



## Influence of Infant Care Practices on Growth and Development on Infants

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### Abstract

**Background:** Growth and development of infants depends on care practices directed towards them. Growth of a child especially in the first two years are determined by the child health care. The period of infancy is characterized by a very rapid of physical and mental growth. The nutritional status of an infant is the end result of many factors which influence his/her growth and development. This study is done to assess the nutritional status of the infants and to study the feeding pattern of the infants and to analyse the influence of feeding pattern on the motor and mental development of the infants.

**Methodology:** This study was done among 200 infants who were born full term, healthy and whose parents willing for the study. Infants and their parents were selected using convenience sampling technique. This study was conducted in Kilpauk Medical College and Hospital between October 2002 and September 2004.

### Results

1. Significant association exists between the birth weight of the infants and their motor development and mental development.
2. Exclusive breastfed infants have normal motor development compared to that of the supplementary and complementary fed infants. Significant association was observed between the type of feeding and motor and mental development.

**Conclusion:** Exclusive breastfed infants have normal motor development compared to that of the supplementary and complementary fed infants. Significant association was observed between the type of feeding and motor and mental development.

### Introduction

Shaping tomorrow's India, by investing in children today is the best, possible development strategy for our country. Child health care is the most crucial factor determining the growth of a child, especially in the first two years when the child has maximum growth. This growth is unparalleled at any other time during its life-span (Jain et al., 1999)<sup>1</sup>.

The period of infancy is characterized by a very rapid of physical and mental growth. This early stage of development is of substantial interest because of the dramatic developmental changes that take place in human beings in this short period of time. There are great advances in the shape and capacity of body and its muscles, substantial growth in complexity of the nervous system, rapid development of sensory and

perceptual ability, achievement of major milestones in understanding and mastering objects in the world, basic acquisition of language skills, formation of specific and central social bonds, and emergence of characteristic personal and social styles. At no other point in the life span do so many aspects of the individual change so rapidly and fundamentally (Bornstein and Bornstein, 2000)<sup>2</sup>.

Nutritional requirements of healthy newborns vary widely according to weight, gestational age, rate of growth and environmental factors. Infants have high requirements of nutrients and calories to support rapid growth, changes in composition of body tissue and maturation. During early infancy much of the nutrient requirement is met by breastfeeding.

Research and the, babies themselves have very clearly show that infants grow very well on a milk-based diet for the first six months of life - that is breast milk or a carefully prepared infant formula.

Breast milk is the most appropriate food for all newborn. It has a very complex nutritional profile. Breastfeeding promotes bonding between mother and baby, reduces the incidence of stomach and intestinal upsets in baby and reduces the incidence of food allergy later in life.

Because nutrition plays a critical role in infant's growth and development, healthcare providers need current and accurate information in order to address parental concerns about infant nutrition . Findings from several studies indicate that parents continue to have questions related to infant feeding throughout infancy. Because health care providers, like nurses, doctors, etc interact with parents during pregnancy, labor, birth, the postpartum, and routine infant care visits, health care providers are a natural choice for parents to gain information about their babies (Morin, 2004)<sup>4</sup>.

Micronutrients are required for the integrity and optimal functioning of immune system. Children with subclinical deficiency of micronutrients are more vulnerable to develop frequent and more

severe common day-to-day infections thus triggering a vicious cycle of undernutrition and recurrent infections. A number of micronutrients are required for optimal physical growth and neuromotor development. Isolated deficiencies of micronutrients are rare in clinical practice and usually deficiencies of multiple micronutrients co-exist. The first 3 years of life are most crucial and vulnerable to the hazards of undernutrition. All efforts should be made so that preschool children are given a balanced and nutritious home-based diet.

### Objectives of the Study

- 1) To gather background information from the mother regarding personal details, family details and pregnancy outcome.
- 2) To assess the nutritional status of the infants
- 3) To study the feeding pattern of the infants and to analyse the influence of feeding pattern on the motor and mental development of the infants.

### Subjects and Methods

**Study Design-** Descriptive study

**Place of Study-** Kilpauk Medical College and Hospital, Kilpauk, Chennai.

**Study Period-** October, 2002 - September, 2004

**Study Population-** 200 infants (9 month to 12 months), who satisfied the inclusion criteria, was selected for the study

#### Inclusion Criteria

Healthy infants of 9 to 12 months of age, born full term and whose parents were willing to participate in the study were selected for the study

#### Sample Selection

The infants and their parents were selected using convenience sampling technique.

