Breastfeeding and its Determinants

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Abstract

Background

Exclusive breastfeeding (EBF) is essential for maternal and child health. Breast milk is considered the most appropriate food for children in the first years of life. Studies conducted in Cape Verde (1) show a prevalence of EBF below the recommended values (2). The determining factors of early weaning in the country are not known. The present study aims to estimate the prevalence of EBF and identify its determinants in Cape Verde.

Method

This is a cross-sectional, observational, quantitative, and analytical study. The study population consisted of mothers of children aged 2 years or younger who were users of health centers on the islands of Santo Antão, S. Vicente, Sal, Santiago, and Fogo. The chi-square test was used to evaluate the association between the duration of EBF and the variables maternity leave, maternal education, family income, and health care. A binary logistic regression analysis was used to analyze the effects of the following variables as predictors of breastfeeding: maternal age, maternal education, marital status, family income, location of residence, pregnancy planning, prenatal care, number of prenatal visits, maternity leave, birth weight, breastfeeding in the first hour after delivery, parity, and breastfeeding counseling.

Results

A total of 1717 mothers aged between 13 and 49 years (Md = 26 years) were interviewed. Most were single (58.9%), had a secondary education (57%), were unemployed (59.3%), and resided in Santiago (35.7%). Breast milk being the best food for the baby/a developmental aid (33%) was the most prevalent reason for breastfeeding. The most cited reasons for stopping breastfeeding or never having breastfed were work (19.8%), insufficient milk (16%), and not liking to breastfeed (9.0%). At the time of data collection, 32.50% of the mothers had breastfed, and 49.2% continued to breastfeed exclusively but without reaching the 6 months necessary for breastfeeding to be considered EBF.

Conclusion

The prevalence of EBF in Cape Verde can be considered moderate. Maternal age, educational level, number of prenatal visits, and parity were significantly associated with breastfeeding. There was no significant relationship of maternity leave, maternal education, and family income with EBF. Receiving breastfeeding counseling was the only health care variable that was associated with the duration of EBF ($p = 0.029$).

Background

Breast milk is the ideal food for children in their first years of life because it is fully adapted to their needs. The first 2 years of life are the most decisive for children's growth and development, and events in those years have repercussions throughout the individual's life. Breastfeeding during this period can prevent the onset of several diseases in adulthood (3).

Breastfeeding is considered fundamental for maternal and child health. Scientific evidence indicates that breast milk is the most appropriate food for children from birth through the first years of life (4). The benefits of breastfeeding for the mother-infant pair are scientifically recognized due to factors such as the nutritional value of breast milk and the immunological protection, low risk of contamination, and protection against obesity and diabetes it confers and its great relevance to the decline of infant morbidity and mortality due to respiratory infections and diarrheal episodes (5); furthermore, it favors physical and emotional development and intelligence (3).

Based on the associated improvements in cognitive capacity and the increase in the child's productivity throughout life, breastfeeding each child for at least 6 months could add an estimated 300 billion dollars per year to the global economy (6).

Early weaning is a complex phenomenon that is influenced by biological, psychological, social, and cultural factors and is characterized by the introduction of other foods into the diets of children who were exclusively breastfed before 6 months of age (7).

The key actions and recommendations of the World Health Organization (WHO) (8) advocate exclusive breastfeeding (EBF) until 6 months of age, followed by complementary breastfeeding until 2 years of age.

Breastfeeding is considered responsible for the prevention of more than 6 million deaths of children under 12 months of age worldwide every year (9). Although there are several scientific studies proving the superiority of breast milk over the milk of other species and the benefits of breastfeeding for infants, women, society, the environment, and health structures, among other agents, recommended rates of EBF are still far from being achieved worldwide, and there are several factors that interfere with this practice. Women may wish to breastfeed but may encounter social, cultural, and political barriers throughout the postpartum cycle that hinder the onset and continuation of breastfeeding. At the individual level, both mother and child face a learning period that can have a positive or negative effect on the duration and type of breastfeeding. Difficulties at the beginning of breastfeeding are common and represent a risk factor for early weaning (10).

