

## Review Article

# Exclusive Breastfeeding-An Obstetrician's Dilemma

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### Introduction

Literature is replete with scientific evidence on the benefits of breastfeeding. The baby, the mother, the family at large are all beneficiaries of this most natural process of a mother breastfeeding her baby.

Human milk feeding decreases the incidence of a wide spectrum of infections<sup>1</sup> which include diarrhoea<sup>2</sup> respiratory tract infections<sup>3</sup>, otitis media<sup>4</sup>, necrotizing enterocolitis<sup>5</sup>, late onset sepsis in the preterm<sup>6</sup> etc. Long term advantages of breastfeeding include reduction of both type I and type II diabetes<sup>7</sup>, leukemia<sup>8</sup>, lymphoma, obesity<sup>9</sup>, asthma<sup>10</sup> among other diseases. Breastfeeding is also associated with enhanced performance on cognitive development<sup>11,12</sup>. The mother is also a beneficiary and besides the well known benefits of involution of the uterus, postlactational amenorrhoea<sup>13</sup>, decreased risk of cancer of the breast<sup>14</sup> and ovary<sup>15</sup>, recent evidence suggests decreased risk of fracture hip post menopause in mothers who have breastfeed their baby<sup>16</sup>.

Breastfeeding saves money both for the family and the nation<sup>17</sup>. The Lancet series on child survival have emphasized the role of exclusive breastfeeding in the first six months of life which can cut down under five

child mortality by 13% to 15%<sup>18</sup>. There could not be more compelling reasons for breastfeeding the baby.

Unfortunately for the obstetrician who is well informed about these benefits, the practical implications of ensuring exclusive breastfeeding in the labor room and in the first few days of birth are not often dealt with. This article is an attempt to look at some obstetric dilemmas, to look at scientific evidence to support practices and suggest some practical methods to address them.

### Feeding in the first hour of life.

The AAP recommends that all healthy infants be placed and remain in skin to skin contact with their mother immediately after delivery till the baby feeds<sup>19</sup>. A study in Ghana showed that ensuring breastfeeding in the first hour of life reduces neonatal mortality by 22%. In a healthy neonate, suckling reflex is at its height 30 to 40 minutes after birth. Early feeds stimulates production of prolactin and increases the mean duration of breastfeeding, thus facilitating establishment of milk secretion, prolonged feeding and increased survival of neonates.

Problems that are posed are related to the routines that have been established in the labor room, that includes cleaning, bathing, weighing etc. These are procedures that do not impact the health and longterm survival of the baby and can easily wait till the baby and mother spend time in bonding. The skin to skin contact keeps the baby warm and suckling at the breast helps in initiating lactation.

*Paper received on 10/08/2007 ; accepted on 12/12/2007*

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As soon as the baby is born and respiration is established, the baby must be placed prone on the mother's abdomen. The baby may crawl towards the breast or may rest snugly against the mother. If the baby makes some sucking movements it can be supported to feed at the breast.

Feeding in the first hour is not difficult if labor room policies are supportive. Antenatal education and counseling is the key to success. The mother must be made aware of the benefits. Printed material, booklets on breastfeeding must be a recommended reading for the mother. A beautiful video on the breast crawl prepared by the BPNI is available on the net. It must be viewed by all health professionals and if possible by the mother in the antenatal clinic. A well informed, supportive husband, relative or a nurse in the labor room could ensure that this important practice is followed.

### **Breastfeeding in mothers with LSCS**

It is more difficult for a mother with LSCS to initiate early feeds and exclusively feed her baby especially in the first few days after surgery. However there are many practices that will help the mother.

