The trend of services provided by human milk banks between 2010 and 2019 in Brazil

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Abstract
Objective: To describe the trend of participation in group and individual support by human milk banks (HMBs) provided between 2010 and 2019 in Brazil.
Methods: Ecological study with data from participation in group and individual support provided by the HMBs between 2010 and 2019, available in the production report of the Brazilian Network of Human Milk Banks. The number of participation in group and individual support was expressed for Brazil and for Brazilian macroregions in absolute numbers. Trend analysis was performed from the analysis of index numbers, considering the year 2010 as a reference. It was calculated the ratio of the number of participation in group and individual support by HMBs for each macro-region and year.
Results: There was an increase of 42% in participation in group support (300,595 in 2010 vs 425,570 in 2019) and an increase of 69% in individual support (1,157,038 in 2010 vs 1,962,162 in 2019). The North and Northeast macroregions had the highest growth rates in the provision of these services (122 and 131%, respectively), above the national growth rate in the study period. In contrast, the Midwest region showed a downward trend throughout this period, for both types of support. However, in the Midwest, there was a higher ratio of participation in groups by HMBs between 2010 and 2016 and for individual support by HMBs between 2010 and 2012.

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Introduction

The Brazilian Network of Human Milk Banks (rBLH) was created in 1998 as one of the strategies to promote, protect, and support breastfeeding (BF) by a joint initiative of the Ministry of Health and the Oswaldo Cruz Foundation (Fiocruz). Its mission includes collecting and distributing quality human milk for preterm and/or sick newborns, contributing to the reduction in infant mortality, as well as improving BF indicators in Brazil.1,2

The human milk bank (HMB) is a specialized, non-profit center, necessarily attached to a maternal and/or children’s hospital, responsible for promoting and encouraging BF. Technically connected to the HMBs, there are the Human Milk Collection Stations (HMCSs), which are fixed or mobile units, extra or intra-hospital, which share the responsibility for the promotion, protection, and support for BF and the human milk collection and storage activities.3

Routinely, nursing mothers/women turn to HMB professionals for guidance on the correct management of BF, to learn or correct the technique, avoid complications, and establish the management of BF. Individual counseling or group support, immediate BF support after delivery, and lactation management were interventions that increased exclusive breastfeeding (EBF) by 49%, and BF by 66%.4

The guidelines provided in care in HMBs and HMCSs require trained health professionals, with knowledge of maternal and child health, and specific skills in the clinical management of lactation. In addition, this action permeates counseling, in which the professional must have sensitive listening, conveying confidence and support to mothers who intend to breastfeed and/or are breastfeeding.6,7

HMBs and HMCSs provide individual and personalized care according to the demand presented, offering all the support that women need during this period. There is also group care involving pregnant and/or postpartum women in conversation circles since prenatal care, which allows the mothers to exchange their experiences, respect their values and prior knowledge, clarify the myths and/or taboos that permeate the act of BF, and making mothers and family aware of all the advantages of BF for mother, child and society.7

Previous studies with HMBs have focused on analyzing the quality, characteristics, microbiological safety, and nutritional composition of breast milk collected and distributed by this service.8-11 These studies are relevant and refer especially to one of the central objectives of the HMBs, which is the collection, processing, and analysis of the microbiological quality of breast milk. However, there are few studies that quantify and describe other relevant activities of the HMBs, which are the encouragement of BF, and assistance in its management.7,12 Thus, the objectives of this study were to describe the trend of participation in individual and group support provided by the HMBs and HMCSs between 2010 and 2019 in Brazil; and to verify the total number of HMBs and HMCSs that updated data for the Brazilian Network of Human Milk Banks Production System in this same period.

Methods

This is an ecological study whose data source was the Production System developed by the rBLH, available on the network website via a production report - Documents Series: rBLH em dados – Brasil 2000 - 2019 - generated by the network in July 2020: https://rblh.fiocruz.br/sites/rblh.fiocruz.br/files/usuario/77/serie_doc_rblh_emdados_corpo_anos_completo_compressed_3.pdf. Data corresponding to the period from 2010 to 2019 were selected. This period was chosen, as the regional consolidated data for the years prior to 2010 were not included in the production report, which would make it impossible to describe the trend of care by region.

