



## ASSOCIATION OF CHILD TEMPERAMENT WITH FEEDING PRACTICES

## Dental Science

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## ABSTRACT

Psychological variable like child temperament may influence feeding patterns, but less is explored and known about this aspect. Present study evaluates the association between child temperament and feeding patterns. The Study is a cross sectional survey of 1300 school children aged 3-6 yrs from Moradabad City. Questionnaire were distributed to the mothers of school children and they were instructed to fill the questionnaire and return back the next day. Child temperament was assessed on the basis of five factors; namely, Sociability, Emotionality, Energy level, Attentivity and Rhythmicity using Malhotra Temperament Schedule MTS. A total of 1,053 parents (81%) responded to questionnaire and were retained for analysis. The correlation of feeding patterns studied with each parameter of temperament. Of the five Temperament factors energy score and rhythmicity was significantly associated with feeding patterns. No Correlation could be established with Sociability, emotionality and attentivity. To conclude, the children who were breast fed ever were found to be less sociable, less emotional, and less energetic, had fleeting attention and poor biological rhythms as compared to their counterparts.

## KEYWORDS

Child Temperament, Emotionality, Sociability, Breast Feeding, Malhotra Temperament Schedule

## INTRODUCTION

Adequate growth, good health and normal development of a child can be ensured by providing required nutrition during early years of childhood especially infancy.<sup>1</sup> Breast feeding provides one such complete means of nutrition for an infant. It is considered best source of nutrition for an infant and is beneficial for the mother as well as the child.<sup>2</sup>

Mothers worldwide have always breast-fed their babies. Apart from being the healthiest, it is also the safest and inexpensive means to be provided for the infant's survival. Huge amount of antibodies and variety of nutrients like proteins, lipids, vitamins, and minerals are found in the breast milk which protects the infant from various diseases, infections, allergies and childhood obesity.<sup>3</sup> Breastfeeding is also associated with better cognitive development.<sup>4,5</sup>

The World Health Organization (WHO) recommends that infants be exclusively breastfed for the first six months, followed by breastfeeding along with complementary foods for up to two years of age or beyond.<sup>6</sup>

In the recent years it has been found that the practice of breast feeding have been tremendously reduced. Large population of mother is either not able to initiate breast feeding or cease the practice at an early age. There are certain factors which play an important role in discouraging the practice of breast feeding, these factors have gained little attention over the years. The incidence and duration of breastfeeding may depend on a complex mosaic of physical, behavioural, social and economic factors.<sup>7,8,9</sup>

By modifying and altering the child temperament it is possible to alter parental risk factors responsible for discouraging the breast feeding practice.

Temperament can be defined as a child's innate personality or behavioural style which is biologically based, relatively stable patterns of emotional behavior.

Temperament is composed of a number of traits or dimensions including fear, positive and negative affect, sadness, distress to limitations (crying and fussing) and activity level. Infant temperament refers to biologically rooted differences in behavior believed to be present early in life and relatively stable across time but it is also found to be modifiable by environmental influences.<sup>10,11</sup>

Thus the present study was designed to find an association between temperament and feeding patterns in preschoolers.

## MATERIALS AND METHODS

This study was conducted to assess the association of child temperament with feeding practices in preschool children of Moradabad city, India.

## 1. STUDY DESIGN:

i. **Type of study:** Study is designed to be a cross-sectional survey to assess the temperament and its correlation with feeding patterns of three to six years children in educational set up.

ii. **Sample Size:** Sample size was estimated at 1,300 to give a precision of 3% at 95% confidence interval.

## 2. Tools for assessment of temperament:

In the present study temperament was assessed on the basis of these five variables.

