

# Evolution of human milk banks in Poland

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## SUMMARY

Breast milk is a unique bioactive substance essential for the development of the newborn's immature immune and digestive systems. The health-promoting effect of breast milk plays an important role in maintaining health and helps neonates adapt to the extrauterine life after birth. Due to the specific composition and, in particular, the presence of bioactive components, human milk limits the occurrence of lifestyle diseases.

Recent studies on the composition of breast milk provide new evidence for the value of human milk in neonatal nutrition. The historical transformation of old Lactaria into modern human milk banks (HMB) is associated with the promotion of exclusive breastfeeding and the use of breast milk as a part of therapy in neonatal intensive care units. Modern medical knowledge guarantees safe transfer of milk to potential recipients. Procedures regarding the requirements of the processing of breast milk in nutritional therapy and the qualification of donors to HMB are currently providing a high standardized control of milk quality.

**Key words:** breastfeeding; lactation; human milk bank

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## INTRODUCTION

Human breast milk donation has been practiced for a very long time, giving newborns a chance to survive. In the times of the pharaohs, nursing women (wet nurses) were carefully selected from among women during lactation [1]. Wet nursing was widely practiced in Europe in the 19th century in order to provide human milk for infants whose mothers were unable to do so. Over the years, Lactaria replaced wet nurses, initially providing access to pasteurized cow's milk, and later to pasteurized human milk. At present, the institution of a Lactarium has been replaced with human milk banks (HMBs), which are experiencing a rapid development in Europe [2,3]. The operation of human milk banks (HMB) is covered by the mother and child care system, and are supported in the recommendations of the world nutrition associations. The mother's milk is the first choice for all neonates, including preterm infants. When it is not available or not sufficient, donor human milk (DHM) from an HMB should be a second choice [4].

HMBs provide an alternative feeding to infant formula for preterm infants when the mother's own milk is unavailable. An HMB is a facility established with the purpose of selecting, collecting, checking, processing, storing, and distributing donor human milk, which is to be used for specific medical requirements [1,5].

## HISTORY OF LACTARIA IN POLAND

Lactaria were created to reduce neonatal mortality, and their aim was to store and sell breast milk. One of the first such institutions in the world was opened in 1909 in Vienna by Mayerhofer and Pribram [6]. The activity of Polish Lactaria and using donor breast milk in neona-

tal feeding was propagated for a long time in establishments operating in various cities, including in Lodz, Krakow, Warsaw and Zamosc. The first documented Lactarium in the Second Polish Republic was called „Drop of milk” and operated in Lodz in 1904. In the first two years of its activity, „Drop of milk” dealt with the distribution of pasteurized cow’s milk and counseling regarding rational nutrition [7].

The initiators of this institution were social doctors Stanislaw Serkowski and Józef Meybaum, under the leadership of the head doctor Henryka Frenkel (1880–1939) [8]. Over time, “Drop of milk,” as a free unit, also began to teach breastfeeding around mothers as well as in government agencies, hospitals and nursing offices. Famous doctors Brzezinski and Szejnach released brochures and guides on breast milk [9]. Unfortunately “Drop of milk” was closed after 3 years of its activity due to lack of funds. Similarly, other units in other cities such as: Sosnowiec, Kalisz, Dabrowa and Lublin, were closed as well [8]. In 1906, “City Milky Kitchen,” also called “Milk plant for infants” (Sauglings - Milch - Anstalt), was established in Poznan. The role of this place was to provide the best cow’s milk, suited to the age and needs of infants, for mothers who could not breast-feed their babies. The milk was bought by the designated pharmacies, and the process of mixing and processing of milk in the dairy was under the supervision of a medical doctor [10].

Pasteurized milk for infants was prepared in four different age-appropriate mixtures with water and sugar in daily drinking portions. Also, three different portions of a mixture of milk with oat gruel for chronically ill children and essence of Keller’s malt soup (Kellerscher Malzsuppe) were offered. The „Instructions for handling milk at home” were given to mothers to prevent the consequences of milk spoilage, and also special ice boxes (Eiskühlkisten) were lent in the summer [10].

Due to the high costs of maintaining the dairy and charitable character of the institution subsidized by the city of Poznan, various milk fees were in force, depending on the monthly income of families who needed to take the allowances into account. In all districts of the city, free consultations for mothers from poorer social classes were available in the so-called „Municipal Infant Care Stations.” The main purpose of these places was to promote natural breastfeeding and facilitate the access to advice on neonatal care provided by esteemed

city pediatricians: Teodor Pincus, Boleslaw Krysiewicz or Zygfryd Prochownik [10].

In 1905, Tadeusz Zelenski, after returning from France, founded “Drop of Milk” in Krakow based on the experience of similar institutions in Paris. He brought with him milk pasteurization apparatus. [11]. After the Second World War, new Lactaria were created in hospital neonatal units. Most of them ended their activities in the 1970s. The discovery of HIV in 1980 and the risk of human diseases spreading through milk caused a reduction in breast milk sharing. The development of a pasteurization technique of breast milk was a breakthrough [12].

