ISSN : 2583-3677

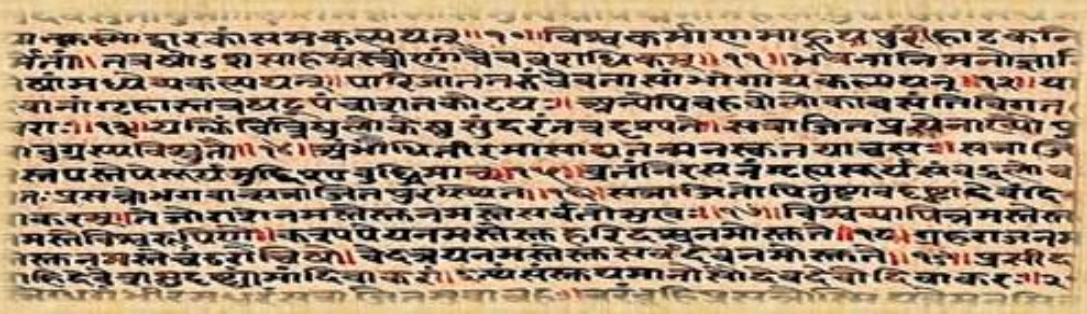
AYUSCRIPT

International Journal for Empirical Research in Ayurveda

www.ayuscript.com

Volume 1, issue 4

Oct - Dec 2022



An official Publication of AYURVEDA RESEARCH & CAREER ACADEMY

Management of Lactation Insufficiency in Postnatal care A critical review of the literature.

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ABSTRACT:

Lactation is beneficial to mother's health as well as provides specific nourishments for the baby. Lactation insufficiency is a major issue in developing countries as the use of breast milk substitutes increases the risk of morbidity and mortality in infants. The breast milk supplements cause malnutrition in the infants which ranges from 23%to 63% during the first 4 months after delivery. This article is about literary research in English language of incidence, pathophysiology, clinical features, diagnosis and current update on treatment of lactation insufficiency from different sources such as PubMed, other web sites, reference books, Ayurvedic Samhitas. The formula feed baby 3 times more likely to die due to respiratory infection, 14 times prone to die due to diarrhea than breast feed baby. Therefore, lactation insufficiency should be managed carefully.

KEYWORDS: *Postpartum period, lactation, breastfeeding, Lactation insufficiency, galactagogue.*

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How to cite article: Ambekar P.S., Anandrao H.A., Deshmukh J.S. Management of Lactation Insufficiency in Postnatal care. A critical review of the literature. AYUSCRIPT 2022;1(4):51-61

Introduction

Breastfeeding is important for maternal health and the healthy growth and development of babies. The World Health Organization recommends that babies should be exclusively breastfed in the first six months of life [1]. However, some problems that develop in the early postpartum period that affect's lactation and breastfeeding [2]. Therefore, the rapid detection and resolution of breastfeeding problems in the post- partum period is essential for maternal and infant health. The synonyms of lactation insufficiency are: 1) breast milk insufficiency 2) lactation failure 3) mothers milk insufficiency (MMI) 4) perceived insufficient milk (PIM) 5) insufficient breast milk, partial 6) neonatal insufficient milk syndrome 8) hypogalactia or lactation inadequacy. Breast milk insufficiency defined as need to start top feeds for the baby within 3 months of delivery because of inadequate breast milk supply [3]. Total lactation failure is defined as total absence of milk flow or secretion of just a few drops of breast milk following suckling for at least 7 days [4]. Partial lactation failure was defined as either inadequate milk output or the need for supplemental feedings to sustain growth.[5] The most common cause of lactation failure is insufficient milk or no milk (80%). The age, parity, education, socioeconomic status and urban versus rural status of mother all had a bearing on the occurrence of lactation failure [6] Segura Millan et al. called oligogalactia as perceived insufficient milk (PIM), which is one of the reasons for the introduction of supplementary bottles [7] The use of breast milk substitutes increases the risk of morbidity and mortality among infants in developing countries.[8]. The mother feels that she has insufficient milk secretion because the baby cries often, frequent demands feeds, shows irritability. The mother should be advised to exclusively breast-fed baby showing a weight gain of 500–1000 gm/month and passing urine 6–8 times/day is showing that baby got sufficient quantity of milk. [9,10]

