

A Review on Breastfeeding

Naresh Kumar Kongari^{1*}, Nikhitha Vuyyala¹, Devi Priya Bhargavi Salveru¹, Surender Kagithapu², Raj Kumar Gaju³,
Shyam Sunder Anchuri⁴

¹Pharm D, Department of Pharmacy Practice, Balaji Institute of Pharmaceutical Sciences, Laknepally, Narsampet, Warangal, Telangana, India.

²Department of Pediatrics, MGMH, Kakatiya Medical College, Warangal-506002

^{3,4}Department of Pharmacy Practice, Balaji Institute of Pharmaceutical Sciences, Laknepally, Narsampet, Warangal, Telangana, India-506331

Corresponding Author: Naresh Kumar Kongari, Pharm D, Department of Pharmacy Practice, Balaji Institute of Pharmaceutical Sciences, Laknepally, Narsampet, Warangal, Telangana, India.

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Abstract

Background: According to WHO(world health organization) and UNICEF(united nations international childrens emergency fund), the rate of malnutrition and mortality can be decreased if all the newborns were breastfed exclusively for six months. It reduces risk of diseases in both mothers and the babies as well. The aim of our review was to show the evidence on benefits and the need of breastfeeding.

Results: According to the results of our review , our analysis confirms that both the family and health care professionals play a crucial role in encouraging mothers regarding breastfeeding.

Conclusion: According to the evidence available we strongly recommend, to intensify the public health education campaigns to promote breastfeeding practices. The most important factor to be considered is that the mothers should be counselled in prior by the obstetrician and gynecologist, nurses, midwives about choosing breastfeeding and continuing it effectively for a better society.

Keywords: new born, malnutrition, breastfeeding, midwives.

Introduction

Breast milk is an excellent food for neonates. It is the ever green gift given by a mother to her baby. ^[1] “In all mammalian species the reproductive cycle comprises both pregnancy and breast-feeding: in the absence of latter, none of these species, man included, could have survived”, wrote paediatrician Bo Vahlquist in 1981. ^[2]

More than 820,000 lives (87 percent of them infants below 6 months of age) can be saved yearly in 75 LMICs with good practice of breastfeeding. Breastfeeding is the top intervention for decreasing under-5 mortality. ^[3]

The mounting up of breastfeeding to the universal level could prevent 823 000 yearly deaths in children younger than 5 years and 20 000 yearly deaths from breast cancer. Breastfeeding extent is more concise in high-income countries than in low income countries. Contemporary epidemiological and biological findings from the last ten years expand on the known profits of breastfeeding for

children and women, whether they are wealthy or scanty. [2]

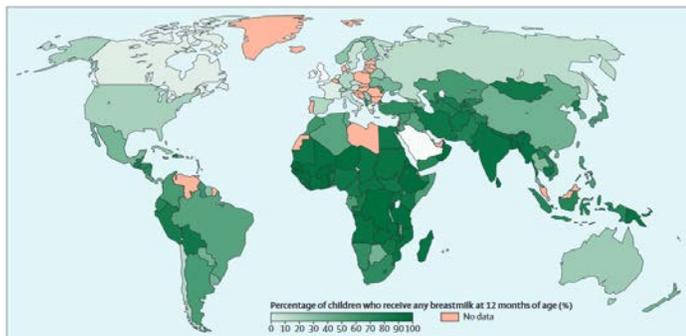


Figure: 1 Global distribution of breastfeeding at 12 months [2]

Both the World Health Organization (WHO) and United Nations Children’s Fund (UNICEF) proposed early initiation of breastfeeding, exclusive breastfeeding during the first 6 months and continued breastfeeding until 24 months of age. [4] Yet breastfeeding rates universally generally remain low. Only 43% of the newborns are placed on the breast within 1 h of birth and 40% of infants aged 6 months or less are breastfed exclusively. [5][6]

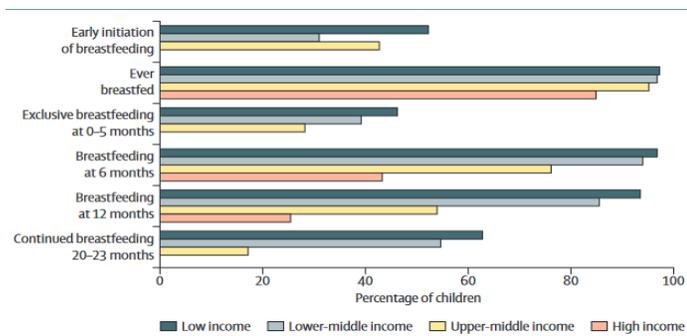


Figure: 2 Breastfeeding indicators by country income group in 2010 Data are from national surveys that used standard indicators, and were weighted by national populations of children under 2 years. Data is from up to 153 countries. [2]

