IMPACT OF THE INFANT STIMULATION PROGRAMME

The effectiveness of the Infant Stimulation Programme (ISP) mediated through AWWs to the mothers was assessed by analyzing the data at three levels namely, (a) at AWWs' level (b) at mother-infant dyads' level and (c) at infants' level by examining the outcome with reference to the following questions :

1. Does the programme increase AWWs' awareness regarding the developmental milestones and stimulation activities for infant care ?
2. Does the programme promote mother-infant interactions?
3. Does the programme enhance infants' motor and mental development ?

Evaluation of AWWs' Before, During and After the Training

AWWs' performance was evaluated in terms of :

* AWW's awareness of developmental milestones of infancy; before and after the training programme.
* Formative evaluation of the AWWs' during the training programme.
* Assessment of AWWs' on the Programme Implementation Checklist while implementing the programme to the mothers.
* Summative evaluation of the AWWs and their supervisors after the programme was conducted with mothers.

AWWs' Awareness Regarding Developmental Milestones and Stimulation Activities for Infant Care

Gains in pre-post test scores : The AWWs' responses at pre and post-test levels on the NIPCCD calendar and Gesell's photographs respectively were scored on three questions related to the age of the infant, developmental tasks of the infant at that age and stimulation activities to foster the same.

Before the training programme the means of the experimental (E) and control (C) groups of AWWs on the NIPCCD Calendar were almost similar (E=23.05; C=25.0). After the training on ISP the means scores increased considerably in favour of the experimental group (E=40.17, C=28.6). A Chi-square test was used to test whether the pre-post test gains of the experimental and control groups were significant. The result presented in Table 7 shows that the number of AWWs in the experimental group showing pre-post test gains above 35 percent on awareness regarding developmental milestones of infancy were significantly more than that of the control group (χ^2, (26; N=28) = 9.94, $p < .01$).

TABLE 7

Percentage Gains in Pre-Post Test Scores of AWWs Regarding Developmental Milestones of Infancy

Groups	Percentage gains < 35	Percentage gains > 35	Total
Experimental (E)	5	13	18
Control (C)	9	1	10
Total	14	14	28

Note : N = 28 n_e = 18 n_c = 10 χ^2 value = 9.94

Qualitative evaluation indicated that responses of AWWs at the pre-test level limited their focus on developmental tasks related to physiological development rather than infant's motor and mental development. Almost all AWWs suggested activities related to balanced diet and immunization, only two AWWs mentioned some activities to foster motor or mental development; though they lacked an understanding of importance of stimulation activities for infants.

However during post-test a significant change was evident in AWW's response wherein they were able to state the developmental milestones and also suggest stimulation activities utilizing environmental or household materials. For example, AWWs were able to state that an infant at three months reaches for dangling objects (motor development), can look at moving person, and respond to sound of a bell (mental development), so the mother could shake a bunch of keys, and hang mobiles from crib as stimulation activities. The AWWs were able to explain the role played by stimulation activities to foster development.

Profile of knowledge gains during formative evaluation : The AWWs' performance on the twelve units during the training programme were evaluated on two evaluations per session. The first evaluation was conducted immediately after each session and the second evaluation was held prior to the beginning of the next session. Performance on the evaluation was viewed according to : (a) percentage scores per AWW, across all units and (b) percentage scores per unit, across all AWWs.

FIGURE 7 : AWWs' Awareness on Milestones of Development Across Units (I-IX)

