

Influence of Intervention on Temperament and Developmental Outcomes of Infants

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KEYWORDS Intervention. Temperament. Childcare. Motor. Mental Development

ABSTRACT Quality child care in the early years essentially means care with a high degree of positive interaction between care-givers and children which leads to better mother-child interaction. The present study attempts to study the efficacy and influence of stimulatory intervention on temperament and motor and mental development of infants. A sample of 109 infants of age birth to eighteen months was selected from two villages that served as an experimental group and control group. The study adopted a semi-longitudinal approach wherein the infants were followed upto 36 months with the final post testing at 36 months. Temperament of infants was assessed by a checklist and Bayley's Scale of Infant Development was used to measure motor and mental development. An intervention consisting of proper stimulation to the infants and scientific knowledge related to childcare, developmental milestones of infants and effective home environment was provided to the mothers of the experimental group infants. Infants in both the groups were pre-tested and post tested to see the effect of intervention. Statistical analysis revealed significant differences between both groups regarding motor and mental development. Temperament was found to be significantly associated with the developmental indices of infants. The stimulatory intervention programme was found to be effective in increasing the motor and mental development of children.

INTRODUCTION

The early years in the life of a child witness the most important aspects of development. It is also said that formative years of childhood are of crucial importance as they lay basis for health and quality of life for present and future times. As stated by Swaminathan (1989) good nurturing or fostering is based on understanding the child's needs and trying to meet them. If their needs are met children get various opportunities to observe, imitate and learn responsibilities appropriate to the age.

Growth and development are continuous processes which begin from the time of conception and can be observed from birth. Growth is quantitative in nature while development is more complex and difficult to measure. There are different aspects or areas of development – physical, motor, sensory, cognitive, emotional and personal. It is necessary to point out that each kind of development

stimulates other kinds. Motor development, or the development of control over muscular functions, is one of the major tasks of the early years of life. Mental development, according to Hurlock (1978), involves reception of sensory information and transformation, elaboration, storage and its usage in various fields. Through the sensory and motor experiences of the first few months, the children develop perceptual abilities and motor skills. Delay in achievement of various motor and mental abilities affects the child in many ways. Research, as reported by Swaminathan (1989), has also shown that sensory stimulation from the environment affects the functioning of neural pathways and the better these are developed the better the child is able to respond to stimuli.

Quality child care is defined as positive care giving and language stimulation given in the good child care environment and is positively related to the early cognitive and language development. It is now well established fact that the crucial stages in brain development occur in the first three to five years of life and that early care and stimulation during that period has a major influence on children's abilities. The ability to respond to different activities depends on the part of infants also, in a way that when the child

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gets proper stimulation and is curious and ready to participate, the learning process seems to be without any problem and becomes interesting. But if the temperament of child is poor that will affect the learning capacities of children, as established by Verma et al (2002). According to Dunn (1979), the infant's reaction to familiarity, novelty and his displays of interest, surprise or declining interest have been seen as particularly sensitive indicators of children's cognitive development. Thus, here lies the importance of providing intervention because the temperament of the child can be best moulded during the early years. Research by Barrera et al. (1986) also indicates that early intervention with parents and infants can improve parental responsiveness, sensitivity to the child's needs and parent-infant interaction results in developmental gain.

Sensing the need of intervention in the areas of motor and mental development including the temperament of infants, the study focuses on providing scientific and need based intervention to infants and their mothers in the rural areas of Himachal Pradesh.

METHODOLOGY

A total of 109 infants of birth to 18 months of age were selected for the study from two distant villages, Bundla and Kandi, of Bhawarna block of Kangra district in Himachal Pradesh. Infants in the village, Bundla, served as experimental group (n = 49) wherein a Farm crèche was established as a part of the study that provided quality care to the infants in addition to supplementary feeding. The infants in the other village (n = 59) were control group as no crèche facilities were provided to them. The study adopted a semi-longitudinal approach of assessing temperament and development wherein the infants were followed upto 36 months with the final post testing at 36 months.

