METHODS AND MATERIALS

Chapter III

METHODS AND MATERIALS

The present research was undertaken in rural Vadodara. The study was carried out with the support of an NGO, which offers nutrition and health care services in 27 villages in and around Nandesari area of Vadodara district. It implements Integrated Child Development Services (ICDS) through 40 Anganwadi centers (AWC) in these villages[1].

In the initial meetings, the NGO was explained in details the objectives of this research study and its various components. The benefits of the intervention through the NGO implemented ICDS was also pointed out. The study was initiated after obtaining permission from the Director of the organization.

The overall objective of this research was to adapt the Health Systems Research (HSR) methodology and to study selected nutrition services (Growth Monitoring (GM), Supplementary Feeding (SF), *Rab* supplementation and Nutrition Health Education (NHE)) 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.

Informed consent: For each phase of the study and for each beneficiary group, informed consent was taken prior to initiating data collection. Only those beneficiaries and functionaries willing to participate in the study were included in the sample.

This research consisted of two phases.

- Phase I was the situational analysis – current implementation of selected ICDS services which formed the basis of the intervention
- Phase II was capacity building training intervention towards enhanced implementation of ICDS in the NGO system program

The **specific objectives** of each phase are given below.

[1] For confidentiality reasons, the name is not revealed here and the term 'NGO' is used.

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

From the functionaries' perspective:

- To study the management and administration of ICDS services with a focus on quality of implementation of services and the contribution of the NGO in ICDS management.
- To study the perceptions about availability and utilization of ICDS services (related to nutrition and child care).
- To identify strengths and weakness of the nutrition related services in ICDS system.

From beneficiaries' perspective:

- To study the perceptions of the mothers about availability and utilization of ICDS services (related to nutrition and child care).
- To study the perceptions of the mothers regarding IYCF practices.
- To study the nutritional status of the young children below 3 years, in terms of prevalence of under nutrition (weight for age, height for age, weight for height) and mothers in terms of BMI.

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

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 (Growth Monitoring, Supplementary Feeding, *Rab* supplementation and Nutrition Health Education) in the context of the NGO system in which they were functioning. The specific objectives were:

- 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.
- To provide capacity building training to ICDS staff i.e. Anganwadi workers (AWWs) 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.
- To especially emphasize the effective implementation of NHEC services to bring about behaviour change in the beneficiary groups for better child nutrition and health care.

- To develop and facilitate implementation of a modified and simple monitoring system to monitor quality of implementation of the specific services under study.
- To enlist the support of the NGO to take action measures for sustaining the improvement brought about in functioning of these services.

Part B: Process and Impact Evaluation of the Intervention

★ **Process evaluation of the intervention from HSR perspective**

The 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:

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

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

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

★ **Triangulation of various research methods – contribution to the HSR perspective**

- To document the strengths and limitations of the interview method and observation method for:
  - situational analysis (i.e. assessing quality of implementation as it is actually taking place in the field)
  - contributing to design of capacity building intervention i.e. training of functionaries
  - 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).

Site of the Study

The study was carried out in the field areas of an NGO in rural Vadodara covering 40 AWCs. For clarity and focus, three ICDS services which relatively have a greater influence on nutritional status of beneficiaries were selected, namely: GM, SF (including *Rab* supplementation program run by the NGO for encouraging initiation of complementary foods (CF) in 7-12 months children) and NHE service.

A Glance at the Study Using the Health Systems Research Methodology Adapted to the ICDS in an NGO System

The flowchart in Figure 3.1 explains stepwise the HSR methodology followed in the study. Thus, according to the figure

1. A situational analysis (Phase I), was carried out with the functionaries and the beneficiaries to gain an insight into how the nutrition related services (GM, SF and *Rab* supplementation, and NHE) were implemented in the NGO-ICDS. It also assessed their perceptions and limitations in the provision of these services to children below 3 years. Several qualitative and quantitative research methods were used in the formative research stage.
2. An assessment of the system's need for improving the implementation of the three selected ICDS services was then conducted.
3. Certain specified job functions of the AWWs and their supervisors were subsequently modified and improved in Phase II. These functionaries were trained for improving their knowledge and strengthening their skills which in turn would enable them to provide better quality services to the beneficiaries.
4. A process evaluation was carried out to know whether the improved and specified job functions were executed by the functionaries, and whether there was improvement in the quality of ICDS services.
5. Support of the NGO to these interventions, identification of gaps and lacunae in the implementation of the improved services post capacity building training were also assessed.
6. Impact evaluation was carried out to assess the impact of the intervention on knowledge and practices of the mothers and the nutritional status of the children.

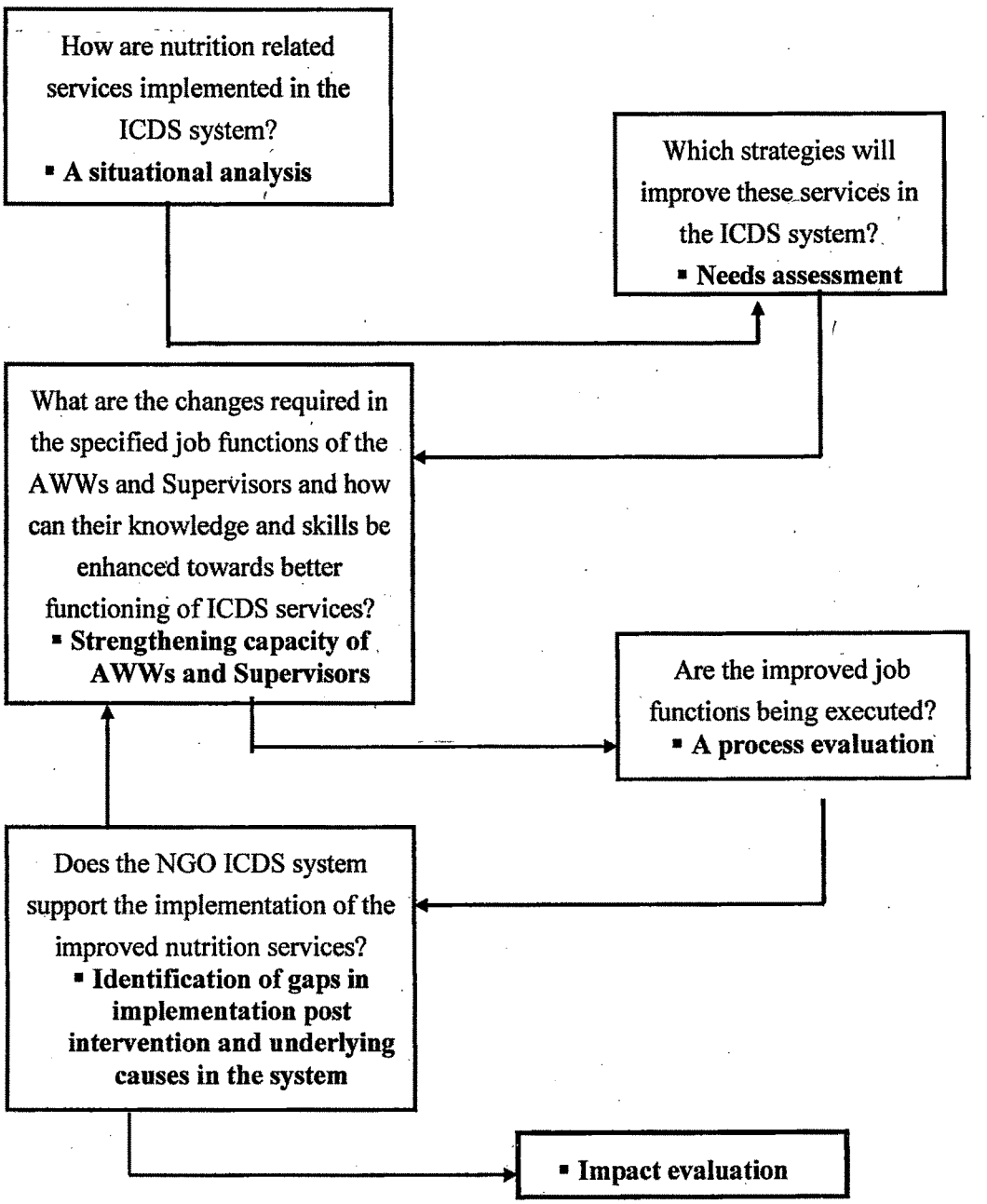
Sample Selection

Rationale for Sample Selection

Broadly two criteria were considered while deciding the sample size.