As in most hospital feeding practices, preparation for breastfeeding and counseling must start in the antenatal period and with the increased rate of LSCS, feeding in the postoperative period must be routinely included in the prenatal sessions. It is easier for a mother who has undergone spinal anesthesia to feed in the first hour of life and keep her baby in skin to skin contact. Mothers who have undergone general anesthesia can feed their baby within four hours or as soon as the effect of general anesthesia wears off. There are two main practical considerations. The first is that pain management must be strictly adhered to since pain inhibits production of prolactin and delays the establishment of lactation. The second is that the baby should be so positioned that the body must be away from the site of incision while allowing for proper latching. In the first few hours of life the baby could be latched prone with the baby's body lateral to the mother ( football or clutch hold), supported by a helper and pillows that are well adjusted. As soon as the mother is in a position to turn, the sidelying position can be used. Again the baby's side position can be supported by pillows and she will need some assistance. A family member can be trained to help

her. To ensure feeding on demand the baby must be near the mother. A normal baby born of an LSCS does on no account warrant nursery or specialized care.

### **Exclusive Breastfeeding:**

#### **When and How to initiate it?**

To sustain the benefits due to early initiation of breastfeeding on morbidity and mortality, "exclusive breastfeeding" must be practiced by the mother infant couple.

Exclusive breastfeeding means giving only breastmilk. This means no water, liquids, tea, herbal preparations, or food through the first six months of life with the exception of multivitamin drops or any other medications prescribed by the physician. An analysis of studies in Brazil and Bangladesh has found that breastfed infants in the first six months of life who were given additional foods had a twofold to threefold higher mortality from diarrhoea and pneumonia in comparison with infants who were exclusively breast fed<sup>20,21</sup>.

To encourage mothers to breastfeed exclusively right from birth, conducive hospital practices include putting the baby to the breast within the first hour, rooming- in the baby with the mother, avoiding separation and placement in the nursery unless medically indicated, avoiding the use of any prelacteal feeds like oral dextrose, milk, honey etc. Health personnel should support and encourage mothers to practice frequent, unrestricted feeding on demand.

In a nutshell, mothers should be educated in the antenatal period that breastmilk has everything a baby needs to quench thirst and satisfy hunger. Hence, breastfeeding needs to be initiated on the labor table and thereafter the mother should feed the baby whenever the baby cries. It is necessary to point out the risks of giving prelacteal feeds including water which can cause diarrhea and illness. Moreover, an infant's stomach capacity is small, and prelacteal feeds interfere with intake of nourishing breastmilk and establishment of successful lactation.

#### **Exclusive breastfeeding: How long?**

There has long been consensus on the need for exclusive breastfeeding; however, there has been

considerable debate on its optimal duration of 4 to 6 months, versus 6 months.

An expert Committee appointed by WHO concluded that exclusive breastfeeding for 6 months confers several benefits on the infant and the mother.

The Expert Consultation recommended exclusive breastfeeding for 6 months, with introduction of complementary food and continued breastfeeding thereafter, emphasizing that this recommendation applies to populations while recognizing that some mothers will be unable to, or choose not to, follow it, and that these mothers should also be supported to optimize their infants' nutrition.

It is recognized that supplementation with iron and zinc may be needed from about two months of age particularly in a low birth weight population <sup>22</sup>.

### **Milk Expression**

Successful breastfeeding needs a properly positioned mother and a properly positioned and well latched baby. Those deceptively simple techniques are the foundation of successful breastfeeding. All health staff must be trained in these techniques to help mothers to breastfeed. However, there are situations when this is not feasible. For a preterm or low birth weight baby, mother's breast might be too full or firm to suckle as sucking reflex may not be well developed. Babies with problems like, cleft lip or palate, or oromotor dysfunction are unable to suckle effectively. On the other hand a mother with local breast problems like congested or engorged breast, sore nipple, mastitis or abscess may not allow her baby to suckle due to associated pain. Under these circumstances, the next best option is to express milk from the breast and feed the baby with wati and spoon or tube. Expressing milk is also very useful for working mothers. Expression helps to maintain lactation. It is useful for all mothers to know how to express and store their milk.

An obstetrician is in an important position to help and influence the mother. Expression should be initiated as soon as mother's condition permits. In fact every mother should be taught the correct technique of expression before discharge from the hospital.

