

Prevalence and determinants of the use of pacifiers and feedingbottle: a study in Southwest Bahia

Vanessa Moraes Bezerra ¹

 <https://orcid.org/0000-0001-5333-2875>

Elma Izze da Silva Magalhães ²

 <https://orcid.org/0000-0001-9909-9861>

Itana Neves Pereira ³

 <https://orcid.org/0000-0002-7593-4778>

Andressa Tavares Gomes ⁴

 <https://orcid.org/0000-0002-5366-2804>

Michele Pereira Netto ⁵

 <https://orcid.org/0000-0003-0017-6578>

Daniela da Silva Rocha ⁶

 <https://orcid.org/0000-0001-6969-6841>

^{1,3,4,6} Instituto Multidisciplinar em Saúde. Universidade Federal da Bahia. Rua Rio de Contas, 58. Candeias. Vitória da Conquista, BA, Brasil. CEP: 45.029-094. E-mail: vanessaenut@yahoo.com.br

² Programa de Pós-Graduação em Epidemiologia. Universidade Federal de Pelotas. Pelotas, RS, Brasil.

⁵ Faculdade de Nutrição. Universidade Federal de Juiz de Fora. Juiz de Fora, MG, Brasil.

Abstract

Objectives: to assess the use of pacifier and feedingbottle and their determinants in children from a municipality of Southwest Bahia.

Methods: a cross-sectional study was performed with 354 children younger than 12 months old. The event was categorized in: exclusive use of pacifier, exclusive use of feeding bottle, use of pacifier and feeding bottle, and not use any of them. Multinomial analysis with logistic regression was applied, and those who did not use any artificial nipples were reference variable.

Results: it was observed that 11.9% of the children exclusively used pacifiers, 21.2% only use bottles and 32.8% used both of them. The following factors were associated with the exclusive use of pacifiers: low maternal schooling level (eight or less years of education), lack of previous experience with breastfeeding, difficulty in postpartum breastfeeding, and lack of incentive to breastfeeding in puericulture. The exclusive use of feeding bottle was associated with unmarried mothers, aged 35 years old or older, and with less years of education (eight or less years). Women who worked outside home and had difficulty in breastfeeding had greater chance of giving both artificial nipples to the children.

Conclusions: the findings present different features related to the exclusive or combined use of pacifiers and feeding bottles, being important to direct health professionals conducts towards mothers' orientation.

Key words *Pacifiers, Feeding bottles, Epidemiological studies*



Introduction

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend not offering pacifiers or feeding bottles to breastfed children as an important step towards breastfeeding success.¹ This instruction takes into account the possibility of "nipple confusion" by the infant, resulting in an oral configuration and sucking pattern inappropriate for breastfeeding after exposure to the artificial nipples,² which contributes to early weaning.³

Studies have shown that the use of pacifiers and/or feeding bottle favors early breastfeeding discontinuance, interferes with the development of orofacial structures, alters child chewing and swallowing functions,⁴ is associated with higher risk of caries occurrence⁵ and teeth malocclusion,⁶ besides it has been considered an important source of contamination by microorganisms harmful to health.⁷

In Brazil, some regulations were established in order to supervise the trade of infant products, including pacifiers and baby bottles. The Brazilian Standard for Commercialization of Foods for Infants and Young Children, Pacifiers, and Baby Bottles (NBCAL - *Norma Brasileira de Comercialização de Alimentos para Lactentes e Crianças de 1ª Infância, Bicos, Chupetas e Mamadeiras*), later changed into Law No. 11265/2006,⁸ aims to ensure the appropriate use of these products in a way that does not interfere with breastfeeding practice. Despite that, artificial nipples are still widely used in Brazil and in several countries worldwide, being a cultural practice widely disseminated in our environment.⁴

In literature, researches evaluating the use of artificial nipples have shown association with several factors, such as low maternal schooling, maternal age under 20 years old, nipple trauma, cohabitation with maternal grandmother, maternal work outside home, primiparity, cesarean section, low birth weight, lack of breastfeeding in the first hour of life, among others.⁹⁻¹³ Most of these studies have only assessed the determinants of exclusive use of pacifiers^{9,10} or exclusive use feeding bottle,^{11,12} thus, studies investigating the combined use of both artificial nipples and their associated factors are still scarce.¹³

Hence, this work aimed to assess the prevalence of exclusive and combined use of pacifiers and feeding bottles and their determinants in children younger than one year old living in a municipality in Southwest Bahia, Brazil.

Methods

It is a cross-sectional study with data obtained from a larger research project, entitled "Breastfeeding frequency and factors associated with early weaning in the city of Vitória da Conquista, Bahia".

For sample calculation, we considered the total number of children younger than one year old, born between June 2009 and May 2010 ($n = 5222$), the prevalence of pacifier use (42.6%),¹⁴ confidence interval of 95%, originating a minimum sample of 351 children. Inclusion criteria were children younger than 12 months old that was attended at the city health units. Children who had health problems that interfered with feeding as well as those who were not accompanied by the mother or legal guardian were excluded.