#### Tool used for the study

Interview schedule is very useful in collecting data for human studies. Therefore, an interview schedule was prepared on the basis of available literature and consultation with the subject

experts. Necessary modifications were carried out after the consultation with the experts<sup>8</sup> and their suggestions were incorporated.

### Data collection

The mothers who bring their infants for immunization to the Paediatric outpatient department of the Kilpauk Medical College and Hospital were contacted personally and the data was collected from them. A good rapport was developed with the mother to answer the questions without any hesitation with clear thinking.

### Statistical analysis

The proportions of various aspects of feeding practices were arrived. Chi-square test was applied to find the association of development of the infants with variables like birth weight and feeding practices. Cross tabulation was computed find the proportion of infants in each of the categories based on the development of the infants.

### Assessment of motor and mental development of the infants

The motor and mental development of the infants was assessed using the Developmental Assessment scales for Indian Infants (DASH). The scale consists of 67 items for motor development and 163 items for mental development. The motor development items cover the child's development from supine to erect posture, locomotion and basic locomotive skills, such as climbing, jumping, skipping, etc. It also includes the record of manipulatory behaviour, such as reaching, picking up things, 'handling and manipulating them, putting or throwing them in a directed manner, etc. The mental development items record the child's cognizance of objects in the surroundings, perceptual pursuit of moving objects, exploring them to meaningful manipulation. It also covers the development of communication and language comprehension, spatial relationship and manual dexterity, imitative behaviour and social interactive, etc. The total of 230 items do not ignore any basic aspects

of development, namely, motor development and mental functioning.

| Motor Clusters                                 | Mental Clusters  |
|--|--|
| i. Neck control (7)                            | i. Cognizance – visual (25)                                |
| ii. Body control (23)                          | ii. Cognizance – Auditory (7)                              |
| iii. Locomotion – 1 Coordinated movements (10) | iii. Reaching, manipulating and exploring (36)             |
| iv. Locomotion – 2, Skills (13)                | iv. Memory (11)  |
| v. Manipulation (14)                           | v. Social interaction and imitative behaviour              |
|  | vi. Language – Vocalization, speech and communication (11) |
|  | vii. Language – Vocabulary and Comprehension               |
|  | viii. Understanding of relationship (18)                   |
|  | ix. Differentiation by use, shapes and movements (8)       |
|  | x. Manual dexterity (7)                                    |

**Figures in the parentheses denote number of items in the tool**

The scoring on both, the sections of DASI I is similar and simple, leading to TWO independent scores and results. Each item for which the child is credited is scored ' 1 '. The total scores on the respective sections of the scales are counted by adding the number of items credited, irrespective of their serial position on the scale. Sometimes, a child may fail to perform under testing conditions or during general observation but the accompanying person reports that he does it at home, for example "Closing round box". Such items be noted as reported but not added to the count to credits - the total score. Occasionally it might happen that some items could neither be administered nor they could be confidently credited by implication on the basis of sequential items credit.

Converting raw (Total) scores to standard scores - The age-placement of the item at the Total Score rank of the scale is noted as the child's developmental age. It may sometimes happen that a child has failed the specific item number equal to his total score. Thus convert the child's total scores to 'his Motor Age (MoA) and Mental Age (MeA). The respective ages be used to calculate his Development Quotients by comparing them with his chronological age, and multiplying it by 100, (MoAICA 100 =DmoQ; and MeNCA x 100 = DMeQ).

DEVIATION QUOTIENTS (DQ) are standard Scores. They are calculated by setting the mean score of each age group at 100 DQ and adjusting the standard deviation to a Universal value of 16 points of deviation. The Following formula was used in calculating equivalent DQ for each raw-score on motor and mental scales under each month from to 30 months. Calculations are reported approximately for 3.5 to 4 standard deviations on both sides of the mean. They range approximately from 35 to 160.

$DQ = 100 + (S-M) \times 16 / Sd$  where,

S = Total score (raw); M = Calculated mean, and Sd = Calculated standard deviation.

