Prevalence of pacifier among breastfed and not breastfed infants attending a university hospital

Prevalência do uso de chupeta em lactentes amamentados e não amamentados atendidos em um hospital universitário

Prevalencia del uso de chupete en lactantes amamantados y no amamantados atendidos en un hospital universitario

Silvia Diez Castilho[1], Renan Capitani Casagrande[2], Carolina Roman Rached[2], Luciana Bertoldi Nucci[3]

ABSTRACT

Objective: To evaluate the prevalence of pacifier use in relation to breastfeeding, to find out the reasons why mothers planned or not to introduce this habit and the arguments for changing their minds about the pacifier used.

Methods: Cross sectional study comprising 642 mother-infant pairs (0–12months) at a University Hospital, in Campinas, São Paulo, Brazil. The mother was questioned about her original intention regarding the pacifier, the current outcome and the explanation for changing or not her mind. After a descriptive analysis, the logistic regression was applied to verify the association between the pacifier and breastfeeding.

Results: The prevalence of pacifier use was 48% (95%CI 44–52), being greater among non-breastfeed infants (70%) compared those breastfed (36%; p=0.029). Among the infants exclusively breastfed, 29% used pacifier (p<0.001). The chance to be breastfed was smaller when the infant used a pacifier (OR=0.22; 95%CI 0.15–0.33). Among the mothers, 60% changed their minds regarding their previous intention about pacifier use. The main reasons for changing plans were: infant rejection (95% – for those who wanted to use the pacifier), and to soothe the baby (72% – for those who initially did not want to use the pacifier).

Conclusions: The prevalence of pacifier use is high. This habit is more frequent among non-breastfed infants; among the breastfed ones, it is less frequent for those exclusively-breastfed. The majority of mothers changed their minds regarding their initial plans about pacifier use. Few worried about the possibility that the pacifier could interfere on breastfeeding.

Key-words: pacifiers; breast feeding; weaning.

RESUMO

Objetivo: Avaliar a prevalência do uso da chupeta em relação ao tipo de aleitamento, as razões das mães para introduzi-la ou não e os fatores associados à mudança de opinião quanto à sua intenção inicial a esse respeito.

Métodos: Estudo transversal que avaliou 642 crianças (0–12 meses) atendidas no Hospital da Pontifícia Universidade Católica de Campinas quanto ao tipo de alimentação e uso de chupeta. A mãe foi questionada sobre sua intenção inicial quanto à chupeta, quanto ao seu uso e, se utilizada, porquê. Após análise descritiva, aplicou-se a regressão logística para verificar a associação da chupeta com a amamentação.

Resultados: A prevalência de uso de chupeta foi de 48% (IC95% 44–52), sendo maior entre as crianças não amamentadas (70%) comparadas às amamentadas (36%; p=0,029).

Instituição: Ambulatório de Pediatria do Hospital e Maternidade Celso Pierro (PUC-Campinas), Campinas, SP, Brasil

[1]Doutora em Saúde da Criança e do Adolescente pela Universidade Estadual de Campinas (Unicamp); Professora da PUC-Campinas, Campinas, SP, Brasil

[2]Acadêmicos da Faculdade de Medicina da PUC-Campinas, Campinas, SP, Brasil

[3]Doutora em Epidemiologia pela Universidade Federal do Rio Grande do Sul (UFRGS); Professora do Centro de Ciências da Vida da PUC-Campinas, Campinas, SP, Brasil

Endereço para correspondência:
Silvia Diez Castilho
Avenida Princesa D'Oeste, 1.144 apto 171 – Jardim Paraíso
CEP 13100-040 – Campinas/SP
E-mail: sdiezcast@puc-campinas.edu.br

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Das que estavam em aleitamento exclusivo, 29% usavam chupeta (p<0,001). A chance de ser amamentada foi menor nas crianças com chupeta (OR=0,22; IC95% 0,15–0,33). Observou-se que 60% das mães mudaram de opinião quanto à intenção de introduzir a chupeta. O principal motivo alegado pelas mães que pretendiam dar a chupeta e não deram foi que a criança a rejeitou (95%) e, dentre as que não pretendiam e introduziram a chupeta, foi acalmar a criança (72%).

Conclusões: A prevalência de uso da chupeta é elevada, sendo maior entre crianças não amamentadas; entre as amamentadas, é menor naquelas que recebem aleitamento exclusivo. A maioria das mães referiu ter mudado sua opinião inicial quanto ao uso da chupeta. Poucas mostraram preocupação com a possibilidade de seu uso interferir na amamentação.