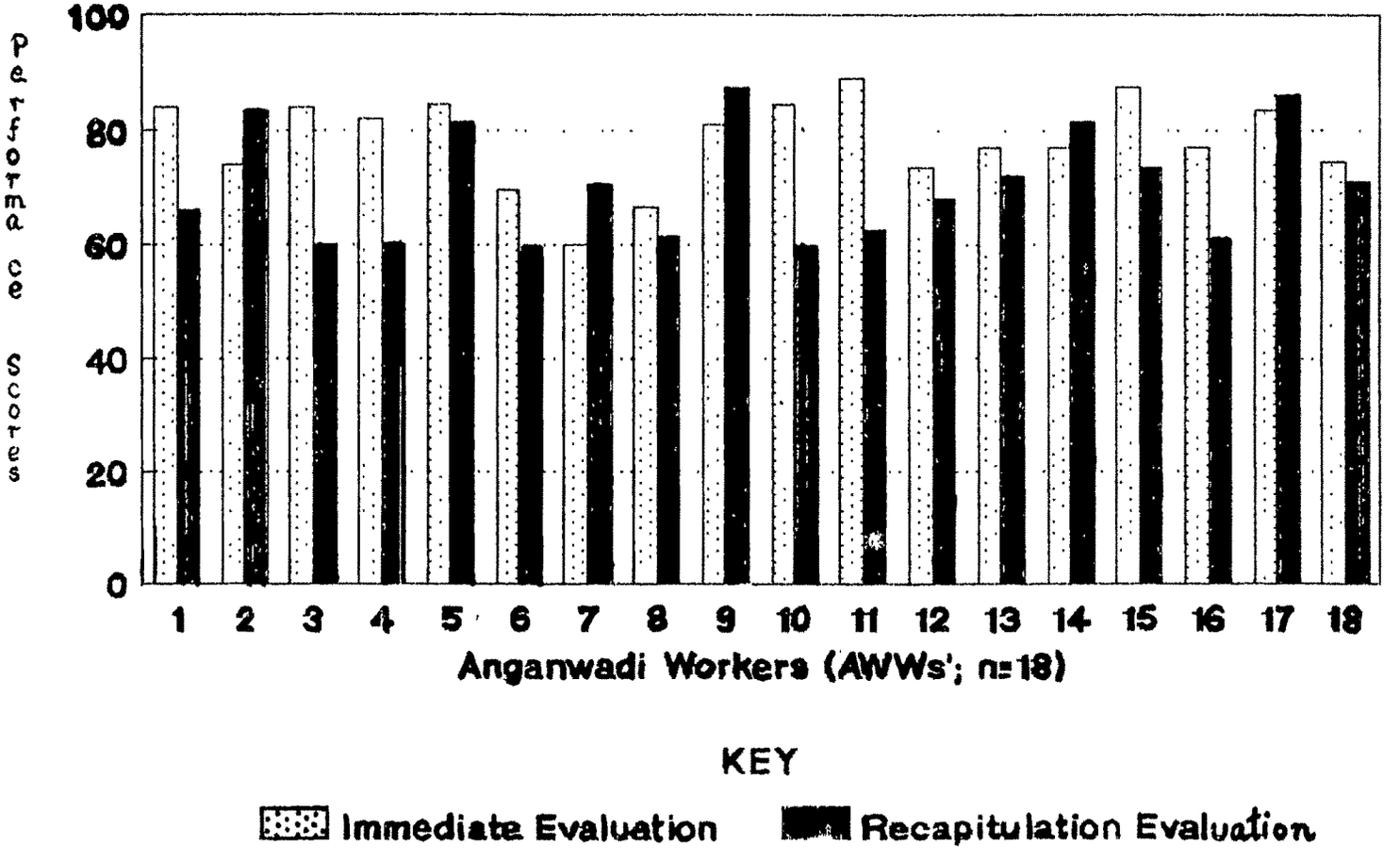
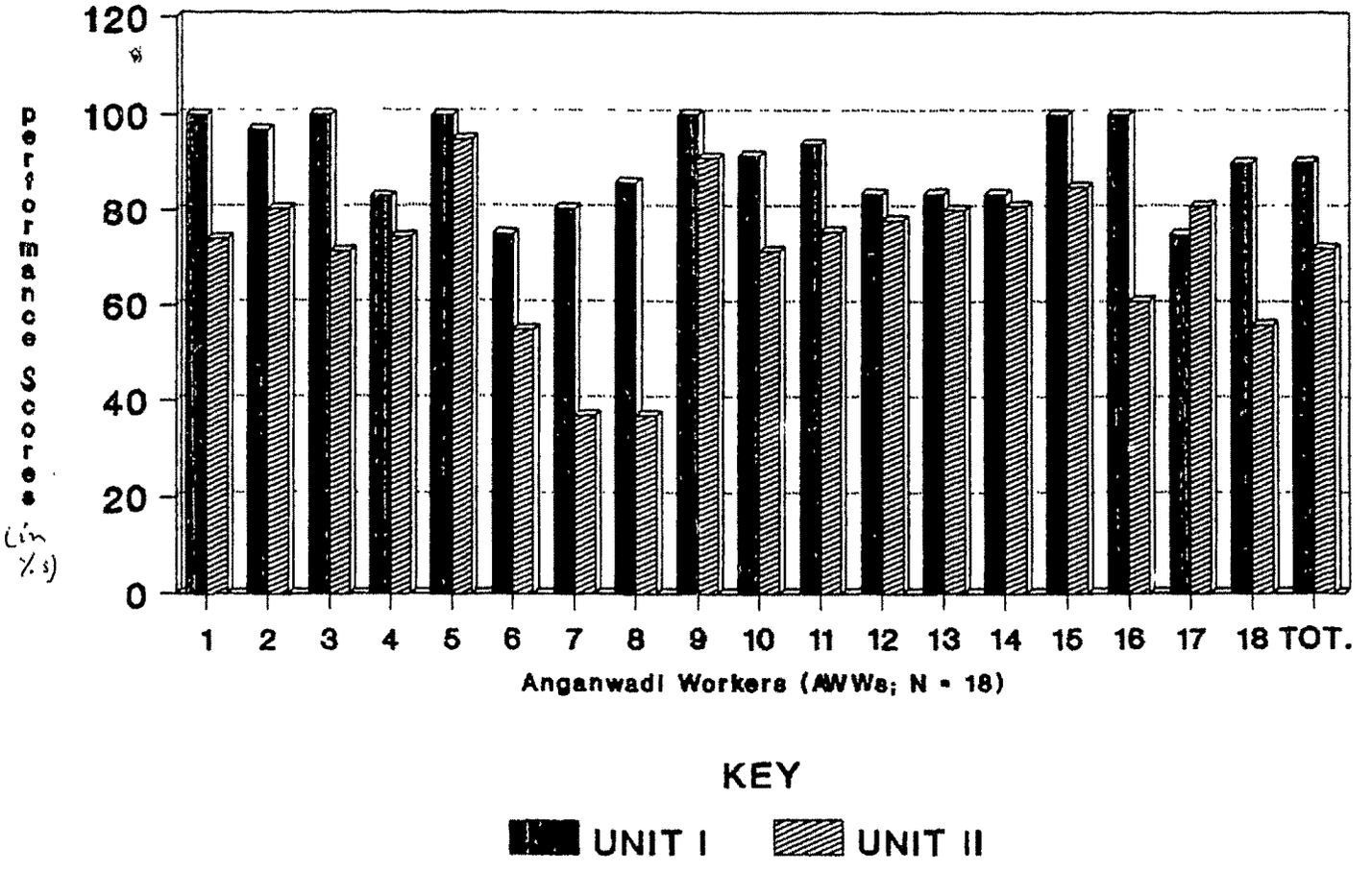


Figure 7 which indicates the performance of the AWWs individually, reveals that 11 out of 18 AWWs (61%) scored above 80 percent in either the immediate or recapitulation evaluation, 6 scored between 70-80 percent while one scored 67 percent. Out of 18, 13 scored higher during the recapitulation evaluation as compared to the evaluation immediately after the sessions. This may be because before the recapitulation evaluation a revision of the earlier session was conducted. High scorer AWWs were more involved and responsive during the various sessions as compared to the low scorers.