The sample was selected from January 2011 to April 2012 and included children younger than one year old who attended the Child Growth and Development (GD) appointments in all health units of the urban area of the municipality, comprising 15 family health units, three polyclinics for primary care, and three health centers.

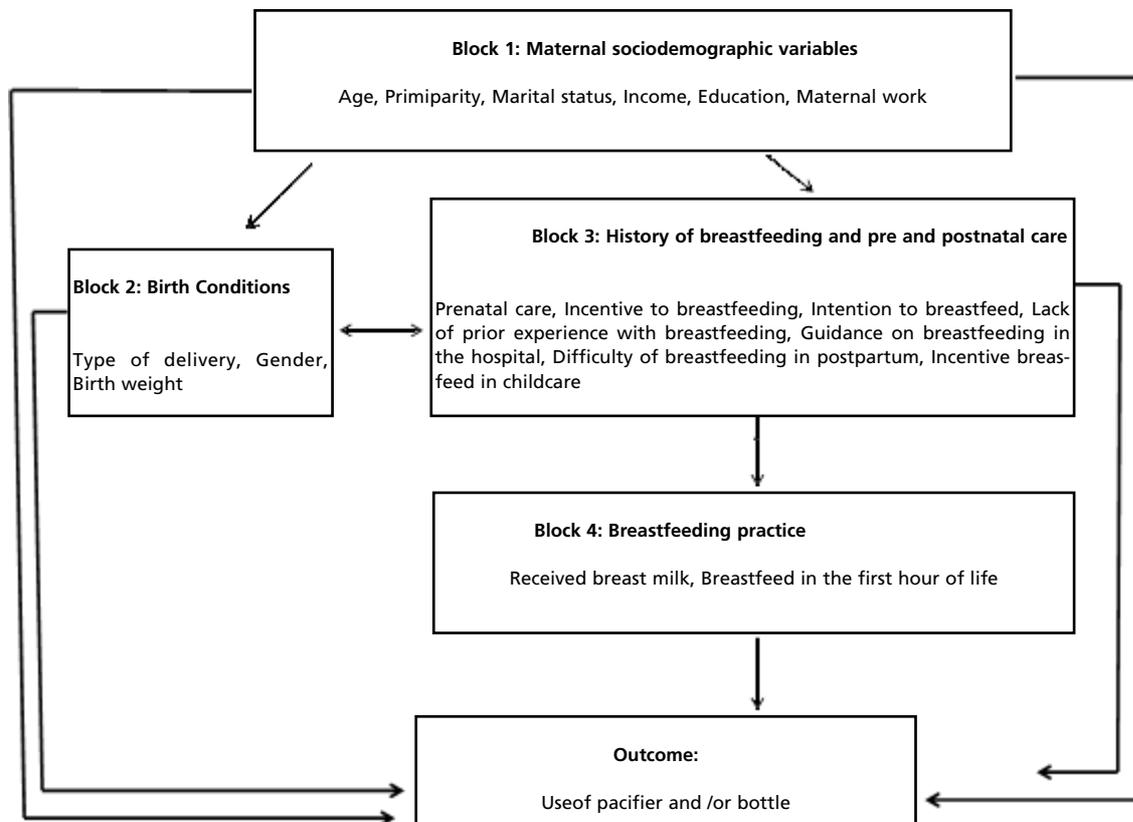
The interviews were conducted by Nutrition students from Federal University of Bahia (UFBA), Anísio Teixeira campus, all of them had been properly trained by the project supervisors. Semi-structured interviews were carried out with children's mothers.

The study dependent variable was the use of pacifiers and/or feeding bottles. Two questions were asked: "Does the child use pacifiers?" "Does the child use feeding bottles?" The outcome was divided into four categories: exclusive use of pacifier, exclusive use of feeding bottle, use of pacifier and feeding bottle, and non-use of pacifiers and feeding bottle. The independent variables were established through a conceptual model for the determinants of the use of pacifiers and/or feeding bottles, adapted from a model proposed by Buccini *et al.*¹³ being organized into four blocks (Figure 1).

For the first group, the following maternal sociodemographic variables were considered: age (<20 years old, 20 to 34 years old, and ≥ 35 years old), primiparous (Yes / No), marital status (with partner / without partner), family income of 1 minimum wage, > 1 minimum wage, schooling level (≤ 8 years of education / >8 years of education), and work outside the home (Yes / No); the variables concerned to child's birth conditions, in its turn, comprised the second block, and were: type of delivery (vaginal / cesarean-section), child gender (male / female), and birth weight ($\geq 2500g$ /

Figure 1

Conceptual model for use of pacifiers and / or bottles.

Adapted from Buccini *et al.*¹³

<2500g); Prenatal and postnatal care: prenatal care, breastfeeding in prenatal care, previous desire to breastfeed, previous experience with breastfeeding, breastfeeding orientation and encouragement in the hospital, difficulty in postpartum breastfeeding, and breastfeeding incentive. The fourth group consisted of two variables: breastfeeding (independent of the type) and breastfeeding in the first hour of life, which were also analyzed in a dichotomous way (Yes / No).