Prevalence

In postpartum women Insufficient milk production is the common problem and is a major reason for early start of top feed. Studies show's a significantly higher incidence of insufficient milk production in women who undergo caesarean section as compared with women who undergo normal vaginal delivery [11]. Segura Millan et al. stated that the incidence of oligogalactia has been estimated to range from 23% to 63% during the first 4 months after delivery [12]. Forman and his colleagues in their study shows,1005 Bedouin Arab women who delivered healthy newborns in 1981 and 1982 described the factors associated with milk insufficiency versus another reason for introducing the bottle and its potential health effects by 2 months postpartum: 72% introduced the infant to the bottle with 72% reporting milk insufficiency as the reason for introducing the bottle. The percentage of milk insufficiency decreases with increasing age of the baby [13]. In a study in Karnataka, it was observed that insufficient milk was the reason for starting top feeds in 53.6% of cases [14]. Lindquist study shows that breast milk insufficiency in a group of 51 healthy women during a period from 3 days to 18 months after delivery. It was found that every second mother experienced lactation crises on at least one occasion (the crisis group). The total energy intake was almost the same for the partially breast-fed baby's receiving breast milk plus supplementary food, and those who were exclusively breastfeeding. Most of mothers in both groups initiated the weaning in accordance with general recommendations.[15]

Due to maternal stress and not eating enough healthy food mothers in Kabul were showing milk insufficiency hence give raise the challenges for the treatment of infants. Most of women discontinue their breast- feeding during the first few weeks of the postpartum period because of insufficient milk production [16].

Aim

The review of literature to find out updates on management of lactation insufficiency in postnatal care.

Objective

To study the incidence, pathophysiology, causes, clinical features, diagnosis and consequences breast milk insufficiency or lactation insufficiency.

Material and Method

Data Source: Bibliographic literary review on the issue was performed by searching publications from the Medline database and from national and international organizations. reference books and classical Ayuredic Samhitas. Some key articles cited in other sources such as PubMed and other Web sites were selected.

Insufficient Milk Production

1) Primary lactation insufficiency:

5% of mothers may have a primary lactation insufficiency due to inadequate glandular tissue resulting from hypoplastic breasts, breast surgery such as mastectomy, breast reduction, nipple piercing, it damages the ductal and neurological pathways. Other causes of primary inability to lactate are severe illness such as postpartum hemorrhage with Sheehan's syndrome, infection [17].

2)Secondary lactation insufficiency

It should be judge by objective measurement of the mother's milk production [18].

Etiology/Predisposing Factors

Factors in the baby

Prematurity with baby Low birth weight, birth asphyxia, birth defects, congenital heart disease and urinary tract infection.

Maternal factors

- Maternal health: Anemia Postpartum hemorrhage, Anemia, smoking. [19]
- Mammogenesis: Insufficient breast tissue, breast surgery (reduction)
- Lactogenesis: Retained placenta, delayed breast- feeding
- Galactopoiesis: Infant tongue-tie, Inadequate breast drainage
- Delayed management of local problems in the breast, e.g., Breast engorgement, retracted nipples, short and too large nipples [20]
- Wrong technique of breast-feeding.
- Psychiatric disorders in the postpartum period interfere with maternal parenting abilities [15]

Environmental factors and hospital practices

- Separation of the baby from the mother
- Painful infections, e.g., episiotomy, cesarian section.
- Inadequate support and guidance from health professionals

Pathophysiology

Lactation is depending on certain reproductive hormones such as estrogen, progesterone, placental lactogen, prolactin, and oxytocin and metabolic hormones such as glucocorticoids, insulin, growth hormone, and thyroid.