## CONTEMPORARY HUMAN MILK BANKS IN POLAND

Human milk feeding significantly improves the clinical condition of neonatal intensive care unit patients, minimizing the risk of necrotizing enterocolitis and sepsis. Healthy women during lactation who effectively feed their own children can become human milk donors [13,14]

The experience of the developing European countries indicates that the activity of human milk banks is an important element of breastfeeding promotion among mothers of premature babies who require special support in the lactation process. Milk banks should be an integral part of the mother and child care system, especially if a newborn requires long-term treatment or when breastfeeding is difficult for the mother. HMBs provide an alternative feeding to infant formula for preterm infants when the mother’s milk is unavailable. An HMB is a facility established with the purpose of selecting, collecting, checking, processing, storing, and distributing human milk, which is to be used for specific medical requirements [13]. At first, human milk donors must undergo a screening process, similar to that used for donating blood, which includes an interview, serological screening and physician’s consent. A panel of blood test includes: HIV-1 and -2 antibody, hepatitis C antibody (anti-HCV), hepatitis B surface antigen (HbsAg), cytomegalovirus IgG and IgM antibody (CMV IgG and CMV IgM) and syphilis antibody [14]. Donor milk must be checked microbiologically and should undergo heat treatment and storage procedures [4]. Donor milk should be pasteurized at 62.5°C for 30 minutes (Holder pasteurization) to destroy all microorganisms: bacte-

ria and viruses including human immunodeficiency virus HIV, human T-lymphotrophic virus type 1, and cytomegalovirus (CMV), which are excreted in breast milk. Holder pasteurization provides a good compromise between microbiological safety and human milk nutritional and biological quality [15]. Many of the nutritional components are not altered or only minimally reduced through the process of pasteurization [15]. Carbohydrates, fats, salts and fat-soluble vitamins are unchanged. However, pasteurization has also been shown to cause a significant reduction in IgA concentration and lysozyme activity, it also reduces nitrogen retention, fat absorption, concentration of water-soluble vitamins, and antimicrobial factors, such as viable leukocytes, immunoglobulins, lactoferrin, complement, and folate-binding proteins [14,16]. Alternative sterilization methods to preserve innate bioactive properties and to decrease the cost of preparing donor milk are investigated. As long as all of the aforementioned safety controls are used, there has never been a reported case of disease transmission through the use of pasteurized donor breast milk; however, this can never be absolutely assured. “Parents should be fully informed of all treatment options available for their children. Parents must thus be made aware of the possibility for their children to receive human donor breast milk along with all of the perceived benefits and potential risks. They must also be made aware of the health advantages of human milk compared with bovine milk. They may then make an informed decision as to the best feeding plan for their baby. Written informed consent from parents/guardians must always be obtained before the administration of human donor breast milk” [17]. Families and caregivers may be reassured that, for the time being, there are no reported cases of pasteurized donor human milk causing an infection with hepatitis viruses or HIV, and that the likelihood of these infections occurring in a neonate given donor human milk is extremely small. All efforts are focused on promoting breastfeeding and the creation of new human milk banks as well as wide distribution of donor milk to reduce the use of infant formula, especially in NICUs [18].

Human milk banks in Poland are non-profit institutions. The first Polish HMB was established in 2012 in cooperation with the Human Milk Bank Foundation, which is the official representative of the EMBA in Poland. It is an internal HMB, operating only for the needs of one neonatology ward in Orłowski Hospital, at which it is located. Since then, five more HMBs have been opened, including one launched in January 2015, called the Regional Human Milk Bank in the Holy Family Hospital in Warsaw, which cooperates with other hospitals in the Mazovia District. In 2016, new banks were opened in Kraków, Opole and Wrocław [19, 20].

## CONCLUSIONS

Around the world, there are many associations that support HMBs and promote guidelines regarding handling of human donor breast milk, among others: the Human Milk Banking Association of North America (HMBANA) and the European Milk Bank Association (EMBA) [20]. A growing number of HMBs in Europe is a response to the evidence supporting the use of human milk in premature babies [21]. Breastfeeding and the use of human milk are becoming normative standards for infant feeding and nutrition. The American Academy of Pediatrics recommends that all preterm infants should receive human milk and that pasteurized donor human milk should be used if the mother’s own milk is unavailable or its use is contraindicated [4]. Documented short- and long-term medical and neurodevelopmental advantages of breastfeeding should be considered as a public health issue and not only a lifestyle choice [2,4]. The use of donor human milk is increasing for high-risk infants, primarily for infants with birth weight <1500 g or those with severe intestinal disorders [22].

Since 2009 in Poland, we have been observing a systematic formation of more and more non-governmental organizations with one of the main statutory objectives being the promotion of breastfeeding and breast milk. Online social networks and mass media allow dynamic popularization of these institutions among the public [19,23].

