illness whereas food deficiency and infections were stated as major causes of malnutrition. A majority (90%) of them believed in continuing CF same as before even during illness. Reason stated was "if proper food is not given child will become weak and malnourished" (*sarkho khorak na khavdava thi balak nablu ane kuposhit thai jae).* Thus, responses obtained through AWWs interviews revealed that awareness regarding IYCF and child health care practices was fairly adequate amongst them.

Role of the NGO System in ICDS Implementation

For improving QOC in implementation of ICDS services, the NGO contributed significantly. The enhanced inputs mentioned below are not normally a part of Government run ICDS system.

Infrastructure support: Medical care and effective referral back-up through a well-equipped hospital was provided by the NGO for ICDS beneficiaries. Once a month a medical team visited one AWC to monitor health status of children. Any severely malnourished or ill child was referred to the hospital run by the NGO for prompt treatment. Every year, each AWC received toys, picture books, paper, crayons, water colors, pencils, charts (for pre school education), floor mats, glasses, earthen pots, cloth filters (to maintain hygiene) and other supplies from the NGO to enable efficient functioning of the AWCs.

Program support: Apart from what the government allocates for supplementary foods, the NGO contributed from its own funds and provided nutritious SF like maize *muthiya* (steamed snack), boiled *chana* (bengal gram whole) and *khichadi* made from *mung dal* (green gram) and rice. All beneficiaries from 1-6 years of age in grade II and above were given single ration whereas severely malnourished (grade II & IV) were supplied double ration.

Nutrition Education Program: As a demonstration-cum-supplementation tool, a "*Rab*" (wheat based sweet gruel) supplementation program was also implemented once a week in all AWCs. Mothers of children (7-12 months of age) attended these demonstration sessions. The *rab* was prepared and fed to the children in front of the mothers to convince them of the need to initiate complementary foods at 6 months. Mothers were shown that their children can accept the gruel. They were taught how to prepare it at home and feed their child on other days of the week.

Monitoring and Coordination Support: The NGO had appointed one full time coordinator who functioned as an effective link between the NGO and ICDS (functionaries and beneficiaries) and coordinated all the ICDS activities between the supervisors and AWWs. She initiated, organized and coordinated all the programs and campaigns and guided functionaries to improve their functioning skills. She also worked as a mediator when supervisors were not able to sort out any problem with AWWs.

DISCUSSION

The discussion below compares the results of the present study with findings of other studies as regards the quality of implementation of nutrition related ICDS services managed by the NGO, based on a framework for Quality of Care (QOC) for child health and nutrition programs adapted from Kanani 1998. The elements studied were: the availability and utilization of services, quality of implementation, monitoring and supervision, profile of the AWWs and supervisors (training received) and their perceptions about ICDS services and IYCF and child care practices.

★ **Training:** While AWWs tend to be well-educated, they are often poorly trained for ICDS tasks. In the present study, only one third had received training prior to joining their jobs and none of the functionaries received refresher training during their job tenure. Even for the supervisors there was no pre-service or refresher training imparted.

Kanani and Patel (1994) interviewed the training instructors in urban Baroda to know the content and duration of training imparted to AWWs. Both practical and theoretical aspects were taught using audiovisual aids. The 15 days block placement for field experience gave each trainee a practical experience of running an AWC. Similarly in 2003, interview responses of 50 AWWs in Chittoor district of Andhra Pradesh revealed that all of them in different randomly selected projects had undergone orientation for 3 months or job course training and also refresher training for a week or even a month.

However, Kapil and Tandon (1990) observed that the quality of training of AWWs, conducted mainly by the voluntary agencies, required improvement, as also studied by Kanani and Zararia (1996) who observed that the training was oriented more towards 'information giving' rather than 'skill development'.

★ **Knowledge of AWWs related to GM, SF and NHE:** Majority of the AWWs of this study had fairly satisfactory knowledge regarding the objectives of GM and SF. However, very few of them mentioned the accuracy and care to be taken while weighing the child and none of them stated the use of growth chart for counseling the mothers. GM was mainly for detecting grades of malnutrition rather than preventing it. Majority of the AWWs believed that there was a positive impact on health of the children due to SF. However, NHE service was the poorest among all services. None of the AWWs could state the actual objective of NHE i.e. to enhance the capability of the mother and to empower them to look after their own health and health and developmental needs of their children and family.

Similar to findings of the present study, majority of the AWWs (70%-94%) of Chittoor district in Andhra Pradesh (Shobha 2003) reported that giving immunization, conducting pre-school program and distributing SF were their major responsibilities; around two third (66%) mentioned giving nutrition health education and only few (25%-30%) mentioned home visits, distribution of IFA tablets and referral service as also their responsibilities. As regards impact of ICDS services on the beneficiaries: one-third of the AWWs reported improvement in health of their village women and children due to immunization service; one fifth (21%) perceived a change in their cooking practices and food habits and few also stated that regular consumption of SF at AWC improved health of beneficiaries (16%).

A study conducted in urban Baroda on ICDS functionaries (6 AWWs, 6 ANMs, 30 women and 60 children from 6 AWCs) revealed that all the AWWs reported the use of growth card as a tool for educating mothers regarding their child's nutritional status. Most of them stated that GM was conducted to know whether the child is gaining or losing weight. All of them

believed that SF influenced children's health positively and their weights increased. Two third of the AWWs stated that the objective of NHE was to improve nutrition intake and health of beneficiaries while half of them also stated that NHE was to decrease child and maternal morbidity and increase awareness regarding immunization (Kanani & Patel 1994).

Other studies reported contradicting results depicting large variation in knowledge of AWWs and quality of functioning of AWCs. While in a study by Kant et al (1984), a majority (93%) of the AWWs could not even answer the full form of ICDS; on the other hand, Tandon (1997) commented that the knowledge of the AWWs with respect to ICDS services were adequate.

★ **Quality of Implementation of AWC activities:** *Continuous unstructured observations* were carried out in the present study and documented to see the sequence and quality of activities. Observations on the daily tasks and time spent on each activity revealed that the AWCs were open only for 2.5 - 3 hours than the expected 4.5 hours. Out of this limited time, majority of the time was spent on Pre School Education (PSE) activities and record keeping. None of the AWWs were observed conducting home visits or counseling mothers during growth monitoring sessions. *Spot observation* data also corroborated and complemented the continuous unstructured observations: children below 3 years were neglected; SF was served before the scheduled time; half of the snack was taken home by children; personal hygiene of the children was poor; *Rab* supplementation never functioned; during GM session weighing was not done accurately; GM was mainly conducted to identify children in different grades of malnutrition and not for promoting IYCF and child care practices to mothers; AWWs were busy with filling up MPR reports; no home visit or NHE meeting was observed during the observation period; AWWs had no IEC material to impart NHE on nutrition and health care of women and children.

Similar to these findings, NCAER report (2001) also revealed that the amount of time spent by the AWWs on supplementary nutrition related activities and preschool education was more than three fourth of their total work time (79%), which did not leave much time for other important ICDS activities such as growth-promotion, health and nutrition education, home visits, referral services and meeting with the community.

Value of observation data was also highlighted in the study by Kanani & Patel (1994) in urban Baroda which revealed that the AWWs did not use the growth card as a tool for educating mothers regarding their child's weight. The growth card was mainly used for identifying child beneficiaries for food supplementation. The AWWs held 1-2 NHE sessions

per month, however the quality of NHE imparted in terms of content, audio-visual aids used, and communication ability was poor.

Another longitudinal study used continuous structured and unstructured observations over one year to evaluate the management components and impact of National Nutritional Anemia Prophylaxis program (NAP) and National Program for the Prevention of Blindness due to Vitamin A deficiency (VAP) within the context of the primary health care in Indore (Khanna 1994). The quality of implementation of services under these programs was also found to be poor; very similar to this study. The IEC to beneficiaries was practically non existent though it was *reported* to be provided by all functionaries; monitoring of beneficiary adherence to iron supplementation was negligible in practice though reported to be regular in interviews. The time and motion study data indicated that the ANMs and LHVs worked for less than 5 hours on an average work day (as against 6 hours reported by them) of which, one third of the time was spent on unproductive personal work.

Those services which have significant long term but less visible benefits e.g health education and nutrition supplementation were not taken as seriously as the "visible" and "important" programs like immunization. Field visits by the supervisors were rare, record checking was poor and supportive supervision was inadequate. Beneficiary responses revealed that the coverage of children and women for iron and vitamin A supplementation was poor. The observation data showed that functionaries rarely monitored the receipt and consumption of supplements and imparted little IEC to the target group. This again shows that the observation method is required to reveal the true picture regarding quality which does not emerge from interviews alone.

In a study by Kanani and Zararia in 1996 on Social Assessment of ICDS in Gujarat direct observation of the field level implementation all nutrition services were made and it was confirmed that the NHE program was the weakest. The NHE activities in communities tended to be sporadic, unplanned and without support of attractive and effective audio visual aids. The basic orientation of the ICDS implementation authorities towards NHE appeared to be one of imparting information to mothers rather than facilitating behavioural change in them. Further, the NHE component was not monitored in ICDS like some other activities such as immunization, leading to a neglect of this activity at field level. Busy mothers had little interest, as they were not convinced of its benefits and did not consider NHE sessions to be interesting and worthy of their time.

However, Vasundhara and Hairsh (1993) in Bangalore reported a brighter picture of the GM service: majority (70%) of the children were weighed correctly, half of the AWWs could plot the growth charts satisfactorily and more than three fourth could interpret the growth charts correctly. Similarly, Gopaldas et al (1990) in their study in Panchmahals and Chandrapur reported that while 87% of the AWWs could correctly interpret the growth cards, only 1% of the mothers could do the same. Again, however counseling was not adequately emphasized.

In a recent study, Chattopadhyay (2004) assessed the knowledge and skills of 34 AWWs in Hoogly district of West Bengal. Observations of GM sessions revealed that less than two third of the AWWs weighed the children accurately and none of them plotted the weight on the growth chart. None of the AWWs counted the beneficiaries for preparing SF and only one fourth weighed the raw ingredients before preparation and distribution.

Evaluation of ICDS program in Rajasthan and Uttar Pradesh reported that the number of Supplementary Nutrition Program beneficiaries often exceeded the number of children actually enrolled at the AWC and children often received less than the recommended 300 kcal of food. In some instances, food was also distributed to indigent adults and it was a common practice for helpers and occasionally AWWs to take home cooked food (Educational Resource Unit 2004).

★ **ICDS functionaries busy with non-ICDS work (vertical campaigns):** In the present study, ICDS functionaries had to look after a host of vertical campaigns (pulse polio campaign, demographic surveys); many of which were not directly related to primary objectives of ICDS) and which also took away a significant proportion (about one-fifth) of their work time.

Evaluation of ICDS in Rajasthan and Uttar Pradesh reported that AWWs were often given other responsibilities outside of ICDS: AWWs were required to meet family-planning and sterilization targets; they were called upon to assist in other government programs for women and children such as the pulse polio campaign and often did what ANMs are supposed to do (Educational Resource Unit 2004).

Tandon (1997) also reported that poor utilization of ICDS services by pregnant and lactating women and children below 3 years was low due to poor community interaction by AWWs through home visits and he attributed this to the hectic work schedule of AWWs and heavy load of other activities which did not permit enough time to make home visits to enhance participation.

The issue of utilizing AWWs for numerous community level programs by several sectors to meet their own sectoral objectives (without any real benefit to ICDS) needs to be seriously reviewed. The Department of Women and Child Development (both in the centre and the states) needs to ensure that there will be primary focus on quality implementation of ICDS services and that the AWW will be allowed limited involvement in diverse community activities like adult education, krishi yatra, gram sabha, school health programs and surveys. Even if the AWW is paid for these 'other' activities, these should not be at the cost of time and attention to ICDS services. It is high time that AWW is not considered a 'conveniently available functionary' for numerous community development tasks. The functions of AWWs and of ASHA-Accredited Social Health Activist (the recent initiative of appointing ASHA under National Rural Health Mission) need to be reviewed in the light of feasibility and quality of care aspects.

Monitoring and Evaluation System (M&E)

A strong monitoring and evaluation system helps program managers track whether project implementation is proceeding as desired and subsequently make informed decisions to correct any problems. Periodically, it allows an assessment to be made of the extent to which the program is having the desired impact and in so doing promotes the most effective and efficient use of resources.

Low prioritization of monitoring and evaluation activities

In the present study, there was very little emphasis on M&E, in part due to a poor understanding of what it entails and its potential contribution to program effectiveness. The primary focus of the program management was on timely release of resources and the recording of expenditures, with very little emphasis on assessing the quality of service delivery and impact of the program. Very few AWWs were aware of the purpose and utility of data collection and instead viewed their data collection tasks as routine, boring and burdensome. Neither did the NGO show adequate interest in making ICDS monitoring geared towards program improvement. Thus, the result was that although the ICDS program was being monitored – in the sense that information was regularly collected on inputs and outputs - the system was not oriented towards using that information to inform action, i.e. it was not used to improve service delivery, beneficiary recruitment or, eventually, modify program design.

2 The Beneficiary Perspective

2.1 *Perceptions of Mothers Regarding Availability and Utilization of Selected ICDS Services*

After gathering information from the functionaries regarding ICDS services, mothers (random 50% of the sample) were interviewed to reveal the real scenario of the actual availability and utilization of the various ICDS services in the villages. The interview results presented below revealed a dismal picture. In contrast to some level of awareness among AWWs, most mothers had negligible information regarding any of the three services (Growth Monitoring, Supplementary Feeding service and Nutrition Health Education).

Growth Monitoring: Monthly growth monitoring of children (<6 years) was done at the AWCs. Mothers or elder siblings of young children (<3 years) came to AWC during weight monitoring sessions. Table 4.1.9 reveals that inspite of mother's regular visits to AWC only half of them were aware of the purpose of GM; 26% stated that AWWs gave no counseling during GM sessions and none had seen the growth card. Many of them suggested that AWWs should counsel the mothers

Spot observation data subsequently corroborated that no AWW used the growth card to impart nutrition education to the mothers to improve the nutritional status of children.

Table 4.1.9 Knowledge and Perceptions of the Mothers regarding Growth Monitoring Service of ICDS (N=53)

Responses	N	%
Purpose of Growth Monitoring (GM)		
▪ To know the nutritional status of the child	28	52.8
▪ To know if there is decrease in weight due to illness	3	5.7
▪ AWWs are ordered to weigh the child every month, so they do it	2	3.8
▪ Don't know / No response	22	42.0
Information given at the time of GM		
▪ AWW tells whether weight increased or decreased	33	62.3
▪ AWW advises to feed the child more; give CF	9	16.9
▪ No information is given during GM	14	26.4
Percentage of women who have not seen the growth card	53	100
Difficulty faced during GM		
▪ No difficulty faced	30	56.7
▪ Don't know / No response	17	32.1
Suggestions to improve this service		
▪ Advice regarding increasing weight should be given	14	26.4
▪ Information regarding CF should be given	3	5.7
▪ AWW should come home to advise	3	5.7
▪ Don't know / No response	31	58.5

Supplementary Feeding Service: Supplementary foods were mainly viewed as attraction to gather children at the AWCs (Table 4.1.10). Few also mentioned that *'sarkar kahe etle apvu pade'* (the Government insturcts the AWWs to distribute snacks, hence they do it). Majority responses (above 50%) indicated that mothers were not aware of the ration of supplementary food distributed to a normal and severely malnourished child; most of the children liked AWC snack but took it home and shared it with their siblings or mothers. Half of the mothers did not feel there was any improvement in the health of their children on consuming supplementary foods at AWCs.

Table 4.1.10 Knowledge and Perception of the Mothers Regarding Supplementary Feeding Service of ICDS (N=53)

Responses	N	%
Purpose of Supplementary Feeding service (SF)		
▪ Child goes to the AWC for supplementary snack	16	30.2
▪ AWW is instruced by the government to give SF	10	18.9
▪ Child learns to eat	5	9.4
▪ Child remains healthy	4	7.5
▪ Don't know	18	33.9
Does the AWW give more quantity of snack to malnourished children		
▪ No	44	83.0
▪ Don't know	9	17.0
Child eats his/her AWC snack at		
▪ AWC	13	24.5
▪ Home	29	54.7
▪ Don't know / No response	11	20.8
Child likes the AWC snack		
▪ Yes	37	69.8
▪ No	13	24.5
▪ Don't know / No response	3	5.7
Change in health status of children on consuming AWC snack		
▪ Yes	16	30.2
▪ No	30	56.6
▪ Don't know / No response	7	13.2
Suggestions to improve this service		
▪ Children don't like maize; other variety should be given	21	39.6
▪ AWW should give dry snacks	5	9.4
▪ AWW should cook the snacks properly	4	7.5
▪ No suggestions	19	35.8

Nutrition Health Education: Of all the nutrition services of ICDS, awareness regarding NHE service was the poorest. Only a few mothers (28%) were aware about NHE activity being conducted at the AWCs, further most of them did not know the topics covered in such meetings as they had never attended these sessions. None of the AWWs came for home

visits according to the mothers. A majority felt that they attained no benefit from this service and there was no improvement in their health nor did the nutritional status of their children improve. Mothers did not trust the knowledge of the AWWs and also AWWs were not confident about communicating the messages effectively. Most of the mothers suggested that AWWs should hold meetings at a feasible time and impart the required messages.

Table 4.1.11 Knowledge and Perceptions of the Mothers regarding Nutrition Health Education Service of ICDS (N=53)

Responses	N	%
Awareness regarding NHE service available / given in AWC		
▪ Yes	15	28.3
▪ No	38	71.7
Topics covered		
▪ Advise mothers to send their children to AWC	2	13.3
▪ Improve food habits	2	13.3
▪ Maintain hygiene	1	6.7
▪ Optimal CF practices	1	6.7
▪ Don't know	9	60.0
Benefits of NHE service		
▪ Information regarding care of children	3	20.0
▪ Improvement in hygiene; decrease in morbidity	2	13.3
▪ Don't know / No response	10	66.7
Difference in health status of the child due to NHE		
▪ Yes	2	13.3
▪ No	13	86.7
Difference in health status of the mother due to NHE		
▪ Yes	0	0.0
▪ No	15	100.0
Suggestions to improve this service		
▪ Meetings should be at a feasible time	37	69.8
▪ AWW should give proper advice; good information	22	41.5

DISCUSSION

The above section on the knowledge and perceptions of the mothers related to the availability and utilization of nutrition related ICDS services managed by the NGO revealed a dismal picture regarding their quality of implementation. Although AWWs themselves had fairly good knowledge related to the purpose and importance of the ICDS services, this information was not passed on to the beneficiaries, leading to poor utilization and impact of services: none of the mothers had seen the growth chart, the purpose of supplementary nutrition was not known, NHE sessions were rarely held or attended and more than half of the mothers perceived no change in the health status of their children because of SF and NHE service.

In a similar study conducted by Shobha (2003), when mothers were enquired about reasons for not attending NHE meetings, they opined that AWWs did not conduct the meetings and few mentioned that they were never called by the AWW. However, the beneficiaries were satisfied with immunization service as that was the most easily available service.

In urban Vadodara, Kanani and Katwala (2006) reported that immunization, growth monitoring and supplementary nutrition were the most utilized services of ICDS, whereas, NHE sessions were rarely conducted and were poorly utilized by the mother beneficiaries. The situation was similar in the 1990s as shown by earlier studies by Kanani and Zararia (1996) and Kanani and Patel (1994) who reported that the regularly available services were easily recalled by the people and these were also the ones frequently utilized by them. Pre-primary education, food supplementation, immunization and growth monitoring (GM) were frequently utilized by the beneficiaries simply because they were available and accessible to the people. Majority of the mothers were aware that GM was done to see if their child gained weight or lost weight but they had never seen their child's growth chart.

Awareness concerning what services were available under ICDS, their regular supply and knowledge of benefits were all found to be necessary for optimal utilization by the people. Poor quality of service was cited as one of the reasons for poor utilization, especially of the supplementary food. NHE was poorly utilized, as the women did not find it interesting or useful.

2.2 Resources Available to the Mother for Child Care

According to Engle (1992), a mother requires minimal economic resources and social support from family and community to be able to care for her child and practice optimal feeding behaviours. Further, she herself needs to have good nutritional status to have the energy and health to care for her child and family.

Socio-Economic Profile of the Family

An overview of the socio-economic characteristics of the families (N=115) from the villages of Nandesari in Vadodara district is presented below (Table 4.1.12). The data was segregated and analyzed both for gender as well as age. Gender differences are presented in the table whereas any significant difference between age groups has been pointed out in the text.

All the mothers belonged to Hindu families. Two third of the families were joint, with significantly higher proportion of girls belonging to joint families ($p<0.05$). Further, more

girls than boys belonged to larger families (>7 members) reflecting perhaps a desire for 1-2 male children. Nearly two third of the mothers were in the age group of 20-25 years and very few were below 20 years. In case of fathers, about 55% were more than 25 years of age. As regards education, one third of the mothers were illiterate and more than half attained only primary education. Education of the fathers was better than that of the mothers with 40% of them attaining secondary and/or higher education; only 5% were illiterate.

About one fourth of the families had pucca houses (cemented house) and two third had semi-pucca houses (with tinned shed roof and brick walls). Access to water was either through individual tap in the house or common municipal taps outside. No toilet facility was available to 60% of the families. Half of the families disposed off the garbage just outside the house while the other half disposed it at a common open land at the outskirts of the village.

The economic status of the families was poor with two third of them having mean per capita income either Rs.201–500 or less than Rs.200. Thus, the economic resources available for child care were limited in these families.

Table 4.1.12 Socio-Economic Profile of Families

Item	Total (N=115)		Boys (N=72)		Girls (N=43)	
	n	%	n	%	n	%
Total number of family members						
▪ <4	8	7.0	6	8.3	2	4.6
▪ 4-7	71	61.7	45	62.5	25	58.1
▪ >7	36	31.3	21	29.2	16	37.2
Type of family						
▪ Joint	76	66.1	42	58.3	34*	79.1
▪ Nuclear	39	33.9	30	41.7	9	20.9
Age of the mother (years)						
▪ <20	4	3.5	4	5.4	0	0
▪ 20-25	75	65.2	48	64.9	27	65.8
▪ >25	30	26.1	18	24.3	12	29.3
Education of the mother						
▪ Illiterate	36	31.3	21	29.2	15	34.9
▪ Literate	35	30.4	26	36.1	9	20.9
▪ Primary	31	27.0	18	25.0	13	30.2
▪ Secondary	11	9.6	6	8.3	5	11.6
Age of the father (in years)						
▪ 20-25 years	40	34.8	28	38.9	12	27.9
▪ >25 years	66	57.4	39	54.2	27	62.8
Education of the father						
▪ Illiterate	6	5.2	6	8.3	0	0
▪ Literate	17	14.8	11	15.3	6	13.9
▪ Primary	43	37.4	22	30.5	21	48.8

Item	Total (N=115)		Boys (N=72)		Girls (N=43)	
	n	%	n	%	n	%
▪ Secondary	35	30.4	24	33.3	11	25.6
▪ HSc	8	7.0	6	8.3	2	4.7
▪ Graduate	4	3.5	3	4.2	1	2.3
Type of house						
▪ Pucca	28	24.3	16	22.2	12	27.9
▪ Semi-pucca	76	66.1	49	68.1	27	62.8
▪ Kuccha	11	9.6	7	9.7	4	9.3
Number of rooms in the house						
▪ 1	33	28.7	26	36.1	7	16.3
▪ 2-4	74	64.4	41	56.9	33	76.8
Source of drinking water						
▪ Common municipal tap	60	52.2	39	55.2	21	48.8
▪ Tap in house	48	41.7	29	40.3	19	44.2
Toilet facility						
▪ Open defecation	70	60.9	49	68.1	21*	48.8
▪ Toilet within the house	30	26.1	12	16.6	18	41.9
▪ Common toilet	15	13.0	11	15.3	4	9.3
Garbage disposal						
▪ Outside the house	60	52.2	35	48.6	25	58.2
▪ Open land	52	45.2	35	48.6	17	39.5
Total family income per month (Rs.)						
▪ ≤1000	13	17.7	5	11.1	8	27.6
▪ 1001-2000	31	42.1	18	40.0	13	44.8
▪ 2001-5000	24	32.9	16	35.5	8	27.6
▪ ≥5001	6	8.3	6	13.3	0	0
Per capita income per month (Rs.)						
▪ ≤200	21	28.8	9	20.0	12	41.4
▪ 201-500	29	39.8	18	40.0	11	37.9
▪ 501-1000	24	33.1	18	40.0	6	20.7

*p<0.05 Note: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and is accordingly stated in text.

Nutritional Status of the Mothers

Good nutritional status and well-being of the mother influences optimal child care and nutritional status of her child; and is also important for her own productivity and quality of life.

Weight, Height and Body Mass Index

The mean weight, height and Body Mass Index (BMI) of the mothers were 41.5 kg, 149.7 cm and 18.5 respectively (Table 4.1.13). Further, Table 4.1.14 reveals that prevalence of undernutrition was high among mothers: 47% mothers weighed <40 kg and 58% had BMI <18.5. Nutritional status of the mothers did not differ significantly with the age or sex of the

child. With widespread undernutrition in mothers, it is likely that their own quality of life as well as their ability to care for their children gets compromised.

Table 4.1.13 Anthropometric Measurements of the Mother of Index Child (N=115)

Measurements	Total (N=115)	6-11 months (N=25)	12-23 months (N=47)	24-35 months (N=43)	Boys (N=72)	Girls (N=43)
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
Height (cm)	149.7 ± 0.5	150.4 ± 1.13	149.3 ± 0.8	149.8 ± 0.7	149.1 ± 0.6	150.7 ± 0.9
Weight (kg)	41.5 ± 0.6	42.4 ± 1.31	41.9 ± 1.2	40.5 ± 0.8	41.7 ± 0.9	41.1 ± 0.93
BMI	18.5 ± 0.3	18.7 ± 0.5	18.8 ± 0.5	18.0 ± 0.4	18.8 ± 0.4	18.1 ± 0.37

All values: NS

Table 4.1.14 Malnutrition in the Mother of Index Child (N=115)

Indicators	Total (N=115)		6-11 months (N= 25)		12-23 months (N= 47)		24-35 months (N= 43)	
	n	%	n	%	n	%	n	%
Height <145 cm	15	13.0	3	12.0	8	17.0	4	9.0
BMI <18.5	67	58.3	15	60.0	29	61.7	23	53.5

All values: NS

Reproductive History of the Mothers

Table 4.1.15 reveals that nearly half of the mothers were married at an early age of 16 years or less and one third were married between the age of 17-18 years. Almost two third of the mothers delivered their first child at the age of 20 years or even less indicating that child bearing responsibilities started at an early age for them. However, many women (42%) practiced birth spacing keeping an interval of ≥3 years which would enable them to dedicate sufficient time to their children.

Table 4.1.15 Reproductive History of the Mothers

Item	Total (N=115)		Boys (N= 72)		Girls (N=43)	
	n	%	n	%	n	%
Age at marriage (years)						
▪ ≤16	54	46.9	31	43.1	23	53.5
▪ 17-18	40	34.8	28	38.7	12	27.9
▪ 19-20	15	13.0	10	13.9	5	11.6
▪ >20	2	1.7	0	0	2	4.9

Age at birth of first child (years)						
▪ ≤18	39	33.9	25	33.7	15	36.6
▪ 19-20	43	37.4	29	39.2	14	34.1
▪ >20	29	25.2	17	22.9	12	29.3
Birth interval between index child and previous child (years)						
▪ 1	10	8.7	7	9.7	3	7.1
▪ 2	26	22.6	19	26.4	7	16.7
▪ ≥3	48	41.7	27	37.6	19	46.4
▪ One child only	31	27.2	19	26.4	12	28.6

All values: NS

Mother's Perception Regarding Her Health and its Effect on Child Care

A majority of the mothers perceived themselves to be in good health. However, nearly half (44%) of them felt the need to further improve their health either through doctors treatment or eating nutritious food. Many mothers believed that their health status adversely affected their ability for child care while a few disagreed, responding that other members of her family helped in child care during her illness.

Table 4.1.16 Mother's Perception Regarding Her Health and its Effect on Child Care

Item	Total		Boys		Girls	
	N = 115		N = 72		N = 43	
	n	%	n	%	n	%
Mother perceives herself to be in good health						
▪ Yes	87	75.7	55	76.4	32	74.4
▪ No	26	22.6	17	23.6	9	20.9
Health of mother affects child care						
▪ Yes	75	65.2	49	68.1	26	60.5
▪ No	33	28.7	18	25.0	15	34.9
Mother feels the need to improve her health						
▪ Yes	50	43.5	29	40.3	21	48.8
▪ No	50	43.5	31	43.1	19	44.2
Mother would like to improve her health through						
▪ Doctor's treatment; medicine	24	48.0	17	58.6	7	33.3
▪ Diet	10	20.0	6	20.7	4	19.0

Note: For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and it depends on the practice

Support Received by the Mother from Husband and Mother in Law for Child Care and House Work

Most of the fathers when home, offered help to the mothers in child care activities like playing with the child and taking the child to doctor when ill. Many of them also helped in purchasing daily food items from the market and feeding the child when mother was busy with household chores. Mothers having a boy child received significantly greater help from their husbands compared to those having a girl child. One of the possible reasons could be

that in the rural areas fathers are more comfortable with their sons (for example taking boy child out to the market and bathing the child when mother is busy), or they value the male child more. More fathers helped in feeding the older children than the younger ones ($p<0.05$), perhaps because handling young children was more difficult.

Mothers received little help from their mother in laws (MIL). Only few MILs (24%-40%) helped in feeding the child, keeping the child clean, preparing food and purchasing food items from the market. In contrast to the fathers, MILs offered help more to mothers having a girl child compared to those having a boy child.

Overall, almost three fourth of the mothers reported that they received adequate family support for child care.

Table 4.1.17 Family Support Received by the Mother in Child Care

Item	Total		Boys		Girls	
	N=115		N=72		N=43	
	n	%	n	%	n	%
Husband helps in						
▪ Playing with the child	103	89.6	66	91.7	37	86.0
▪ Taking child to doctor when ill	84	73.0	56	77.8	28	65.1
▪ Purchase of daily food items	58	50.4	42	58.3	16*	37.2
▪ Feeding the child	55	47.8	38	52.8	17	39.5
▪ Keeping child clean	34	29.6	26	36.1	8*	18.6
Mother-in-law helps in						
▪ Playing with the child	50	43.5	29	40.3	21	48.8
▪ Feeding the child	33	28.7	19	26.4	14	32.6
▪ Keeping the child clean	28	24.3	15	20.8	13	30.2
▪ Preparing food	27	23.5	14	19.4	13	30.2
▪ Purchase of daily food items	17	14.8	9	12.5	8	18.6
Support required for child care						
▪ No support required	83	72.2	52	72.2	31	72.1
▪ Husband	14	12.2	10	13.9	4	9.3
▪ Family members	13	11.3	8	11.1	5	11.6

*$p<0.05$, All other values: NS

Several responses are multiple responses hence the percentage may exceed 100.

Mothers' practices are influenced to a great extent by their own experiences and by knowledge obtained from people within and outside the family. Mothers received advice to feed prelacteals more from their own mothers and mother-in-laws. The good practice of feeding colostrum was advised more by the ANMs and doctors compared to elders and MILs in the family. However, decisions regarding initiation of breastfeeding, water feeding, top milk and complementary feeding were taken mainly by the mothers themselves. Although mothers themselves decided on initiating major IYCF practices, their source of knowledge were elders in the family. Very few mothers mentioned doctors, ANMs and

AWWs as their source of knowledge for IYCF practices depicting negligible role of the functionaries in influencing IYCF practices.

Table 4.1.18 Advice Received by the Mother related to IYCF

Item	Total		Boys		Girls	
	N=115		N=72		N=43	
	n	%	n	%	n	%
Prelacteal feeding advised by						
▪ Mother	21	46.7	10	41.7	11	52.4
▪ MIL	7	15.6	3	12.5	4	19.0
▪ Mid wife	6	13.3	5	20.8	1	4.8
▪ ANM	5	11.1	3	12.5	2	9.5
Colostrum feeding advised by						
▪ ANM	18	31.6	13	33.3	5	27.8
▪ Doctor	11	19.3	8	20.5	3	16.7
▪ Self	8	14.0	5	12.8	3	16.7
▪ Elders	6	10.5	4	10.3	2	11.1
Initiation of BF advised by						
▪ Self	38	33.0	22	36.0	16	37.2
▪ Doctor	25	21.7	14	19.4	11	25.6
▪ ANM	22	19.1	15	20.8	7	16.3
▪ Mother	11	9.6	7	9.7	4	9.3
▪ Mother-in-law	9	7.8	7	9.7	2	4.7
Water feeding advised by						
▪ Self	67	58.3	43	59.7	24	55.8
▪ Mother-in-law	18	15.7	12	16.7	6	14.0
▪ Mother	14	12.2	8	11.1	6	14.0
▪ Neighbour	8	7.0	7	9.7	1	2.3
Top milk feeding advised by						
▪ Self	41	69.5	28	70.0	13	68.4
▪ Mother	6	10.2	5	12.5	1	5.3
▪ MIL	6	10.2	3	7.5	3	15.8
Complementary feeding advised by						
▪ Self	73	68.9	44	65.7	29	74.4
▪ MIL	14	13.2	8	11.9	6	15.4
▪ Doctor	7	6.6	6	9.0	1	2.6
Source of knowledge about child feeding practices						
▪ Elders	59	51.3	37	51.4	22	51.2
▪ Self	29	25.2	17	23.6	12	27.9
▪ Doctor	18	15.7	10	13.9	8	18.6
▪ Friends	17	14.8	13	18.1	4	9.3
▪ AWW/ANM	16	13.9	15	20.8	1	2.3

Notes: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and depends on the presence of the practice.

DISCUSSION

The present data shows that the socio-economic resources available to the mother for care-giving were inadequate in terms of living conditions, education and income of the family.

★ **Mother's nutritional status and reproductive health**

In the present study, the prevalence of undernutrition was high among mothers 58% had BMI<18.5 and among these many mothers believed that their poor health status adversely affected their ability for child care.

According to NFHS-3 (2005-06) the prevalence of undernutrition (BMI<18.5) among women in India and Gujarat are 39% and 42% respectively which are below the levels of the present study. Kanani and Gadre (2003) reported a similar high prevalence (62%) of undernutrition among mothers (children less than 3 years) of rural Vadodara.

★ Early marriages were common in the present study, with nearly half (47%) reporting marriage at 16 years or less. Further, almost two third of the mothers delivered their first child at the age of 19 years or more. NFHS–3 survey (2005-2006) reports that in rural India and Gujarat 52% and 38% women are married by 18 years and median age at birth of first child is 19 and 20 years respectively. Similar to this study, another study carried out in families with children 6-36 months in rural Vadodara also reported early age of marriages (16 years or less: 57%) and child birth (less than 18 years: 40%) (Kanani and Gadre 2003). Early marriages and early pregnancy may compromise the ability of the mother to give adequate care to the child, which is required to achieve optimal health.

★ **Husband's and Mother in law's support to the mother**

Most of the fathers played with their child and helped the mothers by taking the child to doctor when ill. But only half of them helped in purchasing daily food items from the market and feeding the child. Further, mothers received little help from the mother in laws (MIL) in child care as well household work. As regards initiating major IYCF practices for the child, mothers took most decisions but their main source of knowledge were often elders in the family, with ANMs and AWWs (14%-16%) playing a negligible role in imparting effective knowledge regarding optimal IYCF practices.

Similar results were reported in studies carried out in urban and rural Vadodara, wherein most of the fathers offered help to mothers in child care activities and more urban MILs helped in all household chores and took care of their grandchildren compared to the rural MILs.

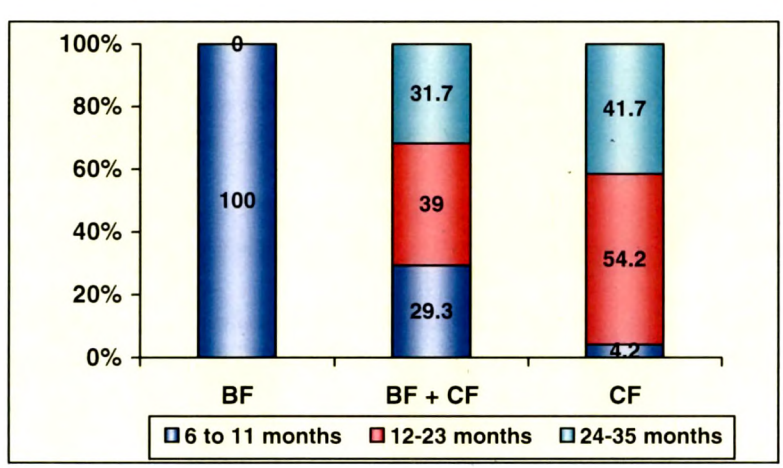
2.3 Perceptions and Practices of the Mothers Regarding IYCF

Since the age group of this study was 6-35 months, all 115 children under the study were categorized into BF: fed only breast milk along with water (no CF), BF+CF: given both breast milk and initiated CF and CF: given only CF (stopped breast milk). Results showed that there were 9 children (8%) in BF category and all of them were from 6-11 months of age indicating that mothers of these children delayed initiation of CF beyond 11 months. Nearly three fourth (71%) children were fed both breast milk and CF; of these there were more boys (61%) than girls (39%). The remaining 21% were given only CF (Table 4.1.19). Half of these children (58%) from only CF category were less than two years of age indicating early cessation of breast milk which is not an optimal IYCF practice followed by the mothers (Figure 4.1.1).

Table 4.1.19 Feeding Practices of Boys and Girls

Characteristic	Total (N =115)					
	BF		BF + CF		CF	
	n	%	n	%	n	%
Total	9	7.8	82	71.3	24	20.9
Boys	5	55.6	50	60.9	17	70.8
Girls	4	44.4	32	39.1	7	29.2

Figure 4.1.1 Feeding Practices of Children According to Age



Knowledge and Practices Regarding Newborn Feeding and Breastfeeding

Table 4.1.20 reports the awareness and practices of the mothers on various aspects of new-born feeding and breastfeeding. However, age wise data for 6-11 months, 12-23 months and 24-35 months have not been entered in the tables as no major differences in beliefs and

practices were seen between the age groups; hence, only significant differences are mentioned in the text.

Major trends (40%-60% responses) indicated that

- Prelacteals were given to newborns because:
  - it was perceived that initially there was no breastmilk and child felt hungry
  - dirt in child's stomach is removed
- Colostrum was fed to only half of the children (more boys than girls) and it was believed to be bad for the child as it was 'dirty and stale milk'
- Breast feeding was initiated as late as beyond 10 hours
- Almost half of the children were exclusively breastfed (EBF) for only 1 month or less because water was initiated. At the time of the survey, more than three fourth (78%) of the children were being breastfed; with more younger children (6-11 months) (97%) as compared to 24-35 months (72%) children.

Table 4.1.20 Current Practices and Perceptions of the Mothers Regarding Prelacteal feeding, Colostrum feeding and Breast feeding

Item	Total (N=115)		Boys (N= 72)		Girls (N=43)	
	n	%	n	%	n	%
Prelacteal Feeding						
Prelacteals given immediately after birth	45	39.1	24	33.3	21	48.8
Type of Prelacteal						
▪ *Patasa* water	33	73.3	15	62.5	18	85.7
▪ Jaggery water	6	13.3	5	20.8	1	4.8
▪ Honey	3	6.7	1	4.2	2	9.5
▪ *Ghee*	3	6.7	3	12.5	0	0
Reasons for giving prelacteals						
▪ Initially no breast milk and child is hungry	24	53.3	10	41.7	14	66.7
▪ Dirt in child's stomach is removed	6	13.3	5	20.8	1	4.8
▪ Child will not cry	4	8.9	2	8.3	2	9.5
Colostrum Feeding						
First milk is called						
▪ *Chep*	25	30.1	18	31.6	7	26.9
▪ Yellow milk	18	21.7	12	21.1	6	23.1
▪ Watery milk	10	12.0	6	10.5	4	15.4
▪ *Chikas*	8	9.6	6	10.5	2	7.7
Colostrum given to the child				✓		✓
▪ Yes	57	49.6	39	54.2	18	41.9
▪ No	56	48.7	31	43.1	25	58.1
Colostrum is good for the child						
▪ Yes	29	25.2	20	27.8	9	20.9
▪ No	55	47.8	36	50.0	19	44.2

Item	Total (N=115)		Boys (N= 72)		Girls (N=43)	
	n	%	n	%	n	%
Reasons for believing colostrum is good						
▪ Child becomes healthy	8	27.6	5	25.0	3	33.3
▪ It is full of energy (*shakti*)	7	24.1	4	20.0	3	33.3
▪ It improves immunity	3	10.3	1	5.0	2	22.2
▪ ANM said so	3	10.3	3	15.0	0	0
Reasons for believing colostrum is bad						
▪ It is unhealthy for child	27	49.1	18	50.0	9	47.4
▪ It is dirty	7	12.7	6	16.8	1	5.3
▪ Others said so	7	12.7	3	8.3	4	21.1
▪ It is stale milk	6	10.9	3	8.3	3	18.8
Breast Feeding (BF)						
Breast feeding was initiated how long after birth						
▪ ≤1 hour	15	13.0	11	15.3	4	9.3
▪ 2-5 hours	20	17.4	9	12.5	11	25.6
▪ 5-10 hours	11	9.6	8	11.0	3	7.0
▪ >10 hours	69	60.0	44	61.1	25	58.1
Duration of exclusive breast feeding						
▪ ≤1 month	55	47.8	33	45.8	22	51.2
▪ 2-3 months	37	32.4	16	21.3	11	30.3
▪ 3-6 months	23	20.0	17	23.6	6	18.8
Mother currently breast feeds her child						
▪ Yes	90	78.3	54	75.0	36	83.7
▪ No	25	21.8	18	25.0	7	16.3
When does mother BF her child						
▪ When the child cries	67	74.4	37	68.5	30	83.3
▪ When mother thinks child is hungry	12	13.3	8	14.8	4	11.1
▪ At some fixed time	10	11.1	8	14.8	2	5.6
Mother perceives her breast milk to be sufficient						
▪ Yes	56	62.2	31	57.4	25	69.4
▪ No	32	35.6	22	40.7	10	27.8
Reasons if YES						
▪ Child does not cry	15	26.8	7	22.6	8	32.0
▪ Child does not feel hungry	11	19.6	7	22.6	4	16.0
▪ Breast becomes full	9	16.1	7	22.6	2	8.0
▪ Child has grown up only on breast milk	8	14.3	5	16.1	3	12.0
Reasons if NO						
▪ Child cries; feels hungry	15	46.9	10	45.5	5	50.0
▪ Breast size reduces	7	21.9	4	18.2	3	30.0
▪ As child grows breast milk decreases	4	12.5	3	13.6	1	10.0

Notes: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and is accordingly stated in text.

Knowledge and Practices Regarding Water Feeding and Top Milk Feeding

Water and Top Milk Feeding: Almost all the mothers fed water to their children before 6 months and half of them initiated water feeding at a very young age of 1 month or less: was earlier for girl children (51%) than boy children (44%). Most of the mothers initiated water so that '*Balak nu modhu na sukaye*' (Child's mouth would not get dry). Though about two third of the mothers perceived that there is water in breast milk (*'pani jevu dhaavan hoi'*: breast milk is like water) and (*'apne pani piye etle dhaavan ma pan pani hoi'*: we drink water so breast milk also contains water), yet a majority initiated water feeding to children at an early age.

More than half of the children were receiving top milk (mostly buffalo milk) at the time of the survey: more boys (55%) than girls (44%). More older children (69%) than younger children (6-11months) received top milk (21%). Age of initiation varied from <4 to 6 months. Frequency of feeding was either once or twice a day. The reasons given for feeding top milk were: *'Dhavan ochu padtu hatu'* (Breast milk was inadequate), *'Balak khata shikhe'* (Child learns to eat) and '*Balak tandurast bane'* (Child becomes healthy).

