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 health care and other services in 27 villages in and around Nandesari area of Vadodara district. This NGO offers various nutrition care and health services in these villages and also implements the government program Integrated Child Development Services (ICDS) in these villages.

The present study was carried out with the following **General Objectives:**

- To study Infant and Young Child Feeding (IYCF) and Care practices and resources available for Care, in relation to breastfeeding and complementary feeding practices in children 3-24 months, in rural Vadodara.
- To improve IYCF and Care practices for children 6-36 months through capacity building of local community groups i.e. *Bachat Mandals* or savings groups which are run by a local Non Governmental Organization (NGO).

This research consisted of two research studies in accordance with two broad objectives given above. 'Study I' formed the basis of the intervention and process-impact evaluation described in 'Study II'. The **specific objectives** of each study are given below.

Study I: Breastfeeding, Complementary Feeding and Care Practices in Rural Vadodara

1. To assess the infant and young child feeding (IYCF) and Caregiving knowledge and practices of the mothers in relation to:
   1.1. Newborn feeding and breastfeeding (initiation of breastfeeding, colostrum feeding, prelacteal feeding, water feeding, exclusive breast feeding-EBF and top milk feeding)
   1.2. Infant feeding (complementary feeding-CF)
   1.3. Health related knowledge and practices
   1.4. Feeding during and after illness (BF, CF)

1.5. Hygiene care (personal hygiene of mother and child, surrounding and food safety)

2. To study resources available to the mother or child Caregiver for Care in terms of
   2.1. Economic resources: the socio-economic status of the family
   2.2. Nutritional status and well being of mother
   2.3. The role of mother in family decision making
   2.4. Family support for child Care
3. To study the morbidity history of the children (3-24 months).
4. To assess the dietary intake of the children from complementary foods.
5. To assess the nutritional status of the children (3-24 months) in terms of prevalence of under nutrition as measured by weight-for-age, height-for-age, and weight-for-height.
6. To study association between Caregiving behaviours and dietary intake as well as nutritional status of the child.
7. To study the association of resources of Caregiving with Caregiving behaviours and child's nutritional status.

Study II: Community Based Intervention Through Capacity Building of Bachat Mandal (BM) Members

- To improve the knowledge of BM members regarding feeding and Care of children less than 3 years of age.
- To build their communication skills with the use of appropriate IEC material in form of flash cards containing appropriate infant and young child feeding (IYCF) messages.
- To educate the BM members to adequately address the concerns or attitudinal barriers of the mothers, which would prevent them from adopting the recommended practices.
- To train them as regards effective use of the Child Feeding and Caregiving checklist as a tool to suggest appropriate feeding behaviours to the mothers as well as to document the change in practices during every home-visit.

Process Evaluation of the Intervention-Perspective of the Bachat Mandal (BM) Members

1. To study the effect of the Capacity building training of BM members on improvement in their knowledge regarding IYCF and Care.
2. To assess the strengths and weakness of Nutrition Education Communication (NEC) carried out by BM members through home visits.
3. To make efforts to further improve the performance of BM members through guided practice.
4. To assess the number and quality of home visits made by BM members as well as the accuracy of filling checklist given (monitoring).

Impact Evaluation of the Intervention

1. To conduct an impact evaluation of NEC intervention in terms of:
   1.1. Mother's recall of NEC messages imparted
   1.2. Change in IYCF and Care practices of mothers in the intervention villages as compared with the control village.
   1.3. Reasons underlying the specific behaviour changes (or lack of change).
   1.4. Change in morbidity profile of the children.
   1.5. Change in food intake of the children (6-36 months) through complementary foods.
   1.6. Change in nutritional status of the children (6-36 months).

Site of the Study and Sample Selection

The study was carried out with the support of a local Non Government Organization (NGO), which offers health care and other services in 27 villages in and around Nandesari area of Vadodara district. Among the many community development programs, the NGO promotes women's economic and social development through various community based programs involving women, including microcredit groups.

Study I: Breastfeeding, Complementary Feeding and Care Practices in Rural Vadodara

For baseline data collection, the study area consisted of five randomly selected villages from the 27 villages under the NGO. Among these selected villages, all those children upto 3 years who were available and whose parents consented to participate were enrolled. For ethical reasons the intervention did not exclude any child but for baseline data collection, in order to remain focused and adhere to the timeline of the study, the age group of 3-24 months was considered. This age group is most vulnerable as far as malnutrition is concerned. Hence Study I data was collected on 106 children (3-24 months). Details of sampling process are given in Annexure 15(A).