Results on the units of the programme demonstrate that other than unit III, the average scores of the AWWs on each unit was high; between 80-90 percent in units II, VI, VIII and IX, and between 90-100 percent in units I, IV, V and VII. Figure 8 illustrates performance of AWWs on units I and II. In 5 out of the 9 units, the average scores were higher in the recapitulation session than that in the first evaluation while it was vice-versa in the remaining units. Unit III, (milestones of prehension ; motor development) was a difficult unit as indicated by low average scores (61%) and wide variations in the scores of AWWs. This could probably be ascribed to (a) length of the unit (14 items in this unit as compared to 4 to 12 items in other units) and (b) the nature of the items covered in this unit. Unit II also had many items (17) but the concept covered were milestones of lower limb movements like walking with help (9-12 months) and as such the AWW may have been more familiar with them

FIGURE 8 : Individual Profile of AWWs on Two Units : An Illustrative Example



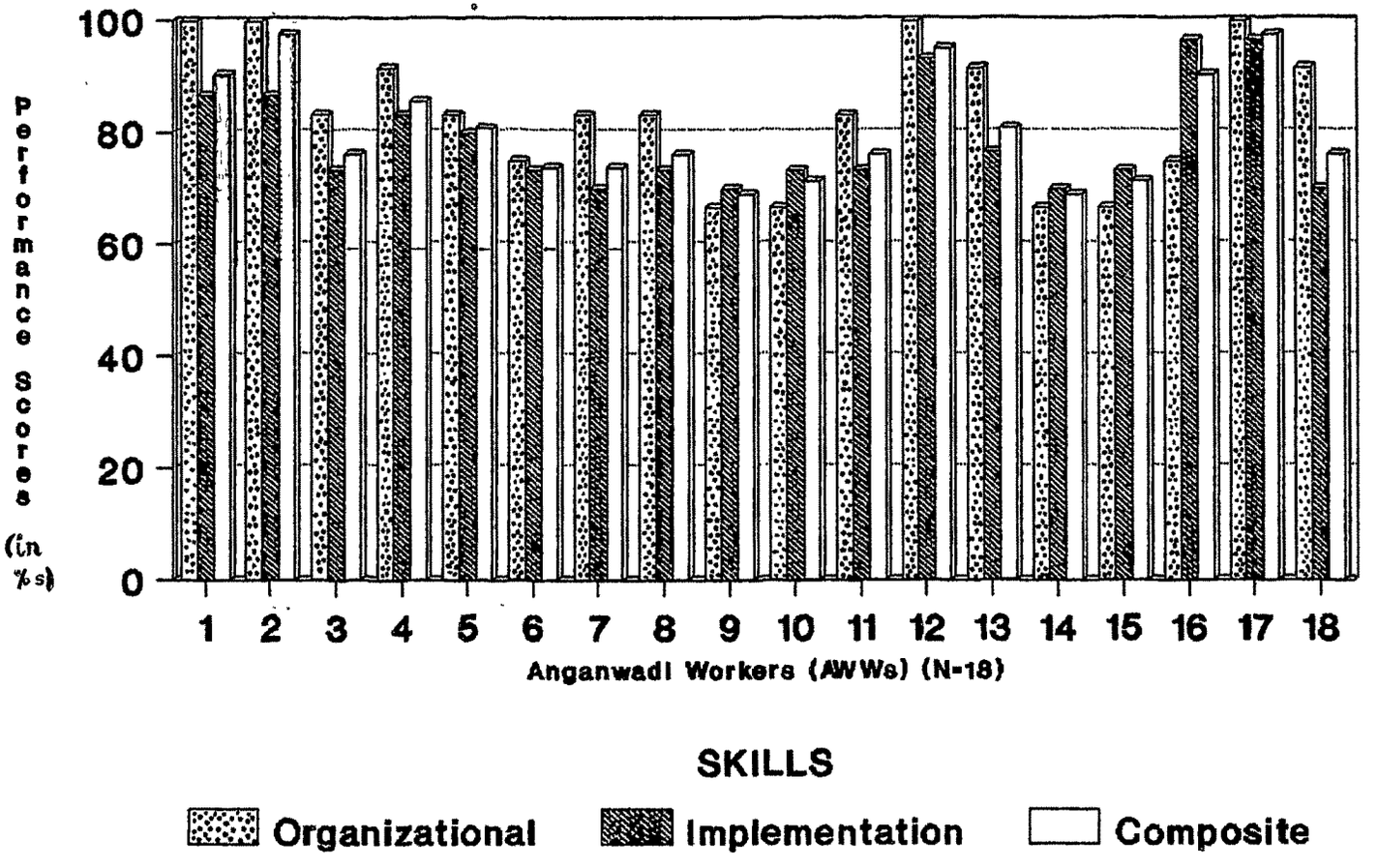
than those covered in unit III (milestones on upper limb movements such as manipulating object (6-9 months). Hence the duration of the session was long thereby affecting the attention span and in turn the conceptual understanding by the AWWs.

Performance of AWWs in Implementation of the Programme to Mothers

The trained AWWs implemented the programme to the mothers of the respective communities and the Programme Implementation Checklist was used to score the AWWs' organizational and implementation skills while the programme was being implemented. Items on organizational skills included ability to assemble the mothers at the venue and organize the programme. Items on implementation skills included ability to use the programme material and the knowledge gained during the programme. The overall performance of the experimental group of AWWs on the organizational skills was 83.79 and on the implementation skills it was 79.47 (See Figure 9). This reflects that the training programme made a difference in their understanding as was seen in the programme conducted by them to the mothers.