- ★ Adequacy of the sample for data analysis including inter group comparisons (eg. according to the age group of children)
- ★ The total time available for study and the time allocated to each phase of the study.

Figure 3.1 An Overview of the Study Using the HSR Methodology



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

The functionary perspective: Since the NGO would be implementing similar ICDS norms as per the government guidelines in all the 40 AWCs under it and also since time was a constraint, a sample of 50% of the total AWWs i.e. 20 NGO-ICDS AWWs were considered adequate and were randomly selected as the sample to study the functionary perspective. This included knowledge and perceptions of AWWs related to objectives and implementation of the selected ICDS services, IYCF practices and observations of quality of implementation of ICDS services.

The sample size of the observation data and other qualitative methods varies as per the availability of functionaries and the concerned activity, and is mentioned as appropriate.

The beneficiary perspective: In view of focus on IYCF in this study, in particular CF, households with children 6-35 months of age were considered eligible for the sample. Considering minimum of 30 children in the sub groups of 6-11, 12-23 and 24-35 months (90 children) and also to take care of some dropouts, a minimum sample of 100 households was considered adequate to study the beneficiary perspective. This sample would also allow gender comparison between boys and girls.

In view of the fact that on an average each AWC covers 1000 population (about 200 households) with an average of 3% consisting of children 0-3 years, each AWC was expected to give 30 children in the eligible age group. Thus, four AWCs from the total 40 AWCs under the NGO were randomly selected so as to give a sample of about 120 children (0-35 months). All the children from 6-35 months who were available and whose parents consented to participate were enrolled to avoid any sample bias. A total of 115 mother-child pairs were thus available, who consented to be enrolled for the baseline survey.

Considering the overall time plan and the time intensive nature of some methods like diet surveys, some of the indicators were studied on random sub samples as given in the next section.

Methods

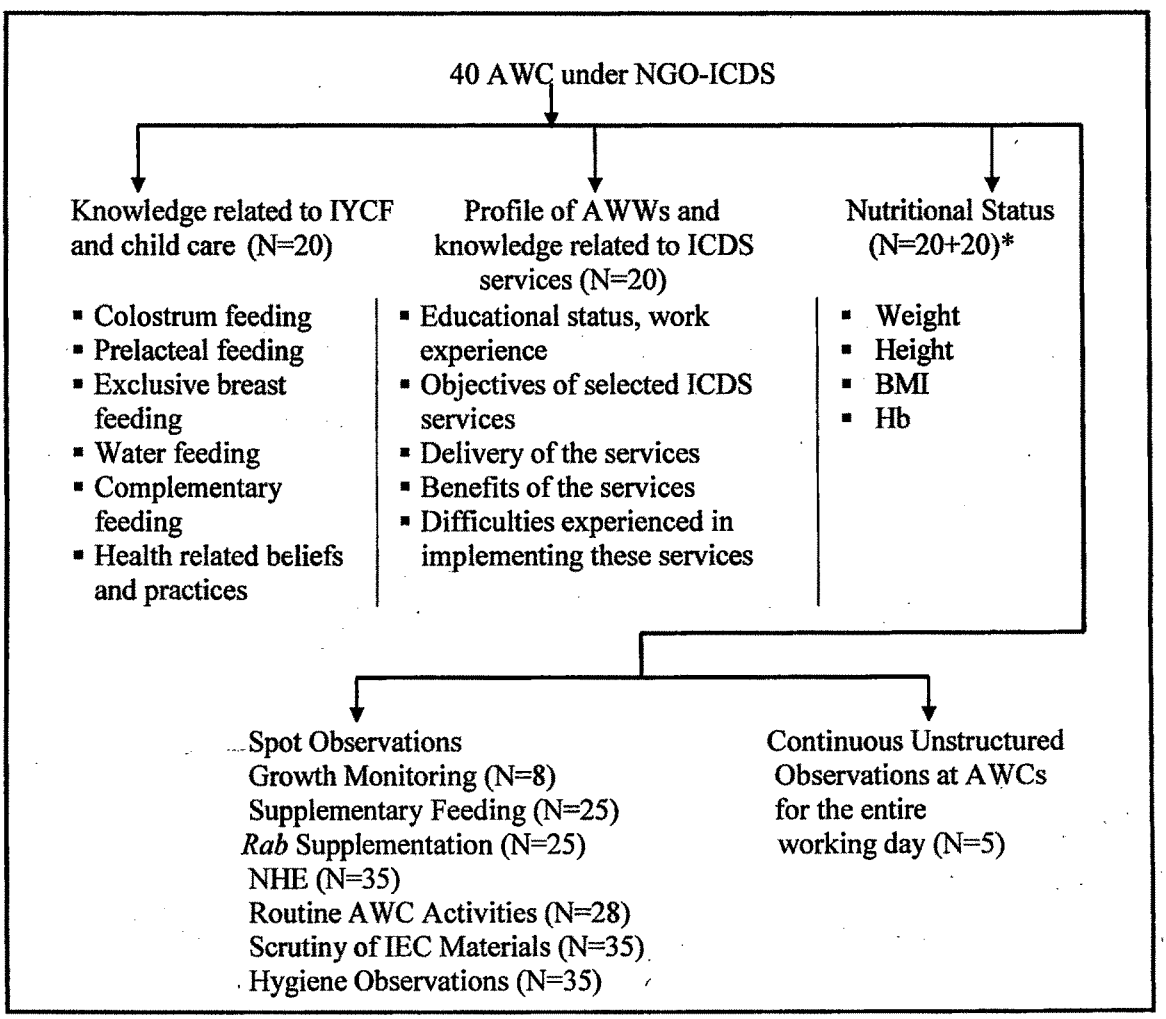
Table 3.1 summarizes the quantitative and qualitative indicators of data collection employed for Phase I.

Table 3.1 Indicators and Tools for Data Collection: Phase I

Indicator	Sample	Method and Tool	Reference
Functionaries			
Profile of AWWs & Supervisors	20	Semi structured interview schedule (Annexure 1-4)	Bernard, 1991
Knowledge related to ICDS services			
Knowledge related to IYCF practices			
Quality of implementation of ICDS services at AWCs	35	Direct observations Continuous Unstructured observations (Annexure 5)	Bernard, 1991
Nutritional Status: Weight, height, BMI and Hemoglobin levels of AWWs	40[2]	Standard methods Cyanmethemoglobin method	Gibson, 1989 INACG,.1985
Beneficiaries			
Awareness and practices of mothers related to IYCF and child care	115	Semi-structured interview schedule (Annexure 7)	Bernard, 1991
Health care seeking practices			
Morbidity			
Socio-economic status			
Influences on mothers: IYCF decisions			
Family support received by the mother			
Knowledge of mothers related to ICDS services	53	Semi-structured interview schedule (Annexure 6)	Bernard, 1991
Anthropometry ▪ Weight for age, Height for age and weight for height (children 6-35 months) ▪ Weight, height and BMI (mothers)	115	Standard methods Secondary Data Review	Cogill B, 2003 Gibson, 1989
Hygiene of the mother, child and environment	115	Direct Structured observation (Annexure 8)	Bernard, 1991
Dietary intake of children (one day) on 50% sample	60	24-hour dietary recall (Annexure 9)	Thomson and Byers, 1994

