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RESEARCH

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Human Milk Collection and Utilization in a Milk Bank From a Municipality of *Paraná* State

Captação e Aproveitamento de Leite Humano em um Banco de Leite de um Município do Estado do Paraná

El delirio en cuidados intensivos: confusión con el Método de Evaluación de la Unidad de Cuidados Intensivos por las enfermeras

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ABSTRACT

Objective: The study's goal has been to describe the collection, utilization and profile of human milk donors in a milk bank of a municipality of *Paraná* State. **Methods:** It is a cohort epidemiological study with quantitative approach. Data were collected from January to February 2015, based on records filed in the first year of operation, 2013-2014. **Results:** Donors belonged to age group from 26 to 32 years old; they were married; they had either 1 or 2 children, and have been indicated by health services, where the primary motivation for the donation was the breast milk excess. The donated milk average amount was 1.4 liter (most in the mature phase). There was a significant loss of milk due to dirtiness. **Conclusion:** It is necessary the development of actions in order to attract donors, reduce milk loss and provide ongoing education for the health professionals involved, aiming to optimize the service operation.

Keywords: Milk banks, Breast feeding, Human milk.

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RESUMO

Objetivo: Descrever a captação, aproveitamento e o perfil das doadoras de Leite Humano em um Banco de leite de um município do Estado do Paraná. **Métodos:** Estudo epidemiológico de corte transversal com abordagem quantitativa. Os dados foram coletados entre janeiro e fevereiro de 2015, a partir de fichas arquivadas no primeiro ano de funcionamento, 2013-2014. **Resultados:** As doadoras eram da faixa etária de 26 a 32 anos, casadas, do lar, tinham 1 ou 2 filhos, foram indicadas por serviços de saúde e a principal motivação para a doação foi o excesso de leite. A média de leite doado foi de 1,4 litro, a maioria na fase madura. Houve perda significativa de leite devido a sujidade. **Conclusão:** Faz-se necessário, o desenvolvimento de ações para a captação de doadoras, para diminuição das perdas de leite e para educação permanente dos profissionais de saúde envolvidos, a fim de otimizar o funcionamento do serviço.

Descritores: Bancos de leite, Aleitamento materno, Leite humano.

RESUMEN

Objetivo: Describir la recopilación, el uso y el perfil de la leche humana de donantes en un banco de leche una ciudad de Paraná. **Metodos:** Estudio epidemiológico de corte transversal con enfoque cuantitativo. Los datos fueron recogidos entre enero y febrero de 2015, a partir de registros archivados en el primer año de funcionamiento, 2013-2014. **Resultados:** Los donantes eran del grupo de edad de 26-32 años de edad, casado, tenía su casa 1 o 2 niños, fueron indicados por servicios de salud y la principal motivación para la donación fue el exceso de leche. La leche donada promedio fue de 1,4 litros, sobre todo en la fase de madurez. Había una pérdida significativa de la leche debido a la suciedad. **Conclusión:** Es necesario, por el desarrollo de acciones para atraer donantes para reducir la pérdida de la leche y la educación de los profesionales de la salud involucrados con el fin de optimizar el funcionamiento del servicio de continuar.

Descriptores: Bancos de leche, Lactancia materna, Leche humana.

INTRODUCTION

Delirium is defined by the American Psychiatric Association (APA) as a disruption of consciousness and cognition that develops over a short period of time and floats throughout the day and night.¹ It is classified as a transient organic mental syndrome with abrupt onset and impairment of cognitive functions, bringing about changes such as reduced level of consciousness, lack of memory, intention and disorder in the sleep-wake cycle. It can occur in an overactive, hypoactive or mixed way. The incidence increases with age, with the presence of cognitive deficit, fragility, severity of the disease and comorbidities. Emergency departments, intensive care units and postoperative sectors have the highest rates of delirium, which can lead to a series of complications, including cerebral insufficiency and cognitive impairment after hospital discharge.²

It is the most common form of acute brain dysfunction in Intensive Care Units (ICU) and occurs in about 70% to 87% of patients admitted to ICUs, where more than 50% are elderly.