As **Figure 3.1** shows, Study I consisted of three major components:

Components	Methods
▪ Knowledge, attitude and practices of the mothers regarding IYCF and Care.	✓ Individual semi-structured interviews. Here all 106 children were included. ✓ Twenty-four hour dietary recall method (focusing on complementary feeding). Here random 50% of the sample was included (n=53). ✓ Direct observation method: breastfeeding and complementary feeding. During field visits all through data collection, the researcher was able to observe 40 children for breastfeeding and 13 children for complementary feeding episodes.
▪ Assessing available resources for Care	✓ Individual semi-structured interviews. Here mothers of all 106 children were included. ✓ Individual semi-structured interviews focusing on family support i.e. perceptions of grandmothers regarding IYCF and Care and support extended to mother in child Care. *All* households which were included in the baseline and which had presence of grandmother (GMP) (n= 31) were taken. Out of the remaining families where grandmother

was absent, 39 families had children in a similar age range of 3-24 months and therefore these formed the comparison group. Both groups were similar as regards the key socio-economic variables i.e. type of house, mean number of children, mean income and average educational levels of parents.

✓ Standard methods for weight, height and BMI of all the 106 mothers.

- Assessing nutritional status of the children

✓ Standard methods for weight and height of all the 106 children.

Table 3.1 Indicators and Tools for Data Collection: Study I

Indicator	Sample	Method and Tool	Reference
Anthropometry ▪ Weight for age, Height for age and weight for height (children 3-24 months) ▪ Weight, height and Body Mass Index (mother of the index child)	102 106	Standard methods	Cogill B, 2003 Gibson, 1989
Awareness and practices of mother related to breastfeeding, complementary feeding and Care	106	Semi-structured interview schedule (Annexure 1)	Bernard, 1991
Health care seeking practices			
Morbidity			
Socio-economic status			
Role of mother in family decision-making			
Influences on mothers: IYCF decisions			
Family support received by the mother ▫ Perceptions of family members (particularly grandmother) regarding support given by them to the mother for breastfeeding, complementary feeding and health care practices	31	(Annexure 2)	
Feeding episodes: ▪ Breast feeding ▪ Complementary feeding	 40 13	Direct observation (using checklist) (Annexure 3)	Bernard, 1991
Hygiene of the mother, child and environment	106	Direct observation (Annexure 4)	Bernard, 1991
Dietary intake	53	24-hour dietary recall (one day) (Annexure 5)	Thomson and Byers, 1994