Palavras-chave: chupetas; aleitamento materno; desmame.

RESUMEN

Objetivo: Evaluar la prevalencia del uso de chupete respecto al tipo de lactancia, los motivos de las madres para introducirlo o no y los factores que hicieron con que mudara de opinión respecto a su intención inicial con relación a eso.

Métodos: Estudio transversal que evaluó a 642 niños (0-12 meses) atendidos en el Hospital de la Pontificia Universidad Católica de Campinas (São Paulo, Brasil), respecto al tipo de alimentación y uso de chupete. La madre fue cuestionada sobre su intención inicial respecto al chupete, a su uso y, si lo utiliza, el porqué. Tras análisis descriptivo, se aplicó la regresión logística para verificar la asociación del chupete con la amamantación.

Resultados: La prevalencia de uso de chupete fue de 48% (IC95% 44-52%), siendo mayor entre los niños no amamantados (70%) si comparado a los amamantados (36%; p=0,029). De los que estaban en lactancia exclusiva, el 29% usaban chupete (p<0,001). La chance de ser amamantado fue menor en niños con chupete (OR=0,22; IC95% 0,15-0,33). Se observó que el 60% de las madres cambiaron de opinión respecto a la intención de introducir el chupete. El principal motivo alegado por las madres que pretendían dar el chupete y no lo dieron fue que el niño lo rechazó (95%) y, entre las que no pretendían introducir el chupete, fue para calmar al niño (72%).

Conclusiones: La prevalencia del uso de chupete es elevada, siendo mayor entre niños no amamantados; entre los amamantados, es menor en los que reciben lactancia exclusiva. La mayoría de las madres refirió haber cambiado su opinión inicial respecto al uso de chupete. Pocos mostraron preocupación con la posibilidad de que su uso interfiriera en la amamantación.

Palabras clave: chupetes; lactancia materna; destete.

Introduction

Pacifier usage has been the subject of debate since the 1970s, when the breastfeeding promotion movement emerged[1]. The World Health Organization (WHO) banned pacifier advertising, because it considers pacifiers cause nipple confusion, which negatively affects breastfeeding adoption and makes weaning more likely[2-4]. The Baby Friendly Hospital Initiative was founded with the objective of mobilizing health-care teams to promote, protect and support breastfeeding, in order to avoid weaning and avert its consequences for infant morbidity and mortality rates[5]. The basic practices that are necessary to support mothers were summarized in the "Ten Steps to Successful Breastfeeding", one of which is "give no artificial teats or pacifiers"[5]. Use of artificial teats (pacifiers and bottles) have also been blamed for craniofacial developmental problems leading to mouth breathing, dental deformities, greater predisposition to airway infections, problems with phonation, dentition, mastication and deglutition, all of which are prejudicial to children's health[6,7].

No reasons for contraindicating pacifiers have been suggested within the field of Psychology, but other health-related disciplines have demonstrated that their use is linked with more harmful effects than beneficial ones[8]. In general, harm is linked with age of first use, and the duration, frequency and intensity of the habit once acquired[8].

However, despite the position against indiscriminate pacifier use adopted by health promotion agencies, they are still being given to infants. The II Survey of Breastfeeding Prevalence in Brazilian State Capitals and the Distrito Federal (PPAM – II Pesquisa de Prevalência de Aleitamento Materno nas Capitais Brasileiras e Distrito Federal) was published in 2009[9] and showed that breastfeeding indicators in Brazil, analyzed both by region and by state capital, had improved and that pacifier use had decreased, when compared with data from 1999[10], although the indicators have still not attained the recommendations.

This study was conducted with the objectives of gaining an understanding of the behaviour of parents and of identifying factors that affect their decisions on whether or not to

give their children pacifiers. To this end, the prevalence of pacifier use was analyzed among patients seen at the pediatric clinics at the Hospital da Pontifícia Universidade Católica de Campinas (PUC-Campinas) in relation to type of feeding, the reasons mothers gave for deciding to use or not to use a pacifier and factors that did or did not change their initial decision. Knowledge of these factors should help health professionals to provide parents with better guidance.