The reproductive hormones act directly on the mammary gland and the metabolic hormones act indirectly by altering endocrine response to the mammary gland. Ductal growth is primarily regulated by estrogen and growth hormone, and alveolar development requires progesterone, prolactin. During pregnancy, the high levels of progesterone inhibit the secretory process of the mammary gland. Once the placenta is expelled after birth, progesterone levels decline rapidly, and prolactin levels get increase that trigger the beginning of lactogenesis II, which results onset of

copious milk secretion [10]. Lactogenesis is include 2 mechanism 1) Release of prolactin 2) induces the release of oxytocin, to induce milk ejection reflex. These two mechanisms are similar in that they can both be activated by suckling; they are work in through two different neuroendocrinological pathways. During pregnancy the skin of the areola is relatively insensitive to tactile stimuli but becomes much more sensitive immediately after delivery. This is physiological changes takes place in order to stimuli other neurological pathway from the nipple to the hypothalamus to initiate and maintain the release of prolactin and oxytocin both of which are required for successful lactation. Any maternal or infant factor that restricts the emptying of the breasts may reduce breast milk synthesis by mechanical and chemical inhibition. The continuous removal of feedback inhibitor of lactation from the milk guarantees the total restoration of the removed milk [22]. In rare cases, women who bleed severely during delivery may develop Sheehan's syndrome, or ischemic necrosis anterior lobe of the pituitary gland.

Due to absent or deficient prolactin secretion, are common initial symptoms of Sheehan's syndrome. In addition, elevated cortisol levels following such a stressful labor and delivery may also affect lactogenesis Stage II. Delayed early contact between mother and baby following a complicated delivery with PPH may also affect the lactation [23].

How to assess adequacy of milk

Milk secretion increases from less than 100 ml/day at the beginning to approximately 600 ml on the fourth day, The infant does not feel satisfied after feedings, cries a lot, wants to nurse frequently, and does not gain weight properly (<20 gm/day) considered the milk is not sufficient. The number of wet diapers a day (less than six–eight) and infrequent small quantity of stools, which are dry and hard, indirectly indicate low intake of milk.

Following signs that indicate an infant is not receiving enough milk in the first weeks of life: no urinary output for 24 hours, weight loss greater than 10% of the birth weight, not regaining birth weight up to 2 weeks of life and absence of yellow stools in the first week and clinical signs of dehydration [24,25]

Investigation

Ultrasound can be done if there is suspected retained products of conception. Maternal testosterone is raised in the presence of gestational ovarian theca lutein cysts, a rare cause of delayed lactogenesis. If required, a woman's hemoglobin level, serum prolactin level, thyroid function should be checked. Urinary tract infection may be asymptomatic in infants, apart from failure to thrive, so a urine test may be done for the baby.[19]

Diagnosis

There are few numbers of questions that ask about the mother's general health:

- Any medical conditions or breast surgery?
- Does she smoke? Smoking over 15 cigarettes daily may reduce milk supply.
- Any endocrinological issues such as hypothyroidism or polycystic ovarian syndrome (PCOS)?

Mother with PCOS with insufficient glandular tissue to produce an adequate milk supply [21,19]. A doctor can ask the mother if she noticed breast changes in the pregnancy or after the birth—no changes may be an indication of insufficient glandular tissue.

Lactogenesis II may be delayed if there is retained placental bits. Anemic women are less likely to continue breast-feeding than normal women. The information is collected about the baby's birth weight, condition, and loss of weight in the first few days.

Treatment

To increase milk production, the following measures are used: Breastfeed the baby in proper position should be done, Increase the frequency of feeding to the baby. The use of bottles and nipple shields should be avoided. Mother should be taking a balanced diet and promote Relactation [26]

In partial lactation failure

Relactation is advised for mothers by motivation and encouragement. There is need to educated about the breast milk because as the days pass by, the amount of top feed needs to be reduced in increments until the infant is entirely on mother's milk [20].

