IMPACT OF STIMULATION INTERVENTION ON MENTAL DEVELOPMENT OF RURAL INFANTS (9-13 MONTHS)

BY

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DISSERTATION

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CANDIDATES DECLARATION

I, hereby declare that the dissertation

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DATE : 31 May, 1993

(S.R.Gaikwad)

CERTIFICATE - I

This is to certify that, the dissertation entitled, "Impact of Stimulation Intervention on Mental Development of Rural Infants (9-13 Months) " submitted in Partial fulfilment of the requirement for the award of the degree of MASTER OF SCIENCE (HOME SCIENCE) in CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS is a piece of the result of bonafied research carried out by Surekha Ramrao Gaikwad under the guidence and supervision. I also certify that the dissertation or part thereof has not been previously submitted by her for a degree of any University.

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CERTIFICATE -II

This is to certify that the dissertation entitled, " Impact of Stimulation Intervention on Mental Development of Rural Infants (9-13 Months)" submitted by Miss. Surekha Ramrao Gaikwad to the Marathwada Agricultural University, in Partial fulfilment of the requirement for the degree of MASTER OF SCIENCE (HOME SCIENCE) in the subject of CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS has been approved by the student's advisory committee after oral examination in collaboration with the External Member.

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CONTENTS

INTRODUCTION

CHAPTER - I

INTRODUCTION

The term intervention can be defined as enrichment or supplementing naturally occuring experiences. Bloom (1964) suggested that the optimal time for intervention is during the first three years of life. Early intervention programmes have been geared primarily to two types of populations the so called "disadvantaged" and the handicapped and developmentally delayed. More recently it has been suggested that all infants would benefit from early education, the argument being that if early educational intervention makes even a slight difference in the intellectural functioning of "the disadvantaged" child, it should have a beneficial effect on all children. Generally intervention programme's intensity is possitively related to magnitude of its cognitive effects on children (Ramey, Bryant and Suarez 1985). The majority of intervention programmes are for children from poverty families. Children who grow up in poverty are at increased risk for fewer cognitive performance and their performance is frequently associated with later school failure (Hess 1970, Scripper 1982). Therefore, it is important to know when socio economic factors become significant in children's intellectual development (Bromwich 1977).

The first two years of the human life span are crucial for the development of intelligence. According to Bloom (1964) 50 per cent of the total intellectual development of the child is completed by the time a child is four years old. According to Piaget cognitive development progresses through a series of stages. The first two years from the first phase in piaget's scheme is the sensorimotor stage. During this stage biology and experience work together in a baby which begins to understand an object by tasting, touching, seeing, hearing, and smelling it. Therefore, caregivers should provide a variety of stimulation to infants that will arouse their curiosity.

The term stimulation is defined as the efforts to promote certain responses and activities in infants. Infant stimulation provides learning experiences, to the infant so as to enhance his/her development, (Healy, 1989). According to Ribble (1965), there are three types of sensory experiences as essential for the proper development of the infant. This includes the tactile and kinesthetic stimulation of touch and movement of the child's whole body by caregivers. The second is visual stimulation and third is auditory stimulation.

Play is the most natural and spontaneous form of stimulation for the infant and it is the child's main occupation and her chief mode of interaction. It is important for expression of emotions, integration of experience, problem solving and cognitive and physical development of infants (Arnaud, 1974).

Therefore, infants who do not have adequate opportunity to play are likely to demonstrate deficit in thoughts, feelings and actions. Non-stimulatory environment and deprivation of toys and materials is detrimental on infants development. Thus, play and play materials have an important role in the development of the infants. Rattles, Mobiles, Balls, Dolls and such similar things intensively draw the child's attention. Watching, Sucking, Chewing, Pushing and Pulling things are the infants favourite games. These activities enhance the child's cognitive development.

For the healthy development of the infant the caregiver must create an environment which gives the infant freedom, opportunity and incentives to move and to explore. Infant needs a stimulating physical environment, but variety and quality of materials are more important than quantity, and adult participation in play is more important than the materials themselves. Infant development is not only affected by the degree of parental stimulation but intellectual development is also related to parent attention and responsiveness to the child's needs, abilities and expressed desires and adoptation of the stimulation to the baby's level and interests.

The parental attitudes, especially that of the mothers has the greatest influence on child's development. The maximum influence is exerted by the mother in the field of cognitive development. Carew (1980) pointed out that parents who participate with their children in socially and intellectually stimulating interactions have children with relatively greater

intellectual competence. No doubt infants learn very early from their mother's caregiving by interacting with mothers and also gradually extending their reciprocity to other members of the family and other adults (Orezelton, 1969). Therefore, supportive family network for parents may be a crucial variable in an intervention programme to optimise an infants Functioning (Hough and Stevens 1981). Infant caregiver attachment behaviours including kissing, fondling, caressing, holding, touching, embrassing, making eye contant and looking at the face are contributing directly to the child's development.

In India about 67.70 Crore population is located in rural areas (Yojana, 1992). Agarwal (1955) stressed the need of early childhood education particularly for the rural setting. Rural children have less equipment for play, and usually rural parents have less free time to look after their children because they are engaged with the work in the farm or at home.

The task for parents and other caregivers is not to force development. Rather, it is to try to ensure that the practices of dialy life give the infant and toddler the emotional security and encouragement that are the foundations for learning at home, in school and through out later life(Zero to three 1992).

Over the years due to socio-cultural changes, Indian mothers are fast losing their ancient moorings. The break-up of joint family system, migration from rural to urban areas and the need to seek employment outside, have all contributed to resulting changes in child rearing practices. The age-old games,

songs and stories, the home-made indigenous toys, which parents and grandparents used with their children are no longer in use. Many parents see no relevance of such practices in the modern push and pull mode of living which is generally considered necessary for survival in the present days (Muralidharan and Asthana 1991).

High quality early childhood programmes and good preschool can help children to prepare for school. But preschools often have to help 3 and 4 years olds to overcome delayed development and alter-self defeating attitudes which are already deeply ingrained. Therefore, early stimulation intervention programme at home levels for effective development of children is a felt need, (Zero to three, 1992).

Therefore, in light of the above it is felt necessary to conduct this study with the following objectives :

1. To assess the mental development of rural infants.
2. To design the infant stimulation intervention programme corresponding to observed mental development of rural infants.
3. To execute the developed design of the infant stimulation programme on the infants through primary caregivers.
4. To assess the impact of infant stimulation intervention programme on mental development of rural infants.

REVIEW OF LITERATURE

CHAPTER - II

REVIEW OF LITERATURE

Many research studies conducted in other countries and some in India have shown that the infants had gained better mental quotients through the implementation of intervention programme. Therefore, a study was taken to see the impact of stimulation intervention on mental development of rural infants. The literature available in relation to various aspects of stimulation has been screened and dealt under the following heads.

1. Stimulation intervention programmes on infants mental development.
2. Home environment in mental development of infants.
3. Primary caregivers/other family members and mental development of infants.
4. Play and play materials on mental development of infants.

2.1 Stimulation Intervention Programmes on Infant Mental Development :

Two years project on the mother-child-home programme was conducted by Levenstien (1968) to provide cognitive stimulus for young children (Twenty to fourty months) and mother child interaction through weekly home visits by "toy demonstrators". Thirty four disadvantaged mother-infant dayds in the experimental group received toys and thirty matched dayds in two control groups were pre-tested and post-tested. Reports of the project's first

year of operation revealed significant IQ changes for the children and for the most part, enthusiasm and responsible co-operation from the mothers.

In infant stimulation intervention programme, Schaefer (1968) utilised home tutors one hour a day for five days a week. Twenty eight (15 mohths old) black male infants were given stimulation until they became 36 months of age and mothers were also encouraged to participate but not to do themselves. Periodic testing of these experimental infants compared with a group of control infants showed that the experimental infants IQ scores were significantly higher than the control fnfants.

Gordon's (1969) infant intervention programme concentrated on providing early extra stimulation to infants through weekly home visits. Mothers were tought as tutors by trained parent educators in their homes. In a two year study, low income mothers and their 3 months old infants were included. The study contained 4 groups of infants, where three were experimental and one was control group. The results showed that maximum infants in intervening group significantly outperformed more than control group infants.

Painter (1969) in similar way utilised home tutors in her study of infant intervention programme. The subjects were younger siblings of both black and white four-year-old children already attending a preschool for "culturally disadvantaged". Twenty infants (eight to twenty four months old) were randomly assigned to either the experimental or the control

group. After an initial IQ pre-test for all the infants (experimental group mean = 98.8, control group mean = 98.4). Experimental group infants were engaged in activities thought to be relevent to cognitive and language development. They were also visited by a female tutor for a whole year. At the end of the year, however, the experimental group mean was 108, while the control group mean was 98.8.

In the Gray and Klau's (1970) Early Training Programme, preschool children and their families were visited in the homes during the intervening 9 months. Children in the experimental group scored significantly higher on cognitive measures during preschool and during the early school years.

In Home Based Intervention Programme, Levenstein(1970) and Madden et al. (1976) made mother agent of child's cognitive enrichment through verbal interaction and play. Two and three years old infants from low income were assigned by housing project. Semi-weekly home visits focused on model verbal interaction around. Sequenced play materials were given for two years. The results showed that experimental group infants has greater IQ and better maternal interaction behaviour than control group infants.

Gordon and Jester's (1972) Home Based Intervention Programme taught mothers how to provide intellectual stimulation for their children. Three, twelve or twenty four months infants were randomly assigned to groups which varied in age of entry.

The 3 years programme constituted weekly home visits emphasizing play, sequenced tasks, and language. At 3, 4, and 5 years experimental infants performed better than control group infants on Standford Binet Inelligence Test.

In Kessan and Fein's (1975) Home-Based Intervention Programme, mothers were taught how to creat environment to facilitate child's play, language, or social performance. Lower-middle class 12 month old infants were randomly assigned to : 1) Play 2) Language 3) Social groups 4) Mother play 5) Child only and 6) Test only groups. The results revealed that language group was initially ahead, at 3 years language play and social groups were ahead on style but not in ability. Restticted family network showed less receptivety to programme.

Gutelius et al. (1977) conducted an intervention to families through pediartricians and nurses. The group used a mobile unit to provide well baby care supplemented by additional home visits for cognitive stimulation. The results indicated that children in the home intervention programme performed significantly better than children in a control group on cognitive development at 1, 2 and 3 years of age.

Gordon et al.(1978) and Lazar (1982) investigated the intensity of home visiting for children from low income families with interventions of 1, 2 or 3 years duration begining at birth. At two and three years of age, there was no effect on intellectual performance, but at ages 4 and 5, after the intervention programme ended, experimental children scored

significantly higher than control children.

A Home-Based Intervention Programme by Gray and Ruttle (1980) made mother to become more effective teachers of their children. Seventeen to twenty four months low income children were randomly assigned to extensive home visits, materials only, and control. Weekly home visits were given for 9 months. The results showed that toddlers in extensive home visits performed better than control group on Bayley scale, Standford Binet Intelligence Test and Receptive Language Test at post-test.