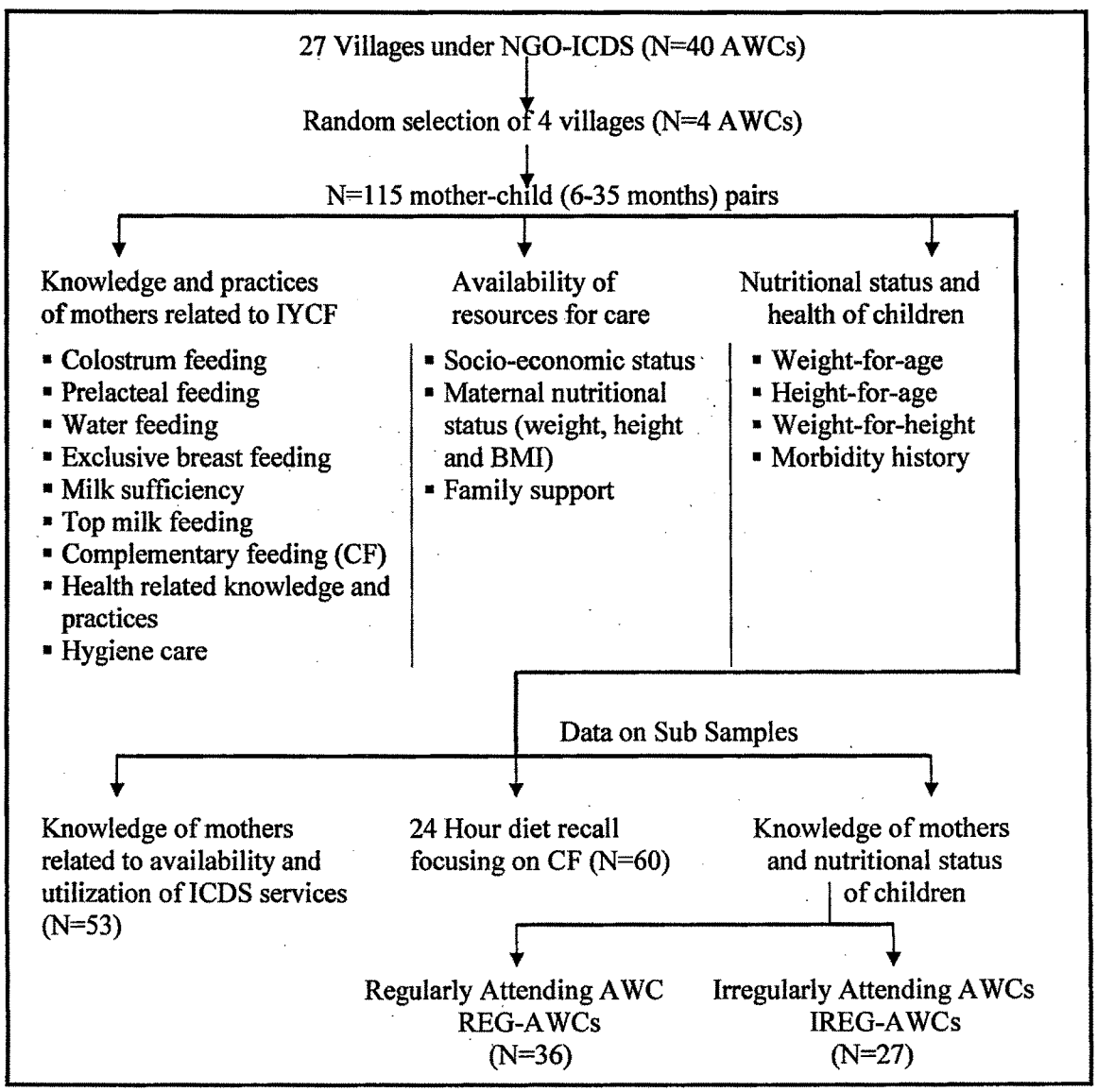
[2] Though 20 AWWs comprised the sample, nutritional status was measured on all 40, on request of the remaining 20 AWWs.

Figure 3.2 Study Design of Phase I Part A: Functionaries



* On request, besides the sampled AWWs the remaining 20 AWWs were also included in this assessment.

Figure 3.3 Study Design of Phase I Part B: Beneficiaries



Description of the Methods used for Data Collection

The tools employed for data collection were pre-tested in a similar rural setting before beginning the actual data collection.

Qualitative Methods Used in Phase I

The qualitative methods used in the formative research included meetings with NGO officials, secondary data review of nutritional status of children, records and registers maintained as regards the nutrition services, semi-structured interviews and direct observations.

1. Meetings with NGO Officials

Several meetings were held with the NGO-ICDS officials over a period of 6 months to obtain an initial assessment of the quality of implementation of nutrition related ICDS services and the priority given to them as compared to other ICDS services.

2. Secondary Data Review

Principle: This includes reviewing archival data or records already available with the subjects under study: census records, household registers and clinic records (published or unpublished). It gives additional understanding regarding specific aspects of the study. Secondary data review shortens the time for research as the best use is made of whatever is available. However, a limitation is that one is never entirely certain about the correctness and accuracy of the data (Annett and Rifkin 1990).

Purpose and Method: The purpose of using secondary data in the present study was to obtain information regarding growth monitoring service: registers maintained to record the nutritional status of children (weights and grades of malnutrition), availability of IEC material with the NGO related to nutrition for refresher training, availability of IEC materials with the AWWs to impart NHE to women in their villages.

3. Semi-structured Interview

Principle: A semi-structured interview is carried out on the basis of a question guide that enlists questions regarding the topics that need to be covered. The researcher's queries follow a pre-determined pattern; however, the focus on the topics may shift according to the responses of the informant (Bernard 1991). Some questions are structured and some are open-ended.

Method: The AWWs, supervisors and mothers of young children (6-35months) were interviewed using a semi-structured question guide.

The interview schedule for *functionaries* (Annexure 1, 3) related to *ICDS services* included questions on:

- Objectives of selected ICDS services
- Delivery of the services
- Benefits of the services
- Difficulties experienced in implementing these services and their expectations from the NGO to improve the implementation of these services

The interview schedule for *functionaries* (Annexure 2, 4) related to *IYCF* practices included questions on:

- Colostrum feeding
- Prelacteal feeding
- Exclusive breast feeding
- Water feeding
- Complementary feeding
- Health related beliefs and practices

The interview schedule for *mothers* (Annexure 6) related to *ICDS services* included questions on the following aspects:

- Purpose of ICDS services
- Benefits obtained from utilizing these services
- Difficulties experienced in availing these services
- Suggestions for improving the utilization of these services

The interview schedule for *mothers* (Annexure 7) related to *IYCF* included questions on the following aspects:

- Socio-economic status
- Reproductive history
- Knowledge of the mothers related to IYCF practices
- Morbidity and feeding during and after illness
- Health related knowledge and health care seeking practices of the mothers
- Family support received by the mothers

4. Direct Observations

Principle: Observations are based on examining an object, an individual, a group of people or an event, using all the senses. Carefully observing behaviour and events helps to obtain valuable non-verbal cues as to what is actually occurring compared to what is being said (Bernard 1991). Lack of correlation between reported and actual practice may be revealed through direct observations (Kashyap 1990).

Purpose and Method: Spot observations - It is a technique in which a researcher simply appears at randomly selected places and at randomly selected time and records what people are doing when they are first encountered.

In this study, spot observations were used to assess the quality of implementation of ICDS services in the AWCs. All the AWWs were observed during the working hours of the AWCs (Annexure 5).

Continuous monitoring observations - In continuous monitoring observations you watch a subject or group of subjects for a specific period of time and record their behaviour as faithfully as possible.

Here, these observations were made to record the routine activities or 'typical day' at the

AWC. The investigator recorded all that she observed over a specified period of time.

Structured observations – It is a method of systematically observing the behaviour of individuals in terms of a schedule of categories. It is a technique in which the researcher employs explicitly formulated rules for the observation and recording

They were made to assess the hygiene of the child, mother and the surroundings. A precoded observation checklist (Annexure 8) was used to guide and record the observations.