## REFERENCES

1. **Musiał-Morsztyn D, Bogdał G, Królak-Olejnik B.** Karmienie piersią na przestrzeni dziejów. Część I – od starożytności do współczesności. *Pielęgniarstwo i Zdrowie Publiczne Nur Pub Health* 2014;4(1):60-64.
2. **Olędzka G.** Mleko kobiece jako prewencja chorób cywilizacyjnych. Bernatowicz-Łojko U, Olędzka G, Borszewska – Kornacka M. i wsp. Banki mleka w Polsce. Funkcjonowanie w podmiotach leczniczych-idea i praktyka. Fundacja Bank Mleka Kobiecego NPZ. Warszawa 2017:12-19.
3. **Hill G, Johnston, G, Campbell S et al.** The medical and demographic importance of wet-nursing. *Can Bull Med Hist.* 1987;4(2):183-192.
4. **Eidelman AI, Schanler RJ, Johnston M et al.** Breastfeeding and the use of human milk. *Pediatrics.* 2012;129 (3): 827-841.
5. **Arslanoglu S, Corpeleijn W, Moro G et al.** Donor human milk for preterm infants: current evidence and research directions. *J Pediatr Gastroenterol Nutr.* 2013; 57(4): 535-542.
6. **Barański R.** Odżywianie dziecka w pierwszym roku życia. *Pediatrica Kliniczna PZWL, Warszawa* 1955: 96-145.
7. **Knypl K, Knypl M.** Od Kropli Mleka przez Lactarium do banków mleka kobiecego. *Gazeta dla lekarzy.* 2015;49 (6): 17-18.
8. **Bołdyrew A.** Nurseries and “A Drop of Milk” Stations as the Centres Supporting Poor Families in the Kingdom of Poland at the Turn of the XIX-th and XX-th Centuries. *Wychowanie w Rodzinie* t. XIV 2/2016:103-119 doi: 10.23734/wvr20162.103.119.
9. **Nawrot-Borowska M.** Nauczanie domowe na ziemiach polskich w II połowie XIX i na początku XX wieku – zapatrywania teoretyczne i praktyka, Wydawnictwo UKW, Bydgoszcz 2011:85-124.
10. **Barański R.** Odżywianie niemowląt. Wydawnictwo Ars Medici, Warszawa 1936:241-305.
11. **Karolczak W.** Miejskie Pijalnie Mleka w Poznaniu w latach 1906-1914. Poznań 1996:275-292.
12. **Górnicki B, Dębiec B, Baszczyński J.** *Pediatrica.* Zarys historyczny rozwoju myśli pediatrycznej i opieki nad dzieckiem w Polsce PZWL, Warszawa 1995:1-22.
13. **Piskorska-Jasiulewicz M, Witkowska-Zimny M.** Breast milk as a medicinal product. *Nursing Topics* 2015; 23(3): 417-422.
14. **Arnold LD.** The cost-effectiveness of using banked donor milk in the neonatal intensive care unit: prevention of necrotizing enterocolitis. *J Hum Lact.* 2002;18:172-7.
15. **Kosmala K.** Bank mleka – główne cele i założenia. Świetliński J. Neonatologia i opieka nad noworodkiem. PZWL Warszawa 2016:277 – 280.
16. **Wesołowska A.** Banki mleka jako element promocji karmienia piersią. *Technika-Technologia OPM* 9-10/2012:35-36.
17. **Romano-Keeler J, Azcarate-Peril MA, Weitkamp JH et al.** Oral colostrum priming shortens hospitalization without changing the immunomicrobial milieu. *J Perinatol.* 2017; 37(1):36-41.
18. **Kim JH, Unger S.** Human Milk Banking *J Paediatr Child Health.* 2010;15(9):595-598.
19. **Broers B.** Muttermilchbanken: Investitionen fürs Leben. *Deutsche Hebammen Zeitschrift (DZH)* 2016;68(10):30-31.
20. **Wesołowska A, Sawczuk D, Paczewska I, Bernatowicz-Łojko U.** Rola organizacji pozarządowych w upowszechnianiu karmienia piersią i mlekiem kobiecym w Polsce. Bernatowicz-Łojko U, Olędzka G, Borszewska-Kornacka M i wsp. Banki mleka w Polsce. Funkcjonowanie w podmiotach leczniczych-idea i praktyka. Fundacja Bank Mleka Kobiecego NPZ 2017:31-45.
21. **Barbarska O, Zielinska M, Pawlus B, Wesołowska A.** Characteristics of the regional human milk bank in Poland-donors, recipients and nutritional value of human milk. *Rocz Panstw Zakł Hig* 2017;68(4):395-400.
22. **Hartmann BT, Pang W, Keil W et al.** Best practice guidelines for the operation of a donor human milk bank in an Australian NICU. *Early Hum Dev.* 2007;83(10):667-673.
23. **American Academy of Pediatrics Section on Breastfeeding and the use of human milk.** *Pediatrics* 2012;129:827-841.