Initially, a descriptive analysis of the population and an estimate of prevalence of pacifier and/or feeding bottle use among children with 95% Confidence Intervals (CI95%) were performed. Differences between groups were assessed using the Pearson chi-square test or Fisher's exact test. For multivariate analysis, the variables that presented statistical significance of $p < 0.20$ were selected. Multinomial logistic regression was used to deter-

mine the factors associated with exclusive use of pacifiers, exclusive use of feeding bottle, and combined use of pacifiers and feeding bottle, considering those who did not use any of these artificial nipples as reference. The *odds ratio* and CI95% were calculated taking into account a dependent variable with more than two nominal categories.

The hierarchical entry of the variables into blocks¹⁵ was adopted, according to the following order: maternal sociodemographic variables; variables on child's birth conditions; variables of breastfeeding history and pre- and postnatal care; and variables on the practice of breastfeeding. Adjustments for variables of the same block and of hierarchically superior blocks were done, remaining in the model those that presented $p \leq 0.05$. The model comparison was performed using the Akaike criterion (AIC) and the suitability of the models was verified by the Hosmer-Lemeshow test for the multinomial model.

All analyzes were performed using Stata software version 12.0 (StataCorp, College Station, Texas, USA).

The project was approved by the Ethics Committee of the Sponsor Institute of Higher Education (CEP / IMES) N^o 2.072 in accordance with the guidelines of National Health Council Resolution N^o. 196/96. Participants were informed about the purpose of the work, procedures, and data confidentiality, and expressed their agreement in participating on the research by signing the informed consent form.

Results

From the 381 children younger than 12 months old attending health units, 354 have participated in the study. The percentage of 7.0% of non-participation is explained by absence of the child mother or legal guardian at the time of the survey or by refusal to take part.

Most of them were female, were born by vaginal delivery, and weighed 2.500g or more. It was also observed that most of the mothers interviewed were between 20 and 34 years old, were primiparous, and worked outside home. It was also found that more than half of the children (64.7%) had breastfed in the first hour of life and almost all population (96.3%) was receiving breast milk (Table 1).

Regarding prenatal and postnatal care, more than 90% of the mothers had prenatal follow-up, incentive to breastfeed during pregnancy and had prior desire to breastfeed. The orientation and incentive to breastfeeding in the hospital in puericulture was reported by 88.4% and 77.2% of the mothers respec-

tively (Table 1).

In regards to the investigated event, 11.9% (CI95% = 8.48-15.25) of the children only used pacifiers, 21.2% (CI95% = 16.9-25.5) only used feeding bottle, 32.8% (CI95% = 27.7-37.7) used both of them, and 34.1% (CI95% = 29.2-39.1) did not use pacifiers or baby bottles (Figure 2).

In bivariate analysis, a greater proportion of exclusive pacifier use and combined use of pacifier and feeding bottle were verified among the children of married mothers, with nine or more years of education, who worked outside home, who had difficulty in breastfeeding post-childbirth. All population who exclusively used pacifiers reported that they had already offered breast milk. For the exclusive use of feeding bottle, superior proportions were observed for the same variables mentioned above, except for difficulty in postpartum breastfeeding, in which the highest proportion of feeding bottle use was among the group that reported having no difficulty (Table 2).

In multinomial logistic regression analysis, it was observed that lower maternal schooling (eight or less years) had a negative association with pacifier use alone (OR = 0.47; $p = 0.045$) and with exclusive use of feeding bottle (OR=0.53; $p = 0.044$). However, the lack of previous experience with breastfeeding (OR = 2.56; $p = 0.027$), difficulty in postpartum breastfeeding (OR = 2.51, $p = 0.017$), and non-encouragement of breastfeeding in puericulture (OR=2.25, $p = 0.048$) exhibited a positive association with the exclusive use of pacifier. Being a child of unmarried (OR = 2.72, $p = 0.034$) and older mothers (OR = 3.53, $p = 0.038$) had a significant positive association with exclusive use of feeding

Table 1

Distribution of the characteristics of children under 12 months in a municipality in the Southwest of Bahia - BA, 2011/2012 (n = 354).

Variables	N	%	CI95%
Sociodemographic and maternal variables			
Maternal age (years)			
< 20	62	17.5	13.53 – 21.49
20 - 34	255	72.0	67.33 – 76.73
≥ 35	37	10.5	7.24 – 13.65
Primiparity			
Yes	173	51.1	45.89 – 56.36
No	181	48.9	43.63 – 54.10
Marital status			
No husband/partner	309	87.3	83.80 – 90.77
With husband/partner	45	12.7	9.22 – 16.19
Family income (minimum wage)			
≤ 1	175	49.7	44.47 – 54.96
> 1	177	50.3	45.04 – 55.53

continue

Table 1 **concluded**

Distribution of the characteristics of children under 12 months in a municipality in the Southwest of Bahia - BA, 2011/2012 (n = 354).