Quantitative Methods Used in the Formative Research

As seen in Table 3.1, the quantitative methods used in the study included measurements of height and weight (anthropometry), calculation of Body Mass Index (BMI), estimation of Hemoglobin to assess the level of anemia and diet and nutrient intake (24 hour diet recall).

1. Anthropometric Measurements

Principle: The physical dimensions of the body are markedly influenced by nutrition. Nutritional assessment is concerned with the measurement of the variations of the physical dimensions, at different age levels and degrees of nutrition. Selected body measurements provide valuable information concerning certain types of malnutrition in which body size and gross body composition are affected (Gibson 1989).

For assessment of nutritional status of children (6-35 months), weight and height measurements were used. For assessment of nutritional status of AWWs and mothers, weight and height were measured and BMI was calculated. The calculated values were compared with the standards.

1.1 Weight

Principle: Weight is a measurement of body mass. It is a sensitive indicator of malnutrition and can be useful for diagnosing protein energy malnutrition and growth failure in children.

Method: The AWWs, mothers and children (more than one year of age who could stand properly on their own) were weighed barefoot on a standardized portable bathroom scale. The subjects were asked to stand straight on the scale without touching anything and look straight ahead. The scale was set to zero before and after each measurement and the weight was recorded to the nearest 0.1 kg.

Children below one year of age were weighed on a Salter scale. The child was placed in the trouser which was suspended from the scale, with minimum of clothing and the reading was taken to the nearest 100 gm. Care was taken that the pointer of the scale was adjusted to zero before the child was placed in the trouser.

1.2 Height

Principle: Height is a linear measurement made up of four components: legs, pelvis, spine and skull (Gibson 1989). The extent of height deficit in relation to age, as compared to regional standards, maybe regarded as a measure of the duration of malnutrition. A given deficit in height may represent a short period of growth failure at an earlier age or a longer period of growth failure at a later age.

Method: A fiberglass tape was used for measuring the height of the children, mothers and AWWs. The subject was made to stand on a smooth surfaced floor, with the back against the wall, feet parallel and together, with the heels, buttocks, shoulders and the back of the head touching the wall. The subject was asked to look straight ahead with the head held comfortably erect, arms hanging loosely by the side. A thin scale was kept on the head, perpendicular to the wall, so as to lightly press the hair. The height was marked on the wall with the help of a pencil, and the reading was taken with the help of the measuring tape. The height was measured to the nearest 0.1 cm.

1.3 Blood Hemoglobin Estimation

In this study, hemoglobin estimation was done by the Cyanmethemoglobin method (INACG 1985). This technique requires dilution of blood with a single reagent, measures all forms of circulating hemoglobin (except sulfhemoglobin), produces a relatively broad absorption band at 540nm that can be measured in both filter and narrow band spectrophotometers and employs standards with exceptionally long stability.

2. Twenty-four hour Diet Recall Method

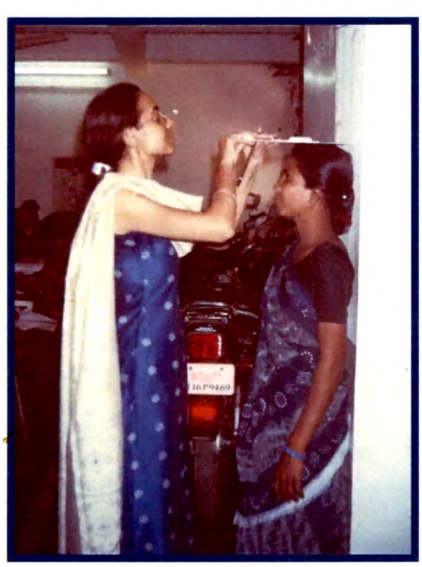
Principle: Food and nutrient intake is an important component of nutritional status assessment. This is one of the most common methods used for diet survey and is based on the process of recall of food consumption over a period of 24 hours, prior to the survey. The ingredients recalled by the respondents are measured using standard cups and spoons. From the cooked amount, the raw ingredients as well as their nutritive value is calculated using data of nutritive value of the regional recipes.

Method: The mothers of children (6-35 months) were asked about the various meals consumed by the children the previous day and the food items consumed in each meal. Amount of cooked food eaten was recorded using standard measures and ingredients were calculated using available data of recipes (Annexure 9).

24-Hour Diet Recall

Hemoglobin Estimation of AWWs

Assessment of AWW's Height



Assessment of Child's Height

The nutrient content of food consumed by the children was then calculated using the food composition tables (ICMR 1991) and compared with the Recommended Dietary Allowance (RDA) for the appropriate age group. For energy (children 6-23 months): Butt et al 2000 standards, proteins: WHO/UNICEF 1998 and for calcium, iron, vitamin A and vitamin C: WHO 2002 standards were taken for comparison. For children 24-35 months all macro and micronutrients were compared with ICMR 1991 standards. Various sources for RDA had to be used because there is no single source or reference giving RDA for nutrients from complementary foods for all the age groups of this study.

Food intake of various food groups by the child was compared with the RDAs for recommended foods for each age group (NIN 1998).

Phase I was followed by an intervention (Phase II)

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

Intervention Phase

The entire intervention of one year was divided in three sections.

Section 1 of the intervention was a capacity building training workshop which was held in NGO premises for 4 days. At the beginning of each training session, the investigator introduced the topics to be covered followed by a detailed explanation on all the messages. Role plays and hands-on-practice component in the form of group discussions and demonstration were also included.

The 4-day NHEC training workshop was divided into 4 sessions.

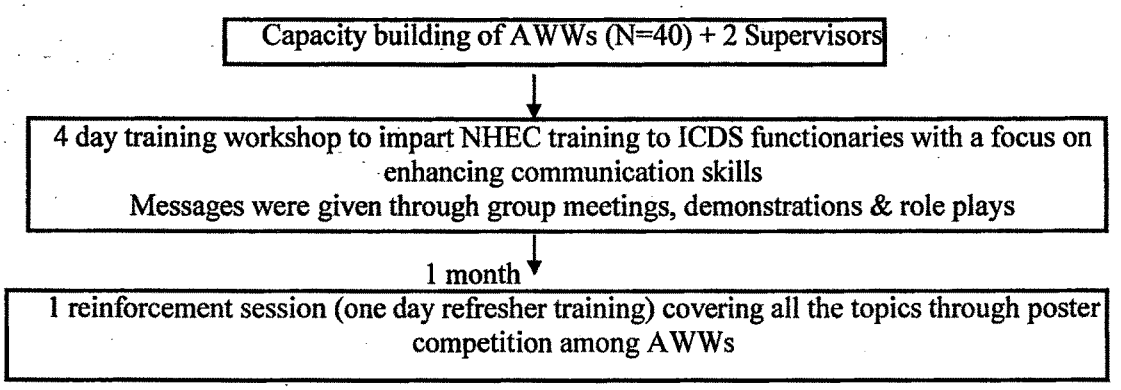
1. Exclusive breast feeding and initiation of complementary feeding at 6 months
2. Supplementary feeding program and *Rab* supplementation program in ICDS
3. Quantity and quality of Complementary foods
4. Active feeding and Hygiene

Further, after a month, one-day reinforcement training was organized to give the AWWs some practice regarding communication skills and handling of flash cards. To test the retention of knowledge related to IYCF messages, a poster competition was conducted where in three topics were given to the AWWs: Hygiene practices, Quantity and Frequency

of CF and Quality of CF. All the AWWs had a choice to select any topic and prepare a visual aid (poster). The best three posters were appreciated and awarded. This exercise helped them to recollect the messages, think how to proportionately draw and how to write the messages. Later, all the AWWs had put up these posters in their respective AWCs as an IEC material.

Pre and post training questionnaires were used to assess the changes in knowledge and skills of the AWWs before and immediately after the training (Annexure 10). Principles of effective communication and the Hubley model (Hubley 1993) of Behaviour Change Communication formed the basis of the training (described later).

