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BACKGROUND, PROCESS AND PROBLEMS OF HUMAN BREAST MILK BANKING: A REVIEW

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ABSTRACT

Many times, especially in the first few days after giving birth, mothers are unable to lactate or provide enough breast milk. In these situations, donor human milk (DHM) from a human milk bank is recognized as the primary source of nutrition, particularly for vulnerable preterm and sick infants. As a cost-saving measure implemented widely, milk banking would be a very effective public health intervention. This overview describes the history, procedure, and issues of the banking of human breast milk banking.

INTRODUCTION

The best diet for newborns is breast milk. WHO, UNICEF, and other organizations advocate for exclusive breastfeeding for the first hour after birth and for at least six months beyond. Infants should consume human milk as their primary source of nourishment because it contains a large number of nutrients necessary for growth and nutrition, such as proteins, lipids, and oligosaccharides, as well as chemicals that protect the immune system. However, there are multiple situations in which mothers are unable to lactate or give enough breast milk, especially in the first few days after giving birth. Donor human milk (DHM) from a human milk bank is regarded as the first-line source of nutrition in these circumstances, particularly when it comes to vulnerable preterm and ill infants. Compared to preterm infants fed formula, those fed DHM have a lower chance of developing necrotizing enterocolitis (NEC) and late onset sepsis. Both the American Academy of Paediatrics and the World Health Organisation (WHO) recognise DHM as the best alternative for newborns when the mother's own milk is not available. However, milk banking would be a highly cost-effective public health intervention as a cost-saving intervention carried out at scale. This review narrates background, process and problems of human breast milk banking.

BACKGROUND

First Milk Bank: Dr. Franz Freiherr von Rosthorn founded the first milk bank in Austria in 1909. It was developed to give infants who couldn't get breast milk from their mom's safe, pasteurized milk. Milk banking has expanded as a result of the initial milk bank's success. Several nations have now started their own milk banks. In 1919, the United States became the first nation to establish a milk bank. France, Canada, and numerous other nations soon followed.

Scientists started to recognize breast milk's many advantages in the 1930s. Studies revealed that breast milk could lower the risk of infections and disorders while also promoting the growth and development of premature infants. At Sion Hospital, the country's first human milk bank was founded in 1989. Every year, this milk bank provides services to close to 3,000 to 5,000 infants. In the Neonatal Intensive Care Unit, unwell and vulnerable babies receive close to 800 to 1200 litres of human milk annually. New mothers receive assistance at the Comprehensive Lactation Management Centre (Human Milk Bank) with pumping, expressing milk, and donating extra milk for other sick babies in the hospital.

The Indian Academy of Pediatrics (IAP) set regulations for the country's human milk banks' operation in 1989. The International Association of Milk Banks (IAMB) and the World Health Organization (WHO) served as the foundation for these recommendations. For the selection of donor moms, the collection and preservation of milk, and the distribution of milk to infants, they established stringent guidelines. To encourage standardization and quality assurance, the IAP also established a national registration of milk banks. Over 50 milk banks are currently in operation in India, a considerable increase in the number of milk banks over the years. Hospitals, non-profits, and governmental entities all operate these banks. They gather milk from nursing women who are willing to donate their extra milk to benefit other infants.

Process

By enlisting donors, processing, storing, and distributing DHM to neonatal intensive care units (NICUs) and other similar settings in a safe and controlled manner, human milk banks (HMBs) perform a crucial role. The European Milk Bank Association (EMBA) has suggested that an oral interview and a written health questionnaire be used for donor screening, followed by serological testing. Regarding handling and storage, chosen donors are urged to gather expressed milk in an appropriate container for donation and are asked to freeze it as soon as feasible within 24 hours. When the HMBs receives donated milk, it is frozen at 20 °C until it is thawed and pasteurized. Prior to and following pasteurization, which typically takes place at 62.5 °C for 30 minutes, milk is tested for microorganisms. The DHM is subsequently distributed by HMBs to the necessary healthcare facilities or to local families who are having trouble breastfeeding. Donor milk is still an expensive option, and access to it is occasionally restricted. Donor human milk is regarded as a valuable and scarce resource because of these factors. In the context of the current investigation, reducing DHM loss and waste may result in better milk quality, fewer milk waste, and increased HMB capacity.

All human milk banks do not routinely bacteriological test pasteurized human milk, and the bacterial count limitations for rejecting milk differ among the banks based on national regulations. These restrictions are necessary because milk that is highly contaminated may prevent pasteurization from working. Additionally, even though most organisms are destroyed during pasteurization, the toxins produced by some bacteria may not always be eliminated by heat. Because of this, any bacterial growth is detected using conventional microbiological methods, and colony growth is also measured.

Problems

Monitoring the temperature of the milk during transit is a top responsibility for the HMF since DHM must be carried securely to maintain its best quality. The HMF was unable to precisely monitor the temperature during transit before working with the REAMIT project. But the organization also wanted to make sure that the milk was kept in prime condition from the time it was made accessible from the donor until it was delivered to its recipient. The HMF was unsure if the milk was kept at its ideal temperature during the transportation time because it was unable to check the temperature and environmental factors. This is significant because the main causes of DHM waste are temperature and humidity. The HMF discharge rate is 7-8%, although during the hotter summer months, a weekly discard rate of up to 25% is not unexpected in HMBs. The effects of heat waves and an unstable climate could make it more challenging to transport DHM.

The quality of the human milk is impacted during transportation by high temperatures and shifting humidity levels. However, microbial contamination at the site of expression is the principal cause of DHM waste. In addition to encouraging donor education and offering sterile containers, HMB employs further measures to reduce the possibility of microbiological failure. Only in a Class 2 biosafety cabinet with an ultra-microfilter are milk donation containers opened, and instruments and processing containers are cleaned there with UV light. Then, using an industrial dishwasher made by Miele (Germany), which warms the equipment to over 85 °C, the equipment is sterilised.

Indian Milk Bank Organization

In India, human milk banks are established as Lactation Support Units (LSU) at delivery points, Lactation Management Units (LMU) at the district level with operational Special Newborn Care Units (SNCU), and Comprehensive Lactation Management Centres (CLMC) at the tertiary level. According to the National Guidelines on Lactation Management Centres in Public Health Facilities, there are currently about 80 milk banks operating in India. Giving milk is an entirely voluntary process that is not encouraged in any way. The regulations forbid the use of donated human milk for profit. The donor screening process is rigorous and in line with other human milk banking groups' donation guidelines. Following excellent manufacturing practises, milk is processed in milk banks through storage, thawing, pasteurisation, testing, and storage till disbursement. The milk banking process follows strict criteria that are fully defined in the guidelines, which also include quality assurance of the process and a detailed food safety methodology elaborated as Hazard Analysis and Critical Control Points.

CONCLUSION

Human milk banks all across the world are struggling to function as a result of the ongoing pandemic. Aims should be made to reduce the negative effects on the newborns' health and wellbeing. In addition to other known long-term advantages, breast milk has considerable advantages for the newborn, including the potential for the transmission of bioactive molecules such anti-infective antibodies. The primary goal of human milk banking is to support and strengthen breastfeeding worldwide. In these unfavourable situations, human milk banks in underdeveloped countries play a crucial role in facilitating the use of breast milk and ensuring the provision of donor milk as gap support to the most vulnerable preterm newborns (1500 g and 32 weeks gestation), in the event that mother's own milk is unavailable.

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