**Factor 1 (Sociability):** Comprises of three variables, i.e., approach withdrawal, adaptability and threshold of responsiveness. Mean score of these three variables are summed to give the sociability score. The range of possible score is 3-15. High scores on this indicate that the child is quite responsive to the environment, adjustable, adaptable and uninhibited.<sup>12</sup>

The variable adaptability measures that how easy or difficult it is to alter a child's behaviour. A very adaptive child will respond directly to parent's instructions even if it is against the child's own inclinations, whereas a poorly adapting child does not modify his or her behaviour despite frequent attempts at intervention by a parent.

ii. **Factor 2 (Emotionality):** This is constituted by two variables i.e. mood and persistence. Sum total of the mean scores of these two variables gives the emotionality score. The possible range of score is 2-10. High emotionality score indicates generally positive, happy mood and vice versa.

iii. **Factor 3 (Energy):** There are two temperament variables activity and intensity, which constitute this factor. High score means more physical as well as psychological energy exhibited in the child's behaviour and vice versa. Range of score possible is 2-10.<sup>12</sup>

iv. **Factor 4 (Attentivity):** It comprises of only one temperament variable i.e. distractibility. It basically denotes attention span and has been named as attentivity. High scores indicate fleeting attention and high distractibility. Range of scores is 1-5.<sup>12</sup>

v. **Factor -5 – (Rhythmicity):** Rhythmicity has been designated as such and retained as the fifth independent factor. The possible range of scores is 1-5. High scores indicate regular and predictable biological functions and low score mean irregularity.<sup>12</sup>

Temperament measurement schedule was used to assess the child temperament in the present study (Malhotra and Malhotra 1988) which is an Indian adaptation of Thomas and Chess's parent temperament questionnaire and measures nine temperament variables described by Thomas and Chess (1968) through 5 items each, enquiring about the behaviour of the child in routine life situations.<sup>12</sup>

MTS (Malhotra Temperament Scale) is based on situations that are applicable to Indian setting, and hence differs from the original parent interview schedule of Thomas, Chess and Birch (1968) Language of original schedule was changed from English to hindi and it was written in Devnagri script (local vernacular language of the area) for the better understanding of the questionnaire as our study population was hindi speaking and also to keep the functional equivalence of the terms. Temperament will be measured on nine variables and out of those five factors were derived (Sociability, Emotionality, Energy Score, Attentivity, Rhythmicity)

Each item is rated on a 5 point scale with considering both the intensity as well as the frequency of occurrence of that particular behaviour. Scores of 1-5 represent the extremes of intensity and frequency of occurrence of that behaviour rated on negative and positive directions. Score of 3 at the midpoint represents average as per the parent's perceptions.<sup>12</sup>

The two earlier studies<sup>10,11</sup> used the Toddler Temperament Scale (TTS) and the Behaviour Style Questionnaire (BSQ) to measure temperament but because of its shorter length the MTS

temperament survey used in the present study may be more user friendly measure (20 items) than the TTS and BSQ (100 items each).

**3. Ethical Clearance and Study Approval:** The study was reviewed and cleared by the ethical committee of Kothiwal Dental College and Research Center Moradabad Permission to conduct the survey in selected schools of Moradabad was obtained from the respective school authority.

#### 4. Organization of survey

i. **Schedule of the survey:** The study was scheduled over a period of one year from March 2008 to April 2009.

ii **METHOD OF OBTAINING DATA:** Out of the list of several school of the Moradabad city identified, ten schools were randomly selected to make the sample of 1300 children aged 3 - 6 years attending preschool and their parents were included in the study. Malhotra temperament schedule MTS was used for collecting the required and relevant information on child temperament. On the first day children were asked to take the questionnaire to their houses and parents were requested to fill these questionnaires. Distributed questionnaires were collected back on the next day.

**RESULTS-PARENTS** of 1,300 children were examined for child Temperaments and feeding patterns by providing with study questionnaire and requested to complete the same. A total of 1,053 parents (81%) responded to questionnaire and were retained for analysis. The correlation of feeding patterns studied with each parameter of temperament.