Figure 3.4 Section 1: Capacity Building Training for Strengthening Quality of Implementation of selected ICDS services with a focus on counseling and communication skills



Section 2 of the intervention was held in 35 AWCs separately (5 AWWs could not conduct NHE group meetings due to unforeseen circumstances in the community).

Principle: Training alone does not bring about the required improvement in performance of workers, unless it is immediately followed by on-field guided practice and corrections of errors made while actual execution of activities takes place. Unfortunately, this is rarely the case. Most often Government institutes and NGOs conduct a one time capacity building training to impart knowledge and improve selected skills without follow up. Hence, in this study to bring about a sustainable change in the communication skills and functioning of the AWWs, it was planned that the capacity building training would be followed by a reinforcement phase wherein each AWW would be individually guided each time they conducted NHEC sessions. This would help them to address their problems related to communication and counseling at one to one level with the investigator.

Inauguration of the Capacity Building Training Workshop by the NGO director and the invited guests at the NGO premises, Nandesari

Capacity Building Training Workshop for the ICDS Functionaries at the NGO premises

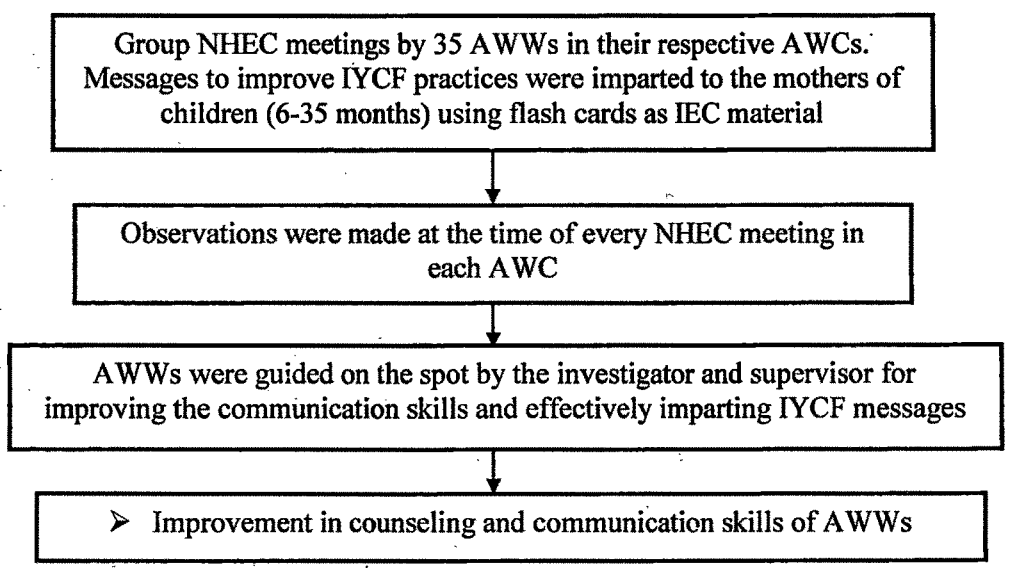
Interactive sessions through Role Plays and Demonstrations during the 4-days Training Workshop

Improving Communications Skills of AWWs through Hands on Practice of Role Plays

Reviving their drawing skills: AWWs making IEC material on IYCF messages during a chart competition at the one-day reinforcement training session

Procedure: Here each AWW held group meetings in her respective AWC and imparted NHEC to mothers on IYCF and child care using flash cards as IEC material. Each NHEC session was guided on the spot by the investigator. After the guided practice and correction of errors made by AWWs as they implemented the NHEC session, improvement in counseling and communication skills of AWWs was noted (Annexure 11).

Figure 3.5 Section 2: Continued Reinforcement of Capacity Building through Guided practice in the field



Section 3

Principle: Long term impact is likely to be seen if the NGO integrates the enhanced intervention (improved NHEC with focus on behaviour change) as per the principle of Health System Research. To document the integration of the enhanced NHEC skills in routine NGO managed ICDS, an indepth study was carried out which included functioning of AWWs and impact on the beneficiary children.

Sample: To assess whether the enhanced NHEC had any impact on the beneficiary families and 6-35 months children, it was necessary to compare "good performers (AWWs effectively conducting NHEC sessions)" with the "poor performers (AWWs not conducting the enhanced NHEC sessions)". These two were designated as the *intervened group* (IG) and the *control group* (CG) respectively. The *two* AWWs for the IG were randomly selected out of the *five* who were found to be conducting the NHEC sessions satisfactorily as revealed from the process evaluation phase (reported in the results chapter). For the CG, *two* AWWs were again randomly selected from the *five* who could not / did not conduct NHEC

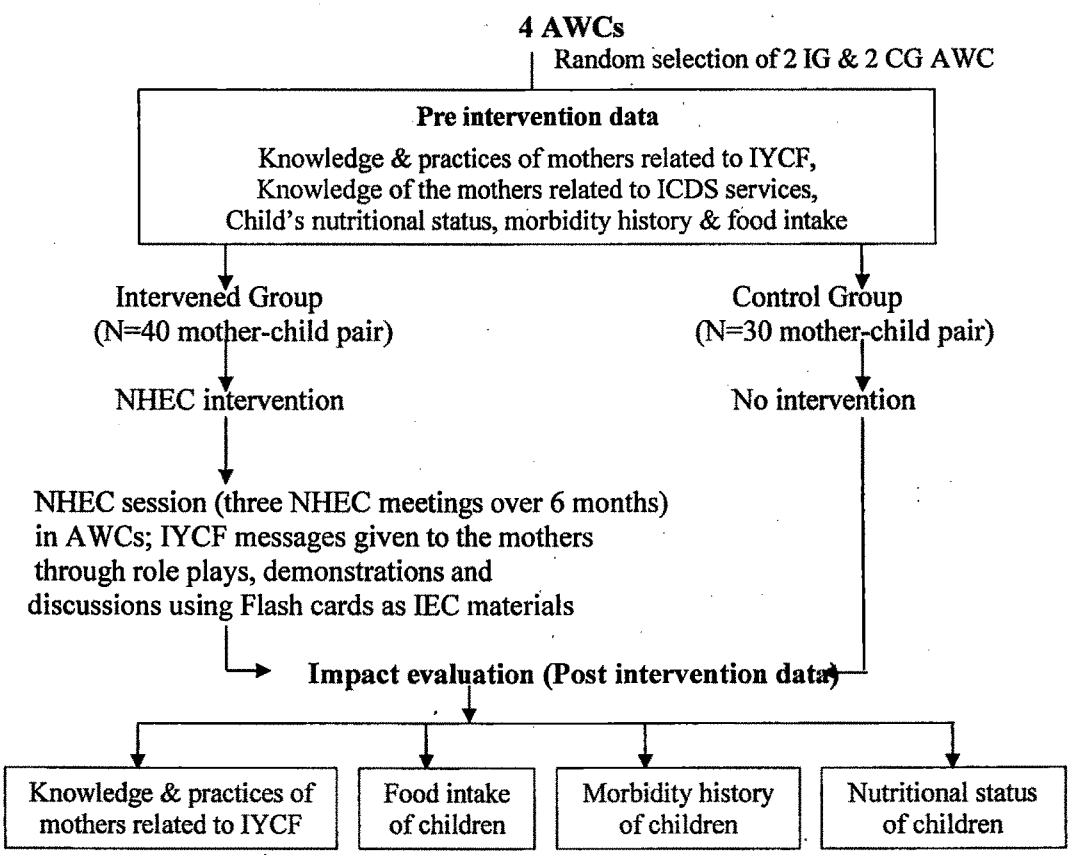
sessions for various reasons.

The two villages covered in the IG gave 40 mothers as beneficiary subjects who consented to participate in the pre and post assessment. Similarly, the two villages included in the CG gave 30 mothers as beneficiary subjects who consented for the pre-post assessment.