Anatomy of Breast

The breast consists of epithelial cells (luminal and myoepithelial), ducts and lobules and two types of stroma (interlobular and intralobular). Five to ten major duct orifices the epidermal surface of the nipple. Large ducts

will lead to the terminal duct lobular unit, which finally form into grape-like clusters of small acini to form a lobule. There are 3 types of lobules, which form at different stages in a woman's development. Size and number of lobules increase progressively by the end of pregnancy; the breast is made up of lobules and separated by stroma. Breast becomes completely mature and functional only at the time of pregnancy.

At the time of puberty type 1 lobule is formed. During each menstrual cycle Changes in the level of estrogen and progesterone stimulate lobule 1 to produce new alveolar buds and finally emerge to more mature structures, known as type-2 and type-3 lobules. After puberty, no further changes occur to the breast until pregnancy.

During pregnancy, mammogenesis (stage 2) occurs due to higher levels of progesterone. The formation of breast tissue during pregnancy is a result of the proliferation of secretory tissue. At Initiation of pregnancy, lobule type 3 is formed due to the involvement of chorionic gonadotropin. These lobules have larger size and number of epithelial cells composing each acinus. In late pregnancy, the proliferation of new acini is decreased, and the lumen becomes enlarged with secretory material or transitional milk.

During delivery and lactation, growth and differentiation is seen in the lobule along with milk secretion. The glandular component of the breast is now mainly made up of epithelial elements and very little stroma. This will continue throughout lactation.

Finally, the involution of mammary glands occurs with the cessation of lactation and requires a combination of lactogenic hormone deprivation and local autocrine signals that signal apoptotic cell death and tissue remodeling. Full regression does not occur, and pregnancy causes a permanent increase in the size and number of lobules. Following lactation, there is always the potential

of the glands to produce milk in response to regular stimulation. [7]

The breast is made up of glandular tissue, supporting tissue and fat. The glandular tissue consists of small clusters of sac-like spaces which produce milk. Each sac is lined by network of myoepithelial cells that propel the milk into lactiferous ducts towards nipple. Before reaching the nipple, the ducts widen to form lactiferous sinuses which store milk. The lactiferous sinuses lie beneath the junction of areola and rest of breast. The areola and nipples are extremely sensitive as they are supplied by a rich network of nerve endings. On the areola there are small swellings of glands which produce an oily fluid to keep the nipple skin soft. Since the lactiferous sinuses lie beneath the areola, a baby must suck at the nipple and areola.

The gum line of the baby should rest at the junction of areola and rest of breast tissue in order to express milk stored in lactiferous sinuses. [1]

Physiology

Lactogenesis is a phenomenon involving many hormones and reflexes. Two hormones directly affect breastfeeding: prolactin and oxytocin. Estrogen is indirectly involved in lactation. [8]

Prolactin Reflex (milk secretion reflex).

- Prolactin is produced by anterior pituitary gland. It is responsible for milk secretion by the alveolar epithelial cells. The whole cycle from stimulation to secretion called as prolactin reflex.