On viewing the variations within the component of organizational and implementation skills, it was seen that in the skills of organizing the programme, 12 out of 18 AWWs obtained a maximum score of three on item `Decides day, date and venue of the programme' and 16 AWWs obtained a maximum score on item `Strategies for calling mothers to attend the programme session i.e. through home visits'. On the item `Preparation of aids for

FIG. 9 : Organizational & Implementation Skills of AWWs in Implementing Programme



programme', 11 AWWs scored a maximum score of three for making good audio-visual aids. Some AWWs had also added ideas of their own for example, an AWW had mounted the flashcards on sticks.

In the implementation skills, on the items `Orienting about the programme' and `Introduction of the daily session', 11 and 17 AWWs respectively obtained moderate and maximum scores, there was only one low scorer who did not give any introduction about the topic of the session. All but 2 AWWs had maximum scores in item `Conducted session in a systematic manner' wherein they were able to cover all relevant aspects of each session in a logical manner. On item `Manner of conducting the various sessions', 11 AWWs had moderate score as they could give detailed explanation on all aspects of the topic while 7 AWWs also encouraged discussions during the session with the mothers, obtaining a maximum score of three. For the item `Decides content from total given content' in the component of organizational skill, 9 AWW (high scorers) were able to modify the content of the programme according to the group needs while 9 AWWs gave it as it was given in the training package and obtained a moderate score. On item `Encourages suggestions and response from the group ', 10 Awws encouraged mothers in 2/3 sessions, obtaining a moderate score while 8 got maximum scores as they did so in all the session.

All AWWs were able to use the materials and aids effectively to help better understanding of the programme concept, obtaining maximum scores. Most AWWs also used practical example like their

personal experiences in bringing up their children and experiences of the mothers in the group. Majority of the AWWs (12) had a moderate score of two in item `Tone and voice modulation while conducting programme' as they were not able to modulate their voice as needed while some AWWs who were able to do so were soft spoken. Six AWWs were also loud and clear and obtained a maximum score of three. All but one AWW summed up the major aspects of the content covered.

Thus it was seen that AWWs were able to :

* Conduct the sessions of the programme in a systematic manner covering the salient features of the units;
* use materials and audio visual aids effectively to develop better understanding of the programme and,
* encourage participation of the mothers during the training.

Summative evaluation : Evaluation related to reactions of the AWWs regarding the role of stimulation, infants' development and parental role in the form of three open ended questions were also made. These were analyzed qualitatively in addition to the quantitative analysis to determine the overall effectiveness of the programme.

All 18 AWWs from the experimental group felt that it was essential to have knowledge of developmental milestones and early stimulation. The reason given was that it would enable them to guide and advise mothers in the community about infants'

development at different ages and thus help mothers to promote infants' development. A few stated that it would also help them to utilize this knowledge for enhancing their own children's development. Three AWWs stated that the knowledge gains could be useful in identifying infants with developmental delays.

All the AWWs stated that the surrounding home environment played an important role in influencing infants' development. They also felt that the mothers role was paramount in promoting infants'development, so the programme would help mothers to know more about their infants' need.

These results highlight some salient points regarding the efficacy of the training programme. The knowledge gains of the AWWs during the post-test indicate that they were able to shift their focus from health and nutrition to the understanding of infant stimulation and its importance. They were able to suggest activities to foster infants' development with reference to the home environment also including household play materials. It suggests that the training programme has been able to sensitize the AWWs to infant's developmental needs.Studies by Ahuja (1989) and Shah (1989) have also shown that training enhances the knowledge content of the grassroot level workers regarding the motor and mental developmental milestones of infancy. Thus training becomes essential for adults to respond sensitively to infants' developmental needs (Honig, 1985).

The formative evaluation suggests that a training programme with clearly defined content areas and using specific strategies such as the activity based approach to convey the message, results in better understanding and knowledge gains of AWWs. Studies by Ahuja (1989), Mathur (1988) and Mukul (1985) also confirm these findings. Thus the main issue is to match training methods to training needs. No matter what the type of programme, its effectiveness is related to appropriate choice of method, strategies and materials according to the training needs (Verma, Mistry & Mehrotra, 1985, p. 47). Formative evaluation also reveals that the attention span and the conceptual understanding of the programme content is better when the subject matter is broken down into smaller units each including knowledge related to a few milestones.

In addition, it is emphasized that programmes for child welfare must have the skills to provide this meaningful stimulation as an important component (Chowdhary, 1987). During the training, the AWWs were not only provided experience in manipulating aids such as glove puppets, clay models as per the requirements of respective sessions of the programme but were also taught how to make them. The findings of the Programme Implementation Checklist indicate that the AWWs were able to use the aids effectively while implementing the programme. The AWWs expressed that these aids were useful in their work at the Anganwadi (AW) also. One can thus conclude that learning by doing (Sharma, 1985) facilitates better understanding of concepts

related to infant's development. Mukul(1985) similarly emphasized trainer's sensitivity to trainee's cues of understanding and her own ability to utilize the programme content in a meaningful way.

Use of local folklore, folkdance and other indigenous materials in the training programme evoked a great deal of interest and enthusiasm in the trainees while participating in the programme. As stated by UNICEF, (1990), "Participatory approach and viable models are only the framework of a fabric; training programmes must partake this yarn and interweave it with the events, situations, resources of the specific local community to form the weft and warp of the cloth" (p.13).