**TABLE 1- Temperament With Breast Feeding**

ITEM	SOCIABILITY		EMOTIONALITY		ENERGY		ATTENTIVITY		RHTHMICITY	
	Mean±SD	p value	Mean±SD	p value	Mean±SD	p value	Mean±SD	p value	Mean±SD	p value
<b>Breastfed ever</b>										
YES	10.05±1.32	0.907	6.97±1.21	0.232	7.23±1.46	<b>0.037*</b>	3.61±0.84	0.745	3.33±1.17	<b>0.005*</b>
NO	10.08±1.27		7.07±1.09		7.34±1.64		3.59±0.85		3.59±0.85	
<b>Breastfeeding while sleeping</b>										
Yes	10.04±1.28	0.908	7.04±1.07	0.083	7.33±1.39	<b>0.000*</b>	3.64±0.84	0.068	3.26±1.17	0.635
No	10.07±1.33		7.07±1.16		7.17±1.59		3.58±0.84		3.38±1.20	
<b>Period up to which breastfed</b>										
1 year	10.07±1.33	0.742	7.09±1.09	0.379	7.21±1.52	0.444	3.60±0.84	0.688	3.44±1.22	<b>0.006*</b>
> 1 year	10.04±1.29		7.03±1.13		7.28±1.48		3.62±0.84		3.23±1.16	

**Sociability:** Children who breastfed ever were found to be less social (10.05) as compared to non-breastfed group (10.08). Those who were breastfed throughout night had low (10.04) sociability scores than those who were not (10.07).

Regarding the period upto which breastfed it was found that the children who were breast fed upto 1 yr (10.07) had high scores than those who were breastfed for more than a year (10.08). Overall result for sociability was not found to be statistically significant in either of aspect. [Table-1].

**Emotionality:** Breastfed Children had an emotionality score of (6.97) compared to (7.07) in non-breastfed children. Those who were breastfed while sleeping or throughout night had low emotionality scores (7.04) than those who were not (7.07).

Regarding the period upto which breastfed it was found that the children who were breast fed upto 1 yr (7.13) had high scores than those who were breastfed for more than a year (7.09). Overall no statistically significant correlation observed between breastfeeding and emotionality. However the mean values of emotionality were lower in breastfed children indicating that the breastfed children had negative mood and irritable behaviour [Table-1].

**Energy Score:** Breastfed Children showed statistically significant correlation with overall energy levels (p=), Energy scores were lower

(7.23 in breastfed children and 7.34 in non-breastfed) with a p value of 0.037, statistically significant (p=0.000) correlation was observed in children who breastfed while sleeping or throughout night indicating these children been less energetic as compared to their counterparts [Table-1]. Though the duration of breastfeeding did not show any correlation between the two groups.

**Attentivity (Fleeting attention): breastfed** Children were found to have higher attentivity score (3.61) as compared to non breastfed children (3.59) indicating fleeting attention and easily more distractible nature as compared to non breastfed group [Table-1].

Regarding the period upto which breastfed it was found that the children who were breast fed upto 1 yr (3.60) had high scores than those who were breastfed for more than a year (3.62). The score has statistically non significant correlation for mood change ability to console, response when engaged in some interesting task, and promptness to response components of attentivity.

**Rhythmicity Score:** Subjects who breastfed had statistically significant (p=0.005) fewer score in rhythmicity (3.33) as compared to other group (3.59) indicating irregular, unpredictable biological functions in breastfed children. The score has statistically significant values for appetite, amount of food intake, sleep, and bowel movement. This indicates that breastfed children were irregular in their biological functions as compared to non breastfed group.

Statistically significant ( $p=0.006$ ) correlation was observed in regard to feeding duration of children. [Table-1].

## DISCUSSION

In the present study children who were breast fed ever were found to be less sociable, less emotional, less energetic, had fleeting attention and possessed poor biological rhythms.

This means that the study population was less adaptable, did not show initiative in approaching and had poor social interaction. They also showed poor response to new stimulus with difficulty in modifying this response in desired direction, preferred to be alone than in company, had intense and persistent negative mood, exhibited low energy levels with very little movement, had fleeting attention which shifts rapidly on exposure to external stimulus and showed unpredictability in time of functions such as hunger and elimination.