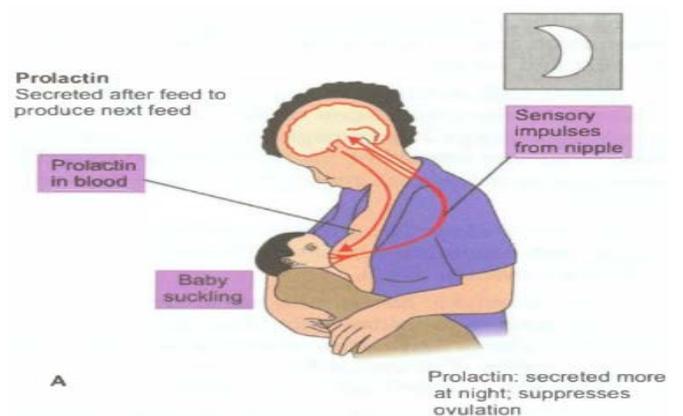
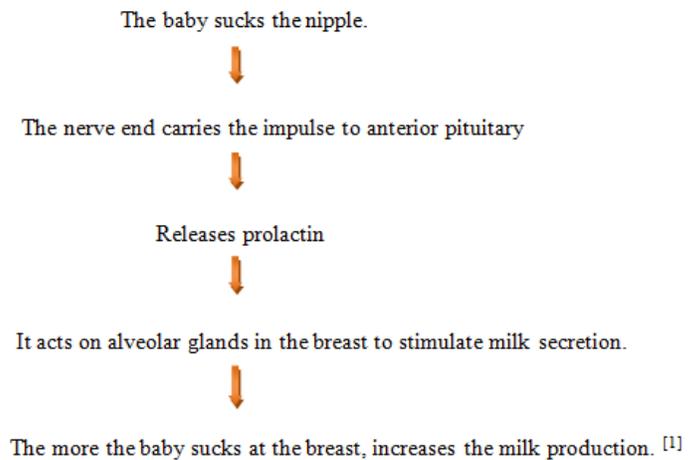
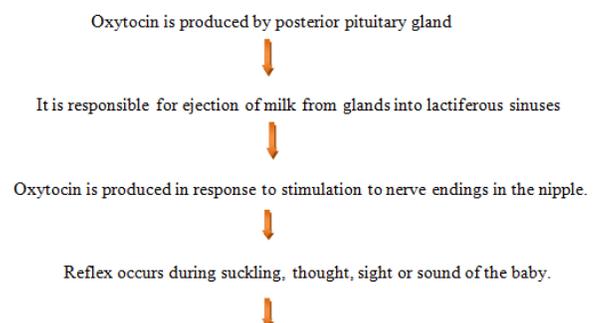


Figure: 3 [1]

Note: More prolactin is released during night time; hence to maintain the reflex, feeding at night time is more important.

Oxytocin Reflex (milk ejection reflex).



Since this reflex is affected by mothers emotion, relaxation, confident and attitude, helps in milk ejection (because stress or lack of confidence decrease the milk flow). [1]

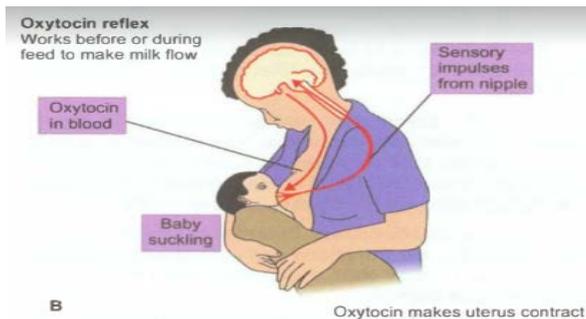


Figure: 4 ^[1]

Composition of Breast milk

Anti-infective agents

Breast milk contains many factors that help to fight against infection ^[9] including:

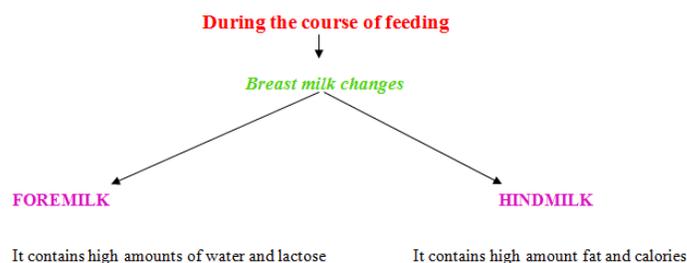
- Immunoglobulin, mainly secretory immunoglobulin A (sIgA), which layers the intestinal mucosa and stops bacteria from entering the cells;
- White blood cells kill micro-organisms;
- Proteins (Lysozyme and Lactoferrin) which can kill bacteria, viruses and fungi;
- Oligosaccharides stop bacteria from attaching to mucosal surfaces.

Developed human milk contains (4%-5%) fat, (0.8%-0.9%) protein, (6.8%-7.2%) carbohydrate known as lactose, and (0.2%) mineral constituents as ash. Its energy content is (60-76 kcal/100 ml). Protein content is higher and carbohydrate content lower in transitional milk than in mellow milk. Age, race, diet, or parity does not largely affect milk composition and there is no compositional difference between milks from the two breasts except one is affected. ^[10]

Colostrum (Transitional milk) is the thicker pale yellow milk produced by breasts immediately after giving birth. It's rich in antibodies that show greater immunization. It's also rich in protein, salt, minerals, nitrogen, vitamin-A, white blood cells, and has less fat and sugar than fully matured milk. Colostrum also exhibits laxative effect and helps a newborn to splash gastrointestinal tract of

meconium, the waste product accumulated before birth, thereby decreasing the chance of jaundice. At the beginning more amount of milk is not produced, but each drop is loaded with protective and nutritive component. ^[11]