Incomplete lactation failure

- Nipple stimulation exercises by nipple stroking and rolling the nipple between thumb and the index finger.
- Frequent suckling, at least 8–10 times a day, each session lasting 10–15 minutes for each breast.
- Drop and drip method is to be used if the infant fails to suckle for 8–10 minutes. The method involves expressing some breast milk or top milk in a cup and gradually pouring it over as drops over the breast. As the drops trickle over the nipple down into infant's mouth, he is stimulated to suckle at the breast [20,26]

Evidence of successful Relactation

- Partial restoration of breast-feeding with reduction of top feed to half of the initial.
- Complete restoration of breast-feeding with total withdrawal of top feed.
- There is first milk secretion in 2–10 days.
- Satisfactory weight gain by the infant [22].

Galactagogues

lactogogues are medications or other substances believed to initiation, maintenance and augmentation of maternal milk production. Because low milk supply is one of the most common reasons given for discontinuing breast-feeding, Relactation and increasing a faltering milk supply because of maternal or infant illness [27,28]. Mothers who are not directly breast-feeding but are expressing milk by hand or with a pump often experience a decline in milk production after several weeks. One of the most common indications for galactagogue is to augment milk production [27].

Domperidone

Domperidone is also a dopamine antagonist [28,29]. Administration of domperidone results in increases of mean serum prolactin levels in normal women from 8 to 111 ng/ml following a single 20 mg dose [21,30]. Doses used for induction and maintenance of lactation range from 10 to 30 mg 3 times daily.

In a recent, randomized, double- blind, placebo-controlled study, 20 women were assigned to receive either domperidone (11 women) 10 mg orally 3 times daily or placebo (9 women) for 7 days. In the final analysis, 4 women were excluded, 3 had incomplete milk records, and 1 infant died of neonatal complications. As compared to baseline, the mean increase in milk yield from days 2 to 7 was significantly higher ($P<.05$) in the domperidone group (50 +-29 ml) as compared to the placebo group (8 +- 40 ml), domperidone group had a significantly higher milk volume at baseline and serum prolactin levels were significantly increased by domperidone therapy ($p = .008$) [28].

Sulpiride

Sulpiride is an antipsychotic that acts as a galactagogue by increasing hypothalamic prolactin- releasing hormone. The dose for initiation of lactation is 50 mg 2–3 times daily. Maternal side effects as like metoclopramide. Ylikorkala et al. gives the Sulpiride 50 mg orally 3 times daily or placebo to 24 mothers who have insufficient milk production during the initial 4 months after delivery. Therapy

was continued for a 2-week period. In addition, supplemental buccal oxytocin was administered to some patients. One woman in the Sulpiride group and three in the placebo group discontinued therapy owing to lack of effect. Daily milk yield was significantly greater with Sulpiride therapy versus placebo both at 1 week (628 +- 51 ml vs. 440 +-68 ml) and 2 weeks (684 +- 67 ml vs. 423 +-60 ml) of treatment (P<.05). Higher serum prolactin noted in women receiving Sulpiride therapy [28].

Oxytocin

It has been used to enhance the onset of lactation among mothers of premature infants. Subjects were given a spray bottle containing either oxytocin 40 U/ml or a blank solution and were instructed to administer 1 spray in each nostril (total dose of 3 U oxytocin) prior to pumping milk. The effect of the spray resulting an increase in milk production in primiparas and a twofold increase in multiparas [28].

Thyrotrophin-Releasing Hormone

It increases the release of both TSH and prolactin. Peters et al. evaluated the use of TRH as a galactagogue in 19 women with lactation insufficiency, on the fifth day postpartum. 10 women received a nasal spray of TRH and 9 received a 0.9% sodium chloride spray for 10 days starting on day 6 postpartum. One spray, equivalent to 1 mg of TRH was administered 4 times daily. At the end of the initial 10-days, milk production was significantly increased in the TRH group from a mean of 142 gm/day to 253 gm/ day (P = 0.014). Seven women in the TRH group requested further treatment for an additional 10-day period. Continued therapy resulted in a further increase in milk production up to 424.3 gm/day [28].

Chlorpromazine

It is an antipsychotic drug and also has been used as a galactagogue. It is similar to dopamine molecule and has the ability to bind and block the dopamine receptor, resulting in increased prolactin levels [28].

