

Expressed Breast Milk as A Solution for Preterm Infants

Ms. Priyanka Dutta, Department Nursing, Shri JTT University Jhunjhunu, Rajasthan, India

Manisha Dwivedi, Department Nursing, Shri JTT University Jhunjhunu, Rajasthan, India

Abstract

This article examines the critical role of expressed breast milk (EBM) in supporting the health and development of preterm infants, who often face significant nutritional and immunological challenges due to their early arrival. EBM provides a vital source of nutrition tailored to the needs of preterm infants, offering essential nutrients and immune factors that protect against infections and promote growth. The article discusses the difficulties associated with direct breastfeeding for preterm infants, such as their underdeveloped feeding skills and medical complications, which make EBM a practical alternative in neonatal intensive care units (NICUs). It explores strategies for supporting mothers in expressing and storing breast milk effectively, including the use of modern pumping technologies and lactation support services. Additionally, the article highlights the long-term health benefits of EBM for preterm infants, such as improved cognitive and developmental outcomes and a reduced risk of chronic diseases. By understanding the importance of EBM and implementing best practices for its use, healthcare providers and families can significantly enhance the health outcomes and quality of life for preterm infants.

Keywords: Preterm Infants, Nutritional, Immunological Challenges, Breastfeeding, Expressed breast milk.

INTRODUCTION

Preterm birth, defined as birth before 37 weeks of gestation, presents significant challenges for both infants and their families. Preterm infants are at a higher risk for a range of complications, including respiratory distress syndrome, infections, and developmental delays, due to their underdeveloped organs and immune systems. Nutrition plays a pivotal role in the survival and development of these vulnerable infants, with breast milk being the gold standard due to its unmatched nutritional and immunological properties. However, many preterm infants are unable to breastfeed directly because of their medical conditions or developmental immaturity, necessitating alternative methods to provide this vital nutrition. Expressed breast milk (EBM) emerges as a crucial solution, allowing these infants to receive the full benefits of human milk while accommodating their unique needs. This article explores the importance of EBM for preterm infants, examining its benefits, challenges, and best practices to support its use in neonatal intensive care units (NICUs) and beyond.

NUTRITIONAL AND IMMUNOLOGICAL BENEFITS OF EXPRESSED BREAST MILK FOR PRETERM INFANTS

Expressed breast milk is uniquely suited to meet the nutritional needs of preterm infants, providing essential nutrients in forms that are easier for their immature digestive systems to process. EBM contains the ideal balance of proteins, fats, and carbohydrates tailored to the infant's developmental stage, which is crucial for promoting growth and organ development in preterm infants. Additionally, the bioavailability of nutrients in breast milk, such as iron and calcium, is superior to that of formula, reducing the risk of deficiencies that could impair development. Beyond nutrition, EBM provides significant immunological benefits that are vital for preterm infants who are particularly susceptible to infections. Breast milk is rich in antibodies, particularly immunoglobulin A (IgA), and other immune factors like lactoferrin and lysozyme, which help protect against common neonatal infections such as necrotizing enterocolitis (NEC) and sepsis. Studies have shown that preterm infants fed EBM have a lower incidence of these life-threatening conditions compared to those fed formula, underscoring the critical role of EBM in enhancing both survival and long-term health outcomes.

CHALLENGES IN BREASTFEEDING PRETERM INFANTS DIRECTLY

Breastfeeding preterm infants directly poses several challenges, largely due to their physiological and developmental limitations. Many preterm infants lack the strength and

coordination required for effective sucking and swallowing, making direct breastfeeding difficult or impossible in the early stages of life. Additionally, these infants often require medical interventions, such as respiratory support or intravenous nutrition, that can interfere with direct breastfeeding attempts. For mothers, the stress and anxiety associated with having a preterm infant can impact milk production, as stress hormones negatively affect lactation. Moreover, physical separation between mother and infant, common in NICU settings, can hinder the establishment of a breastfeeding routine, further complicating efforts to provide breast milk directly. These challenges necessitate alternative feeding methods, with EBM serving as a critical bridge to provide the benefits of breast milk until the infant is able to breastfeed directly.

