

REVIEW OF THE FIVE-YEAR FUNCTIONING OF THE FIRST SERBIAN BANK OF HUMAN MILK

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The first Serbian bank of human milk was founded in 2009 at the Institute of Neonatology in Belgrade and it has worked as a part of the Department of Mothers, Milk Bank, Enteral Cabinet and Consultative Infirmary. The aim of the paper is to show the functioning of the bank in the period from January 1, 2010 to December 31, 2014.

We analyzed the following elements: the number of admitted mothers, development of lactation, quantity of collected milk, quantity of milk related to its origin, number of donors of human milk from home environment. Our results showed the following: the number of mothers hospitalized at the Institute was on average about 29 per year. Large amounts of milk (about 4,400 l per year) are collected every year in the First Serbian Human Milk Bank. The biggest donation of milk comes from mothers whose children are hospitalized at the Institute, followed by donors from the home environment. The largest number of mothers (70-80%) develop lactation in a certain period. The best year for the First Serbian Human Milk Bank was 2013. It is necessary to improve the system for collecting colostrum. *Acta Medica Medianae* 2017;56(2):85-91.

Key words: human milk bank, donor milk, neonatology

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Introduction

Even though it was always thought that the nutrition with human milk is the most natural way of nutrition for children, nowadays, there are more and more proofs that confirm the importance that this kind of nutrition has on the growth and development of infants. In the last decades, it has been confirmed that this is very important, not only for term newborns, but also for infants (1). Moreover, the nutrition with human milk in the earliest age affects the health both during the childhood and adulthood. A large number of studies have shown that, owing to the composition of the human milk that includes specific nutritive, energetic, endocrine, immunological, anti-infective and many other factors, the incidence of necrotizing enterocolitis, sepsis and other infections

in the preterm infants is reduced, as well as many other chronic illnesses that significantly affect mortality and morbidity (among which the most significant bronchopulmonary dysplasia and intolerance of enteral nutrition). Today, it is also believed that such a diet can prevent many chronic diseases, not only in childhood, but also later in the adult age: hypertension, insulin resistance and atherogenic lipoprotein profile, food allergies, metabolic diseases, immune deficiency, cardiopathy (2-8). Also, a growing body of information is published regarding the importance of the action of HAMLET protein from the human milk (Human Alpha-lactalbumin Made Lethal to Tumours) on a broad range of cancers (9).

It is known that colostrum that is secreted in the first days after birth is significant for feeding newborns. However, recent studies continue to confirm the specific nature of this milk in the energy and nutritional balance, and nutrition of infants in the first days of life. Colostrum is milk adapted to the specific requirements of a child during the first days after birth. It has less energy, lesser amount of lactose, lipids, glucose, urea, water-soluble vitamins and nucleotides of mature milk, but a larger amount of protein, fat-soluble vitamins, many trace elements and a higher whey/casein ratio. Today, the positive effects of colostrum on the immune function, digestion as well as its antioxidant properties are well-known (10).

In the past, aristocracy and the upper class of many cultures and religions commonly used the cow milk if mothers had no milk. In the 18th

century, this practice was spread to the lower strata of society. With the establishment of human milk banks in recent times, this has become accessible to all strata of society.

Human Milk Banks are organizations that are engaged in collecting, storing, analyzing, processing and distribution of human milk. All stages of this process are specified in the Protocol that prescribes the work rules for human milk banks. Many countries have their own protocols, but they are basically very similar. This protocol defines the path of human milk from a donor to the user. Thus, the protocols prescribe: specific health of women who can be donors of human milk, their behavior and habits, the prohibition of drug use, processing and storage of milk, subjecting to certain laboratory analyzes, etc. (11).

Users of donor human milk are babies whose mothers from certain reasons are not able to breastfeed them. These reasons are numerous: the latent period from birth to early lactation, agalactia, the use of drugs contraindicated during breast-feeding, maternal illness, etc.

The milk is obtained from donors, thanks to the particular procedure in which milk is collected and delivered to the banks. In banks, the milk is stored and subjected to analysis after which it is delivered to children in need.

The existence of human milk banks is actually a bridge between the baby and human milk. That means between the baby and feeding with mother's own milk, until this is made possible (12). This contributes to a greater percentage of feeding, exclusively with human milk, of those babies whose body weight is very low (13).