The temperament of infants in both the groups were tested using a self developed checklist which consisted of aspects such as responsiveness, shyness, cooperativeness etc. The checklist consisted of 45 statements and for each of the statements a score of 5, 3, 1 were given for 'Always', 'Sometimes' and 'Never' respectively. The higher the scores better was the temperament of infants. Based on the raw scores, the infants were categorized into three groups which were :

<i>Temperament level</i>	<i>Score range</i>
Difficult	17 – 40
Slow to Warm	41 – 63
Easy	64 – 85

The Bayley Scale of Infant Development was administered on infants to assess the motor and mental development along with Psychomotor Development Index (PDI) and Mental Development Index (MDI). The scale consisted of 79 items to measure motor development and 163 items for mental development. The raw scores were then converted to indices with reference to Bayley's norms and were categorized as follows:

<i>Category</i>	<i>Score range</i>
Low	Less than 90
Medium	90 – 110
High	More than 110

An intervention programme was planned which aimed at educating the mothers of infants in experimental group. The package consisted of providing stimulation to the infants coming to the farm crèche in addition to educating their mothers about antenatal and prenatal care, understanding developmental milestones of infants, conducive home environment for infants, stimulating toys and play materials and nutrition and health care. The intervention was given once a week for a period of one and a half years through various techniques of lectures, demonstrations and discussions. The control group infants and their mothers were devoid of any such experience. All the infants were then post-tested to see the effect of intervention. The data was collected and statistically analysed by using chi square and t-test to know the impact of intervention.

RESULTS AND DISCUSSION

The early years are a time of the most rapid physical and mental growth and set the stage for later years. Infancy and early childhood is the most crucial period when the foundations for the physical and mental development are laid. As rightly said by Vander and James (1977), proper care and right kind of development opportunities are critical since these have a direct bearing upon the future human resource development of a nation. The results of the impact of intervention on the developmental outcomes and tempera-

ment of infants are presented in the Tables 1 to 5. It is revealed from Table 1 that although an equal percentage of infants in control and experimental groups were present in the different categories of temperament during pretesting but majority of the control group children were of medium (slow to warm) temperament during post-testing as compared to all the infants in experimental group who were having easy temperament during the same period. Although a similar kind of trend was observed in the categories of Psychomotor Developmental Index (PDI) and Mental Developmental Index (MDI) but the main difference was that during post-testing very less percentage of control group infants were having high levels of PDI and MDI than the experimental group (Tables 2 and 3). It is also observed that children having low indexes were more in number in the control group than in experimental group. Recent research has indicated that less active children may have greater need of stimulation by caregivers than more active children. In the present study, the temperament of infants were categorized into three divisions out of which less percentage of infants had difficult temperament and no child was in this category after giving intervention. Due to the knowledge given to their mothers

about the responsiveness of infants, tackling of temper tantrums, proper and effective stimulation, there was an increase in the number of children in experimental group who had easy temperament. A study by Verma et al (2002) revealed the significant effect of temperament and considered it as one of the important dimensions which affects the development of children. It also came through in the study done by Van den Boom (1994) on the influence of temperament and mothering on attachment and exploration of infants, it was found that after giving intervention to mothers and infants, the intervention group mothers were significantly more responsive, stimulating, visually attentive and controlling their infant's behaviour than control group mothers. Also intervention infants had higher scores on sociability, self-soothing and they cried less than the control group

Temperament is traditionally defined as the individual's behavioural 'style' – the way in which behaviour is expressed. This behavioural style appears early in life, has a biological base and is atleast moderately stable across time and situations. Temperament is one of the most important dimensions of the personality and includes parameters such as emotional sensitivity of the child, adjustability, less stranger anxiety

Table 1: The temperament levels of infants during pre and post test.

<i>Temperament scores</i>	<i>Pre-Test</i>		<i>Post-Test</i>	
	<i>Exp. group</i>	<i>Con. group</i>	<i>Exp. group</i>	<i>Con. group</i>
Difficult (17 – 40)	6 (12.24)	3 (5)	-	-
Slow to warm (41 – 63)	24 (49)	37 (68)	-	37 (63)
Easy (64 – 85)	19 (39)	19 (32)	49 (100)	22 (37)

Note: Figures in parenthesis denotes percentages.

Table 2: The levels of Psychomotor Development index of infants during pre and post test.

<i>Psychomotor development Index levels</i>	<i>Pre-Test</i>		<i>Post-Test</i>	
	<i>Exp. group</i>	<i>Con. group</i>	<i>Exp. group</i>	<i>Con. group</i>
Low (Below 90)	13 (26.5)	12 (20.33)	3 (6.2)	24 (40.7)
Average (91 – 110)	26 (53)	35 (59)	31 (63.2)	35 (59)
High (Above 110)	10 (20.5)	12 (20.33)	15 (30.6)	-

Note: Figures in parenthesis denotes percentages.