It is estimated that only 41% of children under 6 months of age are exclusively breastfed worldwide; this is still below the recommendation of the WHO, which establishes EBF prevalence goals for 50% in 2025 and 70% in 2030 (2).

According to (11), wealthy nations have the lowest rates of EBF early in life. In middle- and high-income countries, 23.9% of children are fed only their mother's milk for the first 6 months after birth. In less-

developed countries, the rate of EBF in the first semester of life reaches 50.8%, which is above the global average of approximately 40%. The highest rates are found in Rwanda (86.9%), Burundi (82.3%), Sri Lanka (82%), Solomon Islands (76.2%), and Vanuatu (72.6%).

Through the National Nutrition Program, the Ministry of Health and Social Security in Cape Verde recommends encouraging EBF. The Continuous Multiobjective Survey (12) demonstrated that the prevalence of EBF was 30.5%. Provisional data from the third Demographic and Reproductive Health Survey (1) show that the rate of EBF is approximately 45% for children aged 4 to 5 months. In summary, the percentage of children fed only with breast milk in the 6 months of life remains well below the WHO recommendation (2015), which is classified as follows: poor (0-11%), fair (12-49%), good (50-89%), or very good (90-100%).

The results of studies conducted in Cape Verde (1, 12) show that the prevalence of breastfeeding is below the values recommended by the WHO (2). However, the determinants and factors that lead to early weaning are unknown.

Therefore, there was a need to conduct this study to analyze the determinants of EBF and identify the factors that determine whether or not mothers breastfeed their children. These results may help in the definition of policies and adequate initiatives to promote, protect, and support breastfeeding.

Methods

Study design

This is a cross-sectional, observational study with a quantitative and analytical approach.

Subjects

The elective population for this study consisted of 1765 mothers of children younger than 24 months who attended the health centers of the selected islands for newborn vaccination and monitoring. Approximately 90% of children aged 6 to 24 months in the country attend health centers for vaccination and monitoring, according to the Statistical Report of the Ministry of Health of 2015 (13).

The following inclusion criteria were considered: having been a mother for less than 24 months, being present at the health center on data collection days, and voluntarily agreeing to participate in the project. The exclusion criteria were having a clinical condition, delay, or mental disorder that prevented responding to the questionnaire. The final sample consisted of 1717 subjects.

Instruments

A semi-structured questionnaire consisting of 39 items was used to collect demographic and socioeconomic data and information on prenatal and postnatal care, the mother's health status, the birth of the child, and the determinants of breastfeeding.

Data collection

Data collection took place on the islands of Santo Antão, São Vicente, Sal, Santiago, and Fire from July to November 2018.

A questionnaire was administered to the mothers via an interview after their child growth and development visits at the health centers on the 5 selected islands.

Before data collection, interviewer teams consisting of 2 health technicians (nutritionists, nurses, or a biomedical engineer) from each selected municipality participated in training either in the city of Praia or by teleconference on February 7, 2018. The technicians received training in different domains: i) basic beliefs about breastfeeding; ii) methods for approaching the respondents; and iii) administration of the questionnaires and use of a support manual containing all the guidelines for the study.

A pretest was performed in which the questionnaire was administered to a group of 30 mothers of children under 24 months of age to assess the clarity of the language and the ease of completing the questionnaire. These questionnaires were not included in the study analyses.

Each field team received support from a supervisor (nutritionist or psychologist).

Statistical analysis

The data were analyzed by using the Statistical Package for the Social Sciences (SPSS, v. 26).

Proportions were used to report the reasons mothers initiated and stopped breastfeeding in the first 6 months of life and to determine the prevalence of EBF for the first 6 months of life.

Chi-square tests (χ^2) were used to analyze the association between the duration of EBF and maternity leave, maternal education, family income, and health care variables (number of prenatal visits, location of prenatal care, child's birthplace, breastfeeding counseling, breastfeeding in the first hour after delivery, and child's birth weight). A binary logistic regression analysis was used to analyze the influence of maternal age, educational level, marital status, family income, location of residence, pregnancy planning, prenatal care, number of prenatal visits, maternity leave, child's birth weight, breastfeeding in the first hour after delivery, parity, and breastfeeding counseling on breastfeeding.