Methods

Data were collected from 642 mother-infant pairs between August of 2009 and March of 2010. Subjects were recruited from among the children who presented for scheduled consultations at the pediatric clinics (there is one for the national health service [SUS] and another for private patients) at PUC-Campinas' *Hospital e Maternidade Celso Pierro*. All patients registered before 12 months of age and brought by their mothers were invited to take part. Each pair was only approached once (since the study design is observational, descriptive and cross-sectional) and pairs were only enrolled after the mother had signed a free and informed consent form.

The sample size was calculate on the basis of the 1999 PPAM results[10] which indicated 66% pacifier use prevalence among children less than 1 year old in the city of São Paulo (the state capital). Sample sizes were calculated using the sampling frame described by Callegari-Jaques[11] with both confidence level (alpha) and margin of error (precision) equal to 5%. Two different scenarios (prevalence rates of 66 and 50%) were considered. For a 66% prevalence rate the sample size would have to be 345 subjects. However, on the basis that in conjunction with improved breastfeeding rates, one would expect to observe a reduced prevalence of pacifier use, it was decided to opt for a 50% prevalence rate, resulting in a sample size of 385 pairs. Since the second stage of the study was to analyze factors associated with pacifier use, data collection was continued until the sample necessary for logistic regression analysis was attained.

Interviews were conducted after pediatric consultations by two investigators who had been trained in advance and who worked a rota system to cover the clinic's opening hours. A semi-structured questionnaire was administered to collect data on maternal characteristics (age, educational level, existence of a partner, number of children, employment, whether returned to work after maternity leave, prenatal consultations, breastfeeding and pacifier guidance received, external influences leading to pacifier use and awareness of the effects of pacifier use), infant characteristics (sex, age, type of feeding, gestational age, birth weight, whether admitted to hospital during the neonatal period, length of hospital stay, age at which started using pacifier) and family characteristics (number of residents in household), in addition to type of feeding and use/no use of a pacifier during the previous 24 hours. An open question was used to elicit the mothers' intentions regarding pacifiers when their children were born and their explanations for the actual outcome, with post hoc characterization of the responses.

Breastfeeding prevalence was assessed using definitions published by the Brazilian Society of Pediatrics (SBP – Sociedade Brasileira de Pediatria), which are themselves based on the WHO criteria[12]: (1) Exclusive breastfeeding; (2) Breastfeeding (children fed breastmilk, irrespective of whether they are being given other foods including non-human milk, i.e., those who are being fed breastmilk, whether exclusively or not, and those who are already on complementary foods [water, tea, juice, mashes]); (3) Not breastfed (children on cow's milk or formula, with or without complementary foods).

Data were analyzed using the statistical packages R and SPSS. The frequencies of variables were analyzed and their respective 95% confidence intervals were calculated (95%CI). The chi-square test was used to compare proportions and logistic regression was conducted with breastfeeding as the dependent variable and pacifier use and age as independent variables. The level of significance was set at $p<0.05$. This study was approved by the Research Ethics Committee at PUC-Campinas.

Results

Ninety (14%) of the 642 mothers studied were adolescents, 390 (61%) had graduated high school, 44 (7%) had a higher education qualification, 522 (81%) were in stable relationships, 400 (62%) were not employed and 97 (40%) of those who did have jobs were still on maternity leave. It was found that 583 (91%) mothers attended at least six prenatal consultations; 618 (96%) stated they had been given breastfeeding guidance at some point (during prenatal, at the maternity unit or during a pediatric consultation) and 417 (65%) had been given guidance about pacifier use. Two hundred and eighty-three (44%) of the 642 mothers had only one child. Just 185 (29%) pairs were living with friends or relatives.

Three hundred and forty (53%) of the 642 children were male, 495 (77%) were born full term, median birth weight

was 3,112g (570–4,810) and 141 (22%) children were admitted to hospital during the neonatal period, with a median hospital stay of 10 days (1-150). The age distribution of the sample was not skewed in favor of any single age group (Figure 1). Median age was 168.5 days (5.5 months) varying from 10 to 363 days.

The prevalence of pacifier use (309/642) in the sample was 48% (95%CI 44–52). Pacifier use was more common among boys (51%) than among girls (45%). In 34% (160/308) of cases of children who were given pacifiers, they were given to the children during the first month and in 77% of these (123/160), the pacifier was given to the child before it was 7 days old.