Anandlakshmy (1982) conducted a study on cognitive competence in infancy into three phases on 6-24 months old infants. In the first phase,it was found that infants from upper socio-economic class had scored high on MDI scores than lower and lower middle class. This difference appeared to be due to a genuine lack of awareness about importance of play on the part of the lower socio-economic level mothers. In the second phases infant from lower and lower middle economic level were followed up on the basis of these findings of the first phase play s strategy were developed for stimulation which was practiced for one month. Anandlakshmy (1985) concluded that perhaps an intervention programme of one month's duration was not sufficient to result in any appreciable increase as the trend was towards an increase in scores rather than being constant.

Whitt and Casey (1982) examined the impact of intervention provided in the context of pediatric health

supervision visits on the mother-infant dyads were randomly assigned at birth to either an intervention or attention control group. From the observation during a 21-min play, it is revealed more sensivity co-operativeness, appropriateness of interaction and appropriateness of play by the intervention group pairs.

Early intervention and its effects on maternal and child development was studied by Slaughter (1983) for 2 years with lower-income black mothers and their 18-44 months age children. Intervention group was involved in toy demonstration and mother discussion groups compared with control group. The results revealed that the children from the two programme groups scored a higher average IQ scores on the Mecarthy scale compared to the control group children.

Segal (1985) evaluated the Ready for School Pfoject, a home visiting programme for 3 and 4 years old. Home visitors helped parents to learn skills and also made them to become effective teachers of their own children. After intervention parents initial attitude was changed to that of a teachers. Segal speculated the change due to the improvement in parent-child social interaction.

Patri (1985) reported the results of an intervention programme of early stimulation in a group of disadvantaged children. He studied 75 disadvantaged children (8-36 month) belonging to unskilled workers in Haryana. Most of the children were lacking in any material for stimulation. But after the

implementation of intervention programme of infant stimulation it was found that those children were more alert, more confident and had greater initiative than the children who had not participated in intervention programme.

Barrera et al. (1986) investigated the effects of a year-long home intervention with a sample of preterm infants randomly assigned to 1-3 groups. Such as a developmental intervention, a parent infant interaction, and no treatment control group. A full term no treatment control was also used. Both intervention approaches focused on the parent-child unit, providing training for parents to improve observational skills, emotional support, and information about community resources. All infants were assessed at 4, 8, 12 and 16 months of age corrected for prematurity. The results suggested that both intervention approaches were effective in modifying some aspects of the home environment and the parent-infant interaction approach seemed to have a greater impact.

The effects of adult intervention on infants level of attention to objects were studied with 10 month-old infants (40 girls and 44 boys) by Parrinello and Ruff (1988). The sample infants were randomly assigned to one to four conditions : low, medium, high intervention, no intervention or control. Level of intervention was controlled by systimatically varing the manner and frequency with which the experimenter talked to the infant, and physical proximity. The results showed that in intervention group overall level of attention was higher compared to the control group in the experimental period.

Muralidharan and Kaur (1989) conducted a study on the impact of an intervention programme on the language and cognitive development of tribal preschool children. Seventy two boys and 72 girls were included from the age 3-4½ and 4½-6 years. Out of 144 children 72 were formed the experimental group and remaining 72 were control group. Experimental group children were given activities developed in children's laboratory. The findings showed that the tribal children in experimental group gained better language and cognitive skills than control group.

Powell and Mc Gre gor (1989) conducted two studies of home visiting and psychological stimulation to deprived children. In the first study children of 6 to 36 months were assigned to groups that visited biweekly, monthly. It was found that the biweekly group showed small but significant increase in scores on the Griffiths Mental Development Scale compared with monthly and control group. Whereas no benifit was shown in the Griffiths scores as the monthly group. In the second study, children aged 16 to 36 months were randomly assigned groups were visited weekly. The groups weekly showed marked improvements. The results showed that as the frequency of visiting increases from none of weekly, the benifits increase as well.

Wasik et al. (1990) conducted a logitudinal study of two early intervention strategies : Project care. Sixty five families with children at risk for cognitive difficulties were randomly assigned to one of three experimental conditions :

1) Child Development centre plus family education, 2) Family education , 3) A control group. It was found that children in an educational day-care programme with a family education component responded significantly better on measures of cognitive performance than other intervention children who did not participate in the education day-care programme.

Murlidharan and Kaur (1990) conducted a study on the impact of an intervention programme on the language and cognitive development of preschool children from the urban Anganwadis. The sample of 144 children was studied from the age 3 to 4½ years and 4½ to 6 years. Out of 144 children 72 ... formed the experimental group.and remaining 72 children were control group. CML(Children's Media Laboratory) materials were made available for the experimental group and were encouraged to use these materials. It was found that experimental group gained better as a result of the intervention.

Markowitz et al.(1991) examined the short-term effects of early intervention on 489 children who began special education services under the age of 5 years. Results indicated that children made developmental gain in their first programme year beyond that predicted by maturation alone.

Mc Gregor et al. (1991) conducted a study on "Nutritional supplementation, psychosocial stimulation, and mental development of stunted children : the Jamaican study. Children aged 9-24

months were assigned in a study from poor neighbourhoods and were grouped as control, supplemented only, stimulated only and supplemented plus stimulated. The results showed that stimulation and supplementation had significant independent beneficial effects on the children's development.

Patnam, et al.(1991) conducted a study on "Impact of early child care centre on the developmental aspects of rural children". A total sample of 54 young children below 2 years of age were grouped as home cared, early child care centre cared and mobile day care centre cared, and variety of activities were given to foster all round development of young children, particular in mental and motor development. The results showed that the Eccc care by trained personal to the young children is superior to the home MDCC care for their mental and motor development. The siblings care at home to young children by energetic elder sibling th. ough inexperienced is better as compared to that of care given by experienced and lethargic old women at MDCC.

Agarwal et al. (1992) one hundred and ninety six children were assessed for physical growth, development, intelligence and concept development between 1 and 3 years of age. Home environment was also assessed using Caldwell Home Inventory. It was found that maternal involvement and stimulation was strongly associated with better behaviour development and intelligence. The results also showed that the effect of home environment on development and intelligence was of a higher magnitude as compared to status and family variables and nutritional status during 1-3 years.

2.2 Home Environment in Mental Development of Infants :

Jones (1954) documented the correlational evidence on environment and mental development. Scores in intelligence tests were found to be related to social, economic and educational classification of the families of the children tested.

Elardo et al. (1975) examined correlation of Home to Children's cognitive development. It was found that "Maternal involvement with child" and "Provision of appropriate play materials" aspects of the home environment at both 12 months and 24 months correlated significantly with 36 month Standford-Binet IQ scores.

Bradley and Caldwell (1976) in a follow up study on the correlation of Home to Children's cognitive development, one hundred and twenty six children were re-examined at 24 months. The results indicated that the home environment variables such as "Provision of appropriate play materials" ($r = 0.56$), "Maternal involvement with child" ($r = 0.55$) and "Emotional and verbal responsivity of mother" ($r = 0.50$) were highly correlated with Standford-Binet IQ scores.

Wach's (1978) research established a strong association between children's mental development and the quality of stimulation available in the home environment during the first three years of life.

Gottfried and Gottfried (1979) studied logitudinally a sample of 130 infants to see the relationship between home environment and cognitive development in young children of middle socic-economic status families. The infants were tested on the Bayley scales of Infant Development at 12, 18 and 24 months. The results of the study showed the positive significant correlations between the HOME scales and the cognitive measures across all of the ages.

Bradly and Caldwell (1981) has reported that the home environment scores of children were less strongly related to race, gender, and even SES than they were to family structure, variables such as birth order, the amount of crowding, and family intactness.

Bradley and Tedesco (1982) reported that children's early cognitive development was associated with family environment factors such as the language stimulation available to the child, the responsivity of parents, the emotional support given by parents, the number of stimulating toys and objects available, the extent to which the home is organised and safe, and the variety of out-of-home experiences provided to the child.

Based on reproductive and demographic factors, development was tested with 51 full-term infants by Siegel(1982). Socio-economic status, birth order, and for the pre-term group, severity of illness in the perinatal group were the most significant predictors of developmental outcome. The Home

observation for measurement of the environment scores were significantly correlated, idependently of SES and developmental level, with the 3 year Reynell and Standford-Binet scores for the pre-term.

Bradley and Caldwell (1984) examined the relation between the home observation for measurement of environment (Home) Inventory and several child status and family structure variables. The results showed that only crowding and birth order showed consistent relations with Home scores of the six home scales, organisation of the environment, provision of appropriate play materials and maternal involvement showed the strongest relation to the status and structural measures.

Bradley et al.(1989) investigated the generalizability of environment/development relationship among 3 ethnic groups across the first 3 years of life. Results indicated a fairly consistent relationship between Home scores and children's developmental status. Measures of specific aspects of the child's home environment, such as parental responsivity and availability of stimulating play materials, were more strongly related to child's developmental status.

2.3 Primary Caregivers and Infant Interactions on Mental Development :

Backwith (1971) examined interactions between biological variables and environmental variables of ten month

old infants. The results indicated that Caffell Developmental Quotients of infants correlated positively with both the extent to which a mother talked to and touched the baby and the extent to which the infant was given an apportunity to explore the home.

Stayton et al.(1971) studied complience in the first year of life through home naturalistic observation of 25 middle class mothers and their babies. It was found that, insensitive mothers were geared almost exclusively to their own wishes, moods, and activities.

Ainsworth and Bell (1973) examined six maternal variables in infants home environment. The results indicated that mothers who were sensitive to infant's signals and permitted their babies floor freedom to explore the world tended to have babies with higher developmental scores.

Golden et al.(1973) examined changes in cognitive development from 18 to 36 months. The results showed that intelligence scores of black males were strongly related to educational and economic conditions of the home by three years of age.

Clarke and Stewart (1973) in a study of relationship between optimal care and infant competence, found that the amount of maternal verbal stimulation as the best single predictor of the infant's overall competence score-specially, a mother who was affectionate, responsive and enriching from both visual and verbal perspectives appeared to produce intellectually competent and secured children.

Bakeman and Brown (1977) observed "Behavioural Dialogues' : An Approach to the Assessment of Mother Infant Interaction. Applying this approach to the observation of 45 mothers-infant dyads during feeding situation revealed that in early infancy, mothers gave more attention to their male than to their female new born infants. Mothers of first born infants spent more time in feeding their infants than do mothers of later-born infants, because they lacked experience and could not satisfy their infants efficiently.

Mishra (1977) conducted a study on the nutritional and Socio-economic correlates of cognitive and motor development of 6-12 month old infant. The findings pointed to a positive relationship between amount and kind of maternal interaction with the infant and the performance of the infant on the Casati Lezine scale and Bayley scale of Infant Development.

Belsky et al.(1980) intervened in the interaction between sight mothers and their 12 month-old infants comparing them to eight control mothers and their 12 months olds. The author was convinced that experimental mothers significantly exceeded their control group in the frequdncy of stimulating their infants. Two months later, the experimental infants were engaged in more competent play than the control infants.

Ninio (1980) investigated vocabulary acquisition in the context of joint reading of picturebook in mother infant dyads belonging to 2 social classes, 20 middle class and 20 lower

class dyads were observed, the infants ranging in age between 17 and 22 months. In both groups interaction focused on eliciting or the labeling information. It was found that low SES mother talked less and attributes and high SES infants had a bigger productive vocabulary whereas low SES infants had a bigger initative vocabulary . It was also shown further the rate of development was slower in the low SES group, as evidenced by lower correlations with the age of the infant.