Figure 3.1 Study Design of Study I

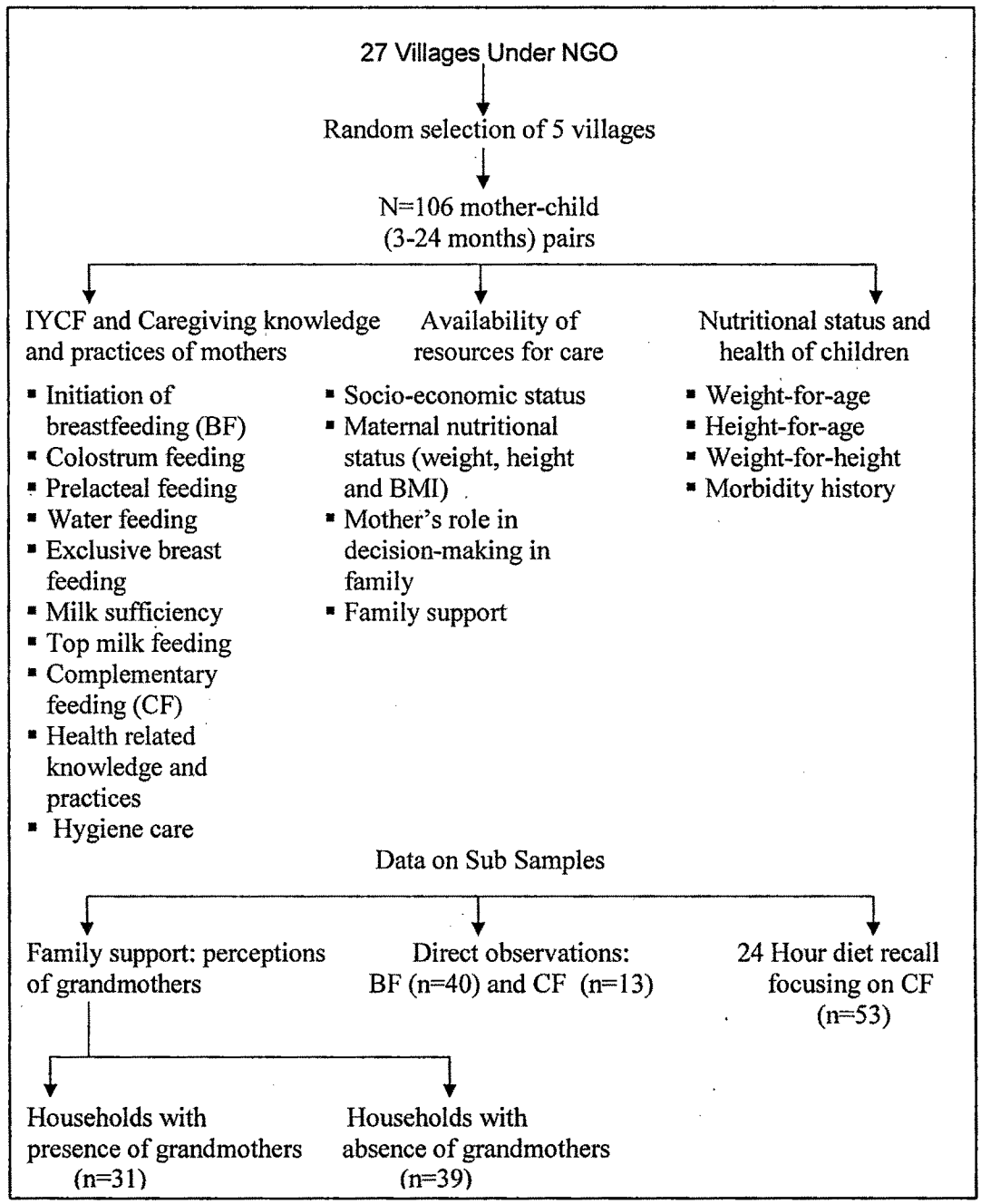


Table 3.1 summarizes the quantitative and qualitative indicators of data collection employed for Study I.

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.

1. 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.

Procedure: The mothers and grandmothers of young children (3-24 months) were interviewed using a semi-structured question guide.

The interview schedule for mothers (**Annexure 1**) included questions on the following aspects:

- Socio-economic status
- Reproductive history
- Knowledge of the mothers related to infant and young child feeding (IYCF) and care.
- Morbidity and feeding during and after illness
- Role of mothers in family decision-making
- Health related knowledge and health care seeking practices of the mothers
- Family support received by the mothers

The interview schedule for grandmothers (**Annexure 2**) included questions on the following aspects:

- Knowledge related to IYCF (breast feeding and complementary feeding)
- Feeding during and after illness
- Support given to the mothers for child care and household work

2. 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).

Procedure: Observations were recorded through a observation checklist. The aim of observations was to assess the breastfeeding and complementary feeding practices (**Annexure 3**), hygiene of the mother, child and the surroundings (**Annexure 4**).

3. Dietary intake by twenty-four hour dietary 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 recipes being followed in the region.

Procedure: The mothers of children (3-24 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 5**). 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 (Butt et al 2000, ICMR 1991, WHO/UNICEF 1998, WHO 2002 b). Food intake of various food groups by the child was compared with the RDA for recommended foods for each age group (NIN 1998). Various sources for RDA were used because there is no single source or reference giving RDA for nutrients from complementary foods for all the age groups of this study.

Assessment of Child's Weight

Assessment of Mother's Weight

24-Hr Diet Recall

Sharma and Kanai, 2008

4. Nutrition assessment by 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 (3-24 months), weight and height measurements were used.

4.1. 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.

Procedure: The mother and child (more than one year of age) 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 less than one year of age were weighed on a Salter scale. The infant 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.

4.2. 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.

Procedure: A fiberglass tape was used for measuring the height of the children. 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.