More mothers fed top milk in cup or glass, few also unfortunately used bottles. Majority of the mothers (77%) however believed breast milk to be better than top milk because:

- '*Mata je khay e dhaavan mathi baalakne male*' (Child receives everything that the mother eats through her breast milk).
- *'Upar na dudh thi baalak beemar pade'* (Child may get ill by consuming top milk).
- '*Uparnu dudh pache na*' (Top milk is not easily digested).

Table 4.1.21 Current Practices and Perceptions of the Mother Regarding Water and Top Milk Feeding

Item	Total (N=115)		Boys (N= 72)		Girls (N=43)	
	n	%	n	%	n	%
Water Feeding						
Age of initiating water feeding						
▪ <1 month	54	46.9	32	44.4	22	51.2
▪ 2-3 months	37	32.2	24	33.3	13	30.2
▪ 3-6 months	21	18.3	15	20.8	6	14.0
▪ >6 months	3	2.6	1	1.4	2	4.7
Mother thinks there is water in breast milk						
▪ Yes	77	67.0	51	70.8	26	60.5
▪ No	18	15.7	11	15.3	7	16.3

Item	Total (N=115)		Boys (N= 72)		Girls (N=43)	
	n	%	n	%	n	%
Top Milk Feeding (TM)						
Top milk given to the child						
▪ Yes	59	51.3	40	55.6	19	44.2
▪ No	56	48.7	32	44.4	24	55.8
Age of initiating TM						
▪ < 4 months	11	18.6	8	20.0	3	15.8
▪ 4-6 months	7	11.8	4	10.0	3	15.8
▪ 6 months	6	10.2	6	15.0	0	0
▪ > 6 months	35	59.3	22	55.0	13	68.4
Type of TM given						
▪ Buffalo	44	74.6	29	72.5	15	78.9
▪ Dairy	8	13.6	6	15.0	2	10.5
Reasons for giving TM						
▪ Inadequate breast milk	30	50.8	23	57.5	7	36.8
▪ Child learns to eat	9	15.3	4	10.0	5	26.3
▪ Child becomes healthy	6	10.2	4	10.0	2	10.5
▪ Child demands	5	8.5	3	7.5	2	10.5
Reasons for not giving TM						
▪ Child does not like	17	30.4	12	37.5	5	20.8
▪ Child cannot digest; may fall ill	14	25.0	8	25.0	6	25.0
▪ Mother gets sufficient milk	12	21.4	5	15.6	7	29.2
Frequency of feeding TM						
▪ Twice a day	24	40.7	17	42.5	7	36.8
▪ More than two times	20	33.9	16	40.0	4	21.1
▪ Once a day	15	25.4	7	17.5	8	42.1
Mode of feeding TM						
▪ Cup / glass	24	40.7	17	42.5	7	36.8
▪ Bottle	13	22.0	10	25.0	3	15.8
▪ Saucer	11	18.6	6	15.0	5	26.3
Which milk is better						
▪ Mother's milk	89	77.4	58	80.6	31	72.1
▪ Both	12	10.4	6	8.3	6	14.0
▪ Top milk	8	7.0	6	8.3	2	4.7
Reasons for believing mother's milk is better						
▪ Child receives nutrition from what mother eats	23	25.8	16	26.7	7	24.1
▪ Child may fall ill with TM	18	20.2	13	21.7	5	13.8
▪ TM is difficult to digest	11	12.4	6	10.0	5	13.8
▪ Child becomes healthy with mother milk	7	7.9	6	10.0	1	3.4

Notes: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and is accordingly stated in text.

Perceptions and Practices of the Mothers related to Complementary Feeding

Results reveal that mothers did not have optimal knowledge regarding various aspects of complementary feeding and many of their practices were found to be inappropriate.

Initiation of Complementary Feeding: Unfortunately, for more than half of the children (59%) complementary feeding (CF) was initiated beyond the recommended age of 6 months; the delay being more for the boys (64%) as compared to girls (46%). Most commonly fed foods were: *roti, khichadi,* fruits, vegetables, biscuits, *dal* and rice. Mothers initiated CF for the reasons that 'their child is grown up', 'they perceived their breast milk to be insufficient' and 'to teach their child to eat CF'. However, very few mothers mentioned that they initiated CF as child requires more energy and nutrition to grow.

The most common benefits of CF stated by mothers were: *'Baalak tandurast rahe'* (Child remains healthy), *'Baalak ne ami rahe'* (Child's hunger is satisfied) and *'Baalak ramtu thay'* (child becomes playful). Nutritional or health benefits were rarely mentioned Further, only few mothers believed that the child would become malnourished if there was late initiation of CF; more than half believing that there were no harmful effects of initiating CF beyond 6 months.

Foods Given and Avoided: Very few children were given special foods like '*dal* water', *'sheera'* (sweet preparation of flour, oil and sugar) and *'khichadi'* (cereal-pulse preparation). More than one third mothers avoided feeding certain foods like fruits (banana, guava, coconut) and vegetables (beans, GLVs) giving reasons that child would suffer from '*varadh*' (respiratory infection). More boys (25%) than girls (13%) were fed special foods. A majority of the mothers believed that their child had normal appetite and the reasons given were: 'child ate well' and 'when hungry child himself/herself asked for food'.

Active Feeding Behaviours: Younger children (<12 months) were fed more frequently by their mothers as compared to older children (>1 year) ($p<0.001$). Moreover, higher proportion of older children were given food to eat and left on their own to finish up the meal compared to younger children (($p<0.01$) indicating more care taken during infancy. As age increased sharing food in the same plate decreased and more children were fed in separate plates. The reason for not giving in a separate plate for young children was that the child would not eat food and waste it if it was served in a separate plate. As regards *age wise* differences, mothers avoided certain kinds of foods more for children less than 12 months (56%) as compared to older children (22%). Thus, overall a higher proportion of mothers

did not practice active feeding behaviours. As regards *gender* differences, more mothers encouraged boy children to eat ($p<0.05$) and sat with them during feeding whereas, more girls than boys ate on their own.

Table 4.1.22 Current Perceptions and Practices of the Mothers Regarding Complementary Feeding and Active Feeding

Item	Total N = 115		Boys N = 72		Girls N = 43	
	n	%	n	%	n	%
Complementary Feeding (CF)						
Complementary foods given to the child						
▪ Yes	106	92.2	67	93.1	39	90.7
▪ No	9	7.8	5	6.9	4	9.3
Age of initiating CF						
▪ <6 months	21	19.8	12	17.9	9	23.1
▪ 6 months	22	20.8	11	16.4	11	28.2
▪ >6 months	63	59.4	44	64.2	19	46.2
Reasons for initiating CF						
▪ Child is grown up	23	21.7	14	20.9	9	23.1
▪ Perceived breast milk insufficiency	19	17.9	14	20.9	5	12.8
▪ Child started sitting	14	13.2	7	10.4	7	17.9
▪ To teach the child to eat	14	13.2	11	16.4	3	7.7
▪ Child started eating on his own	14	13.2	6	9.0	8	20.5
▪ Child feels hungry	11	10.4	7	10.4	4	10.3
▪ Child gets nutrition, more energy is required	9	8.5	6	9.0	3	7.7
Benefits of feeding CF						
▪ Child remains healthy	56	52.8	38	56.7	18	46.2
▪ Child's hunger is satisfied	21	19.8	13	19.4	8	20.5
▪ Child becomes playful	15	14.2	8	11.9	7	17.9
▪ Child grows well; learns to walk	5	4.7	3	4.5	2	5.1
Foods Given and Avoided						
Special foods prepared for the child						
▪ Yes	22	20.8	17	25.4	5	12.8
▪ No	84	79.3	50	74.6	34	87.2
Foods avoided for the child						
▪ Yes	37	34.9	24	35.8	13	33.3
▪ No	69	65.1	43	64.2	26	66.7
Type of foods avoided						
▪ Fruits	19	51.4	13	54.2	6	46.2
▪ Vegetables	16	43.2	13	54.2	3	23.1
▪ Bajra *rotla*	4	10.8	3	12.5	1	7.7
Perceptions on Child's Appetite						
Mother thinks child has a normal appetite						
▪ Yes	80	75.5	47	70.1	33	84.6
▪ No	21	19.8	17	25.4	4	10.3
Reasons for normal appetite						
▪ Child eats well	44	55.0	23	48.9	21	63.6
▪ When hungry child asks for food	18	22.5	12	25.5	6	18.2
▪ Child plays well	5	6.3	2	4.3	3	9.1

Item	Total		Boys		Girls	
	N = 115		N = 72		N = 43	
	n	%	n	%	n	%
Active Feeding						
Child is fed by						
▪ Himself / herself	57	53.8	32	47.8	25	64.1
▪ Child or mother depending on the food	34	32.0	25	37.3	9	23.1
▪ Mother	15	14.2	10	14.9	5	12.8
Mother's feeding behaviours						
▪ Feed the child on demand	78	73.6	47	70.1	31	79.5
▪ Give food and leave	45	42.5	25	37.3	20	51.3
▪ Encourage child to finish up the meal	28	26.4	22	32.8	6*	15.4
▪ Sit with the child while feeding	15	14.2	11	16.4	4	10.3
▪ Force the child to eat	6	5.7	4	6.0	2	5.1
▪ Mother eats with the child	5	4.7	2	3.0	3	7.7
Child eats with family members						
▪ Yes	44	41.5	27	40.3	17	43.6
▪ No	28	26.4	21	31.3	7	17.9
▪ Sometimes	34	32.1	19	28.4	15	38.5
Child is fed in separate vessel						
▪ Yes	88	83.0	53	79.1	35	89.7
▪ No	18	17.0	14	20.5	4	10.3
Number of active feeding behaviours followed by mother (out of 5)#						
▪ ≤1	5	4.7	4	6.0	1	2.6
▪ 2-3	88	83.0	53	79.1	35	89.7
▪ >3	13	12.3	10	14.9	3	7.7
Mother practices active feeding						
▪ Yes (≥ 3 behv/5)	59	55.7	38	56.7	21	53.9
▪ No (< 3 behv/5)	47	44.3	29	43.3	18	46.1

* $p<0.05$. # Indicators of active feeding behaviours followed by the mother: feeding the child as frequently as needed, sit with the child, encouraging child to eat, make child eat with family members and feeding the child in separate plate. Presence of 3 or more of these indicators was categorized as active feeding. Note: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and depends on whether child is initiated CF.

Beliefs and Practices of the Mothers Related to Health

Table 4.1.23 describes the awareness and practices of the mothers related to child health. Mothers described a *healthy* and *strong* child as: '*Baalak jaadu hoi*' (child is fat); '*Baalak hastu ramtu hoi*' (child is playful); '*Sharir saaru dekhaye*' (child appears good). While a *weak* and *ill* child was described as: '*Balak rame na, chanu manu padyu rahe*' (child is not playful and remains inactive); '*Balak patlu hoye*' (child has a thin body); '*Balak nu vajan ochu hoye*' (child has low body weight).

A majority of the mothers perceived their child to be healthy for the reasons that child is playful, eats well and child's weight is normal. Unfortunately, most children were infact

under weight (section III). A common perceived cause of child's illness was 'evil eye'. *Age wise* analysis revealed that food deficiency was considered as a cause of malnutrition significantly more for older children than younger children (6-11 months: 24%, 24-35 months: 50%, $p<0.05$). Some mothers, especially those having a girl child, perceived illness as a normal part of development. Further, a significantly larger proportion of mothers of boy children believed that illness-infection causes malnutrition as compared to mothers of girl children. Almost all the mothers reported to seek doctors' treatment for an ill child; while also taking treatment from faith healers especially for *'varadh'* (respiratory infection).

Majority of the mothers having a male child (91%) perceived that diet played an important role in child's health compared to fewer mothers having girl children (85%).

From the children who were registered at the AWC for availing various ICDS services, about two third attended the AWCs regularly. According to the mothers, Growth Monitoring was the most (73%) utilized service followed by Immunization (57%) and Supplementary Feeding service (54%). Not a single mother reported receiving the Nutrition Health Education service at the AWC. All the ICDS services were better utilized by girl children than by boy children though these differences were not significant.

Age wise analysis revealed that supplementary feeding ($p<0.01$) and preschool education service ($p<0.001$) were utilized more by the older children compared to the younger ones.

Table 4.1.23 Health Related Beliefs and Practices of the Mothers

Item	Total N = 115		Boys N = 72		Girls N = 43	
	n	%	n	%	n	%
Description of a healthy child						
▪ Child is fat	42	36.5	26	36.1	16	37.2
▪ Child appears good	31	27.0	20	27.8	11	25.6
▪ Child is playful	30	26.1	20	27.8	10	23.3
▪ Child's weight is appropriate	19	16.5	13	18.3	6	14.0
Description of a weak child						
▪ Child is not playful	46	40.0	34	47.2	12*	27.9
▪ Child has a thin body	36	31.3	19	26.4	17	39.5
▪ Child has low body weight	28	24.3	18	25.0	10	23.3
▪ Child cries a lot	18	15.7	14	19.4	4	9.3
Mother perceives her child to be healthy						
▪ Yes	81	70.4	51	70.8	30	69.8
▪ No	32	27.8	21	29.2	11	25.6
Causes for childhood illness						
▪ Evil eye	81	70.4	50	69.4	31	72.1
▪ Inappropriate food	29	25.2	20	27.8	9	20.9
▪ Illness is normal part of development	19	16.5	8	11.1	11*	25.6

Item	Total		Boys		Girls	
	N = 115		N = 72		N = 43	
	n	%	n	%	n	%
▪ Seasonal change	19	16.5	8	11.1	11	25.6
▪ Bathing child in cold water	16	13.9	14	19.4	2	4.7
▪ Unhygienic conditions	15	13.0	9	12.5	6	14.0
Treatment sought during illness						
▪ Doctor	113	98.3	71	98.6	42	97.7
▪ Faith healer	79	68.7	48	66.7	31	72.1
▪ Home remedy	13	11.3	11	15.3	2	4.7
Child's diet is associated with his/her health						
▪ Yes	94	88.7	61	91.0	33	84.6
▪ No	6	5.7	2	3.0	4	10.3
Cause of malnutrition						
▪ Food deficiency	48	41.7	31	43.1	17	39.5
▪ Illness and infection	37	32.2	26	36.1	11*	25.6
▪ Don't know	26	22.6	16	22.2	10	23.2
▪ Lack of care	5	4.3	3	4.2	2	4.7
Are Anganwadi services used regularly						
▪ Yes	84	73.0	52	72.2	32	74.4
▪ No	31	27.0	20	27.8	11	25.6
Utilization of AWC services						
▪ Growth monitoring	61	72.6	34	65.4	27	84.4
▪ Vaccination	48	57.1	29	55.8	19	59.4
▪ Supplementary foods	45	53.6	25	48.1	20	62.5
▪ Preschool facility	18	21.4	12	23.1	6	18.8

*p<0.05, All other values: NS

Notes: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and depends on presence of practice.

Feeding of the Child during Illness

Breast feeding and complementary feeding practices of the mothers during child's illness and during recovery are presented in Table 4.1.24. When *mothers were ill*, many mothers (43%) breastfed less than before giving the reason that *'Amari bimari baalakne lage'* (child will contract mother's illness). Whereas, fewer mothers (33%) reported to feed same as before perceiving that *'Balak radya kare che, koina paase naa rahe etle dhavdavu pade'* (Child keeps crying and cannot be pacified by anyone else so I have to breastfeed) and *'Baalak khali maa na dhavan pær che'* (Child is only on breast milk). When children suffered from cold/fever or diarrhea, most of the mothers fed their child breast milk and complementary foods according to his/her demand perceiving that *'Bimari maa baalak nu modhu bagdi jaye ane khavanu bhave naa'* (During illness child loses his/her taste senses so does not feel like eating) and *'Baalak ne bhuk nathi lagti'* (Child does not feel hungry).

However, when their *children started recovering* from illness, majority of the mothers fed (BF and CF) same as before. Comparing the *gender differences*, significantly more girl children than boys were fed complementary foods 'same as before'; while more boys were fed either more than before or as they demanded ($p<0.05$).

Table 4.1.24 Current Perceptions and Practices Related to Child Feeding During and After Illness

Item	Total		Boys		Girls	
	N = 115		N = 72		N = 43	
	n	%	n	%	n	%
Frequency of BF, when mother is ill						
▪ Same as before	30	33.3	19	35.2	11	30.6
▪ Less than before	39	43.3	23	42.6	16	44.5
▪ Stop breast feeding	11	12.2	6	11.1	5	13.9
▪ Amount child demands	10	11.3	6	11.1	4	11.1
Frequency of BF, when child has Cold & Fever						
▪ Same as before	7	7.8	3	5.6	4	11.1
▪ Less than before	6	6.7	4	7.4	2	5.6
▪ Stop breast feeding	1	1.1	1	1.9	0	0
▪ Amount child demands	76	84.4	46	84.2	30	83.4
Frequency of BF, when child has Diarrhoea						
▪ Same as before	19	21.1	10	18.5	9	25.0
▪ Less than before	5	5.6	4	7.4	1	2.8
▪ Stop breast feeding	4	4.4	3	5.6	1	2.8
▪ The amount child demands	56	62.2	31	57.4	25	69.4
Frequency of CF, when child has Cold & Fever						
▪ Same as before	10	9.4	8	11.9	2	5.1
▪ Less than before	5	4.7	5	7.5	0	0
▪ Stop feeding	5	4.7	3	4.5	2	5.1
▪ Amount child demands	86	81.8	51	76.1	35	89.7
Frequency of CF, when child has Diarrhoea						
▪ Same as before	19	17.9	13	19.4	6	15.4
▪ Less than before	5	4.7	4	6.0	1	2.6
▪ Stop feeding	5	4.7	4	69.0	1	2.6
▪ Amount child demands	71	67.0	41	61.2	30	76.9
Frequency of BF, during recovery						
▪ Same as before	78	86.7	44	81.5	34	94.4
▪ Less than before	4	4.4	3	5.6	1	2.8
▪ More than before	3	3.3	3	5.6	0	0
▪ Amount child demands	5	5.5	3	5.6	2	5.6
Frequency of CF, during recovery						
▪ Same as before	87	82.1	51	76.1	36	92.3
▪ Less than before	3	2.8	2	3.0	*	2.6
▪ More than before	4	3.8	4	6.0	1	0
▪ Amount child demands	7	6.6	5	7.5	0 2	5.1

*$p<0.05$, All other values: NS

Base N from which percentage values have been calculated varies and depends on whether child is breastfed or fed CF

Foods Given and Avoided During Illness: Mothers of children eating CF (N=106), were asked whether any special foods were fed or any foods were avoided when their child suffered from cold-cough or diarrhea. More than half of the mothers reported to feed either special foods or avoid certain 'harmful' foods during child's illness; more mothers having boy children (63%) reported doing this than mothers of girl children (36%). Special foods fed during cold were tea and lemon juice; and foods avoided were fruits, sweets and fried foods with the belief that they would aggravate the condition. However, in case of diarrhea, special foods like fruits, curd and rice were fed for faster recovery whereas spicy foods, pulses and cereals were avoided considering them to be heavy for the stomach and difficult to digest.

Table 4.1.25 Current Perceptions and Practices Related to Foods Given and Avoided During Illness

Item	Total N = 115		Boys N = 72		Girls N = 43	
	n	%	n	%	n	%
Foods given or avoided during child's illness (cold, fever, diarrhea)						
▪ Yes	56	52.8	42	62.7	14	35.9
▪ No	30	28.3	15	22.4	15	38.5
Special foods in cold-cough						
▪ Tea	3	6.8	3	8.8	0	0
▪ Lemon water	1	2.3	0	0	1	10.0
Foods avoided in cold-cough						
▪ Fruits	24	54.5	18	52.9	6	60.0
▪ Sweets	8	18.2	7	20.6	1	10.0
▪ Fried foods	6	13.6	6	17.6	0	0
Special foods in diarrhea						
▪ Fruits	12	32.4	8	32.0	4	33.3
▪ Rice; *khichadi*	4	10.8	3	12.0	1	8.3
▪ Curd	4	10.8	3	12.0	1	8.3
Foods avoided in diarrhoea						
▪ Spicy foods	8	21.6	4	16.0	4	33.3
▪ Pulses; *dal*	6	16.2	6	24.0	0	0
▪ Cereals; *roti*	5	13.5	3	12.0	2	16.6
▪ Vegetables	4	10.8	4	16.0	0	0

Notes: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and it depends on type of illness.

Hygiene Observations

Poor personal and environmental hygiene increases the risk of infections and morbidities and affects the nutritional status of the child. The data presented in table 4.1.26 and table

4.1.27 depicts hygiene scores assigned to the child and the mother (obtained from adding up score given to each hygiene practice). Maximum score was 10.

Both boys and girls had a mean and median hygiene score of 6 which was not satisfactory. As regards hygiene of mothers, majority followed good hygiene practices. However, only few mothers and children had clean and short nails.

Observations of hygiene in most of the houses revealed that the water storage utensils were clean, covered and kept above floor level. However, very few households (25%) used *'doya'* (ladle) for taking water out from the pot. This may lead to contamination of drinking water. Further only about 50% of the houses had clean floors and majority had improper ventilation. Toilet facility inside the house or in the courtyard was available to less than half households. Flies, mosquitoes and rats were observed within and outside every house.

Although there were no significant *gender* differences, girls had better hygiene than boys (clean hair, hands and clean clothes). However, hygiene of the mothers having a boy child was significantly better than those having a girl child (cut and clean nails $p<0.01$ and clean clothes $p<0.05$). As regards differences in *age groups*, younger children (6-11 months) had better personal hygiene as compared to older children. Thus, the observations highlight the need to improve certain hygiene practices for the child, mother and surrounding areas.

Table 4.1.26 Observation Data of Hygiene Practices (Personal and Environmental Hygiene)

Item	Total N=115		Boys N=72		Girls N=43	
	n	%	n	%	n	%
Personal hygiene of the child						
▪ Face clean	77	66.9	48	66.6	29	67.5
▪ No discharge from eyes	103	89.5	65	90.3	38	88.4
▪ No discharge from mouth	90	78.3	56	77.7	34	79.1
▪ No discharge from nose	79	68.7	53	73.6	26	60.5
▪ Hair neatly combed	64	55.6	40	55.5	24	55.8
▪ Hair clean	91	79.1	56	77.8	35	81.5
▪ Hands clean	67	58.3	39	54.2	28	65.2
▪ Nails cut short	35	30.4	22	30.5	13	30.3
▪ Nails clean	15	13.0	10	13.8	5	11.7
▪ Clothes clean	63	54.8	37	51.4	26	60.5
Personal hygiene of mother						
▪ Face clean	108	93.9	70	97.3	38	88.4
▪ No discharge from eyes	112	97.5	72	100	40	91.3
▪ No discharge from nose	112	97.5	72	100	40	93.1
▪ Hair neatly combed	85	73.9	53	73.6	32	74.5
▪ Hair clean	103	89.5	65	90.3	38	88.4
▪ Hands clean	101	87.9	65	90.3	36	83.7
▪ Nails cut short	51	44.4	39	54.2	12**	27.9

▪ Nails clean	37	32.2	30	41.7	7**	16.3
▪ Clothes clean	101	87.9	67	93.1	34*	79.1
Hygiene of surroundings						
▪ No stagnant water inside house	106	92.2	66	91.8	40	93.1
▪ No stagnant water outside house	81	70.5	47	65.3	34	79.1
▪ Water storage utensil is clean	108	93.9	71	98.7	37	86.1
▪ Water storage utensil is covered	106	92.2	70	97.3	36	83.7
▪ Water storage utensil is kept above floor level	87	75.7	55	76.5	32	74.5
▪ *Doya* used for filling water	29	25.3	16	22.2	13	30.3
▪ The floor is clean free from dust	68	59.2	43	59.8	25	58.2
▪ Proper cross ventilation in the house	32	27.8	18	25.1	14	32.6
▪ Toilet facility available inside the house	43	37.4	27	37.5	16	37.2
▪ No flies inside the house	18	15.7	12	16.7	6	13.9
▪ No insects inside the house	57	49.6	36	50.0	21	48.8
▪ No rats inside the house	27	23.5	15	20.8	12	27.9
▪ No flies outside the house	2	1.7	2	2.8	0	0
▪ No insects outside the house	41	35.7	26	36.2	15	34.9
▪ No rats outside the house	29	25.3	16	22.2	13	30.3

*p<0.05, **p<0.01, All other values: NS

Table 4.1.27 Mean Hygiene Scores

Item	Maximum score	Total	Boys	Girls	6-11 mths	12-23 mths	24-36 mths
		N=115	N=72	N=43	N=34	N=45	N=36
Hygiene of child							
Mean score ± SE	10	5.9±0.2	5.9±0.3	6.0±0.4	6.4±0.4	5.7±0.4	5.7±0.4
Median score		6.0	6.0	6.0	7.0	6.0	6.0
F statistic			0.05 NS		1.06 NS		
Hygiene of mother							
Mean score ± SE	9	7.1±0.2	7.4±0.2	6.4±0.3	7.2±0.3	6.7±0.3	7.3±0.2
Median score		7.0	7.0	7.0	7.0	7.0	7.0
F statistic			11.05**		1.3 NS		
Hygiene of surrounding							
Mean score ± SE	9	5.7±0.2	5.7±0.2	5.7±0.3	5.5±0.3	6.1±0.3	5.5±0.2
Median score		6.0	6.0	6.0	6.0	6.0	6.0
F statistic			0.0 NS		1.65 NS		

**p<0.01, NS: non significant

DISCUSSION

The above results indicate that the IYCF related awareness and practices of the mothers were found to be unsatisfactory and corroborated the prevalent scenario of other regions in our country and outside.

Prelacteal feeding: Prelacteal feeding practice is widespread in Indian community, which contributes to loss of essential nutrition which breastmilk can provide and places babies at

risk of illness. In the present rural population, nearly half (40%) of the mothers fed prelacteals (*Patasa* water, jaggery water, honey and *ghee*) to their children; more girls than boys. NFHS-3 (2005-06), reported that more than half of the mothers (57%) across India fed prelacteals to their children before introduction of breastmilk. Prelacteal feeds were more common in rural areas than in urban areas, among women with no education, in the low socio economic group, and whose child was born at home. It was most common in Bihar (91%) and Uttar Pradesh (86%) and least common in Kerala and Sikkim (11-12%). Over the years, many studies have reported a similar scenario. Feeding prelacteals like boiled water, sugar/honey/jaggery water and glucose is widely prevalent in urban as well as rural India, ranging from 86% in Orissa, 65% in Rajasthan to 42% in Chandigarh (Pathi and Das 2005, Parmar et al 2000 and Singh 1997). Studies conducted in urban and rural Vadodara have found that 40%-73% newborns were given prelacteals, mainly *'patasa'* water and honey. The main reasons given were: initially no breast milk is produced and child is hungry', 'it inculcates *sanskar* (values) in the newborn' and 'it clears the dirt from the baby's stomach' (Srivastava and Sandhu 2005, Sharma and Mishra 2004, Kanani and Gadre 2003 and Kanani and Malik 2002).

Colostrum feeding: Colostrum is found to be rich in antibodies and proteins. It is recognized as the best prophylaxis for diarrhea, septicemia and many types of allergies. But because of its unique color and viscosity, most women in India consider it potentially harmful to the infant. Many describe colostrum as 'pus', 'dirt', and spoilt milk left over from the earlier lactation period. Present data reported that colostrum was fed to only half of the children; there being more boys than girls (54% vs. 42%). Those who discarded colostrum stated reasons such as: 'colostrum is unhealthy for the child' and it was 'dirty and stale milk'.

Review from Bihar and Rajasthan revealed that a higher percentage of women discarded colostrum (66%-77%) (Yadav and Singh 2004, Singh 1997). However, in Chandigarh there was a contrasting picture with more than 80% mothers who practiced feeding colostrum to their children (Parmar et al 2000).

In urban and rural Vadodara only 61%-64% mothers reported to feed colostrum. The reasons for not feeding colostrum were similar to the present study: 'it is stale/dirty' (Srivastava and Sandhu 2005, Mehan and Yadav 2004, Kanani and Gadre 2003). However, Kanani and Katwala (2006) in urban Vadodara, reported a high prevalence of feeding colostrum to infants (71%) as mothers perceived it to be beneficial for child; with more boys

than girls fed colostrum - similar to the findings of present study. Overall, an increasing trend of giving colostrum is being reported over the years.

Breast feeding: According to PAHO/WHO (2003) early initiation of breast feeding (within one hour of birth) ensures availability of colostrum to the newborn and is associated with fewer breastfeeding problems and better mother-infant relationship.

The International Baby Food Action Network (IBFAN), Asia Pacific World Breastfeeding Trends Initiative (WBTi) studied IYCF Practices, Policies and Programs Worldwide. They issued report cards to all countries after assessing the implementation of *Global Strategy for Infant and Young Child Feeding* in South Asian countries in 2005-2006. The assessment was carried out by partners in breastfeeding movement including the Government of India, professionals and NGOs. Breastfeeding Promotion Network of India (BPNI) coordinated this activity. The India report card revealed that India scored 68/150 and ranked sixth among eight South Asian countries. The assessment was based on a set of 15 indicators, ten for policies and programs and five for the resultant practices.

IYCF practices: India Report Card	**Prevalence (%)**	**Score**
1. Initiation of Breastfeeding (within 1 hour) *0-29% scores as 3/Red; 30-49% as 6/Yellow;* *50-89% scores as 9/Blue; 90-100% scores as 10/Green.*	**15.8**	**3 – Red**
2. Exclusive Breastfeeding (for first 6 months) *Key:0-11% scores as 3/Red; 12-49% as 6/Yellow;* *50-89% scores as 9/Blue; 90-100% scores as 10/Green.*	**46.9**	**6 – Yellow**
3. Median Duration of Breastfeeding *Key:0-17 months scores as 3/Red; 18-20 as 6/Yellow;* *21-22 scores as 9/Blue; 23-24 or beyond scores as 10/Green.*	**25.4**	**10 – Green**

However, in the present study breast feeding was initiated as late as beyond 10 hours for above 50% of the new borns. Majority of the children (80%) were exclusively breastfed (EBF) for only 3 months or even less mainly due to initiation of water feeding. Further, water feeding was initiated earlier for girl children than boy children.

The NFHS-3 (2005-06) reported that only 23% mothers initiate breast feeding within one hour and 46% newborns are exclusively breastfed for 0-5 months. Similar is the picture in Gujarat state where only about 27% of the children receive timely breastfeeding (urban: 30%, rural: 25%). Exclusive breastfeeding for 0-5 months is practiced for 48% children (urban: 47%, rural: 48%).

In Latur (Maharashtra), Kameswararao (2004) also reported a low prevalence of exclusive breastfeeding till 4 months in a sample of 65 urban mothers (49%) and 249 rural mothers

(37%). Surprisingly more number of poor and illiterate mothers of both urban and rural areas practiced EBF than well to do mothers. This indicated that the socioeconomic status may not always be the factor for non-practice. Prevalence of '*almost exclusively breast fed infants*' (fed water, medicines, vitamins, tonics) was comparatively high (60%) in total sample.

Interview responses of 354 lactating women from Maternal Child Health (MCH) centers in Delhi revealed that only one fourth of the mothers practiced EBF till 4 months and most of the mothers preferred to provide infants something additional besides breast milk. Initiation of breastfeeding was earlier among literate mothers (within 6 hours of birth) as compared to illiterate mothers (Rasania et al 2003).

Another study by Yadav and Singh (2004) on breast feeding practices of 8,000 mothers (6,676 from rural and 1,279 from urban) from Bihar revealed that less than one third (29%) of the mothers started breast feeding their child within 24 hours indicating a poor prevalence rate everywhere in the country.

Studies conducted in urban Vadodara by Kanani and Malik (2002) and Mehan and Parkar (2001) also reported a dismal picture with only 18%-24% mothers practicing EBF till 6 months.

Top milk feeding: At the time of the survey about half of the children (more boys than girls) were receiving top milk, which was initiated before six months by one third mothers, believing that their breast milk was inadequate for the child.

Aneja et al (2001) in Delhi found that 80% children received top milk and 68% mothers had initiated top milk feeding before 6 months of age. However, Kanani and Malik (2002) reported a very low prevalence (10%) in urban Vadodara (n=50 children, 0-6 months). Another comparative study on 40 mothers (3-36 months children) each from urban and rural Vadodara reported 49% and 20% children to receive top milk respectively (Kanani and Gadre 2003).

Complementary feeding

***Initiation of complementary feeding*:** There is worldwide consensus that complementary feeding should begin at six months of age. In the present study, for more than half of the children (59%), complementary feeding (CF) was initiated beyond the recommended age of 6 months; the delay being more for the boys (64%) as compared to girls (46%). Further, according to more than half of the mothers, there was no apparent harm to the child in

delaying complementary foods. The reasons mentioned for initiation of CF were: 'their child had grown up', and 'their breast milk was insufficient'.

NFHS–3 (2005-2006) survey data of India as well as of Gujarat reveals delayed initiation of CF. In India 56% and in Gujarat 57% of children are fed solid or mushy foods at the age of 6-9 months; the percentage being still lower for rural children (India 54%, Gujarat 51%).

Yadav and Singh (2004) found that more than half of the mothers in Bihar introduced CF to their infants between 6-12 months. Cereal preparation and milk formed the major food item as substitutes for children for breast milk.

Few other local studies carried out in urban and rural Vadodara have also reported a similar picture where mothers introduced CF to their children after the age of 6 months: 60%-73% (Mehan and Yadav 2004, Kanani and Gadre 2003, Kanani and Gupta 2002).

Dietary diversity and active feeding: Less than one fourth of the children were given special foods (*'dal* water', *'sheera'* and *'khichadi'*) and more than one third were not fed certain foods like fruits (banana, guava, coconut) and vegetables (beans, GLVs) with the myth that child would suffer from '*varadh*' (respiratory infection).

With regard to feeding behaviours, unfortunately active feeding behaviours were not practiced by a significant proportion of mothers. Further, younger children were fed more frequently by their mothers as compared to older children. As regards *gender* differences, more girls ate on their own while more boys were fed by their mothers (encouraged boy children to eat and sat with them during feeding).

In a study by Brown et al (1992) it was found that the rural Bangladeshi women did not encourage their children to eat food until they were $1^{1/2}$ to 2 years of age. Mothers restricted CF with the belief that food caused 'stomach problems'. Although small amounts of liquid and solid foods were introduced to children in the first year of their life, these rarely included vegetables, fish and lentils.

A review of studies carried out in this department was done by Kanani et al (2005) who reported that in urban Vadodara, special foods were made for 28%-57% children. Active feeding was reported by a low percentage of women (14%-35%). Less than half of the mothers encouraged the child to eat more. A few active feeding behaviours were found to be practiced more by mothers of boy children as compared to those with girls (feeding the child, encouraging to eat more).

Health related awareness and practices

A majority of the mothers in the present study perceived their child to be healthy. Most of the mothers attributed 'evil eye' to be the major cause of child's illness. A significant proportion of mothers having girl child perceived illness as a normal part of development. In general, food deficiency and illness and infection were reported as the common causes of malnutrition. However, importance of CF for health of the young child was not realized by many mothers.

In other similar studies in and around Vadodara, less than one-third mothers related child's health to food intake of the child. Mothers gave varied responses based on the child's physical attributes (good body, thin body, and weak body), his activities (playfulness) and his behaviour (whether he laughs/cries often) (Kanani and Gupta 2002, Kanani and Katwala 2006). Another study by Kanani and Gadre (2003) compared the caregiving behaviours related to feeding practices of children (3-36 months) in rural and urban areas of Vadodara city. Mothers from both areas attributed 'Evil eye' as the most common cause for childhood illness and most of them (>70%) perceived food deficiency as cause of malnutrition.

Feeding during illness

Most mothers decreased the number of breastfeeds when they were ill with a view that mother's illness would infect the child. When the child suffered from illness, most of the mothers fed breast milk and CF according to child's demand. Various reasons cited were 'during illness child loses his/her taste senses so does not feel like eating' and 'child does not feel hungry'. More than half of the mothers having boy children (63%) reported to feed either special foods or avoid certain 'harmful' foods during child's illness than mothers of girl children (36%). In case of diarrhea, special foods like fruits, curd and rice were fed for faster recovery whereas spicy foods, pulses and cereals were avoided considering them difficult to digest. Majority of the mothers (>80%) reported to feed (BF and CF) same as before when the child started recovering from illness.

Review of data in Vadodara has revealed that it was primarily child's demand for food that determined his/her intake of food (Kanani et al 2005). Srivastava and Sandhu (2005) also reported avoidance of certain foods (44%) during child's (6-24 months) illness.

Hygiene observations

Hygiene observations revealed inadequate personal hygiene of the older children 12-35 months and of mothers. Hygiene score of the house and surroundings was also poor with

less use of '*doya*' for fetching water from the pot, poor ventilation, absence of clean floor and presence of flies and mosquitoes.

Summing up this section, optimal breastfeeding, complementary feeding and caregiving practices were not followed by a majority of the mothers, inspite of the extra inputs by the NGO in implementing ICDS services. The next section presents morbidity history and nutritional status of the children.

2.4 *Morbidity History of the Children*

As seen in table 4.1.28, two third of the children had suffered from illness in past two weeks to the interview. Illness was reported more for boys than girls (69% vs. 61%). Children suffered more from cold and cough followed by fever and diarrhea. Though less than 20% children were reported to suffer from diarrhea, mothers perceived diarrhoeal episodes to be more severe than cold, cough and fever. For treatment of cold and fever, majority of the mothers consulted the doctor. However, for treating diarrhea apart from doctor's medicines, mothers also tried home remedies.

According to the mothers, above half of the children (57%) experienced morbidity during teething. Majority of the children suffered from diarrhea and vomiting. Although most of the mothers sought for doctor's treatment, few superstitious mothers tied a black thread ('*Dant patti*') around the child's neck and took him to the faith healer as a cure for illness. Most mothers responded '*jhada ulti ane tav daant ave tyaar sudhi rahe pachi eni mete mati jaye*' (illness like diarrhea, vomiting and fever are a normal part of the teething process).

Table 4.1.28 Morbidity History of the Child

Item	Total N = 115		Boys N = 72		Girls N = 43	
	n	%	n	%	n	%
Child fell ill during previous 15 days						
▪ Yes	76	66.1	50	69.4	26	60.5
▪ No	39	33.9	22	30.6	17	39.5
Type of illness						
▪ Cold & cough	56	73.7	41	82.0	15	57.7
▪ Fever	33	43.4	21	42.0	12	46.3
▪ Diarrhoea	14	18.4	7	14.0	7	26.9
Perceived severity of fever						
▪ Severe	18	54.5	12	57.1	6	50.0
▪ Not severe	15	45.5	9	42.9	6	50.0
Perceived severity of cold & cough						
▪ Severe	28	50.0	21	51.2	7	46.7
▪ Not severe	28	50.0	20	48.8	8	53.3

Item	Total N = 115		Boys N = 72		Girls N = 43	
	n	%	n	%	n	%
Perceived severity of diarrhoea						
▪ Severe	9	64.3	5	71.4	4	57.1
▪ Not severe	5	35.7	2	28.6	3	42.9
Treatment given: Doctor's medicine						
▪ Fever	31	93.9	20	95.2	11	91.7
▪ Cold & Cough	41	73.2	31	75.6	10	66.7
▪ Diarrhoea	9	64.3	6	85.7	3	42.9
Illness during teething						
Child experience illness during teething	65	56.5	42	58.3	23	53.5
▪ Yes	50	43.5	30	41.6	20	46.6
▪ No						
Type of illness						
▪ Diarrhoea; vomit	53	81.6	32	76.2	21	91.3
▪ Fever	14	21.5	12	28.6	2	8.7
▪ Cold	5	7.7	4	9.5	1	4.3
Treatment given						
▪ Doctor's medicine	46	70.8	29	69.0	17	73.9
▪ Faith healer	16	24.6	9	21.4	7	30.4

Notes: In some sections, several responses are multiple responses hence the percentage may exceed 100. For simplicity, selected responses (more frequently occurring responses) are given in some sections hence the percentage may not add up to 100. The base N from which the percentage values are calculated varies and it depends on the illness experienced

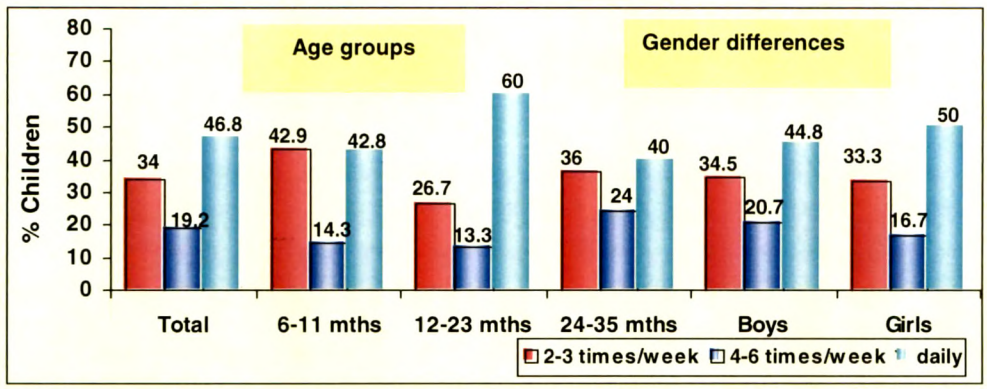
2.5 Nutritional Status of Children: Weight, Height and Diet Intake

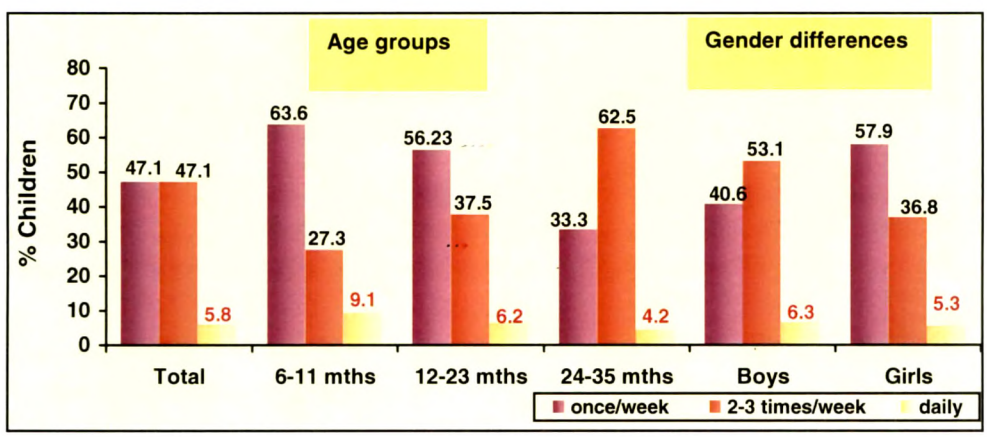
Frequency of Intake of Protective Foods

Intake of fruits (85%) was higher than vegetables (78%) among children. In case of fruits, younger children consumed more fruits as compared to older children: 6-11 months (92%) vs. 24-35 months (83%). However, the scenario was different with regard to vegetable consumption; older children consumed more (86%) vs. younger children (58%). One of the reasons for this age wise difference could be avoidance of certain vegetables for the younger children fearing it would cause *'varadh'* (respiratory infection) which has been reported earlier.

Frequency of Vegetable Intake: Only about half the children had daily intake of vegetables (Figure 4.1.2). Higher proportion of children in the lower age group (6-11 months) had the lowest frequency of vegetable intake i.e. 2-3 times/week as compared to the older age groups. As regards gender differences, more girls than boys had daily vegetable intake but the differences were not significant.