Data and methods: Pre intervention data was collected on knowledge and practices of mothers related to IYCF, utilization of ICDS services, nutritional status of the children, their diet intake and morbidity history as described in section 1. After an observation period of 6 months where in NHEC intervention through mother's meetings took place, post data was collected on the same above mentioned parameters. Data was analyzed and compared to see the change if any between the two groups (IG vs. CG).

During post data collection it was observed that all 40 mothers of the IG did not attend NHEC meetings conducted by the AWWs. Hence, during data analysis the IG was bifurcated into two groups: those who attended NHEC meetings (AT-NHEC) and those mothers who did not (NAT-NHEC) and these two groups were compared.

Figure 3.6 Section 3: Pre-Post Intervened vs. Control Intervention – An Indepth Study



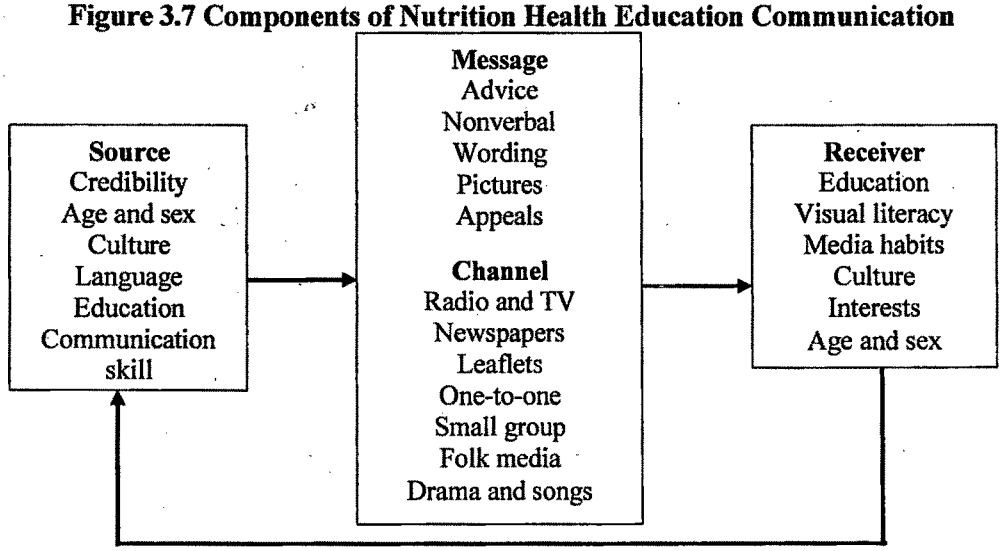
Both the Experimental and Control villages were comparable as regards key socio-economic indicators.

The Communication Component of the Intervention Process

Conceptual Framework of the Communication Process

The focus of the intervention was not just on transfer of information or improvement in knowledge but equally on communication for behaviour change. The framework of communication given by John Hubley (1993) describes the four components and formed the basis of the capacity building intervention of this study (Figure 3.7).

Figure 3.7 Components of Nutrition Health Education Communication



Source: (Hubley 1993)

The Receiver (Audience): The first step in planning any communication is to adequately understand and become familiar with the intended audience. Different individuals respond differently to the same message, with the significant causes being present in attributes of the receivers themselves.

In this study, formative research as well as literature review helped us to understand belief and practices of rural women. Efforts were made to help the AWWs become sensitive to a woman's constraints within her family and to help these women to utilize the resources available for child feeding and care through consistent nutrition education during meetings.

The Communicator (Source or Sender of communication): To give effective NHEC, the communicators / nutrition educators (here the AWWs and supervisors) needed to learn good communication skills. Any training, be it pre-service and on-job or refresher training,

should help to develop communication skills and qualities rather than focus only on content. Hence, this aspect was included in our capacity building training.

Communication skills included:

- Choosing objectives
- Deciding actual content of advice, i.e. what to say
- Deciding which learning aids to use, e.g. depending on factors like literacy level and specific audience needs
- Ability to speak clearly and sufficiently loud to be heard
- Ability to listen, ask questions and promote discussion
- Ability to address the resistance factors; the anxieties and doubts of audience
- Using non-verbal communication effectively, i.e. gestures, eye contact, tone of voice and posture to establish rapport, showing concern and respect.

The present training focused on training AWWs and Supervisors to become effective communicators by:

- Effective use of flash cards and interpersonal communication skills
- Deciding which flash cards have to be shown to the mothers depending on the practice that needs to be initiated or improved during a particular age
- Holding the flash card in such a way that the audience (all mothers) is able to view it clearly
- Explaining the picture on the flash card and reciting the slogan behind each flash card for faster learning of the message
- Talking / discussing with the mothers in a clear, audible and friendly voice

The Message: The message consists of what is actually communicated including the actual appeals, words, pictures and sounds that the communicators use to get the ideas across. A message is a methodically designed communication for information and/or motivation. A well designed message addresses itself clearly to the problem to be dealt with. It recommends a solution or action after taking into account the resistance points to the desired action and has a motivational element. A poorly designed message will fail to make the intended impact while an adequately researched and well-thought out message presented appropriately is more likely to catch the audience attention.

In this study the aspects considered while formulating the messages were:

- Messages were designed on the basis of formative research so as to target those areas of IYCF that were not optimal or were inappropriate (problem behaviours)
- The messages were focused, simple and feasible and they incorporated the reasons or explanations for following a particular behaviour. The messages were *practice oriented* and *do-able*.

- They had an emotional appeal so that the mothers would be motivated for positive action by highlighting the benefits. They also addressed 'resistance factors to change' and clarified the doubts and anxieties of mothers. For example, 'not giving water' till 6 months (EBF) was not easily accepted. This required adequate counseling, including hazards of giving water. At times, what appears to be 'resistance' is really a lack of understanding of the criticality of the behaviour and the harm that can occur if it is not followed.
- The messages were made interesting and easy to remember by incorporating slogans.

The messages related to IYCF imparted in the training, are given in Box 3.1. These IYCF messages were further imparted by the AWWs to the mothers in their respective villages through NHEC meetings.

Box 3.1 Critical Do-able messages to be imparted to mothers by AWWs regarding IYCF

- Exclusively breast feed the infants for the first 6 months
- Initiate CF at 6 months
- Improve the quantity and frequency of feeding CF

Age	Frequency of feeding CF in a day	Standard volume of CF in each serving (100ml)
6 – 9 months	3	1 cup
10 – 12 months	4	1.5 cups
1 – 3 years	5	2 cups

- Improve the quality of CF
  - Include fruits and vegetables, which are rich sources of vitamins and minerals in daily diet of children.
  - Importance of feeding fruits and vegetables and consequences of not feeding them.
- Encourage active feeding: sit with the child, encourage the child to eat more, encourage eating in a separate plate
- Improve environmental and personal hygiene of both mother and child: wash hands with soap and water before and after feeding, before cooking and after defecation
- Encourage family support: role of father and mother-in-law regarding purchasing fruits and vegetables for the family, preparing and feeding CF to the child, playing with the child and taking care of the child when mother is away for work

The Channel: This is also referred to as the communication vehicle. It is the medium or the delivery system for a message. The medium can be a person, mass media like radio, television or printed media; visual aids like flash cards or posters, audio-visuals like video. It

is important for the educators to select the appropriate channels for the intended audience and also to use them effectively.

In this study, **flash cards** were designed and developed to impart messages (given in Box 3.1) to orient the AWWs regarding effective handling of visual aids and increasing the interest value of the service (Annexure 12). The AWWs enacted role plays to practice counseling the messages and using the flash cards keeping in view the communication aspect. **One set of 12 flash cards** was given to each AWW which was later used as a communication tool to impart NHE to mothers in their village.

