ORIGINAL ARTICLE

COVID-19 pandemic impact on breastfeeding rates in a Baby-Friendly hospital in Portugal

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Abstract

Objectives: to assess the COVID-19 pandemic impact on breastfeeding rates during birth hospitalization in a Baby-Friendly certified perinatal hospital in Portugal.

Methods: observational retrospective study comparing pre-pandemic (2019) and pandemic (April–December 2020) periods. A total of 900 healthy term mother–newborn dyads in rooming-in were included. Maternal and neonatal variables associated with breastfeeding at discharge were analyzed using chi-square, Student's t-test, and multivariable logistic regression ($p<0.05$).

Results: breastfeeding rates were higher in the pandemic period (99.3%) than in the pre-pandemic period (97.6%; $p=0.031$). Exclusive breastfeeding (80.2% vs. 81.6%; $p=0.611$) and skin-to-skin contact (56.2% vs. 58.0%; $p=0.590$) did not differ significantly. Exclusive breastfeeding was associated with vaginal delivery (pre-pandemic OR=3.07; 95%CI=1.83–5.13; $p<0.001$; pandemic OR=2.29; 95%CI=1.39–3.77; $p=0.001$), weight loss <10% ($p<0.001$), and absence of phototherapy in the pre-pandemic period (OR=3.38; 95%CI=1.96–7.12; $p<0.001$). No associations were found with maternal age, parity, sex, or gestational age.

Conclusions: exclusive breastfeeding rates were not negatively affected by pandemic restrictions. Maintaining Baby-Friendly practices preserved essential breastfeeding support.

Key words *Breastfeeding, COVID-19 pandemic, Newborn*

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Introduction

The COVID-19 pandemic, declared by the World Health Organization (WHO) on March 11, 2020,[1] profoundly affected healthcare systems and practices worldwide. The rapid need to implement infection control measures – such as social distancing, isolation, and the reorganization of hospital workflow – had potential implications for maternal and neonatal care. Among these, restrictions on companionship during labor, reduced postnatal support, and limitations on mother–newborn contact raised concerns about the establishment and maintenance of breastfeeding.[2]

Pregnant and postpartum women and their newborns are particularly vulnerable to disruptions in care. In the early months of the pandemic, uncertainty regarding SARS-CoV-2 transmission routes led to inconsistent recommendations on breastfeeding and rooming-in practices.[3,4] Initial concerns about possible vertical transmission prompted some hospitals, including in Portugal, in restricting skin-to-skin contact and temporarily separating mothers and infants.[5-8] As scientific evidence accumulated, it became clear that breastfeeding was safe and that COVID-19 transmission occurred mainly via respiratory droplets.[9-11] Consequently, international guidelines – led by WHO – were revised in favor of maintaining breastfeeding and early contact, provided that infection control measures were observed.[11]

Despite these clarifications, the pandemic context introduced emotional stress, reduced in-person support, and modified care routines that could negatively affect breastfeeding initiation and continuation.[12,13] Several studies worldwide reported heterogeneous effects, reflecting variability in hospital policies, resources, and adherence to Baby-Friendly practices.[5,6,14]

The Baby-Friendly Hospital Initiative (BFHI), launched by WHO and UNICEF in 1991, aims to protect, promote, and support breastfeeding through the implementation of ten evidence-based steps.[15] Hospitals adhering to these standards are recognized as Baby-Friendly. Our institution, certified since 2007, is committed to maintaining these practices through staff training and consistent breastfeeding support during hospitalization.[16]

Understanding how COVID-19 pandemic influenced breastfeeding within a Baby-Friendly environment is crucial, particularly in contexts where protective measures may have conflicted with breastfeeding promotion principles. Therefore, this study aimed to evaluate the impact of COVID-19 pandemic on breastfeeding rates during birth hospitalization in a Baby-Friendly certified perinatal hospital in Portugal.

Methods

This was an observational, analytical, retrospective study based on clinical data from mother–newborn dyads whose births occurred during the pandemic period (April 1 to December 31, 2020) and the homologous pre-pandemic period in 2019. These months correspond to the phase of stricter restrictions and greater uncertainty regarding the impact of SARS-CoV-2 on maternal and neonatal health.