Figure 4.1.2 and 4.1.3 Frequency of Vegetable and Fruit Intake among Children (N=60)





Frequency of Fruit Intake: Figure 4.1.3 indicates that though higher proportion of children were reported to consume fruits, the frequency of consumption was poor, as nearly half of the children consumed fruits only once a week. Negligible proportion of children (6%) had daily fruit intake. As regards age wise differences, younger children consumed fruits less frequently and with increase in age frequency of consumption increased; 2-3times/week: 6-11 months 27%, 12-23 months 38% and 24-35 months 63%. More boys consumed fruits 2-3 times/week than girls. However, these differences were not significant ($p>0.05$).

Dietary and Nutrient Intake of Children

The mean food and nutrient intakes from complementary foods were quantitatively assessed through the 24-hour diet recall method on 50% (N=60) of the total sample. The intakes of food groups and nutrients are compared and presented as percentage of recommended dietary allowances (RDA). Appropriate reference standards were taken for food groups and for macro and micronutrients for comparison. The rationale has been explained in the methods chapter.

Food Intake

The mean dietary intake of various food groups (Table 4.1.29) was poor. Cereal and pulse intake was nearly half (41% and 48% of RDA), where as milk intake was only about one third of the RDA. The intake of vegetable, roots–tubers, fruits, sugar and oil was dismal (less than 20% of RDA). Not much difference was noted in intake of foods in younger and older children; only the cereal and pulse intake of older children (24-35 months) was significantly higher than that of younger age groups.

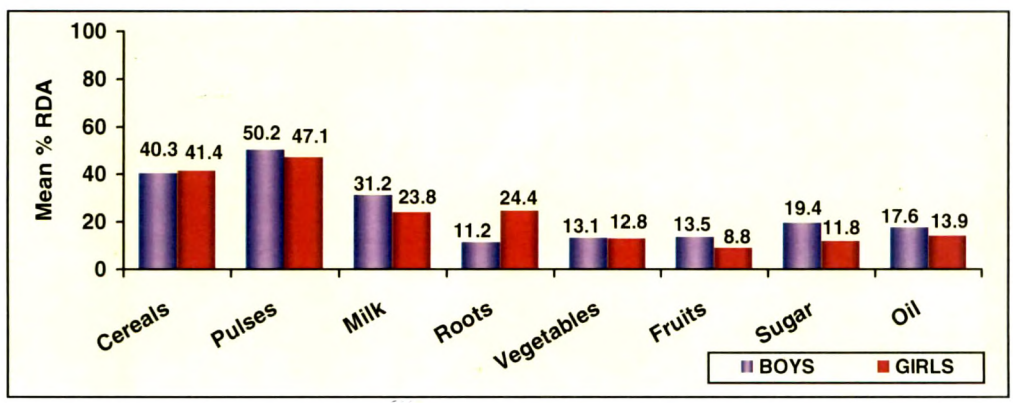
Table 4.1.29 Mean Food intake of Children

Food Groups		Total N = 60	Food Intake by Age			t value
			6-11 months n = 12	12-23 months n = 19	24-35 months n = 29	
Cereals	Mean± SE	41.84±3.62	18.58±4.16	36.68±5.76	54.84±5.09	9.8***
	Median	36.75	14.50	27.00	47.00	
Pulses	Mean± SE	13.67±1.74	3.79±1.43	14.26±2.63	17.37±2.83	4.92*
	Median	10.25	2.00	12.00	13.00	
Milk	Mean± SE	56.23±8.73	54.25±27.08	45.86±11.16	63.15±12.42	0.38^{NS}
	Median	32.75	4.50	25.00	37.00	
Roots	Mean± SE	8.36±2.23	5.00±3.82	8.01±4.19	9.98±3.42	0.35^{NS}
	Median	0.00	0.00	0.00	1.00	
Vegetables	Mean± SE	6.18±1.67	1.58±1.41	3.28±1.80	9.99±3.09	2.61^{NS}
	Median	0.00	0.00	0.00	2.00	
Fruits	Mean± SE	11.57±3.70	1.58±1.59	8.00±4.92	18.03±6.78	1.65^{NS}
	Median	0.00	0.00	0.00	0.00	
Sugar	Mean± SE	4.06±0.49	2.18±1.29	3.42±0.64	5.25±0.73	3.29*
	Median	4.00	0.00	4.00	5.00	
Oil	Mean± SE	3.03±0.43	0.94±0.32	3.13±0.69	3.83±0.70	3.56*
	Median	2.00	0.23	2.25	2.00	
Mean Food intake (% RDA)						
Cereals	Mean± SE	40.70±3.22	41.30±9.24	32.69±5.10	45.70±4.24	1.62^{NS}
	Median	35.21	32.22	22.50	39.17	
Pulses	Mean± SE	48.54±5.79	26.94±10.97	48.95±8.70	57.90±9.43	2.04*
	Median	41.67	13.33	43.33	43.33	
Milk	Mean± SE	28.11±4.36	27.13±13.54	22.93±5.58	31.92±6.27	0.41^{NS}
	Median	16.38	2.25	12.50	18.50	
Roots	Mean± SE	16.73±4.46	10.00±7.65	16.03±8.38	19.97±6.84	0.35^{NS}
	Median	0.00	0.00	0.00	2.00	
Vegetables	Mean± SE	13.00±3.45	6.33±5.63	6.55±3.60	19.88±6.18	1.97^{NS}
	Median	0.00	0.00	0.00	4.00	
Fruits	Mean± SE	11.57±3.70	1.58±1.59	8.00±4.92	18.03±6.78	1.65^{NS}
	Median	0.00	0.00	0.00	0.00	
Sugar	Mean± SE	16.22±1.99	8.70±5.16	13.68±2.56	21.00±2.93	3.29*
	Median	16.00	0.00	16.00	20.00	
Oil	Mean± SE	16.09±2.14	9.38±3.21	15.63±3.47	19.17±3.49	1.53^{NS}
	Median	10.00	2.25	11.25	10.00	

*p<0.05, **p<0.01, ***p<0.001, NS: non significant

Figure 4.1.4 gives the sex wise distribution of the food intake as %RDA met by children. The consumption of various foods did not vary significantly among boys and girls though boys had a higher intake of all foods (except roots) than girls.

Figure 4.1.4 Mean Intake of Various Foods (% RDA) between Boys and Girls



Note: Difference between means of boys and girls are all Non significant

Nutrient Intake

The nutrient intake (mean intake and mean % RDA) met by children in different age groups is presented in Table 4.1.31.The mean intake of calories (overall) was found to be low (meeting only 53% of RDA) indicating inadequate consumption of CF by children. However, the protein intake was found to be higher (70% of the RDA). The mean intake of calcium and iron was low, meeting about one-third the RDA. Intake of vitamin C and vitamin A was the most deficient (25% and 8% of RDA respectively). The poor intake of micronutrients was probably due to the deficient intake of fruits and vegetables as indicated earlier (Figure 4.1.4).

Comparing the actual nutrient intake of children in different age groups, it was noted that the older children (24-35 months) were consuming significantly higher amount of many nutrients than did the younger children (6-11 and 12-23 months).

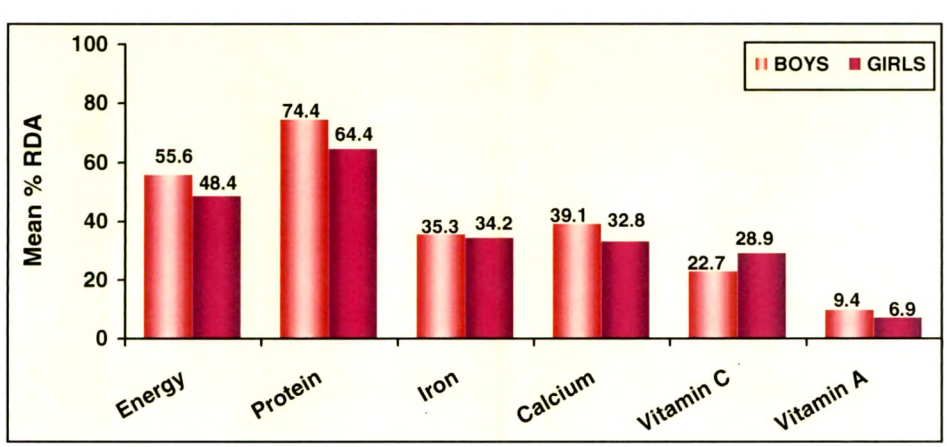
Percent RDA: It was noted that except for calcium intake which consistently declined with age, there was no clear age wise trend for other nutrients. As the child grows, its nutrient requirements increase, which if not met leads to undernutrition. In case of proteins and iron, the middle age group (12-23 months) had a significantly higher intake compared to the other two groups. For the remaining nutrients (calcium, vitamin C and vitamin A) RDAs met by 24-35 months children were higher than the younger children. Overall trends however were not consistent but it is clear that the nutrient intake were dismally low especially for micronutrients (Table 4.1.30).

Table 4.1.30 Mean Nutrient Intake of Children in Different Age Groups

Nutrients		Total N = 60	Nutrient Intake by Age			
			6-11 months n = 12	12-23 months n = 19	24-35 months n = 29	F value
Energy (Kcal)	Mean± SE	374 ± 26.30	200 ± 44.71	353 ± 33.63	459 ± 38.76	8.89***
	Median	375	150	359	437	
Protein (gm)	Mean± SE	10.88 ± 0.90	5.64 ± 1.41	9.61±1.05	13.89 ± 1.41	7.91**
	Median	9.66	3.44	8.68	13.22	
Iron (mg)	Mean± SE	3.20 ± 0.38	1.51 ± 0.24	2.64 ± 0.38	4.26 ± 0.70	4.58*
	Median	2.65	1.19	2.73	3.34	
Calcium (mg)	Mean± SE	154.45± 19.29	121.64±57.52	132.26 ±24.11	182.56 ±28.08	1.01^{NS}
	Median	109.28	15.67	115.72	134.94	
Vitamin C (mg)	Mean± SE	9.38 ± 2.17	1.69 ± 0.73	8.40 ± 3.35	13.20 ± 3.79	2.09*
	Median	2.56	0.75	2.56	5.21	
Vitamin A (µg)	Mean± SE	33.39 ± 4.33	32.1 ± 13.96	27.29 ± 5.55	37.92 ± 5.99	0.58^{NS}
	Median	21.40	3.00	19.0	26.00	
Mean Nutrient intake (% RDA)						
Energy	Mean± SE	52.60 ± 4.20	71.89±14.51	64.14 ± 6.11	37.06 ± 3.13	8.24***
	Median	40.82	62.33	65.27	35.24	
Protein	Mean± SE	70.27 ± 5.37	59.21±14.61	88.14 ±9.65	63.14 ± 6.39	2.76*
	Median	62.73	36.81	79.63	60.09	
Iron	Mean± SE	34.83 ± 3.74	16.25±2.53	45.56±6.63	35.49 ± 5.81	4.18**
	Median	27.95	12.80	47.07	27.83	
Calcium	Mean± SE	36.52 ± 4.75	30.41±14.38	26.45 ± 4.82	45.64 ± 7.02	1.82*
	Median	24.50	3.92	23.14	33.74	
Vitamin C	Mean± SE	25.35 ± 5.88	5.64±2.42	26.11 ± 11.18	33.0 ± 9.47	1.67*
	Median	7.20	2.50	8.53	13.03	
Vitamin A	Mean± SE	8.35 ± 1.08	8.02±3.49	6.82 ± 1.39	9.48± 1.5	0.57^{NS}
	Median	5.35	0.75	4.75	6.50	

*p<0.05, **p<0.01, ***p<0.001, NS: non significant

Figure 4.1.5 Mean Nutrient Intake (% RDA) of Boys and Girls



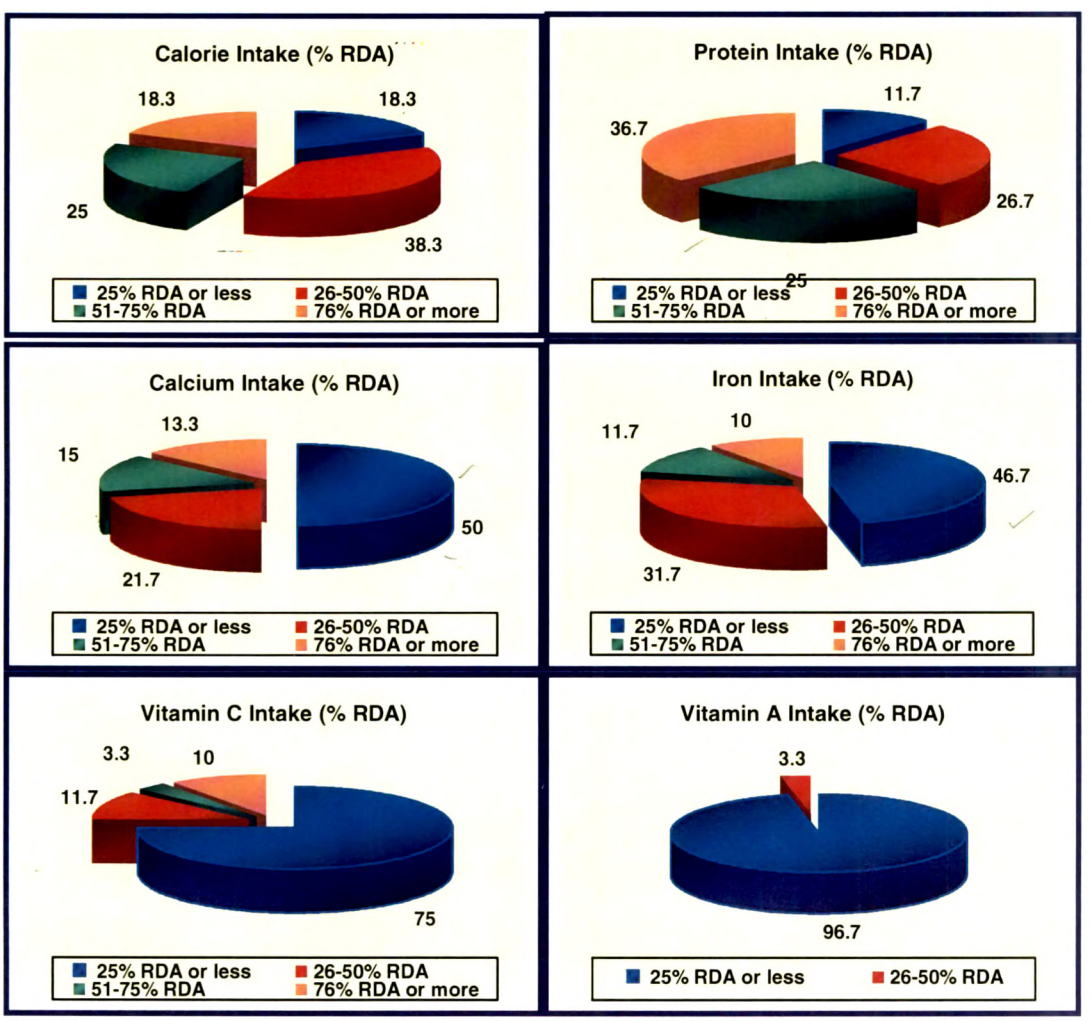
Note: Difference between means of boys and girls are al Non significant

In case of differences between boys and girls, boys had higher intake of all nutrients except vitamin C; however, these gender differences were not significant (Figure 4.1.5). The mean and median values for most of the nutrients differed indicating wide variations in complementary food intake.

The Nutrient Intake at Various Levels of Recommended Dietary Allowances

The intake of various nutrients at various levels of RDA is presented in Figure 4.1.6. Above one third children (38%) met only between 26-50% RDA for energy. However, protein intake was better as more than one third children met more than 75% of the protein RDA and another one fourth met 51%-75% of the RDA. As regards calcium and iron intake, half of all children met only upto one fourth the RDA. Further, majority of the children had negligible intake of vitamin A and vitamin C meeting ≤25% RDA.

Figure 4.1.6 Percent Children Who Met Various Level of % RDA (N=60)



Nutritional Status of Children

This section presents the results of the nutritional status of children measured in terms of underweight (weight-for-age <-2z scores), stunting (height-for-age <-2z scores), wasting (weight-for-height <-2z scores) with reference to WHO growth standards. Mean weight and height were analyzed using EPI-info 6.04d computer package and underweight, stunting and wasting were analyzed using WHO Anthro 2007 package.

Mean Weight and Height of Children

The weight and height data of the children is presented below in Table 4.1.31. The mean weight of the children was 77% of the WHO growth standards and the mean height met 90% of the standards. As age increased, the mean weight and height increased. However, even the prevalence of malnutrition increased; older children met lower percentages of the standards than younger children. Between boys and girls, boys were slightly better nourished than girls, meeting slightly higher standards than girls.

Table 4.1.31 Comparison of Weight and Height of the Children with the WHO Growth Standards[1]

Characte-ristic	N	Weight (kgs)			Height (cms)		
		Mean ± SE	Median	% WHO Standard Mean ± SE	Mean ± SE	Median	% WHO Standard Mean ± SE
Total	115	8.29 ± 0.2	8.0	76.7 ± 1.2	74.3 ± 0.6	74.0	90.9 ± 0.6
Age (months)							
▪ 6–11	25	7.00 ± 0.2	7.0	81.6 ± 2.2	67.4 ± 0.9	66.0	94.8 ± 1.3
▪ 12–23	47	7.95 ± 0.2	8.0	76.2 ± 2.0	73.2 ± 0.8	72.0	90.9 ± 1.0
▪ 24-35	43	9.42 ± 0.3	9.0	74.4 ± 1.9	79.5 ± 0.8	80.0	88.6 ± 0.8
F value				2.63^{NS}			8.16***
Sex							
▪ Boys	72	8.68 ± 0.2	8.6	77.8 ± 1.5	75.5 ± 0.8	76.3	91.2 ± 0.7
▪ Girls	43	7.64 ± 0.2	7.9	74.9 ± 1.9	72.3 ± 0.9	72.0	90.4 ± 1.2
t value				1.18^{NS}			0.55^{NS}

***p<0.001, NS: non significant, 1: WHO Growth Standards (2007)

The Figure 4.1.7 depicts that initially when the child is breastfed and initiated with complementary foods, the weight of both boys and girls is near the WHO reference standard. However, later as age increases the gain in weight is not consistent. At the end of the third year, the mean weight of both boys and girls is far below the standards.

Similarly, a higher proportion of children in younger age group do not suffer from height deficit. However, with increase in age the difference increases (Figure 4.1.8). For both mean weight and height, boys met higher percentage of standards than did the girls.

Figure 4.1.7 Comparison of Mean Weight of the Children Sex wise with the WHO Growth Standards

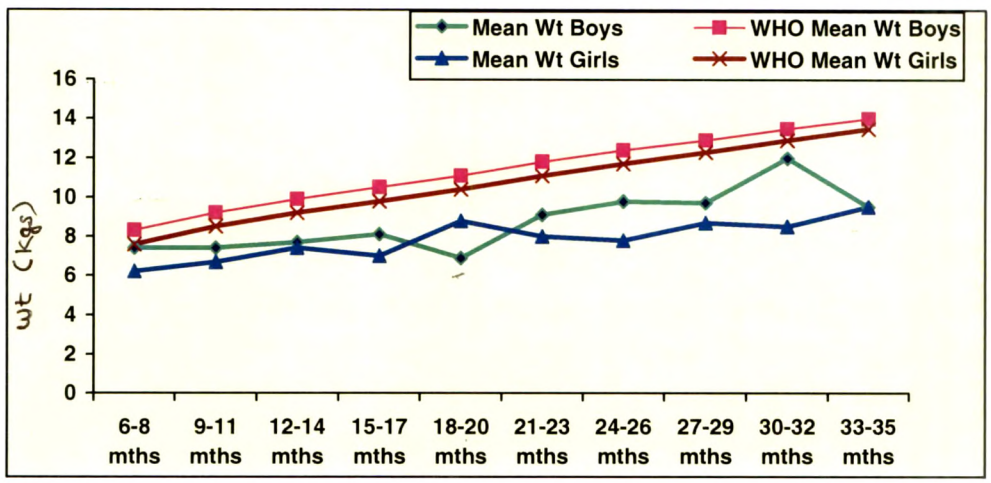
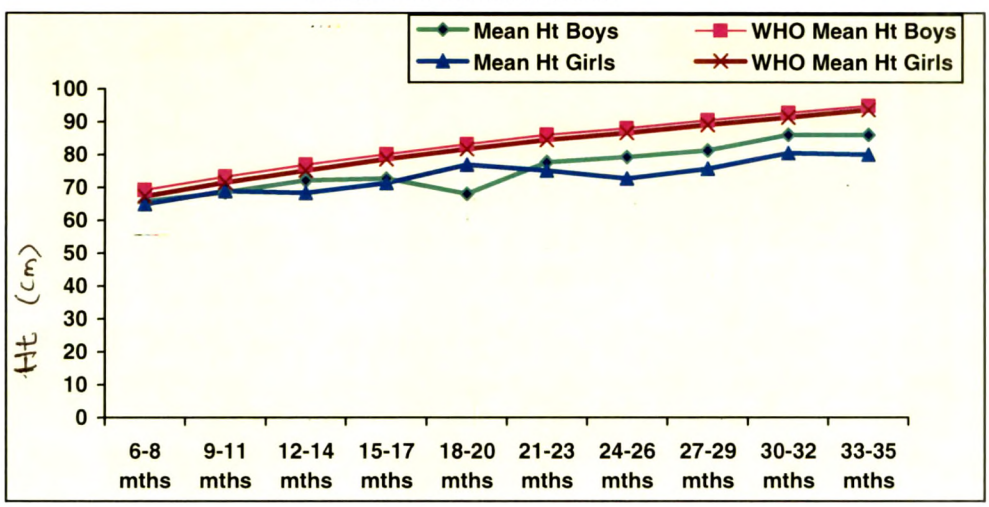


Figure 4.1.8 Comparison of Mean Height of the Children Sex wise with the WHO Growth Standards



Underweight: Weight-for-Age (WAZ) Z score

As table 4.1.32 shows about two-third of the children were underweight (WAZ<-2z score) and one third of the children were severely underweight (WAZ<-3z score).

With increase in age the prevalence of underweight increased significantly ($p<0.05$). Though severe underweight also increased with age the difference was not significant. No significant gender differences were obtained. However, the proportion of girls in both underweight and severe underweight categories was seen higher than in boys.

Table 4.1.32 Nutritional Status of Children by Weight-for-Age[1] (WAZ) Z Score Values

Characteristic of the Child	Undernourished				Normal	
	WAZ (<-2 z score)		WAZ (<-3 z score)			
	n	%	n	%	n	%
Total (N=114)	74	64.9	39	34.2	40	35.1
Age of the child (months)						
▪ 6-11 (n=25)	11	44.0	6	24.0	14	56
▪ 12-23 (n=46)	29	63.0	14	30.4	17	37
▪ 24-35 (n=43)	34	79.1	19	44.2	9	29
Chi-square	8.65*		3.35^{NS}			
Sex of the child						
▪ Male (n=72)	46	63.9	21	29.2	26	36.1
▪ Female (n=42)	28	66.7	18	42.9	14	33.3
Chi-square	0.09^{NS}		2.21^{NS}		NS	

*p<0.05, NS: non significant
1: as %WHO Growth Standards (2007)

Stunting: Height-for-Age (HAZ) Z score

As Table 4.1.33 reveals, almost three fourth (70%) of the children were stunted (HAZ<-2z score) and nearly 40% suffered from severe stunting (HAZ<-3z score). The prevalence and severity of stunting increased significantly as age increased. Severe stunting also increased with age though not significant. No significant gender differences were obtained. However, more boys suffered from stunting whereas, higher proportion of girls fell in severe stunting category.

Table 4.1.33 Nutritional Status of Children by Height-for-Age[1] (HAZ) Z Score Values

Characteristic of the Child	Stunted				Normal	
	HAZ (<-2 z score)		HAZ (<-3 z score)			
	n	%	n	%	n	%
Total (N=110)	77	70.0	42	38.2	33	30
Age of the child (months)						
▪ 6-11 (n=25)	11	44.0	8	32.0	14	56
▪ 12-23 (n=44)	31	70.5	17	38.6	13	29.5
▪ 24-35 (n=41)	35	85.4	17	41.5	6	14.6
Chi-square	12.66**		0.60^{NS}			
Sex of the child						
▪ Male (n=69)	49	71.0	24	34.8	20	29
▪ Female (n=41)	28	68.3	18	43.9	13	31.7
Chi-square	0.09^{NS}		0.91^{NS}		NS	

*p<0.05, **p<0.01, NS: non significant
1: as %WHO Growth Standards (2007)

Wasting: Weight-for-Height (WHZ) Z score

As seen in Table 4.1.34 nearly one fourth (28%) children were wasted (WHZ <-2z score). There was no significant difference in the proportion of wasted children both age wise and sex wise. However, higher percentage of boys were wasted compared to girls.

Table 4.1.34 Nutritional Status of Children by Weight-for-Height[1] (WHZ) Z Score Values

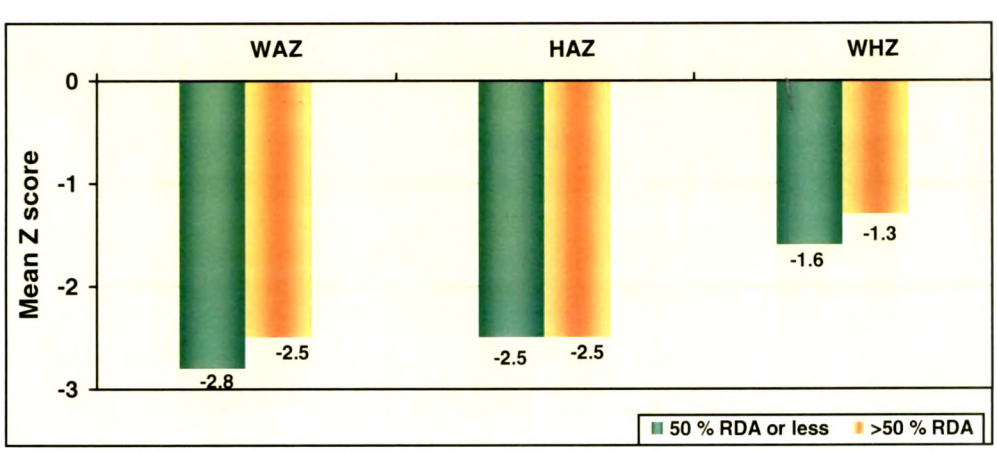
Characteristic of the Child	Wasted				Normal	
	WHZ (<-2 z score)		WHZ (<-3 z score)			
	n	%	n	%	n	%
Total (N=113)	32	28.3	9	7.9	81	71.7
Age of the child (months)						
▪ 6-11 (n=24)	5	20.8	2	8.3	19	79.2
▪ 12-23 (n=46)	14	30.4	4	8.7	32	69.6
▪ 24-35 (n=43)	13	30.2	3	6.9	30	69.8
Chi-square	0.84^{NS}		0.1^{NS}			NS
Sex of the child						
▪ Male (n=72)	21	29.2	8	11.1	51	70.8
▪ Female (n=41)	11	26.8	1	2.4	30	73.2
Chi-square	0.07^{NS}		1.63^{NS}			NS

NS: non significant
1: as %WHO Growth Standards (2007)

Relationship between Child's Calorie Intake and Nutritional Status

Figure 4.1.9 establishes the importance of adequate food intake towards improved nutritional status of the child. Those children whose calorie intake was higher (>50% of RDA) had lower underweight (low mean weight-for-age z scores), and wasting (low weight-for-height z scores) as compared to those who had lower calorie intake (≤50% of RDA); however, the differences were not significant (p>0.05).

Figure 4.1.9 Mean WAZ[1], HAZ[2] and WHZ[3] Z Scores of Children with Different Levels of Calorie Intake (N=60)



1: weight-for-age, 2: height-for-age, 3: weight-for-height
For WAZ, HAZ and WHZ the relation is non significant

Do the Caregiving Behaviours Have an Influence on Child's Nutrient Intake?

As Table 4.1,35 revealed that a higher intake of calories was significantly associated with the practice of giving special foods to the child. Other Caregiving behaviours did not significantly influence child's nutrient intake; infact most of the Caregiving behaviours were unsatisfactory in both the groups.

Table 4.1.35 Association of Mother's Caregiving Behaviours with Child's Calorie Intake

Caregiving Behaviour	Calorie intake			
	≤ 50% RDA (N=34)		> 50% RDA (N=26)	
	n	%	n	%
When Child is ill:				
▪ Mother does not reduce CF	3	8.8	4	15.4
▪ Gives CF only when child demands	31	91.2	22	84.6
Uses anganwadi services				
▪ Yes	26	76.5	21	80.8
▪ No	8	23.5	5	19.2
Initiated CF at 6 months				
▪ Yes	8	23.5	5	19.2
▪ No	26	76.5	21	80.8
Gives special foods to child				
▪ Yes	2	5.9	7	26.9*
▪ No	32	94.1	19	73.1
Encourages Child to eat				
▪ Yes	7	20.6	3	11.5
▪ No	27	79.4	23	88.5
Sits with the child				
▪ Yes	5	14.7	6	23.1
▪ No	29	85.3	20	76.9
Serve food in separate plate				
▪ Yes	31	91.2	22	84.61
▪ No	3	8.8	4	5.4
Make child eat with family members				
▪ Yes	17	50.0	9	34.6
▪ No	17	50.0	17	65.4

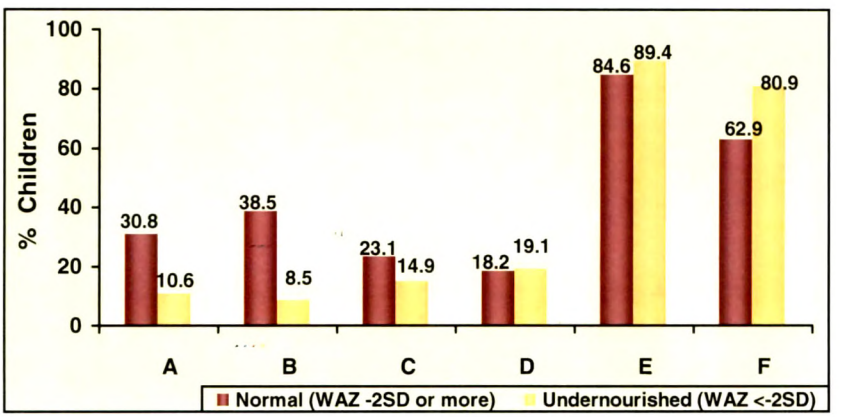
*p<0.05; All other Caregiving behaviours vs. Calorie intake: non significant association

Do the Caregiving Behaviours have an Influence on Child's Nutritional Status?

Figure 4.1.10 studied the association between Caregiving behaviours and child's nutritional status by comparing the proportion of mothers practicing the Caregiving behaviours between two groups: the group with normal nutrition status versus the undernourished group (by weight-for-age z score).

None of the Caregiving behaviours showed a significant relationship with weight-for-age ($p>0.05$). Behaviour A, B and C given in figure below were associated with better nutritional status of the child. However, a higher proportion of undernourished children were regularly attending the AWCs compared to the normal ones, perhaps because when families perceive their children to be undernourished they send them to AWC.

Figure 4.1.10 Association of Mother's Caregiving Behaviours with Child's Weight for Age Z Score



A: mother breastfeeds the child same as before when child is ill
B: mother gives special foods to child
C: mother encourages the child to eat
D: mother sits with the child to eat
E: child is fed in separate plate
F: Child is regularly sent to the AWC

Do the Resources of Care have an Influence on Child's Nutritional Status?

Table 4.1.36 presents the relationship between selected resources of care with child's nutritional status (weight-for-age Z score). It was found that mothers with higher education had a higher proportion of normal children than undernourished. Similarly father's education was also positively linked with the nutritional status of the child. Further, those study children who were first or second in the birth order were likely to be cared for and hence had better nutritional status as compared to those with parity three or four.

Table 4.1.36 Association of Selected Resources of Care with Child's Nutritional Status

Resources of Caregiving	Nutritional status by Weight-for-Age (N=115)			
	Normal (N=33)		Undernourished (N=82)	
	n	%	n	%
Mother's education (completed years)				
▪ ≤7	21	63.6	66	80.5
▪ >7	12	36.4	16	19.5
Mother's BMI (Mean ± SE)	19.6 ±0.6		18.1 ±0.3*	
Father's education (completed years)				
▪ ≤7	9	27.3	28	34.1
▪ >7	24	72.7	54	65.9
Family type				
▪ Joint	23	69.7	54	65.9
▪ Nuclear	10	30.3	28	34.1
Birth order				
▪ ≤2	26	78.8	55	67.1
▪ >2	7	21.2	27	32.9

Normal: weight-for-age ≥-2 SD, Undernourished: weight-for-age <-2 SD
*Mother's BMI vs. weight-for-age; p<0.05

DISCUSSION

The above results thus highlight that high prevalence of morbidity, poor intake of CF and unsatisfactory nutritional status prevailed in the study sample.

Prevalence of morbidity

The incidence of morbidity was high among children with majority of them (66%) suffering from cold/cough followed by fever and diarrhea, 15 days prior to the interview. Illness was reported more among boys than girls. Most of the children were taken to the doctor for treatment of these illnesses.

The prevalence of three important and commonly occurring illnesses among children in India: acute respiratory infection (ARI), fever and diarrhoea (past 2 weeks) was reported to be 6%, 15% and 9% respectively by NFHS-3 (2005-06) with higher prevalence among rural children than urban children. The national average was much below the prevalence observed in the present study.

A recent study undertaken in 6 villages of Ghaziabad, Uttar Pradesh to understand the current complementary feeding practices and assess the malnutrition status of infants (6-12 months) reported a high prevalence of morbidity: diarrhea (48%), fever (42%), cough (39%) and acute respiratory tract infection (ARI) (12%) (Garg and Chadha 2009). Similar results

were also reported by Kanani and Gadre (2003) with nearly 50% children (less than 3 years) in both urban and rural Vadodara suffering from morbidities like cold/cough, fever and diarrhea during the course of the study.

In another longitudinal study by Rao et al (2000) on preschool children (n=845, 0-5 years) from slum communities in Pune, it was reported that gastrointestinal illness and fever contributed to half of the total morbidity. Further, morbidity incidences were higher in rainy season and were associated with wasting. Higher morbidity affected significantly growth velocities in weight throughout pre-school age. Molla et al (1983) found that during illness, infants themselves limit food intake, possibly because of anorexia from infections. Thus, frequent incidence of morbidity can have detrimental effects on the food intake leading to retarded growth in children.

It is clear that morbidity control through better hygiene; safe water-sanitation and prompt treatment of illnesses is an important measure to control under 3 malnutrition.

Dietary intake

The frequency of consumption of protective foods i.e. fruits and vegetables was very low in this study; with less than half children consuming vegetables daily and less than one tenth consuming fruits daily. The mean intake of almost all food groups was poor. Except for cereals and pulses, the mean RDAs met by other food groups were dismally low especially for fruits and vegetables (less than 20% of RDA). This deficient intake of all foods was reflected in the mean nutrient intake of the children who consumed inadequate amount of calories (53% of the RDA), only about one-third the RDA of calcium and iron and dismally low amounts of vitamin C and vitamin A (25% and 8% of RDA respectively). Gender differences were not significant as regards amount of foods and nutrients consumed.

Studies carried out in other parts of the country have also reported marked deficits in nutrient intake, particularly energy and iron intake, compared to RDA's in early childhood years.

A formative study in 6 villages of Ghaziabad, Uttar Pradesh on the current complementary feeding practices of 151 infants (6-12 months) found that the nutrient intake from CF was inadequate and there was no significant difference observed between the mean intakes of 6-8 and 9-12 months age group. It was also observed that though the mean energy consumption increased with age, the intake as percent of RDA decreased (6-9 month:77%, 9-11 months:62% and 12months:39%). In line with nutrient intake, food group analysis showed

the mean intake of cereals and milk being the highest with consumption of green leafy vegetable, other vegetables and fruits being the lowest by the infants (Garg and Chadha 2009).

The diet of 150 rural preschool children (1-3 years) in Punjab was found to be imbalanced with plenty intake of milk – milk products and low intake of cereals, pulses and green leafy vegetables. Thus, while the intake of protein and fat was one and a half to two times of RDA the intake of iron, ascorbic acid and niacin was inadequate (Grover and Singh 2006).

Kapur et al in 2005 investigated the dietary intake of 545 children (9-36 months) from 41 anganwadis of North-East Delhi and reported grossly inadequate intake of all food groups (cereals, pulses, roots, green leafy vegetables, other vegetables, fruits, sugar, fats and oils). The nutrient intake for energy and iron was 56% and 45% of the RDA. There was no significant difference in the food intake of boys and girls and also among children at 9-12 months and 13-24 months of age.

Kapil et al (1999) studied the nutrient intake of severely malnourished children (n=130 in 50 AWCs) in two ICDS Projects in Rajasthan State. The nutrient intake assessment of these children revealed that the mean calorie intake in 6-11 months age group was 626 Kcal (26% less than the RDA); in 12-35 months age group was 717 Kcal (42.2 % deficit) and in 36-71 months age group the deficit was 50.4% indicating severe energy deficiency as the children grew.

Nutritional status

More than 60% of the children in this study were underweight (weight-for-age <-2z scores) and stunted (height-for-age <-2z scores) and about one fourth were wasted (weight-for-height <-2z scores) indicating a very poor state of nutritional status of the children. Prevalence of malnutrition increased significantly with the increasing age from 6-11, 12-23 and 24-35 months. As regards gender differences, for both mean weight and height, boys met higher percentage of standards than did the girls. Further, severe undernutrition and stunting was more in girls than boys.

The prevalence of underweight (47%), stunting (42%) and wasting (17%) among children under 3 years in Gujarat is as high as the national average (underweight: 46%, stunting: 38% and wasting: 19%) (NFHS-3, 2005-2006). Furthermore, the nutritional status of children (below 3 years) of rural Gujarat by the same indicators is still higher than the overall state figures (underweight: 50%, stunting: 46% and wasting: 18%).

Studies have also noted that proportion of children who are undernourished increases rapidly with the child's age from 12–23 months (Dinesh et al 2006, Bhalani and Kotecha 2002, Rao et al 2000 and Saxena et al 1997); because of cumulative detrimental effect of poor diets, inappropriate child feeding and child care practices and infections.

In another study in Vadodara, Bhalani and Kotecha (2002) assessed the nutritional status and gender differences among children under 5 years of age of 30 AWCs. From the total of 3157 children, 40.5% were mildly malnourished (according to IAP classification) and 22.4% were moderately to severely malnourished. Here too, more girls (68.2%) were malnourished than boys (58%) (Grade I, II, II).

The results of the present study and studies cited from various parts of the country depict a poor nutritional status of children under 3 years as well as a dismally low food and nutrient intake. To study the relationship, few authors have tried to assess the influence of food intake on child's nutritional status.

Kapur et al (2005) studied the association of food intake on child's (9-36 months) nutritional status and found that higher calorie intake was associated with better nutritional status as expressed by mean weight-for-age, height-for-age and weight-for-height z scores. He further reported a low intake for most nutrients in the undernourished/ stunted group as compared to those in normal group with significant differences in the energy intake ($p<0.05$). Similar results were reported with regard to adequacy of energy, protein and calcium and degree of undernourishment among preschool children from rural areas of Mysore (Jyothi et al 2005).

Association of Caregiving behaviours with child's nutritional status and nutrient intake

Many Caregiving behaviours in this study were positively associated with child's weight-for-age. Some behaviours like giving special foods to the child significantly influenced adequate nutritional status of the children as well as intake of calories. Similar relationships have been observed elsewhere (Table 4.1.37).

Table 4.1.37 Association of Caregiving behaviours with child's nutritional status and nutrient intake

Reference (Author and year)	Place and sample	Major conclusions
Present study	Rural Vadodara N=115 (6-35 months children)	Caregiving behaviours like: - mother breastfeeds ath child same as before when child is ill - mother gives special foods to the child - mothers encourages the child t eat were positively associated with child's weight for age
Dinesh et al 2006	Urban Allahbabd N=217 (under 5years children)	There were significantly less proportion of underweight and stunted children who were - initiated to breastfeeding within six hours of birth - were fed colostrum - got proper complementary feeding as compared their respective counterparts
Singh et al 2004	Urban Imphal N=545 (1-5 years children)	Normal nutritional status were significantly more among children: whose mothers knew breast feeding as superior to any other feeds (57.7%) than those whose mothers did not (25%); whose mothers knew the ideal timing of weaning (74.6%) vs. those (33.6%) who did not.
Aneja et al 2001	Urban slums of Delhi N=114 (6-12 months children attending MCH clinic)	Positive relation found between mean weights of children and desirable BF and CF practices of mother like colostrums feeding, exclusive breastfeeding (6 months), timely introduction of semi-solid and solid foods, non dilution of top milk and avoiding bottle feeding
Range et al 1997	Bangladesh (6-18 months)	Important Caregiving behaviours that contributed to positive nutrition deviance were: colostrum feeding, introduction of CF after four months, including food items from family pot and preparing special food items for the child
Kanani and Gupta 2002, Srivastava and Sandhu 2005	Urban Vadodara Kanani and Gupta: N=51 (6-18 months) Srivastava and Sandhu: N=60 (6-24 months)	Caregiving behaviours: continued breastfeeding, active feeding and use of AWC services were significantly associated with higher calorie intake of children and better nutritional status (by weight-for-age)

Association of resources of Caregiving with Caregiving and child's nutritional status

In the present study it was found that mother's years of education and BMI were significantly associated with child's weight-for-age. Other studies have also reported a link between maternal and social characteristics and child's nutritional status.

Undernutrition in terms of underweight and stunting among children (under five years of age, N=217 from urban Allahbad) was found to be significantly associated ($P<0.05$) with maternal education, socio economic status and antenatal registration, but their association with caste and receipts of ICDS benefits by children was not found to be significant (Dinesh et al 2006).

A cross-sectional study conducted on rural children (n=260, 1-5 years) Andhra Pradesh found that father's literacy was significantly associated with positive-deviance in the developmental status of girls possibly because they did not discriminate between boys and girls and facilitated the provision of food and other benefits. Whereas, belonging to a nuclear family was significantly associated with positive-deviance in the development of girl children (Aruna et al 2001).

Ruel et al (1999) and Reed et al (1996) reported no significant influence of maternal education on child's nutritional status (weight-for-age) especially in households with minimum level of resources. In rural Chad, maternal height showed some association with child's (12-71 months) height-for-age but it was not significant (Begin et al 1999). However, in Gujarat, maternal weight and height were significantly related to weight-for-age of infants (0-6 months) (Christian et al 1989).

Comparing Mothers of Children Regularly Attending AWCs vs. Those Irregularly Attending AWC – Knowledge on IYCF

Results below present the comparison of the knowledge and practices of the mothers regarding IYCF (children regularly attending AWC vs. irregularly attending AWCs). The criteria for regular attendance was "regular in taking SF and attending GM sessions", since these were the two services most frequently offered at AWCs. Mothers of these two groups of children were interviewed: regular at AWC (REG-AWC N=36) and irregular at AWC (IREG-AWC N=27). Further, nutritional status of these two groups of children (weight for age, height for age and food intake) was also compared.

IYCF practices (focus on complementary feeding): Data indicated that significantly more IREG-AWC mothers (81%) initiated CF late (beyond 6 months) to their children compared

to 56% of the mothers from REG-AWC group (Table 4.1.38). Although mothers from both groups fed *dal*, rice, *roti*, vegetables and fruits as CF, a significantly higher proportion of them from REG-AWC group fed vegetables as compared to IREG-AWC group who fed mostly cereals, pulses and biscuits to their children. This shows that knowledge regarding micronutrient rich foods like fruits and vegetables was poor in mothers of IREG-AWC group. As regards knowledge related benefits of CF, more mothers of REG-AWC stated that 'child remains healthy' and 'becomes playful', whereas around one third mothers of the other group stated that their 'child's hunger is satisfied'. Very few mothers from both groups prepared special foods (*sheera, dal* water and *khichadi*) for their children. However, more mothers avoided feeding some foods like coconut, guava, GLVs and bananas perceiving they would cause cold and cough. Active feeding (sit with the child while he eats, encourage the child to eat more, make child eat with family members) was poorly practiced in both groups.