The rBLH Production System is a management tool launched in 2006 with the objective of systematically and securely obtaining data. In the system, the following registration data are made available: production, human resources, equipment, and environmental conditions of each HMB inserted in the system. The HMB teams are responsible for updating the system monthly, as well as providing data from their respective HMCSs. Previously, the information gathering was carried out by telephone, fax, and e-mail. Possibly, these channels made data systematization difficult, as there was no specific interface for data entry. It is important to stress that the provision of data is not mandatory; however, the information used by the Fiocruz Quality Accreditation Program in Human Milk Banks for the Unified Health System (FQAP-HMB-UHS) is collected from the rBLH Production System. Therefore, the HMB that does not keep the system up to date may lose the certification that guarantees the quality of the service.

The FQAP-HMB-UHS is an integrated action of the General Coordination of Child Health and Breastfeeding of the Ministry of Health with Fiocruz, which aims to validate the quality of the information provided by HMB managers in the Production System. The certification assesses services based on the required quality standards, equipment, qualification of professionals, and level of service quality during the year. Services are rated in the gold, silver, and bronze categories.

Selected data

Data referring to the participation in group and individual support were selected, as they are directly related to the role of BF support performed by the HMBs. The total number

Conclusion: Individual and group support provided by the HMB as a strategy to support breastfeeding increased considerably in Brazil during the study period, especially in the North and Northeast regions.

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of HMBs units and HMCSs that updated the rBLH Production System monthly was also collected.

Participation in group support is characterized by the activity performed by an HMB/HMCS professional, whether of middle or higher level of education, in the form of a group to clarify doubts about breastfeeding, exchange breastfeeding experiences, respect mother values, and prior knowledge and to talk about benefits of BF. This activity may be performed outside the HMB environment and the number of group support represents the count of users who participated in each group activity.

On the other hand, the participation in individual support consists of the activity performed by an HMB/HMCS professional, whether of a middle or higher level of education, individually to the woman and/or the child. The total number of individual support represents the sum of all individual support, regardless of whether it was performed for the same person at different times. In the participation in individual support, an HMB professional was dedicated to the care of a woman or a child or even the mother-child binomial, so each appointment must be counted as one.

Data analysis

For analysis, the authors compiled data from the document series report and exported it to an Excel® spreadsheet. Statistical analyses were performed using Stata SE 13.0. Data were analyzed from the preparation of a spreadsheet containing the total number of the participation in group and individual support per year for Brazil and for each Brazilian macroregion. The number of the participation in group and individual support is available by state and the authors decided to express by Brazilian macroregions (North, Northeast, Midwest, Southeast and South). The total number of support (group or individual) for each macroregion represents the sum of data from the respective states. The classification of regional divisions (macroregion) was officially defined by the Instituto Brasileiro de Geografia e Estatística (IBGE) and this classification was applied by rBLH.

The trend analysis was performed from the analysis of index numbers, considering the year 2010 as a reference, that is, all subsequent years were compared to 2010 records. The index number is used when the authors want to compare the variation in the time of a given phenomenon in relation to a reference year. In this study, the phenomena analyzed were the participation in group and individual support, and the reference year was 2010, which was assigned the value ‘1’. The index number for each year was obtained by division of the value of group or individual support in each year by the value of support (group or individual) from 2010. Values above 1 indicated an increase in the number of groups and individual support at the HMB compared to the year of reference and values below 1 signaled a reduction in these services.

This rBLH report also provides the total number of HMBs and HMCSs per month, state, and year. For the synthesis of these data, an arithmetic means of establishments (HMBs + HMCSs) that updated the rBLH production system was performed by region, for each year in the study period. The ratio of the number of participations in both support (group and individual) by HMBs and HMCSs for each macroregion and year was estimated mainly because of the variation of numbers of HMBs and HMCSs in each macroregion.

The National Research Ethics Commission (CONEP), in Resolution 510/2016, establishes that research conducted with information of public access and without personal identification does not need to be evaluated by ethics committees.

Results

The absolute number of the participation in group and individual support by each year and macroregion was described in Table 1. The authors verified an increase for both support in all macroregions, except in the Midwest. The number of HMB and HMCS also increased, and the magnitude of increase was greater in the North and South regions (doubled) and smaller in Midwest (Table 1).