Bee et al.(1982) illustrated that mother infant interaction and general environmental quality were among the best predictors of intellectual and language development during the first four years of life.

Olson et al.(1984) in an analysis of 120 mother infant pairs observed at home, found that maternal verbal stimulation and responsivity, positive control and affection best predicted toddler compliance.

Lutkenhaus et al.(1985) explored the relation between the quality of infant mother attachment at 12 months and the child's style of interaction with an unfamiliar visitor at age 3 years (20 girls and 26 boys). Findings indicated that children with secure attachment relationship at 12 months with their mothers showed greater sociability in interactions with unfamiliar person than children with an insecure attachment relationship.

In a study "Early maternal and environmental correlates of quality of infant and 18 month Bayley performance" Ricciuti and Thomas (1990) found that maternal and family

environmental characteristics showed significant influence on quality of infant care as well as subsequent behavioural development within low income "high-risk" populations. The substantial correlates were found in predicting 18 month Bayley score .

Fiese (1990) examined the relation between 57 mother-toddler interaction and complexity of symbolic play under 4 conditions. 1. Child play alone, 2. Child play with mother 3. Child modeling mother and 4. Child play with mother following the modling condition. Results showed that more cognitively complex play observed when the children were playing with their mothers than when playing by themselves and maternal intrusiveness more likely precceded simple exploratory play.

Singer and Singer (1992) conducted a study on "The House of make Believe" : Play and the Developing Imagination. They emphasized the blending of three facets of the child's development constitutional factors, the influence of the caregiver's personality traits and style and the combined effect of these components on the baby's emerging cognitive skills. They noted the importance to young children of a person who plays and encourages play, places, Space and time for play, and props and pets.

2.4 Play and Play Materials on Mental Development of Infants :

The predictability of cognitive differences at 12 months from infant and maternal behaviours at 4 months was investigated by Ruddy and Bornstein (1982). The results indicated that frequent maternal stimulation at 4 months specially, by encouraging babies attention to objects, correlated with the xsize of speaking vocabulary at 12 months, and it is shown that the maternal stimulation positively influenced infant's cognitive development.

Parpal and Maccoby (1985) examined the effects of 3 models of mother-child interaction on children's subsequent compliance with maternal directives. Thirty nine lower middle class families with children, ranging in age from 3-2 to 4-6 were included in the study. Prior to the compliance test, mothers and children were in one of the following conditions. Responsive play (mother trained), free play (mother untrained) and noninteractive.

The results showed that both the responsive play and non-interactive conditions produced higher levels of child compliance than the untrained free play condition.

Mothers and Fathers of 4 boys and 4 girls at each of 3 ages(7,10 and 13 months) were videotaped during toy play interactions with their infants by Power (1985). It was found that parents of older infants used more verbal techniques alone and less physically perform behaviours for their children. It is also noticed that mothers were more responsive than fathers to infant cues of interest and attention specially at 13 months,

and were more successful in influencing infants behaviour with increasing infant age, mothers of girls were more directive of their infants play, whereas mothers of boys were less directive.

Sing and Gill(1986) investigated "Maternal Judgement of Appropriateness of play materials for infants, toddlers and preschoolers. A total of 65 mothers were selected for the study. The results revealed that a majority of mothers rated different types of squeeze toys (87.71 %) rattles (75.4 %), and air filled toys (78.5 %) to be most appropriate for infants, followed by balls, string pulled toys and mechanical toys. Small blocks (75.3 %) were judged most appropriate toys for toddlers. All types at squeeze, stuffed and air filled toys still remained suitable for toddlers.

Symon and Moran (1987) examined "The behavioural dynamics of mutual responsiveness in early face-to-face mother-infant interaction. In this study 20 mothers were instructed to play with, imitate and hold the attention of their 13-16 week old infants in 33 mean correlation analysis revealed that the infants of mothers who were most responsive during play and attention getting episodes also displayed relatively high levels of responsiveness.

A comparative study of the intervention and non-intervention group was done by Mokashi (1990, unpublished) on the high risk babies. In intervention group, parents were instructed to provide simple stimulation with ordinary cheap objects available in the home, and also especially mothers

were asked to play with the infants and cooperate in infant's play activities. The results showed that out of 64 babies who followed therapy advised to them at 6 months, 70.3 per cent normalised at 12 months. It is further informed that regular stimulation and early intervention had a significant role to play in the improvement of high risk newborns.

M A T E R I A L S A N D M E T H O D S

CHAPTER - III

MATERIALS AND METHODS

The present study was undertaken to assess the impact of stimulation intervention on mental development of Rural Infants (9-13 months). Materials and methods used for this purpose are discussed under the following heads.

1. Locale of the study.
2. Selection of the sample.
3. Selection of the tools.
4. Selection of the play materials for stimulation intervention programme.
5. Implementation of the stimulation intervention programme.
6. Statistical analysis.

3.1. Locale of the Study :

Nandgaon, Hatta, Asola, and Adgoan were the four villages selected randomly for this study. After conducting a rapid survey infants from Nandgoan and Hatta were identified for experimental purpose while infants from Asola and Adgoan were included in control group. The experimental group infants were exposed for specially designed stimulatory activities while the control group infants had no such additional exposure.

3.2 Selection of the Sample:

Prior to the experiment, all the infants from the selected four villages were assessed for their mental age. From this, a sample of 60 healthy infants of both sexes, each of 30 in the age group of 9-13 months, with similar mental age (9-11 ± months) belonging to low SES and nuclear families were selected randomly. Out of these 60 infants, boys and girls each 15 were picked-up to form the experimental group who had access for stimulatory activities which were specially designed for the study. The remaining 30 infants i.e. boys and girls each 15 comprised of control group who had only routine activities.

3.3 Selection of the Tools :

The tools applied in stimulation intervention programme are discribed below:

1. Interview schedule.
2. Bayley Scale of Infant Development (BSID).
3. Home inventory.
4. Socio Economic Status scale (SES),

3.3.1 Interview Schedule :

All the sample infants mothers/primary care givers were personally interviewed with the help of pre-tested questionnaire and were also simultaneously observed. The information was collected on the aspects such as family background of the child, interaction between caregiver and infant, play materials and

other materials available in the home, caregivers involvement in infant's activities, personality traits of primary caregivers,etc. (Appendix - I).

3.3.2 Bayley Scale of Infant Development :

To estimate the mental development of 9-13 months old infants, items were taken from Bayley Scale of Infant Development (BSID). Mental scale of BSID consisted of 163 items which cover mental development from Birth to 30 months. Age placements were given for every item in the scale. Easy items were administered to the child depending on chronological age of the infant. The procedure for presenting each item and the nature of performance of the child for credit were referred from manual for using Bayley Scale of Infant Development,(Research form 1961) based on Baroda studies and Baroda norms.

3.3.2.1 Training for the Investigator :

Before the commencement of this research work the investigator was given training in operating BSID scale. Also the investigator was helped in testing of the infants during the experiment. It was ascertained that the investigator was fully trained to undertake the work.

3.3.2.2 Testing Procedure :

All the sample infants were tested in their own homes twice during the period of the study. The first testing was done before their inclusion in the study (Pre-test) and the second testing (Post-testing) was after 2 months stimulation intervention programme.

Pre and post testing was done under the supervision of the person who was trained and using BSID regularly.

Testing was conducted in court-yard and inside door ways of the infants own homes. Only infants primary caregivers were allowed alongwith the infants while testing. The mob was controlled by the other helper of the investigator.

Pre-testing and Post-testing :

Items used for pre and post testing are given in appendix-II. While testing the infants, items which had age placements much lower than the infants chronological age were used for the pre and post testing.

Calculation of Mental Development :

The procedure for calculating mental indexes was followed as per the BSID manual for using Bayley scale of Infant Development(Research form 1961) based on Baroda studies and Baroda norms. The total mental performance score was converted in to mental age (MeA) by referring to the age placement Norms(Table-2)as per the BSID mannual,(Research form 1961). The mental scores were converted into mental indexes by referring Table-4 (BSID manual).

3.3.3 Home Inventory :

The Home observation for measurement of the environment Inventory (HOME : Caldwell and Bradly, 1984) was administered to

each participating family. The information needed to score the Inventory is obtained through observation and interview done in the home with the child and the child's mother. The Home Inventory of Infants and toddlers version was used. This version contains 45 binary choice items clustered into 6 subscales and total scores as shown in Appendix- III .

3.3.4 Socio Economic Status Scale :

The selected sample was classified into various categories of socio-economic status by applying socio-economic status scale (Rural by Pareek and Trivedi 1964). The scale is based upon the information about the rural family like caste, ocaupation, education, social participation, land holding, house, farm power, material possessions and the type of family. The socio-economic status of a family is determined by applying the following classificatory scale to the total soore(Appendix-IV).

Category of Class	Total Score
Upper class	Above 43
Upper middle class	33-42
Middle class	24-32
Lower middle	13-23
Lower class	Below 13

3.4 Selection of Play Materials for Stimulation Intervention Programme :

1. Sources used for developing play materials.
2. Development of play materials.
3. Package of activities used.

3.4.1 Sources Used for Development of Play Materials :

For planning stimulation intervention programme for infants activities developed by Swaminathan (1989), Murlidharan and Asthana (1991) and Patnam, Desetty and Vasekar, (1991) were used as basic sources for developing suitable materials for infant stimulation activities.

3.4.2 Development of Play Materials :

Mostly cheap and indigenous materials provided for desinged activities by the department of child development and family relationships, in addition to the materials available in the infants homes. The provided material were as follows.

a) Readymade Material :

Plastic doll, small plastic boxes with lids, Rattles , Baloons, Balls, Sponge pieces, crayons and white papers, sand papers, glaze papers and velvet papers were provided for differentiating between different textures.

b) Developed Material :

Wooden blocks with different colours.
Card board puzzles.
Story Books

c) Materials Available in the Home :

Cups and Spoons, Pots, Plates, Steel catories, Cotainers, Clothes, Foods, Colour Picture, Books of Elderly siblings, posters, Mirror, Baskets of different material (iron or cane)

Decorative articles, Rolling board etc. In addition to this, certain materials such as tape-recorder and used pianotype switches were also used for stimulation intervention programme.