Statistical analysis was performed at a significance level of 0.05.

Results

Sample characterization

The sample consisted of 1717 mothers with children aged 2 years or younger who attended health centers of the islands of Santo Antão (16.8%), São Vicente (17.7%), Sal (15.3%), Santiago (35.6%), and Fire (14.5%). The mothers were between 13 and 49 years old (Md = 26 years old); 57% had completed

secondary education, 25% had an integrated basic education, 12.9% had higher education, 4.1% had technical-vocational training, and 1% were illiterate. Regarding marital status, 40.8% were married or cohabiting, 58.9% were single, and 0.3% were divorced or separated. A total of 59.3% were unemployed, and 40.7% reported having an occupation; 39.5% of respondents had a monthly family income of less than CVE 15,000.00, 31.6% had a monthly family income between CVE 15,000.00 and CVE 29,000.00, 14.9% had a monthly family income between CVE 30,000.00 and CVE 60,000.00, 10.3% had a monthly family income greater than CVE 60,000.00, and 3.7% did not know their monthly family income. A total of 16.8% of the mothers lived on Santo Antão Island (11.6% - Ribeira Grande, 3.2% - Paul, and 2.0% - Porto Novo), 17.7% lived on São Vicente Island, 15.3% lived on Sal Island, 35.6% lived on Santiago Island (15.8% - Santa Catarina, 19.3% - Praia, and 0.5% - Ribeira Grande de Santiago), and 14.5% lived on Fogo Island (4.8% - Mosteiros, 7.9% - São Filipe, and 1.8% - Santa Catarina do Fogo). Most of the mothers lived in urban areas [1,210 (70.5%)], and 506 (29.5%) lived in rural areas. A total of 716 (41.7%) reported having only one child, 522 (30.4%) reported having 2 children, 278 (16.2%) reported having 3 children, and 201 (11.7%) reported having more than 3 children. A total of 439 (25.6%) of the children were between 0 and 6 months old, 760 (44.3%) were between 6 and 15 months old, and 517 (30.1%) were older than 15 months old.

Reasons mothers started and stopped breastfeeding in the first 6 months of their child's life

The mothers reported the following reasons for breastfeeding their children: breastmilk is the best food for the baby (319; 18.7%), breastmilk is a healthy diet (153; 8.9%), breastmilk helps with child development (90; 5.2%), breastfeeding counseling was provided (73; 4.3%), breastmilk protects the baby against infections (55; 3.2%), the mother produced enough breastmilk (51; 3.0%), breastmilk is a child's right (45; 2.6%), breastfeeding is an act of love/attachment (27; 1.6%), breastfeeding is more practical (12; 0.7%), breastfeeding protects the mother's health (10; 0.6%), breastfeeding is a mother's duty/pleasure (10; 0.6%), breastfeeding is more economical (8; 0.5%), breastmilk protects the baby from allergies (1; 0.1%), and children need to be breastfed (1; 0.1%); 817 (47.9%) reported more than one reason, 13 (0.8%) chose all of the previous 14 (0.8%) did not know, and 6 (0.5%) did not specify.

The mothers' reasons for stopping breastfeeding or for never having breastfed their children were as follows: 64 (19.8%) had to work, 52 (16%) had insufficient milk, 29 (9.0%) did not like to breastfeed, 12 (3.7%) were ill, 9 (2.8) had breast problems, 8 (2.5%) had weak milk, 7 (2.2%) were worried about aesthetics, 5 (1.5%) became pregnant, 4 (1.2%) used contraindicated drugs when breastfeeding, 2 (0.6%) used bottles and pacifiers, 1 (0.3%) had a sick baby, 37 (11.4%) chose more than one option, and 94 (29%) selected other reasons. The "other" reasons the mothers specified for not breastfeeding and/or stopping breastfeeding were as follows: 31 (9.6%) mothers introduced food/water, 27 (8.3%) children did not accept breastfeeding, 21 (6.5%) mothers refused to breastfeed, 5 (1.5%) indicated that the child/mother traveled, 4 (1.2%) mothers had to study/work, 3 (0.9) because of the child's health, 2 (0.6%) due to medical advice, and 2 (0.6%) due to health problems.