For many years underestimated and often unrecognized as a form of cerebral dysfunction, it is currently recognized as an important factor in morbidity and mortality in ICUs.²⁻³

Delirium is also an independent predictor of intercurrents and is considered a marker of poor prognosis. It is related to long-term cognitive impairment in 22 to 76% of the cases of intensive care patients, which may occur during or after hospitalization. Furthermore, the high mortality rates caused by delirium can be compared to those of acute myocardial infarction or sepsis, which shows the dimension of this problem for intensive care.⁴

Other intercurrents related to delirium and their economic impact and in the treatment of the patient are described: self-extubation, removal of catheters and invasive devices, increase in the length of hospital stay, increased costs generated by hospitalization.^{2,4-5}

Studies that involve the theme become relevant to contribute to the clinical practice of the nurse, implying significantly in the quality of care and morbidity and mortality of the patients. It is expected with this work, contribute to the construction of new knowledge and transformation of the practice. Knowing the relevance of delirium and its repercussions on critical patient health favors the implementation of effective nursing care that aims to reduce hospitalization days, costs generated and also the morbidity and mortality of critical patients.

Based on Faria and Moreno research,³ the main measure to change this paradigm is to search, evaluate and identify. It is fundamental to implement a protocol for the systematic evaluation of the presence of delirium in the ICUs. In order to do this, they suggest the use of validated scales such as the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), together with the definition of objectives and interventions in the face of findings in clinical practice.

Given the above, the study's aim was to understand the nurses' understanding about delirium in the critical patient and the use of the CAM-ICU method.

METHODS

It is a cohort epidemiological study with quantitative approach. Data were collected from documents filed in an HMB located in a hospital from a municipality of Paraná State.

The HMB used in this research was inaugurated in 2013 and is the city's first service. The team is formed by a nurse-coordinator, who along with the other members of the team, nursing technicians, nutritionists, and doctors, all together perform the management of donated milk, disclosures, guidelines, awareness of mothers for donation and encouragement for BF.

The data source was the HMB standardized forms that contained information of interest in this research. The period defined for the survey was from October 2013 to October 2014, which refers to the first year of providing HMB service. The data included in the following sources were included

in this research: Internal and External Attendance Form; Classification and Selection Forms of Milk Donated and Distribution Recording of Pasteurized Human Milk. Those forms contained the following information: registration of donors and newborns; Losses and origin of HM; Receptor data, destination and amount of milk. The variables of interest were recorded in a previously structured instrument for the data collection. Data collection took place in January and February 2015.

Data collected were compiled in the Microsoft Office Program - Excel® 2001 version, analyzed by simple statistics with the construction of tables, verifying the frequencies of the variables studied.

The study complied with the recommendations of Resolution No. 466/2012 that deals with research involving human beings, and was appreciated and approved by the Research Ethics Committee of the Universidade Estadual do Centro Oeste (UNICENTRO), which was requested to waive the Term of Free Consent and Clarified, considering that it is a database search. The survey was approved by the Legal Opinion No. 840.199/2014.

RESULTS

The data analyzed were organized with information on the characterization of the donors, characteristics of the donation, related to the losses and the destination of the milk.

From October 2013 to October 2014, 57 women were registered as donors. Regarding the age group of donors, 40.4% were between 26 and 32 years old, 33.3% were between 18 and 25 years old, 15.8% were aged between 33 and 39 years, 7% were under 18 years old, yet, 3.5% declared they were 40 years or older.

Regarding the marital situation, 77.2% of the donors were married, 14% were single, only 1.8% were divorced and 7% of the registrations did not contain this information. Regarding the number of children, 48.4% were primipara, 21.8% had two children and 15.8% three or four children, 14% of the registers were without information regarding the number of children. Regarding the presence of the father with the donor, 86% reported having a father figure, 5.2% said they did not have them, and 8.8% did not include this information.

Regarding the profession of donors, the following data were found: 26.3% were called the household, 1.8% as a public servant, 5.3% were autonomous, other occupations totaled 14%, and 52.6% were registered did not present this information.

The health habits of HM donors: 1.8% reported smoking and none of the donors referred to alcoholism. Regarding drug use, 15.8% were in some type of unspecified treatment, which did not compromise the donation, 49.1% of the donors denied the use of medication and 33.3% did not provide information on this variable.

