METHODOLOGY
The present study developed a nutrition communication package targeted towards initiating change in nutrition behaviour with a specific focus on nutritional problems such as PEM and vitamin A deficiency. This package was executed and evaluated for its effectiveness in selected slum areas of Mumbai. Community health workers from these slums were trained as "change agents" to effectively deliver this package in the community.

3.1 Study Design

An experimental study design was selected to provide the most reliable evidence for the relationship between the exposure as nutrition communication and the outcome as change in nutritional behaviour. This design reduces the likelihood of confounding, due to randomisation procedures (Hennekens et al, 1987). **Pre-post experimental-control design** was used. The details of study design are schematically described in Figure 3.1.

3.2 Population

In Mumbai 50% of the population live in the slums due to extreme crunch of space. The slums are characterised by overcrowded housing, low literacy rate, poverty, ignorance and inadequate nutrition and health facilities. They also lack adequate basic amenities like water, toilets, power supply, proper sewage and garbage disposal system (Ramesh, 1994). A low standard of living is therefore inevitable, exposing children to various health and nutritional problems.

The commonly existing health and nutritional problems among children in slums are upper respiratory tract infections including tuberculosis; diarrhoea, scabies and worm infestation (Udani, 1989). A high percentage of undernutrition, including vitamin A deficiency, was noted among slum children (Udani 1989; NNMB 1995; Aspatwar and Bapat, 1995; Geetha et al 1996) with the intake of most nutrients being below the Recommended Dietary Allowances. (NNMB, 1995). The study, which was undertaken in the urban slum areas of Mumbai, provided the context to understand the situation in a realistic perspective.
**Figure 3.1 Study Design**

**Hypothesis**
Nutrition Education leads to Positive Change in Nutrition Behaviour with regard to KAP

**Experimental Design**

**EXPERIMENTAL GROUP**
160 mothers of preschool children: Mankhurd slums

**Situation Analysis**
The NGO
Community Profile
Market Survey
Nutritional status of children
KAP of the Mothers
Media Literacy and Orientation

**CONTROL GROUP**
160 mothers of preschool children: Goregaon slums

**Development of Action Plan for Nutrition Communication**

**Development of Plan for Modules**
- Identify key issues & areas of focus
- Review of Nutrition education
- Design messages and select communication channels
- Design content of modules

**Present the plan of the modules to CHWs**

**Training and Capacity Building of CHWs**
- Understand the needs
- Design training sessions & lesson plans
- Conduct training sessions
- Evaluate training & trainees

**Participation of CHWs in Development of Modules**
Using modules, Feedback & Ideas for Content
Revise the Plan

**Pre-test in the Community**
Finalise the Modules

**Execution and Monitoring**
Execution of modules for mothers
Integrated food-based activities for children

**Evaluation**

**Formative**
- Coverage of Modules
- Effect on CHWs
- Effectiveness of Communication Channels
- Effectiveness of Modules

**Summative**
- Effect on mothers: KAP of mothers, participatory involvement in program
- Nutritional status of children
- Benefits of the programme:
  - Evolved training modules for trainers
3.2.1 Study Population

The study population comprised of two target groups viz. mothers of pre-school age children and community health workers.

**Mothers:** Mothers of pre-school age children from two selected geographically distant slums areas viz. Mankhurd and Goregoan, having similar socio-economic background were selected for the study. The nutrition education package was executed among these mothers to evaluate its effectiveness.

**Community Health Workers:** The Community Health Workers working in these slums were targeted to become "change agents" for initiating positive change in nutrition behaviour among mothers. Training and capacity building were undertaken for them.

3.2.2 Locale of the Study

The slum areas selected for the study were Mankhurd and Goregaon. The Mankhurd slum, located on the eastern express highway, served as the experimental area. The Goregaon slum located on the Andheri-Kandivali Link Road served as the control area. The location of the slums was such that the prospect of movement of people from one area to the other was restricted. The geographic location of the study area is shown in Figure 3.2.

