

LACTATION PHYSIOLOGY AND PROBLEMS OF FEEDING MOTHERS

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ABSTRACT

Lactation is a Physiological process during which there is interaction of hormones that directly affects the Breast feeding. During the suckling of the baby anterior lobe of pituitary gland secretes prolactin and the posterior lobe secretes oxytocin. The breast milk is called as “*Piyusha*” which means equal to “*amrutha*”, the liquor of life and western science use the word “colostrum”. It is the infant’s first immunization. Breast-feeding is the right of every child. Breast-feeding is an unequalled way of providing ideal food for the baby’s healthy growth and development and has a unique biological and emotional influence on the health of both the mother and the child as stated by World Health Organization (WHO). Hence the Breast-feeding problems should be corrected for preventing the infectious diseases of infants and reduce the infant mortality rate.

Keywords: Lactation, prolactin, oxytocin, estrogen, pituitary gland, breast milk, infant mortality rate

INTRODUCTION

The Physiology of lactation is a very important process in the motherhood for the growth and development of the baby. The babies with breast feed are less vulnerable to various diseases and prevent the neonatal death. In our *Ayurveda* classics *stanya* is called as the “*Piyusha*” which means “*amrutha*” and also considered as the first immunization. WHO and American Academy of Paediatrics declare that not all mothers are able to breastfeed their infants exclusively at first six months of life¹. So the awareness of mother’s milk is necessary to prevent the problems of breast feeding to avoid neonatal deaths and maintain child health.

OBJECTIVES: To understand the lactation physiology and the problems of feeding mothers.

Physiology of Lactation:

The breasts begin to develop at puberty. Estrogen stimulates the growth of the breasts, mammary gland and deposit of fat to give mass to the breasts. In addition, greater growth occurs during pregnancy and glandular tissue then it becomes completely developed for production of milk².

Role of Estrogen- (Growth of the ductal system) through pregnancy tremendous quantities of estrogens

secreted by the placenta cause the ductal system of the breasts to grow and branch.

Role of Progesterone – Development of breasts into milk-secreting organs also requires progesterone. Once the ductal system has developed, progesterone acting synergistically especially with oestrogen but also with all the other hormones just mentioned, causes additional growth of the lobules, budding of alveoli and development of secretory characteristics in the cells of the alveoli. These changes are analogous to secretory effects of progesterone on the endometrium of the uterus during the latter half of the Female Menstrual cycle.

Initiation of Lactation: The hormone prolactin promotes the milk secretion. The hypothalamus plays an essential role in controlling prolactin secretion, the hypothalamus mainly stimulates the production of all the other hormones, but it mainly inhibits prolactin production. Anterior pituitary secretion of prolactin is controlled either entirely or almost entirely by an inhibitory factor formed in the hypothalamus and transported through the hypothalamic-hypophysial portal system to the anterior pituitary gland. This factor is called Prolactin Inhibitory hormone. It is almost certainly the catecholamine dopamine, which is known to be secreted in the accurate nuclei of the hypothalamus and which can decrease prolactin secretion as much as 10-fold.

Ejection (let-down) – Process of milk secretion continuously into the alveoli of the breasts, but milk does not flow easily from the alveoli into the ductal system and therefore, does not continually leak from the breast nipples. Instead, milk must be ejected from the alveoli and into the ducts before the baby can obtain it. This process is called milk ejection or milk let-down. It is caused by combined neurogenic and hormonal reflex that involves the posterior pituitary hormone oxytocin. The oxytocin reflex is called the “let-down reflex” or “milk ejection reflex”. Oxytocin is produced more quickly than prolactin. Oxytocin starts when the mother gives breast feed to baby and baby is suckling, it is a conditioned reflex to sensation of touch, smell or seeing her baby or the baby cry or the thought of the baby³.

Inhibition of Milk Ejection: A particular problem in nursing baby is many psychogenic factors or generalised sympathetic stimulation throughout the body can inhibit oxytocin secretion and consequently depress milk ejection⁴.

Oxytocin Reflex: Some of the signs of an active oxytocin reflex experienced by the mothers are

- Tingling sensation in breast before or during breast feed.
- Flow of milk from breasts by thought of baby or cry of baby.
- Milk flow from other breasts during suckling.
- Slow deep sucks and swallowing by the baby which shows that milk is flowing into the mouth.⁵

Feedback Inhibitor:

The milk is controlled in breast by FEEDBACK INHIBITOR OF LACTATION, (FIL) it is a polypeptide present in breast milk. If the milk is not utilised the inhibitor collects and stops the cells from secreting, helping to protect breast from being full and its harmful effects. If breast milk is removed the inhibitor is also removed, and secretion resumes. If the baby does not take feeding the milk should be removed by expression.⁶

Reflexes of the Baby:

Reflex of the baby is important for appropriate breast feeding.