Regarding information on gestational age, 10.5% of the women reported that the birth occurred before 36 weeks of gestation, 36.9% between 37 and 41 weeks and 3.5% with more than 42 weeks, with 49, 1% of registered women did not have this information. The type of delivery of the mothers was: 65% of cesareans, 25% of vaginal deliveries and 10% of registrations that did not include the type of delivery performed. Regarding birth weight, 5.3% of the babies were born with weight less than 1,500 g, 12.3% with weight between 1,500 g and 2,500 g, 28.1% of newborns between 2,500 g and 3,500 g, and 14% above 3,500 g, but 40.3% of the registrations did not contain this data.

When examining the variables related to indication for milk donation, it was observed that 58% was made by the health services, 14% by the media and 14% by other means of information, with 14% still remaining without these data.

Regarding the reason for the donation, 31.6% of the mothers donated due to excess milk, 17.5% were motivated by the desire to help and 50.9% of the registries did not have this information filled.

HM usefulness and destination

In this topic will be discussed the data related to the average of milk per donor and the average of milk per donation, volume donated according to the stage of breast milk, reasons for milk losses and volume of milk destined for each institution.

Table 1 presents the variables related to the average milk per donor and average milk per donation.

VARIABLE	Volume (L)
Average milk per donor	1.4
Average milk per donation	0.37

Source: Registration Form of classification and selection of the donated milk, HMB archives.

Table 2 displays the volumes of Human Milk donated and its classification by phase of breast milk.

VARIABLE	Volume	
	Liters	%
Mature milk	10	93.78%
Transitional milk	15	3.72%
Colostrum milk	377,680	2.50%
Total donated volume	402,748	100%

Source: Registration Form of classification and selection of the donated milk, HMB archives.

Table 3 shows the reasons for donated milk losses and the respective volume lost.

Table 3 - Reasons for milk losses.		
VARIABLE	Volume	
	Liters	%
Dirtiness presence	55.5	90.37%
Technical problems	3.5	5.77%
Microbiological examination	1.3	2.19%
Broken bottle	1.0	1.67%
Total	61.5	100%

Source: Registration Form of the donated milk losses, HMB archives.

Regarding the destination of Pasteurized Human Milk, Table 4 presents the referral of donations, usage, losses and storage.

Table 4 - Milk volume per institution.		
VARIABLE	Liters	%
Total stocked milk in HMB	134,248	33.34%
Hospital A	125,495	31.16%
Institution B	81,490	20.23%
Total volume wasted	61,515	15.27%
Total milk donated	402,748	100%

Source: Registration Form of the donated milk destination, HMB archives

There was no referral of donated milk for consumption in the home, neither was it sent to private maternity homes in the municipality or to other cities of the regional health service that also provide maternal and infant care

DISCUSSION

The gain of knowledge about the socio-demographic profile of milk donors is important in order to achieve the appropriate divulgation approach and the collection of new donations.⁷ By being aware about it is paramount for the HMBs to meet their goal of collecting and distributing HM and meeting the needs of their receptors. The participation of the donor is fundamental, since the existence of the HMB is linked to women who are willing to offer the HM free of charge, since it is a non-profit establishment in which the commercialization of products is prohibited.⁸

The profile of human milk donors in this study revealed that 40.4% of the donors were in the age group between 26 and 32 years old, 77.2% were married, 86% reported having support from the intimate partner during the donation process, and most them was primipara.

Regarding the average age of the donors, other similar studies found a similar profile in Brazil⁹⁻¹⁰ and in another countries.¹¹⁻¹²⁻¹³ Nonetheless, researches have shown that there is no relation between maternal age and milk donation. It is important to highlight other factors that the literature points out as decisive for the nurse to decide to be a donor,

such as personal experiences, motivation, encouragement, support, knowledge of HMB.⁷

The marital status in the present study is similar to the results found in another study, which shows that 74.2% of the mothers were married or lived with their partners, where there was partner support in 38.8% of the cases.¹⁰ Having the intimate partner support is considered a factor that favors breastfeeding. The paternal presence in the first days after the birth of the child is favored by the paternity license, since it allows the father to participate and support the woman during the lactation process, contributing to a better effectiveness of this process.¹