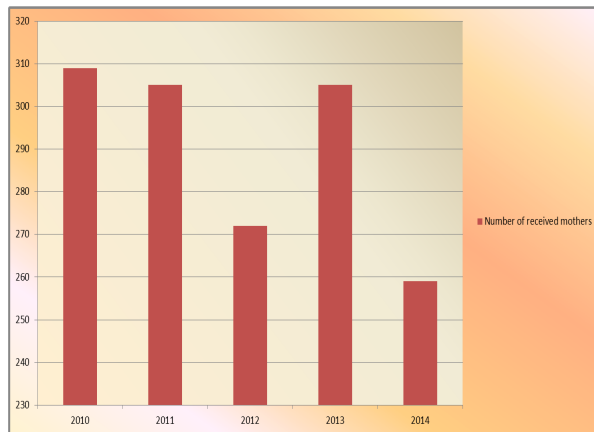


Figure 1. Number of Received Mothers

was collected and it was on average 4,406.4 L per year. The largest amount was in 2013 and it was 5,250 L (Figure 4). The total amount of milk of hospitalized mothers was 17,752 L, on average 3,550.4 L per year. The largest amounts were collected in 2013, and they amounted to 3,900 L (Figure 5). The milk of hospitalized mothers was divided into two groups: the first group mother's own milk and the total amount for 5 years was

Aims

In order to show the functioning of The first Serbian Bank of Human Milk in the period from January 1, 2010 to December 31, 2014, we analyzed the following elements:

- Number of received mothers
- Development of lactation
- Number of donors of human milk from home environment
- Quantity of collected milk
- Quantity of milk related to its origin

Methods

In order to perform a complete analysis, a retrospective analysis of the documentation of the First Serbian Human Milk Bank of the Institute for Neonatology was carried.

Results

The number of hospitalized mothers in the analysed five-year period was 1,450, on average 290 per year. The largest number was in 2010 and 2013 and the smallest number of hospitalized mothers was in 2014 (Figure 1.). Lactation was developed in 79.86% of mothers (Figure 2). The total number of donors of human milk from home environment was 350 in the five-year period, on average 70 donors per year (Figure 3). The total amount of collected milk for five years was 22.000 L. Every year, a relatively constant amount of milk

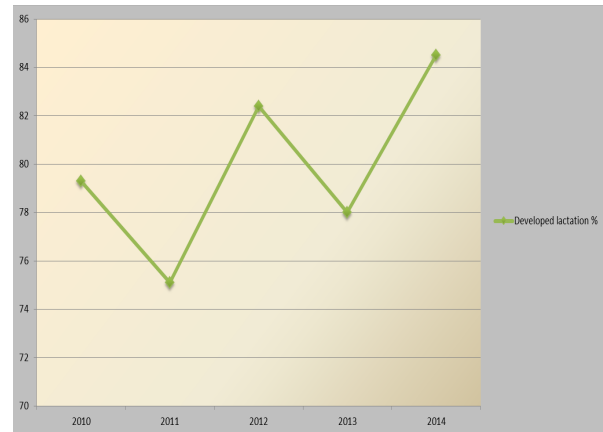


Figure 2. Developed lactation

10,297 L, on average 2,059.4 L per year, whereas the second group comprised the rest of their milk (donor milk) and the total amount was 7,455 L, on average 1,491 L per year. The largest amount of this milk was in 2013 (Figure 6). Four thousand two hundred and eighty-four liters of milk were collected from mothers from home environment, on average 8,56.8 L per year and the largest amount was in 2013 (Figure 7). The total amount

