METHOD

The present chapter describes the method of the study in terms of the phases of the study, sample selection, description of tools used for the study, procedures of data collection, and the techniques used in analyzing the data.

Phases of the Project

The present study is a part of the Infancy Project of the Department of Human Development and Family Studies, M.S. University, Baroda. The project included four phases, as illustrated in Figure 3. In phase I, the programme packages for motor and mental development were developed by the investigator. The next two phases of the project were pilot studies, phase II (Mathur, 1988) field tested the motor package while phase III (Ahuja, 1989, Shah, 1989) field tested the combined motor and mental package of the training programme on a small sample. In phase IV, based on the insights gained from the earlier phases, modifications were made in the Infant Stimulation Programme and its efficacy was evaluated on a larger scale. The investigator was thus involved in phase I and phase IV of the project. A video cassette was also developed as part of the training kit in the present study.

FIGURE 3 : Phases of the Infancy Project.

Phase - I

Baseline study of :
- Documented information, and

- Informal talks with AWWs and mothers

Developing a motor & a mental development stimulation programme

Phase - II

Pre-testing materials and aids.

Selecting and developing indicators of evaluation of programme

Pre-testing the tools and making necessary modifications.

Implementing the motor programme package to AWWs and mothers.

Phase - III

Implementing the motor and mental development stimulation programme on a different set of AWWs (under supervision of Bhailal Amin Hospital and mothers.

Evaluating efficacy of the programme at three levels namely
- AWWs' level
- mother-infant dyads' level and
- infants' level

Phase - IV

Developing a training package of the stimulation programme which includes :

Writing a training manual with guidelines for its use.

Preparing a training kit of audio-visual aids for the programme.

Developing a video cassette on the training programme.

Field-testing the combined motor and mental development stimulation programme on a larger scale.

Evaluating efficacy of the programme at
- AWWs' level. (Supervisors as monitors)

- mother-infant dyads' level, and

- infants' level.

Sample of the Study

The sample of the study comprised of 28 Anganwadi Workers, three supervisors, and 54 mother-infant dyads. The criteria for sample selection is mentioned below :

* Selected Anganwadis (AWs) should, (a) be representative of the urban block in Baroda city under the ICDS Scheme and (b) cover a minimum population of 1000.
* Selected Anganwadi Workers (AWWs) should have, (a) undergone AWWs' training and (b) had two to four years of work experience.
* Selected mothers should, (a) be a beneficiary of the selected AWs, (b) belong to a unitary family, (c) not be employed outside the house, and (d) have infants within the age range of 1 to 20 months with normal nutritional status or in the grade I category of protein-calorie malnutrition.