These slums were selected firstly, because they characterised the typical life style/set up of the disadvantaged a metropolitan city like Mumbai. Secondly, due to the advantage of operational feasibility, as these slums were covered by an NGO called “The Child Eye Care Charitable Trust”(CECCT), for provision of an integrated package of health services with a main focus on prevention of vitamin A deficiency. The study was therefore carried out in co-ordination with the NGO to reinforce nutrition communication and its delivery in the community.
3.2.3 Sample Size and Selection

Mothers
At the time of the study, the total population of the Mankhurd slum was 20000, out of which 8 to 10% or an estimated 1600 to 2000 children were pre-school age children. A list of the mothers having pre-school age children was prepared, from which 160 mothers were selected by simple random sampling. In case of mothers, who had more than one pre-school age children (3-6 years), the youngest child was included as index child. A similar procedure was followed for the control group and 160 selected mothers for the study.

Community Health Workers (CHWs)
All the CHWs employed with the NGO in the experimental area were selected for the study. The hierarchy and the number of CHWs included in the study are as follows.

The community health volunteers were residents of these slums.

3.2.4 Reference Population

The present study has dealt with socio-economically disadvantaged communities. The results of this study, however, could be considered for comparison or applicability to mothers of pre-school age children from lower socio-economic groups in urban as well as rural areas.
3.3 **Strategy for the Programme**

The establishment of communication is necessary to enable the interchange of information between the agents of change and the prospective adopters for achieving the expected outcome. The strategy was designed to facilitate this process based on the following goals.

1. Develop effective communication actions for nutrition education of the mothers.
2. Build capacity and train the CHVs to act as change agents in the community.
3. Enable mothers to gain nutritional knowledge and adopt new attitudes and practices.

**The course of action for the strategy is described under each phase.**

3.4 **Approaches and Methods Used**

The participatory learning approach was used based on *experiential learning cycle*, providing an opportunity for learners to experience, reflect, generalise and take action. “Active-participatory and problem-posing” approach based on the concepts of Brazilian Pedagogue Freire (1972), American adult educator Knowles (1980) and Kolb (1984) was applied for the study. *(Figure 3.3)*

**Figure 3.3 Experiential Learning Cycle**
Participatory learning methods were used throughout the study to involve the target groups in the process of learning. These methods included- role play, simulation, group discussion, skill practice exercises, games, demonstration, food display with discussion, visual aids with discussions, etc.

### 3.5 Work Plan of the Study

Taking into consideration the strategic goals and approach, the study was carried out in four phases.

I. **Situational analysis**

II. **Development of action plan for nutrition communication**

III. **Execution and monitoring of nutrition communication activities**

IV. **Evaluation**

At each phase, *quantitative* as well as *qualitative* methods of data collection were employed in order to strengthen the validity of findings. In recent years, qualitative methods are being increasingly used by health professionals to explore perceptions and attitudes relating to health and illness and to test and validate social and cultural information gathered through quantitative survey procedures. (Scrimshaw and Hurtado, 1987; Attig and Yoddumnern-Attig, 1993; Khan and Manderson, 1992) Qualitative methods are also valuable in examining perceptions and comprehension of communication methods and materials developed. (Edwards et al, 1986; Yoddumnern-Attig and co-workers, 1993)

#### Phase I - Situational Analysis: Time Period - 5 Months

During this phase, a systematic field investigation was carried out in order to assess the current situation in the selected communities. This enabled to determine various aspects on which modules could be built. The following aspects were considered.
1. **The NGO**

The NGO was studied to get an understanding of the nutrition/health education activities conducted in the target slums and the resources available for carrying out the present investigation. The objective was to ascertain the need and the feasibility of the present investigation. The information was gathered by discussions with the project authorities and staff members. Field observations were also made during the initial data collection.

2. **Community Profile**

General information about the family was collected using an interview schedule. *(Appendix I)* The information collected included education, socio-economic conditions, information on health seeking behaviour of the mothers including hygiene, health and nutritional care during illness, immunisation status.

3. **Market Survey**

A market survey was carried out to ascertain the availability of dark green leafy vegetables (DGLV), yellow-orange vegetables and fruits (YOV). Ten vegetable and fruit vendors at different locations in and around the study area were interviewed to obtain information on the seasonal availability, price and purchase trend for provitamin-A foods. Weights of a few DGLV bunches were obtained periodically,
because size and price of DGLV bunches change seasonally, thereby affecting consumption. Availability of pre-formed vitamin A foods was also noted.