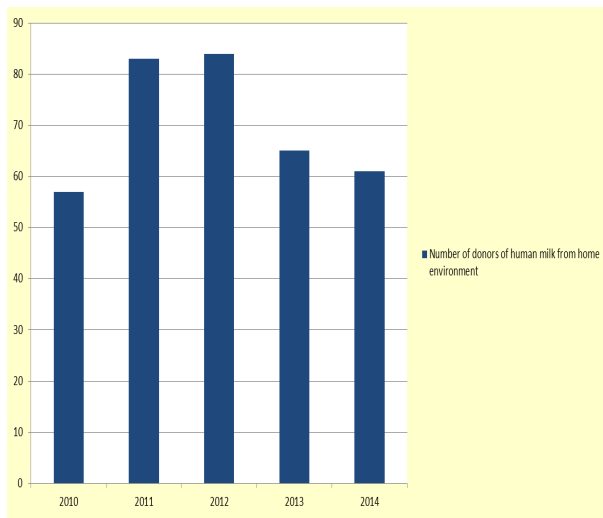


Figure 3. Number of donors from home environment

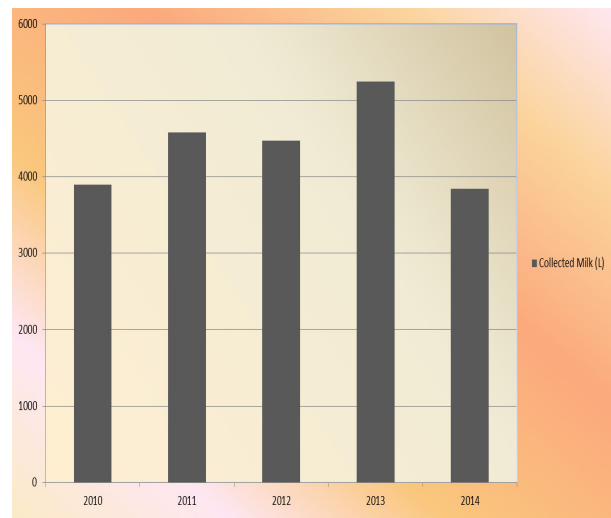


Figure 4. Collected milk

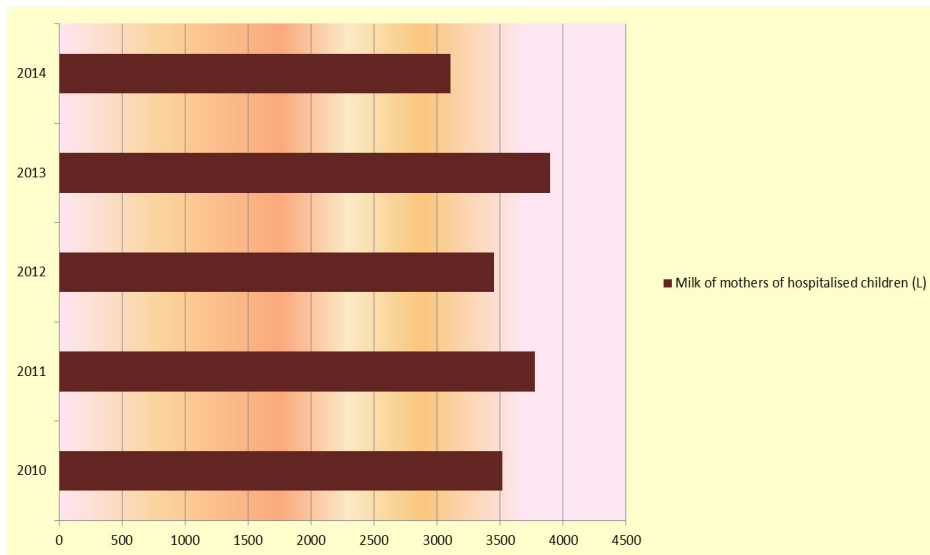


Figure 5. Milk of mothers of hospitalised children

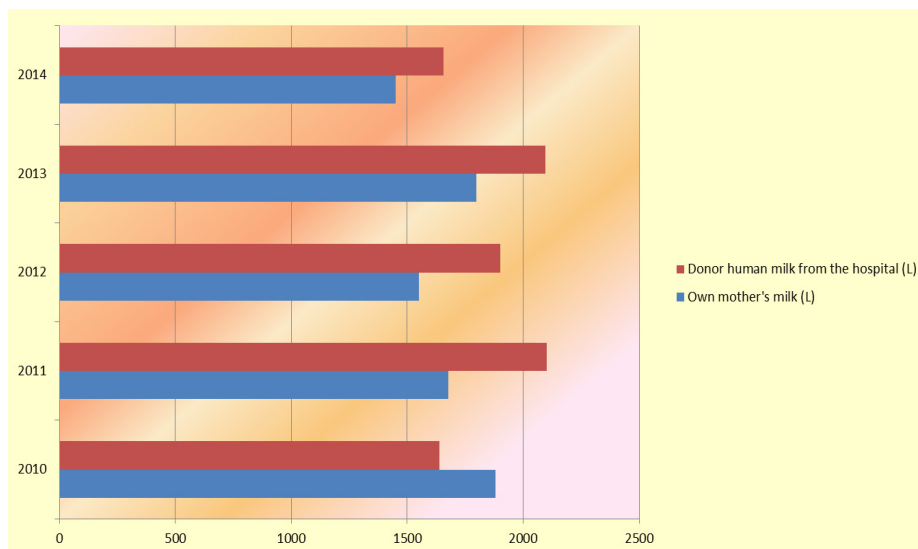


Figure 6. Donor milk from the hospital and own mother's milk

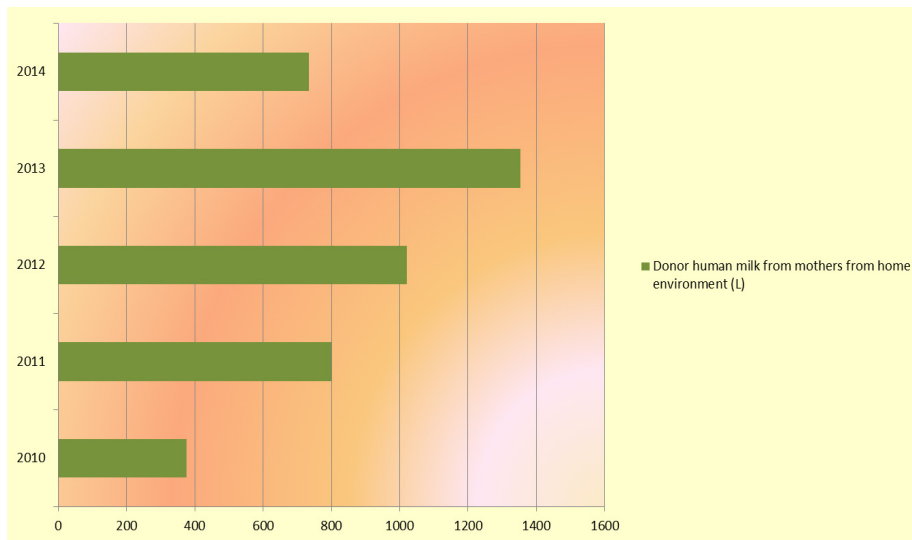


Figure 7. Donor human milk from mothers from home environment

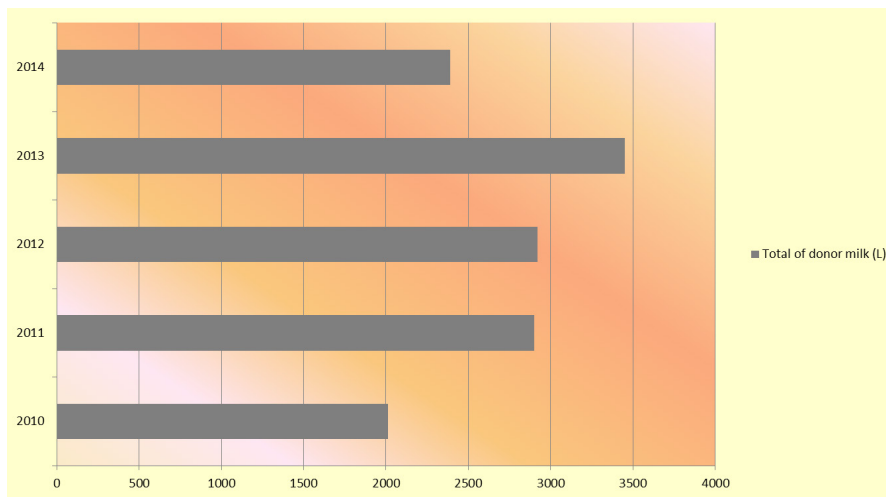


Figure 8. Total of donor milk

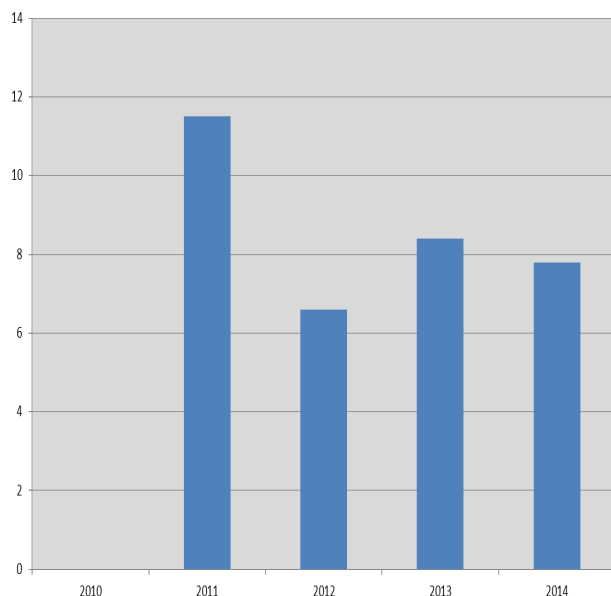


Figure 9. Colostrum

of donor milk was 11,739 L for five years, on average 2,347.8 L per year, with the largest amount in 2013 (Figure 8). The total amount of collected colostrum was 34.3 L, on average 6.86 L per year, and the largest amount was collected in 2011 (Figure 9).

Discussion

The first human milk bank was established in Vienna, Austria, in 1909. Today, there are 207 banks like this in Europe and other 15 are developing. Two more banks opened in 1919 - one in Boston and the other in Germany. With the world development, the number of milk banks is growing, which represents a progress in pediatrics and leads to increased survival of premature infants.

With the number of human milk banks growing, their associations were established in many countries and on many continents. Thus, in 1985 the Association of human milk banks in North America was formed (The Human Milk Banking

Association of North America - HMBANA), with a number of objectives, of which the most important is the formation of standards for the operation of milk banks in North America (14).