However, unmarried women should also be approached and encouraged to donate HM, as studies investigating the profile of donors present an increasing and a significant number of women with this profile, also present in this study. Even in the absence of the partner, these mothers may present safety in relation to breastfeeding.⁹⁻¹⁰

Most of the women reported being a mother and breastfeeding for the first time while, a smaller portion, were in the second or third breastfed children. A similar result was found in national and international studies. In Brazil, two studies in Minas Gerais presented similar results, 61.3% of the donors were primiparas, and 58% in the study in São Paulo 51%, in Paraná 56% and 71.93% in Mato Grosso had only one child.^{7,10-11} In other countries the findings are similar, in Taiwan 68.9% of the milk donors were primiparas and in Madrid 64% of the mothers were having the first baby.¹²⁻¹³ It may be related to a greater search for health services, possibly due to lack of experience and insecurity when breastfeeding. Another factor is related to the fact that these mothers have greater availability of time to dedicate themselves to giving. This allows for a relational relationship between mother and the HMB service, then favoring the breast milk donation.¹⁰

Regarding the occupation (work related), available data showed that many HM donors reported having “home” occupation. Contrary to this finding, other researches have shown that most donors have paid work. In the city of Uberaba-MG, 58.1% of the donors reported having formal or informal work and, nevertheless, they maintained the donations of HM.^{7,10}

In another study, only 25.2% of the donors were housewives.¹³ A relationship can be found between milk donation and availability and flexibility of time, demonstrating that access to women in the labor market, at the service of the HMB, it is more difficult. Given this fact, the HMB can identify the elements that have impaired the donation of workingwomen in order to develop strategies for adherence of these people.

With regard to health habits, most of the nursing mothers denied smoking and alcoholism. Life habits are informed by the prospective donor when completing the registration form. The woman should inform if she makes use of tobacco, alcohol, drugs and other drugs. In this study, 1.8% reported being an irregular smoker, 15.8% were using medications that did not

interfere with the donation. However, moderate amounts of tobacco and some medications are not an impediment to donating HM. The RDC 171 that regulates the functioning of HMB recommends that the donor should be healthy, smoke no more than 10 cigarettes per day, do not use alcohol or drugs and no drugs incompatible with breastfeeding.¹⁴ However, in this research it was emphasized that 33.3% of the analyzed forms did not present such information. This is extremely important information to know the possible donor and guarantee the donated milk quality.

According to the results of our study, the most common type of delivery among donors was cesarean procedure. Authors mention that cesarean provides difficulties for the woman to initiate breastfeeding, due to the effect of anesthesia, pain and limitation of movement. The duration of exclusive breastfeeding was related to the assistance received by the woman during the labor and delivery process, and the highest prevalence of exclusive breastfeeding was related to vaginal delivery.¹⁵

Regarding the birth weight, in this study 28.1% of the donor's babies had between 2,500 g and 3,500 g. Similar result was found in Spain, in which the mean weight of the children was 2,975 g. It was found a relationship between the continuity of the BF and full-term newborns weighing more than 1,500 g.¹² Premature babies, who require hospitalization in a neonatal intensive care unit, are also more likely than not to be breastfed, due to the clinical child and the service routines themselves. Despite of that, there are public policies like the Kangaroo Method that help in the recovery of the BF in these situations.²

About knowing that the HMB exist, the donors pointed out as a means of encouraging health services and the media. In a study performed in a city of Minas Gerais State, mothers were advised about the HM donation, as follows: by the health professionals (64%), during prenatal care (29%) and by their relatives (16.1%). On the other hand, for Spanish researchers, only 15.5% of the donors met the HMB through a health professional, 16.7% during the prenatal consultations or while they were in the maternity ward, the others met by communication means (24.2%), friends (22.4%) and internet (13%).¹² The data found diverge from the current research, considering that the health services were the main responsible for indicating the donation. It emphasizes the importance of networking for the operation of HMB in order to strengthen the service and favor the increase of donors.