3.4.3 Package of Activities :

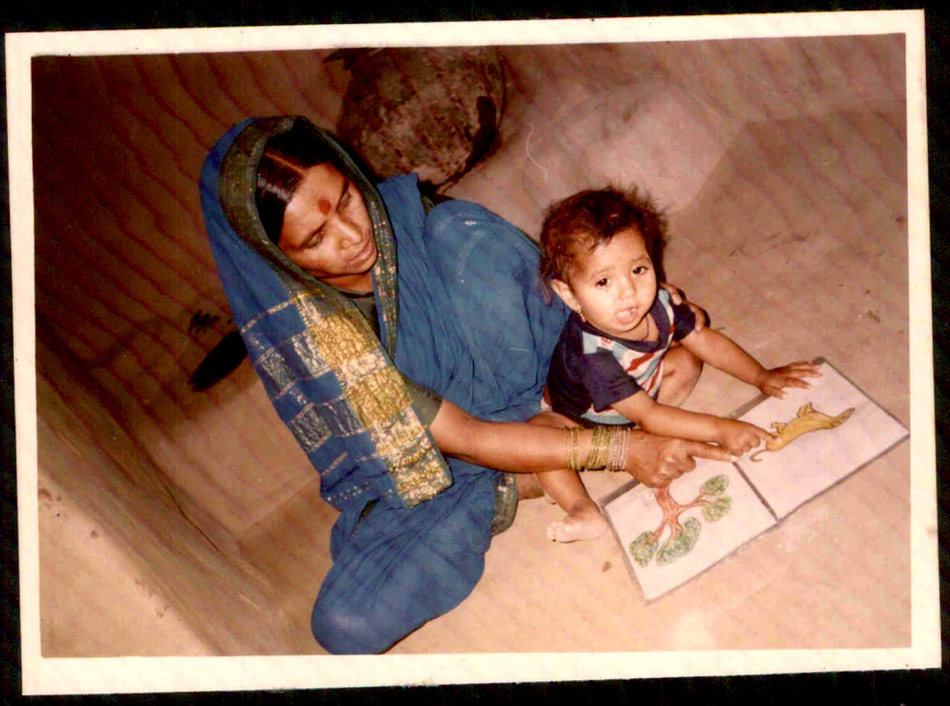
The series of infant stimulation activities planned and executed to the infants of experimental groups were as follow :

Looking for, indentifying body parts, imitating, pointing out opening and closing lids, putting in and taking out, scooping, following instructions, pulling, pushing, hiding and finding object, Squeezing, banging, Making and listening different sounds, turning pages, pointing out the picture, scribbling, bouncing splashing, naming, paper tearing, filling, feels air , follows instructions, hide and seek game, knows different textures colour , shape, size and concept, listening songs, singing songs, dancing, building blocks, collection.

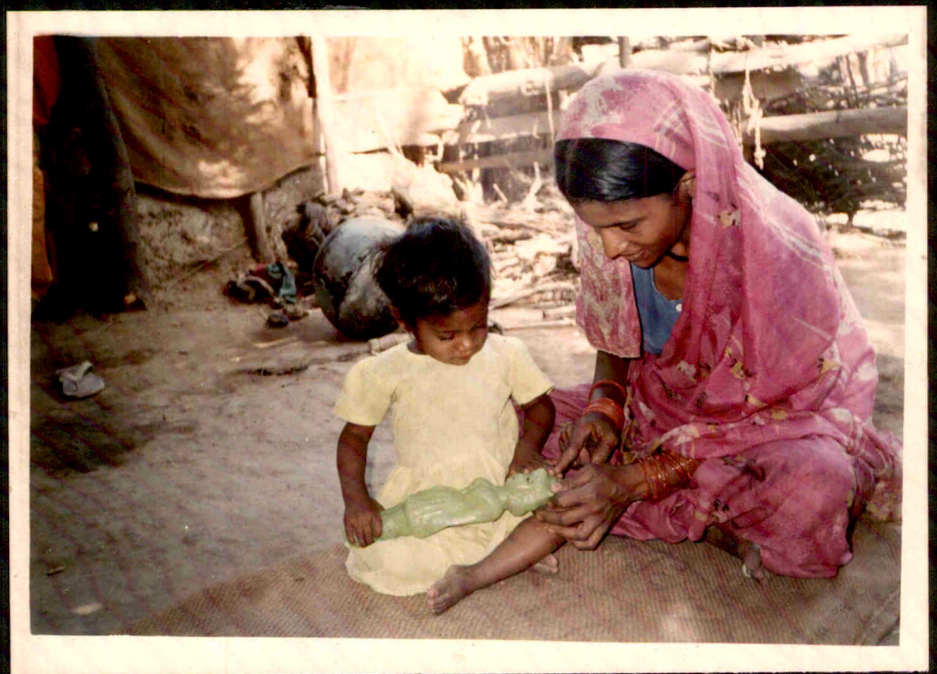
3.5 Implementation of Stimulation Intervention Programme :

The intervention programme was executed through the primary caregivers for two months in the homes of selected infants (experimental group). The primary caregiver is the person who is relatively more involved in infant care activities and who interacts more with the infant. The programme was supervised by the investigator twice in a week. Before and during the stimulation intervention programme primary caregivers in the group of 4-5 were given demonstrations regarding how to use play

Play materials introduced
in infant stimulation intervention



Identification of pictures



Identification of body parts

Squeezing of wet sponge in a tub

Trying to match basic shapes

Puffed rice being put into container

Streatching hand to return rattle after instruction

Encouraging infant to build a tower of blocks

materials for different activities and trials were also taken to ensure that the instructions given were followed fully. The infants were given readymade, developed and home made materials alternately through the primary caregivers as per their convenience. Every time in the first visit readymade or developed material was given, while in the second visit addition of materials available in the home was suggested for continuing the activities with change in the situation. For example. If ball was given in the first visit to stimulate activities of throwing, catching on the floor. In the second visit the addition of the home material such as container was suggested to place the ball in the water to continue the activity. Similarly the pictures, photographs, etc. were related to items in real life. Instructions were given to primary caregivers regarding handling and proper storing of play materials. Besides this, they were also asked to praise, encourage, clap, kiss and hug the infant immediately after the sucessful completion of each activity or after quick correct response. Caregivers were encouraged to play with infants, whenever they had free time and were also requested to take infants for out to expose them to their surroundings and allow their infants to play with their siblings and other children around.

3.6 Statistical Analysis :

To analyse the data paired 't' test was used to find out the significant difference in mental quotients on pre and post-test. And unpaired 't' test was used to compare the mental ages of control and experimental groups at the time of pre-test

at varing chronological age as per the standard procedures given by Panse, [illegible] and Sukhatme, [illegible] (1985) and Singh, [illegible] and Chaudhary (1975).

The relative and absolute gains were calculated as follows.

$$\text{Absolute gain} = \text{Post-test (MQ)} - \text{Pre-test MQ}$$

$$\text{Relative gain} = \frac{\text{Post-test MQ} - \text{Pre-test MQ}}{\text{Pre-test MQ}}$$

MQ - Mental quotient

RESULTS AND DISCUSSION

CHAPTER - IV

RESULTS AND DISCUSSION

The investigation on the "Impact of stimulation Intervention Programme on Mental Development of Rural Infants" was undertaken with the objective to find out the effect of stimulation intervention on improvement of mental development of selected rural infants. In this two months study, infants from experimental group were exposed to variety of activities with play materials and activities which were specially designed for this purpose. The data obtained through this experiment was tabu. lized, analysed statistically and reported here under following heads.

1. Background information of the sample.
2. Assessement of the mental development of selected rural infants prior to stimulation intervention programme.
3. Assessement of the impact of infant stimulation intervention programme on mental development of rural infants after implementation.
4. Factors affecting infant stimulation intervention programme.

4.1 Background Information of the Sample :

Details about background information of the sample is given in Table 1.

The table gives details about the family size, family monthly income, birth order of the infants and education of

Table 1 . Background information of the sample :

Parameters	Percentage of families			
	Control group (30)		Experimental group (30)	
a) Birth order of the child				
First born	36.66		36.66	
Later born	63.33		63.33	
b) Family size				
Small(0-5)	73.33		46.66	
Middle(5-8)	26.66		53.33	
c) Family monthly income(Rs.)				
Below 500	19.00		-	
600-800	86.66		93.33	
Above 800	3.33		6.66	
d) Literacy level of parents	Father	Mother	Father	Mother
Illiterate	53.33	100.00	40.00	86.66
Primary	36.66	-	30.00	6.68
Secondary	6.66	-	16.66	6.66
Higher secondary	3.33	-	13.33	-

parents of the sample infants. It is observed from the Table 1 A that above 63 per cent infants in control and experimental groups were later borns and remaining were first borns. As seen from the Table 1 B majority (73 %) of control group families and above 53 per cent experimental group families were small and middle sized families respectively.

Large percentage of families (86 to 93%) in control and experimental group had their monthly income in the range of Rs.600-800. Below Rs.500 monthly income was found in 10 per cent control group families. Three to six per cent families in control and experimental groups were having monthly income above Rs.800.

Information regarding literacy level of parents given in Table 1 D indicated that the sample mothers of infants in control group and above 86 per cent mothers in experimental group were illiterates. Thirty to thirty six per cent control and experimental group fathers had education upto primary school level respectively, while 3 per cent control group and 13 per cent experimental group fathers had completed education upto higher secondary school.

4.2 Assessement of Mental Development of Selected Rural Infants Prior to Intervention Programme :

Assessement of mental development of selected rural infants is dealt under the following heads.

1. Mental ages of selected rural infants.
2. Mental quotients of selected rural infants.

4.2.1 Mental Ages of Selected Rural Infants :

Mental ages of selected rural infants prior to the is presented in Table 2.

Table 2 : Mean mental ages of selected rural infants prior to the stimulation intervention programme

Mean age of infants (months)	Mean Mental Ages (Mean ± SD)				't' value
	Number of infants	Control group	Number of infants	Experimental group	
10.50	-	-	2	9.60	
11.53 ±0.16	7	10.56 ±0.28	8	10.82 ±0.34	0.36 NS
12.17 ±0.21	19	11.00 ±0.25	18	11.25 ±0.37	2.37*
13.00	4	11.17 ±0.15	2	11.95 ±0.07	

NS - Non significant; * - Significant at 5% level

As seen from the Table 2, mean mental ages of infants of 11 ± months in control and experimental groups were 10.56 and 10.82 respectively. For the infants of 12 ± months, the mean mental age values were 11.00 in control group and 11.25 in experimental group. The mean mental age of infants in 13 ± months of control and experimental groups were 11.17 and 11.95 respectively. For the infants of 10 ± months in experimental group, the mean mental age was 9.6.

The differences in the mean ages of infants of control and experimental groups were not very conspicuous in all

chronological ages at the time of commencement of the intervention. The mental ages of infants of both the groups were below their chronological ages.

It is identified that control group infants mental ages were slightly lower than the experimental group infants at the time of commencement of the investigation. While slight variations in mental ages of infants were also found among the experimental group. Such variation may be due to maturation and environment in which they lived.

Statistically there was no significant difference between control and experimental groups infants of 11.56 ± months old. But there was a significant difference between control and experimental group infants of 12.17 ± month age.

4.2.2 Mental Quotients of Selected Rural Infants Prior to the Intervention :

Mental quotients of selected rural infants prior to the Intervention. is presented in Table 3.

Table 3 · Mean mental quotients of selected rural infants prior to the stimulation intervention programme

Groups	Mean age of selected infants (months)	Mean mental quotients of selected infants mean ± SD	't' value
Control group (30)	12.14 ±0.45	81.99 ±5.31	4.02*
Experimental group (30)	11.90 ±0.68	89.43 ±7.09	

* - P < 0.05

The table clearly shows that the mean mental quotients of selected infants of control and experimental groups were different at the time of stimulation intervention. The infants of 12.14 ± months from control group were having 81.99 mean mental quotients. While for infants of 11.9 ± months age, mean mental quotient was 89.43. Experimental group infants had high mental quotient scores than scores of control group infants, though both of these scores were low compared to the scores of average infants.

On pre-testing, infants performance in both the groups was different. Besides this, it was clear that experimental group infants mean chronological age was less than control group infants. Though experimental group infants had less mean chronological ages, they had better mental quotient scores as compared to control group infants. This implies that the infants in experimental group might be having either better potentials or better stimulatory environment.