Milk can be expressed manually or by using milk pumps. The best and most economical method remains "hand expression" or "manual expression". During the first three days after delivery the amount of milk expressed may vary from a few drops to a teaspoon. After the supply becomes plentiful and with practice- an entire feed can be expressed. Manual expression of milk takes time. At first, there may be no milk seen, but after pressing on the areola for a few times, milk starts to drip out and may even spray out in streams. Once the technique is mastered, it is very convenient, cheaper and quicker. Several pumps are available in the market today. The common hand held pumps shaped like a bicycle horn and made of rubber are unsafe for use. They are difficult to clean and impossible to sterilize, carrying the risk of bacterial contamination. They should never be used if the milk is being expressed for being fed to the baby.

Mechanical, cylindrical pumps are safe and easy to use. These can be easily sterilized and are not very expensive.

Automatic Electrical Pumps battery operated and semi-automated pumps are also available. The suction generated can be regulated to suit the user.

Evaluation done by Zinaman revealed that electrical pumping was more effective in raising maternal prolactin levels and volume of milk in comparison with hand pumping and manual expression <sup>23</sup>. Hence this may be considered as short gap arrangement till the mother masters the art of manual expression.

Expressed breastmilk stays in good condition at room temperature for 8 hours, or in refrigerator for 24 hours, or in the freezer at -20°C for three months. If mother is expressing milk to keep up the production while the baby cannot feed, she must express milk at least eight times a day ( in 24 hours), including two times at night and once early morning. This night expression is very important to maintain good blood levels of the hormone 'prolactin'-responsible for the production of milk. Studies have revealed that optimal milk production occurs with at least 5 expressions per day and pumping durations that exceed 100 minutes/day<sup>24</sup>. A RCT has revealed that pumping both breasts simultaneously produce more milk<sup>25</sup>. Stress and a negative attitude definitely discourage the outcome.

### **Insufficient milk syndrome (Low milk production)**

Perceived lack of milk is the most common reason women report early termination of lactation. A study conducted at the Lactation Management Clinic of Sion hospital, Mumbai demonstrated that out of 519 mothers only 3 mothers had lactational failure<sup>26</sup>. The study highlighted the fact that supportive breastfeeding practices in the hospital constitute the foundation for initiation of successful breastfeeding, however constant reinforcement and support to all lactating mothers is essential to maintain lactation. A mother may believe that she does not have enough milk because the baby cries often, wakes up frequently, demands feeds frequently or she feels her breasts are soft and empty. If the baby gains normal weight and has normal urine output with exclusive breastfeeding, the mother needs reassurance that her baby is growing well.

The babies with poor/no weight gain with normal/low urine output need close attention. Local/systemic problems in mother/baby, incorrect attachment, incorrect feeding practices should be recognized and treated or lack of confidence in mother and appropriate management should be instituted. Advice on how to increase milk production is most beneficial.

It is essential to enquire about feeding practices e.g. number/length of breastfeeds, provision of supplements, use of bottles/ pacifiers etc. The baby should be examined for evidence of systemic illness or local problems like cleft palate, oromotor dysfunction etc. Local breast problems like inverted/

sore nipples should be ruled out. Observation of mother-infant couple while feeding provides most valuable information related to positioning & attachment at the breast.

Most mothers have enough milk and all she needs is reassurance and supports. In few situations especially with anxious mothers, galactagogues may be helpful. Emphasis should be given during counseling that the best galactagogue is a baby suckling at the breast in a correct position, frequently & for a long duration. Drugs like metoclopramide and chlorpromazine are shown to increase milk production in mother. The drugs are to be given only if all other measures fail. It is important to note that true lactational failure is very rare.