Morbidity Profile and Treatment Seeking Behaviours: In both groups the prevalence of morbidity was high (REG-AWC: 61% vs. IREG-AWC 70%) in past 15 days of the interview. A major reason given for child's illness by mothers of REG-AWC was 'inappropriate or decreased food intake by the child' (31%), whereas equal proportion of mothers from the other group perceived illness to be 'a *normal part* of child development'. Besides seeking doctor's treatment, significantly more mothers (76%) of REG-AWC group stated that children should be taken to AWCs for treatment during illness as compared to only half mothers of the other group. Majority of the mothers (94%) from REG-AWC groups believed that diet plays a role in determining child's health. More mothers from REG-AWC group mentioned AWWs and ANMs as their source of information/knowledge related to IYCF compared to IREG-AWC mothers.

Table 4.1.38 Knowledge and Practices of Mothers Regarding IYCF

Responses	REG-AWC (N=36)		IREG-AWC (N=27)	
	n	%	n	%
Initiation of CF				
▪ <6 months	9	25.1	3	11.1
▪ 6 months	7	19.4	2	7.4
▪ >6 months	20	55.5	22	81.5*
Type of CF given to child				
▪ *Roti*	29	80.6	19	70.4
▪ *Khichadi*	29	80.6	17	63.0
▪ Fruits	26	72.2	15	55.6

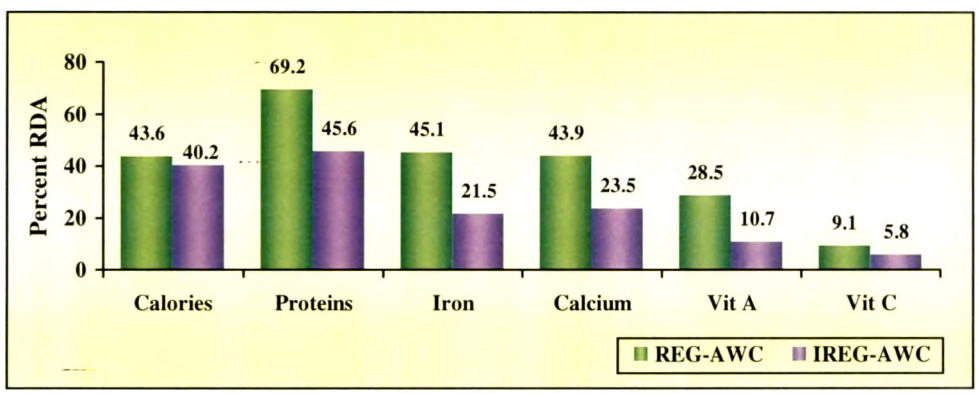
Responses	REG-AWC (N=36)		IREG-AWC (N=27)	
	n	%	n	%
▪ Vegetables	24	66.7	10	37.0*
▪ Biscuits	16	44.4	19	70.4*
▪ *Dal*	13	36.0	18	66.7
▪ Rice	12	33.3	17	63.0
Reason for initiation of CF				
▪ Child is grown up	11	30.6	4	14.5
▪ Perceived breast milk insufficiency	8	22.2	5	18.5
▪ Child has started sitting; walking	5	13.9	2	7.4
▪ Child gets nutrition from CF	8	22.2	1	3.7
Benefits of CF				
▪ Child remains healthy	23	63.9	10	37.0*
▪ Hunger is satisfied	3	8.3	8	29.6*
▪ Child becomes playful	8	22.2	0	0
▪ Child grows well; learns to walk	2	5.6	2	7.4
Special foods given to the child	6	16.7	6	22.2
Foods avoided	14	38.9	11	40.7
Mother feels child has normal appetite	28	77.8	16	59.3
Who feeds the child				
▪ Child himself /-herself	24	66.7	15	55.5
▪ Mother	2	5.6	6	22.2
Active feeding behaviours				
▪ Feed on demand	26	72.2	18	66.7
▪ Give food and leave child to finish up the meal	18	50.0	10	37.0
▪ Encourage the child to finish up the meal	5	13.9	10	37.0
▪ Sit with the child	5	13.9	3	11.1
Child eats with family members				
▪ Yes	17	47.2	15	55.6
▪ No	4	11.1	8	29.6
▪ Sometimes	15	41.7	4	14.8
Child eats in separate vessels	30	83.3	23	85.2
Prevalence of illness in children	22	61.1	19	70.4
Mother perceives her child to be healthy	26	72.2	19	70.4
Causes of child's illness				
▪ Evil eye	27	75.0	16	59.3
▪ Consumes less food/inappropriate food	11	30.6	4	14.8
▪ Illness is a normal part of development	7	19.4	8	29.6
Diet has a role in determining child's health	34	94.4	21	77.8*
Causes of malnutrition				
▪ Food deficiency	17	47.2	8	29.6
▪ Illness and infection	15	41.7	7	25.9
▪ Don't know	5	13.9	12	44.4
Mother perceives herself to be in good health	32	88.9	18	66.7
Source of knowledge regarding IYCF				
▪ Elders	17	47.2	14	51.9
▪ AWW / ANM	7	19.4	1	3.7
▪ Friends	8	22.2	5	18.5
▪ Self	9	25.0	8	29.6

*$p<0.05$ Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

Nutritional Status of Children

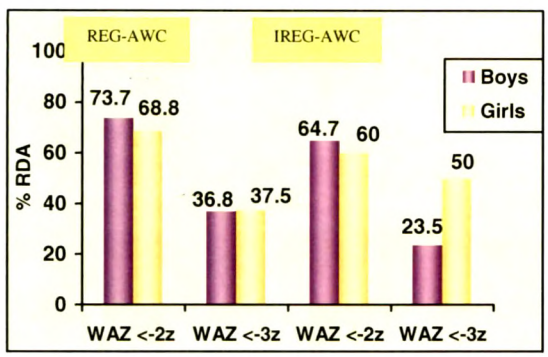
Nutrient Intake: Figure 4.1.11 reveals that the intake of all nutrients (mean percent RDA) of children in REG-AWC group was higher than IREG-AWC group. The micronutrient intake (iron, calcium, vitamin A and vitamin C) of REG-AWC children was nearly double than that of their counterparts. The children from REG-AWC group met less than one third of the day's Vitamin A requirement. However, children from both the groups met only negligible percentage of RDAs of Vitamin C. A higher micronutrient intake in REG-AWC group was perhaps because mothers from this group knew the importance of feeding fruits and vegetables to children.

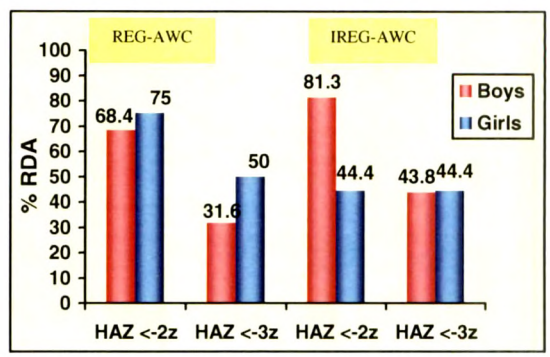
Figure 4.1.11 Nutrient Intake (mean % RDA) of Children Regular at AWCs Vs. Irregular at AWCs



Prevalence of Underweight and Stunting: The prevalence of underweight (WAZ <-2SD) was slightly higher among children of REG-AWC (71%) compared to IREG-AWC (63%); whereas, the prevalence of severe underweight was almost similar in both groups. Though gender differences were not significant in both the groups, more girls (50%) of the IREG-AWC group were severely underweight compared to only one fourth (24%) of the boys, highlighting the importance of ICDS for girls (Figure 4.1.12). The prevalence of stunting in both the groups was high (REG-AWC: 71% vs. IREG-AWC: 68%). Further, among IREG-AWC group boys were more stunted than girls (Figure 4.1.13).

Figure 4.1.12 and 4.1.13 Prevalence of Underweight (Weight for Age) and Stunting (Height for Age) among Children REG-AWC vs. IREG-AWC





DISCUSSION

In the present study, the mothers of children regularly attending AWCs were better informed as regards selected IYCF practices and their children had better nutrient intakes and nutritional status compared to those not regularly attending AWCs.

However, data from Kerala, Maharashtra, Rajasthan and Uttar Pradesh show no clear evidence that desirable IYCF behaviors were more common in ICDS areas (Bredenkamp and Akin (2004). There is also not much evidence that ICDS has been successful in attaining its goal of improving the coverage of specific child health interventions such as de-worming and Vitamin A supplementation, and encouraging mothers to adopt appropriate child care and feeding behaviors (including practices related to breastfeeding, weaning and diet) that have the potential to improve child growth and health outcomes. Although communication for behavior change through the AWW is a crucial weapon against poor health and malnutrition, it appears that any information that the AWW is conveying to mothers is not being communicated effectively enough to impact positively on mothers' behavior. However in these studies, within ICDS areas, comparison between those regular and not regular in availing of ICDS services was not reported.

Comparison of intermediate health outcomes and behaviours across children living in villages with and without an AWC

Percentage of children	In villages	Kerela	Maharashtra	Rajasthan	Uttar Pradesh
Breast fed within 1 hour of delivery	Without AWC	85.6	54.4	9.4	6.1
	With AWC	80.0***	41.2***	10.3	6.7
Consumed colostrum	Without AWC	98.0	18.9	74.1	53.4
	With AWC	96.9***	28.7***	80.4***	37.3***
Exclusively breast	Without AWC	67.1	21.5	38.4	99.7

Percentage of children	In villages	Kerela	Maharashtra	Rajasthan	Uttar Pradesh
fed till 6 months	With AWC	58.2***	11.3***	43.3*	84.6***
6-9months children	Without AWC	84.1	67.3	93.8	0.3
consuming CF	With AWC	87.7	73.6	93.7	19.1***

Source: Calculated from ICDS III Baseline/ ICDS II Endline survey 2000-02 (Bredenkamp and Akin 2004)

The relationship between state malnutrition prevalence and ICDS coverage

Regardless of the indicator of ICDS coverage used whether it be (a) the percentage of villages with an AWC, (b) the number of ICDS beneficiaries or (c) public expenditure on ICDS, access to the ICDS program appeared to be poorest in the states with the worst nutrition indicators:

(a) Examining the percentage of villages with an AWC, it was seen that the five states with the highest underweight prevalence – namely Rajasthan, Uttar Pradesh, Bihar, Orissa and Madhya Pradesh - all ranked in the bottom ten in terms of ICDS coverage.

(b) Also, states with greater percentage of underweight children tended to have a smaller percentage of children enrolled in ICDS program. Worst is Bihar where, despite an underweight prevalence of 55%, only 1.5% of children benefited from the ICDS program. At the other end, Manipur, Mizoram, Nagaland and Sikkim exhibited an underweight prevalence that was among the lowest in India (between 20%-30%) and were among the five states with the highest percentage of ICDS beneficiaries.

There was also some evidence that household attitudes and behaviours were important detriments of the children's access to ICDS food: some mothers thought that their children did not need food (even though the same children were accessed by researcher as malnourished), some mothers failed to collect the food from the AWC and sometimes families prohibited the collection of food. Surveys revealed negligible complaints about food quality or quantity, but field visits showed that food was sometimes badly cooked, dry and salty (Brendenkamp and Akin 2004 and Educational Research Unit 2004). There was substantial leakage in the "take home food" components of ICDS since many children shared the ICDS food with siblings or elders. In Madhya Pradesh, only about a third of children consumed all of the "take home food" themselves. One third of children consumed less than a quarter of food and 6% of the children consumed none of the food taken home from AWC (Brendenkamp and Akin 2004). However, despite the irregularity of the food supply and leakage of food to the non needy, one way in which the Supplementary Nutrition

Program (SNP) is effective is as an incentive to attract children to the centers – where they can then receive other health – nutrition related services. Without the SNP, attendance at the AWC tends to be much lower.

Does participation in ICDS make a difference in calorie intake and nutritional status?

It was discouraging to note in our study that there was no significant difference in the prevalence of malnutrition among children regularly attending (REG-AWC) and not regularly attending (IREG-AWC); though the calorie and micronutrient intake as percent RDA of children in REG-AWC group was better than those in IREG-AWC. Thus, inspite of children attending AWC regularly because of the overall quality of care being sub-optimal in ICDS, the impact is negligible. It is also possible that since the more disadvantaged groups usually avail of ICDS services more regularly as compared to the relatively better off families in the same community; these children are hence likely to be in poorer nutritional status as a result of which ICDS may bring them on par with those not attending AWCs which is an important contribution.

ICDS evaluations in the country indicate reduction primarily in prevalence of severe malnutrition. Swami et al in 2001 studied the nutritional status (by weight for age) of 1286 preschool children from urban, rural and slum areas of Chandigarh and found that the prevalence of malnutrition significantly increased with increase in age till 3rd year (56.3%), then started declining ($p<0.001$). The prevalence of PEM was significantly higher among ICDS beneficiaries (53.8%) than non-ICDS beneficiaries (46.9%) ($p<0.05$). However, severe (grade III, IV) malnutrition was less among ICDS (3.6%) than non-ICDS (5.8%) beneficiaries but the difference was not significant.

NIPCCD evaluation (1992) and Das Gupta et al (2004) reported that the prevalence of underweight was lower among children in areas with the ICDS program in place than elsewhere, for both children under three (underweight: 29.2% where the program was in place vs. 32.3% elsewhere) and children aged 3-6 years (underweight: 25.3% where the program was in place vs. 30.2% elsewhere) but given the sample sizes of the control and treatment groups both these differences were statistically insignificant.

Three other studies found little or no association between presence of an AWC in a village and the likelihood that a child is underweight. Multivariate analysis of the NFHS-I data, the World Bank (2004a) estimated that for boys, having a local ICDS center was associated with a 5% reduction in the likelihood of being underweight, but there was no significant

association for girls. Using both the NFHS-I and II data, Das Gupta *et al* (2005) found a significant and positive effect of the program on nutritional outcomes. However, using propensity score matching techniques, when children in ICDS villages were compared with children with similar demographic, household and village characteristics in non-ICDS villages, little significant effect was noted.

Cross-sectional data collected from Kerala, Rajasthan and Uttar Pradesh. Bredenkamp and Akin (2004) found that children who lived in villages with AWC were not significantly less likely to be underweight or ill than other children.

How Different is the Nutritional Status of Children of the Current Study When Measured by New WHO Growth Standards (2007) Compared to the NCHS Standards (1983)?

After data collection, during the data analysis phase the baseline as well as the pre-post intervention data was analyzed using the NCHS reference standards. However, at the time of thesis writing the new WHO Growth standards (2007) were recommended. Hence, the whole data was reanalyzed using new reference standards and is presented in the thesis. To ascertain whether trends in results are different if the newer standards are used, tables 4.1.39, 4.1.40 and 4.1.41 and figure 4.1.14 compare the nutritional status of children (Phase I data) analyzed using NCHS and WHO growth standards. The anthropometric data was collected on all 115 children in the study. However, the sample size varied for assessment of nutritional status by NCHS and WHO standards as the records were accordingly flagged by the respective two softwares at the time of data analysis.

The prevalence of underweight for total sample (Table 4.1.39) was found to be slightly higher by NCHS standards as compared to WHO standards; whereas an opposite trend was seen for stunting (Table 4.1.40) and wasting (Table 4.1.41). According to the WHO and NCHS standards, with increase in age the proportion of underweight children increased significantly ($p<0.05$). This trend was similar even for stunting though in case of NCHS standards it was not significant.

With regard to gender, similar to NCHS standards, WHO standards also did not reveal any significant differences except in case of severe stunting where in girls were more severely stunted than the boys (41% vs.17%).

Table 4.1.39 Weight for Age (WAZ) of Children: Comparing WHO vs. NCHS standards

Characteristic of the Child	Underweight (WAZ <-2 z score)				Severe Underweight (WAZ <-3 z score)			
	WHO		NCHS		WHO		NCHS	
	n	%	n	%	n	%	n	%
Total	74	64.9	79	69.3	39	34.2	40	35.1
Age (months)								
▪ 6-11	11	44.0	12	48.0	6	24.0	4	16.0
▪ 12-23	29	63.0	31	67.4	14	30.4	15	32.6
▪ 24-35	34	79.1	36	83.7	19	44.2	21	48.8
Chi-square	8.65*		9.61**		3.35^{NS}		7.69*	
Sex								
▪ Male	46	63.9	51	70.8	21	29.2	24	33.3
▪ Female	28	66.7	28	66.7	18	42.9	16	38.1
Chi-square	0.09^{NS}		0.22^{NS}		2.21^{NS}		0.26^{NS}	

*p<0.05, **p<0.01, NS: non significant

Table 4.1.40 Height for Age (HAZ) of Children: Comparing WHO vs. NCHS standards

Characteristic of the Child	Stunting (HAZ <-2 z score)				Severe Stunting (HAZ <-3 z score)			
	WHO		NCHS		WHO		NCHS	
	n	%	n	%	n	%	n	%
Total	77	70.0	65	58.0	42	38.2	29	25.9
Age (months)								
▪ 6-11	11	44.0	11	44.0	8	32.0	6	24.0
▪ 12-23	31	70.5	27	61.4	17	38.6	10	22.7
▪ 24-35	35	85.4	27	62.8	17	41.5	13	30.2
Chi-square	12.66**		2.62^{NS}		0.60^{NS}		0.70^{NS}	
Sex								
▪ Male	49	71.0	39	55.7	24	34.8	12	17.1
▪ Female	28	68.3	26	61.9	18	43.9	17	40.5
Chi-square	0.09^{NS}		0.41^{NS}		0.91^{NS}		7.45**	

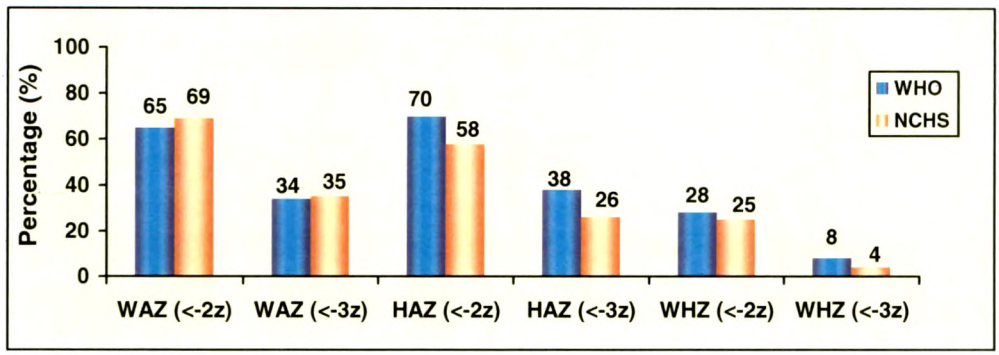
**p<0.01, NS: non significant

Table 4.1.41 Weight for Height (WHZ) of Children: Comparing WHO vs. NCHS standards

Characteristic of the Child	Wasting (WHZ <-2 z score)				Severe Wasting (WHZ <-3 z score)			
	WHO		NCHS		WHO		NCHS	
	n	%	n	%	n	%	n	%
Total	32	28.3	28	24.8	9	7.9	4	3.5
Age (months)								
▪ 6-11	5	20.8	2	8.3	2	8.3	0	0
▪ 12-23	14	30.4	14	30.4	4	8.7	2	4.3
▪ 24-35	13	30.2	12	27.9	3	6.9	2	4.7
Chi-square	0.84^{NS}		4.5^{NS}		0.1^{NS}		0.01^{NS}	
Sex								
▪ Male	21	29.2	20	27.8	8	11.1	4	5.6
▪ Female	11	26.8	8	19.5	1	2.4	0	0
Chi-square	0.07^{NS}		0.96^{NS}		1.63^{NS}		2.36^{NS}	

NS: non significant

Figure 4.1.14 Comparison of WHO vs. NCHS standards for WAZ, HAZ and WHZ of children



Prevalence of Undernutrition in Children: Comparison of Primary Vs. the Secondary Data

Every month during the growth monitoring activity, each AWW weighed the children and noted down the weights in a notebook or register. The weights of the children were put against their respective ages and grades of malnutrition were obtained using a growth chart. These grades were further entered into the record register along with the respective weights. A complied report was prepared by each AWW giving age wise and sex wise distribution of normal and malnourished children. At the end of the month during Monthly Progress Report meeting the MPR was prepared by the supervisor showing age wise and sex wise distribution of prevalence of malnutrition in all 40 AWCs. There was a lot of data transfer during this exercise. In the present study, secondary data (containing the names, age, sex, weight and grade of malnutrition) for 4 consecutive months was collected from all 40 AWCs. Total data of 1400 children was obtained. However, only complete data (with no missing information) was analyzed (N=1010).

Observations made during GM sessions revealed that AWWs did not weigh the children accurately (not checking the zero mark, damaged weighing scale, torn trousers of salter scale, children not standing straight, some children with shoes on, children crying not allowing the AWW to weigh properly, incorrect record transfer). Hence, the primary data collected accurately by the investigator on 115 children from 4 AWCs was compared with the results of the secondary data to check the correctness and accuracy of the secondary data collected over a period of 4 months. It is realized that there is a considerable difference in the "N" of the two data sets being compared, nevertheless the comparison does serve the

purpose of highlighting the inaccuracies and errors of the growth data collected by the AWWs pointing out to a need of the NGO to supervise growth monitoring effectively.

The WAZ scores for both secondary and primary data were calculated using the WHO Anthro 2007 package. Unfortunately, there was a considerable difference in the two data sets – with the primary data of the investigator showing underweight almost twice as high as the secondary data of the AWWs (65% vs. 38%) (Table 4.1.42). Similarly severe underweight was three times higher as measured by the investigator compared to the AWWs (24% vs. 12%). Thus, it can be concluded that weights of the children were being consistently reported as higher than actual weights (atleast twice as much). ✓

The secondary data of 1010 children was subjected to further analysis to see the trends in weight gain and weight loss. The difference in weights obtained over four months was categorized into constant weight, low weight gain, normal weight gain and fluctuating weight. Table 4.1.43 gives the agewise and sex wise distribution. More than 50% children had a fluctuating weight, 15% children marked low weight gain and less than one fourth children showed weight gain equal to or above the WHO standards for all 4 months. The results depicted that weight fluctuations were very high in children under fluctuating weight category. Some children showed weight gain or weight loss of 1.5-2 kgs in one month and in many children there was a consistent weight gain of 500gms every month. This appears to be because of erroneous reporting.

Table 4.1.43 Children Categorized According to Gain or Loss in Weight per month

	Constant* Wt		Low Gain#		Gain@		Fluctuating$ Wt	
	n	%	n	%	n	%	n	%
Total (N=1010)	43	4.26	148	14.65	230	22.77	589	58.32
6-11 months (N=288)	11	3.82	58	20.14	58	20.14	161	55.90
12-23 months (N=445)	17	3.82	60	13.48	115	25.84	252	56.62
24-35 months (N=277)	15	5.42	30	10.83	57	20.57	176	63.54
Boys (N=532)	30	5.64	88	16.54	120	22.56	293	55.07
Girls (N=478)	13	2.72	60	12.55	110	23.01	295	61.72

* Constant Weight: No change in weight all four months
# Low Gain: Weight gain is lower than standard weight gain per month (WHO standard) according to age and sex all four months
@ Gain: Weight gain is equal to or above the WHO standard according to age and sex all four months
$ Fluctuating Weight: There is weight gain and / or weight loss or constant weight in any of the months. There is no constant weight gain, nor constant weight loss, nor is the weight constant.

Table 4.1.42 Comparing the prevalence of Underweight (Weight for Age) of Children of the Present study (N=115) vs. the Secondary Data (N=1010)

	Secondary Data										Primary Data	
	Month 1		Month 2		Month 3		Month 4		Average (4 months)		Present Study	
	<-2SD	<-3SD	<-2SD	<-3SD	<-2SD	<-3SD	<-2SD	<-3SD	<-2SD	<-3SD	<-2SD	<-3SD
	%	%	%	%	%	%	%	%	%	%	%	%
Total	39.4	12.8	37.6	12.5	36.4	11.6	37.6	10.8	37.8	11.9	64.9	34.2
Age (months)												
6-11	25.0	9.4	24.9	9.2	23.3	6.8	25.5	5.5	24.7	7.7	44.0	24.0
12-23	38.2	11.2	33.3	9.8	32.6	10.7	30.3	9.0	33.6	10.2	63.0	30.4
24-35	56.3	18.8	52.8	18.9	47.3	15.1	49.0	14.4	51.4	16.8	79.1	44.2
Sex												
Boys	41.0	12.6	39.5	13.0	38.7	12.1	39.9	10.8	39.7	12.1	63.9	29.2
Girls	37.7	13.0	35.4	11.9	33.9	11.1	35.0	10.9	35.5	11.7	66.7	42.9

Was the Grading of Children done correctly?

The secondary data was also assessed to see the correctness of grading children based on the weight. In order to verify the accuracy in gradation, a subsample (10%) of the secondary data was randomly selected having an equal distribution of boys and girls in the respective age groups. The investigator herself graded these children (N=200) according to their weights using the growth chart and compared the results with grades given by the AWWs. Table 4.1.44 gives the differences in grades of children as given by the AWWs and the investigator. It was noted that there was a big difference: in all 4 months there were more children in Grades I and II and fewer in Normal grade according to the AWWs. While according to the investigator, there were far more children in Normal grade and fewer in grade I & II based on the weight values given by the AWWs. This analysis showed the inaccuracy in grading by the AWWs and also that since reported weight values were higher than the real values, the 'Normal" grade was higher as seen by the investigator compared to the actual picture of malnutrition reported earlier.

Table 4.1.44 A Comparison of Grading done by the AWWs and the Investigator Based on Weights Recorded by the AWWs (Secondary Data)

Nutrition Grade of the children	Number of Children in Various Grades According to				Difference B – A	
	AWW (A) (N=200)		Investigator (B) (N=200)			
	n	%	n	%	n	%
Month 1						
Normal	47	23.5	88	44.0	41	20.5
Grade I	93	46.5	73	36.5	20	10.0
Grade II	54	27.0	33	16.2	21	10.5
Grade III	6	3.0	5	2.5	1	0.5
Grade IV	0	0	1	0.5	1	0.5
Month 2						
Normal	51	25.5	85	42.5	34	17.0
Grade I	97	48.5	76	38.0	21	10.5
Grade II	46	23.0	32	16.0	14	7.0
Grade III	6	3.0	6	3	0	0
Grade IV	0	0	1	0.5	1	0.5
Month 3						
Normal	53	26.5	83	41.5	30	15.0
Grade I	92	46.0	79	39.5	13	6.5
Grade II	51	25.5	34	17.0	17	8.5
Grade III	4	2.0	3	1.5	1	0.5
Grade IV	0	0	1	0.5	1	0.5
Month 4						
Normal	69	34.5	88	44.0	19	9.5
Grade I	80	40.0	72	36.0	8	4.0
Grade II	46	26.0	33	16.5	13	6.5
Grade III	5	2.5	6	3.0	1	0.5
Grade IV	0	0	1	0.5	1	0.5

Further, the incorrect grades given by the AWWs were marked and segregated. This is further summarized in Table 4.1.45. It was noted that above 40% of the children were incorrectly graded in 3 of the 4 months period revealing that the error in grading was very high.

Table 4.1.45 Percentage of Children Graded Incorrectly over the Period of 4 Months

Month	Total Children in the Wrong Grade (out of 200 children)		Most Frequent Errors Noticed in Recording Grade
	n	%	
Month 1	86	43.0	▪ Underestimation of Normal Grade ▪ Over estimation of Grade I and Grade II
Month 2	81	40.5	
Month 3	82	41.0	
Month 4	72	36.0	

It can be concluded from the overall analysis of the secondary data that not only were there errors in weight measurements (leading to a high underestimation of malnutrition), there were major errors in plotting grades of children as well. This makes it amply clear that the NGO system needs to sincerely consider how to train, supervise and ensure that such serious errors in growth monitoring do not occur. This is all the more important because this data are compiled at higher levels and the errors get magnified.

Phase II: Capacity Building Training Intervention Towards Enhanced Implementation of ICDS in the NGO system

Part A: Improving the quality of implementation of nutrition related ICDS services within the NGO System in rural Vadodara

Objectives

The major objective of this phase was to build the capacity of the ICDS functionaries to be able to improve the quality of nutrition related services i.e. Growth Monitoring (GM), Supplementary Feeding (SF), *Rab* supplementation and Nutrition Health Education (NHE) in the context of the NGO system in which they were functioning. The specific objectives were:

i. To review and modify, jointly with NGO, ways of enhancing the quality of implementation of the above services which contribute to reduction of under three malnutrition.
ii. To provide capacity building training to ICDS staff (Anganwadi workers and Supervisors) to enhance their knowledge and skills to be better able to implement selected ICDS services, with a focus on IYCF and child care practices.
iii. To especially emphasize the effective implementation of NHE service to bring about behaviour change in the beneficiary groups for better child nutrition and health care.
iv. To develop and facilitate implementation of a modified and simple monitoring system to monitor quality of implementation of the specific services under study.
v. To enlist the support of the NGO to take action measures for sustaining the improvement brought about in functioning of these services.

1.1 Lacunae in the NGO Implemented ICDS System and Interventions Implemented

A meeting was held with senior NGO staff and the ICDS coordinator from the NGO to share with them the functioning of AWWs and existing drawbacks in the ICDS system – Phase I, in particular:

- Absence of IEC materials on child nutrition, IYCF and health care
- Virtual absence of NHEC service and no home visits by AWW
- Absence of growth chart registers for plotting weight of children
- No standard cups or measures for serving fixed quantity of SF

- Inadequate monitoring system (supervisors monitored AWC services without any fixed guidelines or monitoring checklists)
- Poor implementation of *Rab* supplementation program
- No refresher training given to supervisors or AWWs since a long time

As a result it was not surprising that the impact on beneficiaries was unsatisfactory since

- poor knowledge existed among mothers regarding IYCF practices and
- dietary intake of children was poor, and high prevalence of morbidity and malnutrition was seen in children below 3 years of age.

Table 4.2.1 summarizes the drawbacks observed in the NGO-ICDS system and the interventions planned to address them.

Table 4.2.1 Lacunae in the ICDS system and Interventions Implemented to Address Them

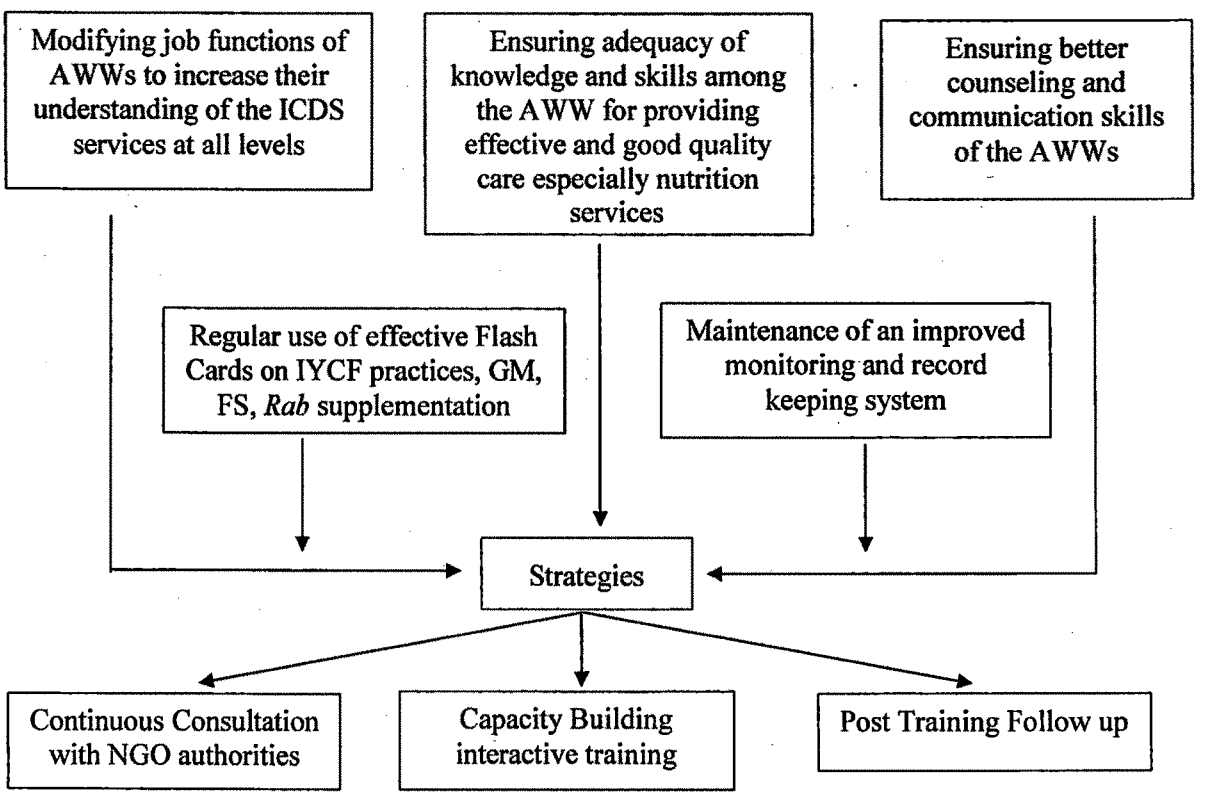
Lacunae in NGO-ICDS system	Interventions Implemented in Consultation with the NGO
1. Lack of clarity of Job functions among AWWs and supervisors	▪ Formulating jointly with the NGO, specific and clear job functions for the AWWs and supervisors. ▪ Dissemination of these job functions by the NGO
2. Low priority and poor quality of important nutrition related services: GM, SF, *Rab* supplementation and NHE	▪ Capacity building training to increase awareness and strengthen skills for effective implementation of GM, SF, *Rab* supplementation and NHE
3. Inadequate and inappropriate supervision and lack of systematic monitoring	▪ Development of simple observation checklists for systematic monitoring of functioning of each AWC with approval of the NGO
4. Absence of IEC material on nutrition related services, IYCF and child care in ICDS system	▪ Development and production of picture flash cards on nutrition services and IYCF and child care ▪ Training AWWs in counseling and communication skills ▪ Incorporating guidelines for use of flash cards in the routine job functions of the AWWs imparted during training

Thus, the data obtained in the situational analysis helped to facilitate and initiate changes in the NGO-ICDS system, which were based on the principle of behavior change as illustrated in Figure 4.2.1. Each box in the figure indicates a specific behavior or knowledge area which was attempted to change in a positive direction.

The major strategies adopted to bring about this change were:

- Continuous consultation with the NGO
- Capacity building training for knowledge and skill improvement
- Post training follow up in particular guided practice in the field to enable functionaries to put into practice the skills learnt during training

Figure 4.2.1 Strengthening capacity of ICDS staff in Effective Communication for Behaviour Change



The following pages describe the various interventions implemented to improve the quality of functions of ICDS services as mentioned in Table 4.2.1.

1.2 Modified and Improved Job Functions

Since the NGO did not have any written job functions for ICDS functionaries with them, written guidelines were jointly developed for executing the job functions based on the lacunae observed in Phase I and the expected job functions as per the National guidelines (NIPCCD 2006). This is depicted in Table 4.2.2.

Table 4.2.2 Job Functions of AWWs and Supervisors (Modified and Improved for better quality of implementation of services)

Growth Monitoring

- Accurately weigh the children using proper calibrated weighing scales
- Accurately grade the children and plot systematically in growth chart registers
- Use growth chart as NHE tool to impart knowledge to the mothers regarding growth and development of their child

***Rab* Supplementation (regular implementation once every week on a fixed day & time)**

- Standardize the recipe
- Follow the same method of cooking in all AWCs
- Maintain the quality and consistency
- Encourage the mothers to visit the AWC once every week and make their child eat all (1 cup) *rab*
- Teach the mothers the method of preparing *rab* at home and encourage them to prepare it on other week days and feed their child

Food Supplementation

- Standardize the recipe of the supplementary foods
- Standardize the serving size
- Maintain the quality and hygiene
- Give variety of foods so that children like eating them

Nutrition Health Education (regular implementation twice a month in each AWC)

- Organize group meetings/*mahila mandal* meetings with the mothers to impart knowledge regarding optimal IYCF and child care practices
- Organize group meetings/*mahila mandal* meetings with the mothers to impart knowledge regarding importance of ICDS services and its optimal utilization for improving nutritional status of their children
- Use Flash Cards regularly and appropriately during each meeting or home visit

Monitoring and Supervision

- Improve the communication and counseling skills of the AWWs by giving them on-job training during the NHE sessions
- Accompany the AWWs during some home visits in rotation
- Motivate and encourage the AWWs to learn and improve their skills
- Monitor the implementation of all services using an observation checklist
- Visit the community and gather information about the functioning of the AWC and assess the change in IYCF practices of the mothers
- Grade all AWCs every month based on a fixed criteria (checklist with points) specified for each service rendered. Recognize and appreciate those AWCs scoring the best grades during every MPR meeting and motivate other AWWs to function better.

NGO Support

To facilitate the execution of these modified job functions, the NGO agreed to:

- Distribute growth chart registers to all 40 AWWs for counseling the mothers regarding grade of the child
- Provide one set each of Flash cards to AWWs on IYCF and care practices to be used

during NHEC meetings and home visits

- Provide a set of standard cups and spoons for serving standard volume of cooked SF to all children.
- Regularize the *rab* supplementation program: ensure that AWWs follow the correct method of *rab* preparation and all of them prepare the optimal quality of *rab*.
- Streamline the monitoring function of supervisors. The NGO agreed to provide the observation checklists to supervisors to monitor the quality of ICDS services. The NGO also agreed to emphasize the importance of NHEC group meetings and home visits as a regular job function of AWWs and supervisors.
- To boost the implementation of ICDS services, a system for appreciating the properly functioning AWCs was developed in which it was recommended that all AWC should be graded every month based on fixed criteria specified for each service by giving points. Those AWCs scoring the highest points should be appreciated during every MPR meeting and motivate other AWWs to function better.

1.3 Training of ICDS Staff with Focus on Improving Quality of Implementation of ICDS Services – Pre to Post Training Assessment

As revealed in Phase I, training was one of the weakest components in the ICDS system. The grass roots level functionaries i.e. the AWWs had not received any refresher training with regard to effective implementation of the nutrition related ICDS services. This was one of the reasons why the nutrition component was weak; as a result knowledge -practices regarding IYCF and child care were inadequate and inappropriate among rural women.

Hence, as described in the previous chapter, a 4-day training program was organized in the NGO premises in rural Vadodara to update the knowledge of the functionaries regarding selected ICDS services and IYCF practices. The functionaries were also oriented to their specific job functions (mentioned above).

After the pre and post training, self administered questionnaire filled in by the trainee AWWs gave information regarding the immediate impact of the NHEC training on their knowledge.

After training, a feedback was elicited from the AWWs regarding their views on the communication aspect of the training given. All the AWWs stated that the communication by the trainer during all sessions was audible and clear, the messages were easy to understand and doable, and the visual aids (flash cards) used were easily visible to all the

participants.

The pre and post training workshop results of each session are given below and indicate the significant improvement in their knowledge. Few AWWs due to genuine reasons could not attend all sessions during the training workshop. Hence, the number of AWWs in the tables vary.

Session 1: Exclusive Breast Feeding and Initiation of Complementary Feeding at 6 Months

Table 4.2.3 NHEC Module Evaluation Session I – Exclusive Breast Feeding and Initiation of Complementary Feeding – Selected Responses (N = 34)

Responses	Pre training		Post training	
	n	%	n	%
Importance of growth card				
▪ To inform the mother regarding increase or decrease in weight or grade of the child	8	23.5	28***	82.4
▪ To know the increase or decrease in weight of the child	30	88.2	15	44.1
▪ Don't know / No response	5	14.7	0	0
Water should not be fed before 6 months	18	52.9	33***	97.1
Age of initiating CF: 6 months	28	82.4	34*	100.0
Reasons for initiating CF at 6 months				
▪ Child requires more nutrition for growth; mothers milk is not sufficient after 6 months	19	67.8	25	73.5
▪ Quantity of breast milk reduces after 6 months	7	25.0	14	41.2
▪ Child grows well; does not become weak; does not loose weight	3	10.7	7	20.6
Harmful effects of delayed feeding				
▪ Child will become malnourished; will lose weight	22	64.7	24	70.6
▪ Child will become weak	19	55.8	18	52.9
▪ Child will fall ill	4	11.7	11*	32.4
▪ Growth retardation, delay in physical and mental development	7	20.6	11	32.4

* $p<0.05$, *** $p<0.001$

From pre to post training, there was a highly significant improvement with above 70% stating the importance of the growth chart especially for counseling the mothers, not giving water before 6 months, the right age of initiation of CF (6 months), and the harmful effects of delayed feeding.

Session 2: Supplementary Feeding and *Rab* Supplementation Program

Table 4.2.4 NHEC Module Evaluation Session II – Supplementary Feeding (SF) and *Rab* Supplementation Program – Selected Responses (N=37)

Responses	Pre training		Post training	
	n	%	n	%
Correct method of *Rab* preparation				
▪ Correct method	8	21.6	32***	86.5
Importance of SF for children below 3 years				
▪ SF adds to the home food; child gets more vitamins and proteins	23	62.2	31*	83.7
▪ Childs weight increases; growth and development takes place	4	10.8	15**	40.5
▪ Child feels lonely and does not eat when mother is not at home	25	67.6	12	32.4
▪ Child eats with other children in the AWC	9	24.3	4	10.8
What quantity of SF should be given to each child?				
▪ 60gm raw / 1 big cup cooked (200ml)	22	59.5	32**	86.5
▪ 2 table spoon cooked	9	24.3	3	8.1
Hygiene practices during cooking and serving SF				
▪ Wash hands with soap and water	28	75.7	32	86.5
▪ Use clean & filtered water	20	54.1	32**	86.5
▪ Use clean vessels	13	35.1	28**	75.7
▪ Use clean cereals and pulses	22	59.5	20	54.1
▪ Use clean and separate glasses for all children	16	43.2	16	43.2

* p<0.05, ** p <0.01, ***p<0.001

From pre to post training, there was a highly significant improvement with above 80% learning the correct method of *rab* preparation after the demonstration session, knowing the importance of SF given to children (<3years) in AWCs and the right quantity (1 std. cup) of cooked SF to be served to each child, as well as how to maintain proper hygiene practices in AWC.

When AWWs were inquired regarding what foods should be added to make SF more nutritious, majority of them stated that drumstick leaves, curry leaves, buttermilk, sprouted pulses and lemon should be added.

