

BREAST MILK BANK-SAVES GENERATION

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Abstract:

Breastfeeding is the best method of infant feeding because human milk continues to be the only milk which is tailor-made and uniquely suited to the human infant. All mothers should be encouraged to breast-feed their infants. When a mother, for some reason, is unable to feed her infant directly, her breast milk should be expressed and fed to the infant. If mother's own milk is unavailable or insufficient, the next best option is to use pasteurized donor human milk (PDHM). India faces its own unique challenges, having the highest number of low birth weight babies, and significant mortality and morbidity in very low birth weight (VLBW) population. Human Milk Banking Association should be constituted, and human milk banks should be established across the country. National coordination mechanism should be developed with a secretariat and technical support to follow-up on action in States. Budgetary provisions should be made available for the activities.

Key words: Pasteurized donor Human Milk, Very Low Birth Weight, Human Milk Banking

Introduction

Breast milk is produced by the breast of a human female for her infant offspring. Milk is the primary source of nutrition for newborn before they eat solid food. The World Health Organization recommends exclusive breastfeeding for the first six months of life, with solids gradually being introduced around this age when signs of readiness are shown. Supplemented breastfeeding is recommended until at least age two and then for as long as the mother and child wish.^{[1][2]}

Proteins

Human milk contains two types of proteins: whey and casein.

Approximately 60% is whey, while 40% is casein. This balance of the proteins allows for quick and easy digestion. If artificial milk, also called formula, has a greater percentage of casein, it will be more difficult for the baby to digest.

human milk is whey protein. These proteins have great infection-protection properties.

Listed below are specific proteins that are found in breast milk and their benefits:

- **Lactoferrin** inhibits the growth of iron-dependent bacteria in the gastrointestinal tract. This inhibits certain organisms, such as coliforms and yeast, that require iron.
- **Secretory IgA** also works to protect the infant from viruses and bacteria, specifically those that the baby, mom, and family are exposed to. It also helps to protect against E. coli and possibly allergies. Other immunoglobulins, including IgG and IgM, in breast milk also help protect against bacterial and viral infections. Eating fish can help increase the amount of these proteins in breast milk.

- **Lysozyme** is an enzyme that protects the infant against E. coli and salmonella. It also promotes the growth of healthy intestinal flora and has anti-inflammatory functions.
- **Bifidus factor** supports the growth of lactobacillus. Lactobacillus is a beneficial bacterium

that protects the baby against harmful bacteria by creating an acidic environment where it cannot survive.

Fats

Human milk also contains fats that are essential for

the health of baby. It is necessary for brain development, absorption of fat-soluble vitamins, and is a primary calorie source. Long chain fatty acids are needed for brain, retina, and nervous system development. They are deposited in the brain during the last trimester of pregnancy and are also found in breastmilk³.

Vitamins

The amount and types of vitamins in breast milk is directly related to the

Benefits of Breast Feeding

Under the influence of the hormones prolactin and oxytocin, women produce milk after childbirth to feed the baby. The initial milk produced is referred to as colostrum, which is high in the immunoglobulin IgA, which coats the gastrointestinal tract. This helps to protect the newborn until its own immune system is functioning properly. It also creates a mild laxative effect, expelling meconium and helping to prevent the build-up of bilirubin (a contributory factor in jaundice). Breast milk has the perfect combination of proteins, fats, vitamins, and carbohydrates

nutrition, including vitamins Fat-soluble vitamins, including vitamins A, D, E, and K, are all vital to the infant's health. Water-soluble vitamins such as vitamin C, riboflavin, niacin, and pantothenic acid are also essential. Because of the need for these vitamins, many

healthcare providers and Lactation consultants will have nursing mothers continue on prenatal vitamins.

Carbohydrates

Lactose is the primary carbohydrate found in human milk.

mother's vitamin intake. This is why it is essential that she gets adequate

It accounts for approximately 40% of the total calories provided by breast milk. Lactose helps to decrease the amount of unhealthy bacteria in the stomach, which improves the absorption of calcium, phosphorus, and magnesium. It helps to fight disease and promotes the growth of healthy bacteria in the stomach.

Expressed breastmilk

For some reason, when the mother is unable to feed her infant directly, her breast milk should be expressed and fed to the infant. It is still safe to use, and most babies will drink it. Scalding it will prevent rancid

taste at the expense of antibodies⁴. It should be stored with airtight seals. Some plastic bags are designed for storage periods of less

than 72 hours. Others can be used for up to 12 months if frozen.

This table describes safe storage time limits.