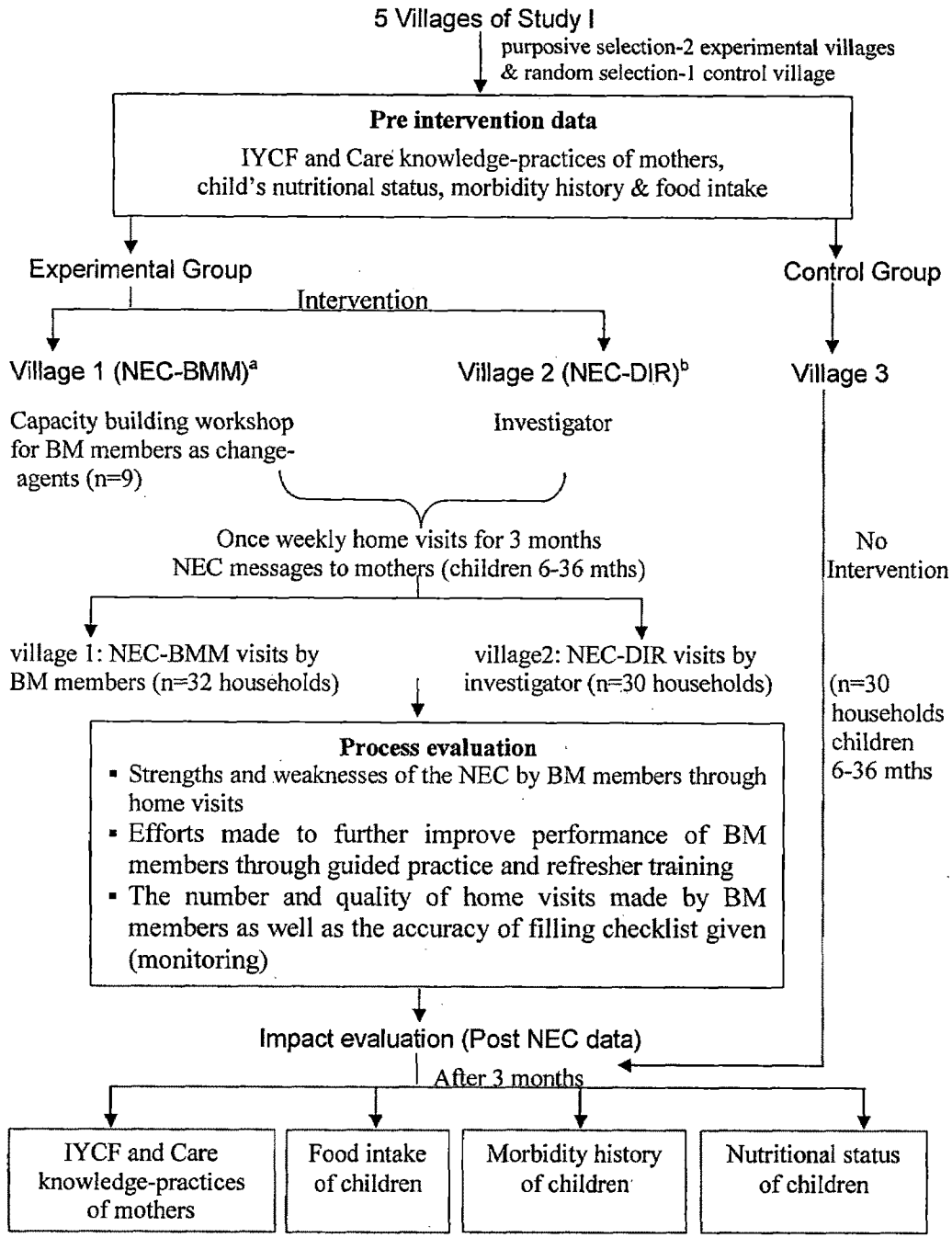
Study I was followed by an intervention to improve the IYCF knowledge and practices of mothers through capacity building of local community groups i.e. *bachat mandals* or savings groups and process-impact evaluation (Study II).

Study II: Community Based Intervention Through Capacity Building of Bachat Mandal Members

From the five villages included in the Study I, the intervention was carried out in two purposively selected villages and one randomly selected village served as the control. **Figure 3.2** gives the overview of the intervention. The description of the NEC strategy is given below. Annexure 15(8) gives sampling details.

Village 1: Nutrition Education and Communication (NEC) intervention through capacity building of *bachat mandal* members (BM members) i.e. *NEC-BMM* was carried out in one village. Here 9 women BM members from various *bachat mandals* within the village volunteered to participate. They were trained in a capacity building workshop as regards communicating simple and focused IYCF messages and given flash cards to use as visual aids during home visit counseling. This training was spread out in 3 sessions of 2 hours each, carried out on separate days. Each BM member was expected to contact around 3-4 mothers of children (6-36 months) in their neighbourhood once a week for 3 months by means of home visits and this was recorded in a simple checklist. A total of 32 families were covered by the BM members. Refresher training was carried out for the BM members after 1 month of the intervention.

Figure 3.2 Study Design of Study II



(NEC-BMM)[a] Nutrition Education Communication through capacity building of *bachat mandal* members

(NEC-DIR)[b] Nutrition Education Communication through direct home visit by reseracher

Village 2: In order to compare the performance of *bachat mandal* in facilitating behaviour change among their neighbourhood women, the NEC intervention through direct home visit i.e. *NEC-DIR* was carried out in another village by the researcher. The same NEC messages using the same flash cards were imparted by the researcher by means of home visits once a week for 3 months to all the mothers (n= 30) with children 6-36months.