Rooting reflex: when baby touches something, the baby finds stimulus and opens the mouth putting tongue down or forward, this is rooting reflex.

Suckling reflex- When something touches the baby's palate the baby starts to suck it.

Swallowing reflex-When baby's mouth fills with milk, he or she swallows, this is swallowing reflex.

Composition of Breast Milk:

Breast milk contains all the nutrients required to the infant in first six months of life, including fat, carbohydrates, proteins, vitamins, minerals and water. It also contains the bioactive factors that augment the infant's immature immune system, provides protection against infections and factors helping digestion and absorption of nutrients^{7,8,9}.

Importance Of Breast Feeding:

Breast feeding provides the ideal food for the baby's healthy growth and development and has a unique biological and emotional influence on health of both mother and child (WHO, 2005)

Exclusive Breast Feeding:

WHO Recommendations 2013 on post natal care

Recommendation 5: Exclusive breast feeding (EBF)

All babies should be exclusively breastfed from birth until 6 months of age. Mother should be counselled and provided support for EBF at each postnatal contact.

- Reinforce early EBF and EBF messages during pregnancy and during all postnatal care visits.
- Ensure breastfeeding is actively promoted in all health facilities.
- Identify and address problems that prevent EBF
- Integrate lactational amenorrhoea method (LAM) and EBF messages to ensure LAM criteria all followed and the major barriers to EB are addressed that threaten the effectiveness of LAM.
- Prepare mothers for transitioning their infants to complementary foods with continued breastfeeding at 6 months and modern family planning methods for mothers using LAM.¹⁰

Skin-To-Skin Contact ("The Kangaroo method"):

Kangaroo care or Kangaroo mother care (KMC) sometimes called skin to skin contact. In new born care where babies are kept chest to chest and skin to skin with the parent it's useful in low birth weight pre term babies. There is evidence that, it is effective in reducing both infant mortality and the risk of hospital acquired infection and increase rates of breast feeding and weight gain placing the baby on bare chest of its mother also improves rate of breast feeding and can lead to improved stability of the heart and breathing rate of the baby.¹¹

Baby Friendly Hospital Initiative (BFI):

A baby friendly hospital is a hospital that follows the WHO / UNICEF code of practice which sets out the "Ten steps to successful breast feeding", namely

1. Have a written breast-feeding policy routinely communicated to all health staff.
2. Train all health care staff in skills necessary to implement this policy.

3. Inform all pregnant women about the benefits and management of breastfeeding
4. Help mothers initiate breastfeeding within a half hour birth
5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk unless medically indicated
7. Practice rooming in (Allow mothers and infants to remain together) 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeed infants.
10. Foster the establishment of breast-feeding support groups and refer mothers to them on discharge from the hospital or clinic.¹²

Problems of Breast Feeding:

(a) Maternal

- Sore nipple

If the baby does not take enough breast into the mouth the mother can get sore nipple¹³.poor positioning of the breast can cause nipple soreness¹⁴. Nipple pain lasting a minute or less at the beginning of feeding may occur during early breast feeding as the infant stretches the tissue. Traumatized nipple appears red, cracked, blistered or bleeding¹⁵.

- Flat and inverted nipple

Nipple abnormalities should be treated during pregnancy, use of breast shields can be taught. Nipple rolling before feeding helps flat and inverted nipple to become more erect. Breast pump used for a few minutes just before feeding may help draw out inverted nipples¹⁶.

- Engorgement

Engorgement can occur at any point during the breast feeding relationship, when breasts are not emptied and milk accumulation in the breast prolonged. Mother may complain that her breasts are hot, swollen, hard and possibly red, shiny and elevated temperature. Engorgement causes decreased milk supply due to stasis of the lactiferous ducts¹⁷.

- **Mastitis**

Inflammation of the breast with or without infection or redness has a variety of aetiologies and presentations that range from the fairly blocked duct to the more serious breast abscess. True infections mastitis can be present in a manner that is easily identifiable or it can be present in a subtle and ambiguous fashion. Some women are challenged with recurrent mastitis¹⁸.

(b) Infant Problem

Premature Babies:

The premature babies can have difficulties coordinating their suckling reflex with breathing. They may need to be fed more frequently because their stomach tends to be smaller and they may get sleepier during feedings.¹⁶ Premature infants unable to take calories by mouth may need external or gavage feeding-inserting a feeding tube into the stomach to provide enough breast milk or a substitute. This is often done with kangaroo care (prolonged skin-skin contact with the mother) which makes later breastfeeding easier. For some suckling difficulties, which may happen with cleft lip / palate, the baby can be fed with a haberman feeder.