### **Drugs and breastfeeding**

As with the helpless fetus in utero, the nursing infant is exposed to nearly everything entering the body of its mother. Most medications given to nursing mothers generally reach newborn infants in much smaller amounts than given to pregnant women reaching the fetus<sup>27</sup>. In most cases, the benefits of breastmilk and breastfeeding outweigh the risks attached to the presence of small amounts of medication in breastmilk. In a study of 838 infants exposed to medications through breastmilk, no infant experienced a reaction requiring a medical attention or breastfeeding cessation, but 11% experienced minor reactions; analgesics, antibiotics, antihistaminics, and sedatives were the most commonly used medications<sup>28</sup>. The timing of maternal ingestion of a drug in relation to the timing of milk synthesis influences the concentration of drug in the breastmilk.

**The commonly used maternal medications while breastfeeding & their effect on the fetus is shown below.**

<b>Medications</b>	<b>Comment in relation to breastfeeding</b>	<b>Effects &amp; Precautions</b>
<b>Analgesics</b>		
Acetaminophen	Safe	Use acetaminophen or ibuprofen preferably.
Ibuprofen	Safe	
Aspirin	Use with caution	
<b>Antibiotics</b>		
Penicillins	Safe unless allergy is an issue	May change infant's intestinal flora and cause diarrhoea.
Aminoglycosides	Safe	Poorly absorbed from GIT

Cephalosporins	Safe	May alter infant's GI flora and cause diarrhoea, common with third generation cephalosporins.
Sulfonamides	Best avoided	Potential to displace bilirubin from albumin Risk of hemolysis with G6PD deficiency
Chloramphenicol	Best avoided	Risk of idiosyncratic reactions
Ciprofloxacin	Use with caution	More data required. Use safer drugs.
Tetracycline	Best avoided.	Dental staining and abnormal bone growth
Metronidazole	Avoid in 1 <sup>st</sup> month postpartum	Risk of carcinogenicity, relatively high infant plasma concentrations.
<b>Antidiabetics</b>		
Sulfonylureas	Contraindicated	
Insulin	Safe	
<b>Anticonvulsants</b>		
Phenytoin	Safe	
Phenobarbitone	Safe	Infant sedation : monitor for lethargy and weight gain
Diazepam	Safe	Infant sedation, Short acting agents like lorazepam & oxazepam is preferable.
<b>Antituberculosis</b>		
Isoniazide	Safe	
Rifampicin	Safe	
Streptomycin	Safe	
Pyrazinamide	Safe	
Ethambutol	Use with caution	Observe for ocular effects.
Pyridoxine	Use with caution	Suppresses lactation with large doses.
<b>Antileprosy</b>		
Dapsone	Safe	
Rifampicin	Safe	
<b>Anticoagulants</b>		
Heparin	Safe	Does not enter breastmilk.
Newer synthetic heparin	Use with caution	Infant coagulopathies, potential for passage into breastmilk due to lower molecular weight
Warfarin	Safe	
<b>Antithyroid</b>		
Methimazole	Contraindicated.	Can suppress infant's thyroid function.
Carbimazole	Contraindicated	Use propylthiouracil & monitor thyroid function.
<b>Theophylline</b>		
Antimalignancy	Safe	Watch for infant irritability
Cytotoxic drugs	Contraindicated	
Radioactive drugs		

The real contraindication for breastfeeding is with the following group of drugs, Radioactive substances, Ergot derivatives, Antimetabolites and Lithium.

There are ways to minimize the effects of medication in breastmilk like prescribing safer alternatives, avoiding breastfeeding at times of peak medication levels in the blood i.e. 1 to 3 hours after an oral dose, breastfeeding the baby before taking the medication or taking the medication just before the baby's longest sleep period & withholding breastfeeding temporarily if a contraindicated drug has been administered. In this case, express out the milk to maintain milk production in the mother.

Thus, in assessing the impact of maternal medication on breastfeeding, the clinician must weigh the benefits of breastfeeding for mother – infant couple against the risk of the presence of small amount of medications in breastmilk. With regard to vast majority of medications, continued breastfeeding is advantageous to both mother & infant.