Village 3: The third village served as the control where no NEC intervention was carried out.

All the three villages were comparable as regards key socio-economic indicators.

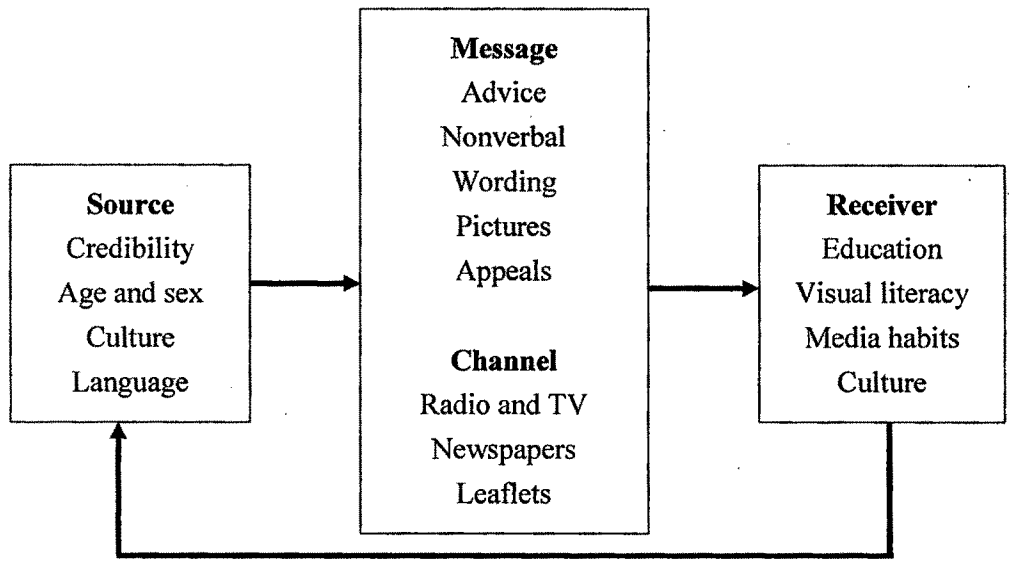
The Capacity Building Intervention for the BM Members in the Present Study

In accordance with the objectives mentioned earlier the intervention is briefly described below.

Conceptual framework of the intervention

From the situational analysis in Study I as well as from the review of literature, it became clear that infant and young child feeding practices and knowledge, especially breastfeeding, complementary feeding and Care was inappropriate and inadequate among the mothers/Caregivers in rural Vadodara. The review also revealed that community based interventions, especially involving women's groups, could prove to be a successful strategy. Therefore, the NEC intervention was implemented involving capacity-building training of local women's *Bachat Mandals* (savings groups) so as, to enable them to support community women to improve breastfeeding, complementary feeding and hygiene care practices for their children. 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 four components and formed the basis of the capacity building intervention of this study (**Figure 3.3**).

Figure 3.3 Components of Nutrition 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 (Study I) as well as literature review helped us to understand belief and practices of village women and also the role of BM members. Efforts were made to help BM members become sensitive to a woman's constraints within her family and to involve the family members especially grandmothers and fathers in nutrition education during the home visits.

The communicator (source or sender of communication)

In order to do their job well, the communicators or the community health and nutrition educators need to learn good communication skills; hence this aspect was included in the capacity building training.

- Communication skills includes:
  - Choosing objectives
  - Deciding actual content of advice, i.e. what to say.
  - Deciding which learning aids to use.
  - Ability to speak clearly and sufficiently loud to be heard.
  - Ability to listen, ask questions, promote discussion.

Use of non-verbal communication is important, which includes gestures, eye contact, tone of voice and posture to establish rapport, showing concern and respect and encouraging responses.

The present training focused on being an effective communicator or sender:

- Effective use of flash cards and interpersonal communication skills.
  - Deciding which flash cards have to be shown to the mother depending on the practice that needs to be initiated or improved.
  - Holding the flash card in such a way that the mother is able to view it clearly.
  - Explaining the picture on the flash card and reciting the slogan behind each flash card.
  - Talking 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, and 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 infant feeding and Care that were not optimal or inappropriate and also to know the reasons behind them.

- The messages were focused, simple and feasible and they incorporated the reasons or explanations for following a particular behaviour.
- They had an emotional appeal so that the mothers would be motivated for positive action. For example, the message on appropriate amount and frequency of complementary feeding also included the benefits for the child if the mothers fed correct amount of foods and adequate number of times. At the same time the consequences of not following the behaviour were also mentioned i.e. lack of adequate growth (weight and height) and frequent illness.
- The messages were made interesting and easy to remember by incorporating slogans.