The low scores of mental quotients in control group infants may be due to inadequate stimulation and improper care of the infants due to lack of awareness on part of the primary caregivers about proper rearing methods. It may be due to passive interaction with the infants by the caregivers and lack of resourcefulness. These results indicating infants from low-income families had low mental quotients are similar with that of Anandlakshmi (1985) and Mc Gregor et al.(1991).

Statistically in pre-testing there was significant difference between mean mental quotients of control and experimental group infants.

4.3 Assessement of the Impact of Infant Stimulation Intervention Programme on Mental Development of Rural Infants

Assessement of the impact of infants stimulation intervention programme on mental development of rural infants is illustrated under following heads.

1. Mental quotients of the selected infants before and and after stimulation intervention programme and absolute gain and relative gain.
2. Mental quotients of selected male and female infants before and after the stimulation intervention programme.
3. Mental quotients of selected infants of varing ages.

4.3.1 Mental Quotients of the Selected Infants Before and After Stimulation Intervention and Absolute and Relative Gain

Mental quotients of the selected infants before and after stimulation intervention and absolute and relative gains are given in Table. 4.

As seen in the table, mental quotients of the control group infants of 12.14 ± age were 81.99 and 84.26 at pre and post testing, respectively. The mean mental quotients of experimental

Table 4 Mental quotients of the selected infants before and after stimulation intervention programme and absolute and relative gain

Study groups	Mean age of infants (Months)	Mean mental quotients mean ± SD		't' value	Gain		't' value
		Pre-testing	Post-testing		Absolute	Relative	
Control group (30)	12.14 ± 0.45	81.99 ± 5.31	84.26 ± 5.66	12.61*	2.27	0.02	12.19*
Experimental group (30)	11.90 ± 0.68	89.43 ± 7.09	107.53 ± 5.25		18.09	0.20	14.88*

* - P < 0.05

infants of 11.9 ± age were 89.43 and 107.53, respectively, in pre and post tests. The mean mental quotient of experimental group infants of 11.9 ± months was more than control group infants of 12.14 ± months at both pre and post testing. After completion of the study the absolute gains recorded in control and experimental groups were 02.27 and 18.09, respectively. The relative gain of both the groups infants were 0.027 and 0.202, respectively. The absolute and relative gain of mental quotients of experimental group was respectively 9 times and 7 times more than that of control group infants.

Further, it can be seen that the control group infants had low mental quotient than infants of experimental groups. The same trend was continued even after 2 months of study. The improvement was also high in experimental group infants than the control group infants.

The slight increase in mental quotient of control group might be due to the interaction between neurological maturation and learning environment available to infants at home. The experimental group after having stimulatory intervention with specially designed play materials for 2 months, had shown remarkable improvement in mental quotients. The findings are in line with the findings of Schaefer (1968), Gordon (1969), Levenstein (1970), Gordon and Jester (1972), Gray and Ruttle(1980) and Slaughter (1983), Painter (1969), Gray and Klaus (1970), Madden et al (1976), Gutelius et al (1977), Gordon et al and Lazar (1982), Parrinello and Ruff (1988), Murlidharan and Kaur (1990), Where home tutors and toy demonstrations made experimental group infants to gain high mental quotients.

It can be concluded that with 2 months stimulation intervention there was an increase in mental quotients of control and experimental infants.

The calculated 't' value also indicated a significant difference in the mental quotients of control and experimental group infants.

4.3.2 Mental Quotients of Selected Male and Female Infants Before and After the Intervention Programme :

Mental quotients of selected male and female infants before and after the stimulation intervention programme is given in Table-5 and illustrated in Fig.1 .

It is shown in the table that in control group the male infants mean mental quotients at pre and post test were 82.16 and 84.32, respectively. The corresponding values for the female infants were 81.83 and 84.20. Whereas, among the infants of the experimental group, male infants had mean mental quotients of 89.90 and 108.99 at the pre and post test. The corresponding values for female infants were 88.88 and 106.07.

As seen from the table, the absolute and relative gains of male infants of control group were 2.16 and 0.02, respectively. The corresponding values of female infants were 2.37 and 0.02 . Among the infants of the experimental group, the absolute and relative gains of male infants were 19.09 and 0.21, respectively. The corresponding values for female infants were 17.19 and 0.19.

Table 5 · Mental quotients of selected male and female infants before and after the intervention programme and absolute and relative gains

Study groups	Mean age of infants (Months)	Mean mental quotients mean ± SD		't' Value	Gain		't' value
		Initial	After 2 months		Absolute	Relative	
Control							
Male	12.07 ± 0.48	82.16 ± 5.66	84.32 ± 5.60	NS 0.05	2.16	0.02	8.94*
Female	12.21 ± 0.42	81.83 ± 5.24	84.20 ± 5.92		2.37	0.02	8.18*
Experimental							
Male	11.80 ± 0.51	89.90 ± 6.55	108.99 ± 4.57	NS 1.45	19.09	0.21	10.13*
Female	12.01 ± 0.81	88.88 ± 7.77	106.07 ± 5.63		17.19	0.19	10.94*

* - P < 0.05, NS - Non significant

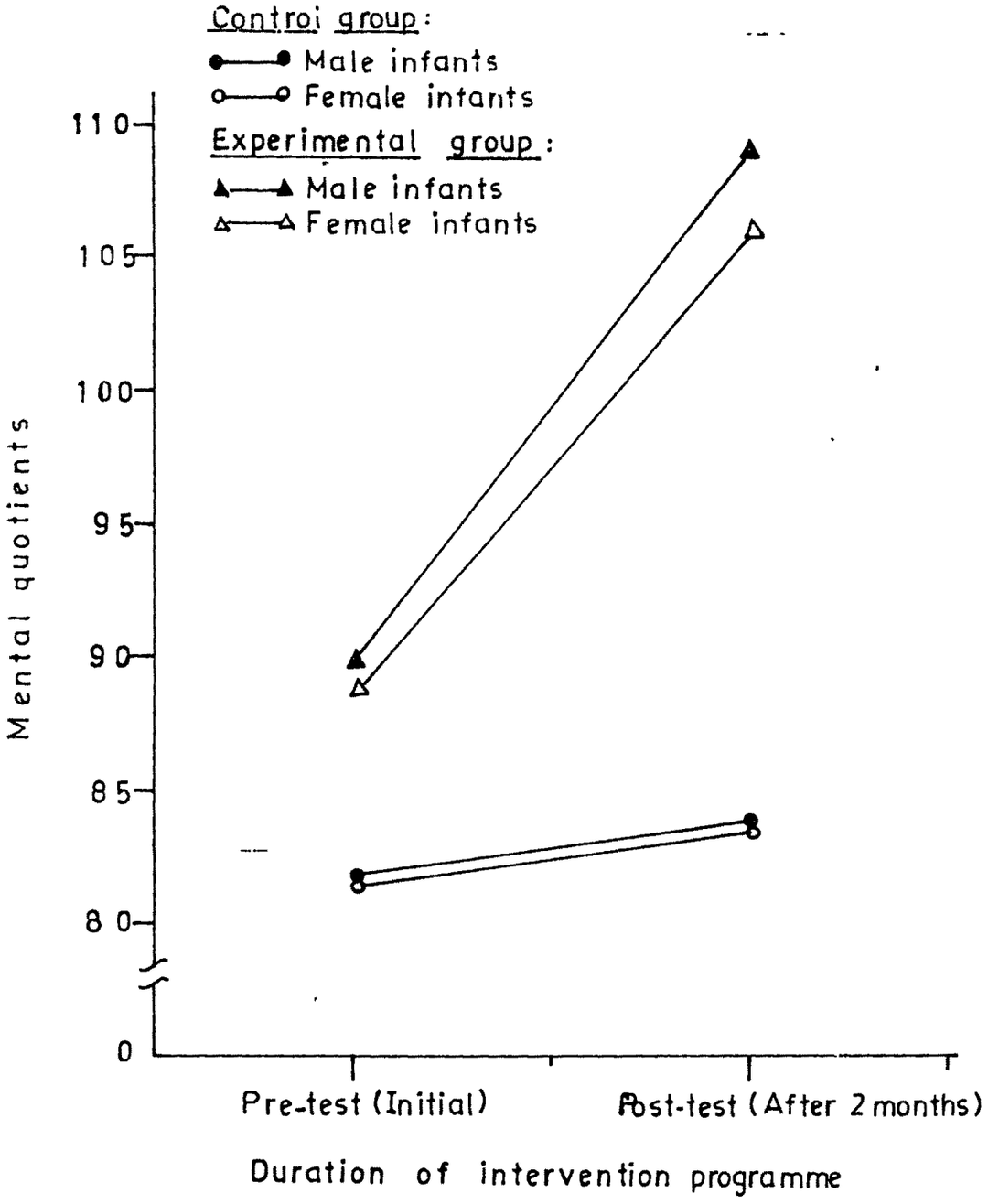


Fig 1. Mental quotients of selected male and female infants before and after the stimulation intervention programme

There was a wide variation in the absolute and relative gains between the male and female infants of control and experimental groups. A similar trend was also observed in the case of the mental quotients of the infants. The absolute and relative gains in mental quotients of male infants of experimental group was more than that of female experimental group infants. Improvement in mental quotients in control group infants may be due to maturity and the suitable available activities at home. Irrespective of the sex, there was high improvement in experimental group infants than control group infants. Whereas in control group, the absolute gain in mental quotients of female infants were slightly higher than that of male infants. This might be due to the age of female infants. It is not suprizing to find the noticeable improvement in mental quotients of male infants compared to female infants in rural area. It is assumed that special attention and care was taken for male infants by the family members from the birth it-self. Besides this, awareness created by the investigator regarding importance on mental development and the role of simulatory intervention in infants at the time of the commencement of programme might have lead the primary caregivers to concentrate in teaching activities to male infants. The results are in the line of Bakeman and Brown (1977).

The difference in mean mental quotients between pre and post tests was significant among the male as well as female infants. But there was no significant difference in the mean

mental age of males and of female infants i.e. between both sex in both pre and post testing.

4.3.3 Mental Quotients of Selected Infants of Varing Ages :

The mental quotients of selected infants of varing ages of control and experimental group is presented in Table-6.

From the table, it is clear that the infants of control group 11 ± months age infants had mental quotients of 82.53 and 84.84 at pre and post test, respectively. The corresponding values for the experimental group infants were 90.10 and 107.71. Among the infants of 12 ± months age, the mental quotients of control group at pre and post test were 83.39 and 85.66, respectively. The corresponding values of experimental groups were 89.37 and 107.51.

The absolute and relative gain of 11.56 ± months age group infants were 2.31 and 0.02, respectively. The corresponding values of experimental group infants were 17.61 and 0.19. Absolute and relative gains among the control group infants of 12 ± months age were 2.17 and 0.02, respectively. Whereas corresponding values of experimental group infants were 18.14 and 0.20.

Among two groups (11.56 ± and 12.17 ± mean months) of infants, the absolute gain of experimental group was very high as compared to control group. The same trend was also observed in the relative gain.

Table 6 . Mental quotients of selected infants of varing ages.