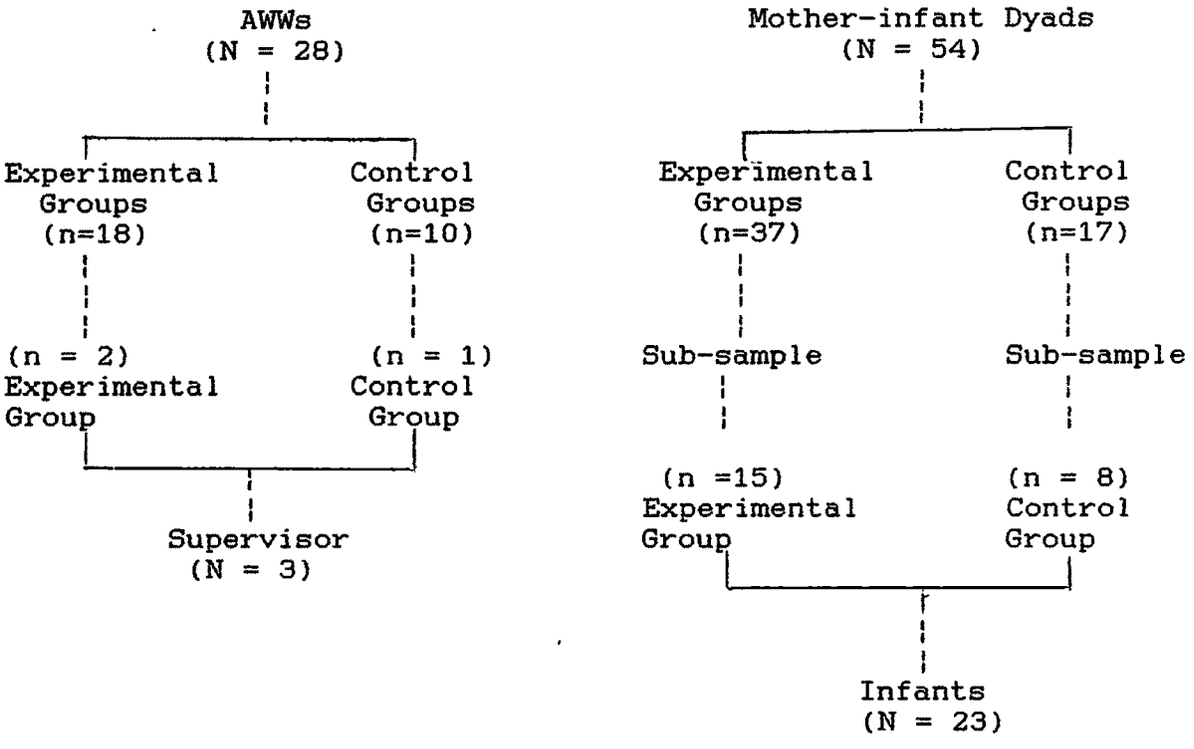
Procedure of Sample Selection and Distribution

Anganwadi Workers and supervisors : A list of AWs functioning in the urban block of Baroda was obtained from the local ICDS head office. AWWs fulfilling the required criteria were short listed and 28 AWWs were chosen using random sampling. Figure 4 gives the sample distribution for experimental and control groups of the study. Supervisors of the selected AWWs were included in the sample.

Mother-infant dyads : Names of infants below 20 months were listed from the records available at each AW and those fulfilling the required criteria were short-listed. A final list of mother-infant dyads were selected through stratified random sampling on the basis of age and gender of infants (see Table 2). In course of the study, there were 13 drop-outs of mother-infant dyads, due

to various reasons such as high rate of mobility, illness and two cases of infant mortality. There were finally 54 mother-infant dyads in the sample. (See Figure 4).

FIGURE 4 : Size and Distribution of the Sample



Infants : A sub-sample of 28 infants were chosen using random sampling from the above sample. After a drop-out of 5 infants, there were 15 infants in the experimental group and 8 in the control group.

TABLE 2

Distribution of Infants During Pre-test According to Gender and Age.

Groups	Age (in months)					Sub Total
	1-3.9	4-6.9	7-9.9	10-12.1	13-20.9	
Experimental						
Male	4	6	2	2	8	22
Female	3	2	2	3	5	15
Sub Total	7	8	4	5	13	37
Control						
Male	2	3	-	2	4	11
Female	1	1	2	-	2	6
Sub Total	3	4	2	2	6	17
Grand Total	10	12	6	7	19	54

Description of the Sample

The age range of Anganwadi Workers in the experimental group was 31-35 years and for the control group it was 26-30 years of age. Most of the AWWs from both the groups had served ICDS for 6 to 11 years.

All the AWWs had undertaken a 3/4 months refresher's course after joining the ICDS. Six AWWs had also done an additional one year Montessori course. As reported by these AWWs all of them were given basic knowledge about activities for preschool

children but information regarding development and care of young children in general and infants in particular was negligible.

As seen in Table 3, the experimental and control group were similar on the background variables. The age of majority of the mothers and fathers of both the groups ranged between 20-30 years and 20-40 years respectively. Most of the mothers in both groups were illiterate while majority of the fathers had attended primary school. The sample included non-working women, though they were usually involved in income generating activities at home like sorting wheat. However, in midcourse of the study, two mothers of the experimental group and one from the control group started working as part-time maid servants.