4. **Nutritional Status of Children**

Nutritional status of the children was assessed using dietary intake, anthropometric measurements, clinical deficiency signs and morbidity history.

(a) **Dietary Intake**

The quantitative dietary intake was estimated for a sub-sample of 50 children in both the experimental and the control groups using the 24-hour dietary recall. Each mother was asked to indicate the type of food preparation, actual ingredients used, the quantity of raw foods. She was also asked the amount (cooked quantity) eaten by the child in terms of household measures like katories, cups, spoons etc. The number of bhakris, chapatties, pav bread slices, biscuits and size of the fruits eaten by the child were also recorded. The household measures were later converted to raw weights in terms of grams per day. The nutritive value of the diet was calculated in terms of kcalories, protein and total vitamin A content, using the food composition tables. (Gopalan et al, 1996). The pro-forma is presented in Appendix II.

(b) **Anthropometric Assessment**

Anthropometric measurements viz. weight and height were taken of 80 children from the experimental group as well as from the control group in order to assess their nutritional status. The pro-forma is presented in Appendix III.

i) **Weight:** Weight of the child was measured by the use of Salter Weighing Scale with the scale measuring up to maximum 20 kg. The readings were taken nearest to 100 g. The child was made to sit in a spacious seat attached to the scale with minimum clothing. The scale was regularly checked and zeroed before weighing. The scale was also checked regularly using the standard weights.

ii) **Height:** Height of the child was measured using Microtoise having accuracy of 0.1 cm. Microtoise is a light and portable instrument for measuring heights. After
removing the shoes, the child was made to stand on a flat surface by the wall with feet parallel, and with heels, buttocks, shoulders and back of the head touching the wall. The head was held comfortably erect with the lower border of the orbit of the eye in the same horizontal plane as the external canal of the ear. The arms were left hanging loosely at the sides. The head-piece of the Microtoise was gently lowered, crushing the hair and making the contact with the top of the head and the reading was taken.

The indicators used to measure nutritional status were weight-for-age, weight-for-height and height-for-age. The weight, height and age information was converted to Z-score values for all the three indicators based on NCHS reference standards, using a special software package- EpilInfo, version 6. The children were classified according to their nutritional status, the cut off point being -2SD of the reference values.

(c) Clinical Deficiency Signs
Clinical examination was carried out on a sub-sample of 80 children in the experimental and control group. Visible deficiency signs for protein energy malnutrition, vitamin A deficiency and anaemia were checked for each child by the community physicians of the CECCT project team. The details of clinical signs assessed are presented in the pro forma in Appendix III.

(d) Morbidity History of the Index Child
The mother was asked to recall if the child had suffered from any illness viz. upper respiratory tract infections, measles, diarrhoea and other infections in the last 6 months prior to the study. The frequency and type of illness were noted. The pro forma is presented in Appendix III.

5. KAP of Mothers
Knowledge, attitudes and practices of the mothers with regard to vitamin A and PEM were studied with the use of interview schedule and focus group discussions.
A. Interview

The mothers were interviewed individually at their homes to elicit information on various aspects knowledge attitudes and practices. A sample interview schedule is presented in Appendix I. The personal interviews were timed according to the convenience and availability of the mothers.

- Knowledge of the mothers with regard to child nutrition including causes, consequences, prevention and treatment of PEM and VAD.
- Attitudes of the mothers with regard to child’s health and nutrition care, suitable foods to be given, food preferences, beliefs, etc.
- Practices followed by the family regarding food choices and purchase, food consumption and preparation. Frequency of consumption for vitamin A, protein and energy foods of the index child was also obtained.

Pilot Testing: A pilot survey was carried out to test the appropriateness of the interview schedule with 30 mothers of preschool children in the community and thereby refine the survey instrument. Its aim was to find out if the questions were clear to mothers, if they could respond with ease and the time taken for the interview. Necessary modifications were made in the interview schedule. Additional inputs given by the CHWs and resident doctors of the NGO about the appropriateness and relevance of the questions asked and nutrition related aspects were also incorporated.