Prevalence of EBF in the first 6 months of life

When asked whether they were breastfeeding their child, 558 (32.5%) of the mothers reported having exclusively breastfed their children up to 6 months of age or longer. It should be noted that although 845 (49.21%) mothers were still exclusively breastfeeding at the time of data collection, they had not reached the 6 months mark for EBF; in addition, 18.29% of the interviewees had not exclusively breastfed.

Impact or relationship between maternity leave and the prevalence of EBF

There was no association between maternity leave and EBF ($\chi^2_{(1059;1)} = 0.032$; $p = 0.865$), i.e., based on this study, there was no statistical evidence that maternity leave influences the prevalence of EBF at a significance level of 0.05 (Table 1).

Table 1
Relationship between maternity leave and the prevalence of exclusive breastfeeding

Maternity leave	Exclusive breastfeeding		χ^2	p-value
	Yes	No		
	n (%)	n (%)		
Works outside the home with maternity leave	14 (3.8%)	25 (3.6%)	0.032	0.865
Work outside the home without maternity leave	352 (96.2%)	668 (96.4%)		

Factors that can positively or negatively interfere with breastfeeding

The result of the binary logistic regression analysis indicated that, in general, being younger than 26 years old (OR = 2.10), having a secondary or higher education level (OR = 1.27), attending more than 8 prenatal visits (OR = 1.61), and having more than 2 children (OR = 1.88) were significantly associated with breastfeeding compared to the respective reference groups (Table 2).

Table 2
Factors that can positively or negatively interfere with breastfeeding

Variables		OR	OR (95% CI)	p-value
Maternal age (years)	< 26 years old	2.10	(1.362 – 3.246)	0.001*
	≥ 26 years old	1.00	–	–
Education	Secondary and higher education	1.55	(1.050 – 2.292)	0.028*
	Up to elementary education	1.00	–	–
Marital status	Single	1.27	(0.876 – 1.829)	0.209
	Married/cohabiting	1.00	–	–
Family income	CVE < 15000	1.01	(0.682 – 1.504)	0.949
	CVE ≥ 15000	1.00	–	–
Location of residence	Rural	1.07	(0.715 – 1.591)	0.754
	Urban	1.00	–	–
Pregnancy planning	Yes	1.06	(0.726 – 1.544)	0.768
	No	1.00	–	–
Prenatal care	Yes	1.46	(9.487 - 4.402)	0.498
	No	1.00	–	–
No. of prenatal visits	≥ 8 visits	1.61	(1.082 - 2.392)	0.019*
	< 8 visits	1.00	–	–
Maternity leave	Yes	1.03	(0.411- 2.561)	0.956
	No	1.00	–	–
Child's birth weight	Low	1.20	(0.536 -2.682)	0.659

OR = 1 reference category

* p < 0.05

Variables		OR	OR (95% CI)	p-value
	Normal	1.00	–	–
Breastfeeding in the 1st hour after delivery	Yes	1.07	(0.680 -1.689)	0.766
	No	1.00	–	–
Parity	More than 2 children	1.88	(1.225 -2.883)	0.004*
	Up to 2 children	1.00	–	–
Received breastfeeding counseling	No	1.27	(0.724 -2.232)	0.403
	Yes	1.00	–	–
OR = 1 reference category				
* p < 0.05				

Estimation of the exclusive breastfeeding gradient according to variations in education and purchasing power

The correlation between EBF and maternal education, assessed by the chi-square test, was not statistically significant ($\chi^2_{(1715;4)} = 6.754$; p = 0.149) at a significance level of 0.05. There was no relationship between maternal education level and EBF (Table 3).