Session 3: Quantity and Quality of Complementary Foods

Table 4.2.5 NHEC Module Evaluation Session III – Quality and Quantity of Complementary Foods – Selected Responses (N=37)

Responses	Pre training		Post training	
	n	%	n	%
Frequency of CF for child				
6-9 months: 3 times	7	18.9	35***	94.6
10-12 months: 4 times	4	10.8	29***	78.4
1-2 years: 5 times	5	13.5	30***	81.1
Quantity of CF for child 6-9months old (in one meal)				
▪ ½ cup	18	48.6	15	40.5
▪ 1 cup	8	21.6	15	40.5
▪ 1 ½ cups	0	0	7	18.9
▪ 3-4 spoons	5	13.5	0	0
▪ 1-2 spoons	5	13.5	0	0
Quantity of CF for child 10-12 months old (in one meal)				
▪ 1 ¼ - 1 ½ cups	0	0	21***	56.7
▪ 1 cup	21	56.7	8	21.6
▪ ¾ cup	0	0	4	10.8
▪ ½ cup	9	24.3	1	2.7
Foods which should be included in diet of young children				
▪ Fruits	30	81.1	34	91.9
▪ GLVs	22	59.5	32**	86.5
▪ Sprouted pulses	20	54.1	24	64.8
▪ Milk; curd; butter milk	20	54.1	22	59.5
▪ *Dal* – rice	0	0	6	16.2
Reasons for feeding these foods				
▪ Helps in physical and mental growth and development	8	21.6	13	35.1
▪ Childs weight increases; child becomes healthy; gets energy	12	32.4	12	32.4
▪ Child gets vitamins, proteins, calories, fats	12	32.4	12	32.4
▪ Blood improves; hair and skin become healthy	2	5.4	9	24.3
▪ Bones become strong, eye sight improves	0	0	4	10.8

** $p < 0.01$, *** $p < 0.001$

There was a remarkable impact ($p<0.01$; $p<0.001$) in the area of complementary feeding as regards: frequency of feeding CF to children of different age groups, the optimal quantity of CF to be fed to them in one meal and including fruits and vegetables more frequently in their diet apart from feeding milk, milk products, sprouts and *dal*-rice. However, only a few AWWs were able to explain the importance of feeding these foods.

Session 4: Active Feeding and Hygiene

Pre training responses regarding active feeding were varied. Nearly one third AWWs believed that mother should feed her child only when s/he demands.

Table 4.2.6 NHEC Module Evaluation Session IV – Active Feeding and Hygiene – Selected Responses (N=39)

Responses	Pre training		Post training	
	n	%	n	%
Active feeding behaviours				
▪ Encourage child to eat: sing songs, tell stories	10	25.6	30***	76.9
▪ Sit with the child; make child eat with all family members	9	23.1	27***	69.2
▪ Feed the child what s/he likes	8	20.5	8	20.5
▪ Feed child at frequent intervals; when child demands	11	28.2	6	15.4
Mother should feed the child in separate plate	32	82.1	39**	100
Why in a separate plate				
▪ Mother will know how much child eats	4	12.5	24***	61.5
▪ Child will feel its my plate; learn to eat	9	28.1	9	23.1
▪ Eating from same plate is not hygienically safe; child might contract mother's illness	12	37.5	7	17.9
Hygiene practices for the child				
▪ Wash child's hands with soap and water before feeding	23	58.9	26	66.7
▪ Don't serve stale food; give fresh food; cover food; use clean filtered water	4	10.3	16**	41.0
▪ Wash child's hands with soap and water after defication	2	5.13	13**	33.3
Consequences of not maintaining hygiene				
▪ Child will fall ill; contract diseases	35	89.7	33	84.6
▪ Child will suffer from diarrhea; vomiting; intestinal infections; skin disorders	18	46.2	29*	74.4
▪ Child will become weak; malnourished; weak immunity	9	23.1	19*	48.7

From pre to post training, there was a highly significant improvement with a majority learning the importance of active feeding and how to feed actively, maintaining hygiene of the child at home especially while feeding, knowing the consequences of improper hygiene practices in particular, infectious diseases and worsening of malnutrition.

Part B: Process and Impact Evaluation of the Intervention

★ Process evaluation of the intervention from HSR perspective

The Health Systems Research (HSR) methodology adapted in this research study, aimed to study the various elements of an NGO system which provides nutrition related ICDS services to improve the health of the children below 3 years.

Specifically the objectives were:

1. To assess the improvement in knowledge and skills of the ICDS functionaries.
2. To document changes in the NGO system towards enhanced monitoring and evaluation of ICDS.

★ **Impact evaluation of the intervention on Beneficiaries**

1. To assess improvement in use of services by beneficiaries
2. To assess improvement in IYCF practices of the mothers (children 6-35 months)
3. To assess the change in the nutritional status of the children (6-35 months)

★ **Triangulation of various research methods - contribution to the HSR perspectives**

1. To document the strengths and limitations of the interview method and observation method for
   a. situational analysis (i.e. assessing quality of implementation as it is actually taking place in the field)
   b. contributing to design of capacity building intervention i.e. training of functionaries
   c. process evaluation of the intervention implemented in this study (capacity building of ICDS functionaries in communication skills for improving IYCF practices in the rural areas).

2.1 Process Evaluation of the Enhanced ICDS after Training

Process evaluation was an ongoing phase. It included assessing the feasibility and sustainability of the intervention in improving the quality of selected ICDS services in the context of the overall working of the NGO.

Response of the NGO-ICDS System to the interventions for improving the Quality of Implementation of Nutrition Related Services

After the 4-day training workshop and one reinforcement session after an interval of one month, AWWs held NHEC meetings at their respective AWCs and imparted nutrition and health education to mothers regarding ICDS services and child feeding practices. Observations were recorded by the researcher using an observation checklist to assess improvement in communication skills of the AWWs when they conducted the enhanced NHEC group sessions with the mothers of young children. After each NHEC session that the AWW conducted, she was given guided practice to improve her skills. At the end of one year of intervention, 35 NHEC meetings were observed through the structured observation method. The checklist in Box 4.2.1 gives the scoring system used to assess quality of

communication in the NHEC sessions that were observed.

Box 4.2.1 Criteria selected for assessing the quality of the enhanced NHEC meetings conducted by the AWWs (Total: 40 points)

1. **Technical Competence: 10 points**
   - Introduced the theme of the meeting: 2
   - Explained the messages well (was familiar with the content): 5
   - Answered questions of mothers correctly: 3
2. **Communication skills: 10 points**
   - Had a loud enough and clear voice: 2
   - Used familiar terms in the local language: 2
   - Spoke with confidence and clarity: 2
   - Encouraged the mothers to ask questions and express their views: 2
   - Maintained eye contact with the audience: 2
3. **Handling of visuals: 10 points**
   - Held each flash card properly so that all the mothers could see it: 3
   - Explained messages without reading the text written on the flash card: 3
   - Used the flash cards in the right sequence : 2
   - Read the slogans written on each flash card clearly: 2
4. **Participation of mothers: 10 points**
   The mothers –
   - Were attentive and interested: 3
   - Asked questions: 3
   - Did not talk among themselves; maintained discipline: 2
   - Did not leave; but sat through the whole session: 2

Results of NHEC sessions observed are presented below.

1. Very few meetings were conducted well (5/35 meetings). These AWWs scored more than 25 points out of 40. The **positive points** of these NHEC meetings were: the AWWs were enthusiastic; they had informed all the mothers in advance about the meeting and also reminded them to attend prior to the meeting; had adequately prepared themselves to take the sessions and were confident about what they wanted to explain; displayed the flash cards as instructed and spoke in a loud enough and clear voice with confidence, using local terms familiar to the mothers. They were able to correctly answer the questions and clarify doubts of the mothers.

2. Unfortunately, a majority of the AWWs (30/35 meetings observed) were seen to be **weak** in their communication skills (score below 25 out of 40). These AWWs did not appear to be interested in conducting the meetings; did not inform the women in advance about the meeting and did not follow up to ensure attendance; had not prepared the IYCF messages well.

One AWW had misplaced a few flashcards and gave an excuse that she was only given half a set. Another AWW had misplaced the whole set and just before the meeting she said "*hun*

bimar hati to noti aavi MPR meeting ma jyare flash cards apya. Supervisor e mane pachithi aapya nahi. Mein be vaar emni pase mangya hata pan emne aapya nahi. mane khabar noti vali meeting ma chart joyase" (I was not able to attend the MPR meeting when these flash cards were distributed. Later the supervisor did not give the set to me. I asked her twice but she didn't give me, I did not know that we had to use them during today's parent meeting).

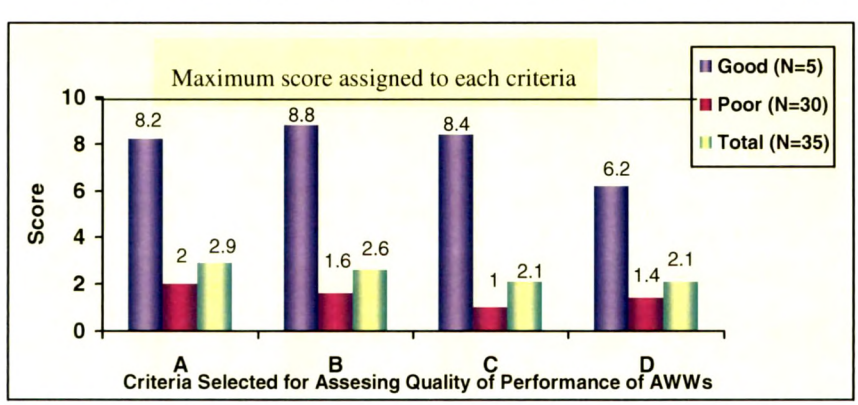
Some AWWs saw the flashcards for the first time at the time of meeting, and were not aware of what message each flash card conveyed (nor were they sure of the right sequence). They could not handle the group well; nor could they make the meeting interactive. Women were seen talking amongst themselves and a few women left the meeting half way.

One AWW confessed that she was conducting the NHEC session for the first time in 7 years of her job experience as AWW. A few AWWs said "*ben amne avu bolta na avde, tamej samjhavo ne. Baheno amaru na sambhle*" (we are not capable enough to explain these messages, instead why don't you explain. They will not listen to us).

To all the poorly performing AWWs, the investigator gave on-site guidance to address their communication drawbacks. Further, in order to do justice to the sessions and fulfill the information needs of the women, the investigator concluded the session with adequate explanation of the messages. The AWWs performing well were appreciated and encouraged to improve further.

Figure 4.2.2 compares the well conducted meetings with the poorly conducted ones based on the mean scores attained by the AWW on the various communication criteria. The five AWWs who conducted good NHEC meetings had a much higher mean score (8/10) compared to the remaining 30 AWWs who had a very low mean score (1.5 /10).

Figure 4.2.2 Quality of Implementation of NHEC Meetings



A: Technical Competence, B: Communication skills, C: Handling of visuals, D: Participation of mothers

Rab **Demonstration to the Mothers by the AWW and Helper during the enhanced NHEC meeting**

Mothers feeding *Rab* to their children after the enhanced NHEC meeting

Supervisor giving on the spot guidance to the AWW and explaining IYCF messages to the rural women using Flash Cards during one NHEC session

Box 4.2.2 Example of a Good NHEC session

The NHEC session was scheduled in the afternoon at 2 pm. According to the AWW (Lataben)[1] women are free after lunch. The AWW and the helper had informed all mothers of young children and pregnant women a day in advance about the NHEC meeting. The helper went for a follow up on the day of the meeting to remind about the timings. Supervisor and the investigator were present. The AWW had a good rapport with all women in the village hence many women (N=25) turned up for the meeting. AWW introduced us (investigator and supervisor) to the audience and described the purpose of the gathering. She had already selected the flash cards related to the topic she wanted to cover.

Messages given were:

- Exclusive breast feeding till 6 months: "*Delivery pachi baalak ne tarataj dhavdavanu. Pilu dudh je aave che jene apne chep kahiye che, te baalak ne jarur pivdavanu. E khub paushtik hoe che. Gadthuti pivdavani nahi. Ena thi baalak ne jhada thai shake. Mata na dhavan ma purti matra ma pani hoye che. Etle baalak ne 6 mahina sudhi fakt maa nu dhavan apvanu, pani pan nahi*". (Immediately after delivery breast feed your child. Do not discard the yellow milk 'colostrum'; it is very nutritious. Do not give any prelacteals to your child. It can cause diarrhoea. Mother's milk has sufficient amount of water; child does not require water from outside. Hence, exclusively breast feed your child till 6 months.

At the beginning of the session, AWW asked questions to the mothers related to initiation of breast feeding, colostrum feeding, water feeding and EBF. After eliciting their answers, she showed the flash cards and explained the messages in details. She recited the slogans and made the mothers repeat after her. Among the mothers, there were few from northern Indian states. These women reported very poor IYCF practices. Hence, the AWW further explained the benefits of EBF and colostrum feeding, and hazards of water feeding in Hindi language using their local terms.

- Initiation of complementary foods at 6 months: "*Jem ek nana chod ne pani ane khatar ni jarur hoe che ugva mate, emaj nana baalak ne pan 6 mahina pachi upari aahar ni jarur pade che. 6 maas pachi maa nu dhavan baalak mate purtu poshan nathi aapi saktu. Sharirik ane maanasik vikas mate vadhare poshan ni jarur pade che. 6 maas baad baalak upari aahar pachavi shake che. Pan jo mata baalak ne aahar naa ape ane fakt dhavadavya kare to baalak nablu ane kuposhit thayi jaaye che*" (AWW started with the example of how a sapling requires water and fertilizer for growth, similarly a child after 6 months also requires complementary foods. Mother's milk is not sufficient for growth of an infant after 6 months. Child requires extra nutrients for growth and development. A child is able to digest complementary foods after 6 months. But if there is delayed initiation of CF and mother continues only breast feeding then the child becomes weak and malnourished).

Plus points of the NHEC session: The AWW had prepared all the messages well. She was not confused with which flash cards to use. At frequent intervals she asked questions to know whether all women had understood the messages well. She used the flash cards in a way that all women could see the pictures properly. She had a loud enough and clear voice. She could maintain silence and discipline. She did not allow mothers to talk among themselves and made the session very interactive.

After the NHEC session was over, she reinforced all messages once again in a sequence and took a feedback from the mothers about what they had learnt. The mothers were convinced and promised the AWW that they would follow the optimal IYCF messages communicated to them.

1: Name changed to protect identity

Good Communication Skills of the AWWs during NHEC sessions: Loud and clear voice, proper handling of FCs, confident and well prepared with all the IYCF messages

Box 4.2.3 Example of a Poor NHEC session

The NHEC session was scheduled at 12 pm. At 1 pm only four women gathered. When investigator and supervisor inquired, the AWW (Seemaben)[2] informed us that she had not informed women in advance about the meeting. No follow up was done by the helper. AWW told us that women are busy with cooking so cannot come before 2 pm. This reflected poor preparation on part of the AWW. Another AWW (Geetaben)[2] of the neighbouring village was present for the meeting. When investigator inquired about her NHEC meeting date she said "I have helped Seemaben in gathering women for the meeting hence my meeting is over. Now I don't need to conduct a separate NHEC session in my AWC". This reflected the little importance given to NHE service. For these AWWs it was an extra job function.

When the supervisor insisted that Seemaben should conduct the meeting immediately, both the AWWs and helper went out to gather women. By 1.30 there were 20 women. Seemaben was very shy during the whole meeting. She had not planned the topics in advance hence the investigator had to guide her in selecting the messages and flash cards. The AWW was not serious and kept laughing all the time. This created a negative image among beneficiary mothers.

She did not introduce the purpose of the meeting and straight away started reading the flash card on exclusive breast feeding. She did not interact with the mothers nor did she assess their knowledge about IYCF practices.

She did not explain the benefit of EBF and hazards of water feeding before 6 months. When the supervisor questioned AWW about right age of water feeding, Seemaben could not answer. It was clear that she had poor knowledge about the topics.

She read out all other messages on initiation of CF at 6 months; quantity of CF at different age groups and quality of CF from the flash cards without giving any explanation on any message. She did not show any pictures to the mothers, nor made any comparisons between a weak and a healthy child as shown on flash card.

Mothers were observed to be talking among themselves. None of them were interested in listening or asking any questions to AWW. Seemaben's poor communication skills could not make the session informative nor interactive. All the mothers were confused about the correct IYCF practices. Finally when women started leaving, the investigator took over the session and started the session again.

2: Name changed to protect identity

Infrequent NHEC sessions: The NHEC meeting dates were scheduled with the AWWs during the Monthly Progress Report meetings once a month, so that there was no overlapping and both the supervisor and the investigator could attend all the NHEC group sessions. Though each AWW had to hold the meeting only once in a month, a few from the group were not very cooperative. In a few cases the supervisors had to request and sometimes even compel them to conduct atleast one NHEC meeting. Unfortunately, majority of the AWWs did not consider conducting NHEC meetings as a routine job function already expected of them, but rather as an extra job for which they were not prepared and some were just not willing to do it. A few reasons given by them to avoid

Poor Communication Skills of AWWs during NHEC sessions: Not facing the audience, improper handling of Flash Cards, not well versed with the IYCF messages

conducting meetings were: *"Women don't cooperate in our village", "Nobody will come, nobody listens to what we say or explain", "We don't have time to do it, its festival time so no one has time", "Women sleep in the afternoon", "Women go out for work".*

2.1.1 Changes in Skills of AWWs Regarding Enhanced Implementation of Selected ICDS Services

As part of process evaluation, changes in knowledge of AWWs regarding nutrition related services: GM, SF and *Rab* supplementation, and NHE service were determined through semi structured interviews. Further, direct observations of ongoing ICDS services helped validate interview data. In the following pages, interview data is followed by observation data for comparison and validation.

Table 4.2.7 presents the change in knowledge of the AWWs regarding Growth Monitoring service. After one year of intervention the AWWs could correctly recall the messages given regarding GM service. Prior to intervention, the AWWs perceived that GM is carried out to know the weight and grade of the child (65%), while after the intervention one third (30%) also believed that increase in weight of the child denotes good health and if child loses weight it indicates poor growth or some morbidity. As regards information given to mothers after GM, majority (85%) of the AWWs reported to show the Growth Chart to the mothers and explained what the growth curves meant (i.e if the line goes down the child is weak and malnourished and if line curves upwards child is normal and healthy); none of the AWWs gave this response prior to intervention.

During the training workshop, all AWWs were given a growth chart register to plot the grade of each child on a separate page. This would help the mothers to know the change in the grade of malnutrition of their children. Post intervention, all AWWs agreed that there was improvement in implementing this service. Grading became easy and they could keep a record for each child individually. According to them, more mothers brought their children for GM regularly to AWC and enquired about their child's grade. A few AWWs reported that they learnt the correct method of grading during the workshop and found it easy to explain to the mother regarding optimal child feeding practices.

Table 4.2.7 Change in Knowledge of AWWs Regarding Objectives and Benefits of Growth Monitoring Service of ICDS

Responses of the AWWs	Pre Intervention (N=20)		Post Intervention (N=20)	
	n	%	n	%
Growth Monitoring				
Objectives of Growth Monitoring (GM)				
▪ To know the weight of the child; to know whether child is gaining or losing weight	13	65.0	14	70.0
▪ If weight increases every month then child is healthy and if weight decreases, child may be suffering from some illness	0	0	6*	30.0
▪ To know in which grade the child falls; to know his growth and development	10	50.0	3	15.0
▪ If the child is malnourished then advise the mother to give nutritious food; take child to doc; send them regularly to AWC	7	35.0	3	15.0
Information given to the mothers after GM				
▪ Show growth curves on the growth chart to the mothers and explain if line curves down child is weak and malnourished	0	0	17***	85.0
▪ If grade decreases then educate parents to feed the child properly; take them to the doctor	17	85.0	7	35.0
▪ If weight increases then tell parents to continue feeding nutritious food	6	30.0	0	0
▪ Inform mother whether child's weight increases or decreases	5	25.0	0	0
Difficulty faced in implementing this service				
▪ Yes	11	55.0	0	0
▪ No	9	45.0	20***	100.0

* $p<0.05$, *** $p<0.001$
Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

Before the intervention, more than half (55%) of the AWWs had expressed difficulties in conducting GM sessions (go from one house to another for weighing infants and lifting older children to hang them on the salter scale). However, after learning the importance of GM service none of the AWWs expressed any such difficulties ($p<0.001$).

Contrary to interview responses, spot observations of Growth Monitoring sessions after the training workshop revealed that only a few AWWs used the growth chart as an NHE tool to impart knowledge to mothers regarding growth and development of their child. None of the AWWs plotted the weight immediately on the growth chart after the weight measurement. This was also confirmed through interview responses of the mothers in different villages.

Table 4.2.8 reveals that as regards objectives of SF service, majority (80%) of the AWWs

prior to the training workshop had the right knowledge (SF service provides extra nutrient supplements to children which they might not be receiving at home). However, half of the AWWs also believed that mothers brought their children at AWC for food supplements and to make their children learn to eat while they were away for work.

Table 4.2.8 Change in Knowledge of AWWs Regarding Objectives and Benefits of Supplementary Food Service of ICDS

Responses of the AWWs	Pre Intervention (N=20)		Post Intervention (N=20)	
	n	%	n	%
Supplementary Food				
Objectives of Supplementary Food (SF)				
▪ Child gets extra supplements / nutritious food through SF in addition to what s/he eats at home, s/he might not be receiving sufficient amounts at home	16	80.00	14	70.0
▪ Child learns to eat; mother leaves child for SF in the AWC and goes for work	10	50.0	10	50.0
▪ Improve child's health, improve nutritional status of the child; for growth and development	8	40.0	5	25.0
Changes observed in health of the children due to SF				
▪ Nutritional status improved; improvement in grade	13	65.0	20**	100.0
▪ Child who came regularly for SF was more intelligent	0	0	15***	75.0
▪ Child receives nutritious food (mix of cereals and pulses) so health improves	0	0	3	15.0
▪ Child learns to eat	6	30.0	0	0
Quantity of cooked food given to each child				
▪ Khichadi – 1 cup	0	0	16***	80.0
▪ Muthiya – ¾ - 1 cup	0	0	12***	60.0
▪ Chana – 80 ml (1/3 cup)	0	0	10***	50.0
▪ Lapsi – 1 cup	0	0	5*	25.0
▪ Use house hold measures not standard cups	20	100.0	1	5.0
▪ 50 gms raw	18	90.0	0	0
Do children consume the entire SF at the AWC?				
▪ Yes	17	85.0	5	25.0
▪ No	3	15.0	15***	75.0
Quantity of SF taken home				
▪ > half the supplement	1	33.3	0	0
▪ < half the supplement	2	66.7	15***	100.0
Method of cooking *rab*				
▪ AWW knows the correct recipe with quantity	0	0	7**	35.0
▪ No specific measurements used as number of children who come to receive *rab* vary every week	20	100.0	6	30.0
▪ AWW does not remember the correct measurements, helper prepares it	0	0	6	30.0
Difficulties experienced in implementing this service				
▪ Yes	18	90.0	0	0
▪ No	2	10.0	20***	100.0

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

All AWWs after the intervention believed that there was an improvement in nutritional and health status of children due to SF compared to only 65% prior to intervention ($p<0.01$). Before intervention one third AWWs believed that children learnt eating and became playful due to SF service, while after the intervention three fourth (75%) of them reported that children who regularly consumed SF became 'more intelligent' ($p<0.001$).

All AWWs prior to intervention did not use any standard measures (used household measurements) for serving cooked food to children. Majority (90%) were aware of the raw amount (50gms) that each child should receive but not the cooked measurement. However, after the intervention more than half (60-80%) could remember the standard measurements of cooked foods (*khichadi, lapsi, muthiya* and *chana*) ($p<0.001$). During the training workshop, cooked recipes and standard volumes of each supplementary snack were demonstrated and all AWWs were given a set of standard cups and spoons for measuring standard weights and volumes of raw and cooked snack. This facilitated the helpers in measuring correct quantities of the raw ingredients as needed to prepare SF depending on the number of children present and it did not lead to left over food.

Majority of the AWWs (85%) prior to the intervention replied that children coming to the AWCs consumed the entire SF served to them at the AWC. However, after the intervention three fourth of them agreed that children do not finish up all the SF at the AWC and the left over was taken home ($p<0.001$).

Spot observations on SF service post intervention revealed that standard cups were used for serving the cooked snack only in half of the AWCs. The AWWs did not pass on the information they had learnt at the training workshop to their helpers regarding which standard cups to be used for which snack. Hence, for measuring the raw ingredients, the helpers did not use any standard measurement. Only at few AWCs, SF was served in steel plates or bowls given by the NGO while at the rest of the AWCs, snacks were served in tiffin boxes brought by the children. AWWs did not encourage the children to finish up the whole snack at the AWC. Majority of the children ate a little quantity and took the rest home. Observations made between 1-2 pm at the AWCs revealed that majority of the AWWs had already served SF and children had left AWCs. Hygiene of children was poor in half of the AWCs. AWWs did not follow good hygiene practices like making children wash their hands before eating SF. More than half of the AWWs utilized the time between 2-3 pm in finishing reports and registers or went home. No home visits were conducted.

Examples of Spot Observations: Supplementary Food service
SF was served before the scheduled time

- Both the AWW and the children had left the AWC by 1.30 pm. Helper: "*AWW ni baby bimaar che etle doctor pase layi gaya che*" (AWW has gone to the doctor for treatment of her ill daughter).
- On Saturdays the AWC is expected to run in the morning from 8 am-12 noon. Children were not present at 11 am in one AWC and the helper was found cleaning the vessels. Helper: "*11 vage nashto api diaye ane chokrao ne chodi daiye. AWC saaf karine parvartaj 12 vagi jaye.*" (We serve SF at 11am and let children go. Cleaning AWC and winding up takes time).
- At another AWC at 11 am on Saturday again children were not present. The AWW was filling up reports. She replied: "*Aaje shrimant hatu gaam ma etle 11 vage chodi didha. Aam to 12 vagya pachi chodvana hoe pan shrimant nu jamanvar hatu etle baalakone mokli didha*" (There was a baby shower ceremony in the village so I allowed the children to leave at 11. Children are supposed to stay till 12 but because of the invitation for lunch, I left them early).
- One AWC runs under a tree. AWW: "*Varsad ni season maa bou motta kala keeda aave che. Balako ne besadi na shakay, etle khali nashto levaj bolaviye.*" (During monsoon big black insects come out from the soil in infinite numbers. Hence, we do not allow children to stay in AWC for any activity. We call them only for AWC snack).

Before the training workshop, none of the AWW was aware of the correct recipe of preparing *rab* in the AWCs for children 7-12 months of age. This led to inconsistency in taste and texture. However, even after the intervention period only few (35%) of the AWWs could recall the correct measurements and steps in preparation ($p<0.01$). Few of them replied that they did not use any specific measurements as number of children varied every week and the others reported that their helpers prepared *rab*, hence they were not sure of the right method of preparation.

Spot observations conducted to monitor the *rab* supplementation program after the intervention revealed that it was the poorest among all services implemented. On surprise visits by the investigator on *rab* supplementation days, it was observed that many AWWs often concealed the real situation and did not report that they had not prepared it. Several reasons given were: "*very young children sleep in the afternoon so we don't cook rab*", "*mothers don't bring children to AWCs as they are busy*".

Examples of Spot Observations: *Rab* Supplementation Program

- In one AWC, the AWW had forgotten to get the *rab* prepared on the scheduled day. However, the moment the investigator enquired, the AWW asked the helper: *"Rab nathi banavi aaje*? (Haven't you prepared *rab* today?) Helper: *"Ghare banavi che"* (I have prepared it at home). AWW: *"To leta aavo ghare su rakhe muki che"* (Then get it to AWC, why have you kept it at home). The helper had made up the story in presence of the investigator, in reality there was no *rab* prepared.
  AWW: "*29 badeko hata aaje pan pona be vage badha jata rahya. Nishal chute aetle mota badeko ni sathe valiyo nana badeko ne pan lae jae*" (There were 29 children today but all of them just left (1.45pm). When elder siblings leave from school, parents come to take the younger ones also)". AWW was found filling the register.
- One AWW reported to conduct *rab* supplementation only on immunization days and not once a week. According to her, more mothers gathered at PHC clinics for immunization where she fed 1-2 spoons of *rab* to all children who visited the clinic. Helper also supported the AWW in her argument. AWW: "*Ame clinic vakhte banaviae, aaje nathi banavi. Beno rasi mukava aave tyare chamchi chamchi pivdaviye.*" Helper: *"Ben dolchama rab lae jaye clinic par. Tyare bou beno aave etle pivdaviye.*" This defeats the purpose, as *rab* is meant as a demonstration tool for initiation complementary feeding to children 7-12 months of age.
- One AWW reported that she had prepared and fed *rab* to children in the AWC before the investigator arrived: "*Ame anganvadi ma rab 12 vage aapi daiye che. Aje 5 balako hata. Eloko rah na joe sake ne etle vahela aapi daeye*" (Young children cannot sit for long so *rab* was fed early). However, the helper said: "*Aaje rab nathi banavi. Lot kakro che, dadelo nathi aetle rab nathi banavi*" (We did not prepare *rab* today as the wheat flour required for *rab* was not available)

Table 4.2.9 depicts that there was an improvement as regards appreciation of the value of NHEC in ICDS.

Table 4.2.9 Change in Knowledge of AWWs Regarding Objectives and Benefits of Nutrition Health Education Service of ICDS

Responses of the AWWs	Pre Intervention (N=20)		Post Intervention (N=20)	
	n	%	n	%
Nutrition Health Education				
Objectives of NHE				
▪ Improves nutritional status of children by improving IYCF practices; teach mothers correct child feeding practices	14	70.0	20*	100.0
▪ Improves the food intake of pregnant and lactating women	8	40.0	7	35.0
▪ Increases awareness regarding immunization	4	20.0	3	15.0
▪ Increases utilization of ICDS services	3	15.0	4	20.0
Benefits of this service				
▪ Mothers have learnt about *rab*; have started feeding *rab* regularly	0	0	6*	30.0
▪ Mothers have learnt about hygiene	3	15.0	5	25.0
▪ Mothers now send children to the AWC; increased	1	5.0	5	25.0

Responses of the AWWs	Pre Intervention (N=20)		Post Intervention (N=20)	
	n	%	n	%
utilization of AW services				
▪ Mothers know about quantity of food to be fed to the child; decreased food taboos	1	5.0	3	15.0
▪ Pregnant women have started coming for FS; weight gain during pregnancy	1	5.0	3	15.0
▪ Mothers bring their children for weight monitoring	0	0	3	15.0
▪ Increased awareness regarding immunization	3	15.0	0	0
▪ No change; No Response	2	10.0	3	15.0
Audio visual aids used for NHE				
▪ Flash cards	0	0	17	85.0
▪ Verbal	0	0	3	15.0
▪ Charts / posters	11	55.0	0	0
Records kept for this service				
▪ Number of home visits	9	45.0	17**	85.0
▪ Number of meetings	0	0	15***	75.0
▪ Number of women who attended the meeting	15	75.0	15	75.0
▪ Topics covered	11	55.0	11	55.0
Topics covered under NHE				
▪ Initiation of CF; IYCF practices	9	45.0	15	75.0
▪ Hygiene	2	10.0	11**	55.0
▪ Active feeding	0	0	8**	40.0
▪ Quality and quantity of food	7	35.0	7	35.0
▪ Utilization of AW services	6	30.0	7	35.0
▪ *Rab* supplementation program	0	0	5*	25.0
▪ Growth monitoring	4	20.0	4	20.0
▪ Diarrhea in children / ORS	2	10.0	2	10.0
▪ Preschool education	4	20.0	0	0
Number of times NHE sessions are conducted in 1month				
▪ Once	10	50.0	9	45.0
▪ Twice	7	35.0	7	35.0
▪ More than 3 times	2	10.0	0	0
▪ Never	0	0	3	15.0
Change in health status of the beneficiaries due to NHE				
▪ Improved health status of the child; weight gain; improvement in grade; growth and development	11	55.0	9	45.0
▪ Improved CF practices; initiation of CF	1	5.0	4	20.0
▪ Children learnt to speak; learnt to eat	1	5.0	3	15.0
▪ Mothers come to AWC for *rab*	0	0	3	15.0
▪ Improvement in hygiene;clean kids come to AWC	4	20.0	4	20.0
▪ Pregnant women now eat GLVs and come for IFA	1	5.0	2	10.0

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

After the intervention, all the AWWs stated that the major objective of NHE was to improve the nutritional status of children by improving IYCF practices, while few also stated improving diet and health of pregnant and lactating mothers as other objectives.

Prior to the intervention, the AWWs believed that NHE helped in increasing awareness among women regarding immunization, family planning and there was improvement in health status of children and mothers. However, after the intervention the AWWs stated that mothers learnt about *rab* preparation ($p<0.05$), good hygiene practices during NHE meeting and utilization of ICDS services increased; for example, *"more mothers now come for GM and Rab supplementation, more pregnant women came for SF and IFA tablets"*. None of the AWWs earlier reported to use flash cards as IEC material but use charts, posters, puppets and books. But after the intervention, majority of them (85%) stated using flash cards given by us during the NHEC group meetings.

However, observations at AWCs revealed total absence of IEC material. None of the AWWs were observed using any such tool to impart knowledge to mothers.

The topics covered during these meetings were related to improve IYCF and child care practices. Hence, after the intervention majority of the AWWs reported giving messages on active feeding, initiation of CF, quantity and quality of foods for children at different ages and good hygiene practices ($p<0.01$).

Half of the AWWs earlier perceived that mothers do not understand the messages and they may not follow the correct practices. A few also complained of not having any audio visual aids for imparting effective NHE. Hence, when asked for suggestions, half of them stated that they needed experts or external faculties to explain and convince the mothers regarding optimal IYCF practices. Further, appropriate IEC materials like charts and posters were needed to help them in effectively imparting NHE.

Spot observations after the workshop revealed a very disheartening picture regarding NHE service. Despite realizing the value of effectively conducted NHEC sessions, none of the AWWs continued conducting NHE meetings as instructed during the training, nor did they improve the quality of the home visits. Further, they did not even impart knowledge to sensitize mothers regarding nutritional status of their children using the growth chart when mothers came to AWCs to avail other ICDS services.

Other observations

At many AWCs, the AWWs were either on leave, busy with immunization, filling records and registers or involved in other activities like school admission. In such instances, the beneficiary children were either allowed to go home before the scheduled time or left alone with the helper in AWC to play on their own. This affected the quality of implementation of all other ICDS services. The Helper cooked SF and handled children simultaneously.

Examples of Spot Observations: Absence of AWW at the AWC

- In one AWC, the AWW was busy with school admissions of children (over 5years) who had left the AWC and had to be admitted in municipal school. AWW: *"Hamana dakhla nu kaam chale che. 10-15 divas to avuj chalse. Mare nishal ma dakhlo karavana form bhari apva pade che. Balako ni matao sathe javu pade che. Bahu time jato rahe che.* (AWW: It is admission time right now. This will go on for next 10-15 days. I have to fill the forms for the parents and go along with the mothers. It takes away a lot of time).
- As late as 12 noon there were no children in AWC. AWW was filling reports and the helper had gone to gather kids.

Continuous Unstructured Observation – Typical Day (Post Intervention)

A Typical Day at AWC	
9:15am	Investigator visits AWC
9:15am	AWW is at home cooking SF; helper is with children in AWC. Helper has to go for vaccination round but specially came to help AWW in making SF.
9:50am	Children are playing on their own since they arrived. Helper has gone to help AWW, so children left alone.
10:00am	Mother of one child visits AWC to get her child weighed. Helper weighs the child but does not note his weight in a book or register.
10:05am	Helper takes girls outside the AWC for *loo* followed by boys at the same place. Boys dirty their legs in the contaminated mud. Helper does not bother to wash their hands and legs.
10:10am	Helper makes all children sit in a circle and sings prayer and poems
10:15am	Helper serves water to children
10:20am	Helper makes children recite 1-10 numbers; shows charts of animals and fruits. Children recite songs and run in a circle (making a train)
10:55am	AWW brings the SF (*chana* and wheat *khichadi*). Children are made to wash hands and sit in a circle with their tiffin boxes
11:15am	Helper serves *chana* using 50ml cup instead of 80ml cup. Then she serves *khichadi* to all children but using 100ml cup in place of 200ml cup. Children don't sit in AWC to eat the snack. All of them take it home. 5 pregnant women and 2 lactating women come for SF. They also don't sit in AWC and take the snack home.
11:20am	All leave AWC early instead of 12pm. When the investigator enquires about previous week's *rab* supplementation, AWW replies *"Gaya budhvare noti banavi. Mare PHC ma clinic hatu etle javu pade. Helper ben pan e divase nota etle nashto pan marej banvo padyo."* (I had a PHC

A Typical Day at AWC	
	clinic last Wednesday and helper was on leave so I had to cook SF, so couldn't prepare *rab)*. AWW could have cooked in on any other day but she didn't
11.30am	AWW weighs 3 children on infant weighing scale and bathroom scale but does not inform any of their parents regarding increase or decrease in weight of the child. She is not aware of whether child gained or lost weight. She does not have the register neither the GC. The set of flash cards were also kept at home. Hence, she did not explain anything to the mother or father regarding growth of their child or IYCF practices. One child weighed lower than the previous month but AWW is not aware of it. His mother said "*Gaya vakhate 9 kilo no hato; pan avakhate 8.5kilo no che. Vajan ochu thayi gayu che*". In response AWW did not advice the mother to increase quantity and frequency of food, nor did she show GC to the mother.
11.40am	AWW and investigator leave

The above example revealed that there was not a major difference in the quality of implementation of GM activity, SF program, *Rab* supplementation and NHE activity before and after the intervention.

2.1.2 *Changes in Knowledge of ICDS Functionaries Regarding IYCF Practices Post Intervention*

After the process evaluation regarding changes in quality of implementation of selected ICDS services, this section reveals whether there was any improvement in knowledge of the AWWs regarding IYCF and child care practices.

Table 4.2.10 Improvement in Knowledge of AWWs Regarding IYCF and Child Care Practices – Selected Responses

Responses	Pre Intervention (N=20)		Post Intervention (N=20)	
	n	%	n	%
Appropriate age for Exclusive breast feeding				
▪ < 6 months	8	40.0	1	5.0
▪ 6 months	12	60.0	18*	90.0
Initiation of water feeding				
▪ < 6 months	17	85.0	1	5.0
▪ 6 months	3	15.0	19***	95.0
Initiation of complementary feeding				
▪ < 6 months	6	30.0	1	5.0
▪ 6 months	11	55.0	15	75.0
▪ 7 months	3	15.0	4	20.0
Benefits of initiation CF at 6 months				
▪ Child remains healthy; child becomes weak if not given CF	11	55.0	12	60.0
▪ Child requires more food as he grows; learns to sit & walk	0	0	5	25.0
Harmful effects of delayed feeding				

Responses	Pre Intervention (N=20)		Post Intervention (N=20)	
	n	%	n	%
▪ Child will suffer from malnutrition; weakness; no growth and development	17	85.0	19	95.0
▪ Child will not learn to eat	5	25.0	2	10.0
▪ Child will fall ill	0	0	4	20.0
Best ways to feed the child				
▪ Encourage the child to finish up the meal	19	95.0	20	100.0
▪ Feed the child on demand	0	0	13	65.0
▪ Feed on time (regular intervals)	13	65.0	1	5.0
Foods that are good for the child				
▪ Fruits	12	60.0	20**	100.0
▪ Vegetables / GLVs	13	65.0	18	90.0
▪ *Khichadi – dal* rice	11	55.0	14	70.0
▪ *Rab*	3	15.0	13**	65.0
▪ Soft mashed foods	0	0	9***	45.0
▪ *Dal* water – rice water	1	5.0	8*	40.0
▪ *Rotla – rotli*	8	40.0	8	40.0
▪ Boiled potatoes	0	0	7**	35.0
▪ Milk – ghee – curd	3	15.0	5	25.0
▪ Sprouts	0	0	5*	25.0
▪ All foods cooked at home	6	30.0	4	20.0
Reasons why these foods are considered good				
▪ Minimize deficiency of vitamins	0	0	14***	70.0
▪ Grade of undernutrition improves; child gains weight; becomes healthy	1	5.0	12***	60.0
▪ He/she gets vitamin C and A from fruits and vegetables	1	5.0	12***	60.0
▪ Child will not feel hungry	4	20.0	12**	60.0
▪ Improve eye sight	0	0	9***	45.0
▪ Are good for growth and development	6	30.0	3	15.0
▪ Improve quality of blood	1	5.0	3	15.0
▪ No Response / Don't Know	9	45.0	0***	0
If child is ill and receiving CF, then mother should feed her child:				
▪ same as before	19	95.0	20.0	100.0
Give reasons for same as before				
▪ If not given food, child will become weak, will not be able to walk and lose weight	12	60.0	20**	100.0
▪ Give food, ORS to reduce dehydration	2	10.0	1	5.0
▪ Will recover fast	3	15.0	0	0
Causes of malnutrition				
▪ Less care by the care giver	6	30.0	14*	70.0
▪ Food deficiency	16	80.0	14	70.0
▪ CF not given or late initiation of CF	0	0	5*	25.0
▪ Unhygienic conditions	0	0	4	20.0
▪ Illness and infection	11	55.0	3	15.0
▪ Insufficient Breast milk	2	10.0	1	5.0
▪ Heredity	4	20.0	0	0

* $p < 0.05$, ** $p < 0.01$, *** $p<0.001$

Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

There was a significant increase in the AWWs response related to EBF till 6 months (60%-90%) and initiation at 6 months (55%-75%) (Table 4.2.10). As regards benefits of initiation CF at 6 months, nearly half of the AWWs prior to and after the intervention stated that child remains healthy because mother's milk production reduces after 6 months.

Before the intervention, AWWs had inadequate knowledge regarding quantity and quality of foods to be fed to children <3 years and they also could not state the desired frequency of meals to be given to children 6-9 months, 10-12 months and 1-3 years of age. However, post intervention nearly half of the AWWs could recall the right messages regarding frequency and quantity of meals for various age groups as communicated in the training workshop.

Though a majority of the AWWs believed in active feeding prior to the intervention, they learned the benefits of active feeding during the training workshop stating that children learn to eat with more willingness and interest when they are fed actively.

All AWWs after the intervention stated that fruits are best for the child along with soft mashed food, boiled potatoes, sprouts, *dal* water-rice water and *rab* ($p<0.01$). A significantly high proportion of AWWs reported that child becomes healthy, gains weight, nutritional grade improves, and child receives vitamin C and vitamin A on feeding fruits and vegetables ($p<0.001$).

Majority of the AWWs after the intervention agreed on feeding CF to the ill child in the same quantity as earlier and all of them reasoned that if food is not given the child will become weak, will not be able to walk and will lose weight ($p<0.01$). Similarly, more AWWs stated the causes of malnutrition (less care by the mother: 70% and late initiation of CF: 25%) ($p<0.05$). All AWWs stated that washing child's and mother's hands with soap and water before feeding prevents illness in children. Few also responded washing mother's and child's hands with soap and water after defecation, use of clean vessels and keeping food covered as good hygiene practices.

Hence, it can be concluded that there was a very significant improvement in the knowledge of AWWs their communication and counseling skills did not show a marked improvement. Nevertheless, according to the AWWs the training workshop had made them more confident to face a group of women and hold meetings. Some stated that they had never experienced this before. A few AWWs who were very shy and hesitant to face a group, became more vocal. The messages given during the training helped to remove all doubts they had regarding complementary feeding, food taboos etc. This further helped them to solve the anxieties of the mothers during the NHE sessions.

DISCUSSION

The capacity building training and process evaluation of this intervention were successful in improving the knowledge of the AWWs regarding ICDS services and IYCF practices with the messages being well retained even one year after the intervention. The AWWs could correctly recall the messages as regards objectives of Growth Monitoring (GM), benefits of GM and importance of growth card (GC) in counseling the mothers; found grading and counseling easier with use of GC and felt service utilization improved. Several benefits of SF were stated: improvement in nutritional and health status; children became more intelligent. All the AWWs stated that the major objective of NHE was to improve the nutritional status of children by improving IYCF practices, promote good hygiene practices and improve utilization of ICDS services.

Further, their knowledge related to optimal IYCF practices, significantly improved. In particular: the right age for initiation of complementary feeding, frequency and quantity of meals for various age groups, benefits of active feeding and foods that are good for the child, feeding CF to the ill child and importance of personal and environmental hygiene.

Though much research has been done on ICDS, extensive review reveals that studies assessing *impact of training on knowledge and skills of ICDS functionaires and/or community based volunteers* are very few. Findings of available intervention studies are cited below.

