



## Consumption of “Stressed milk” resulting in “Stressful child”

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### Abstract

Various factors lead to stress in human beings which have a physical component and psychological component. These factors can be from the environment or from within the body. We propose a hypothesis that there is a third element where the stress factors can be transmitted from stressed lactating mother to their babies through breast milk. The babies thus exposed to high levels of stress hormones viz., cortisol display symptoms of stress. Chronic exposure to such abnormal levels of cortisol also lead to defective brain growth and the whole body overreacts to normal levels of stress hormones later in their life.

### Keywords

*Breast feeding, Cortisol, Infant, Development*

### Introduction

Stress is the consequence of the failure of human being to respond to emotional and physical threats. Stress is seen in all age groups right from infant to an elderly individual. The autonomic nervous system provides the rapid response to stress commonly known as the fight-or-flight response, which involves the sympathetic nervous system and withdrawing the parasympathetic nervous system. Thereby enacting physiological changes in cardiovascular, respiratory, gastrointestinal, renal, and

endocrine systems. Stress results in release of adrenocorticotrophic hormone (ACTH) from the pituitary into the bloodstream, which results in secretion of cortisol and other glucocorticoids from the adrenal cortex. Steroids are involved in the organism's response to stress and the response is finally terminated via feedback mechanism (1). Advantages of breastfeeding include providing nutrition, psychological benefits of maternal-infant bonding, improved gastrointestinal outcomes, reduced risk of allergic conditions, increased immunity and fewer systemic infections and improved psychomotor development (2).

### The *Hypothesis*

Even though breastfeeding continues to offer health benefits during infancy and early childhood, we propose a hypothesis, that a lactating mother who is in stress of various forms like emotional, social and postpartum can transmit the stress factor in the form of excess cortisol hormone through breast milk and affect the child's development.

### *Evaluation of Hypothesis*

Breast milk contains proteins, carbohydrates, fats, vitamins, minerals and antibodies. Up to 6% of the human milk fat contains vaccenic acid and conjugated linoleic acid (3) which contributes for synthesis of cortisol. Infants, who are exposed to maternal stress (4) and poor family attachment (5), are prone for improper maturation of Hypothalamo-Pituitary Adrenal axis (HPA). While many hormones control stress reactions, some having multiple roles, cortisol is probably the most typical of the stress hormones which is produced in stressed lactating mother. During stress, stress hormones are released under control of the HPA axis to help the body to cope up with the stressful situation. This cortisol gets transmitted from mother to the baby in excess of required quantity necessary for normal child's development. In such a situation, the symptoms in the child can be excessive cry, refusing the feeds, disturbed sleep, frequent changing of the nappies.

### *Discussion*

Repeated exposure to "negative" stress causes chronic elevations of cortisol in lactating mothers. Chronically elevated cortisol is transmitted from

stressed lactating mother to the infants through the breast milk. Infants regularly exposed to stress also demonstrate higher cortisol releases and more sustained elevations of cortisol in response to stressful situations (6). The hormonal and functional adjustments that go along with it are shown to be associated with permanent brain changes in infancy that lead to elevated responses to stress throughout life. A brain developed in a stressful environment overreacts to stressful events and controls stress hormones poorly throughout the life. Levels of cortisol and other stress hormones are regularly elevated in these individuals (7). Elevated Cortisol levels can dampen the immune system, defective ossification, damage to hippocampus which can lead to impaired learning in later ages.

### *Conclusion*

Although breast feeding provides the infant with all required nutritive and non-nutritive benefits, nursing mothers and family members should realise that Consumption of "Stressed milk" would result in "Stressful child". This hypothesis requires clinical correlation involving the estimation of Cortisol levels (figure 1), assessment of infant's behavioural, developmental and neurological changes.

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### *Conflict of Interest*

No Conflict of Interest to be declared.