Table 3
Relationship between maternal education level and exclusive breastfeeding

Education	Exclusive breastfeeding		χ^2	p-value
	Yes	No		
	n (%)	n (%)		
Illiterate	5 (0.9%)	12 (1.0%)	6.754	0.149
Integrated basic education	154 (27.7%)	274 (23.6%)		
Secondary education	293 (52.7%)	685 (59.1%)		
Higher education	80 (14.4%)	141 (12.2%)		
Technical-vocational training	24 (4.3%)	47 (4.1%)		

As shown in Table 4, there was no relationship between EBF and family income ($\chi^2_{(1717;4)} = 6.977$; p = 0.137).

Table 4
Relationship between family income and exclusive breastfeeding

Family income	Exclusive breastfeeding		χ^2	p-value
	Yes	No		
	n (%)	n (%)		
Less than CVE 15,000.00	233 (41.8%)	445 (41.8%)	6.977	0.137
CVE 15,000.00 to CVE 29,000.00	170 (30.5%)	372 (32.1%)		
CVE 30,000.00 to CVE 60,000.00	84 (15.1%)	172 (14.8%)		
More than CVE 60,000.00	59 (10.6%)	118 (10.2%)		
Did not know	12 (2.2%)	52 (4.5%)		

Association between EBF and health care

As we can see in Table 5, the chi-square test showed a significant association between exclusive breastfeeding and whether the mother received breastfeeding counseling ($\chi^2_{(1717;2)} = 4.926$; $p = 0.029$).

The correlation between the EBF and the other health care variables, such as number of prenatal visits ($\chi^2_{(1717;2)} = 1.682$; $p = 0.431$), location of prenatal care ($\chi^2_{(1667;3)} = 3.501$; $p = 0.321$), child's birthplace ($\chi^2_{(1698;3)} = 2.542$; $p = 0.468$), breastfeeding in the first hour after delivery ($\chi^2_{(1704;1)} = 0.078$; $p = 0.797$), and birth weight ($\chi^2_{(1709;1)} = 0.276$; $p = 0.646$) were not statistically significant at a significance level of 0.05.

Table 5
Relationship between exclusive breastfeeding and health care

Health care		Exclusive breastfeeding		χ^2	p-value
		Yes	No		
		n (%)	n (%)		
Number of prenatal visits	Less than 8 visits	315 (56.5%)	620 (53.5%)	1.682	0.431
	8 or more visits	220 (39.4%)	495 (42.7%)		
	Did not remember	23 (4.1%)	44 (3.8%)		
Location of prenatal care	Health center	458 (84.2%)	934 (83.2%)	3.501	0.321
	Hospital	22 (4.0%)	55 (4.9%)		
	Private clinic	30 (5.5%)	46 (4.1%)		
	More than one option	34 (6.3%)	88 (7.8%)		
Child's birthplace	Hospital	525 (94.9%)	1098 (95.9%)	2.542	0.468
	Health center	17 (3.1%)	34 (3.0%)		
	At home	9 (1.6%)	9 (0.8%)		
	Other	2 (0.4%)	4 (0.3%)		
Received breastfeeding counseling	Yes	508 (91.0%)	1013 (87.4%)	4.926	0.029*
	No	50 (9.0%)	146 (12.6%)		
Child breastfeed in the first hour after delivery	Yes	444 (80.1%)	915 (79.6%)	0.078	0.797
	No	110 (19.9%)	235 (20.4%)		
Child's birth weight	Low	526 (94.3%)	1092 (94.9%)	0.276	0.646
	Normal	32 (5.7%)	59 (5.1%)		
* p < 0.05					

Discussion

Factors that led mothers to initiate and stop breastfeeding in the first 6 months of the baby's life

In the present study, the mothers reported the belief that breast milk was “the best food for the child” and a “healthy food”, as well as its “benefits to the child’s health”, among other factors, as the main reasons for breastfeeding, which is consistent with the findings of other studies (14, 15).

In contrast, the mothers’ reasons for early weaning included “having to work or study”, “insufficient milk”, “the baby’s refusal to take the breast”, and “the mother’s refusal to breastfeed”, among other factors, a finding that corroborates some studies (16–20). The reasons indicated for stopping breastfeeding are similar to those cited in the work of (21) and are mainly related to the mother’s insecurity about breastfeeding (poor latch). Additionally, returning to work remains an important barrier to the maintenance of exclusive and mixed breastfeeding and contributes to a large drop in the breastfeeding rate between the ages of 3 months and 6 months.