The trend analysis for the number of participation in group support performed per the HMBs between 2010 and 2019 is described in Figure 1A and B. From 2010 to 2019 the participation in group support increased from 300,595 to 425,570 for all macroregions (data not shown in table or figure). In 2015 and 2016 the number of participation in group support was the lowest in the analyzed historical series, but still higher than that in 2010 (7%).

When analyzing the macroregions, there was a greater fluctuation over the period (2010 to 2019) compared to the national scenario. The North and Northeast regions (Figure. 1A) have always remained above the national trend, even with variations over the 10-year period. In the year 2019, for example, the Northeast region registered an increase of 154%, which corresponds to 163,243 attendances compared to 64,247 in 2010. Meanwhile, in the Southeast region (Figure. 1B) there was a sharp drop in 2018, for this year the number of group support performed represented only 59% of the total practiced in the reference year in that same region. Contrary to the other regions, the Midwest (Figure. 1B) was the only region with a downward trend during the entire study period. In 2010, 107,595 group support was conducted, while in 2019 this figure dropped to 51,969 (Table 1), corresponding to only 48% of the previous number.

Regarding participation in individual support (Figures. 2A and B), the authors observed an increasing trend during the study period. In 2019, 1,962,162 participations in individual support were provided, representing a 69% increase in the total performed in 2010 (1,157,038 individual support). Analyzing the different regions of Brazil, the authors found that the North and Northeast regions (Figure. 2A) had the highest growth rates in the provision of this service, as participation in group support, with values higher than the national ones. These regions showed a growth of 122% and 131%, respectively, at the end of 2019 compared to the reference year (2010). The trend in the Southeast region (Figure. 2B) is like the national variation, while the South region of the country shows stabilization in growth after 2016. The Midwest region, in turn, showed a downward trend, in 2019 (200,623) participation in individual support corresponded to 90% of what was provided in 2010 (218,453).

In Table 1, we also described the means of the count of HMB units and HMCSs updated by rBLH Production System. In the Southeast and Northeast regions there are a greater number of establishments throughout the period and in the North region, a smaller number of establishments. There was a greater increase in the mean number of
establishments in the North and South regions, corresponding to 182% and 104%, respectively. The Northeast and Southeast regions also grew, but in smaller proportions, 70% and 29%, respectively. In contrast, the Midwest region showed the smallest growth in the number of HMB units and HMCSs in the historical series, corresponding to 8%.

From the differences between the number of participation in group and individual support and the number of HMBs and HMCSs in this period in each macroregion, we calculated the ratio of the participation in group and individual support per HMB and HMCSs. Regarding participation in group support (Figure 3A), the highest ratios were observed in the North and Midwest, followed by the Northeast. In the North region, there was a sharper drop in the ratio from 2015 onwards and in the Midwest, the decline stabilizes from 2016 onwards. Regarding the participation in individual support (Figure 3B) the highest ratios were also observed in the North and Midwest, followed by the Northeast. In the Midwest region, there is a downward trend, but the ratio remains high.

Discussion

The results analyzed in our study point to an increasing trend both in group and individual support at the HMBs between 2010 and 2019. For participation in group support, there was an increase higher than 40%, when comparing 2019 to 2010, and a growth of almost 70% in the total number of individual support provided, comparing the same period, highlighting the expressive increase in the North and Northeast regions. We also witnessed a greater number of HMBs and HMCSs in the Southeast and Northeast regions. In the Northeast and South regions, the number of HMBs and HMCSs almost doubled between 2010 and 2019, and in the North region, the number tripled. Although we observed a decreasing trend in absolute number in the participation in group and individual support in the Midwest region, the volume of both supports carried out by each HMB was high.