The total scores used to get the child's Deviation Quotient by referring to the appropriate Column and Row, in tables given in Annexure. Locate the total score of the child under the column of total score. Then cross-point of the row of the child's total score and the column of his age group gives his Deviation Quotients MoDQ & MeDQ thus noted be converted into Percentile Rank by referring to the table in Annexure.

### Observation and Results

- 37.5 percent of the infants who were not adequately breast fed had delayed motor development while 6.5 percent of the infants had delayed mental development. Significant association exists between the birth weight of the infants and their motor development and mental development.
- Exclusive breastfed infants have normal motor development compared to that of the supplementary and complementary fed infants. Significant association was observed between the type of feeding and motor and mental development.
- Exclusively breastfed infants have the mental development at a normal pace compared to the other infants.

### Observations

**Table – 1** General details of the mothers

| Details                            | N   | %    |
|------------------------------------|-----|------|
| <b>Age of the mother</b>           |     |      |
| Less than 20 years                 | 35  | 17.5 |
| 20 years – 24 years                | 62  | 31.0 |
| 25 years – 29 years                | 73  | 36.5 |
| 30 years – 34 years                | 21  | 10.5 |
| 35 years – 40 years                | 9   | 4.5  |
| <b>Age at the time of marriage</b> |     |      |
| < 19 years                         | 55  | 27.5 |
| > 19 years                         | 145 | 72.5 |
| <b>Marital status</b>              |     |      |
| Married                            | 183 | 91.5 |
| Separated                          | 10  | 5.0  |
| Widowed                            | 7   | 3.5  |
| <b>Educational level</b>           |     |      |
| Not attended school at all         | 18  | 9    |
| Discontinued schooling             | 85  | 42.5 |
| 10 <sup>th</sup> pass./+2 pass     | 82  | 41   |
| Degree/Diploma                     | 15  | 7.5  |

About 26.5 percent of the mothers were in the age group of 25 to 29 years. About 73 percent of the mothers were married, after 19 years of age. Majority of the selected mothers were married with the spouse alive. Forty one percent of them had completed higher secondary level.

**Table – 2** Details regarding the Latest Pregnancy

| Details   | N   | %    |
|---|-----|------|
| <b>Baby planned</b>                                       |     |      |
| Yes   | 52  | 26.0 |
| No  | 148 | 74.0 |
| <b>Preference of sex of the baby</b>                      |     |      |
| Male  | 164 | 82.0 |
| Female  | 36  | 18.0 |
| <b>Type of birth did you have with your latest infant</b> |     |      |
| Vaginal   | 118 | 59.0 |
| Assisted  | 52  | 26.0 |
| Caesarean   | 40  | 20.0 |
| <b>Termination of pregnancy at any time</b>               |     |      |
| Yes   | 89  | 44.5 |
| No  | 111 | 55.5 |
| <b>Pregnancy welcomed with joy in the family</b>          |     |      |
| Yes   | 181 | 90.5 |
| No  | 19  | 9.5  |
| <b>Knowledge about planning</b>                           |     |      |
| Yes   | 163 | 81.5 |
| No  | 37  | 18.5 |

The results show that majority of the mothers did not plan their conception. About 82 percent of them preferred male child Most of the mothers



had the knowledge of family planning. Nearly half of them have terminated pregnancy at any time before this baby. About 59 percent of the mothers experienced vaginal delivery while 20 percent caesarean delivery.

**Table – 3 Prenatal care**

| Prenatal care                       | N   | %    |
|-------------------------------------|-----|------|
| <b>Attend prenatal care</b>         |     |      |
| Yes                                 | 142 | 71.0 |
| No                                  | 58  | 29.0 |
| <b>Kinds of prenatal care</b>       |     |      |
| Antenatal class                     | 38  | 19.0 |
| Visit to Medical professionals      | 92  | 46.0 |
| Others                              | 12  | 6.0  |
| <b>Any illness during pregnancy</b> |     |      |
| Yes                                 | 178 | 89.0 |
| No                                  | 22  | 11.0 |
| <b>Post natal complications</b>     |     |      |
| Yes                                 | 47  | 23.5 |
| No                                  | 153 | 76.5 |

Nearly three fourth of the selected mothers have attended prenatal care and nearly half of them had visited medical practitioners for prenatal care. Majority of the mothers had illness during pregnancy. About 24 percent of the mothers had postnatal complications.