Dysphoric Milk Ejection Reflex:

(D-MER) is a newly recognised condition affecting lactating woman that is characterised by an abrupt dysphoria, or negative emotion that occurred just before milk release and continuing not more than a few minutes. Preliminary testing tells us that D-MER is treatable and preliminary research tells us that inappropriate dopamine activity at the time of the milk ejection reflex is the cause of D-MER.¹⁹

Many preterm infants are capable of breast feeding for at least some feeding each day, Mothers who are not able to breast feed their infants should begin pumping their breasts as soon as possible after birth, to establish optimal milk supply.

The mothers should use dual collection kit and pump 8 to 10 times daily for 10 to 15 minutes until the milk flow has ceased for a few minutes and to be stored²⁰. Babies with cleft palate, blocked nose, premature baby, are not able to do suckling properly.

In Ayurveda Classics The Stana Sampat (Merits Of Breasts):

Acharya Charaka describes *stanasampat* as the breast which is devoid of *ativrdhawa*, *atilamba* and *atikrishna* and have appropriate nipple. *Acharya Sushruta* explains various abnormalities by feeding with imperfect breast as *urdhwastana*, *lambastana* this makes the child *karela*, *udrwaksha* (upward looking) and cover the face and nose.

Acharya Charaka insisted to give breast milk from first day of birth onwards.

Dushitha Stanya:²¹

Vata dushta stanya

When the breast milk is vitiated with *vata*, then it floats on water, it becomes astringent in taste, and will be foaming, looks dry. The baby gets constipated, produces less urine.

Pitta dushta stanya

When the breast milk is vitiated with *pitta*, then it creates yellow streaks in water, it becomes warm, sour, spicy and burning. The baby will suffer from diarrhoea, heat, jaundice.

Kapha dushta stanya

When the breast milk is vitiated with *kapha* then it sinks in water, it becomes salty, dense, shiny. The baby refuses to eat and baby suffers from urticaria.

The volume of breast milk is 2

Anjalīs. (*A.H.Sha.3:82*)²²: The breast milk is sweet, unctuous, light and it is easily assimilated by child. (*S.Ni.10:25*)²³. The factors responsible for secretion of breast milk depends on proper nourishment of *Rasa Dhatu* (*S.N.10:18*)²⁴ and the secretion of breast milk depends on the diet of the mother (*A.H.U.:1:17*)²⁵.

Infant Death Related To Breastfeeding:

Kunata. N.B,(1995) reports that BPNI states 4000 infants who die daily in India have been bottle fed, most of these infants die of infections which are typically caused by bottle feeding. Human breast milk protects infants from several infections and allergies, such that breast fed infants are 25 times less likely to die than

the bottle fed infant, due to diarrhoea and pneumonia. Breast feeding has higher IQ than bottle fed ones²⁶.

Golding. J.et al., (1997) reports there is relationship between bottle feeding and infant mortality. The protective effect of breast feeding becomes more evident when death from gastroenteritis and respiratory infections are analyzed.²⁷

Singh .m and Paul. V.K, (1997) reported that the infant mortality rate in India dropped from about 140/1000 live births in the early 1970's to 73/1000 in 1994. The IMR is highest in Orissa which is 103/1000 and lowest in Kerala State (16/1000). Neonatal / pre-natal data collection in the country is carried by means of the samples registration system, generating vital statistics.²⁸

DISCUSSION

Stanya is formed from *Rasa-rasa prasadabhaga* i.e., body fluids. *Stanya* is the secondary tissue of *Rasa Dhatu*. The *Rasa Dhatu* circulates through the body reaches the breast, and then the *stanya*/breast milk is formed. The touch, sight, or even thought of child stimulates secretion and expulsion of Breast Milk. Immediately after Labour the *Artavaha srotas* constricts due to excess of *vata* and actual secretion of Milk begins on the 3rd or 4th puerperal day. On the first and second day the breast secretion is of thick and heavy yellowish fluid which is called as *Piyusha* and thereafter the actual milk is secreted^{29,30}.

Breast milk is associated with several advantages:

1. Lower risk of infection: The breast milk is clean and uncontaminated. It contains several anti-infective factors, which protect the baby from external infections. There is a high concentration of secretory IgA, IgM, lysozyme, antistaphylococcal factor and specific inhibitory substances against viral infections. Lactoferrin present in breast milk is less than 50 percent saturated with iron and this does not make breast milk a suitable medium for the growth of enterobacteria. High level of bifidus factor protects the baby from the infection with *Escherichia coli*. Breast milk, especially the colostrum (early concentrated secretion from breast) has viable phagocytic macrophages and lymphoid cells, which provide non-specific gastrointesti-

nal host defences and offer protection against diarrhoea. Para-amino-benzoic acid (PABA) provides protection against malaria.