The income of the families in the study ranged from Rs. 500 to 2500 per month. Majority of fathers of infants were self-employed as tailors, vegetable vendors, cycle mechanics and carpenters. Many of them also worked as daily wage earners while a few were paid monthly, in regular jobs. The nature of their jobs varied, they were factory workers, drivers, gardeners, army sepoys and clerks.

TABLE 3

Background Information on Infants' Family

in Frequencies and Percentages

Background Variables	Group			
	Experimental		Control	
	Mother	Father	Mother	Father
Age (in months)				
Below 20	2 (5.41)	--	1 (5.88)	--
20 - 30	31 (83.78)	22 (59.49)	15 (88.24)	8 (47.06)
Above 30	4 (10.81)	15 (40.54)	1 (5.88)	9 (52.94)
Education				
Illiterate	24 (64.86)	8 (21.62)	10 (58.82)	5 (29.41)
Primary	12 (32.43)	19 (15.35)	6 (35.29)	10 (58.82)
Secondary & above	1 (2.70)	9 (24.32)	1 (5.88)	2 (11.18)
Occupation				
Daily wage earners	--	10 (27.03	--	5 (29.41)
Self - employed	--	20 (54.05)	--	9 (52.94)
Regular jobs	--	7 (18.92)	--	3 (17.65)
Income level				
Below 500	--	3 (8.11)	--	1 (5.88)
501-1500	--	24 (64.86)	--	12 (70.59)
Above 1500	--	10 (27.03)	--	4 (23.53)

Note: $N = 54$, $N_e = 37$, $N_c = 17$
The entries represent frequencies, the corresponding percentage appear in parentheses.

TABLE 4

Description of Tools

	Tools	Tool Description	Purpose	Administration and Scoring Procedure
	For AWWs			
1.	Agnanwadi Workers Proforma (Appendix A).	This consists of background information of AWWs such as age, education, professional qualifiction, date of joining the ICDS program.	The proforma was used to collect background information of AWWs to know whether she has ICDS training and any other training.	It was filled by asking questions individually to the AWWs
2.	NIPCCD Calender (National Institution of Public Cooperation and Child Development, New Delhi).	It includes 8 flashcards depicting milestones of motor develoment during infancy (0-30 months)	The NIPCCD calender was used to pre-test and the Gesell's photographs to post-test AWWs knowledge on motor milestones of development.	Each flashcard, photo and slide was shown to AWWs and questions asked regarding : a) identification of the milestone and age group dipicted in the picture, b) developmental tasks of infants c that age group, and c) age- appropriate stimulation activities that can be provided.
	Gesell Photographs.	These 8 photographs dipict milestones of motor development during infancy (0-30 months).	Based on responses of AWWs in phase II, the number of Gesell photographs and BSID slides were reduced from 12 to 8 in this phase eg. in one photo the infant appeared older than his age as it was a close-up.	Each correct response was scored as one and each incorrect response as zero.
	BSID Slides (Dept. of Human Development & Family Studies, (HDFS), MSU, Baroda).	These 16 slides illustrate milestones of mental developement during infancy.	For pre- and post-testing AWWs knowledge of mental milestones of infancy, two different sets of BSID were used.	

Table 4 Contd...