**Table – 4 General details of the infant**

| General details                              | N   | %    |
|--|-----|------|
| <b>Sex</b>                                   |     |      |
| Male   | 115 | 57.5 |
| Female                                       | 85  | 42.5 |
| <b>Birth order</b>                           |     |      |
| First  | 52  | 26.0 |
| Second                                       | 86  | 43.0 |
| Third  | 50  | 25.0 |
| Fourth                                       | 12  | 6.0  |
| Fifth  |     |      |
| <b>Gap between the baby and last sibling</b> |     |      |
| Not applicable                               | 52  | 26.0 |
| Less than 3 years                            | 123 | 61.5 |
| 3 yrs or more                                | 25  | 12.5 |
| <b>Birth weight</b>                          |     |      |
| < 2.5 Kg                                     | 26  | 13.0 |
| 2.5 Kg                                       | 28  | 14.0 |
| > 2.5 Kg                                     | 146 | 73.0 |

About 57.5 percent of the infants were males and 42.5 percent were females. Forty three percent of the infants were born second and only 25 percent of the infants were fourth born. There was a gap of less than 3 years among 61.5 percent of the infants. About three fourth of the infants were having birth weight of more than 2.5 kg.

**Table – 5 Illness of the Infant**

| Illness of the Infant                                   | N   | %    |
|---|-----|------|
| <b>Illness suffered by the infant</b>                   |     |      |
| Diarrhoea   | 126 | 63.0 |
| Respiratory tract infection                             | 157 | 78.5 |
| PUO   | 82  | 41.0 |
| <b>Frequency of illness</b>                             |     |      |
| Once in a week  | 6   | 3.0  |
| Once in a fortnight                                     | 56  | 28.0 |
| Once in a month   | 138 | 69.0 |
| <b>When baby falls sick, first health care provider</b> |     |      |
| Private Doctor  | 134 | 67.0 |
| Government Doctor                                       | 30  | 15.0 |
| Buying medicines across the counter                     | 31  | 15.5 |
| Going to the Mosque                                     | 5   | 2.5  |
| Any other   | 10  | 5.0  |

About 78.5 percent of the infants had suffered from respiratory tract infection. Only three percent of the infants had some illness once a week but about 69 percent of the infants had illness only once a month. More than half of the infants were attended by the private doctors when they fall sick. Only 15 percent of them go to the Government doctors and equal percentage of them buy medicines across the counter when the child falls sick.

**Table – 6 Initiation of breast-feeding**

| Breast feeding                           | N   | %    |
|--|-----|------|
| <b>Colostrum given to the baby</b>       |     |      |
| Yes                                      | 173 | 86.5 |
| No                                       | 27  | 13.5 |
| <b>Anything given before breast milk</b> |     |      |
| Yes                                      | 153 | 76.5 |
| No                                       | 47  | 23.5 |
| <b>If given, other food</b>              |     |      |
| Glucose (sugar) water                    | 32  | 16.0 |
| Water                                    | 72  | 36.0 |
| Honey                                    | 16  | 8.0  |
| Others                                   | 33  | 16.5 |
| <b>Initiation of breast feeding</b>      |     |      |
| First day                                | 138 | 69.0 |
| Within 3 days                            | 25  | 12.5 |
| After 3 days                             | 47  | 23.5 |
| <b>Reasons for breast feeding</b>        |     |      |
| More nutritious                          | 153 | 76.5 |
| Cheaper                                  | 198 | 99.0 |
| Convenience                              | 185 | 92.5 |
| Better for mother                        | 52  | 26.0 |
| Any other                                | 50  | 25.0 |
| <b>Frequency of feeding</b>              |     |      |
| Demand                                   | 156 | 78.0 |
| Timely routine                           | 172 | 86.0 |
| <b>More feeding</b>                      |     |      |
| During day time                          | 174 | 87.0 |
| At night                                 | 26  | 13.0 |

Most of the infants were given colostrum. Things like glucose water, honey and water was given to the infants before breast feeding. Sixty nine percent of the mothers breastfed the child on the first day. The reasons cited for breast feeding by the mothers were that it is cheaper (99%), convenient (92.5%) more nutritious (76.5%) and better for the mother (26%).