Human growth hormone

One study shows 16 healthy, lactating women received either recombinant human growth hormone in a dose of 0.1 IU/kg/day subcutaneously, or placebo injection, on days 3–9 of a 10-day study period. At baseline, milk production volumes were similar in both groups. After 7 days of therapy, there was a significant increase (P < .02) in milk volume in the human growth hormone–treated group (18.5 +-1.5%) as compared with the placebo-treated group (11.6 +- 2.0%) mothers. The use of this drug as a galactagogue is limited.

Metoclopramide

It promotes lactation by antagonizing the release of dopamine in the central nervous system [28,29]. This drug can cause extrapyramidal side effects, which include tremor, bradykinesia (slow movements) and other dystonic reactions. Metoclopramide and chlorpromazine may help certain mothers with lactation failure to revert to normal milk production through their galactagogue effect [27]. Kauppila et al. reported a dose–response relationship between improved lactation and metoclopramide 5, 10, or 15 mg 3 times daily in 37 mothers in which the insufficient breast milk production during the initial 2 months after delivery. Daily doses of 30 and 45 mg of metoclopramide resulted in significant increases in serum prolactin levels and milk production, with the 45 mg daily dose producing a faster onset of effect [28] Metoclopramide is accelerated protein concentration of breast milk and also to changes in the electrolyte composition of breast milk [30] The most commonly used medications are metoclopramide and domperidone it's a dopamine antagonist, which increase prolactin levels. Domperidone does not cross the blood–brain barrier and it safer than metoclopramide, but these drugs do not

stimulate milk secretion when prolactin levels are already high or when there are not enough glandular tissues [38]. Metoclopramide is a more effective releasing agent for prolactin than TRH. One placebo-controlled trial showed that metoclopramide was more effective than placebo at maintaining failing lactation [39].

Ancient Indian medicine

In the ancient Ayurvedic Samhitas mentioned the medicinal plants as galactagogue as a *stanyajanan gana*. The use of natural products believed to be able of increasing milk production has a long history. The most commonly used products include fenugreek, Anise, fennel, cumin, grape, and coffee. Various pharmacological and clinical studies have proven the galactagogue activity of herbs such as when rats were fed with Nigella sativa seeds [31]. Many studies showed that roots of Asparagus racemosus when administered orally in goats [32], rats, cows, and buffaloes [33] increased milk production. A double-blind randomized clinical trial shows the galactagogue effect of root of A. racemosus in lactating mothers. The results showed that the oral use of root increased plasma prolactin concentration threefold in the trail than in the control group [37]. Other study stated that the effect of A. racemosus was caused the release of corticosteroids or an increase in prolactin. It is proved that Shatavarin I-V, the steroidal saponins, has the hormonal effect of *Shatavari* and confirms its use as traditional galactagogue [38]. Fenugreek has been reported to increase milk production in women within 24–72 hours. The recommended dose of fenugreek for use as a galactagogue is two–three capsules of 500 mg 3 times daily [39].

Discussion

It this review of literature, focus should be kept on the updates on management of lactation insufficiency in postnatal care. It was observed that most of women in postnatal period experienced Lactation insufficiency. These problems depend on the factors related to mother, breast, breastmilk, baby.

This study showed that prenatal counselling, motivation, follow-up to reduced breastfeeding problems and an improving breastfeeding success which ultimately increase maternal milk production. Strong motivation, social support and use of lactogogues increases the chances of lactation. In this review incidence, etiopathogenesis, pathophysiology, causes, clinical features, diagnosis and consequences breast milk insufficiency/ lactation insufficiency was studied in detailed and their solution are given. Lactation insufficiency is a major issue in developing countries as the use of breast milk substitutes increases the risk of morbidity and mortality in infants. The breast milk supplements cause malnutrition in the infants which ranges from 23%to 63% during the first 4 months after delivery. Most of study which was mentioned in this literary review shows that, there is insufficient milk production in mother is due to, the poor balance diet, faulty feeding technique, presence of painful condition in breast and lack of knowledge of breast-feeding importance. In mother who delivered by caesarean section shows lactation insufficiency as compared to normal vaginal delivery mother. Most of women discontinue their breastfeeding during the first few weeks of the postpartum period because of insufficient milk production. Etiological factor should be avoided in order get sufficient milk production in mother. Relactation should be encouraged. Varies galactagogues such