Variables	N	%	CI95%
Maternal education (years of study)			
≥ 9	186	52.5	47.32 – 57.77
≤ 8	168	47.5	42.23 – 52.68
Maternal working outside home			
Yes	274	77.4	73.02 – 81.77
No	80	22.6	18.22 – 26.97
Birth conditions			
Type of delivery			
Vaginal	232	65.9	60.93 – 70.88
Cesarean	120	34.1	29.11 – 39.06
Gender			
Male	173	48.9	45.89 – 56.36
Female	181	51.1	43.63 – 54.10
Birthweight (g)			
≥ 2500	323	92.8	90.08 – 95.54
< 2500	25	7.2	4.45 – 9.91
History of breastfeeding and pre and postnatal care			
Prenatal care			
Yes	350	98.9	97.76 – 99.97
No	4	1.1	02.35 – 2.23
Incentive to breastfeeding during prenatal care			
Yes	316	90.0	86.87 – 93.17
No	35	10.0	06.82 – 13.12
Intention to breastfeed			
Yes	326	92.1	89.26 – 94.91
No	28	7.9	5.08 – 10.73
Lack of prior experience with breastfeeding			
Yes	165	46.7	41.51 – 51.97
No	188	53.3	48.02 – 58.48
Guidance on Breastfeeding in the hospital			
Yes	311	88.4	84.98 – 91.71
No	41	11.6	8.28 – 15.01
Difficulty of breastfeeding in postpartum			
Yes	178	50.3	44.48 – 54.95
No	176	49.7	45.04 – 55.51
Incentive breastfeed in childcare			
Yes	271	77.2	72.79 – 81.61
No	80	22.8	18.38 – 27.20
Breastfeeding practice			
Receives/ received breast milk			
Yes	341	96.3	94.35 – 98.29
No	13	3.7	1.70 – 5.64
Breastfeed in the first hour of life			
Yes	229	64.7	59.68 – 69.69
No	125	35.3	30.30 – 40.31

bottle. Women who worked outsidehome (OR = 1.99, $p = 0.043$) and had difficulty in breastfeeding

(OR = 1.80, $p = 0.030$) were more likely to use both artificial nipples (Table 3).

Figure 2

Prevalence of the use of pacifiers, bottles, both of them and no artificial nozzle in children under 12 months from a municipality in the Southwest of Bahia - BA, 2011/2012.

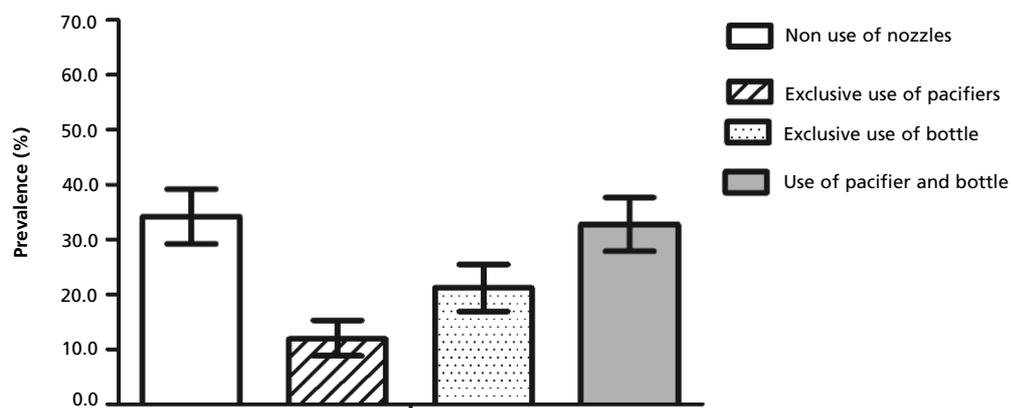


Table 2

Distribution of the use of artificial nozzles in relation to sociodemographic and maternal variables, birth conditions, prenatal and postnatal care in breastfeeding in children under 12 months of age in a city in the Southwest of Bahia - 2011/2012.

Variables	Non use of nozzles (n=121)		Use of pacifier (n=42)		Use bottle (n=75)		Use of pacifier and bottle (n=116)		p
	n	%	n	%	n	%	n	%	
Block 1: Sociodemographic									
Maternal age (years)									
< 20	26	21.5	7	16.7	7	9.3	22	19.0	0.189
20 - 34	84	69.4	31	73.8	55	73.3	85	73.3	
≥ 35 or more	11	9.1	4	9.5	13	17.3	9	7.8	
Primiparity									
Yes	54	44.6	25	59.5	37	49.3	57	49.1	0.425
No	67	55.4	17	40.5	38	50.7	59	50.9	
Marital status									
No husband/partner	112	92.6	39	92.9	61	81.3	97	83.6	0.046
With husband/partner	9	7.4	3	7.1	14	18.7	19	16.4	
Family income (minimum wage)									
≤ 1	65	54.2	17	40.5	34	45.3	59	51.3	0.380
> 1	55	45.8	25	59.5	41	54.7	56	48.7	
Maternal education (years of study)									
≥ 9	52	43.0	26	61.9	47	62.7	61	52.6	0.029
≤ 8	69	57.0	16	38.1	28	37.3	55	47.4	

continue

Table 2

concluded

Distribution of the use of artificial nozzles in relation to sociodemographic and maternal variables, birth conditions, prenatal and postnatal care in breastfeeding in children under 12 months of age in a city in the Southwest of Bahia -2011/2012.