B. Focus Group Discussion

Focus group discussion is an instrument designed to gather information primarily about beliefs, values and understanding. They have been increasingly used in many areas of public health as rapid assessment procedure. (Khan and Manderson, 1992) Focus group discussions were carried out with an aim to obtain close information, strengthen information obtained through the interview schedule and facilitate planning of the intervention. Focus group discussions were conducted in experimental and control groups. The discussions were recorded by a note taker.
Selected aspects: Key aspects from the interview schedule regarding knowledge, especially attitudes and practices regarding nutrition were selected and reasons underlying the problems were elicited.

The focus group discussions dealt with the following aspects.

- Mothers’ perceptions about nature of malnutrition.
- Perceptions and beliefs about "nutritious" foods.
- Beliefs and practices about various vitamin A foods.
- Dietary pattern.
- Infant feeding practices.

The groups: The mothers from different pockets in the community who were willing to participate were selected for the focus group discussions. Two such groups, consisting of 12-15 mothers in each were selected. Care was taken to select homogenous group of women in terms of literacy level, socio-economic background, language spoken, etc.

Conducting Focus Group Discussion: As a warm up, participants were asked questions about their day to day life to make them more relaxed. The discussion was initiated by narrating an incident or showing pictures or charts. With a subtle change from general to more specific discussions on the key aspects listed above, open-ended questions were asked. An attempt was made to probe into the deeply held beliefs, likes and dislikes and practices. Close up of the discussion was carried out by recapitulating the discussed points.

The recorded discussions were later transcribed to evolve areas of focus to be envisaged in development module.

6. Media Literacy and Orientation

Discussions on familiarity and preference of communication media were held with the mothers with aim to aid selection of communication channels for nutrition communication. Discussions were conducted with the same group of participants who were involved in focus group discussion in the experimental area.
Phase II. Development of Action Plan for Nutrition Communication: Time period - 6 Months

Development of action plan for nutrition communication focused at development of modules and training and capacity building of CHWs to execute these modules in the community. The process is depicted in the following figure.

Figure 3.5 Process of Development of Action Plan

A. Development of Plan of Nutrition Communication Modules

This phase of the study was initiated after analysing both the quantitative and qualitative data to estimate the extent of the problem, assessing the general awareness of the community about the problem and their perception about the food, practices, etc. During this stage, plan for nutrition communication modules was developed.
taking into account the community's felt needs. The steps involved in the development of plan of modules are briefly discussed below.

1. **Identify key issues and areas of focus:** Using the key findings from situation analysis of nutritional status of children, community situation, knowledge, attitudes and practices of the mothers with regard to PEM and VAD, areas of focus were identified. Based on these, themes were selected for the modules.

2. **Review of nutrition education:** Communication materials and methods on various nutrition and health related aspects prepared and used by various NGOs were evaluated for its content, presentation and relevance.

3. **Select messages and appropriate communication Methods:** Messages for the nutrition communication were prepared for the selected themes. Appropriate communication methods and materials were selected for delivery of these messages. Worksheets were prepared addressing each theme arising from the baseline data, which served as a guideline to prepare the modules.

4. **Design content of the module:** The detailed content of the modules was built around the messages and included text and visuals for each module. A detailed planning was done and a draft was prepared for each module.

This plan of content was finalised with the help of CHWs and mothers after their training and pre-testing module plan in the community.

**B. Training and Capacity Building of CHWs**

Training sessions were conducted for CHWs to involve them in the process of module development and to equip them to execute modules in the community. The process of training and capacity building is described as follows.
1. Understanding the Needs of the Trainees

Training needs of the field workers were assessed by discussions with the project authorities viz. trusty, senior social worker and resident doctors. The previous knowledge, skills and attitudes of these field workers and the additional inputs required to deal with community women were considered. Discussions and brainstorming sessions were also held with COs and CHVs to assess their needs and to determine their priorities for the training, pertaining to the broad aspects selected. They were also oriented with the nature of the nutrition communication actions to be undertaken for mothers.

2. Design Training Sessions and Lesson Plans

Based on the needs of the health workers appropriate topics and training approach were selected. Lesson plans were designed in detail.

