



ORIGINAL ARTICLE

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



Dannyele Nunes Carrijo ^a, Marília Neves Santos ^b,
Vivian Mara Gonçalves de Oliveira Azevedo ^c, Ana Elisa Madalena Rinaldi ^{d,*}

^a Universidade Federal de Uberlândia, Faculdade de Medicina, Programa Multiprofissional de Residência em Atenção à Saúde da Criança, Uberlândia, MG, Brazil

^b Universidade Federal de Uberlândia, Faculdade de Medicina, Programa de Pós-graduação em Ciências da Saúde, HCUFU-EBSERH, Banco de Leite Humano, Uberlândia, MG, Brazil

^c Curso de Fisioterapia, Faculdade de Educação Física e Fisioterapia, Universidade Federal de Uberlândia. Programa de Pós-graduação em Ciências da Saúde, Faculdade de Medicina, Universidade Federal de Uberlândia. Uberlândia, MG, Brazil

^d Curso de Nutrição, Programa de Pós-graduação em Ciências da Saúde, Faculdade de Medicina, Universidade Federal de Uberlândia, Uberlândia, MG, Brazil

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KEYWORDS

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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 macroregion 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.

Study conducted at the Universidade Federal de Uberlândia (FAMED-UFU), Faculdade de Medicina, Uberlândia, MG, Brazil.

* Corresponding author.

E-mail: anaelisarinaldi@gmail.com (A.E. Rinaldi).

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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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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 enable the establishment and maintenance of lactation.⁴ 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%.⁵

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_em_dados_corpo_a_nos_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

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)¹³ 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 at 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

Table 1 Total number of the participation in individual and group support and the average of the numbers of human milk banks/human milk collection stations and number of with available data in the Brazilian Network of Human Milk Banks (rBLH) by year and geographic region. rBLH. 2010-2019.

	North			Northeast			Midwest			Southeast			South		
	Individual (N)	Group (N)	HMB (N)	Individual (N)	Group (N)	HMB (N)	Individual (N)	Group (N)	HMB (N)	Individual (N)	Group (N)	HMB (N)	Individual (N)	Group (N)	HMB (N)
2010	84,770	31,660	10	306,068	64,247	59	218,453	107,595	32	422,235	73,192	103	125,512	23,901	27
2011	114,487	41,280	11	349,348	83,658	64	215,904	87,960	32	448,367	80,317	105	134,288	30,046	28
2012	147,628	50,730	13	403,336	91,340	74	223,624	98,766	33	481,974	76,742	108	123,336	31,454	29
2013	143,354	64,295	14	489,906	93,888	81	207,763	91,978	35	486,831	81,587	109	138,676	30,220	34
2014	153,589	71,345	16	558,240	109,932	84	214,444	74,072	35	557,148	78,674	112	164,434	38,302	36
2015	157,489	68,702	17	574,248	113,524	84	191,848	56,428	33	581,345	77,631	112	196,989	44,267	40
2016	174,477	54,429	19	603,886	114,260	89	180,422	42,933	34	588,415	73,006	121	193,776	37,778	42
2017	186,508	71,869	25	704,020	154,077	92	187,467	50,019	34	623,665	83,670	121	180,407	35,114	45
2018	193,784	61,064	27	689,420	153,370	97	190,309	53,596	34	640,711	43,618	125	171,096	32,149	49
2019	188,152	72,228	27	709,475	163,243	100	200,623	51,969	35	689,291	103,179	133	174,621	34,951	55

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 HMCs 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 HMCs in this period in each macroregion, we calculated the ratio of the participation in group and individual support per HMB and HMCs. 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 HMCs in the Southeast and Northeast regions. In the Northeast and South regions, the number of HMBs and HMCs 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 HMCs. There was an equivalence between the greatest increase in attendance and the greatest expansion in the number of establishments (HMBs and HMCs). 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 HMCs, distributed throughout the national territory, with 15 HMB units and 30 HMCs in the North macroregion, 53 HMBs and 66 HMCs in the Northeast, 27 HMBs and 10 HMCs in the Midwest, 92 HMBs and 85 HMCs in the Southeast, and 35 HMBs and 28 HMCs in the South.^{7,14} In February 2008, for example, 187 HMBs and 27 HMCs were registered in the rBLH production system.¹ One of the possible explanations for the greater number of HMBs and HMCs 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,

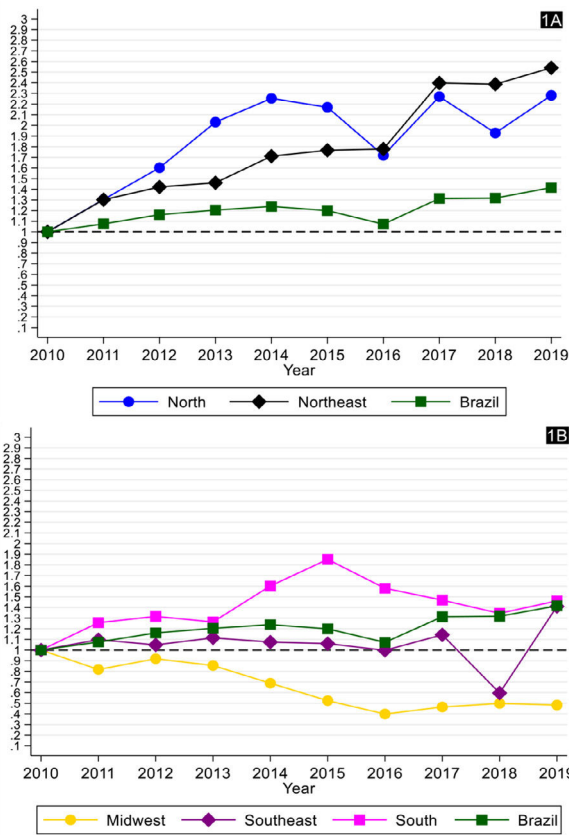


Figure 1 Trend of participation in group support provided by Human Milk Banks/Human Milk Collection Stations in Brazil and in the North and Northeast (1A), Midwest, Southeast and South (1B) regions of the country. Brazilian Network of Human Milk Banks (rBLH), 2010-2019.