In a similar study results showed that among the characteristics of behavioural style like activity, rhythmicity, approachability and mood, parents consistently rated difficult children as having low approachability and rhythmicity, and high activity and negative mood.<sup>13,14</sup>

Malhotra S & Kaur RP (1997) et al did a comparative study of temperament & psychopathology in children born to mentally sick parents (psychotic & neurotic). Results showed that children of psychotic as well as neurotic parents had low sociability i.e. were withdrawing and less adaptable: lower emotionality (persistently negative mood); lower energy i.e. less activity and less intensity of emotions: low distractibility and less regular biological rhythm.<sup>15,16</sup>

In the present study low sociability of breastfed children is attributed to the children's closeness to their mother at an early age, as the breastfed children spent maximum time with their mother owing to their nutritional needs and the same reflected in their behaviour at a later stage of life.

In a qualitative study, Bai, Middlestadt, Peng and Fly (2009) found that women placed high value on the emotional and health benefits of breastfeeding for 6 months relating it to the strong bond between mother-child and improved mother-child health.<sup>17</sup>

Phuphaibul (2012) in his study revealed overprotection style during the first 6 months of life, followed by the reasoning style. Though, during the infancy years the parenting styles were found to be random and highly variable, which includes overprotection on one side and neglectful styles on the other.

A study examined the mothering behaviours of 12 teens who breastfed and found that breastfeeding teen mothers held their infants closer even when they were not breastfeeding. (Lawrence, McAnarney & Aten, 1988)<sup>18,19</sup>

Roy PM, Joseph W and Jean B (2002) designed an investigation to clarify the literature on gender differences in temperament. It was found that girls were less socially desirable than boys. Boys had higher activity level and non adaptability and as far as threshold level was concerned girls were rated as more sensitive. Though in the present study gender differences were not evaluated.<sup>20</sup>

Emotional bond between the mother and the child during infancy years is supported and reinforced by breast feeding. Present study results revealed that breastfed children had low levels of emotionality and showed discontented and irritable behavior. This can be explained by the fact that child demanded similar closeness with the mother even after cessation of breast feeding and showed irritability when it was not fulfilled. The feeding method is associated with both the child's temperament and the mother's perception of herself and the child.

Blandine de Lauzon et al found that infants who were breastfed were rated by their mothers as having overall more challenging temperaments, they were reported to show greater distress, lower emotional stability, laughing and vocalization as compared to formula fed infants. Similar observations were found in the present study.

However, some previous studies among three-month-old infants found no associations between breastfeeding and infant temperament.<sup>21,22</sup>

No correlation was observed with respect to emotionality among breast fed children irritable behaviour as compared to their counterparts. Previous studies comparing infant temperament between breastfed and formula-fed infants have shown mixed results in breastfed newborns compared to formula-fed newborns. With this in mind, it is not surprising that more challenging temperaments were seen in breastfed infants in our study.

The temperament of the infant may influence the frequency of feeding. This temperament pattern may act as an adaptation for survival in infant who fuses and cries in order to elicit more frequent responses by its caregiver and indirectly driving the overfeeding response.<sup>23</sup>

Carey found that the subset of infants in his practice that had gained the most weight from 6- to 12-months had been rated as more difficult by their mothers at 6-7 months.

Another important aspect which may be related to child behavioural characteristics was studied by Darlington and Wright (2006), they reported that temperamental "distress to limitations" was related to fast weight gain (top 20% of expected weight per gender) from birth to 8 weeks. However, feeding method, duration, or frequency of feeds did not show significant relationship with the temperament dimensions they assessed. It was suggested that difficult infants might be fed more often to quieten them.<sup>24</sup>

Barr et al 1989 looked at temperament and feeding as determinants of early fussing and crying, but found no significant associations.<sup>25</sup>

Energy expenditure in a child increases with the increase in motor activities. In the present study more physical and physiological energy was exhibited by breastfed children and the difference was statistically significant. These findings suggest that children express their distressed behaviour through crying and fussing which expend energy. This behavioural style may affect both sides of the energy balance equation, which in turn necessitates to evaluate the infant temperamental parameters. Because temperament develops from birth and shows continuity over time, it may have an important role in the development of subsequent behaviour relating to both feeding and physical activity patterns.<sup>26</sup>

Present study revealed that breast fed children were highly distractible and had fleeting attention. High distractibility in breast fed children could be explained by the fact that children with lack of self regulation have problems in calming themselves when stressed and entertaining themselves when bored.