Aspects considered while designing the flash cards:

- Each flash-card depicted only one message with pictures, making it simple for many illiterate mothers to understand.
- To convey the message clearly, comparison strategy was used. For example, to show the importance of consuming fruits and green leafy vegetables, a picture comparing a healthy child (consuming fruits and green leafy vegetables) and a weak child (consuming fried unhealthy snacks) was used.
- Behind each flash card the specific message was written along with a brief explanation in order to guide the communicator during group meetings.
- Each flash-card also carried a slogan which would help the functionaries and beneficiaries to remember the message easily.
- Flash-cards were made attractive by use of few bright colours.
- The pictures were developed keeping in mind the rural environment.
- The flash-cards were made gender sensitive by including pictures of both girl and boy child.
- The language on the flash card was simple, crisp and culturally relevant (in Gujarati).
- The flash-cards were pre-tested to know if the messages were acceptable and effectively conveyed.

The Communication Process

After understanding the audience, preparing the messages and developing the IEC material, it is very important for the trainer to use the learning aid effectively during the training sessions and further for the AWWs when they conduct NHEC meetings or home visits with the mothers.

Aspects considered to make the teaching-learning process effective and successful were:

- Flash cards were used to encourage people to share their experience. For example, if a story was depicted in the visual, the trainer explained the story and requested the AWWs to share their experiences.
- Flash cards were held high enough for all to see; care was taken to see that it faced the audience all the time.
- Messages were read out loud and key points were emphasized.
- Pictures and messages were pointed out rather than just speaking it out.
- Simple terms in local language were used and questions were asked in between making sure that the audience has understood the message well.
- Finally, the audience was asked to clarify any doubts or concerns about practicing the advice given; and whether they were convinced about the practice shown.

Given below are the elements of communication strategy for

a) improving quality of implementation of ICDS services and

b) improving the IYCF practices of the mothers

Elements of Communication Strategy for Improving the Quality of Implementation of ICDS Services

Message	Behavioural content / Cognitive content	Motivational appeal	Message approach	Visual aids used
Implementation of GM service	Use of Growth chart as NHE material to explain its use and importance	Mothers will gain knowledge about importance of GM and its impact on child's nutritional status	Discussion and explaining the growth chart	Growth chart
Improving SF program	Importance of SF, quality & quantity of foods, variety of SF, standardization of recipes, maintenance of hygiene	SF gives extra nutrition and improves health of the children; increases the attendance at AWCs	Discussion and demonstration	Standard measurements, cooked volumes of SF and serving sizes; Flash cards
Improve *Rab* Supplementation program	Regularize *rab* supplementation	Timely initiation of CF; growth and development of the child	Demonstration and discussion	Standard measurements, serving sizes
Imparting NHE to mothers of young children to improve IYCF practices	Improving communication skills, importance of group meetings, organize group meetings twice a month, make regular home visits	Improvement in knowledge and IYCF practices of the mothers, improved nutritional status of children	Group discussion, role plays	Flash cards

Components of each message

They are given in Annexure 20 and they relate to improving the quality of implementation of GM, SF and NHE services. They include objective of each component (behavioural and cognitive objective), communication method, procedure and evaluation criteria used.

Elements of Communication Strategy for Improving the IYCF Practices of the Mothers

Message	Motivational appeal	Attitudinal Barrier / Resistance	Message approach	Visual aids used
EBF for 6 months	Mother's milk is complete food for the child's growth and development till 6 months	Mother's milk is not sufficient; Child feels thirsty; water is necessary	Discussion & role play	Flash card (benefits of EBF and hazards of feeding water)
Initiation of CF at 6 months	Child will have normal growth and development; Child will become healthy; Child will learn to eat and accept foods other than BM	Child is very young to digest foods; Mother's milk is sufficient	Comparison through role play	Flash card (a healthy child when mother is feeding CF; a weak child when child is only on BM)
Improve quantity and frequency of CF	Child will learn to eat; Child's height and weight will increase; Child will become playful	Child is very young to digest more quantity of food; Child does not like CF	Discussion & demonstration	Flash card (quantity and frequency of CF for different age groups). Demonstration of different amounts of cooked CFs
Improve quality of CF	Child's eye sight will improve; skin and hair will glow; Child will remain playful; Child will have normal growth and development; immunity to fight against diseases will increase	Child does not like vegetables; Child does not eat spicy food we eat; Cannot afford to purchase fruits and vegetables for the child.	Comparison and discussion	Flash card (rich sources of Iron, vitamin A and vitamin C; comparison of child suffering from micronutrient deficiencies and a healthy child eating fruits and vegetables)
Practice active feeding	Child will get optimal nutrition; Child's appetite will improve; Mother will know the quantity of CF the child eats.	Mother does not have time to sit with the child; has lot of house work; Child can eat on its own.	Comparison and role play	Flash card (difference in the health of the child who is actively fed and other who is left alone)
Maintain good hygiene (personal and environmental)	Child will not fall ill frequently; Child will remain healthy on consuming freshly cooked food kept covered.	Mother cooks early and goes for work; children eat on their own; mother forgets to wash child's hands before feeding and	Role play	Flash card (good vs. poor hygiene practices; a weak child who is dirty vs. a healthy child kept clean)

Message	Motivational appeal	Attitudinal Barrier / Resistance	Message approach	Visual aids used
		after defecation.		
Family support	Family members support the mother to take optimal care and upbringing of the child	Father does not have time for child care and MIL feels it is not her work	Role play	Flash card (father taking child to the market; MIL feeding the child when mother is completing house hold chores)

Part B: Process and Impact Evaluation

Process Evaluation of the Intervention and Guided Practice to Improve Performance

Process evaluation was an ongoing phase. It included assessing the feasibility and sustainability of the intervention as regards implementation of the improved NHE service by the AWWs. After the 4-day training workshop and one reinforcement session after one month, 35 AWWs out of 40 held NHEC meetings at their respective AWCs and imparted nutrition-health education to mothers regarding ICDS services, child feeding and care practices. Continuous unstructured observations were recorded using an observation checklist to assess improvement in the communication skills of the AWWs during the enhanced NHEC sessions (Annexure 11). Each enhanced NHEC session was critically observed and on the spot guidance was given by the investigator. Further, improvement in the quality of functioning of AWWs related to other ICDS services was also observed and noted.

The indicators and tools for process evaluation of the intervention are given in Table 3.2

Table 3.2 Indicators and Tools for Process Evaluation

Indicators	Method and Tool	Sample
Evaluation of the NHEC meetings conducted by the AWWs with respect to: ▪ Technical competence ▪ Communication skills ▪ Use of flash cards ▪ Participation of mothers	On site observation in each NHEC meeting Feedback and on the spot guidance to improve their communication skills	35
Improvement in knowledge of AWWs related to IYCF and ICDS services	Semi Structured Interview (Annexure 13 and 14)	20
Quality of implementation of ICDS services	Direct / spot observations	40

After the intervention period, the 20AWWs (50% of total) interviewed at baseline were interviewed again to assess the change in knowledge related to ICDS services and IYCF practices. Improvement in quality of functioning of AWCs was assessed through spot observations (Annexure 18).

Impact Evaluation with a focus on Beneficiaries: The In-depth Study

As mentioned earlier, (Phase II, section 3), an in-depth study was carried out which included the pre and post evaluation of the NHEC intervention in two intervened villages, including all the households with children aged 6-35 months who were willing to participate and continued to be present during and after completion of the intervention. For comparison, similar assessment was also made on households with children in the same age group in the control village, where AWWs did not conduct any NHEC session.

Table 3.3 summarizes the quantitative and qualitative indicators of data collection employed for pre- post NHEC data collection.

Table 3.3 Indicators and Tools for Data Collection Pre-Post Intervention

Indicators	Method and Tool	Sample
Change in knowledge of mothers related to ICDS services (Pre vs. Post IG) Improvement in knowledge related to IYCF practices of mothers (pre-post IG vs. CG)	Semi-structured interview (Annexure 15, 16 and 17)	IG=40 IG=40 CG=30
Change in food intake of the children	24-hour dietary recall	IG=38 CG=30
Change in Anthropometric indicators of the children (6-35 months) Weight for age, Height for age & Weight for height	Standard procedures	IG=40 CG=30
Change in hygiene practices; morbidity profile of the children	Semi-structured interview	IG=40 CG=30

Description of the methods used for Process and Impact evaluation

1. On field observation and feedback

Procedure: Each enhanced NHEC session conducted by the AWW was critically observed through continuous unstructured observations. Later these observations were categorized based on the communication criteria devised for evaluation (described in Results chapter). Each positive skill (strength) and negative behaviour (weakness) were given scores and based on the mean score obtained, each NHEC session was ranked as good or poor.