In this research, the reasons that led the women to donate milk were the following: 31.6% the breast milk excess and the desire to help 17.5%. The reasons for donating milk were also similar in a study carried out in Madrid.¹² Accordingly, a study done in Uberaba-MG showed that excess milk produced (58.1%) and altruism (32.3%) were the main reasons for the breast milk donation.¹⁰ The reasons that led the women to donate milk in the studies cited were primarily for biological and personal issues related to excess milk and secondly for humanitarian reasons to do good and help.

The data of this research present an average of milk received per donor of 1.4 L and average volume in each donation of 0.37 L. The maximum volume donated per nursery was 27 L and the minimum volume was 0.01 L. In contrast to this data, a HMB in Europe obtained an average donor volume of 3.1 L, varying between 174 L and 0.04 L.¹² Compared with the Fiocruz data in 2015, it was observed that the average of donation in Paraná State was around 1.1 liters per donor. On the other hand, the data found in the South region of Brazil were: 0.88 L per nursery. While in Brazil as whole, 1.07 L per donor was obtained.¹⁶ It can be observed that HMB in the municipality in question obtained a milk volume above the State and Country averages, but is still below the donations received in the Europe.

The low volume donated by some nursing mothers may be related to HMB's search for help in BF. When receiving aid, the milk that is collected for the HMB is usually a minimal amount, and then do not characterize an assiduous donor. Given this, it is important to sensitize women who seek support from HMB to continue donating milk even after breastfeeding has improved.

The donor should be advised that there is no specific amount of milk, neither a standardization of the number of times for extraction. During breastfeeding, there is no problem in donating milk, since the more the breast is stimulated, whether for donation or for feeding your baby, more milk will be produced.¹⁷ This information is very important for mothers who donate, and should be valued by the professionals who do the capture and approach, as it will influence the amount of donated milk. One of the reasons that hinders the donation is the fear of mothers in donating milk and, consequently, lacking for their baby. This shows that many women did not receive guidance on the maintenance and stimulation of milk production by the nurse during the donation.⁹

Breast milk is classified into 3 stages, as follows: colostrum milk, transitional milk and mature milk. In the first phase, colostrum, present from gestation until about 2 to 7 days after birth, presents as a yellowish and thicker milk, its abundance is small, however sufficient and necessary for the first days. In its composition are found antibodies and leukocytes considered the first "immunization" of the child against most of the bacteria and viruses. The next phase is the transitional milk, which is produced between 7 and 14 days after birth. This one presents a higher volume per feed when compared to colostrum. At this stage milk undergoes gradual nutritional changes between the characteristics of colostrum for mature milk, such as the reduction of protein levels and increase of fats and carbohydrates, adapting to the nutritional and digestive needs of the newborn.¹⁷

At the last phase, mature milk is produced, being secreted around the 10th day after birth, it is a continuation of the transitional milk, its characteristics are of a white and opaque liquid, having little odor, its taste is sweet, having a volume ranging from 700 to 900 mL per day on average during the first

six months. Its basic composition contains water, proteins, carbohydrates, lipids, vitamins and minerals.¹⁷

In the present study, mature milk was the one that obtained the largest volume (377 liters), transitional milk with 15 liters and colostrum with 10 liters. The volume of colostrum produced by a woman ranges from 2 to 10 mL per feed, up to 40 mL per day, and multiparas produce more colostrum when compared to primiparas. The volume of mature milk produced per day ranges from 600 to 840 mL per woman. The transitional milk is usually ejected for a short period, between the 7th and the 14th day after birth.¹⁸

It is natural for the HMB to receive a higher volume of mature milk because it is produced during most of the lactation cycle, while colostrum and transitional milk are restricted for short periods. After the breast is emptied, the breast of the woman may present engorgement, favoring the search for HMB at this stage.