	Tools	Tool Description	Purpose	Administration and Scoring Procedure
3.	Formative Evaluation Checklist (Appendix B)	It consists of items on the type, sequence and age of occurance of developmental milestones and activities to foster infant's development.	It was used to evaluate the AWW's understanding of the programme at the end of each session and at the begining of the subsequent session.	Each correct response was given a score of one and incorrect a score of zero.
4.	Programme Implementation Checklist (Mathur 1988, Dept. of HDFS, MSU, Baroda). (Appendix C)	It consists of items related to : a) Organization skills, b) Implementation skills.	It evaluated whether the AWWs were able to deliver the programme effectively to the mothers.	Each item has 3 levels of performance of which one was tick-marked based on observations of how the session was conducted by AWWs. Scores of 1,2 or 3 were given
5.	Summative Evaluation (Appendix B)	It consist of 4 open ended questions	It was used to obtain AWWs' and supervisors feedback regarding the infant stimulation programme	Responses of the AWWs' and supervisors were noted.
For Infants				
6.	Bayley's Scales of Infant Development (BSID), adapted by Phatak,(1973, Department of HDFS, MSU, Baroda).	The norms for motor and mental scale of BSID were established for Indian babies from birth to 30 months. It consists of 67 motor and 163 mental items of infants developmental milestones.	The scale was used to pre and post-test infants' motor and mental development. It was also used to develop the infant stimulation programme.	It is a point scale and gives motor and mental quotients. The administration and scoring procedures were followed as per the BSID manual. Infant testing were done by two investigators who were trained in administering the BSID.

Table 4 Contd...

Tools	Tool Description	Purpose	Administration and Scoring Procedure
For Mother-Infant Dyads			
7. Observation cum-Interview Schedule (Appendix D) This tool was adapted from Khurana's (1985) tool. Necessary modifications in the tool were made by Mathur (1988) to make it relevant for a home setting from an insitutional setting. Additional modifications were made by Shah & Ahuja (1989) and present investigator to convert it into a checklist from a running observation schedule.	The tool has two sections a) Observation, Check-list of mother-infant dyads interaction includes physical, verbal and non-verbal modes of interactions. b) Interveiw Schedule consists of item on : - Background information of family members, - Physical layout of the house and - Care and play material in the house for infant.	It was used as pre- and post-test to gain insight into the interactional patterns between mother and infant and other home related information.	Mother-infant interaction were observed in home setting for a total time block of 30 minutes. Tally marks were made against the approximate mode of interactions observed at the time. Inter-rater reliability of 89.4% was established between the research assistant and investigato on a sample of 10 mother-infant dyads.

Almost all the families lived in their own one or two-roomed houses which were made of mud. The house were clean and had minimum furniture. The break-up of the sample in terms of infants' age and gender is given in Table 2. In the total sample, 30 percent were one-child families while in the remaining, the number of siblings ranged from two to seven.