Place of storage	Temperature		Maximum storage time
	°C	°F	
In a room	25 °C	77 °F	Six to eight hours
Insulated thermal bag with ice packs			Up to 24 hours
In a refrigerator	4 °C	39 °F	Up to five days
Freezer compartment inside a refrigerator	-15 °C	5 °F	Two weeks
A combined refrigerator and freezer with separate doors	-18 °C	0 °F	Three to six months
Chest or upright manual defrost deep freezer	-20 °C	-4 °F	Six to twelve months

Breast milk Bank

In some mothers own milk is unavailable or insufficient, the next best option is to use pasteurized donor human milk (PDHM). India faces its own unique challenges, having the highest number of low birth weight babies, and significant mortality and morbidity in very low birth weight (VLBW) population. In our country, the burden of low birth weight babies in various hospitals is about 20% with significant mortality and morbidities⁵. Feeding these babies with breast milk can

significantly reduce the risk of infections. Hence the Government, health experts and the civil society must join hands to propagate the concept of human milk banking for the sake of thousands of low birth weight and preterm babies. The first milk bank in Asia under the name of Sneha, founded by Dr. Armeda Fernandez, was started in Dharavi, Mumbai on November 27, 1989. Currently, the number of human milk banks (HMB) has grown to nearly 14 all over India but the growth of human milk banks has been very slow as compared to the growth of neonatal intensive care units.

In Tamil Nadu Breast Milk Banks were inaugurated in seven state-run hospitals in Tiruchirappalli, Madurai, Coimbatore, Theni, Salem and Thanjavur, besides the over 160-year old Government Institute of Obstetrics and Gynaecology and Hospital at Egmore. Each bank has been provided with equipment worth Rs. 10 lakhs to preserve the milk donated by mothers. Such milk can be stored for three months and will be given to babies who cannot get milk from their mothers.

LOCATION OF HUMAN MILK BANKS

Human milk banks are primarily focused to provide donor milk to high-risk newborns admitted in the Neonatal unit. Therefore, a location in close proximity or even inside the boundaries of neonatal unit is desirable. This also helps in administrative supervision by medical staff. Presence of human milk banks in the neonatal units is associated with elevated rates of exclusive breastfeeding rates in VLBW babies

The Recipients

PDHM (Pasteurized Donor Human Milk) can be prescribed on priority for preterm babies and sick babies, babies of mothers with postpartum illnesses, and babies whose mothers have lactation failure, till their milk output improves. Absent or insufficient lactation: Mothers with multiple births, who cannot secrete adequate breast milk for their neonates initially.

If PDHM supplies are sufficient donor milk may be supplied

- For babies of non-lactating mothers, who adopt Neonates and if induced lactation is not possible.
- Abandoned neonates and sick neonates.
- Temporary interruption of breastfeeding.
- Infant at health risk from breast milk of the biological Mother.
- Babies whose mother died in the immediate postpartum period

EQUIPMENTS

- Pasteurizer/Shaker-water bath :Device to carry out heat treatment of donor milk at the recommended temperature of 62.5°C for a period of 30 minutes (Pretoria Holder pasteurization method) prior to its use
- Deep freezer: A deep freezer to store the milk at -200°C is essential in the milk bank.
- Refrigerators
- Hot air oven/Autoclave
- Breast milk pumps
- Containers Generator/Uninterrupted power supply
- Milk analyzer: It is desirable to have macronutrient analysis of breast milk

General Guidelines for Staff of the Human Milk Bank

Standard operating procedures (SOP) of the bank (which should be displayed at proper places) should be adhered to.

- Hygienic practices like proper hand wash, donning gowns, mask, gloves, trimming nails, locking long hairs should be maintained.
- Gloves should be worn and changed between handling raw and heat-treated milk.

- Staff should undergo regular health checks and be immunized against Hepatitis B.
- There should be a program for ongoing training of the staff

Criteria for breast milk donors

Who can donate?

A lactating woman who:

- is in good health, good health-related behaviour, and not regularly on medications or herbal supplements (with the exception of prenatal vitamins, human insulin, thyroid replacement hormones, nasal sprays, asthma inhalers, topical treatments, eye drops, progestin-only or low dose estrogen birth control products);
- is willing to undergo blood testing for screening of infections; and
- has enough milk after feeding her baby satisfactorily and baby is thriving nicely.

Who cannot donate?