After each session of the training programme, group discussions were held where trainees were encouraged to relate their experiences and problems while working with young mothers and children. Besides providing an opportunity to share experiences during the discussion, AWWs were able to clear their doubts and exchange ideas regarding the programme messages. During the training, emphasis was on encouraging the trainees to suggest their own ideas on ways to enrich infants environment. It was also suggested that the AWWs talk to the mothers and grandmothers during their home visits regarding the traditional lullabies, and activities they had used when their children/grandchildren were growing. Several AWWs mentioned some interesting stimulation activities based on their personal experiences or talks in the community. Thus "a successful

training strategy for early child development personnel is one that emphasizes the learner's strengths rather than weaknesses; applies active and participatory training methods, perceives the trainer as a facilitator rather than a director and fosters a co-operative rather than a competitive training environment" (UNICEF, 1990, p. 22).

The success and effectiveness of any well designed programme finally depends on its implementation. The grassroot level worker is thus responsible for the eventual outcome of the programme. The results highlight the fact that AWWs were able to transfer the knowledge and concepts imbibed during the training programme to the practical level on the field. The flow of knowledge from the trainer through the trainees and ultimately to the mothers emerged as another salient point in this study. The fact that AWWs were local members of the community and have established rapport with the mothers through nutrition and other services they offer helped in the smooth implementation of the programme. Ahuja (1989) too reported that AWWs were able to effectively `deliver' infant stimulation programme to mothers.

These studies indicate that the AWWs, the grassroot level functionaries can play a crucial role as teachers, caregivers and promoters in early childhood stimulation and integrated child development services. Since the integrated package of services provided at the AW centres focus on the preventive aspect, the present programme will help in giving it the needed developmental dimension. In view of the influence of early

experience on children's development, it is essential for intervention programmes to focus attention on developmental variables. Nutritional intervention alone is not sufficient, there is need for introduction of simple stimulus items and establishing use of play for optimal development in child care programme (Anandalakshmy, 1982).

However to maintain a quality early intervention programme at macro-level some inbuilt strategies such as involving the field supervisor is essential. In the present study, the supervisors helped to monitor AWWs attendance during the programme besides coordinating meetings with them before and after the programme. This also "helps to motivate and further the enthusiasm of the trainees besides ensuring smooth implementation" (Verma, et al., 1985, p. 47). Thus intervention programme services should not only address the needs of young children but also help strengthen the context in which they are embedded, including the family, the community and the physical, social and economic environment (Consultative Group of ECCD, 1993).

Evaluation of Mother-Infant Interaction Patterns

Data obtained from the observation checklist on mother - infant interaction has been presented and discussed in terms of : (a) quality of maternal interactions, viz. supportive, neutral and restrictive and (b) modes of maternal interactions viz. physical, verbal and non-verbal under each of the categories of supportive, neutral and restrictive interactions.

Quality of Maternal Interactions

To study the effects of the Infant Stimulation Programme on maternal interactions, Multiple Classification Analysis (MCA), was carried out, taking the scores of supportive (physical, verbal, non-verbal) and neutral (physical, verbal, non-verbal) interactions as the main independent variable. Since age of the infant is likely to have a direct effect on the interactions between the mother and infant, infants' age was taken as a control variable.

Further, the interest was to take the net effect of intervention in the experimental group; changes in the maternal interactions in the experimental group from pre- to post-test due to passage of time and other extraneous factors were also adjusted. To judge the significance of each of the independent variable on each of the dependent variables, analysis of variance (ANOVA) was computed.

Supportive maternal interaction : As indicated in Table 8 the scores on maternal interactions of the experimental and control group suggest that the frequencies of supportive interactions of the experimental group had increased considerably after undergoing the Infant Stimulation Programme, whereas the post-test scores of the control group had decreased.

An increase in frequencies for "encourages musculature" "motion stimulation", "affectionate verbal approach" "provides visual and auditory stimulation", and "gives objects to infants" were seen in the experimental group of mothers.

TABLE 8

Supportive Maternal Interaction in Frequency Average Per Mother and Total

Groups	Test Levels		Average Gains per Mother	Total
	Pre-test	Post-test		
Experimental (e)	36.94 (1367)	43.15 (1596)	6.20	80.80 2963
Control (c)	37.47 (637)	36.53 (621)	0.94	74.0 1258

Note : $n_e = 37$ $n_c = 17$

The entries represent frequencies per child, the corrosponding parentheses includes the total.

Neutral maternal interactions : It was interesting to note that while there was considerable increase in the frequencies of neutral maternal interactions of the control group from pre- to post-test the increase in the means for the experimental group was negligible (see Table 9). The mean score of several items under neutral interactions have decreased for the experimental group. These items were related to "neutral physical contact", "verbal instruction" and "taking away objects".

TABLE 9

Neutral Maternal Interaction in Frequency Average Per Mother and Total

Groups	Test Levels		Average Gains per Mother	Total
	Pre-test	Post-test		
Experimental (e)	18.89 (699)	19.72 (730)	0.73	38.62 1429
Control (c)	16.64 (283)	21.88 (372)	5.24	38.52 655

Note : $n_e = 37$ $n_c = 17$

The entries represent frequencies per child, the corrosponding parentheses includes the total.

Restrictive maternal interactions : Frequencies obtained under restrictive maternal interaction (see Table 10) were comparatively less for the experimental and control groups, both before and after the programme. Less number of restrictive maternal interactions can be explained by the reason that an Indian mother is generally inclined to indulge her infant's wishes and demands.

It was observed that the restrictive interactions were mainly verbal scolding or threat and there were very few incidences of physical punishment except in three observations in which the mothers slapped the child when he/she was crying. Restrictive interactions were mainly used to prohibit the infant from using material or being in a situation which could prove harmful to the child.