With regard to diet, 65% of the children were being fed breastmilk and 35% were not (Table 1). The prevalence of exclusive breastfeeding among infants under 6 months was 46%, with 79% of children less than one month on exclusive breastfeeding, followed by 64% of those 1–2 months old, 61% of 2–3 month-olds, 46% of 3–4 month-olds, 23% of 4–5 month-olds and 9% of those aged 5–6 months.

Pacifier use was more frequent among non-breastfed children (157/224; 70%; 95%CI 64–76) than among those being breastfed (151/418; 36%; 95%CI 32–41), while 29% (48/164) of the exclusively breastfed children were using pacifiers (95%CI 22–36). For comparison between the proportions of breastfed and non-breastfed children using pacifiers $p=0.029$ and for the comparison between exclusively breastfed and non-breastfed children $p=0.001$. The logistic regression analysis showed that the likelihood of being breastfed was lower among those who used pacifiers than among those who did not (OR=0.22; 95%CI 0.15–0.33), irrespective of postnatal age, which was included as a covariable.

Table 2 summarizes the reasons given by mothers to explain their initial intentions of whether or not to use a pacifier. From the entire sample of 642 mothers, 61% (390) had intended to give their children pacifiers and 39% (252) said they had not intended to. Among those children whose mothers had intended to give them a pacifier, 40% (156/390) had acquired a pacifier habit, while 60% (234/390) were not using pacifiers. In 95% of these 234 cases, the reason provided by the mother to explain why her child had not started using a pacifier was that the children themselves had rejected their pacifiers. In contrast, 60% (152/252) of the children whose mothers had originally intended not to give them a pacifier were using one and 40% (100/252) were not using one, as originally planned. In this subset, 72% of the 152 mothers who had changed their minds said they had done so to soothe their children.

Discussion

The prevalence of pacifier use is still high among the children under 12 months old recruited to this study and their rates of breastfeeding and exclusive breastfeeding are still below the ideal. Understanding the reasons why mothers give their children pacifiers is a step towards enabling health professionals to educate mothers about the pros and cons of using a pacifier.

This study has limitations resulting from the non-probabilistic sample. Although all of the children under 12 months who presented for consultations during the study period were invited to take part, only one mother-child pair was enrolled per family (in which the child was less than 12 months old)

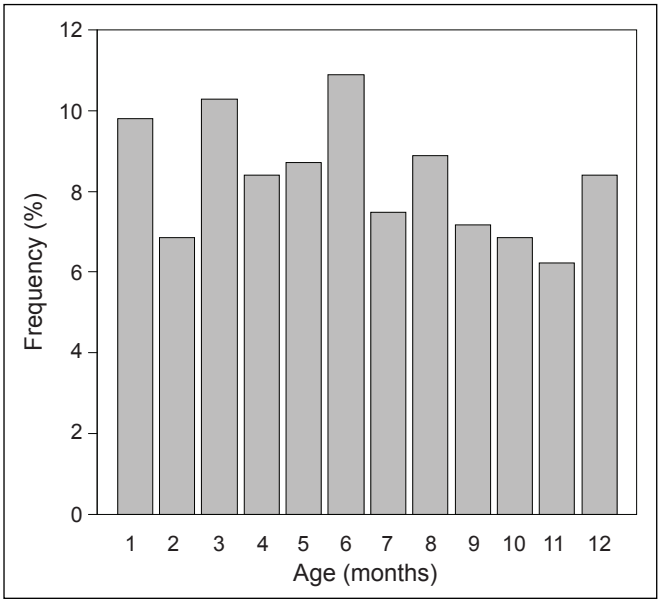

Figure 1 - Frequency distribution of the children in the sample (n=642) by age

Tabela 1 - Prevalence of pacifier use by type of feeding, for all 642 children in the sample

	Prevalence			Age in months
	n	%	95%CI	Mean (±SD)
EBF	163/355	45.9	40.7–51.1	2.12 (±1.5)
BF	418/642	65.1	61.4–68.8	4.58 (±3.1)
NBF	224/642	34.9	31.2–38.6	7.83 (±2.8)

EBF - exclusive breastfeeding: children under 6 months on exclusive breastfeeding (163/164, because one child was older than 6 months); BF – breastfeeding: includes children who are breastfeeding irrespective of whether exclusive or not, including all children given breastmilk exclusively, breastmilk and other milks and breastmilk and complementary foods - i.e. breastfed children); NBF - not breastfeeding: children being fed other milks (cow's milk or formula) with or without complementary foods.