Description of the Tools

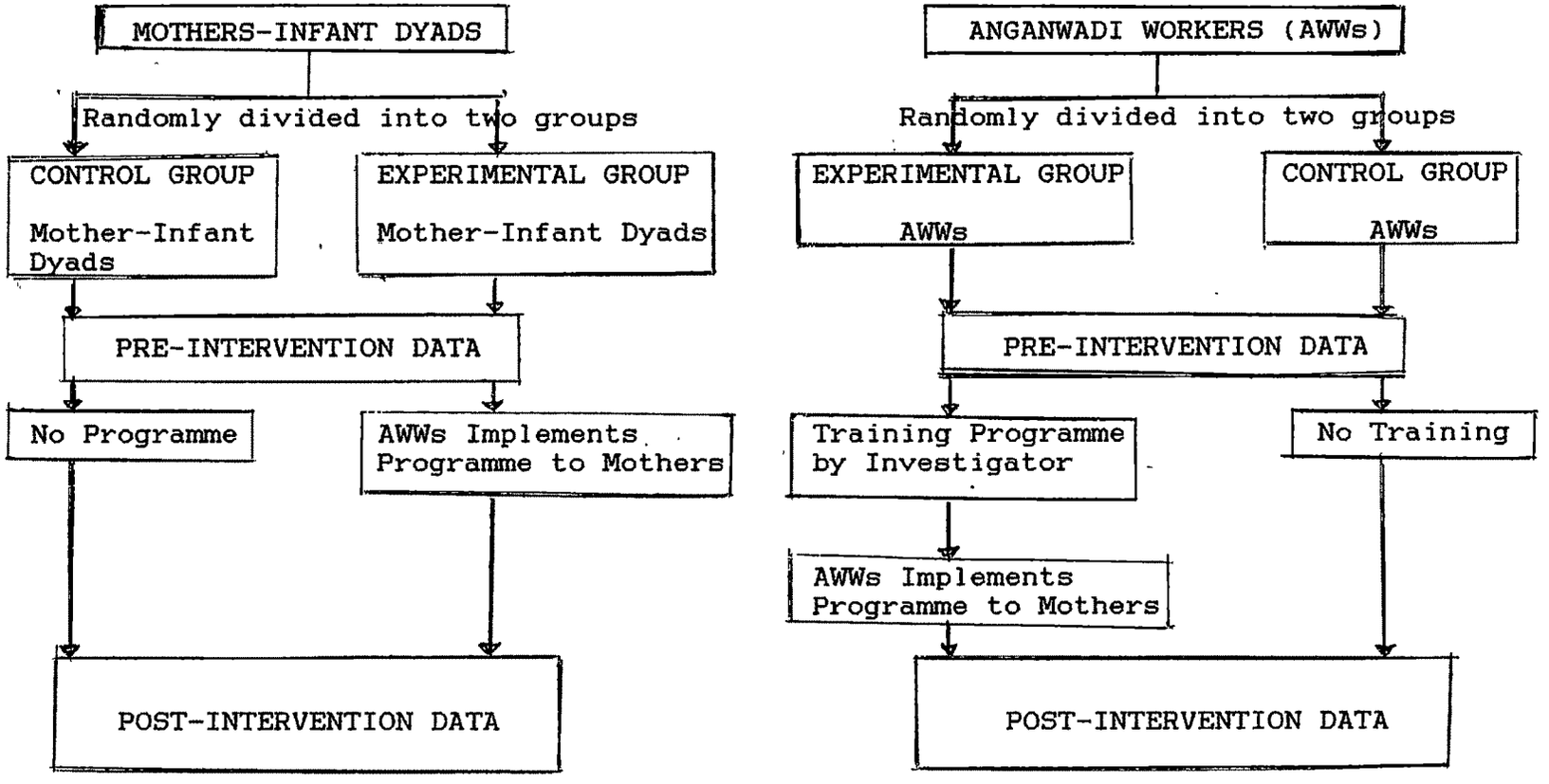
The tools used to measure the variables of the study are described in Table 4.

Procedure of Data Collection

Research Design

A quasi-experimental design with pre-test,post-test was used in the present study. The experimental and control groups were pre-tested; the training programme was administered to the experimental group (the control group was included in the puppet making session only) and both groups were then post-tested. The data was obtained from three sources in the present study namely the AWWs, the supervisors and mother-infant dyads. (Refer Figure 5).

FIGURE 5 : Research Design of the Study



The study called for continuous monitoring and evaluation to test the feasibility of programme package which entailed the following methodology in the study :

1. Evaluation at each stage : As there was need for evaluation at frequent interval, evaluation was inbuilt in the training programme.

2. Evaluation at three levels : Evaluation of programme impact at each level, namely, AWWs, mothers and infants called for use of different methods of data collection and analysis.

3. Evaluation of each subject : The need to do indepth evaluation of each subject and the nature of the information needed (e.g. changes in interactional patterns) called for study sample.

The entire study was carried out in the following six stages :

1. Pre-testing of the sample, prior to implementing the training programme.
2. Developing the Infant Stimulation Programme (ISP)
3. Implementing the training programme to AWWs of the experimental group.
4. Supervising AWWs' (experimental group) implementation of the programme to the mothers of the experimental group.
5. Post-testing of the sample to evaluate the impact of the programme on the AWWs and mother-infant dyads.
6. Developing the programme manual and the video cassette of ISP.