3. Conducting Training Sessions

An in-depth training workshop spanning five days was conducted for the COs. The workshop was conducted at Urban Health Centre, Dharavi and practical sessions in the field site. The COs from other project areas also participated in the training workshop at Urban Health Centre.

Eight days training programme was conducted for CHVs in the area of nutrition, communication and usage of modules. The workshop was held at the project's field office, in Mankhurd and practice sessions were conducted in the community. The trainings were facilitated by the investigator.

4. Evaluation of Training and Trainees

The training course was evaluated by the participants. A five point rating scale was used and comments/recommendations were invited from the participants. (Appendix IV) During the practice sessions in the class as well as in the community, performance of the CHWs was assessed. The aspects considered were personal qualities, delivery of content, handling of communication channels and facilitation skills. The pro-forma used is presented in Appendix V.
5. Participation of CHWs in Development of Modules

CHWs participated in the development process of modules in following ways.

*Prepared communication methods and materials:* As a part of the training exercises, CHWs were asked to prepare communication methods and materials on the selected themes from the modules. The aim was to generate ideas and try them out so that they could be used for the modules. These ideas were incorporated in the modules.

*Feedback and suggestions on the modules:* At the end of training, plan of modules was presented to CHWs to assess its suitability, clarity of messages, and overall effectiveness. The feasibility of use for the modules was also considered. Copies of the proposed plan of modules were distributed to the CHWs in advance and they were asked to go through it. Each module was presented and explained which was followed by a discussion. Open-ended and probing questions were asked to the participants. Queries and suggestions were invited from them. Feedback and suggestions given by the CHWs were noted.

*Feedback and suggestions on usability of the modules:* After the training, practice sessions for CHWs were organised in the community. During these sessions, CHWs used the modules in the community, which ascertained the usability of the modules and performance of CHWs.

The modules were revised based on the feedback from the CHWs and observation during the practice sessions.

6. Pre-testing of the Modules

The revised draft of modules was tested with the potential users and experts.

*a) Pre-testing the modules with the mothers:* Each module was pre-tested on 6 representative groups, each group consisting of 15-20 mothers of “at risk” children for perception and comprehension of messages, communication channels, acceptability and overall effectiveness. The modules were presented by the COs and facilitated by the investigator. Sample guideline questions for pre-testing the
communication methods and materials are presented in the **Appendix VI**. "Pre test data sheet" for each module are presented in **Appendix VII**.

b) **Feedback CHWs and experts:** The content of the modules was evaluated by experts from nutrition and health related profession. The panel of experts were Nutritionists, Academicians and Program Planners. The content and appropriateness of the modules was evaluated by resident doctors, social workers, COs and CHVs by observing the modules sessions during the process of pre-testing. The pro-forma used for evaluation is presented in **Appendix VIII**.

Suggestions and recommendations during pre-testing the modules were incorporated in the modules and the modules were finalised for the execution. **The topics for the modules**, which were developed to be used in the community are listed herein.

<table>
<thead>
<tr>
<th>1. Foods for energy and growth</th>
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</thead>
<tbody>
<tr>
<td>2. Providing growth and energy foods</td>
</tr>
<tr>
<td>3. Diet for children</td>
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<tr>
<td>4. Complementary feeding</td>
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<tr>
<td>5. Foods good for eyes</td>
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<tr>
<td>6. Foods good for eyes: facts and values</td>
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<tr>
<td>7. Incorporating foods good for eyes in diet</td>
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<tr>
<td>8. Childhood illnesses</td>
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</table>

**NOTE:** Since the present investigation involved probing into the **feasibility** of development and execution of modules, the actual process has been discussed in details under the chapter Results and Discussion.
During this phase, nutrition communication modules were executed in the experimental area. Integrated food based activities were also carried out for the children. No other nutrition education activities were held in this area. Regular monitoring and supervision was carried out during the programme.

**A. Execution of Nutrition Communication Activities.**

The steps involved in the execution of activities for mothers as well as children are presented below.

![Figure 3.6 Execution of Communication Activities](image)

1. **Forming Mother's Groups and Building Rapport.**

Area-wise groups of mothers were formed to facilitate execution of nutrition communication modules in the community. Each group consisted of 12-15 mothers and 9 such groups were formed. In addition to these mothers, other women living in the neighbourhood also invited to attend the sessions. Before beginning the module sessions in each group, introductory sessions, games, discussions, cooking demonstrations, etc. were conducted as rapport building activities.