Tabela 2 - Descriptive analysis of reasons mothers gave for changing their minds with respect to their original decisions on whether or not to use a pacifier, together with actual outcomes

	Intended to use a pacifier (n=390)			Did not intend to use a pacifier (n=252)		
		n	%		n	%
Did use a pacifier (n=308)	To soothe (crying babies)	143	92.0	To soothe (crying babies)	109	72.0
	It looks pretty	4	3.0	Everybody uses them	2	1.0
	To extend intervals between feeds	3	2.0	To extend intervals between feeds	18	12.0
	To prevent thumb sucking	4	2.0	To prevent thumb sucking	14	9.0
	Others*	2	1.0	Professional advice	9	6.0
	Total	156	100.0	Total	152	100.0
Did not use a pacifier (n=334)	Child refused	223	95.0	It looks ugly	10	10.0
	It causes dependency	3	1.0	It causes dependency	27	27.0
	To avoid weaning	4	2.0	To avoid weaning	12	12.0
	Others**	4	2.0	It causes infection	11	11.0
				Sees no need to use one	17	17.0
				Professional advice	1	1.0
				Dental problems	22	22.0
	Total	234	100.0	Total	100	100.0

*To avoid sudden infant death syndrome and to administer medicines; **Father did not agree, to avoid infection, dental problems

and babies were only enrolled if accompanied by their mothers (who are the best sources for the information required, making this an intentional non-probabilistic sample) and if the mothers provided consent. There were not, however, a large number of refusals and the sample size was sufficient to investigate the prevalence of pacifier use in the study population and the mothers' justifications for using them.

Cross-sectional studies do not provide a basis to establish causal relationships, but it is notable that the prevalence of pacifier use was greater among non-breastfed children than among breastfed children and in the breastfed subset, pacifier use was significantly lower among those exclusively breastfed. Many authors have suggested that there is an association between pacifier use and reduced breastfeeding duration[13,14], but the cause-effect relationship is not yet consensus. Children using pacifiers were 22% less likely to be breastfed than children who did not. Karabulut *et al*[15] also reported evidence of this association, whereas O'Connor *et al*[16], stated that the association did not exist. They suggested that other variables, such as difficulties interfering with breastfeeding and the mother's intentions, could be causing bias and that the subject demands further study.

In this study, 48% of the sample was using a pacifier. This indicates an improvement since the PPAM conducted in 1999[10] reported prevalence rates in children under 12 months of 58% for Brazil, 66% for the Southeast region and 66% for São Paulo. The prevalence observed here was in line with the decrease observed in the 2009 PPAM (data collected in 2008)[9], which found that 43% of Brazilian children under 12 months were using a pacifier, with prevalence rates of 51% in the Southeast region and in São Paulo. According to the Breastfeeding and Municipalities Project[13], the proportion of pacifier use in Campinas varied from 55 to 59% in 1999 and had fallen to 51.5% 5 years later (2004).

The prevalence of breastfeeding among this study population (65%) is better than the 56% observed in 2001 in the Northwest of the city of Campinas (which is the same area in which the Hospital e Maternidade Celso Pierro is located[17], but these rates are still worrying, since both median exclusive breastfeeding and median breastfeeding are lower than recommended by the WHO[18].

In this context, it is of interest that even though 96% of the mothers said they had received breastfeeding guidance and 65% had been advised about pacifiers, the prevalence of pacifier use remains elevated. Discussions of pacifier use can vary depending on what the professional being consulted wishes to focus on, but even so, it is up to the parents to make the decision on whether to use a pacifier and they should be informed of the effects[8]. This study provides information that makes it possible to evaluate the reasons why mothers give their children pacifiers.

Pacifiers have more harmful effects than beneficial ones[8], but despite this the myth that they help to soothe children appears to trump any other information given to parents, since 92% of the mothers who had originally intended to use a pacifier said it was to soothe the child and 72% of those who had originally intended not to use a pacifier but ended

up doing so gave the same reason for having changed their minds. When children suckle at the breast, they are satisfying both nutritional and emotional needs[19]. The belief that pacifiers do soothe children is passed down from mother to daughter and very often pacifiers are given to children to stop them crying, thus delaying feeding, when in fact the child is simply hungry[20]. Both groups included mothers who said they gave their children pacifiers to increase the interval between feeds (2% of those who had originally intended to use a pacifier and 12% of those who had not). If this practice is begun before breastfeeding is established it can lead to weaning, both because of nipple confusion and also because the lack of stimulus leads to a reduction in milk production. Pacifiers were generally given during infants' first month of life and particularly during the first week of life, which has also been observed in other studies[14,21]. Howard *et al*[22] observed that pacifier use was correlated both with exclusive breastfeeding duration and with breastfeeding duration. According to Binns and Scott[23], this is because mothers allow their children to suckle less often and the lack of stimulus reduces milk production. Breastfeeding promotion campaigns highlight these harmful effects of pacifiers, but do not appear to be raising mothers' awareness of the problem sufficiently[5].