Infants age (Months)	Mental quotients(mean ± SD)				Gain			
	Initial		After 2 months		Absolute		Relative	
	Control	Experimental	Control	Experimental	CG	EG	CG	EG
11.56 ± 0.16	82.53 ± 6.97 (7)	90.10 ± 12.25	84.84 ± 7.79 (8)	107.71 ± 6.72	2.31	17.61	0.02	0.19
12.17 ± 0.21	83.39 ± 3.52 (19)	89.37 ± 4.22	85.66 ± 3.84 (18)	107.51 ± 5.21	2.17	18.14	0.02	0.20
13.00	74.42 ± 3.40 (4)	83.85 ± 4.45	77.10 ± 3.80 (2)	105.20 ± 0.28	2.68	21.35	0.03	0.25

Figures in parentheses indicate number of infants C

CG - Control group EG - Experimental group

It can be said that there was variation in mental quotients of infants at varing ages between control and experimental group.

4.4 Factors Affecting Stimulation Intervention Programme :

1. Primary caregivers.
2. Home environment.
3. Play materials and family possessions.

4.4.1 Primary Caregivers :

The details of the primary caregivers personality traits of the primary caregivers and influence of primary caregivers on mental development of rural infants are given in Table- 7,8 and 9 are presented under the following heads.

1. Details of the primary caregivers of selected rural infants.
2. The personality traits of the primary caregivers of the selected rural infants.
3. Primary caregivers influence on mental quotients of selected infants.

4.4.1.1 Details of the Primary Caregivers :

Details of the primary caregivers of the selected rural infants is discussed in Table 7.

It is seen from the Table-7 that the infants in control and experimental groups were cared by different primary caregivers. These were mothers (CG 26 and EG 23), grandmothers (CG 1 and EG 3) and elder siblings (CG 3 and EG 3). Majority of the mothers in

Table 7 Details of the primary caregivers of the selected rural infants

Details of primary caregiver	Percentage of primary caregivers					
	Mother		Grand mother		Elder sibling	
	CG(26)	EG(23)	CG(1)	EG(4)	CG(3)	EG(3)
Age (yrs)						
08-09	-	-	-	-	66.66	33.33
10-19	11.53	21.73	-	-	33.33	66.66
20-29	80.76	60.86	-	-	-	-
30-39	7.69	17.39	-	-	-	-
Above 39	-	-	100.00	100.00	-	-
Education						
Illiterate	100.00	82.60	100.00	100.00	-	-
Primary school	-	8.69	-	-	-	33.33
Secondary school	-	8.69	-	-	-	-

CG - Control group EG - Experimental group

both the groups were in the age group of 20-29 years. While grandmother-caregivers were nearing middle age and were illiterates. Above 66 per cent elder sibling caregivers were 8-9 in control group and 10-19 years age in experimental group. All the sample mother, grandmother and elder sibling caregivers in control group were illiterate. Majority of mother-caregivers and all grandmothers in experimental group were illiterate.

On the whole it can be concluded that majority of primary caregivers were mothers and they were in adulthood period. Elder sibling caregivers were too young to look after infants properly.

4.4.1.2 Personality Traits of the Primary Caregivers of the Selected Rural Infants

Personality traits of the primary caregivers are presented in Table 8.

From the table it is evident that 90-96 per cent of primary caregivers in control and experimental groups respectively, were found to be warm and affectionate towards their infants. Ninety three per cent in control group and 96 per cent in experimental group primary caregivers read and understood facial expressions and signals of the infants. Seventy six and 86 per cent primary caregivers respectively in control and experimental groups had good verbal interaction with their infants during the conversation. Active involvement was less

Table 8 Personality traits of primary caregivers of the selected rural infants

Personality traits	Percentage of primary caregivers		't' value
	Control group	Experimental group	
Resourceful	33.33	36.66	0.47^{NS}
Responds quickly and appropriately	33.33	43.33	0.79^{NS}
Warm and affectionate	90.00	96.66	0.51^{NS}
Understand infants signals and behaviour	93.33	96.66	0.36^{NS}
Good in verbal interaction	76.66	86.66	0.65^{NS}
Active involvement	20.00	23.33	0.52^{NS}
Passive involvement	80.00	76.67	0.38^{NS}
Motivates and appreciates infants	20.00	26.66	0.28^{NS}

NS - Non significant.

(20-30 %) and passive involvement was more (80-76 %) in control and experimental groups. Above twenty per cent primary caregivers motivated infants to do the task and appreciated their infants for accomplishments. Above 33 per cent primary caregivers in both the groups found to be resourceful and responded quickly and appropriately to infants.

Majority of primary caregivers in both the groups were warm and affectionate towards their infants, which is one of the vital component for the infant stimulation. It is explained that the personality traits of the primary caregiver may be related to the gain in mental quotients of selected infants as discussed in Table-3. The findings are in line with that findings of Bradley and Tedesco (1982), Elardo et al.(1975), Bradley and Caldwell (1976), Clarke-Stewart (1973), Bee et al.,Riccuiti and Thomas (1990) who found that maternal and family environmental characteristics influenced quality of infant care as well as intellectual competant.

Difference in the personality traits of the primary caregivers of infants between experimental and control group was non significant.

On the whole it can be concluded that experimental group mother had good personality traits than control group.

4.4.1.3 Primary Caregiver Influence on Mental Quotients of Selected Infants :

The mental quotients of the infants cared by different primary caregivers are given in Table-9.

Table 9 Impact of primary caregiver on the mental quotients absolute gain and relative gain of selected infants

Primary caregivers	Age range (Yrs.)	Mean mental quotients (mean ± SD)				Absolute gain		Relative gain	
		Control group		Experimental group		CG	EG	CG	EG
		Initial	After 2 months	Initial	After 2 months				
Mother	19-36	81.80 ± 5.50 (26)	83.95 ± 5.83	89.63 ± 7.60 (23)	107.62 ± 4.80	2.15	17.99	0.02	0.20
Grandmother	55-65	- (1)	-	91.17 ± 4.99 (4)	110.01 ± 3.72	-	18.84	-	0.20
Elder sibling	8-10	85.28 ± 1.25 (3)	88.40 ± 1.99	85.50 ± 4.94 (3)	103.59 ± 9.45	3.12	18.09	0.01	0.21

Figures in parentheses indicate number of infants

CG - Control group EG - Experimental group

The table shows that the control group infants cared by mothers had mental quotients of 81.80 and 83.95 respectively at pre and post-tests. The corresponding values of experimental group infants were 89.63 and 107.62 respectively. The difference in the mental quotients between pre and post tests of both groups of infants cared by mothers was quiet obvious. The mean of the mental quotients of both the group infants was increased after intervention. The absolute and relative gains of mother-cared infants in control group were 2.15 and 0.02 respectively. The respective values of experimental group infants were 17.99 and 0.20.

The number of grant mothers and elder siblings, sample was inadequate for statistical analysis. Therefore, the data was statistically analysed only of mother-caregivers.

From the above table, it is concluded that there was improvement in mental quotients of control and experimental group infants cared by caregivers after the intervention programme. Among the infants of mother caregivers, the experimental group infants had gained high mental quotients than that of control group. The same trend was found in absolute and relative gain of experimental group.

The higher scores of mental quotient, absolute and relative gains were observed in experimental group infants. This may be due to the more involvement of mother-caregiver in stimulation intervention. The above results are in the line of Slaughter (1983) and Fiese (1991).

4.4.2 Impact of Home Environment on the Mental Quotients of Selected Infants

The impact of home environment on the mental quotients of selected infants is given in Table-10 and illustrated in Fig.2.

It is evident from the table that the mean mental quotient of control group infants from lowest middle and middle half home environment were 81.64 and 84.04 respectively. In experimental group infants from lowest middle home environment had mean mental quotients of 89.31 and 108.09 respectively at pre and post tests. The corresponding values of middle-half-home-environment were 89.69 and 105.67. Among the infants of the control group from lowest-middle-home environment had the absolute gain 2.65 and relative gain 0.03. The corresponding values for experimental group infants were 18.79 and 0.21. The absolute and relative gains of control group infants from middle half home environment were 2.09 and 0.02 respectively. The corresponding values for experimental group infants were 15.99 and 0.17.

In control group, as it was seen from the table, the infants from lowest middle and middle half level of home environment had similar mean mental quotient at the time of pre-test and similar improved mean quotients were found in both the levels of home environment at post-test. Among the infants of experimental group from lowest middle and middle-half-home environment, though they had similar mean mental quotient at the

Table 10 : Impact of level of home environment on the mental quoteints of selected infants

Level of Home Environment	Mental quotients (mean ± SD)				Absolute gain		Relative gain	
	Initial		After two months		CG	EG	CG	EG
	CG	EG	CG	EG				
Lowest middle	81.64 ± 5.16 (27)	89.31 ± 7.49 (23)	84.29 ± 5.93	108.09 ± 4.66	2.65	18.79	0.03	0.21
Middle half	81.95 ± 2.24 (3)	89.68 ± 6.07 (7)	84.04 ± 2.79	105.67 ± 6.93	2.09	15.99	0.02	0.17

Figures in parentheses indicate number of infants

CG - Control group. EG - Experimental group

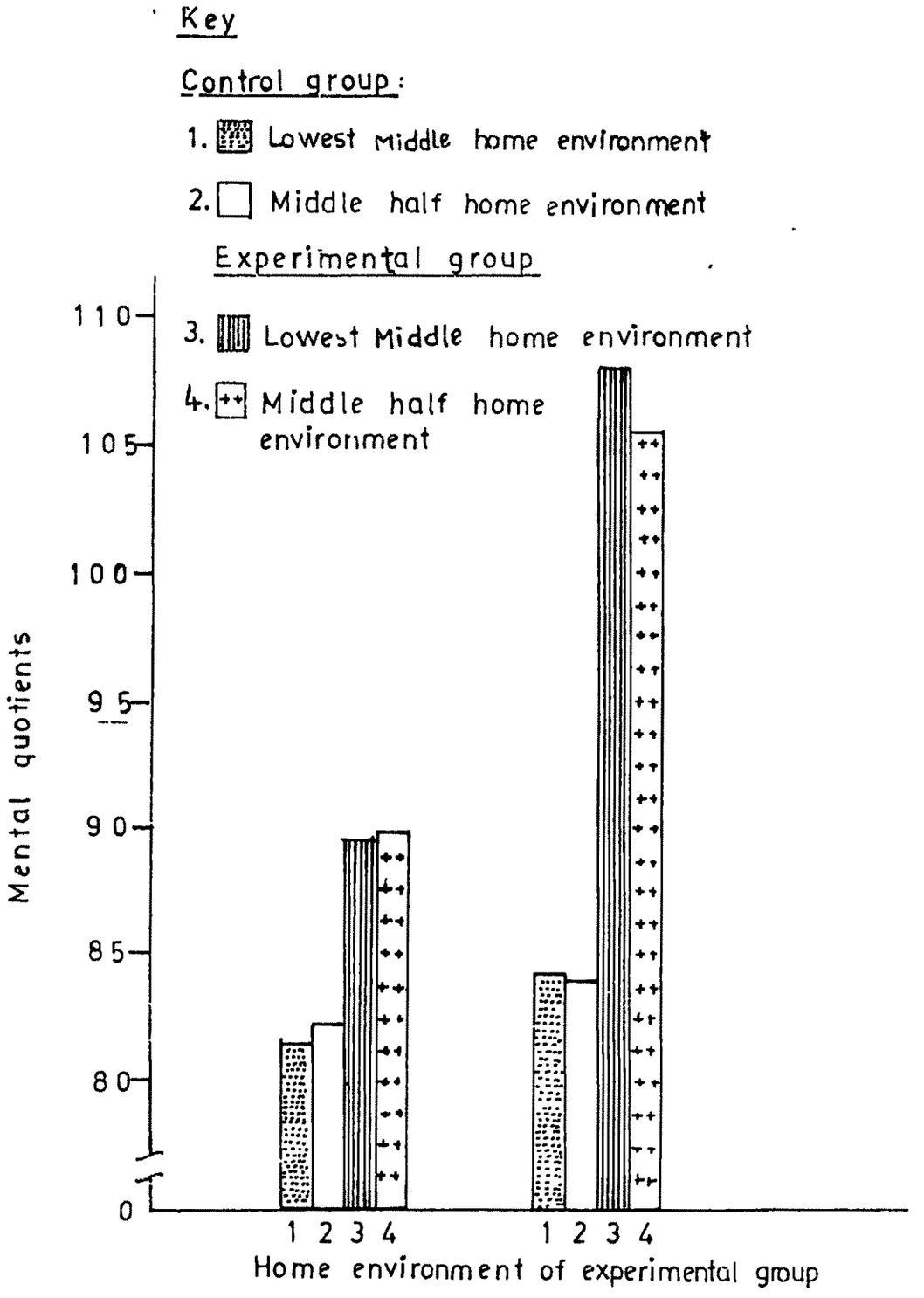


Fig 2. Impact of level of home environment on the mental quotients of selected infants