Variables	Non use of nozzles (n=121)		Use of pacifier (n=42)		Use bottle (n=75)		Use of pacifier and bottle (n=116)		p
	n	%	n	%	n	%	n	%	
Maternal working outside home									
Yes	103	85.1	35	83.3	52	69.3	84	72.4	0.024
No	18	14.9	7	16.7	23	30.7	32	27.6	
Block 2: Birth conditions									
Type of delivery									
Vaginal	81	67.5	25	59.5	44	59.5	82	70.7	0.328
Cesarean	39	32.5	17	40.5	30	40.5	34	29.3	
Gender									
Male	60	50.4	20	47.6	34	45.3	59	50.9	0.894
Female	61	50.4	22	52.4	41	54.7	57	59.1	
Birth weight (g)									
≥ 2500	110	93.2	42	100.0	67	90.5	104	91.2	0.232
< 2500	8	6.8	0	0	7	9.5	10	8.7	
Block 3: History of breastfeeding and pre and postnatal care									
Prenatal care									
Yes	121	100.0	42	100	74	98.7	113	97.4	0.252
No	0	0.0	0	0.0	1	1.3	3	2.6	
Incentive to breastfeeding during prenatal care									
Yes	108	89.3	38	90.5	65	87.8	105	92.1	0.793
No	13	10.7	4	9.5	9	12.1	9	7.9	
Intention to breastfeed									
Yes	112	92.6	38	90.5	70	93.3	106	91.4	0.935
No	9	7.4	4	9.5	5	6.7	10	8.6	
Lack of prior experience with breastfeeding									
Yes	65	53.7	15	35.7	36	48.0	49	42.6	0.154
No	56	46.3	27	64.3	39	52.0	66	57.4	
Guidance on Breastfeeding in the hospital									
Yes	107	88.4	37	88.1	63	84.0	104	91.2	0.513
No	14	11.6	5	11.9	12	16.0	10	8.8	
Difficulty of breastfeeding in postpartum									
Yes	53	43.8	28	66.7	31	41.3	66	56.9	0.012
No	68	56.2	14	33.3	44	58.7	50	43.1	
Incentive breastfeed in childcare									
Yes	96	80.0	27	64.3	59	78.7	89	78.1	0.199
No	24	20.0	15	35.7	16	21.3	25	21.9	
Block 4: Breastfeeding practice									
Receives/ received breast milk									
Yes	121	100.0	42	100.0	68	90.7	110	94.8	0.003
No	0	0.0	0	0.0	7	9.3	6	5.2	
Breastfeed in the first hour of life									
Yes	84	69.4	23	54.8	45	60.0	77	66.4	0.276
No	37	30.6	19	45.2	30	40.0	39	33.6	

Table 3

Adjusted analysis of factors associated with exclusive use of pacifiers, exclusive use of bottles and use of pacifiers and bottles in children with less than 12 months in a municipality of the Southwest of Bahia BA, 2011/2012.

Variables	Use of pacifier		Use of bottle		Use of pacifier and bottle	
	OR	CI95%	OR	CI95%	OR	CI95%
Sociodemographic[†]						
Maternal age (years)						
< 20	1.00		1.00		1.00	
20 - 34	1.18	0.46 – 3.07	2.02	0.80 – 5.15	1.05	0.54 – 2.05
≥ 35	1.20	0.28 – 5.05	3.53	1.07 – 11.65	0.81	0.28 – 2.39
Marital status						
No husband/partner	1.00		1.00		1.00	
With husband/partner	0.96	0.24 – 3.77	2.72	1.08 – 6.86	2.32	0.99 – 5.44
Maternal education (years of study)						
≥ 9	1.00		1.00		1.00	
≤ 8	0.47	0.23 – 0.98	0.53	0.29 – 0.98	0.76	0.45 – 1.29
Maternal working outside home						
Yes	1.00				1.00	
No	0.97	0.37 – 2.58	1.88	0.90 -3.90	1.99	1.02 – 3.87
History of breastfeeding and pre and postnatal care[‡]						
Lack of prior experience with breastfeeding						
Yes	1.00		1.00		1.00	
No	2.56	1.11 – 5.90	1.46	0.75 – 2.86	1.59	0.87 – 2.91
Difficulty of breastfeeding in postpartum						
Yes	1.00		1.00		1.00	
No	2.51	1.18 – 5.33	0.98	0.54 – 1.80	1.80	1.06-3.05
Incentive breastfeed in childcare						
Yes	1.00		1.00		1.00	
No	2.25	1.01 – 5.02	1.15	0.55 – 2.40	1.09	0.58 – 2.08

OR= adjusted *odds ratio* for the variables contained in the model; CI95%= Confidence interval;

The reference was not using pacifier and bottle (nonuse anything)

([†])Adjusted among sociodemographic variables;

([‡])Adjusted between sociodemographic variables and pre and post natal care.