**Table – 7** Details regarding breast-feeding of the infant

| Breast-feeding                                 | N   | %    |
|--|-----|------|
| <b>Sufficiency of milk</b>                     |     |      |
| Yes  | 112 | 56.0 |
| No   | 88  | 44.0 |
| <b>Initiation of breast feeding</b>            |     |      |
| Mother/Mother's relatives                      | 42  | 21.0 |
| Mother in law/ in law's relatives              | 35  | 17.5 |
| Doctor   | 16  | 8.0  |
| Nurse  | 95  | 47.5 |
| Self initiated                                 | 12  | 6.0  |
| <b>Difficulty in breast feeding</b>            |     |      |
| Not applicable                                 | 195 | 97.5 |
| Flattened/Inverted nipples                     | 5   | 2.5  |
| <b>Continuing to breast feed the Baby</b>      |     |      |
| Yes  | 143 | 71.5 |
| No   | 57  | 28.5 |
| <b>If, no, time of stopping breast feeding</b> |     |      |
| Not applicable                                 | 143 | 71.5 |
| Within 3 months                                | 5   | 2.5  |
| 4-6 months                                     | 15  | 7.5  |
| 7-9 months                                     | 7   | 3.5  |

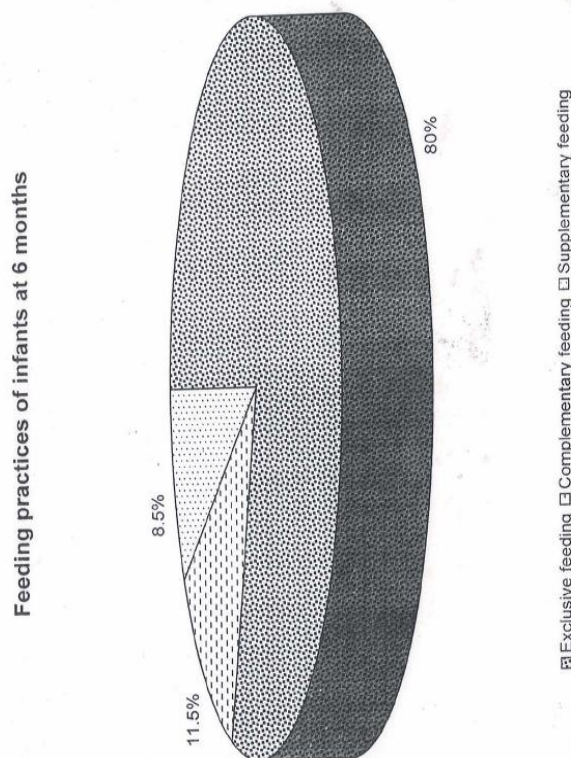
About half of the mothers expressed that the breast milk was sufficient for the baby. It is found that for about 47.5 percent of the mothers, the nurses initiated the breastfeeding. Very few of the mothers had problem in the breast.

About three fourth of the mothers (71.5 %) were breast feeding the infant between 9 and 12 months.

**Table 8** Feeding practices of infants at 6 months

| Type of feeding       | N   | %    |
|-----------------------|-----|------|
| Exclusive feeding     | 160 | 80.0 |
| Complementary feeding | 23  | 11.5 |
| Supplementary feeding | 17  | 8.5  |

About 72 percent of the infants were breastfed at 6 months. Complementary feeding and supplementary feeding was given to 16 percent and 12 percent of the infants respectively.



**Table – 9** Details regarding complementary feeding of infants

| Complementary feeding                      | N   | %    |
|--|-----|------|
| <b>Initiation of complementary feeding</b> |     |      |
| Within 3 months                            | 13  | 6.5  |
| 4-6 months                                 | 23  | 11.5 |
| After 6 months                             | 164 | 82.0 |
| <b>Frequency of complementary feeding</b>  |     |      |
| Once or twice                              | 34  | 17.0 |
| 3-4 times                                  | 112 | 56.0 |
| More than 4 times                          | 54  | 27.0 |
| <b>Preference of weaning foods</b>         |     |      |
| Home made                                  | 178 | 89.0 |
| Commercial                                 | 22  | 11.0 |

It is noted that 82 percent of the mothers have started complementary feeding after 6 months of age of infants. It is expressed by 56 percent of the infants are fed 3 to 4 times per day. Most of the mothers prefer giving home made foods compared to the commercial foods.