The hospital, located in central Portugal, recorded 2366 births in 2019 and 2354 in 2020. During the pandemic, rooming-in was maintained whenever possible, under strict infection control measures. Hospital discharge was generally at 48 hours of life for all healthy term newborns when clinical and social conditions were met; prior to the pandemic, discharge after cesarean section occurred at 72 hours.

Healthy term newborns in rooming-in from birth to discharge were included. Exclusion criteria were maternal conditions or medications contraindicating breastfeeding, confirmed SARS-CoV-2 infection, and declared intention not to breastfeed. Infection was ruled out through polymerase chain reaction testing on nasopharyngeal samples.

A structured convenience sample was used, including the first 50 eligible dyads per month between April and December in each period, totaling 450 dyads for both the pre-pandemic and pandemic groups. This sampling approach ensured representation across the study period and exposure to different healthcare teams.

The main outcome was the rate of breastfeeding and exclusive breastfeeding at hospital discharge. Exclusive breastfeeding was defined as feeding only with breast milk at discharge; breastfeeding included both exclusive and mixed feeding. The secondary outcome was the identification of maternal and neonatal factors associated with exclusive breastfeeding in each period.

Collected maternal and newborn variables included: maternal age, parity, gestational age, mode of delivery (vaginal or cesarean), skin-to-skin contact (≥30 minutes), newborn sex, birth weight (<2,500 g, 2,500–3,999 g, ≥4,000 g), weight loss during hospitalization (%), and complications such as hyperbilirubinemia requiring phototherapy.

Data were extracted from electronic medical records (SClínico®) between September 2022 and March 2023 by trained neonatologists and pediatricians, and stored in a secure database.

Statistical analysis was performed using IBM SPSS Statistics (version 26). Categorical variables were expressed as absolute and relative frequencies; continuous variables as means and standard deviations or medians and interquartile ranges, according to distribution. Group comparisons (pandemic vs. pre-pandemic) were made using the chi-square test for categorical variables and Student's t-test for continuous variables with normal distribution. A p-value <0.05 was considered statistically significant.

To explore factors associated with exclusive breastfeeding, univariable and multivariable logistic regression analyses were performed, reporting adjusted

odds ratios (OR) and 95% confidence intervals (CI). The final model included variables with statistical significance in univariable analysis and those previously reported in the literature to influence exclusive breastfeeding positively (skin-to-skin contact, multiparity) or negatively (significant weight loss, cesarean delivery). The adequacy of the model was verified using the Hosmer–Lemeshow and Omnibus tests.

The study was approved by the Ethics Committee of the *Unidade Local de Saúde de Coimbra*, Portugal (PI OBS. SF.143-2022), in accordance with national ethical standards and the Declaration of Helsinki. Given the retrospective design and the use of anonymized medical record data, informed consent was waived. Confidentiality and anonymity of the participants were guaranteed.

Results

A total of 900 mother–newborn dyads were included, 450 in each period (pre-pandemic and pandemic). The number of full-term deliveries per month was similar over the periods.

There were no significant differences in baseline maternal or neonatal characteristics between groups (Table 1). The maximum weight loss during hospitalization was comparable in both periods.

As shown in Table 2, the overall rate of breastfeeding at hospital discharge was significantly higher during the pandemic period compared with the pre-pandemic period (p=0.031). However, exclusive breastfeeding and skin-to-skin contact rates did not differ between periods.

Analysis of factors associated with exclusive breastfeeding in the pre-pandemic (Table 3) and in the COVID-19 pandemic period (Table 4) revealed no relation with maternal age, gestational age, or newborn sex in either period. In both periods, vaginal delivery (pre-pandemic OR=3.07, 95%CI= 1.83;5.13; p<0.001; pandemic OR=2.29, 95%CI= 1.39;3.77; p=0.001) and skin-to-skin contact (pre-pandemic OR 2.34; 95%CI= 1.44;3.80; p<0.001; pandemic OR=1.87; 95%CI= 1.17;2.98; p=0.008) were positively associated with exclusive breastfeeding. In the pre-pandemic period,

Table 1

General characteristics of the mothers and newborns in the pre-pandemic and during the COVID-19 pandemic periods. Coimbra, Portugal, 2019-2020.