### **Providing Breastmilk In Situations Where Mother's Milk Is Unavailable:**

#### **Concept Of Human Milk Banking:**

At times the baby's own mother's milk is unavailable, either because the mother has some problem like post partum eclampsia, PPH, acute severe illness or because the baby has been transferred to another hospital without the mother or because the baby is preterm and the mother's milk output is still inadequate. In such situations where mother's own milk is not available to the baby, the next best option is to use another mother's milk as it is "species specific", and provides the necessary immunity. A human milk bank ensures that this milk is safe in all ways to feed the baby. A human milk bank may be defined as a service established for purpose of collecting, screening, processing, storing & distributing safe, donated human milk that is dispensed to recipients who are not biological offspring's of the donor mothers <sup>29</sup>.

Milk is obtained from healthy, lactating donor mothers who are HIV, VDRL & HBSAg negative. The milk is collected in autoclaved stainless steel containers with lids. In the milk bank, the milk is pasteurized in a shaker water bath at 62.5 degrees celsius for 30

minutes, rapidly cooled and then stored in the freezer at -20 degrees Celsius <sup>24,30</sup>.

Pasteurized and frozen banked milk retains its nutritional properties and a significant amount of immunoglobulins though the cellular components are destroyed. Pasteurized milk can be stored for a period of six months. The frozen milk is thawed by standing the container in warm water and is to be used by 4-6 hours, latest by 8 hours of thawing. Thus banked milk can serve as a temporary alternative till the mother is in a position to breastfeed.

On a smaller scale, pasteurization can be carried out by an individual by the 'Pretoria Pasteurization Method'. Pretoria pasteurization is a simple low cost method which has been shown to inactivate HIV in breastmilk <sup>25,26</sup>. The method uses passive transfer of heat from 450 ml of water heated to boiling point in which the container of expressed milk is placed. Milk temperatures of 56-62.5 degree Celsius are maintained for 15 -30 minutes. This method of pasteurization could be used on a small scale in nursing homes, so as to avoid the use of replacement feeds, when mother's milk is temporarily not available.

#### **HIV positive mothers and breastfeeding:**

Ever since Ziegler and colleagues in Australia described the case of an HIV-1-infected infant who apparently acquired the infection after being breastfed by his previously healthy mother, who received a postpartum transfusion of HIV-1-contaminated blood in 1985, the small but significant risk of HIV transmission through breastfeeding has become an important issue <sup>27</sup>.

Analysis of published studies of mothers with HIV-1 infection has estimated further risk of transmission through breastfeeding (in addition to in utero and/or intrapartum transmission) of 14% and around 27% among women with acquisition of HIV-1 infection after delivery <sup>28</sup>. In mothers who are infected with HIV when they are still breastfeeding, the risk of transmission through breastmilk is nearly twice as high as for women infected before or during pregnancy <sup>31</sup>. This higher rate of transmission is because of viremia associated with primary infection with HIV-1 and the presumably high viral load concomitantly in human milk, women who breastfeed during primary infection with HIV-1.

In a study by Coutsooudis, the estimated proportion of infants HIV-1 infected by 3 months was significantly lower for those exclusively breastfed for 3 months than in those who received mixed feeding before 3 months (14.6 vs 24.1%,)<sup>32</sup>. This is due to the fact that contaminated fluids and food given to infants with mixed breastfeeding damaged the bowel and facilitated the entry of HIV-1 into tissues. The findings have important implications for prevention of HIV-1 infection and infant-feeding policies in developing countries as exclusive breastfeeding for 3 to 6 months may offer HIV-1-infected women in developing countries an affordable, culturally acceptable, and effective means of reducing mother-to-child transmission of HIV-1 while maintaining the overwhelming benefits of breastfeeding<sup>32</sup>.

Recognizing the need to minimize the risk of MTCT to infants while simultaneously avoiding the increased risk of added morbidity and mortality due to malnutrition and infection, WHO, UNAIDS, and UNICEF have issued the following recommendation: "For mothers who are HIV negative or do not know their HIV status, exclusive breastfeeding for the first six months and continued breastfeeding for upto two years or longer with addition of complimentary food after six months is recommended.