time of pre-test, after 2 months period of stimulation intervention their mean mental quotient were different. The same trend was observed in absolute and relative gains also. All the sample infants of both the groups from lowest middle and middle half home environment had lower mental quotients. Comparatively experimental group infants had better mean mental quotient than control group infants.

The reasons for low mental quotient in rural infants may be due to lack of proper home environment and lack of stimulation given by the family. After the intervention programme the improvement was seen in mental quotient of lowest middle and middle half home environment infants. Improvement in control group may be due to maturity and availability of toy substitutes and family possessions. For experimental group infants high mental quotients were due to the stimulation intervention programme and family environmental factors such as responsivity of parents and the number stimule. The relative and absolute gains were more in experimental group of lowest middle than middle half home environment group. These findings are in line with the findings of Elardo et al.(1975), Wach's(1978), Bradley and Tedesco (1982), Bradley and Caldwell(1984), Bradley et al.(1989).

It can be concluded that the improvement in mental quotients of experimental group was more than control group from lowest middle and middle half level of home environment infants.

4.4.3 Play Materials and Family Possessions Available at Infants Home Contributing to their Stimulation :

Play materials and family possessions available at infants home contributing to their stimulation is given in tables 11 A, 11 B and 11 C.

It is indicated from Table-11 A that toys were not available in majority (60 %) of infants families in control and experimental groups. While remaining 40 per cent families had either home made or readymade toys for their infants.

Information regarding indigenous materials indicated in Table 11 B, explain that 90 per cent families in both the groups used kitchenware/Dinningware like catories, cups, spoons, plates, vessels as toy substitutes for their infants play. While remaining families made infants to play with water, dough, sand, blocks (wooden pieces) under their supervision.

List of family possessions is given Table 11 C. About 23 per cent to 26 per cent families from both the group had wall posters in their homes. Again 16 to 20 per cent families in both the groups used coloured pictures, school books of elder children for recognition and pointing out. Other items such as radio, clock, fan were available in few families. Fan and wall hangings were not found in control group infants families.

Statistically there was no significant difference between control and experimental groups in play materials and family possessions.

Table 11 Play Materials and Family Possessions Available at Infants Homes Contributing to their Stimulation.

Play materials/Family possessions available in home.	Control group (30)	Experimental group (30)	't' value
A) Toys :			
1) Available	40.00	40.00	-
Home made	33.33	25.00	0.61 NS
Readymade	50.00	25.00	1.00 NS
Home made and Readymade	16.66	50.00	1.15 NS
2) None	60.00	60.00	-
B) Indigenous materials :			
Wooden pieces/blocks, sand, dough, water	10.66	13.33	0.58 NS
Kitchan Ware and dinning .	93.33	90.00	0.36 NS
C) Family possessions :			
Radio	10.00	6.66	0.68 NS
Clock	10.00	3.33	1.03 NS
Fan	-	3.33	-
Wall Hangings	-	3.33	-
Coloured picture -	16.66	20.00	0.30 NS
-Book of eldersiblings wall posters	23.33	26.66	-

NS - Non Significant

S U M M A R Y

CHAPTER - V

SUMMARY

Rural infants due to poverty, lack of play materials, and proper care may be delayed and deficit in learning process but by providing appropriate environment that is extra stimulation they may improve. On this basis a study was carried out to see the impact of stimulation intervention programme on mental development of rural infants for a period of 2 months, with the following objectives.

1. To assess the mental development of selected rural infants.
2. To design the infant stimulation intervention programme corresponding to observed mental development of selected rural infants.
3. To execute the developed design of the infant stimulation programme on the selected infants through primary caregiver.
4. To assess the impact of infant stimulation intervention programme on mental development of rural infants.

For this study, a sample of 60 healthy infants of both sexes in the age of 9-13 months, with similar level of mental ages belonging to low SES and nuclear families were selected randomly from four villages of Parbhani district. Out of these 60 infants, 30 infants were comprised of the experimental group. This group had the assess for specially designed stimulatory activities

while the remaining 30 control group infants did have only routine activities.

The study was initiated by the testing the selected infants for their mental ages, using Bayley scale of Infant Development. On this basis a series planned stimulation activities were executed on the infants of experimental group through the primary caregivers. The materials for the designed activities which were mostly cheap and indigenous, were provided to the infants in addition to the materials available in their respective homes. The intervention programme which was executed for 2 months was supervised by the investigator by making periodical visits to infants homes with a duration of three days consecutive visits.

The infants primary caregivers were personally interviewed with the help of pre-tested questionnaire and were also simulteneously observed. The mental development of sample infant were estimated twice during the period of study. The first assessement was done before inclusion in the study and after two months study post-testing was done. The quality of stimulation and support available to a child in the home environment was assessed by using Home Inventory developed by Caldwell and Bradley.

The findings of the study are summarised below.

1. Assessement of the Mental Development of selected Rural Infants prior to Stimulation Intervention Programme.

1. Prior to the experiment, the mental ages of selected infants were below their chronological ages.
2. Mental ages of control group infants were slightly low than the experimental group.
3. Mean mental quotients of control and experimental groups were different at the time of intervention.
4. Experimental group infants had better mental quotient scores than control group infants, though their mean chronological ages were less than control group.

2. Assessment of the Impact of Infant Stimulation Intervention Programme on Mental Development of Rural Infants after Implementation.

1. The mean mental quotient scores increased after two months stimulation intervention.
2. The rate of improvement was higher in experimental group infants than the control group infants.
3. The male infants from experimental groups were brighter than female infants and the infants of the control group. Whereas there was slight variations in female and male infants mental quotient of control group.
4. In all the sample age groups i.e. 11±, 12± and 13± infants from experimental group had higher mental quotient scores after two months intervention whereas there were slight differences in mental quotients of different age group infants on pre and post-test.

3. Factors Affecting Infant Stimulation Intervention Programme :

1. Majority of the primary caregivers were mothers followed by elder siblings and grandmothers and were illiterates.
2. Near about all primary caregivers were warm, affectionate towards their infants and they were able to understood their infants needs and wants.
3. Active involvement was less in both the groups mother.
4. Majority of caregivers from both the groups were good in verbal interaction.
5. There was improvement in mental quotients of control and experimental group infants irrespective of the primary caregiver.
6. It was found that toys were not available in majority of infants families of both the groups. But playing with kitchenware/dinningware was found common for all the sample infants.
7. Besides all these findings it was also observed that majority of the sample families were small sized families with monthly income of Rs.600-800. Majority of mothers were illiterates and fathers were educated upto primary school level.

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CHAPTER -VI

LITERATURE CITED

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A P P E N D I C E S

APPENDIX - I

INTERVIEW SCHEDULE

DETAILS ABOUT INFANT CAREGIVER INTERACTION :

1. General Information :

Name of the infant :

Age :

Date of birth :

Sex : Male / Female

Ordinal position :

Name of the respondent :

Name of the Mother :

Name of the Father :

Religion / Caste :

Area : Slum/Rural :

Address of the Family : _____

_____

Type of Family : Nuclear / Joint / Extended

Size of the Family : Small / Middle / Large
(0-4) (5-10) (Above 10)

Total income of the Family Rs._____/Months.

Total Family Members :

No.of Children in the Family :

Information about the family members.

Sr. No.	Name	Age	Literacy level	Relation with infant	Occupation	Income
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

2. Who spends most of the time with infant : Mother/grandmother/Elder sibling/ anyother

3. How old primary caregiver is _____ years.

4. Educational status of the primary caregiver : Illiterate/ Literate/Primary/Secondary/Higher Secondary/College

5. Personality traits of primary caregiver. IS the primary caregiver -
   1. Resourceful
   2. Responds quickly and appropriately
   3. Warm and affectionate
   4. Understands infant signals and behaviour
   5. Good in verbal interaction
   6. Actively involvement
   7. Appriciates infants
   8. Passive involvement

6. Does the infants family have :
   1. Radio 2 T.V. 3 Clock 4. Fan 5.Wall Hangings 6. wall decorative pieces 7. Coloured picture book 8. elder sibling.

7. Does the infant have toys ? Yes/No
   If yes, Home made/ Readymade

   If No; does the infant play with any toy substitutes like wood/stone/kitchenware/Dinnihgware/ other household materials/ anything else

APPENDIX - II

MENTAL SCALE

Name of the Infant : _____

Age:_____ Date of Birth_____Address:_____

Sr. No.	50% Age placement in months	Item Discription
1.	2.	3.
59.	5.0	Sustained inspection of ring
60.	4.9	Picks up cube
61.	5.0	Turns head after fallen spoon
62.	5.1	Recovers rattle in crib,
63.	5.2	Reaches persistently
64.	5.3	Lifts cup
65.	5.5	Reaches for second cube
66.	5.5	Transfers object hand to hand
67.	5.5	Exploitive string play
68.	5.6	Smiles at mirror image
69.	5.6	Bangs in play
70.	5.6	Interest in sound production
71.	5.7	Picks up cube defectly and directly
72.	5.8	Lifts cup with handle
73.	5.9	Pulls string securesring
74.	5.99	Looks for fallen spoon
75.	6.1	Retains two of three cubes offered.
76.	6.3	Playful response to mirror
77.	6.5	Manipulates bell:Interest in details.
78.	6.5	Attends to scribbling
79.	6.9	Cooperates in games
80.	7.1	Vocalizes 4 differents syllables
81.	7:1	Pulls string adaptively and secures ring
82.	7.1	List end selectively to words.
83.	7.4	Attempts to secure 3 cubes
84.	7.5	Uncovers toy