Table 3: The levels of Mental Development index of infants during pre and post test.

<i>Mental development Index levels</i>	<i>Pre-Test</i>		<i>Post-Test</i>	
	<i>Exp. group</i>	<i>Con. group</i>	<i>Exp. group</i>	<i>Con. group</i>
Low (Below 90)	19 (39)	13 (22)	1 (2)	15 (25.4)
Average (91 – 110)	25 (51)	45 (76)	10 (25.5)	41 (69.5)
High (Above 110)	5 (10)	1 (1)	38 (77.5)	3 (5.1)

Note: Figures in parenthesis denotes percentages.

Table 4: Effect of intervention on temperament and developmental variables

Variables	Pre testing			Post testing		
	Exp group	Con group	t value	Exp group	Con group	t value
Infants temperament	57.36 (14.75)	58.3 (11.78)	0.359	83.85 (5.33)	60.98 (7.04)	19.195**
Psychomotor Development Index (PDI)	95.24 (19.51)	97.55 (18.62)	0.626	107.04 (11.68)	92.01 (5.78)	8.201**
Mental Development Index (MDI)	90.51 (20.05)	91.41 (17.22)	0.40	123.24 (14.85)	94.21 (8.53)	11.868**

Note: Figures in parenthesis denotes standard deviation

** Significant at 1% level

and other aspects of personality. Table 4 shows the significance of intervention on the temperament of infants, Psychomotor Development Index and Mental Development Index of infants. It can be observed that although the mean scores of infants during pretesting were similar, significant differences were seen at the time of post-testing in all the variables. This is further illustrated by significant t-test values and the figure depicting the effect of intervention (Fig. 1). The wealth of research on infancy has amply confirmed what parents and those who care for babies know so well – that young babies differ markedly from one another. As suggested by Dunn (1979), the infant's reaction to familiarity, novelty and his displays of interest, surprise or declining interest have been seen as particularly sensitive indicators of the child's cognitive development. Likewise, the development of intelligence, personality and social behaviour occurs most rapidly during the early years. A research by Brazelton (1994) revealed that infants

exposed to good nutrition, toys and playmates have measurably better brain functioning than those raised in a less stimulating environment. It is quite clear from the present study that temperament seems to have a significant effect on the mental and motor development indices of infants. Children showing low developmental indices also had difficult or poor temperament and a higher percentage of children with easy temperament had better indices in the experimental group. This might be because the mothers of these infants were more energetic, sociable, attentive and sensitive and provided appropriate encouragement and stimulation to their infants. Vondra and Belsky (1993) found that psychological integration and mental capacities were associated with mothers sensitivity and authoritative pattern of disciplining their infants

Table 5 reveals the association of temperament and developmental indexes of infants. Significant association was found between temperament and developmental indices whereby

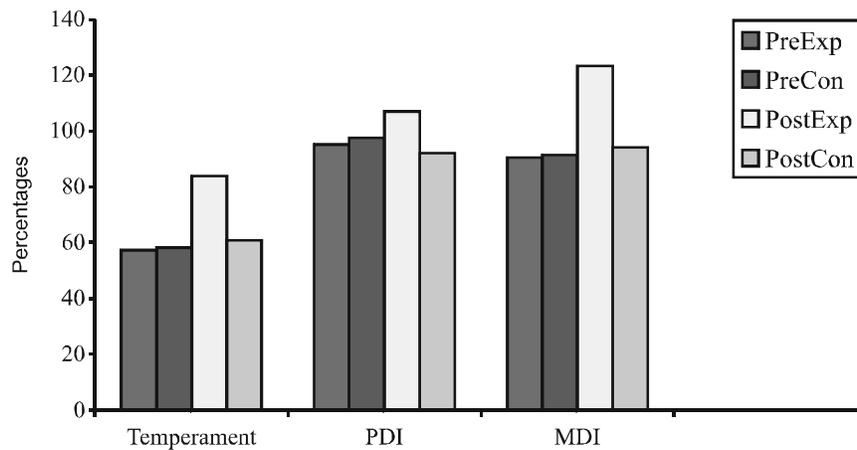


Fig. 1. Effect of intervention on different variables during pre and post testing of infants

Table 5: Association between Psychomotor Development Index (PDI), Mental Development Index (MDI) and Infant's temperament of experimental and control group.