Fully Matured milk Mature milk is thinner, comes in 2 to 4 days after the delivery and is produced in larger amounts when compared to colostrum. Mature milk consists of fat, water, carbohydrates, vitamins, protein, and minerals, amino acids, white cells and enzymes. ^[11]



Note: After few days of feeding breast milk will contain some amount of white cells and more amount of antibacterial enzyme, Lysozyme, it remains high level as long breastfeed continues.

Breast milk contains more than 210 beneficial elements, with more being discovered all the time. ^[11]

Other bioactive factors

Bile-salt stimulated lipase: Once the milk has reached the small intestine, it promotes the entire digestion of fat. ^[12] Compared to breast milk, fat in artificial milk is less completely digested. ^[13]

Epidermal growth factor: ^[14] provokes the maturation of the lining of the baby's intestine, so that it is easy to digest and absorb nutrients, and is less easily infected or stimulated to foreign proteins. It has been proposed that other growth factors in human breast milk target the development and maturation of nerves and retina. ^[15]

The composition of human breast milk is the standard biological nutrition for infants. It also contains thousands

of different bioactive molecules that fight against inflammation and infection and afford to the development of organs and immune system.

Starting to breastfeed

How breastfeeding works?

At the stage of pregnancy breasts are ready to make milk for the infant. Some changes occur in the breasts such as breasts may get larger and firmer and nipples may appear darker. A newborn Baby's stomach can hold 4 teaspoons of milk hence they only need small amounts to be satisfied. After a few feedings breasts gradually change from Transitional milk to making milk. The color of the milk will change from yellowish to bluish-White and watery looking. When the baby sucks, your breasts are stimulated to let-down milk.

During the let-down reflex mothers feel a range of sensations? These may include:

- ✓ A tingling pins-and-needles sensation starts under your arm and then moves across and down the breast.
- ✓ Milk dripping starts from the other breast.
- ✓ Some cramping occurs in uterus in the early days after delivery.
- ✓ This discomfort settles when baby starts feeding.
- ✓ Some mothers may not feel their let-down at baby's appetite has an effect on how much is taken at the feed.
- ✓ A hungry baby will take more Milk.
- ✓ Breastfeed often (around 8 to 12 times each day).^[17]

Skin To Skin Contact (SSC):

What Is Skin To Skin Contact?

Skin-to-skin contact is usually referred to the practice where a baby is dried and laid directly on their mother's bare chest after birth, both of them covered in a warm blanket and left for at least an hour or until after the first feed. Skin-to-skin contact can also take place any time a baby needs comforting or calming and to help boost a

mother's milk supply. Skin-to-skin contact is also vital in neonatal units, where it is often known as 'kangaroo care', helping parents to bond with their baby, as well as supporting better physical and developmental outcomes for the baby.^[18] SSC through sensory stimuli such as touch, warmth, and odor is a powerful stimulant, which among other effects releases maternal oxytocin.^[19] During breastfeeding or suckling, maternal oxytocin levels are raised by somatosensory stimulation. Oxytocin is also released by non-noxious stimuli such as touch, warm temperature etc. in plasma and in cerebrospinal fluid.^[20]

Importance of Skin To Skin Contact

- Relaxes and Calms both baby and mother.
- Regulates the heart rate and breathing of the baby, helping them to adjust life outside the womb.
- Stimulates digestion and an interest in feeding.
- Enables colonization of the baby's skin with the mother's friendly bacteria, thus providing protection against infection.
- Releases hormones to support breastfeeding and mothering.

Additional benefits for babies in the neonatal unit:

- Improves oxygen saturation.
- Reduces cortisol (stress) levels particularly following painful procedures.
- Encourages pre-feeding behavior.
- Assists with growth.
- May reduce hospital stay.
- If the mother expresses following a period of skin-to-skin contact, her milk volume will improve and the milk expressed will contain the most up-to-date antibodies.^[18]

Steps in Skin To Skin Contact

- once they have found the breast, they will tend to rest for a little while;

- After a while the baby will start to familiarize with the breast, by nuzzling, smelling and licking around the area. This period can last for some time and is important, so should not be rushed. Sometimes it is tempting to help baby to attach at this time but try allowing them to work out how best to attach themselves.
- Finally baby will self-attach and begin to feed. It may be that baby and mother need a little help with positioning at this stage.
- Once baby has suckled for a period of time, they will come off the breast and often both mother and baby will fall asleep.^[18]