as metoclopramide, domperidone, Sulpiride, thyrotrophin releasing hormone, oxytocin, chlorpromazine, growth hormone is used to treat lactation insufficiency. The most commonly used medications are metoclopramide and domperidone it's a dopamine antagonist, which increase prolactin levels. Use of the natural herbs who believed to increase lactation such as, fenugreek, Anise, fennel, cumin, grape, coffee, Nigella sativa seeds and Asparagus racemosus are to be increased.

Conclusion

Mother's milk is important for baby. Data in the study is suggested that, the promotion of exclusive breast- feeding in the first 6 months is the single most effective intervention for baby to reduce its mortality by 13%–15% below 5 years of age. The mothers which feel that they have insufficient milk secretion, face numerous physical, emotional problems of breast-feeding, and even small anxieties about milk supply can lead to lactation insufficiency. Lactation insufficiency in mothers is mainly because of not using the proper technique of breast-feed the infant. However, there are some conditions which affects the lactation where the proper diagnosis and treatment is necessary.

References

1. World Health Organization. Postnatal care for mothers and newborns: Highlights from the World Health Organization 2013 Guidelines. Available from: http://www.who.int/maternal child adolescent/publications/WHO- MCA-PNC-2014-Briefer_ A4.pdf. (Accessed on: 01 Ekim 2016).

2. Benoit B, Goldberg L, Campbell-Yeo M. Infant feeding and maternal guilt: The application of a feminist framework to guide clinician practices in breast feeding promotion. Midwifery 2016; 34: 58–65.

3. Joshi JV, Bhandarkar SD, Chadha, Shah R. Menstrual Irregularities and Lactation Failure may Precede Thyroid Dysfunction or Goiter. J Post grad Med [serial online] 1993 [cited 2011 Dec 13] 39:137-41. URL: http://www.jpgmonline.com/text.asp?1993/39/3/137/614 [Accessed on 13-12-11].

4. De NC, Pandit B, Mishra SK, Pappu K, Chaudhuri SN. Initiating the Process of Relactation: An Institute based Study. Indian J Ped 002;39: 173-178.URL: http://www.indianpediatrics.net/feb2002/feb-173-178.htm [Accessed on12-12-11].

5. Banapurmath S, Banapurmath CR, Kesaree N. Initiation of Lactation and Establishing Relactation in Outpatients. Indian J Pediatr 2003; 40:343-347. URL: http://www.indianpediatrics.net/apr2003/apr- 343-347.htm [Accessed on 12-12-11]

6. Mathur GP, Chitranshi S, Mathur S, Singh SB, Bhalla M. Lactation Failure. Indian J Pediatric 1992; 29(12):1541-4. URL: indianpediatrics.net/dec1992/1541.pdf [Accessed on 12-12-11]

7. Segãoera-Millãn S, Dewey KG, Perez-Escamilla R J. Factors Associated with Perceived Insufficient Milk in a Low-Income urban Population in Mexico. Nutr 1994; 124:202-212. URL: http://jn.nutrition.org/content/124/2/202.full.pdf [Accessed on 12-12- 11].

8. Narayanan I. Rational Approach to Lactational Failure. Indian J Pediatr 1985; 52: 167-170. URL: http://www.springerlink.com/content/t5u632l464310673/ [Accessed on 13-12-11].

9. Desai P, Malhotra N, Shah D, the editor. Principles and Practice of Obstetrics and Gynecology for Postgraduates. 3rd ed. New Delhi: Jaypee Brothers; 2008.p.373-5.