European Association of Milk Banks (The European Milk Bank Association - EMBA) was formed on October 15, 2010. The center of the association is in Milan. The association accepts new banks and associations of banks whose number is increasing (15).

The first Serbian Human Milk Bank is one of the oldest and largest milk banks in this region and, until recently, was the only milk bank in Serbia. It was founded as a nonprofit organization in 2009 at the Institute of Neonatology in Belgrade, and since 2010 has been a member of the European Milk Banks Association (15).

Even though there are different examples, human milk banks in Europe mostly work as nonprofit organizations (16).

The first Serbian Human Milk Bank is located in the department of the Institute, which was originally organized into four subunits: Mothers' department, Milk bank, Enteral cabinet and Consultative clinic, which combines all activities related to the nutrition of children, not only during their stay at the Institute, but also later by monitoring their development.

A large number of mothers of newborns hospitalized in Neonatology Institute were also hospitalized. The largest number of hospitalized mothers was in 2010 and 2013. This number varies over the years and is in direct proportion to the number of hospitalized children. One of the goals of this department is: mothers, as early as possible, should be with their children, which affects not only the natural food, but also the overall development of the baby.

Precise statistics regarding breastfeeding in our country is scarce, but according to UNICEF, only about 13% of mothers exclusively breastfeed their children during the first six months. Problems associated with breastfeeding are multifactorial and require serious analysis. The most common causes are: insufficient quantity of milk, late lactation stimulation, mothers' sickness that prohibit breastfeeding, as well as the use of drugs not allowed during breastfeeding. The results of our study showed that at the Institute of Neonatology, lactation evolved in over 70% of hospitalized mothers. The study by Kalliopi Dritsakou and associates reported that about 30% of mothers of premature babies, especially newborns with very small body weight, had an adequate amount of milk during the first day (11). Our results cover all forms of lactation regardless of the duration and quantity of milk, which explains such a high percentage. Such a large percentage of lactation is gained thanks to our highly specialized team of the department and the whole Institute of Neonatology which is one of the most important goals of nutrition of infants.

Human milk in the First Serbian Human Milk Bank is collected in two ways. The first comes from the mothers hospitalized at the Institute that donate their milk in excess when leaving. They are

subjected to some protocols to become donors of their milk. Our team contacts mothers while still in the maternity ward, does the whole breastfeeding training and participates in the collection of milk. These activities continue after admission of mothers. So far, great motivation of these mothers to leave excess amounts of milk is related to the positive experiences acquired during hospitalization at the Institute for Neonatology.