**Table – 10** Details regarding supplementary feeding

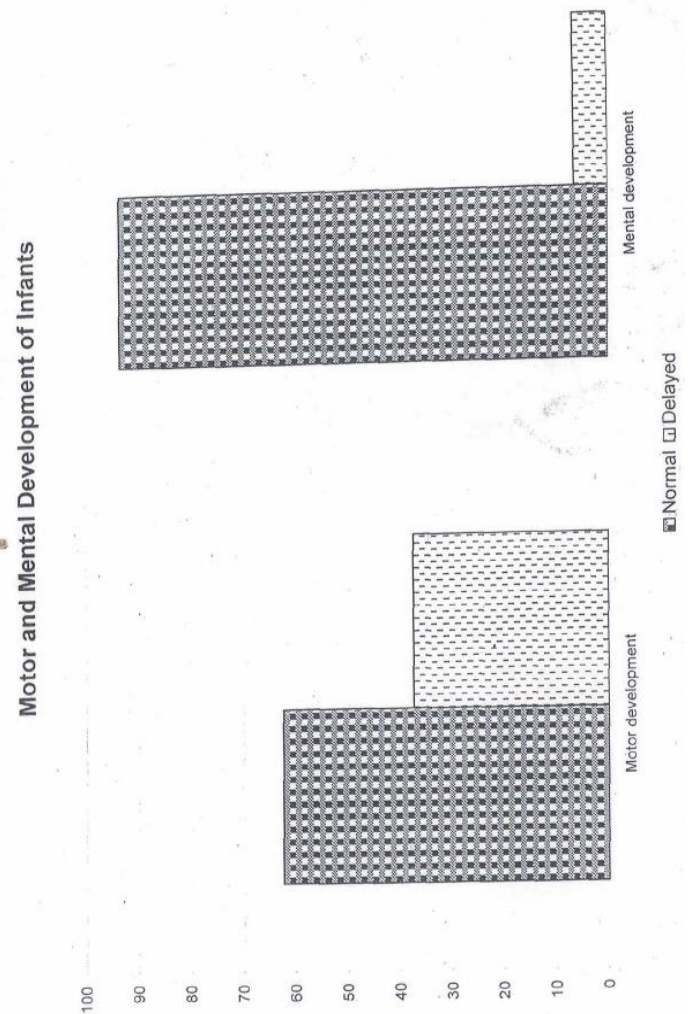
| Supplementary feeding                      | N   | %    |
|--|-----|------|
| <b>Started supplementary feeding</b>       |     |      |
| NA   | 143 | 71.5 |
| Within 3 months                            | -   | -    |
| 4-6 months                                 | 7   | 3.5  |
| 7-9 months                                 | 10  | 5.0  |
| <b>Reasons for stopping breast feeding</b> |     |      |
| Problem with the breast                    | 5   | 29.4 |
| Problem with the baby                      | 1   | 5.9  |
| Returning to work                          | 11  | 64.7 |
| Fatigue                                    | -   | -    |
| Others                                     | -   | -    |
| <b>Infant formula</b>                      |     |      |
| Amul                                       | 5   | 29.4 |
| Lactogen                                   | 12  | 70.6 |
| Any other                                  | -   | -    |
| <b>Other milk</b>                          |     |      |
| Cow's milk                                 | 15  | 88.2 |
| Buffalo's milk                             | 2   | 11.8 |

About 8.5 percent of the infants have been started with supplementary feeding. Among the 17 infants who have started on supplementary feeding, 10 infants started only between 7 and 9 months. Nearly half of them have stopped breast feeding to resume to job. Infant formulae like Amul, Lactogen were given to infants. Majority of the infants were fed on cow's milk.