The channel

This is also sometimes referred to as the communication vehicle. It is same as the medium, which is 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.

A set of 12 flash cards was used as the medium of communication in the intervention. Aspects considered while designing the flash cards:

- Since many mothers were illiterate, the front of the flash cards consisted of the messages depicted through pictures and very little text was used.
- Behind each flash card the specific message was written along with a brief explanation so as to guide the nutrition education communication during home visits.
- The pictures were culturally relevant, simple and incorporated comparisons so as to be quickly and easily understood by the mothers. For example, comparing a weak child who had been initiated complementary foods much beyond 6 months with a healthy child who began complementary feeding at the right age. The

pictures were also gender sensitive, depicting both girl and boy child.

- The language on the flash card was simple, crisp and culturally relevant (in Gujarati).

Why were members of savings groups considered as ideal senders of messages?

- The BM members were already involved in a community activity.
- Had self motivation and family support to engage in home visits.
- They were literate and able to read as well as write.
- Belonged to the same village, they were well known among the neighbourhood women and enjoyed good rapport with them.

The implementation of the Capacity building training workshop

Keeping the above in mind, the sessions of the three-day interactive capacity building training were about 2-3 hours each. In addition to the knowledge oriented sessions, role plays and hands-on-practice component in the form of group discussions and demonstration were also included. Further, on the last day of the training, role-plays by the BM members to the whole group were conducted for further reinforcing the messages, to give them practice regarding communication skills and handling of flash cards. Feedback was given after role-play to improve their counseling skills.
(Please see **Annexure 6** for workshop program and sessions)

The last session of the capacity building training also focused on how the home visit could be **documented** in a simple checklist. The aspects documented in the checklist have been explained later.

Feedback of the workshop session through a self administered questionnaire

Principle: This type of questionnaire is meant to be filled out by the respondent under guidance of the investigator. It carries a set of questions pertaining to the topic of relevance. This questionnaire maybe structured, or semi-structured, or both.

Purpose: In the present study, the questionnaire for the BM members was meant to obtain their feedback regarding the capacity building training – how well the messages were communicated and the change in knowledge of the BM members regarding breastfeeding, complementary feeding and hygiene care.. The following four questions were asked to the participants after each of the three training sessions (**Annexure 7**).

- How did you find the information given in the training?
- Did you understand the content of the information? / Found it easy?
- Was the training session audible and clear to you?
- Were the flashcards shown during the training visible to you?

Another self administered questionnaire (semi-structured) assessed improvement among the BM members regarding various aspects of child feeding and Care, pre to post capacity building training (**Annexure 8**). This questionnaire was also administered four months after the intervention to check the retention of messages by the BM members. Following aspects were covered in the questionnaire:

- Exclusive breastfeeding and Initiation of complementary feeding.
- Quantity and quality of complementary foods.
- Active feeding and hygiene.
- Family support for child Care.

Process Evaluation of the Intervention

The process evaluation was carried out with respect to the success of the capacity building of 9 women *bachat mandal* (BM) members within one village; those who had volunteered as change agents for improving BF, CF and Care practices in their village (NEC-BMM).

The data obtained in NEC-BMM village as regards performance of BM members was compared with the data obtained from NEC-DIR village.

The indicators and tools for process evaluation of the intervention is given in **Table 3.2.**

Table 3.2 Indicators and Tools for Process Evaluation of the Intervention

Indicators	Method and Tool	Sample
Strengths and weakness of BM members in carrying out home-visits with respect to: ▪ Communication skills ▪ Use of flash cards ▪ Accuracy of filling monitoring check lists	▪ On site observation in the field and giving feedback for each BM member especially in initial home visits. ▪ Follow up weekly meetings with BM members ▪ Review of monitoring checklist filled by BM members (Annexure 10) ▪ Feedback from mothers using structured checklist (Annexure 9 and 11)	9 BM members 19 mothers
Number of home visits carried out	Follow up weekly meetings with BM members	9 BM members

Description of the methods used for data collection

1. On field observation and feedback

Procedure: After the capacity building training sessions, unstructured observations were made, for the initial home visit carried out by each of the BM members to assess the quality of implementation of home visits with regard to NEC messages imparted, use of flash cards and filling of checklist, as well as to further improve their communication skills.