	Pre-pandemic (n=450)	COVID-19 pandemic (n=450)	*p*
Maternal age (years), mean ±SD	32.02±5.71	32.17±5.49	0.690#
Primiparous, n (%)	235 (52.2%)	228 (50.8%)	0.665*
C-section, n (%)	98 (21.8%)	107 (23.8%)	0.474*
GA (weeks). Mean ±SD	38.95±1.08	39.06±1.07	0.155#
Male newborn, n (%)	230 (51.1%)	224 (49.8%)	0.689*
BW (grams), mean±SD	3219.71±401.53	3264.76±455.41	0.116#
Maximum weight loss in hospital (%), mean ± SD	6.71±2.24	6.58±2.74	0.447#
Phototheray, n (%)	46 (10.2%)	40 (8.9%)	0.496*

BW= birth weight; GA= gestational age; SD= standard deviation; #T test for independent samples; *Chi square test.

Table 2

Rates of breastfeeding, exclusive breastfeeding and skin-to-skin contact in the pre-pandemic and during the COVID-19 pandemic periods. Coimbra, Portugal, 2019-2020.

	Pre-pandemic (n=450)		COVID-19 pandemic (n=450)		*p**
	n	%	n	%	
Breastfeeding at discharge	439	97.6	447	99.3	0.031
Exclusive breastfeeding at discharge	367	81.6	361	80.2	0.611
Skin-to-skin contact	261	58.0	253	56.2	0.590

Breastfeeding (exclusive breastfeeding plus mixed feeding). *Chi square test.

Table 3

Exclusive breastfeeding rate and its relationship with maternal and newborn characteristics in the pre-pandemic period. Coimbra, Portugal, 2019.

Variables	Pre-pandemic 2019 (n=450)			
	EBF		*p**	aOR (95%CI)
	n	%		
Maternal age (years)			0.081	-
<35	245	83.9		
≥35	122	77.2		
Parity			0.019	1.80(1.10;2.94)
Primiparous	182	77.4		
Multiparous	185	86.0		
Type of delivery			<0.001	3.07 (1.83;5.13)
C-section	65	66.3		
Vaginal	302	85.8		
Newborn´s sex			0.888	-
Male	187	81.3		
Female	180	81.3		
Gestational age (weeks)			0.484	-
<39	118	79.7		
≥39	249	82.5		
Birth weight (g)				
<2,500	8	72.7	0.445	-
[2,500; 4,000[	347	81.8	0.530	-
≥4,000	12	80.0	0.874	-
Maximum birth weight lost at hospital			<0.001	17.86 (6.87;46.44)
<10%	361	84.9		
≥10%	6	24.0		
Phototerapy			<0.001	3.38 (1.96;7.12)
Yes	27	58.7		
No	340	84.2		
Skin-to-skin contact			<0.001	2.34(1.44;3.80)
Yes	227	87.0		
No	140	74.1		

EBF= Exclusive breastfeeding; aOR= adjusted odds ratio; CI= confidence interval; *Chi square test.

Table 4

Exclusive breastfeeding rate and its relationship with maternal and newborn characteristics during the COVID-19 pandemic period. Coimbra, Portugal, 2020.

Variables	COVID-19 pandemic 2020 (n=450)			
	EBF		*p**	$_{a}$OR (95%CI)
	n	%		
Maternal age (years)			0.737	-
<35	230	80.7		
≥35	131	79.4		
Parity			0.506	-
Primiparous	180	78.9		
Multiparous	180	81.4		
Type of delivery			0.001	2.29 (1.39;3.77)
C-section	74	69.2		
Vaginal	287	83.7		
Newborn´s sex			0.758	-
Male	181	80.8		
Female	180	79.6		
Gestational age (weeks)			0.661	-
<39	109	79.0		
≥39	252	80.8		
Birth weight (g)				
<2,500	13	76.5	0.692	-
[2,500; 4,000[	335	82.3	0.001	3.04 (1.57;5.90)
≥4,000	13	50.0	<0.001	0.22(0.10;0.49)
Maximum birth weight lost at hospital			<0.001	6.22 (2.42;15.98)
<10%	353	81.9		
≥10%	8	42.1		
Phototerapy			0.089	-
Yes	28	70.0		
No	333	81.2		
Skin-to-skin contact			0.008	1.87 (1.17;2.98)
Yes	214	84.6		
No	147	74.6		