Discussion

This research estimated the prevalence and investigated the determinants of pacifier and/or feeding-bottle use in children younger than 12 months old in a municipality of Southwest Bahia. The prevalence of the use of artificial nipples in the investigated population was high, and only 34.1% did not use pacifiers or feeding bottles, and their usage was associated with sociodemographic factors, experience and difficulties in the breastfeeding process and encouragement.

Related to the combined use of pacifiers and feeding bottle, the verified prevalence was similar to

the data from II National Survey on Breastfeeding Prevalence (33.5%).¹³ Regarding the exclusive use of these artificial nipples, the prevalence of use of pacifier was higher than the one reported in the National Survey (9.1%), while the prevalence of use of feeding bottle was lower than that reported in the same survey (24.8%).¹³ In Bahia State, as well as in Northeast region as a whole, higher prevalence of exclusive use of pacifiers (48.7% and 43.6%) and exclusive use of feeding bottle (63.6% and 60%) are recorded when compared to the frequencies observed in this study.¹⁴

Lower maternal schooling showed a negative association with exclusive use of pacifiers and exclusive use of feeding bottle, even after adjust-

ment by other variables. These findings were also seen among children of working women in the interior of São Paulo.¹⁶ However, in literature, there have been reports of divergent results. In a study conducted by Tomasi *et al.*,⁹ a superior frequency of pacifier use was verified among children of mothers with low schooling level, and in the study by Shamim *et al.*,¹² maternal illiteracy was one of the determinants for feeding bottle use.

Regarding this research's findings, it is suggested that this lower chance of exclusive use of pacifiers and feeding bottle may be related, in part, to the greater frequency of receiving information about breastfeeding (which includes the recommendation for not offering artificial nipples) in health services by women with low schooling level. The research carried out by Cruz *et al.*¹⁷ may reinforce this hypothesis, as they have detected a higher prevalence of having received all the guidelines on breastfeeding among women with lower schooling level who attended basic health units in their coverage area during prenatal.

Children of women who have reported difficulty in breastfeeding in postpartum period presented greater chances of exclusive use of pacifiers as well as the combined use of pacifiers and bottle. In regards to the exclusive use of pacifiers, some authors have pointed to this event as a marker of the challenges in breastfeeding.^{18,19} The difficulties faced by nursing mothers in the breastfeeding process may favor the use of pacifiers, considering that many mothers attribute pacifiers to the so-called "infant tranquilizer" function.²⁰ Thus, the need to calm the crying and the natural restlessness of newborns, which is intensified in the presence of difficulty in breastfeeding, can lead mothers to offer pacifiers to their children, and once established, this habit does not change over time.¹⁰ Besides, pacifiers can be used as a mechanism to decrease and space breastfeeding in women with breastfeeding difficulties, thus relieving discomfort during the process.²¹

Related to the combined use of pacifiers and feeding bottle, it is possible that, given a difficult breastfeeding scenario, the use of pacifiers contributes to a reduction in the number of breastfeeds and a consequent lower stimulation of the breasts, resulting in reduced milk production,²² which leads the mother to also offer the feeding bottle with another type of milk to satisfy the child. Besides, confronting the obstacles that hamper breastfeeding, feeding bottle is an easier alternative to feed the child, since in this utensil milk is ingested more quickly and without causing discomfort to the

mother.²³

The replacement of natural breastfeeding by the feeding bottle can cause damage to the sensorimotor-oral system development, due to the lack of correct stimulation of orofacial structures, favoring the installation of oral sucking habits, such as those triggered by the pacifier.²⁴ Thus, it is presumed that the obstacle in breastfeeding facilitate the use of pacifier or feeding bottle, and the use of one of these nipples may also ease the use of the other one.

The lack of experience in and the non-incentive for breastfeeding in puericulture also showed a positive association with the use of pacifiers alone. For the lack of prior breastfeeding experience, this association may be related to the fact that mothers who have never breastfed tend to interpret the newborn's crying and natural agitation as a sign of hunger or dissatisfaction even after the child has been breastfed. According to Sertório and Silva,²⁵ inexperienced mothers may qualify breastfeeding as insufficient, in terms of satiating the infant suckling need so that they start looking for alternatives to ensure the baby's satisfaction and "complement" breastfeeding with the pacifier, obtaining the expected result, when effectively the child has already been satiated.