### Overview Box

***First Question: What do we already know about the subject?***

Stress is a part of human life from birth till death. Cortisol hormone is released in response to stress. Breast feeding has been extensively advocated worldwide for healthy development of new-borns

***Second Question: What does your proposed theory add to the current knowledge available, and what benefits does it have?***

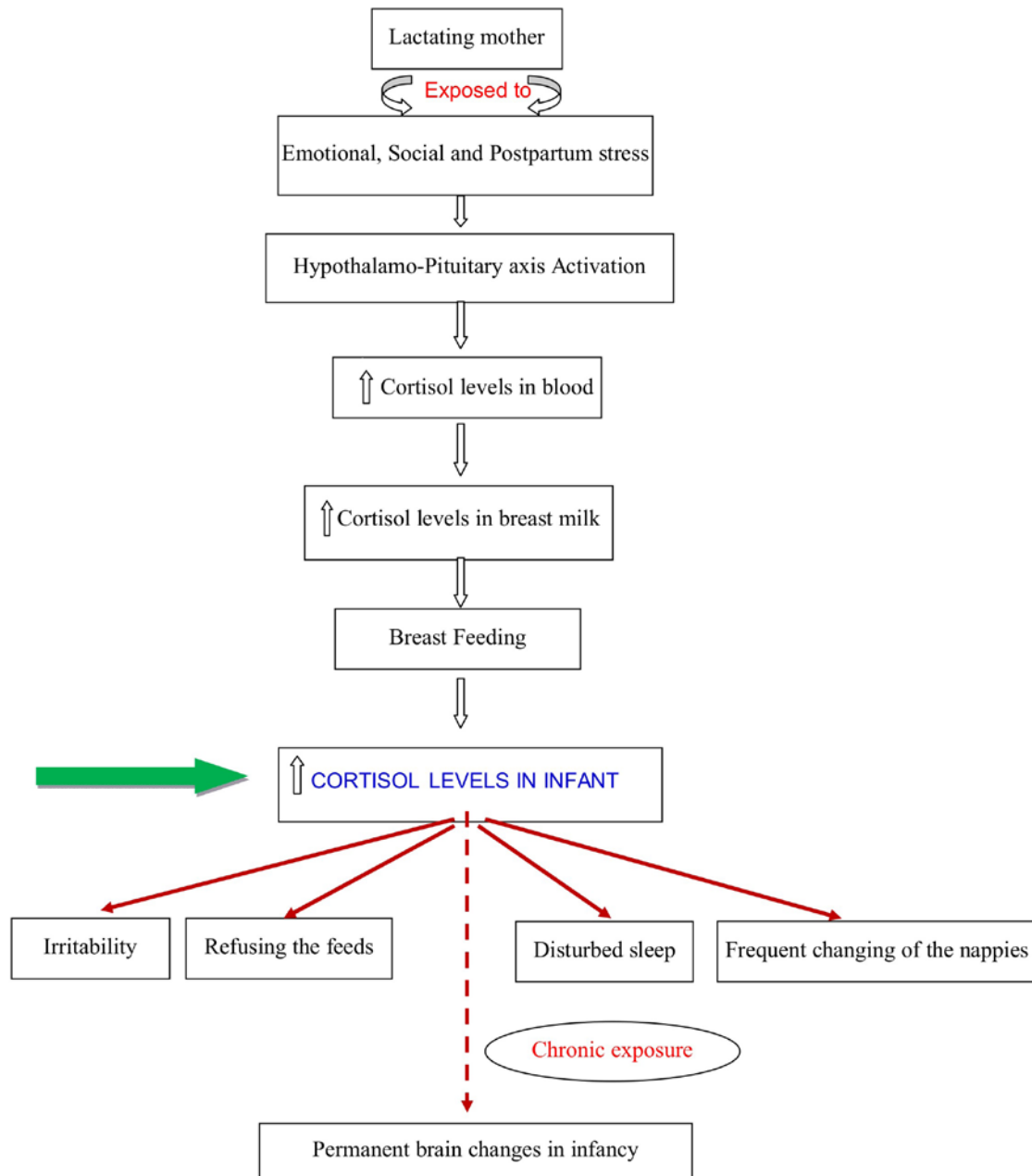
Even though breast feeding offers various benefits, it can have detrimental effects for the development of the child, if lactating mother is exposed to chronic stress.

Health education needs to be given to Health care workers, expectant parents and their family.

***Third question: Among numerous available studies, what special further study is proposed for testing the idea?***

Infant's behaviour and developmental changes correlated with their cortisol levels before and after feeding need to be assessed in such cases. This hypothesis can be evaluated by clinical studies having an adequate sample size eliminating the confounding factors which can alter the cortisol levels.

**Figure1:** Evaluation of the hypothesis can be done at the green arrow shown in this figure.



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