One of the possible reasons for the increase in group and individual support could be the expansion in the number of HMBs and HMCSs. There was an equivalence between the greatest increase in attendance and the greatest expansion in the number of establishments (HMBs and HMCSs). The rBLH is considered the largest and most complex production system in the world and, according to data from 2020, it is composed of 222 HMB units and 219 HMCSs, distributed throughout the national territory, with 15 HMB units and 30 HMCSs in the North macroregion, 53 HMBs and 66 HMCSs in the Northeast, 27 HMBs and 10 HMCSs in the Midwest, 92 HMBs and 85 HMCSs in the Southeast, and 35 HMBs and 28 HMCSs in the South. In February 2008, for example, 187 HMBs and 27 HMCSs were registered in the rBLH production system. One of the possible explanations for the greater number of HMBs and HMCSs in the Southeast and Northeast regions could be the higher population concentration in these regions.

A recent national survey showed that among children under the age of 4 months, EBF prevalence rose from 4.7 to 60.0%, from 1986 to 2019, respectively. Meanwhile, the prevalence of EBF among children under the age of 6 months increased by 42.8 percentage points over the same period.
from 2.9 to 45.7%, which corresponds to an increase of about 1.2% per year.\textsuperscript{15} The findings of this study may indicate a possible contribution of the HMBs to the increase in BF rates in Brazil, and the increase in support and expansion of the rBLH, as assistance in the HMB helps in the management of BF, especially in the first days and weeks of life of the newborn. Evidence shows that BF rates and duration increase when a woman receives BF counseling.\textsuperscript{16,17} Support from the HMB, in its services, offers the technical base that the woman needs to be successful in the management of BF, giving the woman self-confidence in BF.

The role of encouraging and supporting BF is still little known by pregnant and postpartum women and society. Recent studies have also shown that most nursing mothers who did not receive prenatal guidance on the clinical management of breast complications were also unaware of the existence of the HMB and its facilitating role in the BF process.\textsuperscript{4,18} These findings reinforce the importance of making the role played by the HMB more visible, which offers support and provides free care, focused on the needs of the child and the mother, helping women with the clinical management of BF (the baby’s attachment to the breast, positioning, milk extraction, relactation, among others).

When analyzing the results by region, there is a fluctuation in the trend of care provided annually. Based on the data the authors have available, we were unable to list sufficient reasons to justify each variation, but we did list some factors that could influence the performance of the HMBs, such as a possible reduction in the number of professionals in certain units; greater demand for assistance at the HMB in each region; need to interrupt the care for construction work; and greater adherence of a region to the participation in group support.

Considering the results found for the North and Northeast regions, these behaved in a very similar way, showing a significant increase over the years for the two types of assistance, always remaining above the national trend. This increase may be due to the growth of the rBLH in these regions, there was a significant increase in the number of HMB units and HMCSs, when the authors compare the mean number of establishments from 2010 to 2019. Although in the Midwest the authors observed the lowest absolute number of participation in group and individual support, the ratio of both support by a number of HMB/HMCS was high. Possible reasons for these results would be cultural issues, diversity of services provided by HMB, or a massive disclosure to population about the services offered by HMB. We suggested that HMBs from the North, Midwest, and Northeast regions proved to be more efficient, both in group and individual support. Also, there was a decrease in the ratio of...
errors, the platform has been improved and, in 2020, a method was included that requests the verification of entered data, based on a comparative analysis of previous months. Another limitation of the study is the lack of information on the amount and duration of group support, as well as the themes that were addressed. As for the participation of individual support, it would be interesting to know how many of this support were performed with the same child or woman.

As for the strengths of the study, we can highlight the fact that the authors have analyzed the function of Promotion, Protection, and Support for BF performed at the HMBs, which is little explored in previous studies. Furthermore, using secondary data, with adequate statistical and epidemiological tools, can generate consistent inferences from the results obtained from the public policies adopted in the country regarding the health of the population.

The study made it possible to see that the assistance provided by the HMBs, as a support strategy for BF, has increased nationally over the years, despite the significant differences between regions. This rise may have contributed to the improvement in BF indicators in Brazil. Future studies can help to understand and correlate care, and the prevalence and duration of BF in the country.

It is expected that these findings increase the visibility of the HMB as a reference in supporting mothers and newborns, and are used by managers, health professionals, and society, providing support for the planning and evaluation of actions in favor of BF. Finally, it is noteworthy that the study allowed us to identify the potential contribution of the rBLH as a public policy to encourage and support BF, and this is due to the professionals that work at these institutions, who truly support BF.

Conflicts of interest

The authors declare no conflicts of interest.

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