The Linkages project (2002, 2006) in Madagascar involved community-based volunteers and members of women's groups, to disseminate messages related to breastfeeding and child nutrition with the use of IEC materials through home visits, educational sessions at the community health center and national or community sponsored health/nutrition events. On 6 months post-training assessment, there was improvement in knowledge of members of women's groups; however, knowledge related to breast feeding was relatively lower compared to the health workers. Hence, it was suggested that community members might need more continuous training than do health workers.

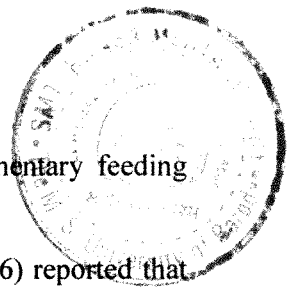
Community influencers (N=34) in a rural area of West Bengal were trained for improved IYCF awareness through lecture, group discussions, question answer session and hand-on–training at frequent intervals over a period of 3 months. Besides the initial training, successive reinforcement trainings were able to improve the community influencer's knowledge significantly regarding infant feeding practices. The authors recommended the need for not only instituting training, but also its reinforcement for generating human

resources on health care from within the community (Haldar et al 2001).

Another study in Brazil aimed to assess the impact on child growth (N=424 children <18 months) of the nutrition-counseling component of the Integrated Management of Childhood Illnesses (IMCI) strategy (Santos et al 2001). For this intervention, doctors from government health centers received 20 hour training in nutrition counseling related to IYCF. After training, doctors in the intervention group (n=17) on average, correctly answered 83% questions related to nutritional counseling as compared to 68% doctors in control group (n=16) ($p<0.05$).

The World Food Program (India) and CARE in 1997 assisted 'Nutrition and Health Education (NHED) project in three blocks of Rajasthan with the collaboration of Government of Rajasthan. The major goal of the project was to reduce malnutrition among the low-income group children participating in ICDS in five blocks of two districts of Rajasthan and to improve the NHED in 621 villages. Training programs were organized for the ICDS functionaries (582 AWWs and 27 Supervisors) to improve the knowledge and skills on the nutrition and health aspects of children, pregnant and lactating mothers. The findings revealed that all the ICDS functionaries learnt a great deal about some aspects of nutrition and health related content of the ICDS project. The outcome of the project interventions was significant in some of the areas i.e. food and its functions, treatment of disease, and immunization. However, it showed a poor increase in the knowledge related to breast feeding, diet, nutrition and health promotion and growth monitoring. The NHED project recommended that such training should be continuous and on going and should include innovative ways of training the AWWS.

In Haryana, Government AWWs and ANMs with the support of an NGO were trained to counsel on locally developed complementary feeding recommendations in intervention communities through monthly home visits. Subsequently, monthly meetings were conducted by the AWWs and ANMs for community representatives; who in turn held monthly neighborhood meetings and conducted group activities through women's groups. The intervention delivery was monitored by the local authorities at the monthly reviews of health - and nutrition related activities and they gave feedback to the workers. Results showed that at the 9-month visit, a higher proportion of infants in the intervention (vs. controls) had one or more of the following contacts in the last 3 months: home visits by Anganwadi workers (67% vs. 31%; $p<0.001$), attendance at weighing sessions (47% vs. 1%; $p <0.001$), immunization sessions (77% vs. 85%). Higher proportion of caretakers in the intervention



communities spontaneously recalled being counseled on optimal complementary feeding practices as compared to those in control (Bhandari et al 2004).

In a social assessment survey of ICDS in Gujarat, Kanani and Zararia (1996) reported that often services were not utilized in a manner to yield any marked impact on health or nutritional status. Mere presence of women in NHE session did not lead to any significant changes in home level practices. Hence, the authors recommended continuous monitoring of the process of implementation of those elements, which are most crucial for impact on beneficiaries.

In the present study, the value of direct observation data was evident to validate interview responses. Contrary to interview responses which reported marked improvement in knowledge of AWWs related to ICDS services and IYCF practices, spot observations revealed that quality of implementation at field level showed little improvement. Only a few AWWs used the growth chart as an NHE tool to counsel mothers regarding growth and development of their child. None of them plotted the weight immediately on the growth chart after the weight measurement. Standard cups were used for serving the cooked snack only in half of the AWCs and no standard measurements were used for measuring the raw ingredients. Majority of the children ate a little quantity of SF and took the rest home. *Rab* was not prepared once during the observation period after the intervention. The AWWs did not continue to regularly conduct NHE meetings nor did they improve the quality of the home visits. At many AWCs, the AWWs were either on leave, busy with immunization, filling records and registers or involved in other activities like school admission - all of which adversely affected the quality of implementation of all other ICDS services. In literature the observation method has not been reported to assess the quality of serves within the overall ICDS system.

2.1.3 Role of the Supervisors in Monitoring the Quality of Implementation of Enhanced ICDS by AWWs

There were 3 supervisors appointed for 40 AWCs (one head supervisor appointed by the NGO and two subordinate supervisors). The head supervisor coordinated and monitored all the activities and guided her subordinates. She also attended meetings at Jilla Panchayat office every month. The supervisors filled Monthly Progress Reports, Salary Reports and Raw Material Reports (food supplements) every month which took up lot of their time away from the field.

During the baseline survey it was noted that there were no set guidelines based on which the

supervisors could monitor the quality of functioning of ICDS services. Hence, after the training workshop the supervisors were given simple observation checklists (Annexure 18) for monitoring the functioning of the AWWs, for assessing quality of NHEC meetings and a ranking checklist (Annexure 19) for rating all AWCs according to various criteria (based on guidelines decided for improved functioning of all ICDS services). This enabled them to compare the functioning of good AWCs vs. the poorly functioning AWCs. It also reflected the efficiency of the AWWs in delivering the services to the community.

However, after the intervention it was observed that the supervisors did not use the checklists. According to them: *"We have lost the checklist and we don't have the guidelines to make it again". "We used one of the checklists earlier, but have not used it since a long time now".* One supervisor went on maternity leave during the intervention period and joined after the intervention was over. She replied *"I am not aware of such a checklist so I don't use it".* None of the NGO authorities after the intervention took charge of monitoring and maintaining the quality of enhanced ICDS services. This revealed a lack of adequate support from the NGO authorities towards functioning of supervisors and AWCs.

Reasons for not sustaining improved NHEC as demonstrated during the intervention were many and linked to the interest and time given by the NGO to supervise ICDS functions.

Time Constraints

- As discussed earlier, the AWWs were loaded with activities other than their routine ICDS functions (vertical campaigns) leading to neglect of one of the most important services i.e. NHEC service. They were also involved in diverse community activities like adult education, *gram sabha* (village panchayat) and surveys. Though the AWWs were paid for these 'other' activities, it consumed their time and diverted attention away from ICDS services.

Lack of supervision

- During the intervention period, the supervisors had a tough time convincing the AWWs to hold NHEC meetings and even after the intervention the situation did not improve. Few AWWs believed that they already had the required information and that they did not need any guidelines or training regarding NHEC. Lack of interest among a few AWWs discouraged the supervisors from giving adequate attention to NHEC. They were demotivated and stated *"Majority of the AWWs are not interested in holding NHEC*

meetings or conducting home visits. We ourselves gather women and advice them regarding improving IYCF practice; the AWWs do not do it".

- After the intervention period, the NGO faced disturbance in their ongoing activities due to serious community unrest and protests in some of the field areas of the NGO. This hindered their routine functions and also adversely affected ICDS services for a long time period.

DISCUSSION

The performance of the AWWs in the present study was continuously monitored and supervised by the investigator so as to ensure optimal delivery of the intervention as well as to solve problems encountered by them in conducting NHEC sessions. Attempts were also made to keep the AWWs motivated and they were also offered constant guidance and support for improved functioning and delivery of services. However, it was disheartening to note that the supervisors did not effectively monitor the quality of implementation of improved job functions of the AWWs and the delivery of services which was perhaps a key reason for lack of significant improvement of AWWs in the field.

A large number of monitoring studies indicate that the ICDS program has many problems with implementation, as well as program design. One major implementation problem is that AWWs are inadequately trained, supervised and supported, which is unfortunate since their duties require considerable understanding of nutrition, pre-school education, maternal and child health issues and hence constant supervision (NIPCCD 1992, Greiner 2000, Allen 2001, NCAER 2001).

Effective goal oriented monitoring aided by a rational management information system (MIS) can make a significant contribution to the management and impact of a program. What is monitored is in fact what is implemented; what is not, receives little attention from field level functionaries. Further, more frequent the monitoring more is the time and effort devoted to a program in the community (Kanani and Zararia 1996).

In the present study also monitoring and supervision remained weak even after the intervention. Monitoring was random and not goal oriented. For example:

Activity	Monitored, hence received attention	Not monitored hence neglected
Growth monitoring	Nutritional grading of children	Use of growth chart to educate mothers; home visits for follow-up
Food supplementation	Quantity of ration, number of beneficiaries covered	Quality of food prepared, actual consumption by beneficiaries; hygiene of food prepared
Nutrition health education	No monitoring, hence absence of NHE meetings and home visits	Use of audio visual aids, efforts to make the sessions interesting, use of mother's group meetings and home visits for imparting NHE

Further, there was no proper MIS system to use the data and records collected from the AWWs. Hence, the supervisors could not provide any feedback on the data including the performance of the AWWs.

Monitoring was an important feature of a community based intervention in two rural community development blocks (152 villages) of Agra district in Uttar Pradesh. The women community volunteers were followed up initially at monthly basis and then every 3 months for reviewing their activities and solving their problems. Pictorial management information system (MIS) format was used by the community volunteers to report the activities undertaken by them and events occurring in their cluster (Nandan 2004).

In China, a year-long rural community-based pilot nutrition education intervention mobilized and trained village nutrition educators (local women's affairs officials or village doctors, n=24 for 24 villages) to make monthly growth monitoring and complementary feeding counseling visits to all pregnant women, and families with infants born during the intervention in the study villages (Guldan et al 2000). At the end of the intervention, 60% of the mothers said that they were visited once per month by the nutrition educator. Although significant improvements in infant feeding practices were documented, certain shortcomings were also present. There was lack of direct contact with the village educators, which led to weak supervision of the township and village educators. As a result the counseling was often too instructive and did not stimulate the mothers' interest as was originally planned. The authors concluded that effective training emphasizing counseling techniques and incentives for village level nutrition educators as well as stronger supervision of their work are crucial to the improvement of infant feeding in the village households; in particular how to effectively reach mothers and enable them to understand and adapt the new behaviours.

2.2 *Impact Evaluation of the Intervention on Beneficiaries*

Impact of NHEC intervention on the beneficiaries was assessed as regards: knowledge related to ICDS services, IYCF practices, food intake and nutritional status of children.

2.2.1 *Changes in Knowledge and Perceptions of Mothers Regarding IYCF Practices after the Intervention: Intervened (N=40) Vs. Control (N=30) villages*

Table 4.2.11 reveals that there was a significant improvement after the intervention in knowledge of the IG mothers regarding initiation of complementary foods at 6 months (15% pre vs. 45% post) ($p<0.05$), which was not observed in CG (33% pre vs. 40% post).

Table 4.2.11 Changes in Perceptions of the Mothers of Children Regarding Complementary Feeding Practices (Intervened Vs. Control)

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N = 30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
Initiation of CF								
▪ <6 months	11	28.1	8	20.0	5	16.7	4	13.3
▪ 6 months	6	15.4	18*	45.0	10	33.3	12	40.0
▪ 7-9 months	7	18	5	12.5	5	16.7	6	20.0
▪ >9 months	15	38.	8	20.0	10	33.3	8	26.7
Types of CF given to child								
▪ *Roti-rotla*	28	71.8	37**	92.5	25	83.3	26	86.7
▪ Fruits	21	53.8	36***	90.0	23	76.7	26	86.7
▪ *Dal*-rice	21	53.8	33**	82.5	18	60.0	21	70.0
▪ *Khichadi*	31	79.5	33	82.5	24	80.0	24	80.0
▪ Vegetables	15	38.5	30***	75.0	15	50.0	21	70.0
▪ Biscuits	32	82.1	20**	50.0	20	66.7	17	56.7
▪ *Mumra* / snacks	9	23.1	11	27.5	8	26.7	4	13.3
Benefits of CF								
▪ Child remains healthy	23	59.0	20	50.0	13	43.3	16	53.3
▪ Child learns to eat	5	12.8	11	27.5	5	16.7	3	10.0
▪ Child remains playful	6	15.4	6	15.0	5	16.7	1	3.3
▪ Child grows well	5	12.8	5	12.5	4	13.3	3	10.0
▪ Don't know	8	20.8	6	15.0	5	16.7	7	23.3
Harmful effects of delayed feeding								
▪ No harmful effect	26	66.7	18	45.0	23	76.7	18	60.0
▪ Child will become malnourished	5	12.8	14*	35.0	3	10.0	6	20.0
▪ Child will fall ill	2	5.1	6	15.0	1	3.3	1	3.3
▪ Child will not learn to eat	2	5.3	4	10.0	0	0	1	3.3
▪ Don't know	4	10.5	3	7.5	2	6.7	5	16.7
Special foods given								
▪ Yes	2	5.1	7	17.5	7	23.3	5	16.7
▪ No	37	94.9	33	82.5	23	76.7	25	83.3

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N = 30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
Foods avoided								
▪ Yes	20	51.3	15	37.5	15	50.0	15	50.0
▪ No	19	48.8	25	62.5	15	50.0	15	50.0
Which foods avoided								
▪ Banana	13	65.0	9	60.0	7	46.7	6	40.0
▪ Guava	14	70.0	5*	33.3	1	6.7	7*	46.7
▪ Fresh coconut	1	2.6	4	26.7	8	53.3	8	53.3
▪ Sweet foods	0	0	2	13.3	0	0	2	13.3
▪ Vegetables	9	45.0	0**	0	8	53.3	1*	6.7
Reasons for avoiding these foods								
▪ *Varadh thay*	7	35.0	7	46.7	8	53.3	11	73.3
▪ Cough - cold	2	10.0	4	26.7	4	26.7	5	33.3
▪ *Bhar rahe*	5	25.0	3	20.0	5	33.3	2	13.3
▪ Diarrhoea	1	5.0	2	13.3	1	6.7	2	13.3
▪ *Tikhu lage*	5	25.0	0*	0	5	33.3	0*	0

* p<0.05, **p<0.01, *** p<0.001

Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

A significantly higher proportion of IG mothers reported feeding fruits, vegetables, *rotla* and *dal*-rice to their children and avoided giving biscuits compared to CG (p<0.01). Nearly half the mother believed breast milk insufficiency as reason for initiation of CF, and very few mothers from both the groups stated '*child gets nutrition*', '*child is grown up now*' and '*mothers stores get depleted*' as other reasons for initiation of CF. More mothers from IG (13% pre vs. 35% post) reported that the child would become malnourished if there is delayed feeding beyond 6 months (p<0.05). Though nearly half of the mothers in both groups reported to initiate CF at 6 months, a majority of them did not prepare any special foods for their children. Of the very few mothers who reported to give special foods, all prepared *sheera* for their children. Other special foods given were *mung, mumra* and *poha.*

The percentage of women who avoided giving certain foods to their children also reduced significantly in IG whereas it remained the same in the CG. Contrary to mothers in the CG (46%) who avoided feeding guava to their children, more mothers (70%) in the IG started feeding guava (p<0.05), where as in both the groups mothers started feeding vegetables to their children. Reasons given for not feeding bananas and sweet foods to children even after the intervention in both groups were '*varadh thay*' and '*such foods cause cough and cold*'.

Further, within the intervened group 60% of the eligible mothers attended the NHEC meetings. Hence, they were divided into two subgroups: Attended NHEC (AT-NHEC) and Not-Attended NHEC (NAT-NHEC). Assuming that those mothers who attended NHEC sessions would have benefited more, sub group analysis was performed and its results are presented in tables along with IG vs. CG tables.

Table 4.2.12 Changes in Perceptions of Intervened Mothers regarding IYCF practices (NHEC Attended vs. NHEC Not Attended)

Responses of the Mothers	Post Intervention IG (N=40)		Post Intervention IG (N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
Initiation of CF						
▪ <6 months	8	20.0	5	22.6	3	16.8
▪ 6 months	18	45.0	13*	59.1	5	27.8
▪ 7-9 months	5	12.5	2	9.1	3	16.8
▪ >9 months	8	20.0	2	9.1	6	33.6
Benefits of CF						
▪ Child remains healthy	20	50.0	10	45.5	10	55.6
▪ Child learns to eat	11	27.5	9	40.9	2	11.1
▪ Child grows well	5	12.5	3	13.6	2	11.1
▪ Child remains playful	6	15.0	4	18.2	2	11.1
Harmful effects of delayed feeding						
▪ Child will become malnourished	14	35.0	11*	50.0	3	16.7
▪ No harmful effect	18	45.0	8	36.4	10	55.6
▪ Child will fall ill	6	15.0	4	18.2	2	11.1

* $p < 0.05$ Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

More mothers in AT-NHEC group (59%) stated that CF should be initiated at 6 months as compared to only one third in NAT-NHEC group ($p<0.05$). Majority of the mothers from both groups reported giving *dal*-rice, *rotla*-vegetable, ***khichadi*** and fruits to their children. However, more mothers from NAT-NHEC also fed unhealthy foods like snacks and biscuits. Half of AT-NHEC mothers stated that delayed feeding leads to malnutrition vs. only 17% from NAT-NHEC group ($p<0.05$). A majority (87%) mothers from NAT-NHEC did not give bananas to their children considering it to be harmful compared to only few mothers from AT-NHEC group.

Table 4.2.13 Changes in Perceptions of the Mothers of Children Regarding Active Feeding (Intervened Vs. Control)

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N = 30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
Who feeds the child								
▪ Child	17	43.6	30**	75.0	14	46.7	22*	73.3
▪ Mother	5	12.8	1	2.5	4	13.3	7	23.3
▪ Depends on food	17	43.6	9	22.5	12	40.0	1	3.3
Active feeding behaviours								
▪ Sit with the child	25	64.1	28	70.0	15	50.0	15	50.0
▪ Feed on demand	27	69.2	28	70.0	16	53.3	16	53.3
▪ Feed on time/at regular intervals	0	0	15***	37.5	11	36.7	9	30.0
▪ Encourage the child to finish up the meal	3	7.7	12**	30.0	13	43.3	11	36.7
▪ Give food and leave him	6	15.4	9	22.5	11	36.7	10	33.3
▪ Force the child to eat	6	15.4	2	5.0	5	16.7	10	33.3
Child eats with the family								
▪ Yes	15	38.5	20	50.0	5	16.7	6	20.0
▪ No	10	25.6	5	12.5	14	46.7	12	40.0
▪ Sometimes	14	35.9	15	37.5	11	36.7	12	40.0
Child is fed in								
▪ Mothers plate	5	12.8	2	5.0	7	23.3	1	3.3
▪ Separate vessel	34	87.2	38	95.0	23	76.7	29	96.7

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Note: Only major perceptions are presented in the table.

The responses may add upto more than 100% due to multiple responses

There was improvement in IG as regards active feeding behaviours with little change in CG. In the IG, for example mothers realized that it is very important to feed the child at regular intervals (0% pre vs. 38% post) ($p<0.001$), encourage the child to finish up the meal (8% pre vs. 30% post) ($p<0.01$) and make child eat with the family members (38% pre vs. 50% post).

Table 4.2.14 Changes in Perceptions of the Intervened Mothers regarding Active Feeding (NHEC Attended vs. NHEC Not Attended)

Responses of the Mothers	Post Intervention IG (N=40)		Post Intervention IG (N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
Who feeds the child						
▪ Child	30	75.0	16	72.7	14	77.8
▪ Depends on food	9	22.5	5	22.7	4	22.2
▪ Mother	1	2.5	1	4.5	0	0
Active feeding behaviours followed						
▪ Sit with the child	28	70.0	18	81.8	10	55.6
▪ Feed on demand	28	70.0	15	68.2	13	72.2

Responses of the Mothers	Post - Intervention IG (N=40)		Post Intervention IG (N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
▪ Feed on time at regular intervals	15	37.5	10	45.5	5	27.8
▪ Encourage child to finish the meal	12	30.0	7	31.8	5	27.8
▪ Give food and leave the child	9	22.5	3	13.6	6	33.3
Child eats with family members						
▪ Yes	20	50.0	12	54.5	8	44.4
▪ No	5	12.5	4	18.2	1	5.6
▪ Sometimes	15	37.5	6	27.3	9	50.0
Child is fed in						
▪ Separate vessel	38	95.0	21	95.5	17	94.4
▪ Mother's plate	2	5.0	1	4.5	1	5.6

Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

There was marked improvement in AT-NHEC compared to NAT-NHEC mothers regarding active feeding behaviours (sit with the child: 82% vs. 56%, feed at regular intervals: 46% vs. 28%, encourage child to finish up the meal: 32% vs. 28% and make child eat with family members 55% vs. 44%).

Table 4.2.15 Changes in Perceptions of the Mothers Regarding Morbidity, Treatment during Illness and Health of Children (Intervened Vs. Control)

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N=30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
Prevalence of illness in children								
▪ Yes	28	70	26	65.0	17	56.7	17	56.7
▪ No	12	30	14	35.0	13	43.3	13	43.3
Describe illness								
▪ Cold - cough	19	67.9	16	61.5	14	82.4	14	82.4
▪ Fever	10	35.7	9	34.6	9	52.9	6	35.3
▪ Diarrhea	4	14.	4	15.4	3	17.6	2	11.8
Treatment during illness								
▪ Doctor's medicine	12	42.9	12	46.2	14	82.4	11	64.4
▪ No treatment	6	21.4	7	26.9	1	5.9	2	11.8
▪ Home remedy	5	17.9	4	15.4	1	5.9	2	11.8
▪ Over The Counter drugs	0	0	4	15.4	1	5.9	2	11.8
Mother perceives her child to be healthy								
▪ Yes	38	95	38	95.0	26	86.7	27	90.0
▪ No	2	5	2	5.0	4	13.3	3	10.0
Reasons for Yes								
▪ Child keeps playing	27	71.1	24	63.2	14	53.8	18	66.7
▪ Child keeps crying and does not eat if ill	9	23.7	12	31.6	9	34.6	6	22.2

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N=30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
▪ Child was thin earlier; is healthy now	5	13.2	11	28.9	3	11.3	0	0
▪ Child does not cry	1	2.6	7*	18.4	1	3.8	6*	22.2
▪ Child has body ache and sleeps all day if ill	3	7.9	6	15.8	3	11.5	3	11.1
▪ Child does not fall ill	1	2.6	4	10.5	4	15.4	6	22.2
Diet plays a role in determining child's health	39	97.5	39	97.5	25	83.3	28	93.4
Causes of malnutrition								
▪ Food deficiency	15	37.5	17	42.5	12	60.0	15	50.0
▪ Lack of care by mother	5	12.5	13*	32.5	5	16.7	7	23.3
▪ Illness and infection	12	30.0	12	30.0	11	36.7	6	20.0
▪ Evil eye	8	15.0	7	17.5	3	10.0	1	3.3
▪ Inappropriate food	6	15.0	2	5.0	2	6.7	2	6.7
Child visits AWC regularly								
▪ Yes	21	52.5	28	70.0	17	56.7	15	50.0
▪ No	19	47.5	12	30.0	13	43.3	15	50.0
Services used regularly								
▪ SF	21	100	28	100	13	76.5	15	100.0
▪ Vaccination	11	52.4	27	96.4	17	100.0	15	100.0
▪ NHE	0	0	0	0	0	0	0	0
▪ Pre school education	21	100	28	100	8	47.1	5	33.3
▪ Growth monitoring	21	100	28	100	15	88.2	13	86.7

* $p < 0.05$

Note: Only major perceptions are presented in the table.

The responses may add upto more than 100% due to multiple responses

Prevalence of morbidity remained the same pre vs. post intervention (nearly 60%) in both IG and CG. The common ailments reported were cold and cough. More mothers (64%) from CG reported to take doctors treatment when their child was ill as compared to only half of the mothers (46%) from IG. Rest of the mothers in both the groups either preferred no treatment for their child, resorted to home remedies or purchased drugs over the counter (without doctor's prescription) from a nearby chemist.

Though prevalence of morbidity was high in children of both groups, a majority of the mothers believed that their children were healthy. Similar reasons were stated by mothers in both groups: '*child keeps playing*, '*does not cry*', '*was thin earlier, is healthy now*'. Of the very few mothers who perceived that their child was not healthy, they gave reasons such as: '*child is weak, suffers from cold-cough and diarrhoea*'.

As regards importance of diet in child's health, majority (>90%) of the mothers after the

intervention in both groups agreed that diet does play an important role in child's health. More mothers from IG (51%) compared to CG (27%) stated that good nutrition is required for good health and if the child does not eat the required quantity of food s/he will fall ill. Further, nearly half of the mothers from IG vs. only 8% from CG reported that child becomes more playful and sleeps well when fed properly.

Mothers' knowledge significantly improved as regards causes of malnutrition in IG. After the intervention some common causes stated by mothers were '*Lack of care by the mother or caregiver*', '*food deficiency*' and '*morbidity*'.

As regards attending AWC, three fourth of the mothers from IG reported to send their children to AWCs as compared to only half in CG. In IG post intervention, all the mothers reported to send their children to avail GM, SF, Pre-school education and immunization. However, none of the mothers from both IG & CG availed NHE service. *Hence, even after intervention NHE remained the most neglected service.*

Table 4.2.16 Changes in Morbidity Profile of Children (NHEC Attended vs. NHEC Not Attended)

Responses of the Mothers	Post Intervention IG (N=40)		Post Intervention IG (N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
Prevalence of illness in children	26	65.0	14	63.6	12	66.7
Type of illness						
▪ Cold-cough	16	61.5	11	78.6	5	41.7
▪ Fever	9	34.6	6	42.9	3	25.0
▪ Diarrhea	4	15.4	0	0	4	33.3
▪ *Varadh* (respiratory infection)	2	7.7	2	14.3	0	0
Mother perceives her child to be healthy	38	95.0	21	95.5	17	94.4
Reasons for yes						
▪ Child keeps playing	24	63.2	15	71.4	9	52.9
▪ Child keeps crying; does not eat if ill	12	31.6	2	9.6	6	35.3
▪ Child was thin earlier; is healthy now	11	28.9	6	28.6	5	29.4
▪ Child does not cry	7	18.4	7	33.3	0	0
▪ Child sleeps all day if ill	6	15.8	1	4.8	4	23.5
Causes of malnutrition						
▪ Food deficiency	17	42.5	10	45.5	7	38.9
▪ Lack of care by mother	13	32.5	11**	50.0	2	11.1
▪ Illness and infection	12	30.0	6	27.3	6	33.3
▪ Inappropriate food	2	5.0	2	9.1	0	0
▪ Don't know	7	17.5	3	13.6	4	22.2
Child visits AWC regularly	28	70.0	16	72.7	12	66.7

** $p<0.01$, Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

There was no major difference in the prevalence of illness in children of both groups. However, the type of illness varied: three fourth of AT-NHEC children suffered from cold-cough while one third of NAT-NHEC suffered from diarrhea. As regards causes of malnutrition, half of the AT-NHEC mothers reported 'lack of care by the mother' as the major cause compared to only 11% by NAT-NHEC ($p<0.01$). More than two third children from both groups attended AWC regularly as reported by their mothers. All AWC services were utilized by all children except NHE service which was reported by none of the mothers from both groups. This implied that after the NHEC intervention, the AWW in intervened village did not conduct any NHEC session.

Table 4.2.17 Hygiene Practices of the Mothers Related to Personal Hygiene of the Child and Child Feeding (Intervened Vs. Control)

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N = 30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
Practice related to personal hygiene of child (after defecation)								
▪ Wash hands with water and soap	14	35.0	24*	60.0	18	60.0	13	43.3
▪ Wash hands with water and mud	8	20.0	8	20.0	4	13.3	5	16.7
▪ Wash hands with water	18	45.0	8	20.0	7	23.3	12	40.0
▪ Clean child with water; bathe regularly	10	25.0	14	35.0	26	86.7	21	70.0
Practices related to child feeding (before and after feeding)								
▪ Wash hands with water	25	62.5	20	50.0	19	63.3	20	66.7
▪ Wash hands with water and soap	5	12.5	10	25.0	5	16.7	2	6.7
▪ Keep food covered	6	15.0	10	25.0	2	6.7	5	16.7
▪ Do not feed stale food	6	15.0	6	15.0	8	26.7	3	10.0

* $p<0.05$ Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

Responses related to hygiene practices of the mothers varied prior to and after the intervention, but there was improvement in the reported practices in IG compared to the CG. A significantly higher proportion of IG after the intervention reported to wash their child's hands with soap and water after the child defecates; before and after feeding and feeding freshly cooked and covered food to their children.

Table 4.2.18 Observations on Hygiene of Children after Intervention (NHEC Attended vs. NHEC Not Attended)

Responses of the Mothers	Post Intervention IG (N=40)		Post Intervention IG(N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
Personal hygiene of the child						
▪ Face clean	26	65.0	17	77.3	9	50.0
▪ No discharge from eyes	31	77.5	20*	90.9	11	61.1
▪ No discharge from mouth	27	67.5	16	72.7	11	61.1
▪ No discharge from nose	9	22.5	6	27.3	3	16.7
▪ Hair neatly combed	24	60.0	15	68.2	9	50.0
▪ Hair clean	16	40.0	11	50.0	5	27.8
▪ Hands clean	20	50.0	13	59.1	7	38.9
▪ Nails cut short	9	22.5	7	31.8	2	11.1
▪ Nails clean	3	7.5	2	9.1	1	5.8
▪ Clothes clean	15	37.5	11*	50.0	4	22.2

* $p < 0.05$ Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

Spot observation data revealed significant improvement in children whose mothers attended NHEC meeting as compared to the other group (no discharge from eyes: 91% vs. 61%, clean clothes: 50% vs. 22%). Higher proportion of AT-NHEC children had a clean face, hair, hands and nails compared to NAT-NHEC children.

Table 4.2.19 Changes in Hygiene Practices of the Mothers Related to Child feeding (NHEC Attended vs. NHEC Not Attended)

Responses of the Mothers	Post Intervention IG (N=40)		Post Intervention IG (N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
Practices related to child feeding (before and after feeding)						
▪ Clean hands with water	21	52.5	12	54.5	9	50.0
▪ Clean hands with and soap	9	22.5	7	31.8	2	11.1
▪ Do not give stale food	4	10.0	3	13.6	1	5.6
▪ No care taken	8	20.0	3	13.6	5	27.8
Practice related to personal hygiene of child (after defecation)						
▪ Wash hands with water and soap	24	60.0	14	63.6	10	55.6
▪ Wash hands with water and mud	2	5.0	0	0	2	11.1
▪ Wash hands with water	3	7.5	2	9.1	1	5.6
▪ Clean child with water; bathe regularly	14	35.0	10	45.5	4	22.2

Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

There was improvement in the reported hygiene practices of AT-NHEC mothers compared to NAT-NHEC mothers. The improved hygiene practices related to child feeding were: clean child's hands with water and soap (32% AT-NHEC vs. 11% NAT-NHEC), do not feed stale food to the child (14% AT-NHEC vs. 6% NAT-NHEC). Improvement was also reported in practices related to hygiene of the child: wash mother's and child's hands with soap and water after defecation (64% AT-NHEC vs. 56% NAT-NHEC) and bathe child regularly (46% AT-NHEC vs. 22% NAT-NHEC).

DISCUSSION

Overall, in the present study the intervened group showed remarkable improvement in the perceptions and knowledge of mothers regarding: initiation of CF at 6 months, harmful effects of delayed feeding, importance of feeding fruits and vegetables to their children; active feeding (to feed the child at regular intervals, encourage the child to finish up the meal and make child eat with the family members) as compared to the control group mothers. Mothers in the intervened group were able to recall many of the IYCF messages taught to them during the NHEC meetings.

Prevalence of morbidity remained the same pre vs. post intervention (nearly 60%) in both IG and CG. Though prevalence of morbidity was high in children of both groups, a majority of the mothers believed that their children were healthy. As regards **attending AWC**, three fourth of the mothers from IG reported to send their children to AWCs as compared to only half in CG to avail GM and SF service. However, none of the mothers availed NHE service. *Hence, even after intervention NHE remained the most neglected service.* As regards improvement in **hygiene practices**, a significantly higher proportion of IG after the intervention reported to wash their child's hands with soap and water after the child defecates; before and after feeding and to feed freshly cooked and covered food to their children.

AT-NHEC vs. NAT-NHEC: Among IG mothers, the positive change in knowledge related to IYCF practices was better in AT-NHEC mothers than in the NAT-NHEC mothers. This improvement was observed just after attending two NHEC sessions. Thus, far more improvement can be expected on repeated NHEC meetings by trained AWWs. AT-NHEC mothers reported improved hygiene practices compared to NAT-NHEC mothers with regard to cleaning child's hands with water and soap, not feeding stale food to the child, washing mother's and child's hands with soap and water after defecation and bathing child regularly.

Spot observation data also revealed significant improvement in personal hygiene of AT-NHEC children compared to the NAT-NHEC children (no discharge from eyes: 91% vs. 61%, clean clothes: 50% vs. 22%). Higher proportion of AT-NHEC children had a clean face, hair, hands and nails compared to NAT-NHEC children.

Several studies appear in literature which have documented the significant and positive impact of well designed and well implemented NHEC intervention to improve IYCF practices and these are summarized in Table 4.2.20. It is clearly evident from various studies that enhancing the communication skills of government health functionaries and mobilizing community volunteers has the potential to be successful in significantly improving breastfeeding, complementary feeding, growth monitoring and health care practices in the intervened families. The major factors contributing to impact were delivery of specific and simple yet reason/benefit based messages which included benefits, regularity of contact with the mother through home visits or community based sessions, a family or community based approach rather than a narrow focus on severely malnourished, implementing a judicious mix of interventions including health services, effective training and monitoring support, selection of local, socially aware women as change agents and support from the Government health–nutrition functionaries.

Table 4.2.20 NHEC Interventions: Impact on Infant and Young Child Feeding Knowledge - Practices

Author and year	Place	Nature of intervention	Key findings
The Linkages project, 2002 & 2006	Madagascar	Trained community - based volunteers of Women's Groups were utilizated to: ▪ Disseminate messages related to breastfeeding - child nutrition with the use of IEC materials through home visits ▪ Conduct educational sessions at the community health center, participate in national or commune-sponsored health/nutrition events, and promote Essential Nutrition Actions (ENA) in their daily activities (n=4300 women representing 259 different groups in 2 provinces).	▪ Volunteers were successful in reinforcing nutrition messages locally. ▪ Positive behaviour changes were seen among mothers regarding infant feeding practices: reduction in the percentage of mothers giving their infants CF prior to 6 months, increased dietary diversity in terms of higher consumption of recommended foods like fish, fruits, vegetables and oils/fats ($p<0.01$). ▪ Feeding frequency remained low. ▪ Significantly more children (84% vs. 78%) washed their hands before eating.
Roy et al, 2005	Bangladesh	Bangladesh Integrated Nutrition Project (BINP) ▪ Objective was to reduce the extent of malnutrition (6-24 months moderately malnourished children) and change the behaviours of mothers related to child-feeding, care and health-seeking practices ▪ The study groups (n=94 each group) comprised of mothers receiving: Intensive Nutrition Education (INE) on food security, care practices and disease control twice a week for three months (INE group), same nutrition education to mothers and additional supplementary feeding to their children (INE+SF group) and nutrition education from the community nutrition promoters twice a month according to the standard routine service of BINP (comparison group).	▪ After three months of intervention and six months of observation, use of separate plate for feeding, frequency of feeding and cooking of additional complementary feeds improved significantly in the INE and INE+SF groups compared to the comparison group.
Penny et al 2005 and	Peru	▪ A cluster-randomized trial of an educational intervention in a poor peri urban area was carried	▪ There were positive changes in practices of mothers among intervention group as

Author and year	Place	Nature of intervention	Key findings
Robert et al, 2006		out to enhance the quality and coverage of existing nutrition education in six government health facilities compared to six control facilities ▪ A birth cohort of 187 infants from the catchment areas of intervention centers and 190 from control areas were enrolled and followed upto 18 months. ▪ The key messages of nutrition education were: feeding thick food preparation, including special foods and active feeding. ▪ Staff of six government health facilities was trained for enhanced quality and coverage of existing nutrition education and compared with six control facilities.	compared to control: feeding nutrient-dense thick foods at lunch at 6 months, recall of three important foods and encouraging child to eat in case of reduced appetite. ▪ Caregiver message recall was associated with improved feeding behaviour ($p< 0.001$).
Hotz and Gibson, 2005	Malawi, Africa	▪ Specific, locally adapted complementary feeding practices were promoted among mothers with children 6-23 months in 3 intervention and 1 control communities (increasing energy density of food, methods to increase bioavailability of iron and zinc, enrichment of CF with energy and nutrient dense foods and active feeding). ▪ Trained community Health Committee members and local Health Surveillance Assistants disseminated the nutrition messages through group sessions and follow up home visits.	▪ Nutrition education resulted in adoption of the feeding messages (10%-25%) by intervention mothers leading to improved CF practices and quality of CF (significantly more animal protein was consumed in intervention than control group).
Kilaru et al, 2005	Karnataka	▪ Monthly nutrition education in 11 randomly and 2 purposively selected villages was delivered by locally trained counselors targeted at Caregivers of infants aged 5-11months (n=69 intervention (I), 69 control (C)). ▪ The key counseling messages focused on: preparation and use of developmentally	▪ Significant differences were observed in the feeding of bananas, with intervention infants eating more (33%) compared to non-intervention infants (4%). ▪ Intervention infants were significantly more likely to be fed at least four times in a day in addition to breast milk (78% vs. 51%) and

Author and year	Place	Nature of intervention	Key findings
		appropriate local foods; appropriate feeding frequency; gradually increasing food diversity; breastfeeding, complementary feeding and avoidance of bottle feeding	received foods from at least five different food groups (42% vs. 19%) in comparison to non intervention infants.
Kapur et al, 2005	Delhi	▪ A community-based, randomized trial was carried out in an urban slum to compare the effect of nutrition education and/or weekly iron supplementation for 4 months on iron status of children (9-36 months) assigned to 4 groups (Group1: nutrition education, Group2: supplementation with 20mg elemental iron, Group3: nutrition education with supplementation, Group 4: placebo & control). ▪ The messages in nutritoin education pacakage were: EBF; timely introduction of CF; appropriate consistency, quality and quantity of CF, feeding family foods, hygiene regarding child feeding and Iron deficiency anemia – causes, symptoms and prevention (through diet).	▪ The nutrition education group and nutrition education cum supplementation group mothers showed significantly higher nurtrition knowledge scores $p < 0.001$). ▪ The specific beliefs that showed improvement ($p<0.001$) in nutrition education group related to: EBF for 4-6 months, feeding children 4-5 times a day, providing variety of foods in the child's diet, putting the child on to the family food by one year, reducing the milk intake and giving more solid food.
Nambiar et al, 2005	Vadodara	▪ Pilot investigation was conducted to evaluate compliance and impact of Dehydrated Drumstick Leaves (DDL) rich modified SF recipes. ▪ Comprehensive training sessions (demonstrations and discussions) were organized for ICDS staff (CDPO, supervisors, AWWs and helpers) and NGO (including the head cook and kitchen staff) involved in the food preparations. ▪ Incorporation of the DDL powder into the salty supplementary foods was taught along with its benefits on child health. ▪ Nutrition communication was given using posters	▪ There was significant impact of the nutrition communication both on the children as well as the mothers. ▪ Scores increased by 40% in a period of one-month indicating effective Nutrition Communication strategies can be implemented to bring dietary improvement for combating the Vitamin A Deficiency

Author and year	Place	Nature of intervention	Key findings
		to increase the knowledge about vitamin A and practice consumption of vitamin A rich foods. ▪ NHE sessions were arranged for the mothers as well as children (2-6 years old).	
AED, 2004	Dehradun	▪ To improve maternal and child nutrition, behavior change strategy (adopted by World Vision) focused on home visits and small group activities and community events. ▪ Community Development Officers (CDOs) were trained in interpersonal communication skills using pictorial counseling cards and they provided counseling during home visits.	▪ There was a significant increase in proportion of mothers who initiated breast feeding within 1 hour (from 1% to 22%); improvement in complementary feeding practices i.e. frequency of feeding and consistency of foods (42% to 77%)
Singh et al, 2004	Imphal	▪ Relationship between nutritional knowledge of the mother and nutritional status of children aged 1-5 years (N=545) was studied. ▪ Mothers were classified into three levels of knowledge-low knowledge, average knowledge and good knowledge. The majority of the mothers (85%) were classified as average, 8.1% as having high knowledge and 6.9% as having low knowledge.	▪ Normal nutritional status were significantly more among children of mothers who knew breast feeding as superior to any other feeds than those children whose mothers did not (57.7% vs. 25%) and also in ideal timing of weaning (74.6% vs. 33.6%). ▪ Knowledge on timing for initiation of breast feeding, prelacteal feeds, giving colostrums and nutrition during pregnancy and lactation was not related with nutritional status of a child.
Bhandari et al, 2004	Haryana	▪ Community based study cluster randomized controlled trial was carried out in 8 communities : 4 received the intervention (developed through formative research) and the other 4 did not receive any specific feeding intervention ▪ Health - nutrition workers in the intervention communities were trained to counsel on locally developed complementary feeding	▪ Higher proportion of caretakers in the intervention communities spontaneously recalled being counseled on optimal complementary feeding practices as compared to those in control. ▪ An increase in intake of certain complementary foods, active feeding and hygiene practices (P<0.0001) at 18 months

Author and year	Place	Nature of intervention	Key findings
		recommendations through monthly home visits, monthly meetings conducted by the ANMs for community representatives; who in turn held monthly neighborhood meetings and conducted group activities through women's groups. ▪ All newborns (552 in intervention and 473 in control groups) were followed every 3 months to the age of 18 months.	was observed.
Nandan, 2004	Agra	▪ 831 socially aware women (Bal Poshan Mitra 'BPM') from 152 villages backed by community support system in two rural community development blocks were trained (as part of a larger community mobilization program). ▪ The BPM's were followed up initially at monthly basis and then every 3 months for reviewing their activities and solving their problems. ▪ The BPM's concentrated their activities on 'at risk' families (pregnant and lactating women, children <2years and severely malnourished children <5years) and promoted specific behaviour changes at community level through counseling.	▪ Messages were easily accepted as they came from a member of a community. ▪ The BPM's were able to successfully improve maternal and child health and nutrition practices. ▪ Conclusion: sustainability of social change is more likely if individuals and communities which are most affected participate in the process, own the process of communication and be owners of their own change
Sharma and Misra, 2004	Vadodara	Study assessed the impact of counseling on infant feeding practices, nutritional status and morbidity profile of the infants from 12 randomly selected slums (EG=6 and CG=6). Group BF: 6-8 months pregnant mothers (n=59, EG=32 and CG=27) for assessing colostrum feeding and exclusive breastfeeding practices. Group CF: Mothers with 2-4 months old infants (n=55, EG=30 and CG=25) for assessing CF	BF: all mothers from both the groups reported non-feeding of colostrum. After intervention all mothers in the EG and 41% in the CG fed colostrum. CF: initiation of CF at 6 months in EG (post 100% vs. pre 27%) compared to CG (post 20% vs. pre 28%)

Author and year	Place	Nature of intervention	Key findings
		practices group.	
Sethi et.al, 2003	Delhi	▪ Nutrition education was given to mothers in slums (n=35 with infants 5-19 months) over two months to improve infant feeding practices.	▪ There was improved awareness about infant feeding among mothers; improvement in variety, quantity and consistency of the complementary foods fed. ▪ Conclusion: nutrition education programs of shorter duration using a 'communication mix' of channels, with repeated reinforcement, could bring about improvement not only in awareness but also in infant feeding practices.
Singh, 2003	Varanasi	▪ Simple Nutrition Education Packages (NEP) were designed, implemented and evaluated on a sample of 150 mothers to improve the existing knowledge and practices in respect to nutrition during pregnancy, lactation and infant feeding in four villages of an ICDS block. ▪ Pre and post evaluation status of the existing knowledge and practice was studied. ▪ The NEP consisted of lecture cum discussion method, TV film (slide story), pictorial booklet, cooking demonstration, community participation for some new recipes.	▪ Knowledge related to importance of increased quantity and type of diet during pregnancy improved by 60% post evaluation. ▪ All the mothers after intervention agreed on giving breast feeding after 4 hours of child birth.
Ghosh et al, 2002	South India	▪ It was a longitudinal community based study on infant growth and care practices ▪ Intervention included nutrition counseling by a trained worker once a month. ▪ Mothers counseled about the need for exclusive breast feeding for six months, choice of appropriate complementary foods, and feeding frequency.	▪ Counseling resulted in improved feeding practices (avoidance of bottle feeding and increased variety of foods).

