INTERNATIONAL JOURNAL OF RESEARCH CULTURE SOCIETY ISSN(O): 2456-6683
Monthly Peer-Reviewed, Refereed, Indexed Journal [Impact Factor: 9.241]
Volume - 9, Issue - 2, February - 2025

DOIs:10.2017/IJRCS/202502010 --:-- Research Paper / Article / Review

Human Milk Banking

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1. INTRODUCTION:

Breast milk is the safest and healthiest source of important nutrients for a baby. It is an integral part of baby's diet. The World Health Organization (WHO) states that the first alternative to a biological mother not being able to breastfeed is the use of human milk from other sources. A human milk bank or breast milk bank is a service that collects, screens processes, and dispenses prescription human milk donated by nursing mothers who are not biologically related to the recipient infant. Health experts call donated breast milk liquid gold and consider it a boon for babies with poor health and weak immune systems. The primary and by far the largest group of consumers of breast milk are a group of consumers of human breast milk are premature babies. Human breast milk is a substitute, instead of formula when a mother cannot provide her milk. This selfless act of milk donation has transformed the lives of countless infants, providing them with the essential nutrients and antibodies they require to thrive.

2.HISTORY

Breast milk donations from one woman to an unrelated infant have a long history. Before the century, the infant would have been directly breastfed by the woman who was referred to as a 'wet nurse'. Rules governing wet nursing have been around since 1800 BC. Wet nursing itself has had periods throughout history when it has fallen from favor. For example, in the 15th century, wet nursing became very unpopular due to the spread of Syphilis. Human milk banking has had similar peaks and thoughts. In the early half of this century, milk banking saw a resurgence in popularity but around the 1970s, this began to change. The first reason for this loss of interest in human milk was the heavy promotion of infant formula, including formulas specially designed for preterm infants. Later, fear of transmission of viruses including HIV in body fluids led to anxiety about the donation of body fluids, including breast milk. Breast milk isn't a new phenomenon in INDIA. But they are scarce. Everything Asia's first milk bank was set up in Mumbai in 1989, there were only 40 odd banks as of 2017. Brazil another developing country has over 217 banks ever since their inception in 1985. Their availability along with better health care has helped reduce Brazil's infant mortality rate by 73%. Current status states that there are over 250 human milk banks globally, with more than 100 in the United States alone.

Early beginnings (1900s-1940s)

The first human milk bank was established in Vienna, Austria91909)
Boston Floating Hospital (USA) starts a human milk depot

Growth and Expansion (1940s-1980s)

Post–WWII- Human milk banking expands globally, with banks established in Europe, North America, Australia
American Academy of Pediatrics endorses human milk banking (1970s)
Development of standardized protocols for collection, processing and distribution

Challenges and advancements (1980s-2000s)

HIV/AIDS epidemic raises concerns about milk safety; strict screening protocols implemented
Advancements in pasteurization techniques (eg. holder method)
The Human Milk Banking Association of North America was founded (in 1985)

Modern era(2000s-present)

Increased awareness of human milk benefits and donor milk availability
Expansion of milk banking to NICUs, hospitals and outpatient settings
Development of new technologies (eg. flash pasteurization, cryopreservation)
Research on human milk's immunological and nutritional benefits
Notable milestones
The first frozen human milk bank was established in (1960Sydney, Australia)
First human milk bank in India (1988 Mumbai)
HMBANA established guidelines for human milk banking
FDA regulates human milk banks as tissue banks(2007)

3.DONOR REQUIREMENT

Donor must

- Be healthy
- Be in the process of lactation
- Undertake a chest x-ray or Tine test
- Have a negative VDRL
- Have no evidence of hepatitis
- Be HIV negative

4.RECIPIENT REQUIREMENT

- Absent or insufficient lactation
- For babies of a non-lactating mother who adopts neonates
- Abandoned babies or sick neonates temporary interruption of breastfeeding
- Infant at health risk from breast milk of the biological mother
- Babies whose mothers died in the immediate postpartum period

5. CONCERN

Some concerns that surround human milk banks include

- Cost availability lack of health care provider interest
- Concern about the type of women who might donate
- Health benefits of human breast milk bank
- Human milk banks offer families a chance to provide their children with reliable and healthy milk from another mother. Human milk banks are needed as they offer milk which mostly is consumed by children whose mothers are not able to provide them with reliable milk.
- Uphold premature babies and those with low birth weight
- Furnish nutrition for babies with medical conditions
- Assist mothers with low milk supply or illness
- supports an alternative to formula for adoptive and surrogate families
- Advances research into the benefits of breast milk

6. INFRASTRUCTURE

The minimum requirement is a partitioned room of 250 square feet that can comfortably lode at least the equipment required for milk banking, a work area for the technician as well as some storage space for records, administration and an area for counseling donors, etc. Privacy is of paramount importance in the area of breast milk expression.