2. Follow up weekly meetings with BM members

Purpose: Throughout the intervention period of 3 months, weekly meetings were held with the BM members to monitor the progress of home visits, completion of checklists given to them and also to solve the problems encountered by them during home visits if any.

3. Structured checklist

Purpose: Two months after beginning of the intervention a structured checklist was used to cross check/validate the performance of BM members by visiting the mothers.

Procedure: Around half of the mothers (n=19) under BM members were randomly interviewed in the absence of the BM member. The content of the checklist pertained to:

- The number of home visits made by the BM member.
- Type of messages received and the use of flash cards by BM members. **(Annexure 9)**
- Whether the mother had tried the suggested child Feeding and Care behaviours (during the last one week) according to the age of the child (**Annexure 11**).

Impact Evaluation of the Intervention

The data for pre and post evaluation of the NEC was collected in the two intervention villages, for all the households with children aged 6-36 months who were willing to participate and continued to be present during and after completion of the intervention period (3 months). This sample was 32 for NEC-BMM and 30 for NEC-DIR village. For comparison, similar assessment was also made on 30 households with children in the same age group in the control village. **Table 3.3** summarizes the quantitative and qualitative indicators of data collection employed for pre, post NEC data collection.

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

Indicators	Sample	Method and Tool	Reference
Change in IYCF and Care practices of mothers during the intervention period	62 45	▪ Structured check list (Annexure 10 and 11) ▪ Unstructured observation in the field (NEC-DIR)	Bernard, 1991
Mother's recall of NEC messages, improvement in IYCF and Care practices of mothers (pre to post intervention)	62	Semi-structured interview (Annexure 12 and 13)	Bernard, 1991
Change in food intake of the children through complementary foods	62	24-hour dietary recall (one day) (Annexure 5)	Thomson and Byers, 1994
Change in Anthropometric indicators of the children ▪ Weight for age, Height for age ▪ Weight for height (children 3-24 months)	62	Standard procedures	Cogill B, 2003 Gibson, 1989
Change in morbidity profile of the children	62	Semi-structured interview(Annexure 12 and 13)	Bernard, 1991

Description of the methods used for data collection

1. Structured Checklist

Purpose: The checklist was used by BM members and the researcher in the NEC-BMM and NEC-DIR villages respectively during the three months of the intervention, to record the adoption of suggested behaviours (according to the age of the child), record the problems faced in practicing the behaviour and to motivate the mothers to change or continue following the recommended practices.

Procedure: The BM member in the NEC-BMM village and the researcher in the NEC-DIR village filled the structured checklist during the weekly home visits to the mothers. For the BM members the checklist (**Annexure 10**) was in the local Gujarati language and kept simple by including only one aspect: list of child feeding and Care behaviours (according to the age of the child) and whether the mother had followed them (previous week). The checklist filled by the investigator in NEC-DIR village included additional details like reasons for change in behaviour and support received from other family members in trying out the behaviour and benefits experienced if any (for the child) (**Annexure 11**).

2. Semi-structured interview

This method has been described in Study I.

Procedure: A semi-structured question guide was used to interview the mothers of children 6-36 months both before and after the NEC intervention to assess the change in child feeding and Care awareness and practices. The interview schedule used before and after the intervention (**Annexure 12** and **13**) covered the following aspects:

- Background information of the family
- Reproductive history of the mothers
- Breastfeeding and complementary feeding knowledge and practices
- Morbidity history of the child (past one week)
- Health seeking knowledge and practices
- Hygiene related knowledge and practices

Further, additional data was obtained post intervention (**Annexure 13**), regarding the

NEC messages imparted during the home visits: recall of messages, message most beneficial or not, specific benefits experienced if any. The questions related to breastfeeding were not included in post evaluation, because at the time of home visits, none of the subjects were less than 6 months and hence the messages related to exclusive breastfeeding and water feeding were not conveyed to them and subsequently not included in post NEC evaluation.

3. Direct observations

Principle: As stated earlier, careful observation of events and behaviour provides valuable data about what is actually occurring and validates reported data.

Purpose: During impact evaluation the aim of observation was to observe the improvement in feeding and Care practices of the mothers who were covered by the home visits by the researcher in NEC-DIR village.

Procedure: The data was obtained during the weekly home visits for the three months of intervention period. The observations were not structured so that any behaviour related to various aspects of feeding and family support to the mother could be noted the way it actually occurred.

4. Dietary intake by twenty-four hour dietary recall method

Purpose: This method was employed during pre and post intervention in order to assess the change in food and nutrient intake of the children (6-36 months) after the NEC intervention (**Annexure 5**). This has been described in study I.