Regarding the association of the exclusive use of pacifiers with the non-incentive to breastfeeding in childcare, it is well established in literature that the use of artificial nipples, such as pacifier, contributes to early interruption of breastfeeding.^{3,15,18,20,21} Evidently, the encouragement of breastfeeding in puericulture by health professionals includes, among other recommendations, discouraging the use of artificial nipples.²⁶ Indeed, when properly oriented, parents feel safer to comfort the child in a crying crisis without using artificial nipples.¹⁸

It was also observed that the children of women aged 35 years old or older living with no partner had a higher chance of exclusive use of feeding bottle. Literature has shown controversial results on maternal age. In the study by Shamim *et al.*¹² mothers aged over 30 years showed a higher preference for feeding bottle, while França *et al.*¹¹ have observed greater chance of using bottle among the children of teenage mothers. It is assumed that the association between maternal age and exclusive use of feeding bottle is related to the fact that older women may have a busy daily routine, which includes their insertion in the market as well as to perform home care activities. In this regard, the mothers would opt for the use of feeding bottle, considering that in addition to allowing the food to be eaten more quickly, it provides more freedom to

perform other activities, since another person can offer it to the baby.²³

Regarding the association between marital status and exclusive use of feeding bottle, literature have brought the fact that the mother in a stable union can have a positive impact on breastfeeding, considering that when a father or partner offers the support necessary for breastfeeding, it can exert a positive influence on the duration of breastfeeding.^{27,28} Therefore, mothers who do not have a partner would choose to offer other milk or formulations to the detriment of breastfeeding, due to the lack of support in the family environment, particularly from the parent or partner.

Maternal work outside the home was related to combined use of pacifiers and feeding bottle, which corroborates Buccini *et al.*¹³ findings. According to Rea *et al.*,²⁹ the conciliation of the roles of mother and worker is increasingly common, making necessary that more labor benefits are created so that mothers continue breastfeeding and do not introduce artificial nipples to their children.

This study has limitations due to the cross-sectional design, thus, for some detected associations it is not possible to establish an accurate temporal relationship between exposure and outcomes. On the other hand, it makes an important contribution to the development of the literature, since it is one of the few studies that evaluated the prevalence and associated factors, not only the exclusive use of pacifiers and feeding bottle, but also the combined use of these artificial nipples.

This research has verified a high prevalence of pacifier use and/ or feeding bottle in children younger than one year old in the city of Vitória da

Conquista, Bahia. The use of these artificial nipples was associated with maternal sociodemographic factors, such as age, marital status, schooling, working outside the home, besides the experience and difficulties in the breastfeeding process and the encouragement of breastfeeding in puericulture.

These findings demonstrate the importance of knowing the social determinants in which this population is inserted, which may help the creation and implementation of health policies with the objective of reducing the use of pacifier and feeding bottle as well as the negative consequences associated with using these artificial nipples.

Acknowledgments

The Health Municipal Secretary of Vitória da Conquista – Bahia and the nursing team of the Health Units for the logistical support in data collection.

Author's contribution

Bezerra VM contributed with the revision of literature, data analysis and revision and writing of the manuscript. Magalhães EIS contributed with data collection and revision of the manuscript. Gomes AT and Pereira IN contributed with data analysis and writing of the manuscript. Pereira Netto M contributed with the conception of the project and revision of the manuscript. Rocha DS contributed with the conception of the project, data collection coordination and revision of the manuscript. All authors approved the final version of the manuscript.

References

1. Protecting, promoting and supporting breastfeeding: the special role of maternity services. A joint WHO/UNICEF statement. Geneva, Suíça: World Health Organization; 1989.
2. Zimmerman E, Thompson K. Clarifying nipple confusion. *J Perinatol.* 2015; 35 (11): 895-9.
3. Rigotti RR, Oliveira MICD, Boccolini CS. Association between the use of a baby's bottle and pacifier and the absence of breastfeeding in the second six months of life. *Ciênc Saúde Coletiva.* 2015; 20 (4): 1235-44.
4. Sociedade Brasileira de Pediatria. Departamento Científico de Aleitamento Materno. Guia prático de atualização. Uso de chupeta em crianças amamentadas: prós e contras; 2017.
5. Avila WM, Pordeus IA, Paiva SM, Martins CC. Breast and bottle feeding as risk factors for dental caries: a systematic review and meta-analysis. *PLoS One.* 2015; 10 (11): e0142922.
6. Costa CT, Shqair AQ, Azevedo MS, Goettems ML, Bonow MLM, Romano AR. Pacifier use modifies the association between breastfeeding and malocclusion: a cross-sectional study. *Braz Oral Res.* 2018; 32: e101-7.
7. Moraes MS, Araújo BC, Costa LEO, Nascimento JS. Shigella in baby bottles of a Brazilian newborn nursery. *J Infect Dev Ctries.* 2015; 9 (6): 679-81.
8. Brasil. Lei no 11.265 de 03 de janeiro de 2006. Regulamenta a comercialização de alimentos para lactentes e crianças de primeira infância e também a de produtos de puericultura correlatos. [acesso em 11 de abril de 2018] Disponível em: <http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2006/Lei/L11265.htm>
9. Tomasi E, Victora CG, Olinto MTA. Padrões e determinantes do uso de chupeta em crianças. *J Pediatr.* 1994; 70 (3): 167-71.