10. Hurst NM. Recognizing and Treating Delayed or Failed Lactogenesis II. Journal of Midwifery and Women's Health 2007; 52(6):588-94. doi: 10.1016/j.jmwh.2007.05.005. URL: http://onlinelibrary.wiley.com/doi/10.1016/j.jmwh.2007.05.005/pdf [Accessed on 13-12-11]

11. Su-Ying L, Jian-Tao L, Yang, Cherng-Chia, Gau, Meei-Ling. Factors Related to Milk Supply Perception in Women Who Underwent Cesarean Section. Journal of Nursing Research June 2011; 19(2):94-101.doi:10.1097/JNR.0b013e31821988e9 URL: http://journals.lww.com/jnr-twna/Abstract/2011/06000/ Factors Related to Milk Supply Perception in Women.4.aspx. [Accessed on 12-12-11].

12. Segãoera-Millãn S, Dewey KG, Perez-Escamilla R J. Factors Associated with Perceived Insufficient Milk in a Low-Income urban Population in Mexico. Nutr 1994; 124:202-212. URL: http://jn.nutrition.org/content/124/2/202.full.pdf [Accessed on 12-12- 11].

13. Forman M R Lewando-HG, Graubard B I, Chang D, Sarov B, Naggan L et al. Factors Influencing Milk Insufficiency and its Long-Term Health Effects: The Bedouin Infant Feeding Study. Int. J. Epidemiol 1992;21 (1):53-58. doi: 10.1093/ije/21.1.53. URL: http://ije.oxfordjournals.org/content/21/1/53.abstract [Accessed on 12- 12-11].

14. Malikarjuna HB, Banapurmath R, Banapurmath S, Kesaree N. Breast-feeding Problems in First Six Months of Life in Rural Karnataka Indian J Pediatr 2002; 39(9): 861-864. URL: http://indianpediatrics.net/sep2002/sep-861-864.htm. [Accessed on 12-12-11]

15. Lindquist C H. Studies on Perceived Breast Milk Insufficiency: A Prospective Study in a Group of Swedish Women. Acta Paediatrica July 1991; 80(s376):1–29. URL: onlinelibrary.wiley.com/doi/10.1111/j.1651- 2227.1991.tb12033.x/abstract. [Accessed on 13-1-12].

16. Gatti L. Maternal Perceptions of Insufficient Milk Supply in Breast-feeding. Journal of Nursing Scholarship 2008; 40 (4): 355–363. doi:10.1111/j.1547-5069.2008. 00234.x URL: http://onlinelibrary.wiley.com/doi/10.1111/j.1547-5069.2008.00234.x/abstract. [Accessed on 26-2-12].

17. Neifert M R. Prevention of Breast-Feeding Tragedies Pediatr Clin North Am 2001; 48(2):273–297.

18. Kent JC, Prime D K, Garbin CP. Principles for Maintaining or Increasing Breast Milk Production JOGNN 2012; 41:114-121. doi: 10.1111/j.1552-6909.2011.01313.x. URL: http://jognn.awhonn.org. [Accessed on 23-12-11].

19. Amir LH. Breast-feeding–Managing 'supply' Difficulties. Australian Family Physician 2006;35(9):686–689.

20. Gupte S, the editor. The Short Textbook of Pediatrics. New Delhi: Jaypee Brothers; 2004.p.113-7.

21. Livingstone V. Neonatal Insufficient Breast Milk Syndrome. Obstetrics and Gynecology. Medicine North America March 1997. URL: http://breastfeedingclinic.com/pdf/Neonatal%20insufficient%20breast%20milk%20syndrome.pdf [Accessed on 13-12-11].