A donor is disqualified who:

- uses illegal drugs, tobacco products or nicotine replacement therapy; or
- regularly takes more than two ounces of alcohol or its equivalent or three caffeinated drinks per day; or
- Has a positive blood test result for HIV, HCV, Hepatitis b or c or syphilis; or
- Is herself or has a sexual partner suffering from HBsAg, HIV, HCV and Venereal diseases or either one has high risk behaviour for contracting them in last 12 months; or
- Has received organ or tissue transplant, any blood transfusion/blood product within the prior 12 months.
- Is taking radioactive or other drugs or has chemical environmental exposure or over the counter prescriptions or mega doses of

vitamins, which are known to be toxic to the neonate and excreted in breast milk; or has mastitis or fungal infection of the nipple or areola, active herpes simplex or varicella zoster infections in the mammary or thoracic region⁶.

Nurses Role in collection of breast milk

- Proper counselling
- Checking suitability for donation
- Getting written informed consent
- History taking
- Physical examination and sampling for laboratory tests
- The donor is sent to designated breast milk collection area in the milk bank or in the milk collection centre.
- Breast milk is collected by trained staff with hygienic precautions
- Method of breast milk expression is chosen by the donor.
- Home collection of breast milk is better avoided at present in our country due of the risk of contamination.
- Washing the breast with water before expression is as good as washing with disinfectant⁷.

Processing

All batches of collected raw breast milk should be refrigerated immediately till the serological report comes negative. Fresh raw milk should not be added to the frozen milk since this can result in defreezing with hydrolysis of triglycerides [8]. While mixing fresh raw breast milk to frozen raw breast milk previously collected from same donor, it should be chilled before adding to frozen milk [9]. For sick or preterm babies,

it is advisable to use a new container for each pumping. Before pasteurization, pooling and mixing may be carried out from multiple donors to ease the process of processing and storage. Pasteurization is carried out by Holder's method. Microbiological screening of donor milk is done before (if there is no cost constraint), and as soon as possible after pasteurization. Pre-pasteurization microbiology can result in wastage of milk to the tune of about 30% in some cases¹⁰. Even after pasteurization, the endotoxins of organisms are still present in the milk in some cases but they have not been found to have any clinical effect on the baby. A bacterial count of 10⁵ CFU/ml or more in raw breastmilk can be considered as an indicator of the poor quality of milk. Based on this and on the theoretical concern that heavily contaminated milk with specific bacteria (e.g. *S. aureus*, *E.coli*) may contain enterotoxins and thermostable enzymes even after pasteurization, expert panel selected 10⁵ CFU/ml for total bacterial count, 10⁴ CFU/ml for Enterobacteriaceae and *S. aureus* as threshold values, which are in consonance with milk banks operating in other parts of the world^{11&12}. No growth is acceptable in post-pasteurization microbiology cultures. Whole batch of culture positive container of pasteurized milk should be discarded.

Storage

Pasteurized milk awaiting culture report should be kept in dedicated freezer/freezer area taking precaution not to disburse it till the culture is negative. Storage should be done in the same container that is used for pasteurization. It is

advisable not to transfer processed milk in other containers as it has risk of contamination. Culture negative processed milk should be kept at -20°C in tightly sealed container with clear mention of expiry date and other relevant data on the label. It can be preserved for 3 to 6 months. Random cultures of preserved milk before disbursement can aid quality assurance.

Disbursal

PDHM should be disbursed at physician's requisition from NICU physician after informed consent from the parents of the recipient. Preterm baby should preferably get PDHM from preterm donors. Frozen PDHM should be thawed by either defrosting the milk rapidly in a water bath at a temperature not exceeding 37°C, or under running lukewarm water taking care that the cap of the container does not come in contact with the water as it is likely to get contaminated¹³. It should never be thawed in a microwave as this results in reduction in the IgA content of the milk and there is a risk of burns if the milk is used too soon¹⁴.

Labelling and record keeping

Human milk bank should have an operational objective of ensuring full traceability from individual donation to recipient, and maintaining a record of all storage and processing conditions. Written standard operating procedures should be followed. Proper labeling at all levels is mandatory; from sterile container for collection of donation, pooling vessel and pasteurization container to storage containers. Labels should be water resistant

and names and identifying details of donors, dates of pasteurization, batch numbers and expiry date should be clearly readable. Record keeping at all levels should be meticulous for Donor Record File containing consent form, donor's and her child's data, screening reports, pasteurization batch files, and for PDHM Disbursal Record File containing relevant data, including recipient consent form. Though rarely required, complications can be prevented with appropriate labelling and recordkeeping.

Contact: Human Milk Bank

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- GH Egmore, Chennai

CONCLUSION

It is clear that artificial formula will never provide the broad range of benefits of human milk. Given the high rate of preterm births in the country and level of malnutrition that ensues in the postnatal growth in such babies after birth, there is an urgent need to establish milk banks across the country, especially in the large neonatal units of all hospitals. This document aims at providing expert opinion regarding the feasibility and operational guidelines for establishing milk banks in the country.

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