Skin-to-skin contact (SSC) may have a long term positive effect on breastfeeding. Twenty-to-forty percent of women experience postpartum depressive symptoms, which affect both the mother and infant. In preterm infants, daily **skin-to-skin contact (SSC)** between the mother and her infant has been shown to decrease maternal postpartum depressive symptoms.^[21]

Positions in Breastfeeding

Positioning and attachment ('P&A') skills-teaching was introduced in 1986 as an aid to initiate breastfeeding.^[22] Feeding position is an important aspect that helps baby's feeding on and the mothers comfort while breastfeeding.^{[23][24]} In Thailand, infant feeding position teaching is a common routine breastfeeding practice in the postpartum ward. Health care professionals will help the mother to learn to position and attach her baby for successful breastfeeding.^[25] The four infant feeding positions, the cradle, the cross cradle, football carry, and side-lying positions are most commonly used. The majority of mothers are discharged at the second day post partum, the number of breast feeding positions in which mothers can practice are limited.^[26]

Cues in Breastfeeding

Infant feeding position is an important aspect that helps a baby's latching on and the mother's comfort while breastfeeding.

Starting cues

- Stirring
- Mouth opening
- Turning head
- Seeking/rooting

Middle cues

- Stretching
- Increasing physical movement
- Hand to mouth

Last cues

- Crying
- Agitated body movements
- Color turning red, time to calm crying baby
- Cuddling
- Skin to skin on chest
- Talking
- Stroking^[17]

Communicating Cues

- cues which Change as the baby grow, include
- Movements of legs, arms and hands.
- Expressions like sleepiness and smiles
- Sounds like laughter .
- Looking away and looking back to mother.^[17]

Exclusive Breastfeeding

The World Health Organization defines exclusive breastfeeding as the practice of feeding only breast milk (including expressed breast milk) to the baby and allows the baby to receive vitamins, minerals or medicine. Water, breast milk substitutes, other liquids and solid foods are excluded.^[27] Breast milk is the ideal source of nutrition to the newborn babies which is uniquely designed to meet all

the nutritional needs of new born babies for the first six months of life. [28] Nutrients of the human breast milk are present in proper balance and are provided in bio-available and easily digestible forms. [29] Exclusively breastfed infants are shown to have lower rates of diarrhea and acute respiratory infections, to have better neurodevelopment and have better physical growth compared to mix-fed or formula fed infants. [30] Infants who are exclusively breastfed for six months experience less morbidity from gastrointestinal infection than those who are partially breastfed for 3 or 4 months. [31]

Continuation of Breastfeeding

The World Health Organization (WHO) recommends exclusive breast feeding for first six months, with supplemental breastfeeding continuing for two years and beyond. [32]

Physiology in Breastfeeding

Successful breastfeeding depends on maternal factors, infant response to breastfeeding, and various psycho physiological factors. Many studies have proved generally that women who have more positive or stronger maternal attitudes and positive obstetric experiences are more likely to succeed and to continue with breastfeeding. [33] Pregnancy, childbirth and compatibility with the newborn may constitute the most perceptive developmental stage in woman's life. [34] Successful breastfeeding not only depends on physiological factors but also on the mother's social and psychological conditions. [35] Studies have exposed that mental disorders such as depression, anxiety and stress have a negative effect on breastfeeding. Some evidence advice that maternal stress can counter the milk letdown reflex. [36] Post partum depression is a mental disorder changes the virtue of the emotional relationship between mother and baby. [37] Studies have shown the prevalence of postpartum depression as 9–31%. [38] A high perceived stress of 46.5% [36] and a postpartum anxiety of

10–50% [39] have been identified in primiparous women. [40] Anxiety and worry are undesirable and unclear emotions [41] that consist of complications of stress. [42] Stress and anxiety are biological-hormonal responses that are affected by the hypothalamic-pituitary-adrenal axis activity, and increase catecholamine such as epinephrine. [43] The axis is more sensitive to stress in postpartum as compared to ordinary women, [44] it leads to decreased prolactin and oxytocin secretion, and thereby reduction in milk supply during breast feeding. [45]

Interventions during Breastfeeding

Getting the first few feeds correct can prevent problems like breast or nipple pain, poor milk supply and early infant weight loss.