**Table 11** Motor and Mental Development of Infants

| Development Quotient | Motor |      | Mental |      |
|----------------------|-------|------|--------|------|
|                      | N     | %    | N      | %    |
| Normal (Above 85)    | 125   | 62.5 | 187    | 93.5 |
| Delayed (Below 85)   | 75    | 37.5 | 13     | 6.5  |

The results indicate that about 37.5 percent of the infants had delayed motor development while 6.5 percent of the infants had delayed mental development.



**Table 12** Effect of feeding practices on motor development of infants at 6 months

| Motor Development Quotient | Type of feeding |      |               |      |               |      | Chi-square value        |
|----------------------------|-----------------|------|---------------|------|---------------|------|-------------------------|
|                            | Exclusive       |      | Complementary |      | Supplementary |      |                         |
|                            | N               | %    | N             | %    | N             | %    |                         |
| Normal (Above 85)          | 105             | 65.6 | 15            | 65.2 | 5             | 29.4 | 8.680<br><i>p</i> <0.01 |
| Delayed (Below 85)         | 55              | 34.4 | 8             | 34.8 | 12            | 70.6 |                         |

It is observed from the cross tabulation between breast feeding practices and development of the infants, infants on complementary feeding have quick motor development compared to that of supplementary feeding. Exclusive breastfed infants have normal motor development compared to that of the I supplementary and complementary fed infants at 6 months. Significant , associations

was observed between the type of feeding and motor development at 0.01 level.

**Table 13** Effect of feeding practices on mental development of infants at 6 months

| Mental Development Quotient | Type of feeding |      |               |    |               |      | Chi-square value |
|-----------------------------|-----------------|------|---------------|----|---------------|------|------------------|
|                             | Exclusive       |      | Complementary |    | Supplementary |      |                  |
|                             | N               | %    | N             | %  | N             | %    |                  |
| Normal (Above 85)           | 153             | 95.6 | 20            | 87 | 14            | 82.4 | 6.285<br>p<0.05  |
| Delayed (Below 85)          | 7               | 4.4  | 3             | 13 | 3             | 17.6 |                  |

The above cross tabulation shows that exclusively breastfed infants have the mental development at a normal pace compared to the other infants. Chi square test has proved that there is a significant association between the type of feeding and mental development of the infants at  $p < 0.05$  level.

### Discussion

Duration of exclusive breast feeding was less as supplementary feeding starts by three months by most of the mothers. But, Ward et al. (2004)<sup>18</sup> has reported that exclusive breast feeding was high among his study group and led to better development the infants. Srivastava et al. (1994)<sup>37</sup>, in their study on breastfeeding patterns in newborn reported that 98 per cent mother were breastfeeding, 88 per cent mothers used prelacteal feeds of one sort or other.. In another study by Ghosh (1995)<sup>38</sup> it is reported that 73 per cent of urban mothers used bottle to feed, where as in rural area the percentage is much lower. Kapil et al. (1994)<sup>39</sup>, found it to be only 9 per cent. Though not bottle fed, a large number of infants consume supplementary food with the help of katori/spoon. Vast majority of infants both urban and rural consume fresh animal milk' with usual life threatening consequences (Ghosh, 1995)<sup>38</sup>.

In a study by Priti and Nidhi (1995)<sup>40</sup>, in Jhabua district in Madhya Pradesh on feeding practices of neonates, only 18 per cent mother breast fed their children immediately after birth, nearly 21 per

cent fed on the 3<sup>rd</sup> day. In between they did not give anything or gave a mixture of 'gud and water' or honey to the newborn child. 54 per cent reported that they breast fed on the 4<sup>th</sup> day. 77 per cent of the mothers did not give colostrum to the babies, because of the belief that colostrum is not good for the baby and is not easily digestible.

In a study by Kaur (1996)<sup>41</sup> in a district in Varaiasi on duration of breastfeeding, it was reported that breastfeeding was continued upto 2 years in 12, 36 and 46 per cent of urban, urban-slum and rural women respectively. It was also concluded that there was a low rate of exclusive breastfeeding among all sections of the community, especially in urban women.

The results of the present study explain that infants on supplementary breast feeding have better mental and motor development. Similar to it, Black et al. (2004)<sup>1</sup> the beneficial effects of weekly iron and zinc supplementation on motor development and orientation-engagement.