The procedure of data collection used in each stage of the study has been enumerated below. The details regarding the procedures of development of the programme and video cassette have been given in the next chapter.

Pre-testing of Experimental and Control Groups

Pretesting of AWWs : The Child Development Project Officer (CDPO) was contacted to orient her regarding the present study and to seek her co-operation for the same. The CDPO was requested to arrange a meeting to introduce the investigator to the supervisors and AWWs during one of their routine meetings. Pre-testing was conducted, either before or after the scheduled meetings of AWWs with their respective supervisors, as per their convenience.

The NIPCCD calender and BSID slides, depicting the motor and mental milestones respectively, were used to find out AWW's awareness regarding developmental milestones of infants and activities to stimulate the same. For each AWW, pre-testing on the NIPCCD calendar took about 15 minutes and for the BSID slides about 30 minutes. Questions were asked either in Gujarati or Hindi. The testings were conducted by the investigator over a period of four weeks.

Pre-testing of mother-infant interaction : The initial home visit was made with the AWW or helper as the contact person. The purpose of the study was explained and their co-operation sought and convenient timings were fixed for data collection.

Observation of mother-infant interactions in the home setting were conducted for over a period of three months, using the observation checklist. Prior to observations of mother-infant interaction patterns, mothers were interviewed about their background information and details regarding physical environment of house, including play material available to the infant, in order to familiarize the mothers to investigator's presence. Being introduced by the AWWs also helped the mothers to be relaxed during the observation.

Pre-testing of infants : The infants of the experimental and control group were tested individually on BSID. Testings were done either at the respective AW center in the community or in the infants' home. The testing took about 30 minutes to one hour depending upon the age of the infant. While administering the test to the infants, efforts were made to make the situation as conducive to the testing as possible.

Training AWWs to Implement the Programme

The training programme was conducted in nine sessions by investigator and a team of resource persons. The programme covered a period of three weeks and was held in the premises of Department of HDFS, M.S University, Baroda. Three sessions were held per week.

The first session of the training programme was an orientation session conducted to make the AWWs aware of the objectives and relevance of the programme. In the next two sessions both experimental and control groups of AWWs learned to

make puppets and clay models which were to be used for programme implementatiion for the experimental group. It also provided the investigator opportunity to have informal interactions with each AWW.

In the next five sessions, the motor and mental development package were given. The motor development package consisted of three units while the mental development package included six units. In the last session, the AWWs were given general guidelines for implementing the programme to mothers. The sequence in which the sessions of the programme were implemented to the AWWs was as follows :

Session - 1	Introductory session
Session - 2	Session on puppet making.
Session - 3	Session on puppet making continued.
Session - 4	Motor development, unit 1 and session on other aid-making.
Session - 5	Motor development, unit 2 and 3.
Session - 6	Mental development, unit 1 and 2.
Session - 7	Mental development, unit 3 and 4.
Session - 8	Mental development, unit 5 and 6.
Session - 9	Summing up session with relevant guidelines for implementing the programme to mothers.

Supervisors of the experimental group attended the orientation session and two sessions of the training programme. They assisted in supervising the implementation of the training programme by co-ordinating and monitoring AWW's attendance in the

programme.

For evaluating AWW's understanding of the training programme, formative evaluations were conducted wherein after each session the AWW's knowledge was assessed in small sub-groups. At the beginning of the next session, recapitulation of the previous session was conducted in a similar manner.

Implementation of the Programme by the AWW's to the Mothers

The AWW's of the experimental group implemented the programme to the mothers (experimental group) in their respective AWs. The day, date and time of conducting these sessions were decided a week in advance with the AWWs. The programme was arranged in the afternoons between 3 to 4 p.m. for five days, in a few AWs it was spread over a week. Programme Implementation Checklist was used by the investigator to evaluate two sessions of the programme implemented by each AWW. The first session was observed for all 18 AWW's so that feedback, if necessary, could be given for subsequent sessions. The second observation was made without prior notice to AWWs. The last session was also evaluated for all the AWWs.