Pasteurizer/shaker water bath

It is essential to have a device to carry out heat treatment of donor milk at the recommended temperature of 62.5 degrees Celsius for 30 minutes (Pretoria Holder Pasteurization Method) before its use. A well-accepted method is the use of a shaker water bath with a microprocessor-controlled temperature regulator an electronic times device and a shaker speed controller. The milk in the container is boiled through the steam and hot water in the water shaker bath. To avoid coagulation of the milk and to distribute heat evenly, the tray on which the milk containers are placed is shaken /wobbled. This shaker water bath should be double-walled and made of steel. Its size varies according to the need of the milk bank, with tray capacity varying from 9 to 24 containers of 200 to 400ml capacity.

Deep freezer

A deep freezer to store milk at -200oc is essential in the milk bank. It is desirable to order a deep freezer with a digital display of the temperature inside it with an alarm setting.

Refrigerators

These are required to store the milk till the whole day's collection is over and the milk is ready to be mixed and pooled for further processing. It is also required for thawing the milk before being dispatched.

Hot air oven/autoclave

A hot air oven or autoclave in the milk bank or centralized sterile service department is essential for sterilizing the containers used for collection from donors, containers for pasteurization, and test tubes for sending milk culture samples to the microbiology laboratory.

Breast milk pumps

Hospital-grade electric pumps are preferred for milk banking as they result in better volumes of expressed milk and are relatively painless and comfortable to use. There is no major difference in the types of electrical breast pumps, manually operated breast milk pumps designed to operate more physiologically by simulating the infant's compressive action on

the areola during breastfeeding can be used with lower cost implications. The pump and the parts should be sterilized /disinfected as per manufacturer instructions.

Containers

For collection and storage of milk single-use hard plastic containers of polycarbonates pyrex orpropylene are used across the world. However, in Indian experiences, cylindrical wide-mounted stainless steel containers of about 200ml capacity with tight-fitting/screwed are equally effective.

Generator/uninterrupted power supply

Every milk bank should have a dedicated centralized source of uninterrupted power supply backup to run the deep freezers and refrigerators in case of electricity failure.

Milk Analyser

It is desirable to have a macronutrient analysis of breast milk to estimate the crude protein and fat of a milk sample, using infrared spectroscopy technology, in teaching hospitals as a step towards lacto engineering**.**

Infrastructure

7. ADMINISTRATIVE STAFF

Human milk banks should have a panel of consultants to guide overall development and functioning. It can include representatives from the areas of pediatric/neonatology, lactation, microbiology, nutrition public health, and food technology. It should consist of a director (for planning, implementing, and evaluating the services) milk bank officer (usually a doctor for the day-to-day running of the bank and training), lactation management nurses (for counseling mothers and assisting expression of breast milk), milk bank technician (for pasteurization of breast milk and microbiological surveillance).

8.DONOR POPULATION

The donor population is formed by healthy lactating mothers with healthy babies who are voluntarily willing to give their extra breast milk to other babies without compromising the nutritional needs of their babies. The donors can include mothers attending well-baby clinics mothers whose babies are in neonatal intensive care units, those who have lost their babies but are willing to donate their milk, or lactating working staff in the hospital and motivated mothers from the community. Donors are not paid for their donations. Try to reach the maximum donor population using a variety of avenues. Spreading awareness about the possibility of breast milk donation in society by various means including mass communication can help in motivating donors. NGOs social clubs and college students can play a good role in it.

9.COLLECTION OF BREAST MILK

After proper counseling, checking suitability for donation getting written informed consent, history taking the physical examination and sampling for laboratory tests the donor is sent to a designated breast collection area in the milk bank or in the milk collection centre. Breast milk is collected by trained staff with hygienic precautions after the method of breast milk expression is chosen by the donor. Home collection of breast milk is avoided at present in our country due to the risk of contamination Washing the breast with water before expression is as good as washing with disinfectant. There is no rationale in discarding foremilk Drip milk collected with the help of breast milk shells is nutritionally inferior with lower fat content and is not recommended for banking. The breast milk may be expressed manually or with breast pumps. Milk should be collected in a properly labelled sterile container and transported to HMB under cold storage conditions.