TABLE 10

Restrictive Maternal Interaction in Frequency Average Per Mother and Total

Groups	Test Levels		Averages Gains per Mother	Total
	Pre-test	Post-test		
Experimental (e)	2.48 (92)	3.41 (126)	0.93	5.89 218
Control (c)	1.76 (30)	2.71 (46)	0.95	4.47 76

Note : $n_e = 37$ $n_c = 17$

The entries represent frequencies per child, the corrosponding parentheses includes the total.

Thus analysis of the quality of mother-infant interactions show that at the post-test the supportive interactions of experimental mothers had increased considerably while it had decreased for the control group. With increase in the age of infants, neutral interactions increased in the control group whereas it had not increased for the experimental group. The Infant Stimulation Programme has not made any difference on restrictive interactions of the mothers; they were low at the pre-level also.

Modes of Maternal Interactions

On further analysis of the effect of the programme on mother-infant interaction, MCA results (see Table 11) show that the effect of intervention on the experimental group was significant for supportive verbal interactions while it was not significant for supportive physical and non-verbal interactions.

TABLE 11

MCA Results of the Effect of the Programme on Supportive Maternal Interactions of the Experimental Group

Mode of Interactions/ Test levels	N	Supportive Maternal Interactions			
		Unadjusted		Adjusted +	
		Mean	Eta	Mean	Beta
Physical Interactions					
Pre	54	14.04		12.65	.05
Post	54	10.46	.24	11.85	
Verbal Interactions					
Pre		10.34		11.47	
Post		16.33	.37	15.23	.23*
Non-Verbal Interactions					
Pre		12.70		13.00	
Post		14.58	.11	14.28	.08

Note :

\+ Adjusted for the effects of infants' age and the effects of changes in the control group from pre- to post-test.

* Significant at .05 level; Analysis of Variance (ANOVA) established the significance of these variables.

Physical interactions : As the unadjusted means show (refer Table 11) the mean scores on supportive physical interactions reduced from pre- (14.40) to post-test levels (10.46). This was mainly due to the increase in infant's ages from pre- to post-testing. This was evident from the fact that when the effect of age and other extraneous factors were adjusted, the difference

between the pre- and post-test scores decreased. ANOVA results also show that infants' age was significantly related to physical supportive interactions.

TABLE 12

MCA Results on the Effect of the Programme on Neutral Maternal Interactions of the Experimental Group

Mode of Interaction/ Test levels	N	Neutral Maternal Interactions			
		Unadjusted		Adjusted+	
		Mean	Eta	Mean	Beta
Physical Interactions					
Pre	54	5.41		5.00	
Post	54	3.83	.24	3.00	.24*
Verbal Interactions					
Pre	54	8.22		9.83	
Post	54	11.46	.23	9.85	.00
Non-Verbal Interactions					
Pre	54	5.26		4.91	
Post	54	5.20	.01	5.55	.07*

Note :

+ Adjusted for the effects of infants' age and the effects of changes in the control group from pre to post-test.

* Significant at .05 level; Analysis of Variance (ANOVA) established the significance of these variables.

While the ISP has not been found to be related to supportive physical interaction, it was seen to influence neutral physical interactions (refer Table 12). MCA results reveal that neutral physical interactions reduces significantly in the experimental group from pre (5.41) to post-test (3.83). This was also indicated by the beta value which was significant at .05 level.

Non-verbal interactions : Similarly the effect of intervention on supportive non-verbal interaction has not been found to be significant as the adjusted mean scores did not increase significantly from pre (13.0) to post-testing (14.28) (see Table 11). This was also seen in the beta value which was not significant. Neutral non-verbal interactions too were not influenced by the Infant Stimulation Programme (see Table 12).

Verbal interactions : It was interesting to note that the effect of intervention on the supportive verbal interaction was significant as the adjusted mean scores increased from pre (11.47) to post-testing (15.23). The extent of effect of intervention, that is, the ISP, on supportive verbal interaction was evident from the value of beta (.23) which was significant atleast at .05 level.

It was also noted here that the value of Eta (.37) reduces substantially when controlled for the effects of infants' age, indicating that infants' age was also a significant influencing factor. In neutral verbal interactions also when the effect of age and other extraneous factors were controlled in the adjusted

mean scores, the post-test scores of the experimental group decreased considerably indicating that age and other factors were mainly responsible for the increase in the frequencies (see Table 12).

TABLE 13

Modes of Infant Interactions in Frequency Average per Child and Total

Groups/ Test Levels	Modes of Infant Interactions			
	Physical	Verbal	Non-Verbal	Total
Experimental (e)				
Pre-test	2.78 (103)	12.0 (444)	6.05 (224)	20.86 (772)
Post-test	6.48 (240)	12.35 (531)	3.48 (129)	24.32 (900)
Average gain per child	3.70	2.35	2.57	3.46
Control (c)				
Pre-test	3.82 (65)	10.58 (180)	3.82 (65)	18.22 (310)
Post-test	5.64 (96)	12.17 (207)	2.35 (40)	20.17 (343)
Average gain per child	1.82	1.59	1.47	1.95

Note : $N_e = 37$ $N_c = 17$

Modes of Infant Interactions

As the table 13 indicates the post-test frequencies of the infant-initiated interactions for the experimental group were higher than :

a) The pre-test frequencies for physical, verbal and non-verbal modes of interactions and
b) The post-test frequencies of physical, verbal and non-verbal interactions for the control group.