22. Giugliani ERJ. Common Problems during Lactation and Their management. Journal de Pediatria 2004;80(5): 147-154.

23. Thompson JF, Heal LJ, Robert CL, Ellwood DA. Women's Breast-feeding Experiences Following a Significant Primary Postpartum Haemorrhage: A Multicentre Cohort Study International Breast-feeding Journal 2010;5:5.URL: http://www.internationalbreastfeedin

gjournal.com/content/5/1/5. [Accessed on 13-12-11].
24. Powers NG. How to Assess Slow Growth in the Breastfed Infant. Pediatr Clin North Am. 2001; 48:345-63.
25. Bernstein D, Shelove SP, the editor. Pediatrics. Philadelphia: Williams and Wilkins; 1996.p.69-70.
26. Relactation: Review of Experience and Recommendations for Practice. Department of Child and Adolescent Health and Development. Elizabeth H, Felicity S, eds. WHO, Geneva PP: 1-38 WHO/CMS/CAH/98-14, 1998.
27. Montgomery A, Wight N. Use of Galactagogues in Initiating or Augmenting Maternal Milk Supply. The Academy of Breast-feeding Medicine Protocol Committee. Approved July 30, 2004. URL: http://jgh.ca/uploads/breastfeeding/abmgalactogogues.pdf [Accessed on 13-12-11].
28. Gabay MP. Galactagogues: Medications that Induce Lactation. J Hum Lact 2002;18(3):274-279. doi:10.1177/089033440201800311. URL: hl.sagepub.com/content/18/3/274.short?rss=1&ssource=mfc [Accessed on 13-12-11]
29. Zuppa AA, Sindico P, Orchi C, Carducci C, Cardiello V, Romagnoli C, et al. Safety and Efficacy of Galactagogues: Substances that Induce, Maintain and Increase Breast Milk Production. J Pharm Pharmaceut Sci (www.cspsCanada.org) 2010; 13(2):162–174. . URL: ejournals.library.ualberta.ca/index.php/JPPS/ article/download/6663/7429 [Accessed on 21-12-11].
30. Campbell-Yeo M L, Allen A C, Joseph K S, Ledwidge J M, Caddell K, Allen VM, et al. Effect of Domperidone on the Composition of Preterm Human Breast Milk. Pediatrics 2010; 125; e107-114. doi: 10.1542/peds.2008-3441.URL: http://pediatrics.aappublications.org/content/125/1/e107.short [Accessed on 13-12-11].
31. C. P. Khare Indian Herbal Remedies: Rational Western Therapy, Ayurvedic, and Other Traditional Usage, Botany. New York: Springer; 2004. p.331.Available from URL: http://books.google.co.in/books?id=463ERB3VeUoC&printsec=frontcover#v=onepage&q&f=false [Accessed on 6-10-12].
32. Vihan VS and Panwar HS. A note on galactogogue activity of Asparagus racemosus in lactating goats. Indian J. Animal Health. 1988; 27: 177-178.
33. Kumar S, Mehla RK and Dang AK. Use of Shatavari (Asparagus racemosus) as a galactopoietic and therapeutic herb – A review. Agric. Rev. 2008; 29: 132-138.
34. Sabnis PS, Gaitondi BB and Jetmalani M. Effect of alcoholic extract of Asparagus racemosus on mammary glands of rats. Indian J. Exptl. Biol. 1968; 6: 55-57.
36. Patel AB and Kanitkar UK. Asparagus racemosus Willd. from Bordi as a galactogogue in buffaloes. Indian Vet. J. 1969; 46: 718-721.
37. Gupta M, Shaw B. A Double-Blind Randomized Clinical Trial for Evaluation of Galactagogue Activity of Asparagus racemosus Willd. Iranian Journal of Pharmaceutical Research 2011;10 (1):167-172. Available from URL: ijpr.sbmu.ac.ir/?action=showPDF&article=874&_obfull [Accessed on 21-3-12]
38. Gaitonde BB and Jetmalani MH. Antioxy-tocic action of saponin isolated from Asparagus racemosus Willd. (Shatavari) on uterine muscle. Arch. Int. Pharmacodyn. Ther. 1969; 179: 121-129.
39. Gabay MP. Galactagogues: Medications that Induce Lactation. J Hum Lact 2002;18(3):274-279. oi:10.1177/089033440201800311. Available from URL: hl.sagepub.com/content/18/3/274.sho

rt?rss=1&ssource=mfc [Accessed on 13-12-11]

Source of Support : None declared

Conflict of interest : Nil