EBF= Exclusive breastfeeding; $_{a}$OR= adjusted odds ratio; CI= confidence interval; *Chi square test.

multiparity (OR=1.80, 95%CI= 1,10;2.94; *p*=0.019) and absence of phototherapy (OR= 3.38; 95%CI= 1.96;7.12; *p*<0.001) were also significantly associated with higher exclusive breastfeeding rates.

During the pandemic, normal birth weight (OR=3.04, 95%CI= 1.57;5.90; *p*=0.001) was positively associated with exclusive breastfeeding, whereas macrosomia showed a negative association (OR=0.22, 95%CI= 0.10;0.49; *p*<0.001). Of the 26 macrosomic newborns in the pandemic period sample, only 50% were discharged with exclusive breastfeeding, but all were discharged with any breastfeeding (exclusive breastfeeding or mixed feeding), reflecting a greater use of formula milk. In the group of low-birth-weight newborns, there were no differences in exclusive breastfeeding rates in relation to the other weight groups in both periods. In both periods, newborns with a weight loss below 10% during hospitalization had greater odds of exclusive breastfeeding (*p*<0.001).

Table 5

Variables positively associated with breastfeeding (exclusively or in addition to formula) at hospital discharge in the pre-pandemic and during the COVID-19 pandemic periods. Coimbra, Portugal, 2019-2020.

Variables	*p*	[a]OR (95%CI)
Model 1: Exclusive breastfeeding		
Multiparous	0.138	1.31 (0.92;1.89)
Skin-to-skin contact	0.150	1.38 (0.89;2.13)
Weight lost <10%	<0.001	8.19 (4.14;16.24)
Without phototherapy	<0.001	2.75 (1.65;4.57)
C-section	<0.001	0.52 (0.32;0.83)
Pandemic period	0.435	1.15 (0.81;1.64)
Model 2: Breastfeeding		
Multiparous	0.233	1.97 (0.65;6.00)
Skin-to-skin contact	0.785	1.22 (0.30;4.96)
Weight lost <10% #	0.998	
Without phototherapy	0.344	0.34 (0.09;1.29
C-section	0.458	1.79 (0.38;8.40)
Pandemic period	0.044	3.75 (1.03;13.59)
Constant	0.167	

[a]OR= adjusted odds ratio; CI= confidence interval; #0 cases of non-breastfeeding.

In the multivariable logistic regression model (Table 5), independent factors associated with exclusive breastfeeding at hospital discharge were vaginal delivery (*p*<0.001), multiparity (*p*=0.019), weight loss under 10% (*p*<0.001), and absence of phototherapy (*p*<0.001).

Discussion

During the COVID-19 pandemic, hospitals faced the dual challenge of protecting mothers and newborns from infection while preserving the quality of perinatal care and the support of breastfeeding. The first hours and days after birth represent a crucial period for the establishment of breastfeeding, and practices such as skin-to-skin contact and early initiation of breastfeeding — strongly recommended by WHO — are known to promote breastfeeding success and maternal–infant bonding.[17,18]

Our study showed that overall breastfeeding rates at hospital discharge were slightly higher during the pandemic than in the pre-pandemic period, while exclusive breastfeeding rates remained stable. These results indicate that, despite the restrictive measures imposed, breastfeeding practices were not negatively affected in this Baby-Friendly certified hospital. This contrasts with findings from some studies reporting a decrease in breastfeeding rates during lockdowns or under strict infection control measures,[19,20] particularly in institutions not adhering to Baby-Friendly practices. Conversely, other studies conducted in Baby-Friendly hospitals, such as those

in the United Kingdom and Italy, have demonstrated the maintenance of favorable breastfeeding indicators during the pandemic, highlighting the resilience of structured institutional support.[21,22]