In addition to these physiological and logistical challenges, breastfeeding preterm infants directly often involves navigating complex emotional and psychological barriers. Mothers of preterm infants frequently experience heightened emotional stress, guilt, and frustration due to their inability to breastfeed directly. This emotional strain can be exacerbated by the NICU environment, where the separation from their infant and the overwhelming medical interventions can create feelings of helplessness and inadequacy. The support system available to these mothers, including healthcare providers, lactation consultants, and family members, plays a crucial role in addressing these emotional challenges and helping mothers cope with the difficulties of direct breastfeeding. Ensuring that mothers receive consistent encouragement, counseling, and practical assistance can help alleviate some of the psychological burdens and foster a more positive breastfeeding experience. By addressing both the physical and emotional aspects of direct breastfeeding challenges, healthcare providers can better support mothers in their efforts to provide the benefits of breast milk to their preterm infants.

ROLE OF EXPRESSED BREAST MILK IN SUPPORTING PRETERM INFANTS IN THE NICU

In the NICU, expressed breast milk serves as an essential nutritional intervention, providing preterm infants with the necessary nutrients and immune protection while accommodating their specific medical needs. NICUs employ various protocols for the use of EBM, often integrating it with other feeding methods, such as tube feeding, to ensure that infants receive adequate nutrition despite their inability to feed orally. The short-term benefits of EBM in the NICU setting include enhanced growth rates, improved digestion, and a reduced risk of infections and gastrointestinal complications. Long-term benefits extend to improved neurodevelopmental outcomes and reduced risks of chronic conditions such as asthma and allergies. To maximize the use of EBM in the NICU, healthcare providers implement strategies to encourage milk expression, such as establishing regular pumping schedules for mothers, providing access to hospital-grade breast pumps, and creating supportive environments that promote lactation. These efforts are crucial in ensuring that preterm infants receive the full advantages of breast milk during their critical early stages of development.

STRATEGIES FOR SUPPORTING MOTHERS TO PROVIDE EXPRESSED BREAST MILK

Supporting mothers in providing EBM requires a multifaceted approach that addresses both the physical and emotional challenges associated with milk expression. Education plays a vital role in empowering mothers with the knowledge and skills needed to express milk effectively, including instructions on using breast pumps, understanding the importance of regular expression to maintain supply, and recognizing signs of milk production issues. Lactation consultants and nurses are essential resources, offering hands-on support and guidance to help mothers overcome difficulties such as low milk supply or improper pumping techniques. Addressing emotional challenges is equally important, as feelings of stress, guilt, or inadequacy can significantly impact a mother's ability to express milk. Providing emotional support through counseling, peer support groups, and positive reinforcement can help mothers feel more confident and motivated to continue expressing milk. Additionally,



creating a supportive environment, both at home and in the workplace, is crucial. Family members and employers can play supportive roles by facilitating time and space for milk expression, recognizing the importance of EBM for the infant's health, and providing encouragement throughout the lactation journey.

INNOVATIONS AND BEST PRACTICES IN EXPRESSING AND STORING BREAST MILK FOR PRETERM INFANTS

Technological advancements in breast pump design and functionality have significantly improved the efficiency and comfort of milk expression, making it easier for mothers of preterm infants to provide EBM. Modern breast pumps offer features such as adjustable suction levels, soft silicone flanges, and hands-free operation, which can enhance the pumping experience and increase milk output. Best practices for expressing and storing breast milk focus on maintaining its nutritional and immunological quality, which is vital for preterm infants. Guidelines recommend expressing milk at least eight times a day, including once at night, to mimic the natural feeding patterns of a newborn and maintain milk supply. Proper storage techniques, such as using sterile containers and labeling milk with the date and time of expression, are essential to ensure that EBM retains its quality and safety. Frozen milk should be thawed gradually in a refrigerator to preserve its components, and care must be taken to avoid microwave heating, which can destroy valuable nutrients and antibodies. For preterm infants transitioning to direct breastfeeding, combining EBM with breastfeeding sessions can help infants practice sucking and develop feeding skills while still receiving adequate nutrition.