10. Pinto MCGL, Melo GFB, Colares V, Katz CRT. Fatores sócio-econômico-culturais relacionados ao uso da chupeta em crianças de zero a quatro anos da cidade do Recife-PE. *Arq Odontol.* 2003; 39 (4): 285-96.
11. França MCT, Giugliani ERJ, Oliveira LDD, Weigert EML, Santo LCDE, Köhler CV, Bonilha AL. Uso de mamadeira no primeiro mês de vida: determinantes e influência na técnica de amamentação. *Rev Saúde Pública.* 2008; 42 (4): 607-14.
12. Shamim S, Jamalvi SW, Naz F. Determinants of bottle use amongst economically disadvantaged mothers. *J Ayub Med Coll Abbottabad.* 2006; 18 (1): 48-51.
13. Buccini GS, Benício MHD, Venancio SI. Determinantes do uso de chupeta e mamadeira. *Rev Saúde Pública.* 2014; 48 (4): 571-82.
14. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Ações Programáticas e Estratégicas. II Pesquisa de Prevalência de Aleitamento Materno nas Capitais Brasileiras e Distrito Federal / Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Ações Programáticas e Estratégicas. – Brasília, DF; 2009. 108 p
15. Victora CG, Huttly SR, Fuchs SC, Olinto MT. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. *Int J Epidemiol.* 1997; 26 (1): 224-7.
16. Santos TR, Buccini, GS, Sebastião, LT. Fatores associados ao uso de chupeta entre filhos de mulheres trabalhadoras com creche no local de trabalho. *Rev CEFAC.* 2017; 19 (5): 654-63.
17. Cruz SHD, Germano JDA, Tomasi E, Facchini LA, Piccini RX, Thumé E. Orientações sobre amamentação: a vantagem do Programa de Saúde da Família em municípios gaúchos com mais de 100.000 habitantes no âmbito do PROESF. *Rev Bras Epidemiol.* 2010; 13 (2): 259-67.
18. Kramer MS, Barr RG, Degenais S, Yang H, Jones P, Ciofani L, Jané F. Pacifier use, early weaning, and cry/fuss behavior: a randomized controlled trial. *JAMA.* 2001; 286 (3): 322-6.
19. Victora CG, Behague DP, Barros FC, Olinto MTA, Weiderpass E. Pacifier use and short breastfeeding duration: cause, consequence, or coincidence? *Pediatrics.* 1997; 99 (3): 445-53.
20. Batista CL, Ribeiro VS, Nascimento MD, Rodrigues VP. Association between pacifier use and bottle-feeding and unfavorable behaviors during breastfeeding. *J Pediatr.* 2018; 94 (6): 596-601.
21. Jaafar SH, Jahanfar S, Angolkar M, Ho JJ. Effect of restricted pacifier use in breastfeeding term infants for increasing duration of breastfeeding. *Cochrane Database Syst Rev* 2012; 7: CD007202.
22. Soares MEM, Giugliani ERJ, Braun ML, Salgado ACN, Oliveira AP, Aguiar PR. Uso de chupeta e sua relação com o desmame precoce em população de crianças nascidas em Hospital Amigo da Criança. *J Pediatr.* 2003; 79 (4): 309-16.
23. Spinelli MGN, Souza SBD, Souza JMP. Mamadeira, xícara ou colher: de que forma os bebês estão recebendo os alimentos. *Pediatr Mod.* 2002; 38 (10): 461-8.
24. Gomes CF, Trezza EMC, Murade ECM, Padovani CR. Surface electromyography of facial muscles during natural and artificial feeding of infants. *J Pediatr.* 2006; 82 (2):103-9.
25. Sertório SCM, Silva IA. As faces simbólica e utilitária da chupeta na visão de mães. *Rev Saúde Pública.* 2005; 39 (2): 156-62.
26. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Saúde da criança: aleitamento materno e alimentação complementar. 2 ed. Brasília, DF; 2015. 184 p.
27. Faleiros FTV, Trezza EMC, Carandina L. Aleitamento materno: fatores de influência na sua decisão e duração. *Rev Nutr.* 2006; 19 (5): 623-30.
28. Silva PP, Silveira RB, Mascarenhas MLW, Silva MB, Kaufmann CC, Albernaz EP. A percepção das mães sobre o apoio paterno: influência na duração do aleitamento materno. *Rev Paul Pediatr.* 2012; 30 (3): 306-13.
29. Rea MF, Venancio SI, Batista LE, Santos RG, Greiner T. Possibilidades e limitações da amamentação entre mulheres trabalhadoras formais. *Rev Saúde Pública.* 1997; 31 (2): 149-56.

Received on August 1, 2018

Final version presented on February 12, 2019

Approved on March 26, 2019