The results obtained in (22) allowed the reasons for non-EBF until the 6th month of the baby's life to be grouped into the following categories: 10 mothers (20%) related early weaning to personal demotivation, 6 (12%) reported a lack of self-will, 2 (4%) reported a lack of time due to work, and 1 (2%) reported a lack of knowledge. Regarding factors related to the baby, 9 mothers (18%) reported that the baby had an aversion to milk, and 2 (4%) reported that the baby seemed to be hungry even after breastfeeding. Regarding physiological factors related to the mother, 20 (40%) reported having little milk, and 20 (40%) reported a consequent cessation in milk production.

Prevalence of exclusive breastfeeding in the first 6 months of life

In the present study, 81% of the mothers correctly identified the period recommended by the WHO for EBF, a result that corroborates the results of several studies (15, 20, 23, 24). However, this knowledge was not enough to ensure that they continued EBF until the child was 6 months old. A study conducted in Malaysia evaluated 213 mothers’ knowledge and beliefs about breastfeeding and concluded that, in addition to having knowledge and taking action, it was necessary to address issues related to culture and traditions and to improve support to ensure successful breastfeeding (15).

The rate of adherence to EBF in the first 6 months of life was 32.5%, which is considered reasonable according to the WHO(25). It should be noted that 49.21% of the children were still being exclusively breastfed but had not reached the 6-month mark at which breastfeeding can be considered EBF. These results regarding EBF are superior to those of (22), in which 12 mothers (24%) exclusively breastfed for a period of 1 or 2 months, 18 mothers (36%) exclusively breastfed for 3 or 4 months, 9 mothers (18%) exclusively breastfed up to 5 months, and only 11 mothers (22%) exclusively breastfed until the 6th month of the child’s life.

The results also corroborate those of (26), in which 7 (5%) of 141 children were never breastfed, 24 (17%) were never exclusively breastfed, 59 (42%) were still being breastfed, and only 2 (1.4%) were still being exclusively breastfed. Despite mothers' knowledge about the importance of EBF, several studies show that the introduction of bottles and other artificial foods is a reality that invariably leads to early weaning. Hence, breastfeeding should be encouraged as a priority action for disease prevention and for improving the physical and mental health of children and families; this implies the need for mothers to be informed, advised, and guided regarding the costs and benefits of breastfeeding and its impact on the baby's health (27).

Influence of maternity leave on the prevalence of exclusive breastfeeding

Maternity leave allows the breastfeeding mother to maintain a safe source of income during a period when she needs to be close to her child; this allows greater dedication to the child and is a facilitator of EBF (28).

In the present study, maternity leave did not have a significant influence on breastfeeding and EBF. Recent studies (4, 18, 19, 24, 28, 29) show that the rate of breastfeeding and EBF rapidly decline when women return to work. Mothers on maternity leave had a higher prevalence of EBF than even mothers who were not working, which is in agreement with several studies (28, 30, 31); this shows the protective effect of maternity leave on EBF for all infants younger than 6 months.

Maternity leave lasting less than 6 weeks increases the likelihood of not starting breastfeeding and early weaning by fourfold. A study conducted in all member states of the United Nations showed that the guarantee of paid maternity leave for at least 6 months was associated with an 8.9% increase in EBF (18).

Factors that interfere with breastfeeding

Several factors can positively or negatively affect breastfeeding, including maternal age, maternal education, marital status, location of residence, family income, parity, prenatal care, and perinatal care.

In the present study, only maternal age, maternal education, number of prenatal visits, and parity had a significant relationship with breastfeeding. Younger mothers seemed to be more likely to breastfeed than older mothers, which is in contrast to the results of several recent studies (22, 24, 31–37).

Mothers with a secondary or higher education were 1.55 times more likely to breastfeed than mothers with less than a primary education; this finding partially corroborates the results of (38), which found that the duration of breastfeeding was longer in mothers with a higher educational level.