However if a woman has tested positive for HIV and when replacement feeding is acceptable (A), feasible (F), affordable (A), sustainable (S) and safe (S), avoidance of all breastfeeding by HIV infected mothers is recommended. Otherwise, exclusive breastfeeding is recommended during the first months of life and should then be discontinued as soon as feasible". The recommendations further state that "when HIV-infected mothers choose not to breastfeed from birth or stop breastfeeding later, they should be provided with specific guidance and support for at least the first two years of the child's life to ensure adequate replacement feeding"

### **Breastfeeding Options for an HIV Positive Mother**

#### **Exclusive breastfeeding with early cessation (Cessation at or before six months).**

If complete avoidance of human milk is not possible, early weaning from human milk (at or before 6 months of age), if feasible, would limit

exposure to HIV-1-infected human milk while allowing the child to experience benefits of breastfeeding. HIV positive mothers who choose to do so must be helped to do so as safely as possible and the transition time from exclusive breastfeeding to exclusive replacement feeding should be minimized as there are concerns about the possible increased risk of HIV transmission with mixed feeding during the transition period between exclusive breastfeeding and complete cessation of breastfeeding.

Smooth transition is also possible by gradually getting the infant accustomed to less frequent feeding from the breast and to drinking breastmilk by cup or wati-spoon. The mother should be encouraged to find alternative means of comforting the infant like rocking, carrying etc. Once the infant has been weaned off the breast, the shift from expressed milk to replacement milk feeds is possible in a shorter duration.

Replacing milk feeds with family food should be tried only after transition to replacement milk feeding has been achieved and the infant is growing well.

Using expressed heat treated milk, using a wet nurse or obtaining milk from a human milk bank are other feasible options.

### **In summary**

There is a 5-20% (average of 14%) risk of transmission of HIV from mother to baby.

All HIV positive mothers should be counseled in the antenatal and postnatal periods regarding choices in infant feeding.

When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended.

Otherwise, exclusive breastfeeding is recommended during the first few months of life.

Breastfeeding should be discontinued as soon as feasible, taking into account, the mother's situation and the risks of replacement feeding (including infections other than HIV and malnutrition).