It is understood from the results that low birth weight infants have delayed motor development. In line with this, Losch and Dammann (2004)<sup>10</sup> that there is an impact of motor skills on individual test performance among verylow- birth weight children of kindergarten age. Lima et al. (2004)<sup>11</sup> identified that significant biological factors associated with mental development were birthweight and infant sex. For motor development, the biological factors were weight-for-age and haemoglobin concentration.

The results of the study by Heywood et al. (1991)<sup>14</sup> are in line with the present study showing a significant association between the feeding practice's and motor development. Complementary fed infants had lower results on the mental scale compared to supplementary fed infants. Temboury et al. (1994)<sup>15</sup> showed that poor mental development were associated with bottle-fed infants, elementary education of the mother and having siblings.

It is understood that breast milk promotes growth and mental development of the infants. It contains amino acids specific for brain development. It is



rich in sulphur containing aminoacids. Cysteine : methionine ratio is high which is essential for CNS development. Breast milk is a rich source of hormones and growth factors like Thyroid stimulating hormone (TSH), Thyroxine, Growth hormone releasing factor, and many. Exclusive breast feeding infants have shown higher IQ and better cognitive and motor abilities.

### Summary and Conclusion

The period of infancy is characterized by a very rapid of physical and mental growth. This early stage of development is of substantial interest because of the dramatic developmental changes that take place in human beings in this, short period of time. The nutritional status of an infant is the end result of many, factors, which influence his her growth and development. The growth and development of an infant is influenced by many factors. The different factors are 88 infant's nutritional requirement, birth weight, and maternal nutritional status during pregnancy and lactation (factors influencing the maternal nutritional status) and feeding practices. Therefore, the study attempts to find the feeding pattern and its influence on the motor and mental development of the infants.

The summary of the findings is presented below.

- 26.5 percent of the mothers were in the age group of 25 to 29 years. 73 percent of the mothers were married after 19 years of age. Majority of the selected mothers were married with the spouse alive. Forty one percent of them had completed higher secondary level.
- Majority of the mothers did not plan their conception.
- 82 percent of them preferred male child.
- Most of the mothers. had the knowledge of family planning.
- Nearly half of them have terminated pregnancy at any time before this baby.
- Nearly three fourth of the selected mothers have attended prenatal care

- Majority of the mothers had illness during pregnancy. About 24 percent of the mothers had postnatal complications.
- 57.5 percent of the infants were males and 42.5 percent were females.
- 25 percent of the infants were fourth born.
- About three fourth of the infants were having birth weight of more than 2.5kg.
- About 78.5 percent of the infants had suffered from respiratory tract infection.
- More than half of the infants were attended by the private doctors when they fall sick.
- Most of the infants were given colostrums.
- Sixty nine percent of the mothers breastfed the child oh the first day.
- The reasons cited for breast feeding by the mothers were that it is cheaper (99%), convenient (92.5%), more nutritious (76.5%) and better for the mother (26%).
- About three fourth of the mothers (71.5 %) were breast feeding the infant between 9 and 12 months.
- 72 percent of the infants were breastfed at 6 months.
- Complementary and supplementary feeding was given to 16 percent and 12 percent of the infants respectively.
- 82 percent of the mothers have started complementary feeding after 6months of age of infants.
- 56 percent of the infants are fed 3 to 4 times per day.
- About 8.5 percent of the infants have been started with supplementary feeding. Among the 17 infants who have started on supplementary feeding. 10 infants started only between 7 and 9 months.
- 37.5 percent of the infants had delayed motor development while 6.5 percent of the infants had delayed mental development. Significant association exists between the birth weight of the infants and their motor development and mental development.

- Exclusive breastfed infants have normal motor development compared to that of the supplementary and complementary fed infants. Significant association was observed between the type of feeding and motor and mental development.
- Exclusively breastfed infants have the mental development at a normal pace compared to the other infants.

### Conclusion

As per the policy proposed by the Breast feeding Initiative programmes, the results of this study exhibits the fact that exclusive breast feeding has a significant effect on the mental and motor development of the infants. Optimal growth and development of the infants are determined by many factors which is mainly the child care measures in terms of feeding, postnatal hospital visits, proper immunization practices, health and hygiene of the child. The outcome of the present study also emphasizes on the fact that proper feeding practices improves and maintains overall growth and development of the child.

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