Some of the mothers gave their children pacifiers to prevent them from sucking their thumbs (3% of those who had originally intended to use a pacifier and 9% of those who had not). The belief that thumb sucking is worse than using a pacifier is also deeply rooted in the population. However, according to Larsson[24], neither thumb sucking nor pacifier use cause malocclusion if the habit is stopped before the child passes 3 to 4 years of age. As long as the habit is abandoned before this age, contact is reestablished between upper and lower incisors and abnormal bite patterns (open bite and/or crossbite) normalize spontaneously[25].

It is of interest to note that 6% of the mothers who had not originally intended to use a pacifier were instructed to do so by a healthcare professional. Since suction stimulus may be used to prepare newborn infants initially fed via nasogastric tube for oral feeding[8,26], pacifiers may have been given to children who were premature or who had been admitted to hospital during the neonatal period.

During the last ten years, studies have been published that suggest pacifiers could be a protective factor against sudden infant death syndrome and one of the mothers in this study decided to use a pacifier for this reason. However, for the time being this effect is contested and there are divergent opinions on the subject[27]. A case-control study conducted in Germany indicated that breastfeeding reduces the risk of sudden infant death syndrome by 50% and, since pacifiers encourage weaning, professionals should consider carefully before suggesting they be used to protect against the syndrome[8,28].

The majority (95%) of mothers who had originally intended to use a pacifier, but did not do so said this was because they had tried, but the child had refused it. When infants are allowed to breastfeed on demand, suckling demands effort and satisfies both the child's hunger and its desire to suck[29]. However, when children are bottle fed, their hunger is satisfied, but the impulse to suckle is not It is therefore to be expected that encouraging on-demand feeding reduces the prevalence of pacifier use. Just 2% of the mothers in this group said they had not used a pacifier in order to avoid weaning. This is a worrying finding, since it appears to show that very few of the mothers changed their opinions in response to the discourse in favor of breastfeeding.

The mothers who had originally intended to use a pacifier and did not do so justified their decision with more coherent arguments: 27% said that the habit creates dependency and that it would be hard to wean the child off the pacifier later. Suction is an innate reflex that guarantees children's survival at the start of life. Since it satisfies the libido, the behavior tends to be repeated and becomes an unconscious habit, which will normally be abandoned as the child passes through later stages of development[29]. If children are allowed to use pacifiers unrestricted, they may fix the habit and find it harder to break.

Whereas 12% of mothers did not use a pacifier for fear of weaning, almost twice as many (22%) stated they were worried about deformation of the dental arch. While pacifiers can cause changes to the dental arch, studies have demonstrated that, in addition to intensity of use, onset of use and when use is discontinued, described above, these deformities are also dependent on the position in which the pacifier is located, facial growth patterns and tonicity of the orofacial musculature[8]. In a society that values personal appearance, esthetic motivations have more weight than other factors that are less easily understood by the majority of the population.

Eleven percent of the mothers reported worries about the possibility of infection, which is perfectly justifiable, since pacifiers can act as vehicles for the transmission of infections such as otitis, oral candidiasis, caries and intestinal parasite infestations[8,27,30,31].

In conclusion, the prevalence of pacifier use in the study population is reducing in line with the decrease observed in Brazil as a whole in the 2009 PPAM[9]. The prevalence of pacifier use was higher among non-breastfed children. Children on

exclusive breastfeeding were less likely to use a pacifier. More than half of the mothers said they had changed their minds with respect to their initial decision on whether or not to use a pacifier either because the child had rejected it, in the case of those who had intended to use one, or because they felt they needed to soothe their child, in the case of those who had originally intended not to use a pacifier. Concerns related to weaning, harm to the dental arch or increased likelihood of infections, about which mothers should have been educated by health professionals, appear to have less impact on the decision of whether or not to use a pacifier, indicating a need to improve the strategies employed in this endeavor.

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