Author and year	Place	Nature of intervention	Key findings
Sharma and Khandelwal, 2002	Vadodara	▪ Study assessed the impact of counseling on IYCF practices and nutritional status of the infants from 14 slums (experimental EG=7, control CG=7). N=44 mothers were assessed for colostrum feeding and exclusive breast feeding practices and N=42 mothers for complementary feeding practices ▪ Pregnant mothers were counseled on early initiation of breast feeding, not giving of prelacteal feeds, colostrum feeding and exclusive breast feeding for first six months of life. ▪ Mothers with 3 months of infant were counseled on the importance of timely, safe and adequate top milk and complementary feeding. ▪ First counseling session (20–30 minutes) followed by reinforcement sessions (10–15 minutes) continued for two months.	▪ Practice of feeding prelacteal reduced in EG (post 28% vs. pre 60%) whereas it deteriorated in CG (post 95% vs. pre 36%) ▪ Breast feeding was initiated same day after birth by majority of EG mothers (post 72% vs. pre 12%) compared to CG (post 12% vs. pre 24%) ▪ Introduction of topmilk at appropriate age: EG (post 56% at 6 months vs. pre 44% at 4 months) and CG (post 16% at 6 months vs. pre 21% at 4 months).
Mangala et.al, 2001	Karnataka	▪ Impact of educational intervention on knowledge of 223 mothers regarding home management of diarrhea was assessed. ▪ Stage I assessed the initial knowledge, attitude and practices of mothers. ▪ Stage II: one-to-one educational intervention supported by audiovisual aids and live demonstrations. ▪ Third stage: post intervention knowledge, attitude and practice assessment after 2 months and 2 years.	▪ There was a significant improvement after intervention in knowledge of mothers regarding definition of diarrhoea, signs of dehydration, and awareness of oral rehydration solution (ORS), shelf life of ORS solution, seeking health care and rational drug therapy during diarrhoea.
Guldan et al, 2000	China	▪ A year-long rural community-based pilot nutrition education intervention (n =250 infants each in	▪ A majority (64%) women stated visits. ▪ The Education group (E) mothers showed

Author and year	Place	Nature of intervention	Key findings
		Education and Control groups) was undertaken in four rural townships. ▪ Village nutrition educators were trained and mobilized to make monthly growth monitoring and complementary feeding counseling visits to all pregnant women, and families with infants born during the intervention in the study villages.	significantly higher nutrition knowledge and reported better infant feeding practices than their Control (C) group counterparts: giving fruits and eggs, rice porridge, fish / meat broth after 6 months. ▪ Significantly more E mothers than C mentioned these foods as those which would help the child to grow well. ▪ Mothers in the E group reported to feed their infants (7–9 months) significantly ($p<0.05$) more times than the mothers of the C group infants. ▪ Hygiene practices reportedly improved in E group.
The Baby Friendly Community Initiative, 1993	Gambia	Objective: To get 25% of mothers to practice exclusive breastfeeding for at least 4 months and to get 90% of mothers with normal delivery to initiate breastfeeding within an hour of delivery. The intervention included *'10 steps to successful infant feeding'*. These were maternal nutrition, weaning, environmental sanitation, and personal hygiene.	Breastfeeding was initiated within one hour of delivery by 87% of mothers after the intervention. Duration of exclusive breastfeeding increased. After intervention 99.5% of mothers fed only breastmilk till four months as compared to only 1.3% before the intervention. Colostrum was referred to as *the protective milk after intervention.* Environmental sanitation involved the whole community resulting in regular village clean-up.

2.2.2 *Impact on Food intake and nutritional status (Height and Weight) of children (6-35 months): Intervened Vs. Control villages*

Apart from assessing the impact of NHEC intervention on change in knowledge of the mothers related to IYCF and care practices, change in the food intake and change in nutritional status of children in both IG and CG prior and after the intervention were also assessed. Further, responses of AT-NHEC vs. NAT-NHEC mothers related to fruit and vegetable intake were also compared.

Fruit and Vegetable Intake (Interview responses)

Table 4.2.21 Changes in Intake of Fruits and Vegetables of Children as Reported by the Mothers (Intervened Vs. Control)

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N = 30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
Fruits given to the child								
▪ Yes	24	60.0	37***	92.5	25	83.3	24	80.0
▪ No	16	40.0	3	7.5	5	16.7	6	20.0
Reasons for giving fruits								
▪ Child gets nutrition; gains weight	0	0	13***	35.1	0	0	9***	37.5
▪ Improves blood; bones become healthy	0	0	6*	16.2	7	28.0	6	25.0
▪ Child demands so we give	0	0	6*	16.2	1	4.0	7	29.2
▪ Child learns to eat	2	8.3	0	0	8	32.0	0	0
▪ Don't know	18	75.0	8*	21.6	6	24.0	3	12.5
Which fruits given								
▪ Banana	17	70.8	28	75.7	13	52.0	7	29.2
▪ Apple	5	20.8	19*	57.4	18	72.0	16	66.7
▪ Zizyphus (*Bor*)	0	0	10	27.0	0	0	3	12.5
▪ Chickoo	5	20.8	6	16.2	1	4.0	5	20.8
Frequency of feeding fruits								
▪ Two three times a week	15	62.5	15	40.5	14	56.0	17	70.8
▪ Everyday	3	12.5	10	27.0	3	12.0	1	4.2
▪ Once a week	6	25.0	8	21.6	8	32.0	5	20.8
Vegetables given to the child								
▪ Yes	19	47.5	32**	80.0	12	40.0	22**	73.3
▪ No	21	52.5	8	20.0	18	60.0	8	26.7
Reasons for giving vegetables								
▪ We give when child demands	0	0	12**	37.5	0	0	10**	45.5
▪ Child becomes healthy	0	0	8*	25.0	2	16.7	7	31.8

Responses	Pre Intervention Intervened (N=40)		Post Intervention Intervened (N=40)		Pre Intervention Control (N = 30)		Post Intervention Control (N=30)	
	n	%	n	%	n	%	n	%
▪ Don't know	15	78.9	5***	15.6	3	25.0	1	4.5
Reasons for not giving vegetables								
▪ Vegetables are spicy	15	71.4	7	87.5	13	72.2	6	75.0
▪ Child does not eat vegetable	1	4.8	0	0	4	22.2	4	50.0
Which vegetables given								
▪ Potatos	17	89.5	23	71.9	9	75.0	15	68.2
▪ *Tuer*	10	52.6	13	40.6	2	16.7	19	86.4
▪ Cabbage	6	31.6	10	31.3	1	8.3	0	0
▪ Bringal	8	42.1	10	31.3	1	8.3	13	59.1
▪ Tomato	1	5.3	8	25.0	4	33.3	6	27.3
▪ *Parvar*	0	0	6	18.8	0	0	3	13.6
Frequency of feeding vegetables								
▪ Everyday	4	21.1	8	25.0	5	41.7	4	18.2
▪ 2 - 4 times week	15	78.9	23	71.9	7	58.3	17	77.3

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

A significant increase in the fruit intake of children ($p<0.001$) was reported by IG mothers with no change in CG. Significantly more mothers from the IG stated that *'child gets nutrition'*, *'gains weight'*, *'blood and bones become healthy'* on eating fruits. Commonly fed fruits were banana and apple in both the groups. Of those families who did not give fruits to their children in both IG and CG groups, reasoned that *"we don't purchase fruits; we cannot afford"*.

A significantly higher proportion of mothers in both IG and CG reported to feed vegetables to their children post intervention ($p<0.01$). Earlier, IG mothers were not aware of the importance of feeding vegetables to children. However, post intervention they reported that *'child becomes healthy'* and there is *'improvement in quality of blood'* on feeding vegetables. Of those mothers who did not feed vegetables, majority of them in both groups felt that child finds vegetables spicy. Among vegetables, potatoes were eaten by most children and GLVs were eaten by very few in both groups. In IG the frequency of feeding vegetables everyday increased post intervention whereas it decreased in CG.

Within the IG children, there was not much difference in the fruit and vegetable intake as reported by the mothers. However, more mothers from AT-NHEC group reported to give a variety of fruits and vegetables to their children compared to NAT-NHEC group.

Table 4.2.22 Changes in Intake of Fruits and Vegetables of Intervened Children (NHEC Attended vs. NHEC Not Attended)

Responses of the Mothers	Post Intervention IG (N=40)		Post Intervention IG (N=40)			
			NHEC meeting Attended (N=22)		NHEC meeting Not Attended (N=18)	
	n	%	n	%	n	%
Fruits given to the child						
▪ Yes	37	92.5	20	90.9	17	94.4
▪ No	3	7.5	2	9.1	1	5.6
Which fruits given						
▪ Banana	28	75.7	15	75.0	13	76.5
▪ Apple	19	57.4	10	50.0	9	52.9
▪ *Boor* (zizyphus)	10	27.0	8	40.0	2	11.8
▪ *Chickoo* (sapota)	6	16.2	3	15.0	3	17.6
▪ Pomegranate	4	10.4	3	15.0	1	5.9
Reasons for giving fruits						
▪ Child gets nutrition; gains weight	13	35.1	10*	50.0	3	17.6
▪ Fruits improve blood; bones become healthy	6	16.2	5	25.0	1	5.9
▪ Child takes less BM; fruits gives satiety	5	13.5	3	15.0	2	11.8
▪ Eats does not eat other foods	4	10.8	1	5.0	3	17.6
▪ Child demands	6	16.2	0	0	6	35.3
Frequency of feeding fruits						
▪ Once a week	8	21.6	4	20.0	4	23.5
▪ 2-3 times a week	15	40.5	8	40.0	7	41.2
▪ 3-4 times a week	4	10.8	2	10.0	2	11.8
▪ Everyday	10	27.0	6	30.0	4	23.5
Vegetables given to the child						
▪ Yes	32	80.0	18	81.8	14	77.8
▪ No	8	20.0	4	18.2	4	22.2
Which vegetables given						
▪ Potatos	23	71.9	14	77.8	9	64.3
▪ Redgram tender	13	40.6	9	50.0	4	28.6
▪ Bringal	10	31.3	7	38.9	3	21.4
▪ Cabbage	10	31.3	6	33.3	4	28.6
▪ Tomato	8	25.0	5	27.8	3	21.4
▪ Onions	5	15.6	3	16.7	2	14.3
▪ Parvar	6	18.8	2	11.1	4	28.6
▪ GLVs	2	6.3	2	11.1	0	0
Reasons for giving vegetables						
▪ Child becomes healthy	8	25.0	7*	38.9	1	7.1
▪ Blood quality improves	4	12.5	3	16.7	1	7.1
▪ Child demands	12	37.5	2	11.1	10	71.4
▪ Vegetables give satiety; does not trouble the mother	2	6.3	1	5.6	1	7.1
Frequency of feeding vegetables						
▪ Once a week	1	3.1	1	5.6	0	0
▪ 3-4 times week	23	71.9	13	72.2	10	71.4
▪ Everyday	8	25.0	4	22.2	4	28.6

* $p < 0.05$ Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

Further, significantly more AT-NHEC mothers believed that *'child gets nutrition', 'remains healthy' and 'gains weight'* on eating fruits and vegetables as compared to other group. Other reasons given by AT-NHEC mothers were: fruits and vegetables improve quality of blood and make bones healthy, where as, more mothers from NAT-NHEC group gave fruits and vegetables to their children only when they demanded.

Figure 4.2.3 Recommended Frequency and Quantity of CF fed to Children of Different Age Groups

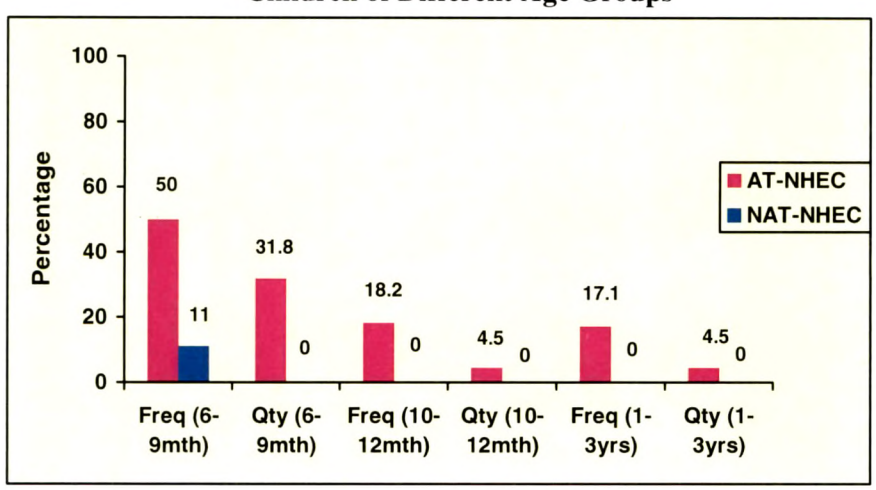


Figure 4.2.3 gives the responses of the mothers from both AT-NHEC and NAT-NHEC groups regarding frequency and quantity of complementary foods given to their children according to their age. During the NHEC sessions, messages regarding optimal quantity and frequency of CF to be fed to children in three age groups were taught to mothers of the intervened group. Messages given were: feed children 6-9 months, 3 times a day - 1 cup in each meal; feed children 10-12 months, 4 times day -$1^{1/2}$ cups in each meal; feed children 1-3 years, 5 times day - 2 cups in each meal.

Post intervention responses revealed that few AT-NHEC and none of NAT-NHEC mothers fed CF in the optimal quantity and frequency according to the child's age. Nearly half the AT-NHEC mothers having 6-9 months children reported to feed their child 1 cup of CF 2-3 times a day. However, very few mothers of older children reported to feed as recommended.

Change in Food and Nutrient Intake of Children (24-hour dietary recall)

The sample size in Intervened group was different in qualitative (interview responses presented above) and quantitative (24-hour recall) analysis. Data in IG was analyzable for 38 children and data of 2 children had to be discarded. The sample size did not change in CG (N=30).

Food Intake

There was a significant impact on the dietary intake of IG children due to the NHEC intervention (Table 4.2.23).

Table 4.2.23 Food intake of children as % RDA in Pre and Post intervention (Intervened Vs. Control Group)

Food Group	IG (N=38)			CG (n=30)		
	PRE	POST	t value	PRE	POST	t value
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE	
Cereals	34.57 ±4.60	63.60 ±4.79	6.17***	39.01 ±6.70	47.99 ±5.00	1.25
Pulses	32.73 ±6.87	81.25 ±8.42	5.06***	40.33 ±10.01	71.71 ±14.74	2.03
Milk	20.23 ±4.91	40.24 ±7.55	2.22*	30.31 ±4.51	42.67 ±8.49	1.44
Roots & Tubers	3.97 ±2.16	12.51 ±3.57	2.65*	6.27 ±2.66	7.29 ±3.86	0.20
Vegetables	15.39 ±5.92	28.39 ±8.54	1.26	7.53 ±2.72	9.33 ±3.01	0.60
Fruits	10.97 ±3.61	36.26 ±10.07	2.30*	15.83 ±6.16	8.40 ±4.06	1.00
Sugar	11.87 ±2.91	34.37 ±2.90	5.18***	14.41 ±2.88	22.61 ±3.61	1.94
Oil	10.11 ±1.98	36.13 ±4.25	6.32***	14.28 ±3.75	20.26 ±3.84	1.52

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In IG, there was a significant rise in the intake of energy giving foods like cereals, pulses, sugar and oil in both boys and girls, meeting >50% of the RDA for cereals and >75% of the RDA for pulses and >30% for sugar and oil. The intake of roots and tubers remained negligible in both sexes both prior and after the intervention. However, intake of protective foods i.e. vegetables improved but yet they could only meet 25%-30% of the RDAs. The intake of fruits significantly increased in boys with negligible rise in girls.

In CG, the intake of none of the foods showed a significant increase in both boys and girls after the intervention (with only girls meeting >80%RDA of pulses). The intake of roots-tubers, vegetables and fruits remained negligible in both sexes both prior and after the intervention meeting hardly 10% of the RDAs.

Figures 4.2.4 (a) to 4.2.4 (d) below give the gender wise comparison of the mean percent RDAs of foods met by IG and CG children before and after the intervention.

Figure 4.2.4 (a) Gender wise Comparison of the Mean % RDAs of Cereals and Pulses met by IG and CG Children Before and After the Intervention

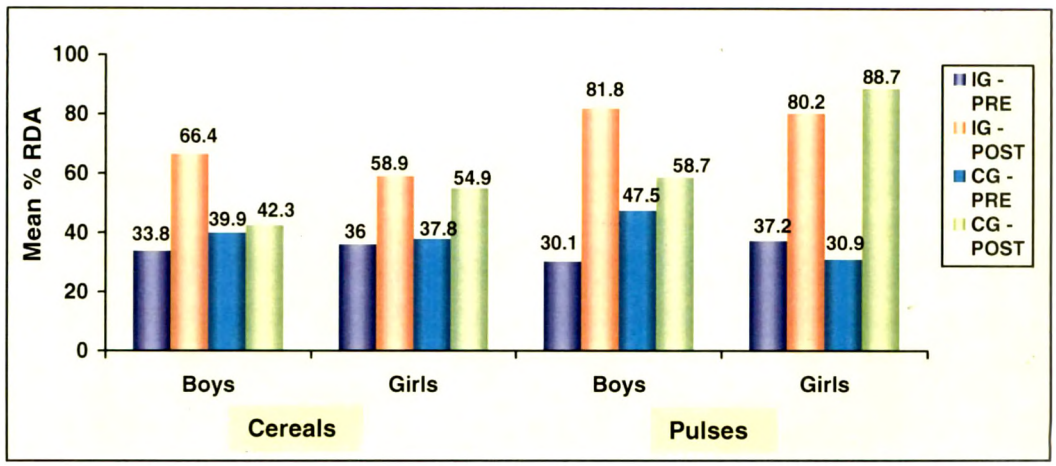


Figure 4.2.4 (b) Gender wise Comparison of the Mean % RDAs of Oil and Sugar met by IG and CG Children Before and After the Intervention

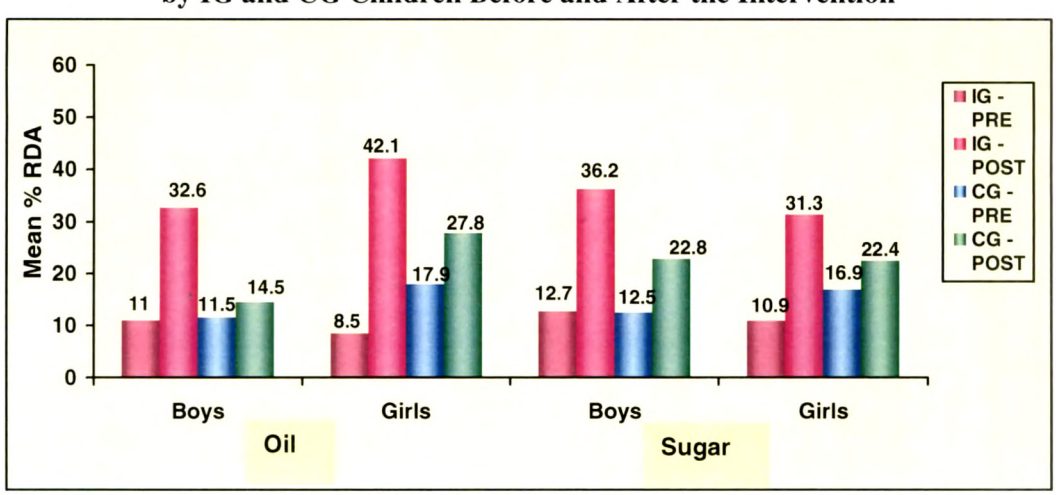


Figure 4.2.4 (c) Gender wise Comparison of the Mean % RDAs of Fruits and Vegetables met by IG and CG Children Before and After the Intervention

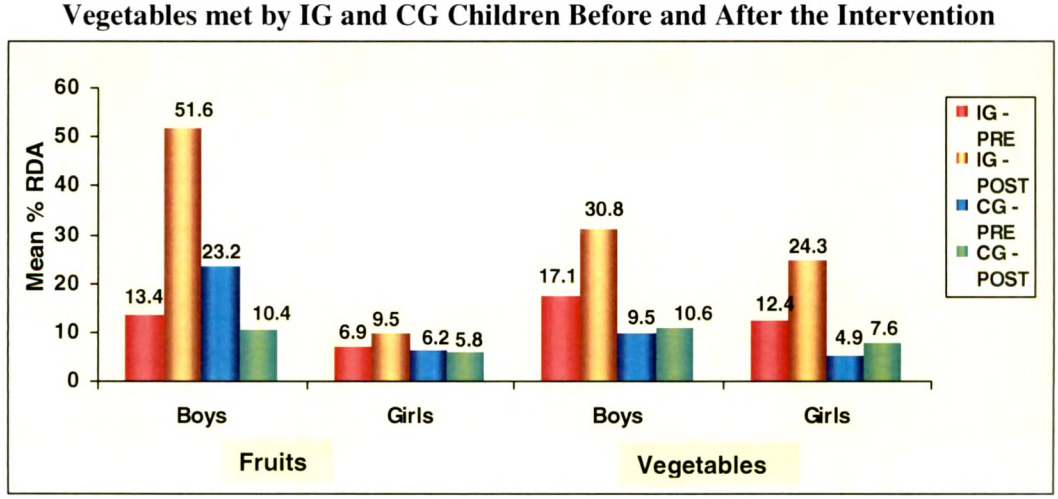
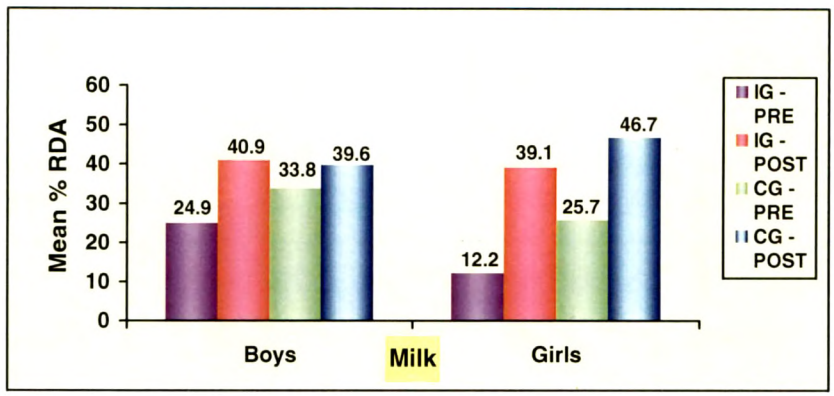


Figure 4.2.4 (d) Gender wise Comparison of the Mean % RDAs of Milk met by IG and CG Children Before and After the Intervention



In IG, pre to post increase between boys and girls was more or less similar and the gender differences were not significant ($p>0.05$). An exception was oil intake, where the intake was 5 times higher in IG girls vs. boys. In case of protective foods, there was a marked increase in fruit intake of boys which was not in girls, whereas with regard to intake of vegetables and milk, increase was similar in both boys and girls.

As regards the CG, there was an increase in intake of these foods from pre to post intervention which could be because of passage of time, but the increment was not as marked as in IG. The magnitude of increase was similar in both boys and girls ($p>0.05$).

Figures 4.2.5 (a, b, c, d) compare the younger (6-23 months) and older children (24-35 months) with regard to impact on intake of various food groups as mean percent of the recommended values (RDA). Figures reveal that:

- there was a 2-3 fold increase in intake of energy giving as well as protective foods in both the age groups in IG.
- the older children showed a marked increase in intake of cereals, pulses, sugar, oil and vegetables than the younger ones in IG, whereas the younger children showed a higher intake of fruits and milk.
- the intake of vegetables remained negligible in 6-23 months children in IG.
- in CG, either there was a marginal increase in intake (cereals, sugar, oil and milk) or showed deterioration (fruits and vegetables) in children of both age groups. There was an exception in pulse intake of older children where they could meet >100% of the RDA.

Figure 4.2.5 (a) Agewise Comparison of the Mean % RDAs of Cereals and Pulses met by IG and CG Children Before and After the Intervention

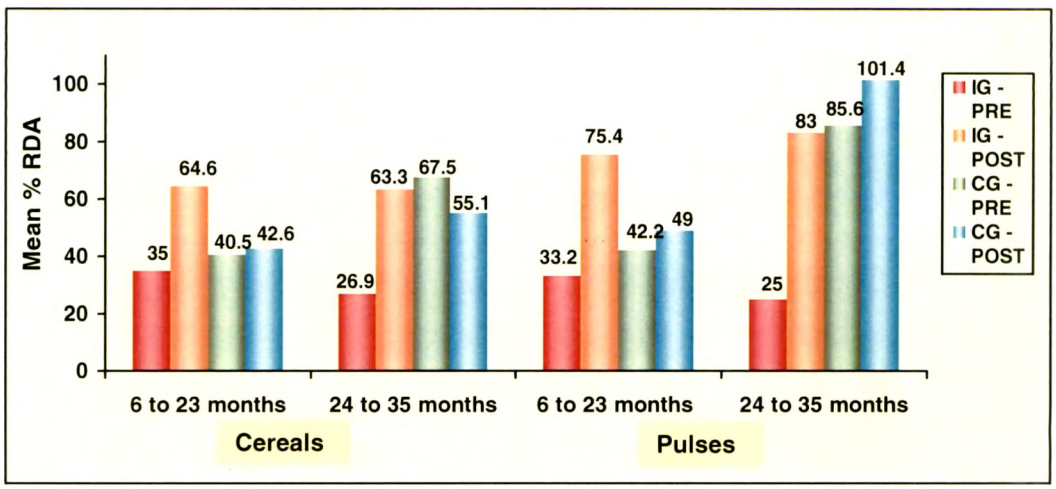


Figure 4.2.5 (b) Agewise Comparison of the Mean % RDAs of Sugar and Oil met by IG and CG Children Before and After the Intervention

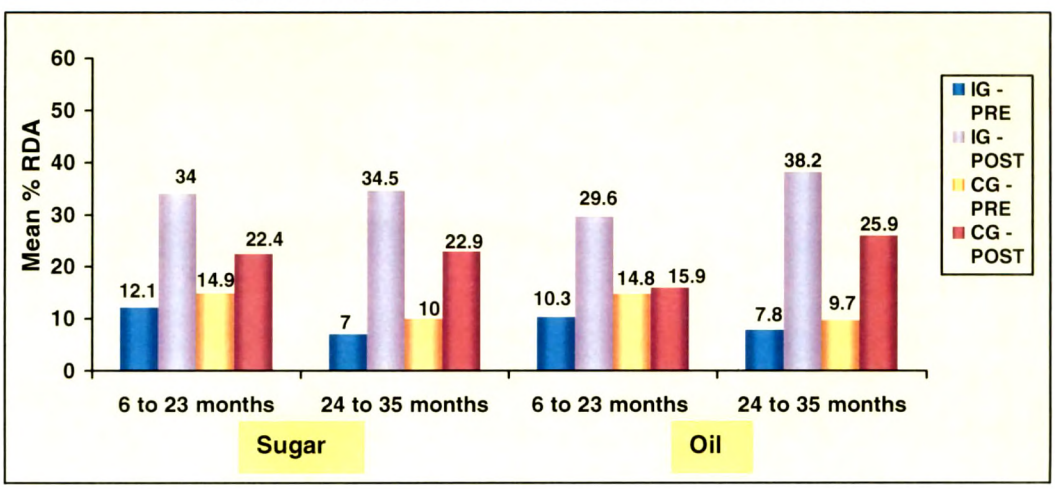


Figure 4.2.5 (c) Agewise Comparison of the Mean % RDAs of Fruits and Vegetables met by IG and CG Children Before and After the Intervention

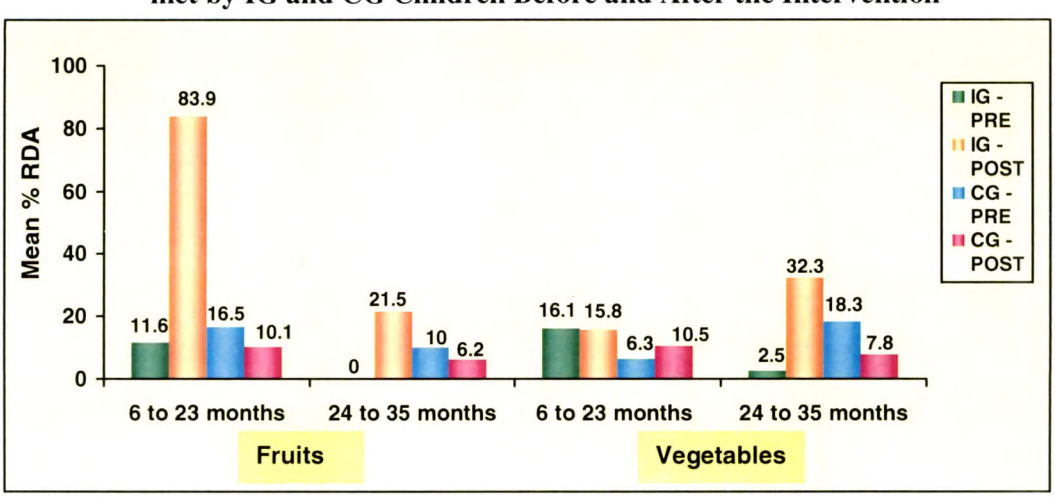
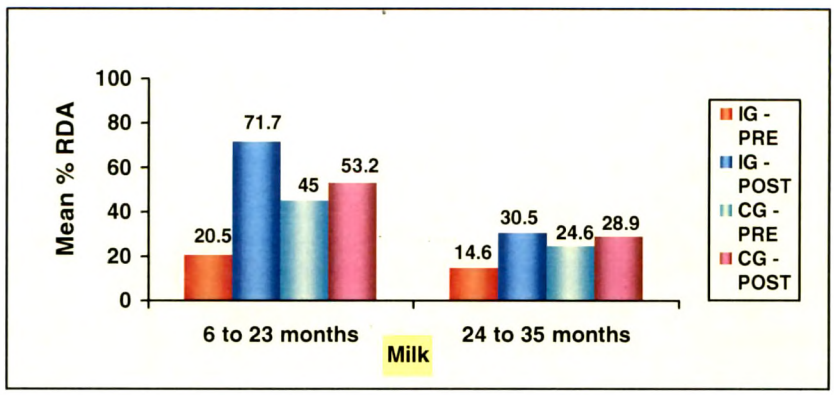


Figure 4.2.5 (d) Agewise Comparison of the Mean % RDAs of Milk met by IG and CG Children Before and After the Intervention



Nutrient Intake

Table 4.2.24 compares the nutrient RDAs met by children in IG and CG before and after the NHEC intervention. There was a significant rise in the nutrient intake of IG children and the RDAs met were higher than the CG children. However, for most of the nutrients, the intake remained around 40%-60% of RDA except for proteins (101%) and remained dismally low for vitamin A (12%). Though according to the mothers, the frequency of fruit and vegetable intake had increased in the IG compared to CG, the quantity was minimal not contributing to their optimal requirements (as seen earlier). The scenario was worse in CG with only a marginal rise in most of the nutrients and a decline in energy intake.

Table 4.2.24 Nutrient intake of children as % RDA in Pre and Post intervention (Intervened Vs. Control Group)

Nutrient	IG (N=38)			CG (N=30)		
	PRE	POST		PRE	POST	
	Mean ± SE	Mean ± SE	t value	Mean ± SE	Mean ± SE	t value
Energy	50.78 ± 6.68	68.14 ± 9.57	1.38	65.92 ± 7.35	57.77 ± 5.57	1.07
Protein	68.00 ± 10.19	101.24 ± 13.03	1.87	80.97 ± 8.55	90.43 ± 8.22	0.98
Calcium	21.57 ± 4.41	50.75 ± 6.77	3.71***	35.54 ± 5.23	38.09 ± 5.00	0.46
Iron	31.34 ± 4.61	47.01 ± 6.96	1.71	37.36 ± 4.30	46.08 ± 4.85	1.48
Vitamin A	6.46 ± 1.33	12.17 ± 1.90	2.46*	9.10 ± 1.41	9.80 ± 1.39	0.55
Vitamin C	21.48 ± 9.28	43.74 ± 12.04	1.47	12.48 ± 3.08	15.45 ± 5.33	0.47

* $p < 0.05$, *** $p < 0.001$

Tables 4.2.25 and 4.2.26 compares the nutrient intake as % RDA of boys and girls, prior and

after the intervention in IG and CG.

Table 4.2.25 Nutrient intake as % RDA of Boys Pre and Post intervention data of IG and CG

Nutrient	IG - BOYS			CG - BOYS		
	PRE	POST	t value	PRE	POST	t value
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE	
Energy	51.23 ±8.21	75.14 ±14.13	1.32	66.58 ± 11.16	54.14 ± 7.69	1.05
Protein	68.32 ±12.12	109.03 ± 19.47	1.63	83.00 ± 12.01	82.56 ± 9.86	0.03
Calcium	25.56 ± 6.32	51.30 ± 9.37	2.34*	42.28 ± 7.76	36.70 ± 6.13	0.69
Iron	32.89 ± 6.36	52.26 ± 10.66	1.39	35.39 ± 6.75	41.19 ± 5.99	0.70
Vitamin A	8.00 ± 1.89	12.26 ± 2.65	1.28	10.62 ± 2.12	10.22 ± 1.98	0.20
Vitamin C	21.35 ± 9.89	48.49 ± 14.45	1.52	11.72 ± 3.83	15.76 ± 7.83	0.44

* $p < 0.05$

Table 4.2.26 Nutrient intake as % RDA of Girls Pre and Post intervention data of IG and CG

Nutrient	IG - GIRLS			CG - GIRLS		
	PRE	POST	t value	PRE	POST	t value
	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE	
Energy	50.02 ± 11.86	56.13 ± 9.3	0.42	65.05 ± 9.13	62.52 ±8.14	0.30
Protein	67.41 ± 18.92	87.89 ± 11.95	0.91	78.32 ± 12.43	100.73 ±13.78	2.36*
Calcium	14.72 ± 4.88	49.80 ± 9.42	3.4**	26.72 ± 5.95	39.92 ±8.55	2.00
Iron	28.69 ± 6.39	38.02 ± 4.58	1.25	39.95 ± 4.76	52.48 ±7.91	1.49
Vitamin A	3.82 ± 1.41	12.02 ± 2.55	3.02**	7.10 ± 1.62	9.25 ± 1.97	1.43
Vitamin C	21.72 ± 19.2	35.60 ± 21.87	0.50	13.48 ± 5.20	15.06 ± 7.16	0.18

* $p < 0.05$, ** $p < 0.01$

In case of IG boys, the mean percent RDA of all nutrients nearly doubled with a significant rise in Calcium intake ($p<0.05$); whereas in CG, all nutrients showed a decline except iron and vitamin C.

In case of girls, both IG and CG girls showed a rise in all nutrients with a significant improvement in Calcium ($p<0.01$) and vitamin A ($p<0.05$) intake in IG and protein intake ($p<0.05$) in CG (Table 4.2.26). Comparing the RDAs of boys vs. girls in IG, boys met higher percent RDAs than girls for all nutrients and conversely CG girls met higher RDAs and their counter parts.

Figure 4.2.6(a) Age wise comparison of Energy and Protein RDAs in IG and CG before and after the NHEC intervention

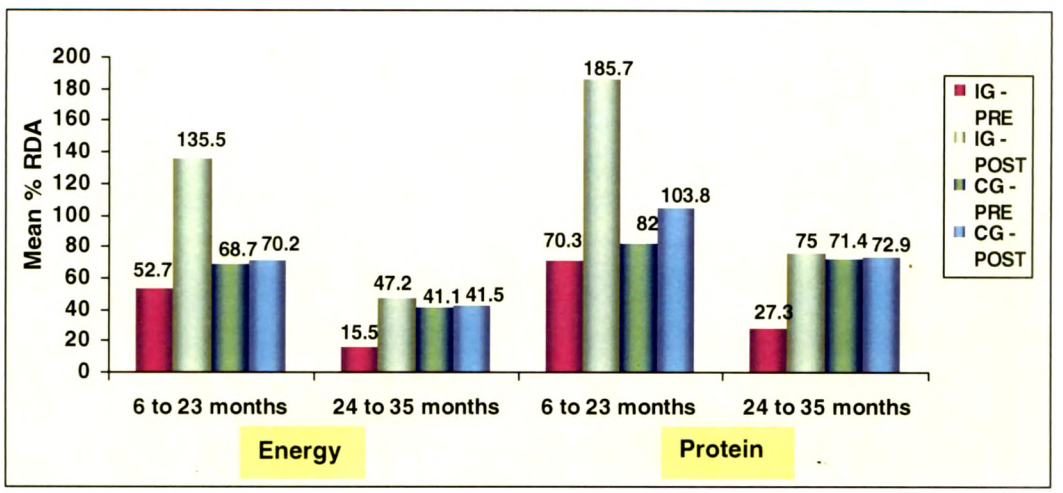


Figure 4.2.6(b) Age wise comparison of Calcium and Iron RDAs in IG and CG before and after the NHEC intervention

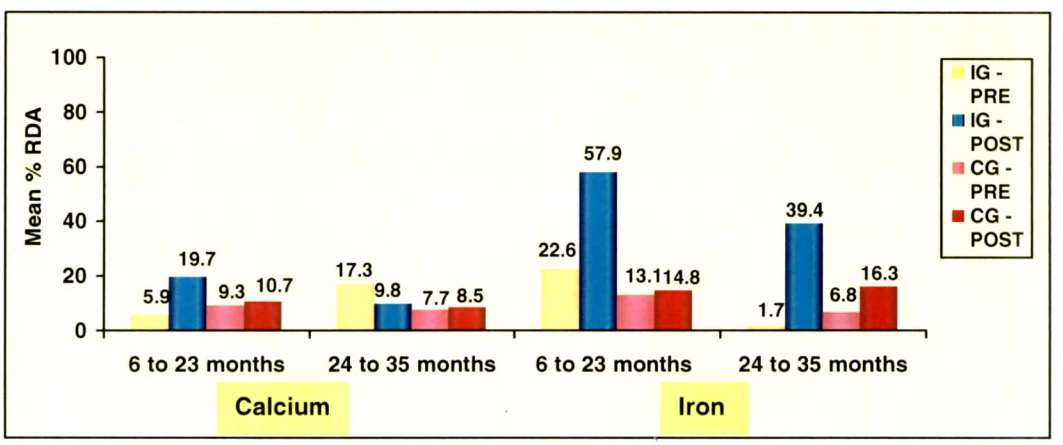
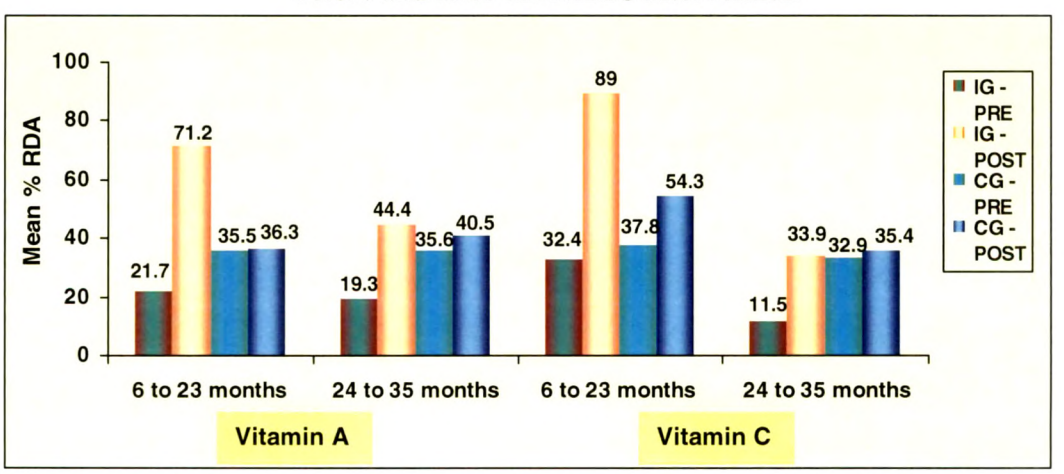


Figure 4.2.6(c) Age wise comparison of Vitamin A and Vitamin C RDAs in IG and CG before and after the NHEC intervention



The mean % RDA of all nutrients of IG children in 6-23 months and 24-35 months age group increased to more than double after the intervention. However, in case of CG children in both the age groups the mean % RDA of all nutrients almost remained the same after the intervention. There was no major increment in any nutrient with a decline noted in energy RDA after the intervention period. CG children could meet <50% of the RDAs for calcium and iron and only 1/8th (10-15%) of Vitamin A and Vitamin C requirements.

Further, it can also be noted that both in pre and post intervention, the % RDAs of all nutrients met by children in 6-23 months age group were higher than in the older age group. This clearly reveals that with the increase in age, the food and nutrient intake did not increase substantially. If the nutrient requirements are not met during this period of growth, it leads to undernutrition.

Impact of the NHEC Intervention on Nutritional Status of Children with Regard to Underweight, Stunting and Wasting

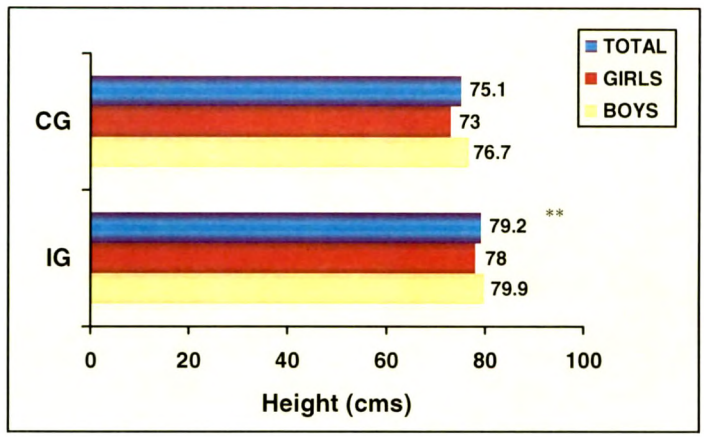
Mean change in weight and height before and after the intervention was analyzed using EPI-info 6.04d computer package and the anthropometric indicators i.e. underweight (weight-for-age <-2 z scores), stunting (height-for-age <-2 z scores) and wasting (weight-for-height <-2 z scores) were analyzed using WHO Anthro 2007 package. The results were compared with the recent WHO standards.

Mean Height and Weight

Height: As Figure 4.2.7 shows, overall, the mean height after the intervention in NHEC intervened IG was significantly higher than non intervened CG ($p<0.01$). In IG, mean height was 79.2 cm (range 68.0 cm - 91.5 cm); whereas in CG the mean height was 75.1 cm (range 61.0 cm - 88.0 cm). However, within the group the differences between boys and girls were not significant.