2. Follow up meetings with AWWs

Purpose: Immediately after the training workshop, monthly meetings were held with the AWWs and supervisors to discuss any constraint or difficulties they faced while conducting the NHEC sessions. The meetings were clubbed with the monthly MPR meetings at the NGO premises so that all AWWs were available at one time. These meetings were a good medium to discuss with the whole group and solve the problems they encountered during NHEC sessions.

3. Monitoring checklist for Supervisors

Purpose: After the training workshop, a structured observation checklist was designed by investigator and given to the supervisors to monitor the quality of implementation of AWC services (GM, SF, *Rab* supplementation and NHE).

Procedure: The supervisors used this checklist during each routine visit and NHEC session. This checklist guided the supervisor to monitor the communication skills of the AWWs while they imparted IYCF messages to the mothers.

4. Direct Observations

Principle: As stated earlier, careful observations of events and behaviours provide valuable data about what is actually occurring and validates reported data. Both spot observations and unstructured observations were used.

Purpose: Spot observations were used to assess the quality of implementation of ICDS services in the AWCs after the intervention. Random visits were made by the investigator and supervisors, and the AWWs were observed during the working hours of the AWCs. Whatever was observed at that instance was noted down and later categorized according to each service. Unstructured/continuous monitoring observations were made to record the routine activities during a typical day at the AWC. The investigator recorded all that she observed over a specified period of time (working hours of AWC).

5. Semi-structured interview

Principle: As described earlier, a semi-structured interview is carried out on the basis of a question guide that enlists questions regarding the topics that need to be covered. Some questions are structured and some are open-ended.

Procedure: Semi-structured interviews were carried out with

a) the mothers of children 6-35 months both before and after the NHEC intervention to

assess the change in IYCF awareness and practices. The aspects covered were: IYCF knowledge and practices, Morbidity history of the child, Health seeking knowledge and practices, Hygiene related knowledge and practices.

b) 20 AWWs after the intervention to assess the change in knowledge related to IYCF practices. This data was analyzed and compared to the data collected on the same 20 AWWs during the formative research in Phase I.

Quantitative Methods

As seen in Table 3.3, the quantitative methods used in this phase included measurements of height and weight (anthropometry) and diet and nutrient intake (24 hour diet recall) of children.

Data Analysis

The various aspects of **quantitative** and **qualitative** data analysis are described in this section. One of the strengths of this study is Triangulation of Methods. **Triangulation** is the use of multiple research methods to study the same problem. An integration of quantitative data with qualitative data can provide insight into the values and subjective perceptions of the subjects studied, particularly the socio-cultural, economic and political contexts in which those perceptions and values are generated, thus aiding in the interpretation of survey data (Glik et al 1987).

Triangulation was first used in social sciences by Campbell and Fiske (1959). They argued that more than one method should be used in the validation process that the variance reflected is that of the trait and not of the method. The effectiveness of triangulation rests on the premise that the weaknesses in each single method will be compensated by the strengths of another. Triangulation allows researchers to be more confident of their results.

Qualitative data

Semi-structured interview (Phase I and II)

The questionnaire data for ICDS services and IYCF awareness and practices obtained from the functionaries and beneficiaries were quantified and their frequencies and percentages were presented in a tabular form. Others were presented in form of text or graphs. Verbatim statements were used to illustrate responses of the AWWs and mothers. Textual interpretation and discussion were also provided.

Observations (Phase I and II)

The ***direct observation*** data of the child, mother and the surrounding environment was analyzed and their frequencies and percentages were presented in tabular form.

The raw field notes obtained during ***continuous unstructured observations*** (functioning of AWCs) were expanded, translated in English (if some parts were written in Gujarati) and a typical day at AWC was figured out. Significant verbatim quotes were retained in Gujarati language with English equivalent given in parenthesis.

The ***spot observation*** data collected at AWCs during field visits by the investigator and supervisors was read carefully and segregated according to different ICDS services. These observations gave a clear picture of the functioning of the AWC and the importance given to each ICDS service before and after the NHEC intervention.

Analysis on Sub samples

The data was analyzed for age-wise and gender differences for Phase I and II. Further, a small portion (sub sample) of Phase I was segregated into REG-AWC (regularly attending AWC) and IREG-AWC (irregularly attending AWC) and analyzed to assess the difference in knowledge of mothers and nutritional status of these children. Similarly, in Phase II (impact evaluation), the Intervened group (IG) data was further segregated into AT-NHEC (attended NHEC sessions) and NAT-NHEC (not attended NHEC sessions) and the change in knowledge of the mothers after the intervention was compared.

Quantitative Data

The quantitative data was statistically analyzed (Chi square and 't' test) to test the differences between the means or proportions of selected parameters using the Epi info 6.04D computer package (CDC Atlanta, USA 2001) and WHO Anthro 2007 package where appropriate. The analyzed quantitative data were displayed as tables and graphs with accompanying text containing interpretation of data and discussion.

Anthropometric data (Phase I and II)

Data related to anthropometric measurements of weights and heights of children were calculated and mean ± SE (standard error) and median values were analyzed. WHO Growth Standards (2007) were used as reference standards for children. Underweight, stunting and wasting were defined based on weight-for-age, height-for-age and weight-for-height Z

scores. Though the data was collected on all 115 children (Phase I) and on 40 children in IG and 30 children in CG (Phase II), the sample size varied due to auto flagging of records (extreme values) by the WHO Anthro 2007 package. Data of weight, height and BMI of mothers were calculated and mean ± SE were analyzed.

In Phase I, the nutritional status of children assessed using WHO standards was compared with data analyzed using NCHS standards (1983).

Diet intake data (Phase I and II)

The diet intake data of food groups and nutrients was analyzed and mean, median, standard deviation and standard error were calculated for the actual intake and percentage of RDA. In Phase I, complete data was obtained on 50% (N=60) of the total 115 children and in Phase II, complete data pre and post was available for 38 children in IG and 30 children in CG.

Scoring System

The indicators and scoring system used for assigning scores to hygiene observations (child, mother and surroundings) in Phase I are explained below:

Hygiene Score

Hygiene of child: clean face, no discharge from eyes, mouth, nose; hair neatly combed, no dirt visible; hands clean; nails cut short, no dirt retained; clothes clean.

Scoring system: The presence of each indicator was assigned a score of 1. Hence the maximum score for hygiene of child was 10.

Hygiene of mother: clean face, no discharge from eyes, nose; hair neatly combed, no dirt visible; hands clean; nails cut short, no dirt retained; clothes clean.

Scoring system: The presence of each indicator was assigned a score of 1. Hence the maximum score for hygiene of mother was 9.

Hygiene of surrounding: no stagnant water inside house, no stagnant water/garbage outside house; water storage utensil clean, covered, kept above floor level, ladle (*Doya*) used for taking water; clean floor and free from dust; proper cross ventilation in house; toilet facility inside house/near veranda.

Scoring system: The presence of each indicator was assigned a score of 1. Hence the maximum score for the hygiene of surrounding was 9.

Using the HSR framework (Figure 3.1), the strengths and limitations of the NGO managed ICDS were highlighted. Secondly, post intervention, the components of ICDS in which improvement was seen and also where improvement was not seen were studied and reasons for lack of change were discussed. All through the results, the data obtained from various methods (interviews and observations) were compared and triangulated. Similarities and differences of the data sets were studied and discussed in both Phase I and II.

The next chapter presents the findings of the study.