The total volume of HM donated during the first year of operation of HMB was approximately 402 liters, of which approximately 61 liters were lost. To ensure the quality of milked milk and to avoid wastage, mothers should be advised on how to proceed at the time of milking. Following the guidelines, one should follow the following procedures: choose a clean, quiet place away from animals; fasten and cover hair with a cap or scarf; avoid talking during the withdrawal of milk or use a mask or diaper covering the nose and mouth; wash your hands and forearms with soap and water and dry with a clean towel; despise the first jets or drops of milk; start the collection in the bottle and store the milk in a freezer after collection.¹⁶

The total volume of HM used by the HMB corresponds to 402,748 liters, of which 134,248 liters remained in stock and 206,985 liters were consumed by newborns of the hospitals of the municipality. According to the RDC 171, milk collected and processed by a HMB must meet the following priority criteria: premature or low birth weight babies who do not suck; infected, especially with intestinal infections; in trophic nutrition; carrier of immunodeficiency; carrier of allergy to heterologous proteins; and exceptional cases, at the discretion of the physician and in cases in which the mother is unable to breastfeed.¹⁴

For neonates hospitalized in a neonatal intensive care unit, human milk is related to the reduction of infections, weight gain, reduction in the incidence of necrotizing enterocolitis and oxidative stress.¹⁷

All human milk received by the HMB must be submitted to initial selection and classification procedures, with the selection steps being as follows: packing verification, presence of soil, color, off-flavor and Dornic acidity. The classification includes parameters such as: lactation period, Dornic acidity check and energetic content by creatinocrit. This milk must be adequate to the requirements of safety and nutritional value, sufficient to guarantee the growth and development of the newborn. In this study it was possible to verify that most of the lost milk occurred in the selection stage, since 90.37%

presented dirtiness and 1.67% the bottle was damaged. A different result was found in the municipality of Maceió-AL where 50.8% of the donated milk was discarded. In this study, the greatest cause of HM losses was milk maturity (63.48%), followed by acidity (27.58%) and presence of dirtiness and fecal coliforms in the milk (8.94%).¹⁹

A percentage of 5.77% of donated milk was disapproved in the microbiological examination, being also wasted. Human milk obtained from healthy donors is free from pathogenic microorganisms, but when it is present, the contamination may be from external sources. Coliforms occupy a prominent place, due to their high probability of occurrence when the milk is not obtained under satisfactory hygienic-sanitary conditions, which evidences the greater loss due to the presence of dirties discussed above.²⁰

It is important to note that pasteurization is important for the maintenance of microbiological quality of the milk. Although pasteurization is a process that ensures the milk microbiological quality, it is important that the milk is protected from previous contamination in order to preserve its components until distribution to the recipient newborn. The high quality milk received by the HMB is directly related to the care in the technique and to the perception of the donation importance to the neonates by the donors.²¹

The percentage of milk wasted in the HMB in the municipality studied can be considered high when it is compared to a similar study carried out in Paraná, where 24% of losses were detected in 2006 and 10.5% of waste were observed in 2008.²¹

CONCLUSIONS

This study was able to make it possible to know about the collection, utilization and profile of human milk donors in a milk bank within its first year of operation, which was located in a municipality of Paraná State. This knowledge has social and professional relevance, since it allows directing actions with a view to the capture of different donors and the optimization and utilization of HM in a HMB. As well as, the investment in the permanent education of health professionals in order to enable them to orientations about BF and in the work developed. By investing and strengthening actions in HMB, they contribute to reduce expenditures with special formulas for premature and newborns at risk, better utilization of the professionals and equipment available, improve the incentive of the HMB, and consequently decrease of infant mortality.

It was found that the data on HM donors reflect a better preparation of multiparous women because they have already experienced breastfeeding. The relevance of the follow-up during the prenatal period was evidenced, because it is a crucial moment in the decision to breastfeed. Furthermore, the data should be used as a basis for HMB to invest in attracting new donors, especially women returning to the labor market, because it was a small number in the sample studied.

It is important to emphasize the importance of health services in the indication of HMB in the support and encouragement of the BF, but new strategies of disclosure should be outlined in order to increase the knowledge of the whole society regarding the work of this service.

Some actions need to be strengthened in order to reduce the volume of losses, especially those related to dirtiness. Therefore, it is necessary to review the guidelines provided by the donors in order to qualify the milk collection at home, as well as to increase the distribution potential beyond the neonatal intensive care units, including the other municipalities of the regional reference.

Regarding the records, it was observed that they are rich sources of information, in which the professionals can be guided towards the survey of indicators, to researches and also to promoting improvements in the referred service. Nonetheless, some difficulties were found during data collection, which was a limiting factor for this research, since most of the registers were not filled correctly, leaving much information incomplete, and then impairing the total data collection.

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