Another way of collecting milk is from donor mothers from the home environment. These mothers report as voluntary donors after which the Institute team participates in their education and collecting milk. Information about donating milk is obtained in many ways: interviews with mothers, through the media, discussions between mothers who have had such experiences, and so on.

For five successive years at the Institute for Neonatology, about 22,000 liters of milk were collected. Each year, we collect a relatively constant amount of milk and on average it is 4,400 liters of milk per year, with the best result was achieved in 2013 when about 5,000 liters of milk were collected. According to data from 2015, 23 banks, the members of the Association of Human Milk Banks of North America (HMBANA - Human Milk Banking Association of North America), collected 129,000 liters of human milk, which on average is about 5,600 liters, regarding one bank of milk per year (13).

In the first Serbian Human Milk Bank at the Institute of Neonatology in Belgrade, the largest amounts of donor milk were collected from mothers of children hospitalized at the Institute, and this amount was on average about 3,500 L per year. Lesser amounts of milk were collected from donors from the home environment, about 1,000L year. The best year for the bank was 2013.

The largest number of mothers from domestic donors was in 2012 and amounted to, on average, 70-80 mothers per year, while the accurate data of the number of donor mothers of hospitalized children, for now, is missing.

From the second trimester of pregnancy the mammary glands are capable of producing milk. Colostrum is the first milk and it is produced seven days after the birth. Colostrum is light yellow, high-density and low-volume milk. In the examined period, the first Serbian bank of human milk collected about 34 liters of colostrum with a maximum of 2013, with a decrease in the coming years.

Numerous factors affect the interest of mothers to be donors, but it is striking that the number of donors among other things is involved in activities of our team in media marketing. Our data suggest that the best years for the first Serbian human milk bank was 2013. The exact reason for this phenomenon is not completely clear but it is evident that, during these years we had a lot of marketing activities in the media related to the bank.

Activities aimed to animate mothers to donate milk are various and they live in different countries. One of the most intensive campaigns is conducted in the UK where there is a very active

Association of Banks of milk of Great Britain (UKAMB - United Kingdom Association for Milk Banking). Campaigns are continuous and include the participation of a large number of participants: neonatologists, pediatricians, general practitioners and family doctors, nursing staff, celebrities, parents, etc. These campaigns use multimedia media: web pages and social networks, hosting on television and in magazines, the use of promotional materials, lectures, workshops, spots with public figures (17).

Conclusion

The number of mothers hospitalized at the

Institute of Neonatology was on average 290 per year.

Every year in the First Serbian Human Milk Bank a large quantity of milk is collected, about 4,400 l per year.

The largest amounts of milk come from mothers donors whose children are hospitalized at the Institute of Neonatology, as well as from donors from the home environment.

The largest number of mothers(70-80%) develop lactation during certain period.

The best year for the first Serbian Human Milk Bank was 2013. It is necessary to improve the collection of colostrum.

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PRIKAZ PETOGODIŠNJEG RADA PRVE SRPSKE BANKE HUMANOG MLEKA

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Prva srpska banka humanog mleka osnovana je 2009. godine na Institutu za neonatologiju u Beogradu i radi kao deo Odeljenja majki, banke mleka, enteralnog kabineta i konsultativne ambulante. Cilj rada bio je prikazati petogodišnji rad banke u periodu od 01. 01. 2010. do 31. 12. 2014. godine. Analizirali smo sledeće elemente: broj hospitalizovanih majki, razvijenost laktacije, količinu sakupljenog mleka, količinu sakupljenog mleka u zavisnosti od porekla, broj donora humanog mleka iz kućne sredine.

Naši rezultati su pokazali da broj majki hospitalizovanih na Institutu za neonatologiju u proseku iznosi 290 godišnje. Svake godine se u Prvoj srpskoj banci humanog mleka sakupi velika količina mleka oko 4400 l godišnje. Najveću količinu mleka doniraju majke čija su deca hospitalizovana na Institutu za neonatologiju, a zatim donori iz kućne sredine. Najveći broj majki (70-80%) razvije laktaciju tokom određenog perioda.

Najbolja godina za Prvu srpsku banku humanog mleka je bila 2013. Neophodno je poboljšati sakupljanje kolostruma. *Acta Medica Medianae 2017;56(2):85-91.*

Ključne reči: banka humanog mleka, donorsko mleko, neonatologija