2. **Conducting Module Sessions**

Module sessions were carried out in the community in the sites convenient to the mothers viz. *verandas* (passage of tenements/houses), houses, temples, balwadi
(preschool), etc. depending upon availability of venue and convenience of the mothers.

Initially the module sessions were conducted by the project supervisors and CHVs assisted them. Once the CHVs were well trained, they conducted the module sessions independently.

Since there were 8 modules, 8 sessions were conducted per group. Two sessions per week were organised for each group, each session consisted of one module. Games based on nutritional themes were also organised during the intervention. The total contact hours for each group was about 9-10 hours.

After a gap of 2-3 months, 5 revision sessions were conducted to reinforce the modules. Modifications in approach and presentation were made which included use of different communication strategies, additional food demonstrations as requested by mothers and seeking more involvement of the mothers during the modules. The total contact hours for each group for this period were about 5-6 hours.

Thus, each group was exposed to nutrition education twice. The time period taken for the intervention was of seven months. The time frame used for implementation is presented below.

**Figure 3.7 Time Frame of Module Execution**

Besides these module sessions, CHVs and supervisors visited the households for the day to day project activities like weighing the children, giving vitamin A dose, deworming, etc. This also served as **contact point** for the reinforcement of
nutritional messages and extending support to the mothers to some extent. The approximate contact time through these activities for each group is 1-2 times a month.

II. Integrated Food Based Activities for Children

Food-based activities were carried out for the index children with an aim to study their preferences, acceptance of various foods and to encourage intake of these foods.

1. Food Selection

Selection and choice of fruits and vegetables, especially pro-vitamin A rich variety, by the preschool children were studied on a sub-sample of 80 pre-school children from the experimental group. This was done to identify their spontaneous preferences of vegetables and fruits. The pro-forma is presented in Appendix IX.

This was carried out at the project’s field office where children often come with their mothers to avail of health services, weighing and nutrition education programs. In the beginning of these sessions, the children were made to recite rhymes in order to create a friendly atmosphere. This activity was carried out in two stages.

i) A variety of locally available and commonly consumed fruits and vegetables were displayed and each child was asked to select any number of fruits and vegetables, which he or she liked or wanted. This selection was observed and the order of selection was noted down. As it was noted that children mainly selected pro-vitamin A foods, the selection of pro-vitamin A foods was studied in detail. The aim was to plan an intervention to strengthen their food selection behaviour.

ii) A variety of pro-vitamin A fruits and vegetables was displayed and each child was asked to select any number of fruits, vegetables which they liked or wanted most. The choice or selection of the items were noted as also was the order of selection.
To reinforce nutritional messages to the children, three poems were prepared on selected themes such as, balanced diet, foods good for eyes and infant feeding. They were taught to the children to be recites with actions. This aimed to stress the importance of nutritious and healthy foods right from an early age and foster good food habits through health related and meaningful poetry to the young children.

2. Food Acceptance
As part of remedial action plan, nutrient-dense recipes suitable for pre-school children were formulated based on their local dietary pattern. Food acceptance attributes were studied among the children to assess their acceptability. This enabled to incorporate these recipes in the modules and encouraged children eat these. The recipes were classified into the following groups.

- DGLV based preparations
- YOV based preparations
- Cereal-pulse and/or milk combination

The recipes were prepared by weighing the ingredients and one serving of each recipe was served to the children. The acceptability was judged on the basis of food portion consumed by the child and the response given by the child to it’s mother about whether he/she liked the recipe, whether he/she will eat the same when prepared at home. (Appendix IX) Suggestions given by the mothers for modifications were also noted.

B. Monitoring
Good monitoring is essential part of any intervention programme to assess if the programme is operating as intended or needs any modifications for improvement. Monitoring on continuous basis was carried out to ensure that everything and everyone were working as planned and to make modification in the activities if required in order to enhance programme effectiveness. (IVACG, 1992)

The activities carried out during intervention were closely monitored on regular basis. Elements needed to be tracked were- module activities, communication channels,
functioning of field workers, gradual changes in community in relation with objectives. Many sources of data were considered, such as direct observation by the evaluator, data from programme personnel, field records, information from the participants. The detailed aspects monitored are discussed under formative and summative evaluation.