The stability of exclusive breastfeeding rates observed in our study may reflect the robustness of the Baby-Friendly Hospital Initiative framework, which emphasizes staff training, standardized protocols, and multidisciplinary involvement in promoting breastfeeding.[15,16] In our institution, the long-standing implementation of these practices and the continuous training of professionals likely contributed to mitigating the potential negative effects of service reorganization, reduced visits, and shorter hospital stays. Moreover, maintaining rooming-in and direct breastfeeding – even under strict infection-prevention measures – preserved opportunities for maternal–infant contact and lactation support during hospitalization.

Among the factors associated with exclusive breastfeeding, vaginal delivery was a consistent positive predictor in both periods, confirming previous evidence that cesarean delivery may hinder the initiation of breastfeeding by delaying maternal recovery and skin-to-skin contact.[23,24] Multiparity was also associated with higher exclusive breastfeeding rates in the pre-pandemic period, probably due to greater maternal experience and confidence; however, this effect lost significance in the adjusted model, possibly reflecting the homogeneity of support provided to all mothers.[25,26]

Newborns with a maximum weight loss below 10% were significantly more likely to be exclusively breastfed at discharge in both periods. Excessive weight loss is a common reason for formula supplementation, as it may signal delayed lactogenesis or inefficient milk transfer. Similarly, newborns who required phototherapy had lower exclusive breastfeeding rates, possibly due to reduced proximity during treatment and interruptions to feeding routines.[27]

During the pandemic, normal birth weight and skin-to-skin contact were associated with higher exclusive breastfeeding rates, whereas macrosomia was negatively associated. The latter finding may relate to early introduction of formula supplementation in macrosomic newborns, who are at greater risk of transient hypoglycaemia or delayed lactation onset. Shorter hospital stays during the pandemic could also have limited opportunities for observation and reinforcement of exclusive breastfeeding in these infants.[28]

Interestingly, despite the major reorganization of healthcare services during the pandemic, skin-to-skin contact rates remained unchanged in our hospital, unlike in other countries where this practice was restricted or temporarily suspended.[29,30] This likely reflects the institutional commitment to uphold WHO recommendations and the BFHI principles, balancing infection control with evidence-based perinatal care. The strong positive association between skin-to-skin contact and exclusive breastfeeding in both periods reinforces its protective role in breastfeeding initiation and maintenance.

This study has several limitations. The retrospective design and structured convenience sampling may limit external validity. Data were collected from a single hospital, and variables such as maternal schooling, socioeconomic status, and psychological factors — known to influence breastfeeding outcomes — were unavailable. Furthermore, the pandemic period analyzed spanned nine months, during which institutional measures and national guidelines evolved, possibly diluting the impact of specific restrictions. Nevertheless, the inclusion of consecutive dyads and the similarity of baseline maternal and neonatal characteristics between groups support the representativeness of our sample and the reliability of comparisons.

To our knowledge, this is the first study in Portugal to assess the COVID-19 pandemic impact of on breastfeeding rates at hospital discharge in a Baby-Friendly certified institution. The stability of exclusive breastfeeding rates observed reinforces the effectiveness of Baby-Friendly practices in safeguarding breastfeeding even under restrictive circumstances. Strengthening these institutional policies and ensuring sustained professional support are essential to maintain optimal breastfeeding outcomes in future public-health emergencies.

Authors' contribution

Ferraz AIB: Conceived and designed the analysis, Contributed data or analysis tools, Performed the analysis, Wrote the paper.

Azevedo TS: Collected the data, Wrote the paper.

Costa MSRD: Collected the data, Contributed data or analysis tools.

Costa CITS: Conceived and designed the analysis, Contributed data or analysis tools, Performed the analysis, Wrote the paper.

Taborda A: Conceived and designed the analysis, Performed the analysis, Revision.

All authors approved the final version of the article and declare no conflict of the interest.

Data availability

All datasets supporting the result of this study are included in the article.

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