10. PROCESSING

All batches of collected raw breast milk should be refrigerated immediately till the serological report comes back negative. Fresh raw milk should not be added to frozen milk since this can result in refreezing with hydrolysis of triglycerides. While mixing raw fresh breast milk previously collected from the same do not, it should be chill before

adding it to frozen milk. 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 using the holder's method, and microbiological screening of donor milk is done before and as soon as possible after pasteurization. Pre-pasteurization microbiology can result in the wastage of milk to the tune of about 30% in some cases. A bacterial count of 105CFU/ml or more in raw breast milk concern that heavily contaminated milk with specific bacteria. May contain enterotoxins and thermostable enzymes even after pasteurization, The expert panel selected105CFU/ML for the total bacterial count,104CFU/ML for enterobacteria, and s.aureus as threshold values which align with MLK banks operating in other parts of the world growth is acceptable in post pasteurization microbiology cultures. A whole batch of culture-positive containers of pasteurized milk should be discarded. Storage pasteurized milk awaiting culture report should be kept in a dedicated freezer area taking precautions not to disburse it till the culture is negative.

11.STORAGE

Should be done in the same container that is used for pasteurization.it is advisable not to transfer processed milk to other containers as it has a risk of contamination. Culture-negative processed milk should be kept at at-20ocin a tightly sealed container with a clear mention of the expiry date and other relevant data on the label. It can preserved for 3 to 6 months. Random cultures of preserved milk before disbursal can aid quality assurance.

12.DISBURSAL

Pasteurized donor human breast milk should be disbursed of physician requisition from the NICU physician after informed consent from the parents of the recipient. Preterm babies should preferably get PDHM from preterm donors. Transport of PDHM should be done under cold storage in the same pasteurized container till its use. Frozen PDHM should be thawed by either defrosting the milk rapidly in a water bath at a temperature not exceeding 370oc or under running lukewarm water taking care that the cap of the container does not come in contact with water as it is likely to get contaminated. It should never be thawed in a microwave as this results in a reduction in the IgA content of the milk and there is a risk of burns if the milk is used too soon while brought to room temperature it should be gently agitated to make a homogenous mixture before use and should be used preferably within 3 hours to prevent contamination. Labeling and record keeping HNB 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. Confidentiality of records should be maintained by the milk bank. Proper labelling at all levels is mandatory. Labels should be water resistant and names and identifying details of donors, dates of pasteurization, batch numbers and expiry dates should be readable. Record-keeping at all levels should be meticulous for donor record files.

13. ECONOMIC IMPLICATIONS

The cost-effectiveness of using banked human milk in neonatal intensive care units has been documented in Western countries, largely due to a reduction in the rate of NEC. In a country like ours, the cost of running a milk bank with potential cost savings due to reduction in NEC, sepsis, and duration of hospital stay have not been evaluated. Given the high incidence of sepsis and a large burden of premature births, this intervention may have the potential to result in substantial savings for the nation.

14. BREAST MILK BANKING IN INDIA

Amaara the first pasteurized breast milk foundation in NCR is an initiative by the fortis La feminae NEWDELHI towards expanding the breast milk banking network in India, presently the bank has 21 active donors who donate breast milk every 10-15 days. Human milk banking started informally almost 100 years ago however the first human milk bank was set up in the United States in the mid 1980s. India's first human milk bank was set up in Mumbai in 1989. India is just beginning. Rajasthan (13), Maharashtra(12), and Tamilnadu(10) are major contributors to the milk bank industry, with Chennai following close behind.

15. POSSIBLE CONFLICTS

Human milk banks should not be a profit-making industry commercial milk banking is open to potential risks since companies can make profits by adultering donor milk. Baby food companies should not be allowed to set up or operate human milk banks or even be part of decision-making since they have clear conflicts of interest.

16. RECORDS

Alyse Ogletree, a mother of two from Denton, donated 53081 ounces of breast milk to the Mother's Milk Bank of North Texas from 11 January 2011 to 25 March 2014, a total of more than 414 gallons she had been admitted into the Guinness book of world records after having applied back in March.

17. CONCLUSION

Breast milk banking is a remarkable service that demonstrates the power of community and compassion. By supporting breast milk donation and banking, we can work together to give vulnerable babies the best possible start in life. By donating breast milk, mothers can make a tangible difference in the lives of these little ones.

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