IMPACT OF EXPRESSED BREAST MILK ON LONG-TERM HEALTH OUTCOMES FOR PRETERM INFANTS

The benefits of EBM extend far beyond the immediate neonatal period, influencing the long-term health and development of preterm infants. Research indicates that preterm infants fed EBM exhibit better cognitive and developmental outcomes, including higher intelligence quotient (IQ) scores and improved motor skills, compared to those who receive formula. These developmental advantages are attributed to the unique combination of nutrients and bioactive components in breast milk that support brain growth and neurodevelopment. Moreover, EBM has been linked to a reduced risk of chronic health conditions such as obesity, diabetes, and cardiovascular disease later in life, which are more prevalent among individuals who were born preterm. The protective effects of EBM are thought to result from its role in programming metabolic pathways and immune function during early life. Additionally, the use of EBM can promote stronger mother-infant bonding and attachment, which positively impacts emotional and social development. Encouraging the use of EBM for preterm infants, therefore, not only addresses their immediate nutritional needs but also sets the foundation for a healthier and more robust future.

Furthermore, the positive long-term effects of expressed breast milk (EBM) are also reflected in improved academic and behavioral outcomes as preterm infants grow older. Studies have shown that children who were fed EBM as preterm infants tend to perform better academically and exhibit fewer behavioral problems compared to their peers who were fed formula. This correlation may be attributed to the enhanced cognitive development and emotional regulation supported by the nutrients and bioactive factors in EBM. Additionally, the early nutritional programming provided by EBM can lead to better regulation of appetite and metabolism, potentially reducing the risk of childhood obesity and associated metabolic disorders. The benefits of EBM extend into adolescence and adulthood, highlighting the importance of continued support for mothers to provide EBM to preterm infants. By promoting EBM, healthcare providers can help lay the groundwork for a lifetime of health benefits, enhancing not only the immediate well-being of preterm infants but also their long-term developmental and health trajectories.

CONCLUSION

Expressed breast milk serves as a vital lifeline for preterm infants, offering unmatched

nutritional and immunological benefits that support their growth, development, and overall health. While direct breastfeeding may not always be possible for these vulnerable infants, EBM provides a flexible and effective solution, allowing them to receive the full benefits of human milk. By understanding the challenges associated with breastfeeding preterm infants and implementing strategies to support mothers in providing EBM, healthcare providers can improve outcomes for preterm infants. Technological advancements and best practices in milk expression and storage further enhance the ability of mothers to provide high-quality EBM, ensuring that their infants receive optimal nutrition. The long-term health benefits of EBM for preterm infants underscore its importance as a critical intervention in neonatal care. By promoting the use of EBM and supporting mothers in their lactation efforts, we can help ensure that all preterm infants have the best possible start in life, laying the groundwork for healthier futures.

REFERENCES

- American Academy of Pediatrics. (2012). Breastfeeding and the use of human milk. *Pediatrics, 129*(3), e827-e841. <https://doi.org/10.1542/peds.2011-3552>
- Bertino, E., & Gianni, M. L. (2017). Breastfeeding and preterm infants: Benefits and challenges. *Clinical Perinatology, 44*(1), 1-15. <https://doi.org/10.1016/j.clp.2016.10.002>
- Brown, A. (2018). *Breastfeeding uncovered: Who really decides how we feed our babies?* Pinter & Martin Ltd.
- Geddes, D. T., & Sakalidis, V. S. (2016). Ultrasound imaging of breastfeeding: A window to the inside. *Journal of Human Lactation, 32*(2), 340-349. <https://doi.org/10.1177/0890334415617296>
- Johns Hopkins Medicine. (2021). How to pump and store breast milk. Retrieved from <https://www.hopkinsmedicine.org/health/wellness-and-prevention/how-to-pump-and-store-breast-milk>
- Kent, J. C., Prime, D. K., & Garbin, C. P. (2012). Principles for maintaining or increasing breast milk production. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 41*(1), 114-121. <https://doi.org/10.1111/j.1552-6909.2011.01313.x>
- Meier, P. P., Patel, A. L., Hoban, R., & Engstrom, J. L. (2016). Which breast pump for which mother: An evidence-based approach to individualizing breast pump technology. *Journal of Perinatology, 36*(7), 493-499. <https://doi.org/10.1038/jp.2016.7>
- Mohrbacher, N., & Stock, J. (2003). *The breastfeeding answer book*. La Leche League International.
- Smith, L. J., & Kroeger, M. (2010). *Impact of birthing practices on breastfeeding: Protecting the mother and baby continuum* (2nd ed.). Jones & Bartlett Learning.
- World Health Organization. (2003). *Global strategy for infant and young child feeding*. World Health Organization. Retrieved from <https://www.who.int/publications/i/item/9241562218>