This is also evident from the comparison of the average gain scores made by both groups. Infants in the experimental group showed more gains, though the difference between the two groups was not much. This increase suggests that the increase in the physical, verbal and non-verbal interactions of the experimental group at the post-level may likely be due to the effects of the intervention mediated through the AWWs to the mothers. However, this cannot be stated affirmatively as the relationship between the two has not been examined, which is a delimitation of the study. Here it is important to note that the observation checklist for mother-infant interaction was made from the point of maternal interactions in this study. Also in the thirty minutes observation, it was not possible to do justice to all infant-initiated interactions as mother-initiated interactions were given priority.

Play materials at home : In addition to the observations of mother-infant interactions, interviews regarding home related information were made; findings from which indicate that a higher

percentage (80.48%) of mothers of the experimental group had play materials in their households after the programme as compared to 56 percent before the programme. In comparison, among the control group only 59.5 percent (post-test; pretest, 55%) have play materials.

These findings indicated a change in mother's attitude towards play materials. Earlier during the interviews at the pre-test, the mothers had reported that they did not buy play materials as infants were too young and they do not need any play materials, besides toys were quite expensive and therefore unaffordable. They added that even if they bought toys for their infants, infants broke them.

In both the groups, it was found that it is the father who usually buys play materials for the infants. The criteria for buying the play materials, however has undergone a change in the experimental group. Initially 29 percent of the experimental group bought toys on the basis of their personal liking as compared to 26 percent of the control group. After the programme there was an increase in the selection of play materials on the basis of age (50.57%) by the experimental group. This indicates that the programme was able to create an awareness in the mothers that play materials for young children should be according to their age,interest as well as durability and safety.

Evaluation of Infants' Motor and Mental Developement

The result regarding infants' motor and mental development obtained from the motor and mental scales of BSID respectively have been analysed using t-test.

TABLE 14

Comparison of Pre-test Score for Experimental and Control Groups on BSID Motor Scale Using t-test

Group	X	SD	Cal t
Experimental (e)	86.65	17.21	
Control (c)	87.9	14.63	0.1 +

Note : ne = 15 nc = 8
+ p value not significant

TABLE 15

Comparison of Pre-test Score for Experimental and Control Groups on BSID Mental Scale Using t-test

Group	X	SD	Cal t
Experimental (e)	91.24	14.35	
Control (c)	87.0	16.73	0.6 +

Note : ne = 15 nc = 8
+ p value not significant

The t values in Table 14 and 15 indicate that there is no significant difference between the scores of experimental and control groups prior to intervention on both motor and mental development scores.

Comparison of post-intervention scores as depicted in Table 17 indicated significant difference in the performance of the two groups on the BSID mental scale.

In the scores of mental scale of BSID the experimental group performed significantly better than the control group.

In the score of motor scale of BSID, though the post-intervention scores of the experimental group were higher than that of the control group, the difference was not significant (see Table 16). Therefore it is likely that the mothers of both the experimental and control group were providing stimulation for motor development even without the infant stimulation programme.

TABLE 16

Comparison of Post-test Score for Experimental and Control Groups on BSID Motor Scale Using t-test

Group	X	SD	Cal t
Experimental (e)	94.64	10.41	
Control (c)	91.35	13.35	0.69 +

Note : ne = 15 nc = 8
+ p value not significant

TABLE 17

Comparison of Post-test Score for Experimental and Control Groups on BSID Mental Scale Using t-test

Group	X	SD	Cal t
Experimental (e)	101.78	8.49	
Control (c)	90.30	10.7	2.82*

Note : ne = 15 nc = 8
* $p < .05$.

The results of the study indicate that the Infant Stimulation Programme was an effective model in educating the mothers of young children as reflected in the increase in supportive maternal interactions and the subsequent gains in infants' mental development as measured on Bayley's Scales of Infant Development. Other intervention studies have also demonstrated positive results in attempts to train parents to work with their children and improve adult-child interactions (Murlidharan & Mishra, 1989; Shah, 1989).

Within the home environment, ecological, psycho-social and attachment theories support that mother-child interactions are potentially the most direct way to affect child's progress. These interactions are influenced by parent's knowledge and skills, as well as by the parent's own needs and coping strategies (Wasik, et al, 1990). In the present study observations of mother-infant interactions at the pre-test level indicated that in both experimental and control groups, mothers were engaged in supportive and neutral interactions, while restrictive interactions were almost negligible. However, these supportive interactions were mainly in the area of physical interactions, for example, affectionate physical contact, carrying infant in arms, etc. Verbal interactions were limited to giving verbal instructions and responding to the child's questions briefly or in mono-syllables. Interviews with mothers revealed that they were of the opinion that the need of infants were limited to health, nutrition and physical care. This was

also reflected in the absence of play materials for infants in the house. Findings of other studies also show that mothers from low socio-economic status (SES) provide lesser opportunities to infants for exploration are less involved in their infant's play and feel there is little they can do to modify their infant's development as compared to middle class mothers who indulge more in spontaneous vocalization. (Anandalakshmy, 1982).

These findings indicated a need to sensitize the mothers to the role they can play in optimizing their child's competencies and development. A factor interfering with infant receiving adequate stimulation is, the widely held belief that members of the family alone know how best to look after the child and women have a "natural knack" of child care. But as field observations in the present study indicate even mother need to know about how to stimulate her child and the quality of care should not be left to experience alone' (Gill, 1993, p.294). Anandalakshmy (1985) too reported that there was a lack of awareness by mothers from the lower SES, regarding importance of cognitive stimulation for infant's development.