Table 4.2.27 compares the mean increment in height per month between IG and CG children. The mean increment in height in IG was higher than CG (IG: 0.79 cm & CG: 0.68 cm), however the difference was not significant. Further, within the IG, the increment in girls was higher than in boys whereas, in CG boys showed higher increment than their counterparts. On comparing increment in height within boys and girls of both groups, the rise was similar among boys of both IG and CG, whereas the increment was significantly higher ($p<0.05$) in girls of IG compared to CG (IG: 0.83 cm & CG: 0.57cm).

Figure 4.2.7 Mean Height of Children after NHEC Intervention



** $p < 0.01$

Table 4.2.27 Mean Increment (per month) in Weight and Height in IG vs. CG Children

Subjects	IG (Post - Pre) (N=40)		CG (Post - Pre) (N=30)	
	Mean Increment Weight (kg) A	Mean Increment Height (cm) C	Mean Increment Weight (kg) B	Mean Increment Height (cm) D
Total	0.15±0.05	0.79±0.22	0.12±0.17	0.68±0.42
Boys	0.13±0.04	0.77±0.16	0.12±0.18	0.77±0.46
Girls	0.17±0.07*	0.83±0.28	0.12±0.15	0.57±0.34*

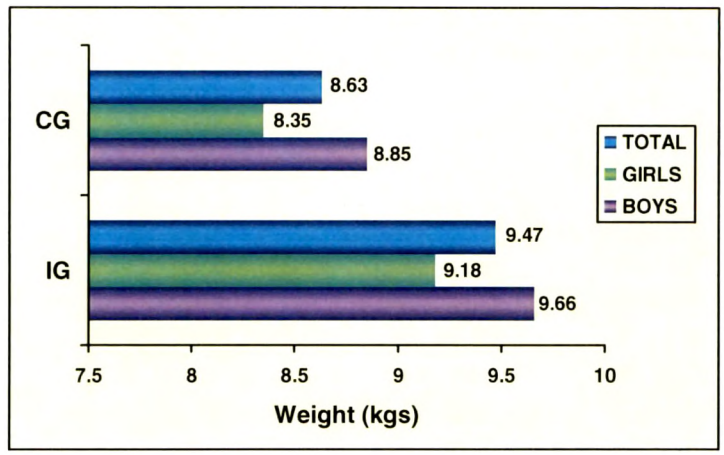
Total - A vs. B: NS and C vs. D: NS
Boys - A vs. B: NS and C vs. D: NS
Girls - A vs. B: NS and C vs. D: t value = 2.24; p=0.03
IG – Boys vs. Girls: Mean Increment Wt – t value=2.16; p=0.04
Mean Increment Ht – NS
CG – Boys vs. Girls: Mean Increment Wt – NS
Mean Increment Ht – NS

Weight: As regards weight, the figure 4.2.8 reveals that the overall mean weight after intervention in NHEC received IG was significantly higher than not intervened CG ($p<0.01$). In IG, mean weight was 9.47 kg (range 7.0 kg - 11.0 kg); whereas in CG the mean weight was 8.63 kg (range 5.8 kg to 12.0 kg). However, within the group the differences between boys and girls were not significant.

Table.4.2.27 reports that the mean increment in weight in IG was higher than CG (IG: 0.15 kg & CG: 0.12 kg), however the difference was not significant. Further, within IG the increment in girls was significantly higher than in boys ($p<0.05$), whereas in CG the increment was similar in both boys and girls. On comparing increment in weight within boys and girls of both groups, the rise was similar among boys of both IG and CG, whereas the

increment was higher in girls of IG compared to CG (IG: 0.17 kg & CG: 0.12 kg).

Figure 4.2.8 Mean Weight of Children after NHEC Intervention



Change in Nutritional Status of Children: Underweight, Stunting and Wasting

Underweight: The prevalence of underweight is reported as low WAZ<-2z score and severely underweight as WAZ<-3z score. The prevalence of underweight in both IG and CG before the NHEC intervention was high (IG: 55% & CG: 60%) and it remained the same even after the intervention period. Strangely, more children in both groups suffered from severe underweight after the intervention period, the reasons for this are not clear.

Stunting: After the intervention the prevalence of chronic undernutrition (stunting) indicated by low HAZ (<-2z score) increased in CG with no change in IG children. Further, the proportion of severely stunted (<-3z score) IG children decreased (60% to 54%), whereas the proportion increased in CG (39% to 48%).

Wasting: The prevalence of wasting (low WHZ<-2z score) increased in both IG and CG after the intervention. However, after NHEC intervention proportion of severe wasting decreased in IG and further increased in CG children.

Table 4.2.28 Change in Nutritional Status of Boys and Girls in IG vs. CG

	IG (N=40)				CG (N=30)			
	PRE		POST		PRE		POST	
	n	%	n	%	n	%	n	%
WAZ <-2 z score								
Boys	13(24)	54.2	15(24)	62.5	11(17)	64.7	10(17)	58.8
Girls	9(16)	56.3	9(16)	56.3	7(13)	53.8	8(13)	61.5
Total	22(40)	55.0	24(40)	60.0	18(30)	60.0	18(30)	60.0
WAZ <-3 z score								
Boys	3(24)	12.5	5(24)	20.8	2(17)	11.7	3(17)	17.6
Girls	3(16)	18.8	4(16)	25.0	6(13)	46.1	6(13)	46.1

	IG (N=40)				CG (N=30)			
	PRE		POST		PRE		POST	
	n	%	n	%	n	%	n	%
Total	6(40)	15.0	9(40)	22.5	8(30)	26.6	9(30)	30.0
HAZ <-2 z score								
Boys	18(24)	75.0	19(24)	79.2	11(17)	64.7	13(17)	76.5
Girls	13(16)	81.3	11(15)	73.3	7(11)	63.6	9(12)	75.0
Total	31(40)	77.5	30(39)	76.9	18(28)	64.3	22(29)	75.8
HAZ <-3 z score								
Boys	14(24)	58.5	14(24)	58.3	7(17)	41.2	8(17)	47.1
Girls	10(16)	62.5	7(15)	46.6	4(11)	36.4	6(12)	50.0
Total	24(40)	60.0	21(39)	53.8	11(28)	39.3	14(29)	48.3
WHZ <-2 z score								
Boys	1(24)	4.2	4(24)	16.6	2(17)	11.7	5(17)	29.4
Girls	2(16)	12.5	2(16)	12.5	1(13)	7.7	2(13)	15.4
Total	3(40)	7.5	6(40)	15.0	3(30)	10.0	7(30)	23.3
WHZ <-3 z score								
Boys	0(24)	0	0(24)	0	1(17)	5.8	1(17)	5.9
Girls	1(16)	6.3	0(16)	0	0(13)	0	1(13)	7.7
Total	1(40)	2.5	0(40)	0	1(30)	3.3	2(30)	6.7

Note: All pre and post intervention values in both IG vs. CG and between sexes within each group are non significant.

This indicated that with NHEC intervention though there was very little or no improvement in IG children, their nutritional status did not further deteriorate. Whereas, in case of CG proportion of underweight, stunted and wasted children increased after the intervention period. Further, IG seemed to benefit more in terms of height gain rather than weight gain.

Figure 4.2.9 indicates that level of underweight was similar in IG boys and girls before intervention; however, after intervention the level of underweight increased in boys with no change in girls. Prevalence of severe underweight increased after intervention in both sexes with girls showing higher levels than their counterparts (girls: 25% vs. boys: 21%).

Figure 4.2.9 Prevalence of Underweight (W-A z score) in Boys & Girls: Impact of NHEC Intervention on IG

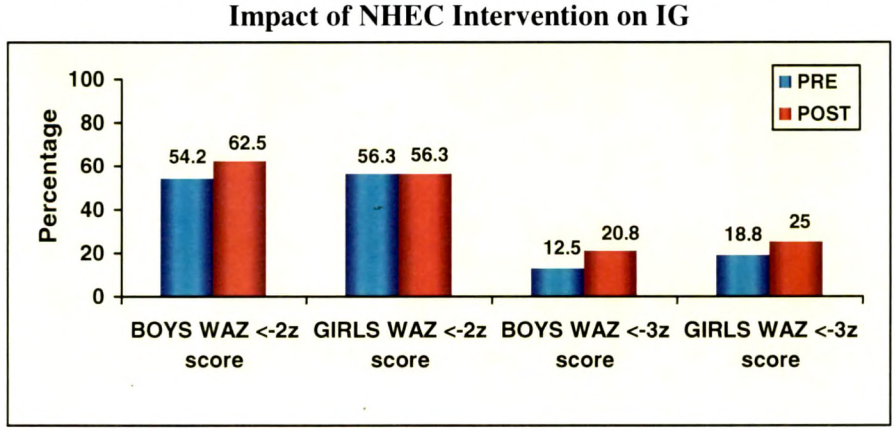


Figure 4.2.10 Prevalence of Stunting (H-A z score) in Boys & Girls: Impact of NHEC Intervention on IG

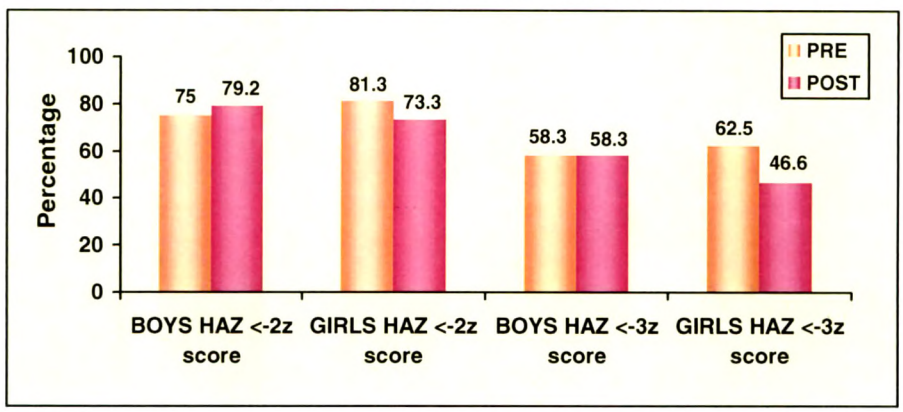


Figure 4.2.10 indicates that prevalence of stunting before intervention was very high (>75%) in both boys and girls. However, after intervention it further increased in boys and decreased in girls but the difference was not significant. Nearly 60% of both boys and girls were severely stunted before intervention; however, after intervention the prevalence decreased slightly in girls with no change in boys.

Figure 4.2.11 reveals that in CG, percentage of underweight boys and girls remained similar before and after intervention. However, there was a vast gender difference in the prevalence of severely underweight children (WAZ<-3z score). Nearly half (46%) of the girls were severely underweight compared to only 20% boys and the difference prevailed even after the intervention.

Figure 4.2.11 Prevalence of Underweight (W-A z score) in Boys & Girls: Impact of NHEC Intervention on CG

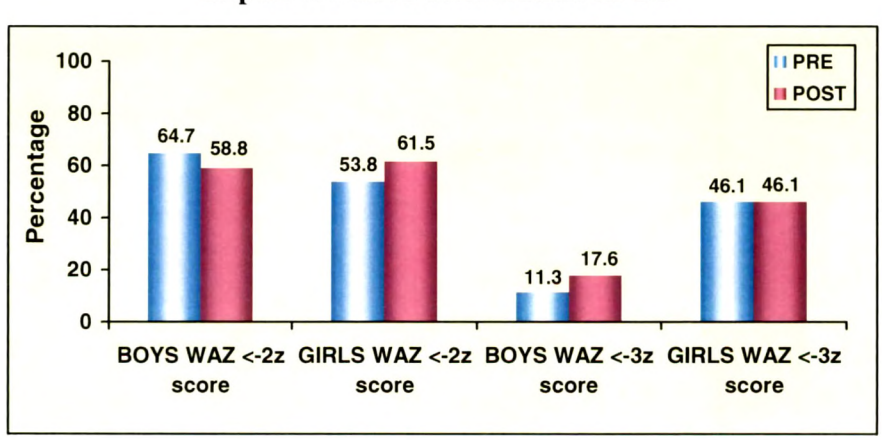


Figure 4.2.12 Prevalence of Stunting (H-A z score) in Boys & Girls: Impact of NHEC Intervention on CG

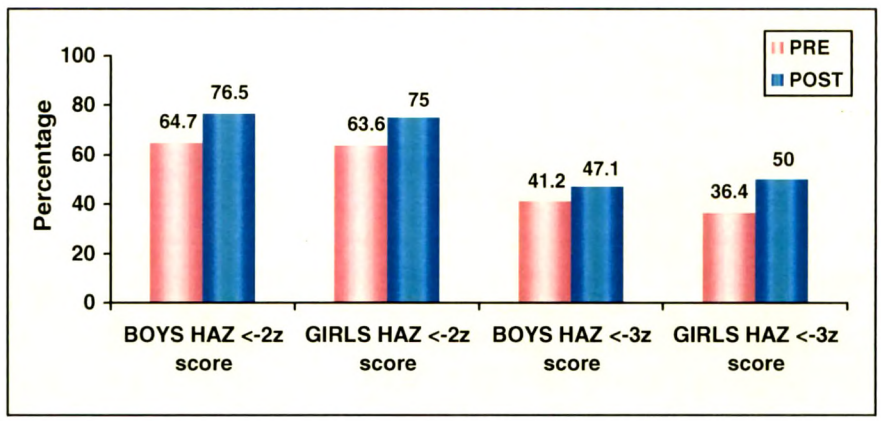


Figure 4.2.12 reveals that the prevalence of stunting increased to >75% in both boys and girls after the intervention. Moreover, even percentage of severe stunting increased in both sexes (around 50%) after intervention.

DISCUSSION

Overall the **food and nutrient intake** of the children in IG (expressed as mean %RDA) improved post intervention as compared to no significant change in the CG children. Comparing the RDAs of boys vs. girls in IG, boys met higher percent RDAs than girls for all nutrients and conversely CG girls met higher RDAs and their counter parts. In IG children in 6-23 and 24-35 months age group mean % RDAs increased to more than double with no change in the CG group after the intervention. The % RDAs of all nutrients met by children in 6-23 months age group were higher than in the older age group denoting that with the increase in age, the food and nutrient intake did not increase substantially.

Why did the prevalence of malnutrition increase despite the intervention?

Considering the fact that there was a positive change in both knowledge and behaviour among the mothers in intervened villages as regards infant feeding, one needs to reflect why nutritional status did not improve in the children. The various possibilities are discussed in the next section.

In this study, although the mean gains (increment per month) in terms of weight and height in IG children was significantly higher than the CG children, the nutritional status as measured by Z scores, did not show any improvement post intervention. Infact there was an insignificant increase in malnutrition as judged by weight-for-age, height-for-age and

weight-for-height in both the groups. However, an encouraging observation was that the prevalence of severe stunting and wasting decreased from pre to post intervention in IG while there was an increase in CG children.

Many international and national community based intervention studies as highlighted in Table 4.2.29 have shown impact on stunting and / or underweight reduction.
For instance, Kilaru et al and Roy et al (2005) documented the impact of nutrition education given to mothers on body weight gain and reduction in underweight prevalence. Interventions often protect young children from deterioration in nutritional status. Thus while they may not improve they do not worsen like the controls do. Brown et al (1992) reported steady WAZ values in experimental group while a drop was seen in control group frequency.

Few other authors have reported relatively more impact on stunting than underweight reduction. One explanation given for effect on length gain was that **hygiene promotion** was a part of the intervention and improving hygiene and sanitation has been reported to improve linear growth (Esrey et al 1992). This points out to the importance of morbidity control for improving nutritional status through hygiene behaviours and better treatment seeking for illness. According to Bhandari et al (2004) in the Haryana study, the improvement in physical growth was less than that expected considering the substantial increases in energy intakes. The possible factor stated for limited effect of the intervention on physical growth was low consumption of foods of animal origin. In the present study also, a similar trend was observed with significant improvement in nutrient intake but lack of positive impact on growth of children. Children in the present study were also consuming a predominantly cereal based diet with less than recommended amount of milk intake and limited animal protein.

One factor influencing impact is the duration and intensity of nutrition education. In the Bangladesh study it was concluded that **intensive nutrition education** significantly improved the status of moderately malnourished children with or without supplementary feeding (Roy et al 2005). In the Peru study a birth cohort was followed for a long period of 18 months (Penny et al 2005).

Morbidity could be a major factor which dilutes positive impact of nutrition education interventions. This observation is supported by the fact that in a Brazilian study (explained earlier) where the nutrition intervention focused on treatment seeking at health facilities, children 1 year of age or more had significantly improved weight gain and a positive but non significant improvement in length was seen as compared to control (Santos et al 2001).

In the present study prevalence of morbidity continued to be high in the intervened group. The reason for this could be perhaps lack of environmental hygiene and personal hygiene. In addition, considering the increase in food intake of the children in intervened group, food safety issues need to be addressed and examined further.

Thus, viewed together, the available studies suggest that the impact of educational interventions on weight and height gains may vary depending on several factors such as the baseline characteristics of the participants, nature, duration and intensity of nutrition education and the environment (in particular hygiene).

Table 4.2.29 NHEC Interventions: Impact on Nutritional status and Food Intake

Author and year	Place	Nature of intervention	Key findings
The Linkages project, 2002 & 2006	Madagascar	Trained community-based volunteers-members of Women's Groups were trained to: ▪ Disseminate messages related to breastfeeding - child nutrition with the use of IEC materials through home visits ▪ Conduct educational sessions at the community health center, participate in national or commune-sponsored health / nutrition events, and promote Essential Nutrition Actions (ENA) in their daily activities (n=4300 women representing 259 different groups in 2 provinces).	▪ Community based women volunteers were successful in reinforcing nutrition messages locally. ▪ Positive behaviour changes among mothers were seen regarding infant feeding practices: increased dietary diversity in terms of higher consumption of recommended foods like fish/shellfish, fruits/vegetables and oils/fats ($p<0.01$).
Roy et al, 2005	Bangladesh	Bangladesh Integrated Nutrition Project (BINP) ▪ Intervention was for reducing the extent of malnutrition (6-24 months moderately malnourished children) and change behaviour of mothers related to child-feeding and care practices and health-seeking practices ▪ The study groups (n=94 each group) comprised of mothers receiving intensive nutrition education (INE) on food security, care practices and disease control twice a	▪ After three months of intervention and six months of observation, mothers of INE and INE+SF groups compared to the comparison group started feeding oil and eggs, which were earlier considered gas producing and indigestible ▪ Underweight: Weight-for-Age median (>75% of median of NCHS standard) improved in INE and INE+SF groups as compared to control (37% and 47% vs. 18%, $p<0.001$). ▪ Weight gain: Positively associated with frequency of feeding recommended foods i.e. *'khichuri'*

		week for three months (INE group), same nutrition education to mothers and additional supplementary feeding to their children (INE+SF group) and nutrition education from the community nutrition promoters twice a month according to the standard routine service of BINP (comparison group).	(cereal-pulse preparation), egg and potato ($p<0.05$).
Penny et al 2005 and Robert et al, 2006	Peru	▪ In a poor peri urban area, a cluster-randomized trial of an educational intervention was conducted. ▪ Staff of six government health facilities were trained for enhanced quality and coverage of existing nutrition education and compared with six control facilities. ▪ Education group (n=187) infants from the catchment areas and 190 from control areas were enrolled and followed up to 18 months. ▪ Key messages on nutrition education: feeding thick food preparation, including special foods and active feeding.	▪ Fewer children in Education (E) vs. control (C) showed nutrient deficits: Energy: at 8 months — Iron: at 8 months — Zinc I 18% 91% 77% C 27% 96% 87% ▪ Calcium intake from complementary foods was also significantly higher at 18 months in the E group than in C (mean 526 mg/day vs. 393 mg/day $p<0.05$). ▪ Children assigned to the E group had significantly higher intakes of energy from animal sources than did those assigned to the C group at age 15 months and 18 months. ▪ Stunting at 18 months (HAZ<-2SD): 5% E group vs. 16% C group. ▪ Adjusted mean changes in weight gain, length gain, and *Z* scores: significantly better in the E group vs. C group
Hotz and Gibson, 2005	Malawi, Africa	▪ Specific, locally adapted complementary feeding practices were promoted among mothers with children 6-23 months in 3 intervention and 1 control communities (increasing energy density of food, methods to increase bioavailability of iron and zinc, enrichment of complementary food with energy and nutrient dense foods and active feeding).	▪ The intakes of energy, animal protein, niacin, riboflavin, calcium, iron and zinc (but not vitamin A), were significantly greater in the intervention compared to control group ($p<0.05$). ▪ The adequacy of nutrient intakes tended to be greater among children 12-23 months of age than among 9-11 months, with the exception of energy and calcium intakes.

		▪ Trained community Health Committee members and local Health Surveillance Assistants disseminated the nutrition messages through group sessions and follow up home visits. ▪ Four education lessons were provided to each intervention community over a period of 8 weeks. Home counseling visits were made 8 weeks after the education lessons ended.	
Kilaru et al, 2005	Karnataka, India	▪ In 11 randomly and 2 purposively selected villages, nutrition education was delivered every month by locally trained counselors to caregivers of 69 intervention (I) infants and 69 control (C) (5-11months). ▪ Key counseling messages focused on: preparation and use of developmentally appropriate local foods; appropriate feeding frequency; gradually increasing food diversity; breastfeeding, complementary feeding and avoidance of bottle feeding	▪ Significant differences observed in the feeding of bananas, with intervention infants eating more (33%) compared to non-intervention infants (4%). ▪ Weight velocity: Statistically significant improvement for I group girls vs. C group girls. ▪ I infants significantly fed at least four times in a day in addition to breast milk (78% vs. 51%) and received foods from at least five different food groups (42% vs. 19%) in comparison to C infants.
Bhandari et al, 2004	Haryana	▪ Community based study cluster randomized controlled trial was carried out in 8 communities: 4 received the intervention and the other 4 no specific feeding intervention ▪ All newborns (552 in intervention and 473 in control groups) were followed every 3 months to the age of 18 months. ▪ Health - nutrition workers in the intervention communities were trained to counsel on locally developed complementary feeding recommendations through monthly home visits, monthly meetings conducted by the ANMs for community representatives; who in turn held monthly neighborhood meetings and conducted group activities through	▪ Energy intakes from complementary foods were significantly higher in the intervention group children at 9 mo (mean ± SD: 1556 ± 1109 vs. 1025 ± 866 kJ; $P < 0.001$) and 18 mo (3807 ± 1527 vs. 2577 ± 1058 kJ; $P < 0.001$) due to increased intake of milk and addition of extra oil to the food. ▪ Difference between the intervention and control groups in energy intake from milk at 18 month of age was greater for boys (505±283 vs. 297±178 kJ) than girls (458±273 vs. 320±162 kJ) ▪ Small but significant effect on length gain (difference in means 0.32 cm) in the intervention group as compared to control group. ▪ The proportion of children with HAZ<-2 Z-score

		women's groups.	did not differ between the 2 groups. ▪ Weight gain was not affected.
Singh et al, 2004	Imphal	▪ Relationship between nutritional knowledge of the mother and nutritional status of children aged 1-5 years (N=545) was studied. ▪ Mothers were classified into three levels of knowledge: low knowledge, average knowledge and good knowledge. ▪ Majority of the mothers (85%) were classified as average, 8.1% as having high knowledge and 6.9% as having low knowledge.	▪ Prevalence of underweight (WHZ) was 45.7%, 58.4% and 26.1% respectively. ▪ Normal nutritional status were significantly more among children of mothers who knew breast feeding as superior to any other feeds than those children whose mothers did not (57.7% vs 25%) and knew about initiation of weaning (74.6% vs 33.6%). ▪ Knowledge on timing for initiation of breast feeding, prelacteal feeds, giving colostrums and nutrition during pregnancy and lactation was not related with nutritional status of a child (P>1.05).
Bhandari et al, 2001	Delhi	▪ Controlled trial in urban slums, 418 infants 4 months of age individually randomized to one of the four groups and followed until 12 months of age. ▪ The first group: received a milk-based cereal and nutrition counseling and twice-weekly home visits for morbidity assessment ▪ The second group: monthly nutrition counseling alone and twice-weekly home visits for morbidity assessment. ▪ One control group: only twice-weekly home visits for morbidity assessment. ▪ The fourth group: received no intervention.	▪ Weight increment: No significant benefit in the nutrition counseling group vs. control and no intervention groups (WHZ≤-2: 12.4% vs. 15.4% and 16.1%). ▪ The nutrition counseling group gained 90 gm more weight than control group during the entire study. ▪ Length increment: No significant benefit in the nutrition counseling group vs. control and no intervention groups (HAZ≤-2: 63.9% vs. 75.8% and 74.2%).
Brown et al, 1992	Bangladesh	▪ Complementary feeding practices were taught to rural families of 62 breast-fed infants (6-12months) through home demonstrations of recipes, ways of enriching meals, feeding vegetables and fruits by eight volunteers	▪ Education group (E) children consumed a significantly greater percent of their energy and protein requirements from CF than did control subjects (C). ▪ Energy and protein adequacy of food decreased in control children. Female children fared better than boys in the protein adequacy of their diets. No significant differences were noted between the E

			and C groups for vitamin A and iron adequacy of the diets. ▪ Higher proportion of E children ate fish, vegetables and oil as compared to C group ▪ WAZ: Over 5 months, E group children gained on average 460gm more than C group and were 0.5kg heavier at final measure ($p<0.001$). ▪ Percent median WAZ (WAPM) of E group held steady at 76% of the NCHS std vs. drop in WAPM of C subjects from 78% to 72%. ▪ Severe malnutrition (WAZ <-3) was 5% in the E group vs. 26% in the C group. ▪ Gender differences in growth were not significant

2.2.3 *Views of Beneficiaries (Intervened group mothers (N=40)) Regarding Changes in Availability and Utilization of ICDS Services After the Intervention*

For this section unfortunately Control data is not available because at the time of collecting this data (which was the last segment of data collected), community disturbances and political unrest took place and the investigator was advised not to visit the villages. Hence, data on perceptions of ICDS services in control villages (CG) post intervention is not available.

There was very little change in the knowledge of intervened mothers regarding the GM service, with about half merely stating (before and after) that "*growth monitoring helps to know decrease or increase in weight of the child*" (Table 4.2.30). Most of the remaining continued to remain ignorant of the benefits of GM. As regards counseling after GM, majority of the mothers (85%) reported that the AWW informed about the weight of the child and only 20% mothers said that AWWs advised them on what home care is required, including complementary feeding for their children.

Table 4.2.30 Changes in Knowledge of the Mothers Related to Growth Monitoring Service of ICDS after the Intervention

Responses of the Mothers	Pre Intervention (N=40)		Post Intervention (N=40)	
	n	%	n	%
Benefits of Growth Monitoring (GM)				
▪ To know the increase or decrease in weight	21	52.5	22	55.0
▪ To know whether child has become healthy or weak	1	2.5	3	7.5
▪ To know whether mother takes proper care of child; is there weight gain due to CF	0	0	3	7.5
▪ Don't know the benefits / I don't go so I don't know	16	40.0	16	40.0
Information given at the time of GM				
▪ AWW tells the weight	28	70.0	34	85.0
▪ AWW advises to feed more; give special foods; give CF	8	20.0	8	20.0
▪ AWW does not tell the weight, writes in the register	8	20.0	2	5.0
Percentage of women who have not seen the growth card	40	100.0	36	90.0
Difficulty faced in utilizing this service				
▪ Yes	14	35.0	3	7.5
▪ No	26	65.0	37**	92.5
Which difficulties faced				
▪ Mother does not have time; AWW should come home to weigh	3	21.4	1	33.3
▪ Don't Know / No Response	10	71.4	2	66.7

** $p<0.01$ Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

Even after the intervention, 90% of the mothers had not seen the growth chart. Of the four mothers who reported that they were shown the growth card received advice to feed more if their child was weak or ill. A positive outcome was that earlier when the mothers were not aware of the importance of GM service, one third of them faced difficulties in utilizing this service. After the intervention majority reported not facing any difficulties ($p<0.01$).

Table 4.2.31 Changes in Knowledge of the Mothers Related to Supplementary Food (SF) Service of ICDS after the Intervention

Responses of the Mothers	Pre Intervention (N=40)		Post Intervention (N=40)	
	n	%	n	%
Benefits of Supplementary Food (SF)				
▪ Child goes to AWC as SF is given; s/he feels happy so AWW gives SF; child doesn't cry	14	35.0	18	45.0
▪ Child remains healthy; gets nutrition; weight increases	3	7.5	10*	25.0
▪ Child does not eat at home but eats AWC snack	0	0	4	10.0
▪ Drumstick leaves improve eyesight; improve blood	0	0	3	7.5
▪ Don't know / No Response	16	40.0	12	30.0
Quantity of SF given to your child				
▪ 1 cup (200ml)	22	55.0	30	75.0
▪ 100 ml	9	22.5	7	17.5
▪ Never observed so don't know	9	22.5	3	7.5
Where does the child eat SF				
▪ At AWC	11	27.5	22*	55.0
▪ At home	29	72.5	18	45.0
If at AWC, then does child eat				
▪ Half of the snack	8	72.7	16	72.7
▪ < Half the snack	1	9.1	6	27.3
Left over snack brought home is eaten by				
▪ Child himself	2	22.2	15**	68.2
▪ Sibling shares the snack	2	22.2	7	31.8
▪ Mother shares the snack	5	55.6	0	0
Child likes the SF				
▪ Yes	29	72.5	30	75.0
▪ No	4	10.0	3	7.5
▪ Don't Know	7	17.5	7	17.5
Change in health status of children due to SF				
▪ Yes	14	35.0	22	55.0
▪ No	17	42.5	9	22.5
▪ Don't Know	9	22.5	9	22.5
Changes in health status observed by the mother				
▪ Child eats more with other children in AWC	4	28.6	6	27.3
▪ Child's health seems good; has gained weight	2	14.3	6	27.3
▪ Child has learnt to eat; now asks for food; is playful	3	21.4	5	22.7
▪ Child does not feel hungry; feels satiety	2	14.3	4	18.2
▪ Does not fall ill	0	0	2	9.1

Responses of the Mothers	Pre Intervention (N=40)		Post Intervention (N=40)	
	n	%	n	%
Reasons for no changes observed in health of the child				
▪ No benefits though s/he eats at AWC	13	76.4	6	66.6
▪ We do not know whether change in health is due to AWC snack or home food	4	23.5	3	33.3

* $p < 0.05$, ** $p<0.01$
Note: Only major perceptions are presented in the table
The responses may add upto more than 100% due to multiple responses

Unlike GM, awareness and utilization of SF service improved. Pre-intervention nearly half of the mothers were not aware of the benefits of SF service, however, after the intervention majority could state the benefits. After the intervention, about one fourth reported that '*children get nutrition*' and '*remain healthy*' on consuming AWC snack ($p<0.05$). Around half (45%) stated that on receiving supplementary foods, children are happy and regularly attend the AWC. Most of the mothers became aware of the right quantity (1cup) of snack served to their children. On-site feeding of snack improved ($p<0.05$); and the portion taken home was more likely to be eaten by the child ($p<0.01$). Post intervention half of the mothers stated an improvement in the health status of their children due to AWC snack. More mothers felt that their child eats more at the AWC and has gained weight.

Table 4.2.32 Changes in Knowledge of the mothers related to *Rab* Supplementation Program of ICDS after the Intervention

Responses of the Mothers	Pre Intervention (N=40)		Post Intervention (N=40)	
	n	%	n	%
Are you aware of the *Rab* program in AWC?				
▪ Yes	8	20.0	12	30.0
▪ No	32	80.0	28	70.0
Do you take or did you take your child to AWC for this program?				
▪ Yes	1	12.5	2	16.7
▪ No	7	87.5	10	83.3

After the intervention, there was no improvement in the implementation of *rab* preparation as a demonstration tool as reported by the mothers. A majority of the mothers (70%) were not aware about the program even post intervention. Out of those who were informed, majority (>80%) did not take their children to AWC.

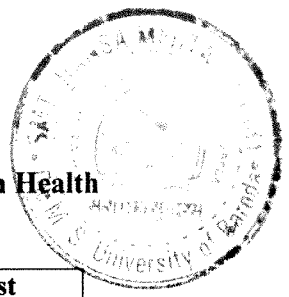


Table 4.2.33 Changes in Knowledge of the Mothers Related to Nutrition Health Education (NHE) Service of ICDS after the Intervention

Responses of the Mothers	Pre Intervention (N=40)		Post Intervention (N=40)	
	n	%	n	%
Are you aware about NHE given at AWC?				
▪ Yes	12	30.0	22*	55.0
▪ No	28	70.0	18	45.0
Topics covered				
▪ Child care; IYCF practices	1	8.3	12**	54.5
▪ Health and Hygiene	1	8.3	3	13.6
▪ Utilization ICDS services; send children to AWC	1	8.3	3	13.6
▪ Vaccination	0	0	3	13.6
▪ Don't know; No Response	8	66.7	1***	4.5
Benefits of this service				
▪ Get information regarding care of children; food habits; CF for children	2	16.7	8	36.4
▪ Hygiene; decrease in morbidity	2	16.7	6	27.3
▪ No benefit	1	8.3	4	18.2
▪ Don't know	8	66.7	4	18.2
Is there a difference in health status of the child?				
▪ Yes	2	16.7	8	36.4
▪ No	10	83.3	14**	63.6

* $p < 0.05$, ** $p < 0.01$, *** $p<0.001$

Note: Only major perceptions are presented in the table

The responses may add upto more than 100% due to multiple responses

After the intervention, a significantly higher proportion of the mothers reported to attend NHE meetings. Yet, this was only 50% of the mothers as group meetings or home visits were infrequently conducted. Of those mothers who attended NHE meeting, nearly half could recall that messages were given related to complementary feeding and child care ($p<0.01$). Further, more than half (64%) of the mothers found no difference in the health status of their children due to this service ($p<0.01$), which is not surprising as sustained and effective NHE is required before nutritional status improvement can be expected.

Triangulation of Qualitative Methods (Interviews, Observations, Secondary Data Review and Informal meetings/conversations) and its Significance During Baseline Assessment and Program Evaluation

The methodological perspective

The present study was an integration of various qualitative research tools to obtain an in-depth and holistic picture of quality of implementation of nutrition related ICDS services within the NGO system and its impact on the beneficiaries. The major strength of the study lies in its multi-method approach and in the HSR methodology adopted towards the assessment of a national nutrition program.

Table 4.2.34 elaborates on the objectives of the use of the qualitative methods which were used in the study, the strengths and limitations of these methods as they emerged during the course of the study.

Table 4.2.34 Objectives, Strengths and Limitations of these Methods as they Emerged During the Course of the Study

Type of method	Objective	Strengths	Challenges	Solutions
Direct Observations: Spot observations and Continuous Unstructured observations	▪ To obtain an insight about the quality of implementation of ICDS services ▪ To validate the data obtained through interviews	1. Reliable and rich information obtained regarding: ▪ management and support received from the NGO ▪ Functioning of AWWs and supervisors (work organization and time management; routine activity pattern; importance given to nutrition related services) ▪ Attitude of functionaries towards these services as revealed through their comments and interactions ▪ Validation of interview and secondary data; especially the gap between reported and observed practices 2. Facilitated in designing the capacity building intervention i.e. training of functionaries based on the lacunae observed in quality of implementation of services during formative research 3. Facilitated in process evaluation of the enhanced NHEC intervention: improvement in communication skills of the AWWs for improving IYCF and care practices in the rural areas 4. Facilitated in impact evaluation: assessing the improvement in quality of functioning of AWCs after the intervention	▪ Concentration and perseverance to face the trying field situations for long periods in the rural areas required by the investigator ▪ Respondent may change his/her behaviour knowing that s/he is being observed	▪ Doing first a few unstructured observations followed by structured and spot observations saves time ▪ Better to do more observations on fewer subjects rather than more subjects and few observations
Semi structured interviews	▪ To assess the perceptions of the functionaries and beneficiaries related to ICDS services, IYCF and child care during formative research ▪ To assess the change in knowledge after the NHEC intervention	1. Indepth information yielded from the functionaries (AWWs and supervisors) and beneficiaries (mothers) regarding: ▪ objectives of selected ICDS services ▪ delivery of the services and its utilization ▪ benefits of the services ▪ difficulties experienced in implementing these services and their expectations from the NGO to improve the implementation of these services ▪ IYCF practices, health related knowledge and health care seeking practices 2. Quantitative information/data was relatively easy to record, analyze and interpret; and qualitative data (such as remarks and explanations to open ended questions) were used as verbatims during report writing	▪ Yields information on what is the situation according to perceptions of functionaries and beneficiaries (socially desirable answers) but not on exactly why is that so (on understanding reasons) ▪ Interview schedules may become lengthy and may not sustain interest of functionaries and beneficiaries	▪ Strengthens interview skills, especially how to probe. Use methods like observations to triangulate the data ▪ Keep forms ready ▪ Ask the essentials ▪ Increase sample size

	▪ To obtain information regarding quality of implementation of ICDS services and to compare it with the observation data	3. A large amount of information from different management perspectives obtained from all category of functionaries (AWWs, supervisors and NGO officials) 4. Interviews gave a focus to the study; helped in designing the IEC material for the intervention based on the formative research for example suboptimal knowledge of the rural mothers related to ICDS and IYCF practices	▪ Obtaining accurate responses is hindered by Interruptions, or probing / prompting by others around (mothers interviews in presence of mother in law or husband)	▪ Have a colleague to keep the others members busy while you interview the respondent
Secondary data review	▪ To obtain information regarding growth monitoring service and availability of IEC material	1. Gave additional understanding regarding specific aspects of the study for example ▪ record of the nutritional status of children (weights and grades of malnutrition which were compared with the primary data collected by the investigator) ▪ availability of IEC material with the NGO related to nutrition ▪ availability of IEC materials with the AWWs to impart NHE to women in their villages 2. Shortened the time for research as the best use was made of whatever was available.	▪ Investigator is never entirely certain about the correctness and accuracy of the data	▪ Use also primary data to validate
Informal conversations with functionaries / meetings with NGO officials	▪ To gain further insight into the functioning and management of ICDS services	1. Informal conversations during MPR monthly meet and during continuous observations, were a good medium to discuss among the AWWs and supervisors the problems they encountered during NHEC sessions and how to overcome them. 2. Reliable and insightful information was obtained as the informants are at ease with the investigator 3. Responses were more spontaneous	▪ Trust and rapport are required between the informant and the investigator before meaningful informal conversations take place	▪ Use informal conversation as one of the methods in tool box

The Methodological Perspective: The Value of Triangulation

There were several finer aspects of implementation which observations revealed; these could not have been documented if only the interview method had been used. Besides, observations gave data closer to the reality than did interviews.

Value of the Observation Method during Formative Research Prior to the Intervention

The continuous unstructured observations conducted at baseline survey, made it clear that the total amount of time devoted to work (which was considerably less than that stated) and the quality of time devoted to each activity (AWWs spending majority of their time in making children quiet, preschool activity, distribution of SF, immunization and making reports and registers) led to a neglect of other important nutrition services like NHE meetings and home visits.

Further, from continuous monitoring observations, it was empirically documented that ICDS functionaries had to look after a host of vertical campaigns (pulse polio campaign, demographic surveys, gram *sabhas*, adult education sessions, *Bachat mandal* meetings); many of which were not directly related to primary objectives of ICDS) which also took away a significant proportion (about one-fifth) of their work time. For time intensive activities like NHE and women's empowerment for better child care, scanty efforts were made in the time available with the functionaries. In all these activities, children under 3 years were totally neglected. They were focused only during immunization sessions and growth monitoring activity.

Spot observations conducted to assess the quality of implementation of various services corroborated and complemented the continuous unstructured observation data. Spot observations further demonstrated that GM was not conducted properly (AWWs did not weigh the children properly; mothers were not shown the growth chart nor explained about their child's growth and development). The *promotion* part of growth monitoring which is a part of nutrition communication service was absent.

Rab supplementation program was poorly implemented and sporadically monitored by the supervisors. *Rab* was not cooked even once during the whole observation period at baseline. Of the few mothers who reported to be aware about this program, none of them were taught how to cook *rab* at home.

NHE service was absent in the formative research. Not a single NHEC session was conducted either through a group meeting or home visit during baseline survey; nutritional

counseling was not given to the mothers at the time of growth monitoring; nor were IEC materials like charts or posters used.

Supervision was also unplanned and sporadic. Supervisors monitored coverage of beneficiaries but not the quality of services. They were not found guiding AWWs regarding the process of conducting effective NHE during growth monitoring during the initial formative research period. They checked the registers but did not accompany the AWW for home visits on any occasion.

Most importantly, the observations did not corroborate the interview data and clearly brought out the gap between stated and actual practices. For example, majority of the AWWs in their interviews responded that *rab* supplementation was regularly implemented and NHE meetings were held atleast once or twice a month. In reality both these services were absent. Further, these observations were also confirmed by the responses of the mothers during their interviews. Majority of the mothers reported that they were not aware of the *rab* supplementation program. They had not even seen the growth chart, nor received counseling from AWWs.

Design of the Intervention and Process Evaluation

Based on the lacunae observed in quality of implementation of services during formative stage, the capacity building intervention i.e. training of functionaries was designed. The 4-day training workshop and the reinforcement session were planned to improve all those skills which the AWWs lacked. Observations even during the workshop helped in identifying AWWs who were weak in their communication skills.

During the process evaluation of the enhanced NHEC intervention, communication criteria was decided on which an observation checklist was devised. This checklist helped the investigator and supervisor to assess the NHEC session systematically. Direct observations revealed that there was a lot of resistance from the functionaries as such meetings were rare or were conducted for the first time. Majority of the AWWs were very poor in their communication skills though they had satisfactory knowledge regarding IYCF practices.

Further, even later i.e. after the intervention, continuous unstructured and spot observations facilitated in assessing the improvement in quality of functioning of AWCs. This established the fact that changes in system are slow and in some areas there is resistance to change.

Observations in rural field situations present their own set of difficulties and problems. Besides tackling the problem of commuting long distances to unfamiliar areas, the investigator has to make extra efforts to build rapport and trust with the functionary being

observed and with the community as there is always an initial lack of acceptance.

Semi-structured interviews: Interviews conducted at baseline and during impact evaluation, gave a wealth of information which was quantified and presented as percentages and gave a sense of proportion of the functionaries and beneficiaries who were aware/not aware of the optimal IYCF practices and nutrition related ICDS services. According to Bernard (1991), semi-structured interviews add a systematic dimension and structure to the investigation, which is lacking in completely open ended or structured interviews. Further, allowing people to open up and express themselves in their dialect using local terms within a given structure yields several anecdotes and comments from the informants which give a valuable insight into the informant's view point.

A limitation faced while using this technique in the present study was that there were lot of interruptions by family members while the mothers were interviewed. This affected the quality of information obtained. Further, the functionary responses when validated by observations revealed a contrasting picture. The knowledge of functionaries was not implemented while performing the AWC activities. This was further corroborated by interview responses of the mothers (poor knowledge related to IYCF practices) and poor nutritional status of the children.

Blending and integrating methods and data for studying the same phenomenon, i.e. triangulation, captures a holistic and contextual picture that transcends mere complementarily and also uncovers biases inherent in individual methods (Pederson 1992, Glik et al 1987).

The present study made use of these strengths of triangulation and could uncover the major and minor aspects of quality of nutrition related ICDS services from functionary and beneficiary perspective. All the methods used, uncovered the lacunae and factors underlying the neglect of nutrition services of ICDS; for example, little support from NGO officials, lack of motivation and enthusiasm of functionaries, no refresher/ in-service training and mismanagement of available time. Triangulation and data validation also helped in intervention design and evaluation as explained earlier. It further helped the investigator to understand and embody not only the skills or tools of both sets of methods, but also the principles underlying different approaches to methods, the major differences in these principles, and differences in outcomes.

Overall, in Health Systems Research, multimethod approaches work well and yield rich and meaningful data.