5. Nutrition assessment by anthropometric measurements

Purpose: The weight and height measurements of the children (6-36 months) were taken both pre and post intervention in order to determine the influence of the NEC home visits on the growth of the children. This has been described in study I.

Annexure 14 presents a glimpse of the flash cards used during the intervention.

Data Analysis

This section describes the key features of **quantitative** and **qualitative** data analysis. The data was analyzed for gender and age-wise differences for Study I and Study II.

Further, for impact evaluation the data was analyzed to assess the change from pre to post intervention in the pooled data of both the intervention villages as well as separately for each of the two intervention villages NEC-BMM and NEC-DIR. In both cases the impact as compared with the control village.

Quantitative Data

For this data statistical tests (Chi square and 't' test) were applied using the Epi info 6.04 D computer package (CDC Atlanta, USA 2001) where appropriate.

Anthropometric data (Study I and Study II)

Data related to anthropometric measurements of weight and height and BMI (for mother) were calculated and mean and median values were analyzed. NCHS (1983) standards were used as reference standards for children. IAP classification and Z scores were used to define the grades of malnutrition.

For Study I although the anthropometric data was collected on all the 106 children, however the sample size reduced to 102 due to flagging of records (removal of incorrect values) at the time of data analysis.

Diet intake data (Study I and Study II)

For dietary intake data, mean, median and standard error were calculated for intake of various food groups (as % RDA), actual intake and percentage of RDA consumed of various nutrients.

In the impact evaluation in Study II complete data pre to post was available for: 31 children in NEC-BMM village, 24 children in NEC-DIR village and 29 children in control village.

Various cross tabulations were done to see relationships if any between relevant indicators. For example, different levels of calorie intake of children as compared to their nutritional status.

Qualitative data

Semi-structured interview (Study I and Study II)

The questionnaire data for Caregiving behaviours were analyzed as percent responses.

The total number of home visits made by the BM members in NEC-DIR village and by the investigator in NEC-DIR was calculated and the mean was analyzed. Over the 3 months of intervention, the mean message recall of the mothers in both NEC-BMM and NEC-DIR was analyzed. Further, the qualitative responses for few practices were scored like: frequency of feeding fruits and vegetables, hygiene practices and composite IYCF practices and the mean scores were then analyzed for pre-post intervention.

Observations (Study I and Study II)

Feeding observations (breastfeeding and complementary feeding episodes) were presented as percent responses. Further, the observation data of the child, mother and the surrounding environment was scored and mean, median and standard error was also calculated.

The textual data obtained from observations and weekly review meetings with the BM members were expanded, read carefully for the patterns in responses and compiled.

Structured checklist (Study II)

The weekly checklist data for home visits was compiled and analyzed as percent responses.

Comparisons were made through cross tabulations to see if any associations existed between two indicators. For example, relation between resources of Caregiving and Care behaviours and child's nutritional status; number of home visits were compared with message recall (mean) of the mothers; socio-economic factors like per-capita income and education were compared with the IYCF practice score of the mothers.

Verbatim responses or quotes of the participants of the study were mentioned where appropriate, to provide insights regarding community views on the topic being studied.

Scoring System

The indicators and scoring system used for assigning scores to some of the practices in Study I and Study II are explained below:

Hygiene Score (Study I)

The indicators used for deriving scores of hygiene practices through direct observation are given below.

Hygiene of child: clean face, no discharge from eyes, mouth, nose (if child has cold, discharge is wiped off); 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 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.

Score for Various Practices Followed: Study II - Impact evaluation (Reported Data)

Frequency of feeding vegetable and fruit

Frequency of consuming fruits or vegetables (number of days in a week)	Score
0	0
1	1
2-3	2
more than 3	3

Hygiene practices

The indicators used for deriving hygiene practice scores for the child are given below.

Hygiene of child: Child as well as mother's hands are washed with soap after child defecation.

Scoring system: Score = 0 if behaviour was not present; 1 if behaviour was present.

Hygiene practices while feeding: Child as well as mother's hands are washed with soap before feeding the child, stale food is not fed to the child and cooked food is kept covered.

Scoring system: Score = 0 if no behaviour was present (out of 3 behaviours); 1 if 1-2 behaviours present; 2 if 3 behaviours present

IYCF Practices

Indicators for IYCF practice score	Score
Child is fed special foods	1
Child is not avoided any foods	1
Active feeding is practiced	1
Frequency of feeding fruits is more than 3 days/week	3
Frequency of feeding vegetables is more than 3 days/week	3
Hygiene while feeding: 3 behaviours present	2
Maximum IYCF score	**11**

The next chapter presents the findings of the study.