The mother's marital status was not associated with breastfeeding, and similarly, younger mothers were more likely to breastfeed, contrary to the findings of (22, 30, 31).

The location of residence was not related to breastfeeding. This contrasts with (39), in which the duration of breastfeeding was higher among children living in rural areas.

The study showed that family income did not interfere with breastfeeding. This does not corroborate the results of (40), in which mothers with a lower income and educational level breastfed for longer periods, but not exclusively; thus, it was assumed that they maintained breastfeeding because they did not work outside the home.

Mothers with more than 2 children had a greater likelihood (OR = 1.88) of breastfeeding than mothers with up to 2 children, which corroborates the results of (39) and (38).

Mothers who attended more than 8 prenatal visits were more likely (OR = 1.88) to breastfeed than mothers who attended fewer than 8 visits. The results of the present study are in agreement with those of (39), which states that the attendance of 6 or more prenatal visits may contribute to an increase in the duration of breastfeeding.

Breastfeeding in the first hour after delivery showed no association with EBF. This result is contrary to (41), in which a bivariate analysis showed that first breastfeeding after 6 hours of life ($p = 0.032$) had a negative association with the duration of breastfeeding, while a multivariate analysis showed that breastfeeding had a positive association with a shorter breastfeeding time.

Relationship between EBF, maternal education, and mother's purchasing power

In this study, maternal education and mother's purchasing power were not related to EBF, which is in line with (42) and (26).

Study (43) also showed that education was not related to EBF.

The findings of other studies are contrary to our findings, in which there was a lower prevalence of EBF among mothers with less than a high school education and with an income below one minimum wage (5). A similar result was found in a study conducted in a northern Brazilian capital, where education was significantly related to EBF (31). These findings indicate that education can be a protective factor for breastfeeding. Most likely, women with no or little education are unaware of the importance of EBF until at least 6 months of life because they are unaware of the high nutritional and caloric value of breast milk for the newborn or of the nutrients necessary for growth and development.

Association between exclusive breastfeeding and health care

In the present study, EBF was associated only with breastfeeding counseling ($p = 0.029$), which corroborates (5) and contrasts with the findings of (43).

The other health care variables – number of prenatal visits, location of visits, child's birthplace, breastfeeding in the first hour after delivery, and birth weight – were not associated with EBF. This result is in agreement with the findings of (43) regarding the number of prenatal visits and the child's birthplace. Regarding birth weight, the results of the present study corroborate those of (5).

Contradicting these results, one study (18) showed that infants with low birth weight whose mothers had 12 years or more of education, were between 20 and 35 years old, and were on maternity leave had a higher prevalence of EBF.

The present study shows that of the children who were exclusively breastfed until they were 6 months old, 32.7% were breastfed in the first hour after delivery, compared to 31.9% of those who were not breastfed in the first hour after delivery. However, there was no significant association between EBF and breastfeeding in the first hour after delivery.

The results of this study are in agreement with those of (5), which reported that of the children who were exclusively breastfed up to 6 months of age, 52.2% breastfed in the first hour of life, and 47.3% breastfed after the first hour. However, contrary to the present study, (5) reported there was a positive association between these 2 variables.

Conclusion

The mothers reported the following reasons for breastfeeding their children: breast milk is the best food for the baby (18.7%), breast milk is a healthy diet (8.9%), breast milk helps with child development (5.2%), having received breastfeeding counseling (4.3%), breast milk protects the baby against infections (3.2%), producing enough breastmilk (3.0%), breast milk is a right of the child/mother (2.6%), breastfeeding is an act of love/attachment (1.6%), breastfeeding is more practical (0.7%), breastfeeding protects the mother's health (0.6%), breastfeeding is a mother's duty/pleasure (0.6%), breastfeeding is more economical (0.5%), breast milk protects the baby from allergies (0.1%), the child needs breastfeeding (0.1%), more than one option (47.9%), and do not know (0.8%).