**Phase IV Evaluation**

To evaluate the overall effect of a programme, it is essential to examine the process and outcome indicators since they are interdependent. (Edwards et al, 1986) Evaluation was carried out during (formative) and after the intervention (summative) to assess the process and outcome of nutrition communication actions. (Figure 3.8)

**Figure 3.8 Evaluation**

![Diagram of Evaluation Process]

**I. Formative Evaluation**: Formative evaluation in campaign development and execution to ascertain how well the target group responding to messages is crucial.
Evaluation was carried out during the intervention period on the following aspects.

1. **Coverage of the Modules**

Coverage of the modules was noted in terms of number of sessions conducted for the mothers' groups. Attendance of the mothers was also considered. Registers maintained by the CHWs and records during the supervision helped to assess coverage of the modules in the community.

2. **Effect on CHWs**

Performance of the CHWs was evaluated using two methods.

A. Pro-forma were administered to gauge the knowledge and training strategies adopted and practical application of the training given, by the CHWs. The pro-forma are presented in Appendix X, XI A, XI B. The key aspects covered in the pro-forma were as follows.

   a) Knowledge about various aspects of nutrition.
   b) Knowledge and ability to use communication skills.
   c) Ability to address peculiar nutritional problems of the mothers in the community.
   d) Support extended to the mothers’ attempt for change in nutrition behaviour.

B. Observation during module sessions: The activities conducted by the CHWs were closely monitored on regular basis. Announced and unannounced visits were carried out regularly. Module sessions were observed and aspects about performance of the field staff were noted. The pro-forma used for supervision is presented in Appendix XII.

3. **Effectiveness of Modules and Communication Channels**

i.) Pre and Post Responses

Module sessions were supervised regularly. Pre and Post responses of the mothers were noted down using the pre-formed set of questions for each module. Six groups of mothers were selected randomly to study the effectiveness of the module. The effectiveness was assessed in terms of understanding of concepts, motivation to
practice the content delivered or knowledge gained and skills. A sample pro-forma used for evaluation of module is presented in Appendix XIII. Mothers' preferences and opinions about communication channels were also gathered.

ii) Field Records and Observations

During the field visits and nutrition communication activities, events in the community highlighting health and nutritional aspects, people's participation, etc. were recorded. Feedback given by the mothers with regard to the module sessions and actions taken by them were noted. Participation and compliance of the mothers to the project's health and nutrition activities was such as regular weighing of the children, giving supplementary feeding to infants was observed. These included problems encountered, changes in attitudes and practices among people. Discussions were also held periodically with the CHWs about their observations and experiences in the community. These records constituted the qualitative inputs for the study.

II. Summative Evaluation

Summative evaluation was used to measure the effects of nutrition communication actions. Most customary methods were applied to measure the change in the target population as a result of an intervention. Summative evaluation was carried out with a gap of a month after completion of the intervention. The time taken was two months. The indicators for evaluation were identified and relevant tools were developed for the same. (Table 3.1)
Table 3.1 Indicators for Evaluation

<table>
<thead>
<tr>
<th>Indicators of Evaluation</th>
<th>Tools</th>
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<tbody>
<tr>
<td>Change in nutrition behaviour</td>
<td>Interview - Pre-Post test</td>
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<tr>
<td></td>
<td>Home visits</td>
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<tr>
<td></td>
<td>Field records - observations</td>
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<tr>
<td>Improvement in dietary intake</td>
<td>24 hour recall</td>
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<td></td>
<td>Food frequency and consumption-interview</td>
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<tr>
<td></td>
<td>Home visits: spot checking</td>
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<tr>
<td></td>
<td>Games, quiz, cooking competition.</td>
</tr>
<tr>
<td>Rate of change in nutritional status of children</td>
<td>Anthropometric assessment: height, weight</td>
</tr>
<tr>
<td>No increase in cases</td>
<td>Clinical examination</td>
</tr>
<tr>
<td>Number of mothers adopted changes</td>
<td>Interview, home visits</td>
</tr>
<tr>
<td>Number of mothers motivated as leaders to bring about change in nutrition behaviour in the community</td>
<td>Participation of these women in the project activities.</td>
</tr>
</tbody>
</table>

Evaluation of KAP of Mothers and Nutritional Status of Children

Assessment of KAP of the mothers and nutritional status of the children, before and after the intervention, revealed the effect of the nutrition communication activities. The details of the tools viz. 24 hour recall, Anthropometric assessment, Clinical examination are mentioned under assessment phase. The other tools used are described below.