from 2.9 to 45.7%, which corresponds to an increase of about 1.2% per year.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.^{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.^{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, relaxation, 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

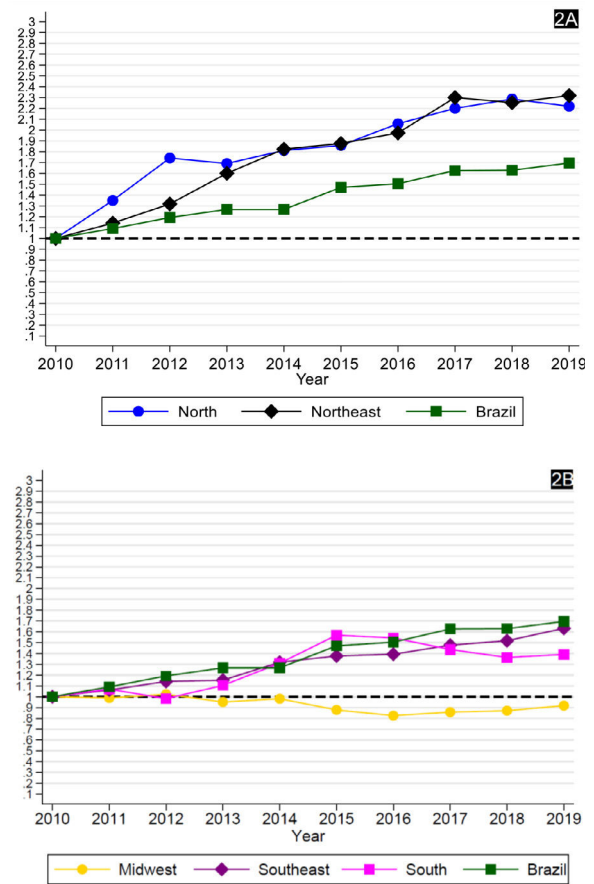


Figure 2 Trend of participation in individual support provided by Human Milk Banks/Human Milk Collection Stations in Brazil and in the North and Northeast (2A), Midwest, Southeast and South (2B) regions of the country. Brazilian Network of Human Milk Banks (rBLH), 2010-2019.

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

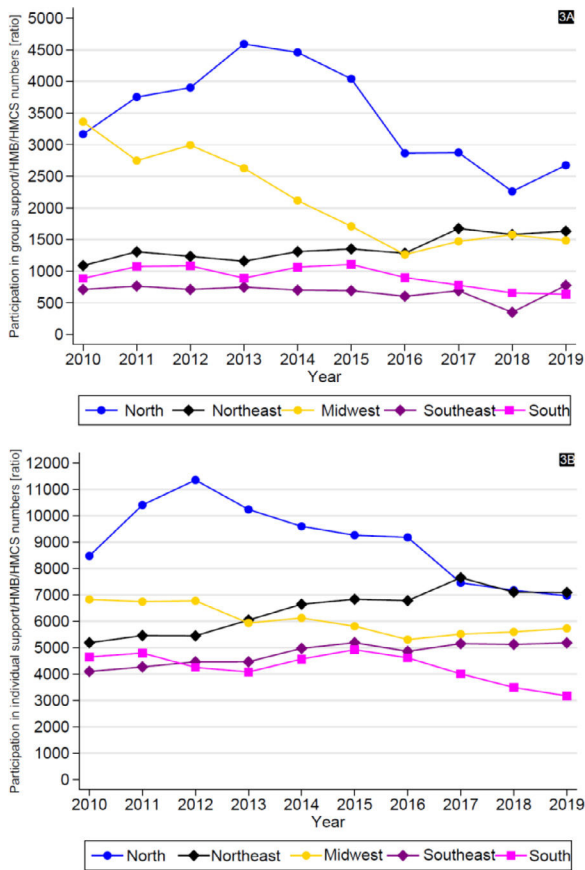


Figure 3 Ratio of the participation in group (3A) and individual (3B) support by Human Milk Banks/Human Milk Collection Stations numbers by macroregions. Brazilian Network of Human Milk Banks (rBLH), 2010-2019.

participation in group and individual support in the North and Midwest and an increase in the Northeast.

Our study found a growing trend in the role of encouraging BF provided by the HMBs, through care, although it is not equitable between geographic regions. This result indicates that the various strategies used in recent decades in favor of BF have been shown to be effective. Despite this, early weaning remains one of the most important public health problems in Brazil, expressing the need for a constant process of monitoring indicators, searching for modifiable determinants, designing interventions, and further research.

Increasing the HMB team and encouraging integration with the basic health units (BHUs) may help improve BF indicators in the country. In addition promoting the qualification and training of these teams, so that they develop specific skills and build knowledge in maternal and childcare, would guarantee the maintenance of the quality of service provided by the rBLH. Furthermore, involving the BHUs in campaigns in favor of BF would reach a greater number of nursing mothers, which may increase awareness of the benefits linked to the act of BF, and the strengthening of inter-institutional support networks.

The present study used secondary data which is subject to some limitations. The coordinator at each HMB/HMCS performs the online insertion of data on the BNHMB platform and this implies possible typing errors. However, to reduce these

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.¹⁹

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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