Post-testing of Experimental and Control Groups

Post-testing of AWWs : One month after the training programme AWWs of both experimental and control groups were post-tested on Gesell's photographs and BSID slides to assess their knowledge regarding motor and mental milestones.

Summative evaluation : After the experimental group of AWWs conducted the programme to the mothers, they were asked questions to know their opinion about (a) the programme and the benefits they have gained from the same,and (b) role of parents in infant's development. After eight months the AWWs were contacted to inquire whether they had implemented the programme again or discussed it with the mothers, either during the group meetings or home visits. This information was elicited from the supervisors also.

Post-testing of mother-infant interaction : Post-testings of mothers-infant dyads, of both experimental and control groups were conducted on the observation cum interview schedule after two/three months from implementation of the programme. In order to avoid experimenter bias, the investigator was blind to the groups of mother-infant dyads.

Post-testing of infants : Infants of both groups were post-tested on the motor and mental scale of BSID. Care was taken to see that minimum distractions occured while testing the infants. Post-testings of infants was conducted seven/eight months after the programme was given to the mothers.

Analysis of Data

The data collected by the various tools mentioned were analyzed to determine the efficacy of the programme package. There were two types of analysis : (a) qualitative analysis and (b) quantitative analysis. Analysis was done as given in Table 6.

The data obtained from observation checklist will be in terms of frequencies in various categories of physical, verbal, non-verbal and combined modes of interactions. These frequencies will then be categorized into three distinct categories of supportive, neutral and restrictive interactions of mother-infant dyads (refer table 5. for a few examples).

TABLE 5

Patterns of Mother-Infant Interactions: An Example

	Quality Of Interaction.		
	Supportive	**Neutral**	**Restrictive**
Physical	Mother pats the back of the child in appreciation when he learns clapping his hands.	When mother goes to courtyard to clean utensils, she carries the child in her arms.	Mother cleans the mud from the child's hand and removes the child from the muddy courtyard.
Verbal	Mother repeats the child's utterencess, da-da, ma-ma and encourages him by laughing and saying `Shabash', very well done.	Mother issues neutral command to the child by saying `go and play with your sister'.	Mother yells at the child `Spit out the cow-dung'.
Non-Verbal	With a smiling face mother tickles the child and makes him laugh.	When the child asks for his toy mother points with her index finger at the place where the toy was	Mother shakes her head from side to side discouraging the child with an unsmiling face when he starts tearing pages of book.

TABLE 6

Plan of Analysis

Data Obtained From	Statistics Applied
1. Evaluation of AWWs Performance	
* Pre-and post-testing AWWs' awareness, using NIPCCD calender, BSID slides & Gesell photographs	Chi-square (X) test was applied to determine the significance of differences in the percentage gains in pre-post test scores of the experimental and control groups.
* Formative evaluation of AWWs' awareness during the training programme	Responses per AWW at the end of each session and before the next session were converted to percentage & the same were depicted in bar graph.
* Assessment of AWWs' on the Program Implementation checklist.	Percentages for each AWW for organizational and Implementation skills and a composite percentage for both was determined to judge the efficacy of the programme
* Summative evaluation of the AWWs' after the programme was implemented to mothers.	Data was analyzed qualitatively to know their views about (a) the training performance (b) the relationship between home, environment, and infants development.
2. Evaluation of Mother-Infant Interaction	
* Pre-and post-testing of mother-infant interaction using Observation cum Interview Schedule	Multiple Classification Analysis (MCA) and analysis of variance were computed wherein the main independent variable were supportive and neutral (physical verbal & non-verbal) interactions. The main dependent variable was exposure to intervention programme.
3. Evaluation of Infant's Performance	
* Pre-and Post-testing of infants' motor and mental	Means of pre-and post-test scores were calcuated and t-test applied to determine significance of difference between (a) pre-test scores of experimental and control groups and (b) post-test scores of experimental and control group.