2. Protects from allergy: The higher protein content of the cow's milk increases the load of completely digested proteins in the gut. As the intestinal mucosa of the infant during the first 6-8 weeks is immature and is easily disrupted by infections and toxins, there is greater risk of absorption of macromolecules of proteins by the intestinal mucosa by a process of pinocytosis. Normally, higher concentration of secretory IgA in the breast milk inhibits absorption of macromolecules of protein. High protein load of cow's milk may overcome this barrier. Cow's milk protein acts as an antigen and may lead to cow's milk allergy. There is no risk of milk allergy in exclusively breast fed infants.

3. Specific protection: Breast-feeding also protects against neonatal hypocalcaemia and tetany (due to its ideal calcium phosphorus ratio and better calcium absorption), necrotizing enterocolitis, deficiencies of vitamin E and zinc and celiac disease. Exclusively breast fed infants are placed at a lower risk of developing diabetes mellitus, childhood lymphoma, liver diseases and bronchial asthma later in life.

4. Digestibility and nutritive value Proteins: The human milk has less protein than the cow's milk. Lower protein content causes lower solute load on the kidneys. As the kidneys have less capacity to concentrate urine in the first week of life, the breast milk is better tolerated especially by the premature infants in the neonatal period. The proportion of lactalbumin is higher than that of caseinogen. Lactalbumin is absorbed better. Caseinogen of human milk forms finer curds and is also more easily digested. Amino acids in breast milk are adequate for brain development. Higher content of polyunsaturated fatty acids (PUFA) promotes brain growth and may protect the individual from atherosclerosis in later life. Active lipase in the breast milk promotes digestion of fats and provides free fatty acids Their pattern facilitates absorption of calcium and salts. Breast milk has a low mineral and sodium content; water content of breast milk is sufficient enough to excrete these quantities of salts.

Therefore, an exclusively breast-fed infant does not require any extraneous water, even in tropical climates.

5. Physiological adaptation: Breast milk of a mother is specific to the need of her baby. A mother, who has delivered prematurely, secretes milk that is easily digested and nutritive for her preterm baby. Preterm milk contains more energy, protein, fat, sodium, zinc, anti-infective factors and macrophages and has lower content of lactose, calcium and phosphorus. Even malnourished mothers have adequate milk supply for their babies; however, content of IgA, protein and lipids may be lower in such milk.

6. Economic factors: Even though the lactating mothers need additional food supplements, the cost of human milk is negligible as compared to the fresh milk or commercially obtained powder milk for artificial feeding. Cost of feeding bottles and replacement of rubber teats is high.

7. Emotional bonding: Breast-feeding promotes close physical and emotional bonds between the mother and the baby. This leads to better parent-child adjustment, fewer behavioural disorders in children and lesser risks of child abuse by the mother.

8. Maternal advantages: Lactation suppresses ovulation, especially in mothers who are feeding their infants exclusively on breast, and serves as an effective contraceptive. Breast-feeding has also been noticed to lower the risk of ovarian and breast cancer. This mode of feeding is more convenient for the mother as she is not required to clean the bottle and prepare the milk for artificial feeding several times during the day and night. Breast-feeding doesn't require fuel consumption and thus doesn't temper with the precarious balance of the ecosystem; it is eco-friendly. Mother can feed the baby in any position, that is comfortable to her and the baby. The child should be attached properly to the breast so as to insert the whole of nipple and most of areola in its mouth. Head of the infant should be slightly elevated while feeding. Burping should follow breast-feeding. The only true contraindications for stopping the breast milk are galactosemia and phenylketonuria. Maternal illness should not result in

interruption of breast feeding. If need arises, expressed breast milk (EBM) may also be given³¹.

TREATMENT TO INCREASE BREAST MILK (STANYA):

Acharya Susrutha in *Sahreerasthanam (10/31)*³² says that the *Stanyanasha* is due to the *Krodha, Shokha,* and *Vaatsalya*. The Mother should be given wheat, rice, *mamsa rasa, matsya,* cow's milk, curd, sugar, garlic. She should be happy, devoid of anger, sorrow, fear and avoidance of excessive walk. The *Stanyajananadravyas* like *Lashuna*(*Allium sativum*), *vidarikanda* (*Pueraria tuberosa*), *Kusha* (*Desmostachyabipinnata*), *Darbha* (*Imperata Cylindrical*), *Kasha* (*SaccharumOfficinarrum*), *Shatavari* (*Asparagus racemosus*) pestered with milk.

CONCLUSION

Healthy growth and development has a unique biological and emotional influence on the health of both Mother and child. Lactation is a physiological process which enhances the production of breast milk. Breast feeding is the right of every child. It is an unequalled way of providing ideal food for the baby's healthy growth and development. Breast milk serves both nutrition and immunological support to developing infant. Breast feeding prevents the Infant Mortality Rate. All the problems of breast-feeding should be addressed by three categories of obstacles maternal obstacles, health professionals and society. Hence long term benefits of breast feeding can be achieved.

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