Statistically Significant difference was observed in rhythmicity among breast fed and non breast fed infants, breast fed infants showed poor biological functions.

A recent article showed that attention and preservice were weaker in breastfed children. Feeding done in order to soothe their externalizing behavior may disrupt their self regulation of food intake and thus interfere with regular biological functions.

Examination of associations among temperament and sleep measures of 67 children between 2.4—5.6 years of age by Hayes MJ et al (2001) revealed that bedsharers have less regular bedtimes; difficulty with sleep onset; more night-waking; and seek out the parents following awakening during the night. Temperamentally, bedsharers were found to be more intense and exhibit less adaptability and rhythmicity.<sup>27</sup>

**Duration of breast feeding** - In the present study it was found that infants who were breast fed for more than a year were less social, less emotional, more energetic more attentive and had poor biological functions. This implies that they preferred to be more with their mother, perceived to have easy emotional behaviour, had high energy levels, were more attentive but lacked in regular biological functions. We hypothesise that longer Breastfeeding duration increases relative closeness of the child to mother as compared to other family members. Child's social and environmental interactions tend to decrease and thus their adaptability and approachability.

Crying and irritability are predicted to act more as an honest signal of nutritional need during earlier than later infancy, and this could explain the lack of difference in temperament between older breastfed infants at age six to twelve months old.<sup>28</sup>

On the contrary a study evaluated by the Infant Characteristics Questionnaire developed by Bates et al.<sup>29</sup> suggested that longer breastfeeding duration seemed to be associated with easier perceived infant temperaments and is found to be associated with reported 'easy' temperament.<sup>30</sup>

Niegel et al. evaluated children from birth to 18 months and found that children who were exclusively breastfed showed fussy/difficult temperament only at age 6 months. Thus, he concluded that even though breastfed children showed difficult temperament but breastfeeding can be continued till later ages if it is supported by weaning post 6 months.<sup>31</sup>

According to the findings of present study that breastfed infants are more irritable than formula-fed neonates it can be concluded that higher level of signalling is required to obtain a given amount of milk which results in annoyance.<sup>32</sup>

This difference in irritability suggests that the initiation of breastfeeding could be stressful to some mothers and infants. It is possible that continuing difficult temperament in some breastfed infants may contribute to the steady decline in breastfeeding prevalence with increasing infant age.<sup>33,34</sup>

Infants who were breastfed or mixed-fed at three months of age were rated by their mothers as having overall more challenging temperaments, with lower scores for surgency/extraversion and orienting/regulation, and higher scores for negative affectivity compared to formula-fed infants and showed consistent differences between these groups across many of the subscales that contribute to the main infant temperament dimensions. To elaborate, breastfed infants showed higher levels of distress, were less pleasing and did not vocalise when compared to formula-fed infants. They were difficult to calm down while experiencing distress or excitement, and more difficult to soothe by caregivers.<sup>35,36</sup>

High energy levels may be because of high amount of essential natural minerals and nutrients provided by breast milk, which formula milk lacks.

Poor or irregular biological functions of these infants can be due to the delay in introduction of solid food or delayed initiation of weaning because of prolonged breast feeding.

## CONCLUSION-

Study found that Energy score and Rhythmicity to be significantly associated with feeding patterns. No Correlation could be established with Sociability, Emotionality and Attentivity.

It can be concluded that the children who were breast fed ever were less sociable, less emotional, and less energetic, had fleeting attention and poor biological rhythms as compared to their counterparts.

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