1. Interview

The interview schedule that was used for the pre-test was also used for the post-test. The details of aspects covered in the interview schedule are presented under assessment phase. Besides these aspects, additional set of questions on selected aspects, which were dealt with in the course of time, were incorporated in the post test interview schedule for the experimental group at the end of the schedule. The pro forma for Interview used for post test is presented in Appendix I.
2. Home Visits

The home visits were organised to obtained first hand information about practices adopted by the mothers after the intervention. Spot-checking, observation and interview were used during these home visits to gauge preparation, consumption, child feeding practices. The pro forma for home visit is listed in Appendix XIV.

About 30 households were selected randomly and unannounced home visits were carried out. About half of the households were visited twice at different time of the day on different day of the week. This was done to elicit more information and minimise the within subject variances with regards to the current nutritional practices. Attempts were made to visit households when mothers were involved in cooking or when children having meals. The information was collected in a casual conversation with the mothers. Mothers were made to feel comfortable and allowed to do their routine work. Foods prepared and used on the previous day or to be prepared on the following day of the visit were also considered if mothers showed the dry preparations (e.g. laddus, chikki) prepared on the previous day or the ingredients purchased for the items to be prepared on the following day.

3. Games

Games served as participatory evaluation technique to evaluate the intervention. Various games were organised to evaluate the knowledge, understanding of different concepts from the modules and its application in day to day realistic situations. These games were - Grouping the Foods, Quiz: Deck Up the Bride, Make diet, Make a recipe, etc. The details of the games are given in Module document pg. 54-62

4. Cooking Competitions

Four cooking competitions were held in the community with an aim to assess the ability to apply the learned knowledge. Nutrition experts and doctors, from Lokmanya Tilak Medical College were invited as judges to evaluate the recipes prepared by the mothers. The recipes were evaluated for their nutritive value, appropriateness for the child, ease of preparation, cost, novelty, etc. The pro forma for evaluation is presented in Appendix XV.
3.6 Analysis of Data

KAP of mothers was quantified to compare the two study groups. In addition to comparing the variables for pre-post and between the group differences, scores were assigned to the responses given by the mothers for each of the KAP variable. Based on the appropriateness of response, each correct response was given a score of one. KAP was then assessed on the basis of overall total score. The following is an example of scoring pattern for different variables. Scores are presented in parenthesis.

**Variable- Knowledge About Prevention and Treatment of VAD**

Intake of DGLV and YOV (1), Intake of flesh foods (1), Vitamin A dose (1), Medicines (0), Cleanliness of surroundings (0), Don’t know (0)

However, in a few instances like frequency of consumption, most positive response received a maximum score and vice a versa.

**Variable- Frequency of Consumption of DGLVs by Children.**

Everyday (4), 4-5 times/week (3), 2-3 times a week (2), once a week (1), once a fortnight (0).

Thus, the mean scores were determined individually for knowledge, attitude, practice and overall KAP. These mean scores were compared between the experimental and control groups using t-test and Analysis of Variance.

KAP data and rest of the data were analysed using statistical packages viz. Visual Foxpro 3, SPSS, Epi Info 6. The descriptive statistical analysis included frequencies, mean and standard deviation of the items included in the interview schedule for the mothers, for the field workers and clinical, anthropometric, dietary data. Difference of mean, proportion in the pre and the post experimental and control groups for the above mentioned items was computed using Student’s ‘t’ test and $\chi^2$ test. Other
statistical tests used were McNemar, ANOVA, to study the effects of different variables on KAP of the mothers.

Most of the qualitative data were analysed in terms of frequencies, number and percentages. Trends of the responses and the observations were categorised according to comparative similarity of responses.