1.	2.	3.
85.	5.7	Rings bell purposively
86.	8.3	Adjusts to words
87.	8.9	Fingers hole in pegboard
88.	8.98	Says-"da-da" of equivalent
89.	9.0	Picks up cup:secures cube
90.	9.7	Inhibits on command
91.	9.9	Looks at pictures in book
92.	9.97	Looks for contents of box
93.	10.2	Puts cube in cup on command
94.	10.2	Stirs with spoon in immitation
95.	10.2	Stirs with spoon immitation
96.	10.5	Repeats performance laughed at
97.	10.6	Unwraps cube
98.	10.7	Uses expressive jargon
99.	10.9	Holds crayon adaptively
100.	10.9	Attempts to imitatescribble
101.	10.98	Turns pages of books
102.	11.1	Dangles ring by string
103.	11.3	Pushes car elong
104.	11.9	Immitates words
105.	11.9	3 or more blocks in cup
106.	12.0	Pats whistle doll in immitation
107.	12.1	Uncovers square box
108.	12.5	Puts beads in box (69f8)
109.	13.1	Spontaneous scribble
110.	13.1	Removes pellet from bottle
111.	13.3	Closes round box
112.	13.4	Places one peg repeatedly
113.	13.67	Uses gustures to make want
114.	13.71	Builds tower of 2 cubes
115.	14.1	Says two words
116.	14.1	Shows shoes, or other clothing or own toys
117.	14.9	One round block in Bayley board
118.	15.1	Adjusts round block in 3 holed brd
119.	15.3	Attains toy with stick
120.	16.2	Builds tower of 3 cubes
121.	16.4	Immitates strocke

1.	2.	3.
122.	16.5	Pegs places in 70 seconds
123.	16.8	Pink form board:Places round block
124.	17.1	Two round blocks in blue board
125.	17.5	Uses words to make wants known
126.	17.96	Follows directions doll
127.	18.2	Pegs placed in 42 seconds
128.	18.6	Blue board: also 2 squares
129.	19.2	Points to partes of the doll
130.	20.4	Names one object
131.	20.8	Blue board:places six blocks
132.	20.8	Differentiates a scribble and a stroke
133.	20.9	Pink form board:completes
134.	21.0	Selects box: containing kitty
135.	21.2	Sentence of two words.
136.	21.3	Names one picture
137.	21.4	Pegs placed in 30 seconds
138.	22.3	Discriminates between cup and plate
139.	22.6	Points to three pictures
140.	22.8	Names two objects
141.	22.9	Discriminates cup,plate and box
142.	23.5	Mends broken doll marginally
143.	23.8	Trains of cubes
144.	23.8	Completes blue board in 150 second
145.	24.1	Names 3 objects
146.	24.3	Pink form board:90 second
147.	24.3	Completes blue board:90 second
148.	24.4	Names watch: 4th picture
149.	24.5	Points to 5th picture
150.	24.5	Names 3 pictures
151.	24.8	Names watch : 2nd picture
152.	24.9	Completed blue board 60 seconds
153.	24.97	Folds paper
154.	25.2	Immitates stroke:verticle and horizontal
155.	25.7	Understands two preposition
156.	26.1	Builds tower of 5 cubes

1.	2.	3.
157.	26.4	Mends broken doll approximately
158.	27.1	Names 5 pictures
159.	27.1	Understands 3 preposition
160.	27.5	Points 7 pictures
161.	27.7	Concept of one
162.	29.0	Pegs placed in 22 seconds
163.	28.8	Mends broken doll exactly
164.	26.9	Builds tower of 8 cubes

HOME INVENTORY

Sr. No.	Subscale	Score	Lowest Middle	Middle Half.	Upper Fourth.
1.	Responsibity		0-6	7-9	10-11
2.	Acceptance		0-4	5-6	7-8
3.	Organization		0-3	4-5	7-6
4.	Learning materials		0-4	5-7	8-9
5.	Involvement		0-2	3-4	5-6
6.	Variety		0-1	2-3	4-5
	Total Score		0-25	23-26	37-45

Place a plus(+) or minus(-) in the box alongside each item if the behaviour is observed during the visit or if the parent peports that the conditions or events are characteristic of the home environment. Enter the subtotal and the total on the front side of the Record sheet.

I. Emotional and verbal Responsibility .

1. Mother spontaneocisly vocalizes to Child at least twice during visit (excluding scolding)
2. Mother responds verbally to vocalizations.
3. Mother tells child name of some object or person.
4. Mother's speech is distinct,Clear and audible.
5. Mother initiates verbal interchanges with observer (asks questions, makes spontaneous commentrits)
6. Mother converses freely and easily.
7. Mother permits child occasionally to engage in "messy" type of play.
8. Mother spontaneously praises child at least twice.
9. Mother's voice conveys positive feelings towards child.
10. Mother caresses or kisses a child at least once.
11. Mother responds positively to praise of child offered by visitor.

Sub total

II. Avoidence of restriction and punishment .

12. Mother does not shout at child.

13. Mother does not express overt annyance with or hostility toword child.

14. Mother neither slaps nor spanks child during visit.

15. No more than one instance of physical punishment during the past week.

16. Mother does not scold or derogate child during visit.

17. Mother does not interfere with childs actions or restrict child's movements more than three times during visit.

18. At least ten books (of elder siblings,text books, papers material) are visible in the home.

19. Family has a pet (cat, goat, dog, etc.)

Sub total :

III. Organization of physical and temporal Environment.

20. When mother is away care is away care is provided by one of three regular substitutes.

21. Someone takes child into grocery store or market at least once a week.

22. Child gets out of house at least four times a week.

23. If child is fell sick, is taken to doctor's clinic.

24. Child has a special place (wall cup board, Devali, small topali,etc.) for keeping his or her toys.

25. Child's play environment appears safe of hazards (away from chullha, water storage, etc.)

IV. Provision of appropriate play materials

26. Child has some muscle activity toys or equipment (ball, door swing, khulkhula,chandwa,etc.)

27. Child has stroller or walkar.

28. Child has push or pull toy (car,any wooden pull toy,etc.)

29. Mother provides toys or interesting activities for child to play during interview.

30. Provides learning equipment, soft toy appropriate to age.

31. Provides learning facilitators appropriate to age mobiles, low height cot(Baj).

32. Provides eye-hand co-ordination toys(ex.containers with lid,boxes,vessels etc.)

1. Provides eye-band co-ordination toys items to go in and out of receptacles, fit together toys,beads.

2. Provides musical toys (ex.raltle,Dhapali etc.) and literature (elder siblings books,news paper)

V. Maternal Involvement with the Child

3. Mother keeps child within visual range and looks at him often.

4. Mother"talks" to child while doing her work.

5. Mother consciously encourages developmental advances.

6. Mother invests "Maturing" toys with value via her attention.

7. Mother structures child's play periods.

8. Mother provides that challenge child to develop new skills.

Sub total :

VI. Opportunity for variety in Daily Stimulation

9. Father provides some care daily.

10. Mother tells story to child at least three times weekly.

11. Infant take at least one meal per day with mother and father.

12. Family visits or receives visits from relatives approximately once a month.

13. Child has three or more books of his own.

Sub total :

APPENDIX - IV

SOCIO-ECONOMIC STATUS SCALE (RURAL)
(Form for Investigator)

Total Score
Category

Respondent_____ Village_____

Age_____ Date_____ Investigator_____

1. Caste :

Schedule Caste	1
Lower caste 2	2
Artisan caste	3
Agricultural caste	4
Prestige caste	5
Dominant caste	6

2. Occupation :

Labour	1
Caste occupation	2
Business	3
Independent Profession	4
Cultivation	5
Service	6

3. Education :

Illiterate	0
Can read only	1
Can read and write	2
Primary	3
Middle	4
High School	5
Graduate	6

4. Social participation

Member of one organisation	1
Member of more than one organisation	2
Office holder	3
Wider public leader	6

5. Land :

No land	
Less than 1 acre	1
1-5 acres	2
5-10 acres	3
10-15 acres	4
15-20 acres	5
More than 20 acres	6

6. House

No home	0
Hut	1
Katcha house	2
Mixed house	3
Puca house	4
Mansion	6

7. Farm power :

No drought animal	0
1-2 Drought animals	2
3-4 drought animals of 1 or more prestige animal	4
5-6 drought animalor Tractor	6

8. Material possession :

Bullock-cart	1
Cycle	2
Radio	1
airs	1
Improved Agricultural implements	2

9. Family : 4

Type
Siggle
Joint

Size

Upto 5	1
Above 5	2
Distinctive features	2

APPENDIX - V

Mental quotients of rural infants of the study groups.

Mean age of infants (Months)	Mental Quotients			
	Control group(30)		Experimental group(30)	
	Initial	After 2 months	Initial	After 2 months
1	2	3	4	5
10 ±	-	-	94.4	107.9
	-	-	90.3	110.8
11 ±	90.4	94.0	97.4	112.45
	82.0	85.0	104.4	112.45
	80.0	81.6	90.9	105.1
	79.55	81.02	76.5	112.45
	93.25	96.9	93.9	101.0
	79.55	81.02	93.9 67.14	116.3 96.9
	73.0	74.15	96.7	105.1
12 ±	80.87	82.55	90.0	107.55
	85.0	88.7	89.1	105.1
	82.3	84.0	91.2	110.41
	92.5	92.8	92.5	109.2
	83.0	84.35	85.7	113.3
	82.3	84.6	83.0	107.55
	82.3	84.6	92.5	117.4
	85.7	88.7	82.3	101.0
	83.0	84.35	89.1	109.2
	83.0	84.35	94.65	106.42
	85.35	90.5	95.9	109.2
	85.7	88.7	91.2	102.45
	84.0	86.52	84.32	106.42
	80.0	82.55	93.45	107.55
	86.5	88.2	92.51	109.2
	83.3	84.6	89.1	109.2
	84.32	86.52	82.3	92.8
	83.3	84.6	90.0	111.4
	74.0	74.5		
13 ±	73.5	76.4	80.7	105.4
			87.0	105.0

APPENDIX - VI

Mental ages of the rural infants of the study groups

Mean age of infants (Months)	Mental Quotients			
	Control group(30)		Experimental group(30)	
	Initial	After 2 months	Initial	After 2 months
10±	-	-	10.2	13.1
	-	-	9.0	11.9
11±	10.7	13.1	10.98	14.1
	10.7	13.1	11.3	14.1
	10.2	12.1	10.7	13.4
	10.6	12.5	10.2	14.1
	10.98	13.4	10.9	13.4
	10.6	12.5	10.5	13.4
			11.1	13.4
			10.9	14.1
12±	10.9	13.1	11.9	14.9
	10.9	13.3	10.98	14.1
	10.9	13.1	11.3	14.9
	11.1	13.4	11.1	14.1
	11.1	13.3	10.9	14.9
	10.9	13.1	11.1	14.9
	10.9	13.1	11.1	15.1
	10.9	13.3	10.9	13.71
	11.1	13.3	10.98	14.1
	11.1	13.3	11.9	14.1
	11.9	13.3	11.3	14.1
	10.9	13.3	11.3	14.1
	10.9	13.3	10.98	14.1
	10.9	13.1	11.9	15.1
	11.3	13.4	11.1	14.1
	10.9	13.1	10.98	14.1
	10.98	11.3	10.9	12.1
	10.9	13.1	11.9	15.1
	10.7	12.5		
13±	11.1	13.1	12.0	15.3
	10.98	13.1	11.9	15.1
	11.3	13.3		
	11.3	13.1		