Variables	Temperament Levels			Total	χ^2 value
	Difficult	Slow to warm	Easy		
<i>Psychomotor Development Index (PDI) of Experimental Group</i>					
Low	4 (28.57)	7 (50.00)	3 (21.43)	14 (28.47)	6.784*
Medium	2 (8.00)	11 (44.00)	12 (48.00)	25 (51.02)	
High	0	6 (60.00)	4 (40.00)	10 (20.4)	
Total	6 (12.24)	24 (48.98)	19 (38.78)	49	
<i>Mental Development Index (MDI) of Experimental Group</i>					
Low	6 (27.27)	12 (54.54)	4 (18.18)	22 (44.89)	13.277**
Medium	0	11 (55.00)	9 (45.00)	20 (40.83)	
High	0	1 (14.28)	6 (85.72)	7 (14.28)	
Total	6 (12.24)	24 (48.98)	19 (38.78)	49	
<i>Psychomotor Development Index (PDI) of Control Group</i>					
Low	2 (16.66)	5 (41.67)	5 (41.67)	12 (20.33)	13.02*
Medium	0	22 (62.85)	13 (37.15)	35 (59.32)	
High	0	11 (91.67)	1 (8.33)	12 (20.33)	
Total	2 (3.38)	38 (64.41)	19 (32.21)	59	
<i>Mental Development Index (MDI) of Control Group</i>					
Low	2 (15.39)	8 (61.53)	3 (23.08)	13 (22.03)	4.19
Medium	1 (2.22)	30 (66.66)	14 (31.11)	45 (76.27)	
High	0	1 (100)	0	1 (1.6)	
Total	3 (5.08)	39 (66.1)	17 (28.82)	59	

Note: Figures in parenthesis denotes percentages

* Significant at 5 % level

** Significant at 1% level

it was observed that infants with warm temperaments had their PDI in the medium range as compared to infants with difficult temperament who had low indices. A higher percentage of experimental group children who had easy (45 %) and warm (55%) temperament had their MDI scores in the medium range. Similar trend was also seen in the control group where more percentage of infants with warm temperament had medium to high level of PDI. A non significant association was found in case of control group where the results indicated that infants with slow to warm temperament were found in both low and medium categories of PDI. The powerful effect of early experience and intervention is apparent in the development of infants who lack the rich varied stimulation of normal homes. This is also supported by Berk (2003) that early experience has a profound impact as appropriate stimulation of their senses in the first year or two of life can leave a lasting imprint on the child's competence. The acquisition of different types of behaviour such as rolling, creeping, standing alone, walking alone broadens the infant's view of the world and allows for engagement in more diverse motor and mental activities. Thus delay

in acquisition of such behaviour and the consequent interference with the interaction between infant and its environment has long-term developmental consequences. Early intervention always has positive effects especially when it comes to the areas of motor and mental development. This was revealed through the present study where it was shown that infants, inspite of having similar scores on temperament and development during pre-testing in both the groups, the intervention given to the experimental group children and their mothers resulted in a heightened performance of children in all the areas. This is supported by a study by Jaya and Ratna (1992) who focused on the effect of home stimulation on mental development of children and found that though the performance of both experimental and control groups were same at pre-testing, due to exposure of stimulation programme experimental children's rate of improvement in mental age was higher than control group. Also studies of effectiveness of developmental intervention programmes by Sharma and Nagar (2003) and Lekskulchai and Cole (2001) have been found useful for the activities during the early period of life.

CONCLUSION

Early years are thus crucial for providing effective stimulation and learning. This is evident by studies by Melissa et al. (2000) who reported that these experiences are to be given from birth, and should involve such activities that demand close interaction between the child and the caretaker. The base of these activities is a warm loving relationship between the child and the adult without which the activities are meaningless. In other words, it is the warmth and love permeating through the activities that helps to enhance the child's development. Parents should be made aware about the importance of various timely developmental milestones of infants so that delays in development could be detected. Temperament of children can be moulded right from the stage of infancy so efforts must be made to make the parents especially mothers about the various positive aspects of temperament that can be imbibed into the children. Early intervention is always fruitful and effective so the governmental programmes running in the villages should have an aspect of stimulatory and timely intervention to be given to the infants.

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