Breast discomfort: A normal breast is tender; breast engorgement can occur on days 2-7 when milk comes in, breast becomes edematous and painful.

Sore nipples: Often caused by suction trauma secondary to incorrect positioning nipples may range in appearance from red to cracked and scabbed. [32]

Plugged ducts: A plugged milk duct feels like a tender and sore lump in the breast. If fever or other symptoms occur then probably have a breast infection rather than plugged ducts. [46]

Mastitis: Soreness or a lump in the breast. Causes symptoms such as:

- Fever and/or flu-like symptoms, such as feeling run down or very achy.
- Nausea
- Vomiting
- Yellowish discharge from the nipple that looks like colostrum
- Breasts that feel warm or hot to the touch and appear pink or red. [46]

Engorgement: Engorgement is the result of the milk building up. It happens during the third to fifth day after

delivery. But it can happen at any time, mostly due to overflow of milk or are not feeding baby or expressing milk often.

Engorgement can also cause:

- Breast swelling
- Breast tenderness
- Warmth
- Redness
- Throbbing
- Flattening of the nipple
- Low-grade fever ^[46]

Health Outcomes Associated With Not Breast Feeding ^[47]

Infant Health Outcomes	Maternal Health Outcomes
Infection; otitis media, LRTI, UTI, diarrhea, bacterial meningitis, sepsis.	HTN, hyperlipidemia, disease, syndrome.
SIDS, Necrotizing Enterocolitis, Post neonatal deaths.	Breast cancer, ovarian cancer, Rheumatoid arthritis, Post partum Depression.
Atopic dermatitis, leukemia, lymphoma, Hodgkin's disease, Asthma, Diabetes.	Reduction in bone health.
Impaired temperature and respiratory regulation.	Increased sleep disturbances, decreased post partum weight loss,
Lack of pain relief.	
Decreased cognitive development.	Lack of amenorrhea
Increased obesity.	

Hazards of Infant Formula and Bottle Feeding

- Pathogen contamination

- Manufacturing errors and warehouse contamination
- Adulteration of formula
- Phytoestrogens in soy formula
- Bisphenol A in feeding bottles
- Not breastfeeding in emergencies ^[47]

The Obstetricians Role in Promoting and Supporting Breastfeeding

Mothers take decisions about infant feeding early in pregnancy. Early in prenatal care, the obstetrician can motivate mothers about the health outcomes of infant feeding and address potential barriers to breastfeeding. By supporting breastfeeding as the best way to feed an infant, the obstetrician-gynecologist can play an important role in improving health outcomes across 2 generations. ^[48]

Effect of Antenatal Counselling On Breastfeeding

The basic to successful breastfeeding is to be Information, Education and Communication (IEC) strategies desired at behavior change. ^[49] These days counselling on breastfeeding is not done as part of antenatal visits. Alexander et al suggested that routine breast examination during antenatal care does not increase the chances of successful breastfeeding detection of cracked nipples in the antenatal period ^[50] followed by appropriate procedure to make nipples draw out may help in ensuring the success of breastfeeding in postnatal period ^[51]. Breastfeeding care provided by the primary care physician during routine preventive visits is likely to have limited impact, compared with the effects of psychological factors, cultural factors, and return to work. ^[52] Studies have resulted that feeding counselling is of poor quality or unavailable for many women. ^[53] If appropriate measures are taken to improve training in breastfeeding counselling and the number of trained professional counsellors, clinical pharmacists at all levels is increased, exclusive breastfeeding would become a social standard. There is a great need to train all those involved in infant feeding

counselling so they have both the knowledge and the skills to help women breastfeed, and can support women in their choice after delivery. Selection of motivated health care workers is likely to be an important factor contributing to the improvements in breastfeeding results. Antenatal counselling helps in educating the mothers for initiation of breastfeeding immediately after delivery and practicing exclusive breastfeeding for first six months of baby's life. All pregnant women should be informed about the profits and management of breastfeeding on a priority basis during antenatal visits.^[53]

Conclusion

Breastfeeding reduces the burden of diseases in both the infants and mothers. There is a growing body of evidence on the benefits of breastfeeding for the baby and also helps the mother to return to a normal health profile after pregnancy. According to the evidence available we strongly recommend, to intensify the public health education campaigns to promote breastfeeding practices. The most important factor to be considered is that the mothers should be counselled in prior by the obstetrician and gynecologist, nurses, midwives about choosing breastfeeding and continuing it effectively for a better society.

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