In contrast, mothers indicated that they stopped or never started breastfeeding because they had to work/study (20%), had insufficient milk (16%), do not like/did not want to breastfeed (10.2%), received medical advice not to/had health problems (3.9%), had breast problems (2.8%), had weak milk (2.5%), were worried about aesthetics (2.2%), introduced food or water (1.8%), the child refused to breastfeed (1.6%), they became pregnant (1.5%), they used contraindicated drugs (1.2%), they used bottles and pacifiers (0.6%), the baby was sick (0.3%), the child or mother traveled (0.3%), the child's health was an issue (0.2%), or more than one option (11.4%).

In the present study, 81% of the mothers reported knowing the WHO's recommended duration for EBF. However, it was not possible to conclude whether this knowledge influenced EBF, as only 32.5% of mothers had exclusively breastfed. Of the remainder, 49.21% were still exclusively breastfeeding but had

not reached the 6-month mark at which breastfeeding is considered EBF, and 18.29% had not exclusively breastfed.

Only the variables maternal age, education level and number of prenatal visits were associated with breastfeeding.

Maternal education level, maternity leave, and family income were not related to EBF.

Regarding health care variables, only breastfeeding counseling seemed to influence EBF.

Study limitations and recommendations for future studies

The following issues should be considered in future studies:

- Use of a countrywide sample stratified by island and municipality that is representative of mothers with children aged 6 months or older, instead of those who are in health care;
- Verification of the reasons the mothers did not complete the number of prenatal visits stipulated by the WHO;
- Analysis of discrepancies among institutions/locations regarding prenatal health care.

Abbreviations

BF - Breastfeeding

EBF - Exclusive breastfeeding

WHO - World Health Organization

Declarations

- **Ethical approval and participant consent**

The project was approved by the National Ethics Committee for Research in Health (CNEPS, for its acronym in Portuguese), as stated in Resolution no. 42/2017. Access to the anonymized database was restricted to members of the research team. A code number was assigned to each element, thus ensuring the confidentiality of the individual data.

Before the administration of the questionnaire, the mothers were informed about the objectives of the study, the importance of conducting the research, and the methodological procedures.

All of the mothers agreed to participate in the study through an informed consent form, in accordance with the ethical principles recommended in the country.

- **Consent for publication**

Not applicable.

- **Availability of data and materials**

The datasets generated and/or analyzed in this study are available from the corresponding author (EDL) upon request with reasonable justification and are stored at the National Institute of Public Health in a repository with limited and controlled access. The data are not publicly available because they contain confidential information that may compromise the privacy/consent of the participants.

- **Conflicts of interest**

The authors declare no conflict of interest.

- **Funding**

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- **Author contributions**

All of the authors read and approved the final manuscript for publication and provided their written informed consent.

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- **Author information (optional)**

Not applicable.

- **Footnotes**

Not applicable.

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Author	Contribution	
EDL	<ul style="list-style-type: none"> • Project coordination • Elaboration of the research project • Training of field workers • Preparation for data collection • Supervision of data collection in the field • Construction of the database • Statistical analysis of the data • Preparation of the study report • Writing of the article • Review of the manuscript 	1. INE; MSSS. Apresentação dos Principais Resultados Preliminares do IDSR-III. 2018; 2. WHO & UNICEF. Global Breastfeeding Scorecard, 2018. Enabling Women To Breastfeed Through Better Policies And Programmes. WHO/Unicef [Internet]. 2019; (3):3. Available from:
AMRLM	<ul style="list-style-type: none"> • Elaboration of the research project • Preparation for data collection • Supervision of data collection in the field • Review of the study report 	
DELRT	<ul style="list-style-type: none"> • Elaboration of the research project • Review of the study report 	
DOBFCV	<ul style="list-style-type: none"> • Elaboration of the research project • Preparation for data collection • Supervision of data collection in the field • Review of the study report 	
IMS	<ul style="list-style-type: none"> • Elaboration of the research project • Supervision of data collection in the field • Review of the study report 	
JJXS	<ul style="list-style-type: none"> • Statistical analysis of the data 	
NMLPV	<ul style="list-style-type: none"> • Elaboration of the research project • Preparation for data collection • Supervision of data collection in the field 	

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