## References

1. Heinig MJ. Host defense benefits of breastfeeding for the infant. Effect of breastfeeding duration and exclusivity. *Pediatr Clin North Am* 2001; 48:105-23.
2. Dewey KG, Heinig MJ, Nommsen-Rivers LA. Differences in morbidity between breast-fed and formula-fed infants. *J Pediatr* 1995;126:696-702.
3. Bachrach VR, Schwarz E, Bachrach LR. Breastfeeding and the risk of hospitalization for respiratory disease in infancy: a meta-analysis. *Arch Pediatr Adolesc Med* 2003;157:237-43.
4. Aniansson G, Alm B, Andersson B, et al. A prospective cohort study on breast-feeding and otitis media in Swedish infants. *Pediatr Infect Dis J* 1994;13:183-88.
5. Lucas A, Cole TJ. Breast milk and neonatal necrotising enterocolitis. *Lancet* 1990;336:1519-23.
6. Schanler RJ, Shulman RJ, Lau C. Feeding strategies for premature infants: beneficial outcomes of feeding fortified human milk versus preterm formula. *Pediatrics*. 1999;103:1150-7.
7. Pettit DJ, Forman MR, Hanson RL, et al. Breastfeeding and the incidence of non-insulin-dependent diabetes mellitus in Pima Indians. *Lancet* 1997;350:166-8.
8. Davis MK. Review of the evidence for an association between infant feeding and childhood cancer. *Int J Cancer Suppl* 1998;11:29-33.
9. Armstrong J, Reilly JJ, Child Health Information Team. Breastfeeding and lowering the risk of childhood obesity. *Lancet* 2002;359:2003-04.
10. Oddy WH, Peat JK, de Klerk NH. Maternal asthma, infant feeding, and the risk of asthma in childhood. *J Allergy Clin Immunol* 2002;110:65-7
11. Lucas A, Morley R, Cole TJ. Randomised trial of early diet in preterm babies and later intelligence quotient. *BMJ* 1998;317:1481-7.
12. Horwood LJ, Darlow BA, Mogridge N. Breast milk feeding and cognitive ability at 7-8 years. *Arch Dis Child Fetal Neonatal Ed* 2001;84: F23-7
13. Labbok MH. Effects of breastfeeding on the mother. *Pediatr Clin NorthAm* 2001;48:143-58.
14. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50302 women with breast cancer and 96973 women without the disease. *Lancet* 2002;360:187-95.
15. Rosenblatt KA, Thomas DB. Lactation and the risk of epithelial ovarian cancer. WHO Collaborative Study of Neoplasia and Steroid contraceptives. *Int J Epidemiol* 1993;22:192-7
16. Cumming RG, Klineberg RJ. Breastfeeding and other reproductive factors and the risk of hip fractures in elderly women. *Int J Epidemiol* 1993;22:684-91.
17. Weimer J. The Economic benefits of breast feeding: a review and analysis. Food Assistance and Nutrition Research Report No. 13. Washington, DC: Food and Rural Economics Division, Economic Research Service, US Department of Agriculture; 2001.
18. Jones G, Steketee RW, Black RE et al. How many child deaths can we prevent this year? *Lancet* 2003;362:65-71.
19. Gartner LM, Morton J, Lawrence RA et al. Breastfeeding and the Use of Human Milk, AAP Policy Statement. *Pediatrics* 2005;115:496-506.
20. Victora CG, Vaughan JP, Lombardi C et al. Evidence for protection by breast-feeding against infant deaths from infectious diseases in Brazil. *Lancet* 1987; 2:319-22.
21. Arifeen S, Black RE, Antelman G et al. Exclusive breastfeeding reduces acute respiratory disease and diarrhoea deaths among infants in Dhaka slums. *Pediatrics* 2001;108:67
22. UNICEF/WHO, Joint Committee on Health Policy. Strategic approach to operationalizing selected end-decade goals: reduction of iron deficiency anemia. New York: Unicef, 1995. (JCHP 30/95/4.5.)
23. Zinaman MJ, Hughes V, Queenan JT, et al: Acute prolactin, oxytocin responses and milk yield to infant suckling and artificial methods of expression in lactating women. *Pediatrics* 1992;89:437.
24. Hopkinson JM, Schanler RJ, Garza C. Milk production by mothers of premature infants. *Pediatrics* 1988;81:815.



25. Lawrence RA. The collection & storage of human milk & human milk banking. In: Breastfeeding: a guide for the medical profession. Lawrence RA. Lawrence RM. (Eds.) 6th edn. 2005, St. Louis, Mosby Inc. pp.761-796.
26. Nanavati RN, Mondkar JM, Fernandez AR et al. Lactation management clinic – positive reinforcement to hospital breastfeeding practices. *Indian Pediatr* 1994;31:1385-9.
27. Howard CR, Lawrence RA. Drugs and breastfeeding. *Pediatr Clin North Am.* 1999;26:447-78.
28. Ito S, Blajchman A, Stephenson M, et al: Prospective follow up of adverse reactions in breastfed infants exposed to maternal medication. *Am J Obstet Gynecol* 1993;168:1393.
29. Zinaman MJ, Hughes V, Queenan JT, et al: Acute prolactin, oxytocin responses & milk yield to infant suckling & artificial methods of expression in lactating women. *Pediatrics* 1992;89:437.
30. Human Milk Banking Association of North America (HMBANA, 2000 ). Guidelines for the establishment and operation of a human donor milk bank. Denver; Author.
31. Cohen RS. Current issues in human milk banking. *Neo Reviews* 2007;8:289-95.
32. Jeffery BS, Mercer KG. Pretoria pasteurization: a potential method for the reduction of postnatal mother to child transmission of the human immunodeficiency virus. *J Trop Pediatr* 2000;46:219-23.