Findings from the Observation Checklist at the post-test level indicate that there was an increase in supportive interactions in mother-infant dyads of the experimental group after the programme as compared to the control group. After the programme on infant stimulation, observations of mother-infant interactions showed that the mothers were able to go beyond meeting only needs of routine care like bathing,

dressing and feeding, putting the baby to sleep. An increase in the frequencies in items for `affectionate verbal approach', like talking, laughing, verbal soothing; `provides auditory stimulation' through play like peek-a-boo, story telling encouraging the infant to talk; and physical interactions in items of `leads by hand' and `encourages musculature' were seen in supportive interactions by mothers. In the area of non-verbal interactions there was increased response in items related to `provides visual stimulation', `eye-to-eye contact', `smiling' and `gives objects' to infant. This suggests that awareness regarding infants' development and stimulation helps mothers to interact meaningfully with their infants. Other researchers have also reported that training on infant caretaking increases supportive interactions of the mother with the infant (Shah, 1989) and the reciprocity of the caregivers (Mukul, 1986).

Results of Multiple Classification Analysis show that the gains in supportive verbal interactions of the experimental group from pre to the post-test level were significant. As the effects due to passage of time and other extraneous factors were controlled, it can be concluded that these gains were due to pure effects of the intervention programme on the experimental group. Thus the improved language stimulation in homes was an important outcome of the programme as evidence indicates that absence of verbal interaction in children's home environment is detrimental to their learning and development (IDRC/UNESCO/UNICEF, 1988). In fact studies of relationship between optimal care and infant competence have shown that the amount of maternal verbal

stimulation was the best single predictor of infants overall competence score (Weissbourd & Musick, 1989).

It was seen that mothers were able to put into practice the suggestions provided in the programme; the supportive interactions and stimulation activities suggested in the training programme were often incorporated within the daily routine activities of meeting their children's needs. For example while bathing or dressing the child it was observed that mothers would talk with the child and encourage the child to talk. Similarly, while doing household chores like cutting vegetables, making dough, the mothers talked with their children and also provided stimulation activities such as asking the child to put a vegetable in the vessel. Thus the same activity which was considered a neutral maternal interaction at the pre-test level, received a tally mark under supportive maternal interaction at the post-test level.

Another change in mother-initiated interactions observed during the post-test level was that while giving instructions or prohibiting the child from doing an activity, mothers provided infants an explanation/reason for doing so, unlike earlier observations of only issuing instructions/commands. This indicated a change in attitude towards child's developmental needs. On similar lines Anandalakshmy (1982) suggests that training programmes should "aim at altering maternal attitudes and providing mothers with the knowledge and skills that would enable them to ensure a stimulating environment for their infants" (p.123).

Moreover, at the post-test level there was a decrease in the mean scores of several items under neutral interactions for the experimental group, while for the control group the increase in neutral interaction was considerable. In the area of physical interactions, the items that had less scores in post-test were `neutral physical contact' `pushing and pulling'. In the area of verbal interactions, the items that indicated decrease were `verbal commands' and `neutral verbal approach' while in the area of non-verbal interactions decrease was found in items related to `taking away objects' and `ignores infant's cues'. This decrease in neutral interactions of the experimental group may be due to the increase in supportive interactions. However it was difficult to state this affirmatively since the extent of relationship between supportive and neutral interactions has not been examined in this study which is a delimitation of the study.

Restrictive interactions continued to be minimal in both experimental and control groups. Kakar (1981) has also reported that the use of punishment and threat by Indian mothers were within the context of reliable mothering. Moreover the presence of the investigator is also likely to influence mothers' restrictive interactions with her infant thus reducing the frequencies for restrictive interaction by mothers from both experimental and control groups. Most mothers in the study have also reported that when the infant breaks or spills something she does not scold because the infant is too young.

Results of the present study with reference to home environment indicate that there was an increase in play materials available for infants after the programme whereas findings at pre-test has shown that mothers lacked awareness regarding importance of play for early learning. Not only were more play materials available in the house, it was also observed that mothers were involved more frequently in playing with their infants. Unlike earlier observations of keeping toys in the cupboards or boxes, they were now kept within easy reach of the infants. In the programme several toys and play materials that they could make at home were suggested. A few play materials made of waste materials were demonstrated to the mothers which evoked their interest and the next day they brought samples of some play materials they had made at home. This strategy of making toys was thus a useful one in the training programme.

These findings are encouraging because deprivation studies (e.g. Mishra, 1982) have shown that cognitive, linguistic and motivational problems of deprived have roots in early experience; with deprivation interfering with growth of perceptual and cognitive processes. A ten year longitudinal study (Bradley, Caldwell & Rock, 1988) has established that play materials in the second year of life appears related to later achievements, irrespective of the later environments.

These studies explain the significant in mental development improvements (as measured by BSID) after the programme. Children who score well on test of cognitive ability are generally found to have mothers who value playing with them (Yarrow, 1975).

Based on research findings, the reciprocal, turn-taking between the infant and the caregiver during the social interactions have been given various terms, some prominent examples are "reciprocity contingency", "mutual dialogue", "interpersonal accommodation", "protocommunication" etc. Research on interactional patterns suggest a definite bidirectionality in mother-infant interactions, implying that behaviour of both influence each other. Therefore increase in supportive interactions of the experimental mothers in the study should have significant impact on infant-initiated interaction. The findings indicate that a slight increase was found at the post-test level in the average gain scores in infant-initiated interactions of the experimental group. The increase in post-test frequencies in infants of the experimental group and the increase in supportive interaction of mother of the experimental group indicate a relationship between the two. However the present study has not examined the correlation between the two which is a delimitation of the study.

It was seen that the amount of interactions initiated by mothers and by infants varied a lot. The mothers in both groups initiated most of the interactions, the infant- initiated interactions were much lesser in comparison. What is the extent of the influence of one on the other, is a question that needs to be answered.

In conclusion, it can be said that the ISP was, effective in creating an awareness in mothers regarding the need to be sensitive to infant's cues and needs. However, a delimitation of present study was that it lacked the measurement of reciprocal interactions of mother-infant dyads.