

Mothers' memory about breastfeeding and sucking habits in the first months of life for their children

Memória das mães sobre amamentação e hábitos de sucção nos primeiros meses da vida de seus filhos

Memoria de las madres sobre amamentación y hábitos de succión en los primeros meses de la vida de sus hijos

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ABSTRACT

Objective: To validate the information of mothers' memory about breastfeeding and sucking habits in the first months of their children's life.

Methods: A cohort study followed 86 children for 36 months from birth. In the initial moment, zero to three months-old infants were assessed about breastfeeding, sucking habits and semisolid food introduction. Nearly six years after the initial study, 53 mothers of these children were re-interviewed regarding their recall about breastfeeding, sucking habits and semisolid food introduction. Kappa, McNemar, Student's *t*, and intraclass correlation tests were used to verify the association between previous and current maternal memory.

Results: Disagreement between previous and current maternal memory was found regarding thumb-sucking (McNemar; $p=0.001$) and pacifier use (McNemar; $p=0.009$). In addition, mothers in the current interview report older ages for introducing bottle feed (Student's *t*; $p=0.043$) and semisolid food (Student's *t*; $p=0.001$). However, memory about duration of breastfeeding presented high intraclass correlation coefficient ($\rho=0.923$; $p=0.001$).

Conclusions: Maternal information about duration of breastfeeding and age of pacifier withdraw is valid for use in retrospective studies. Introduction of bottle feeding, pacifier and semisolid foods during the first six months of life may suffer a recordatory bias.

Key-words: breast feeding; sucking behavior; bias (epidemiology).

RESUMO

Objetivo: Validar as informações da memória materna, sobre amamentação e hábitos de sucção nos primeiros meses da vida de seus filhos.

Métodos: Estudo de coorte que acompanhou, durante 36 meses, 86 crianças com idade inicial de zero a três meses, para avaliar os desfechos sobre: amamentação, hábitos de sucção e início da alimentação semissólida. Cerca de seis anos depois do estudo inicial, 53 mães dessas crianças foram reentrevistadas quanto aos hábitos alimentares e de sucção de seus filhos. Testes de Kappa, McNemar, *t* de Student e correlação intraclasses foram utilizados para testar a relação entre a memória materna pregressa e atual.

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Resultados: A memória materna progressiva e atual discordou sobre as práticas de sucção de dedo (McNemar; $p=0,001$) e de chupeta (McNemar; $p=0,009$) pelos seus filhos. Além disso, a memória materna atual relatou idades mais tardias para o início do uso de mamadeira (t de Student; $p=0,043$) e da alimentação semissólida (t de Student; $p=0,001$). Contudo, apresentou um alto coeficiente de correlação intraclasse quando a informação lembrada foi o tempo de amamentação ($\rho=0,923$; $p=0,001$).

Conclusões: Informações maternas, sobre o tempo de amamentação e sobre idade de cessação do hábito de sucção de chupeta são válidas para serem utilizadas em estudos retrospectivos. Com menor nível de validade, podem ser utilizadas as informações sobre a sucção de chupeta e de mamadeira nos primeiros seis meses de vida, somadas à idade da introdução do uso de mamadeira pelas mães.

Palavras-chave: aleitamento materno; comportamento de sucção; viés (epidemiologia).

RESUMEN

Objetivo: Validar las informaciones de la memoria materna sobre amamentación y hábitos de succión los primeros meses de la vida de sus hijos, en Vitória, Espírito Santo (Brasil).

Métodos: Estudio de cohorte que siguió, durante 36 meses, a 86 niños con edad inicial de cero a tres meses para evaluar los desenlaces sobre: amamentación, hábitos de succión e inicio de la alimentación semi-sólida. Aproximadamente seis años después del estudio inicial, 53 madres de esos niños fueron re-entrevistados respecto a los hábitos alimentares y de succión de sus hijos. Pruebas de Kappa, McNemar, t de Student y correlación intraclase fueron utilizadas para probar la relación entre la memoria materna anterior y actual.

Resultados: La memoria materna anterior y actual discordó sobre las prácticas de succión de dedo (McNemar; $p=0,001$) y de chupete (McNemar; $p=0,009$) por sus hijos. Además, la memoria materna actual relató edades más tardías para el inicio del biberón (t de Student; $p=0,043$) y de la alimentación semi-sólida (t de Student; $p=0,001$). Sin embargo, presentó un alto coeficiente de correlación intraclase cuando la información recordada fue el tiempo de amamentación ($\rho=0,923$; $p=0,001$).

Conclusiones: Informaciones maternas sobre el tiempo de amamentación y sobre la edad de término del hábito de succión del chupete son válidas para uso en estudios retrospectivos. Con menor nivel de validez, se puede utilizar

las informaciones sobre la succión de chupete y de biberón en los primeros seis meses de vida, sumadas a la edad de la introducción del uso de biberón por las madres.

Palabras clave: lactancia materna; comportamiento de succión; bias (epidemiología).

Introduction

Knowledge about the factors that determine feeding and sucking habits in the first months of life is extremely important because the survival of newborns depends on feeding. Naturally, infants are born with an unconditioned sucking and swallowing reflex⁽¹⁾, which enables them to satiate their feeding instinct by the meeting of the infant's mouth with the mother's breast, defined as breastfeeding⁽²⁾. However, the actual breastfeeding encounter between mother and newborn is determined by favorable, as well as detrimental, factors for breastfeeding⁽³⁾.

Breastfeeding until the second year of life has a recognized function in the prevention of infant malnutrition⁽⁴⁾, gastrointestinal and respiratory problems⁽⁵⁾, allergies⁽⁶⁾, malocclusion⁽⁷⁾ and even infant death⁽⁸⁾. Most studies about the factors that determine the duration of exclusive or nonexclusive infant breastfeeding are cross-sectional and based on information derived from maternal recall⁽³⁾. In this context, a potential caveat of studies that use this retrospective approach is the uncertainty about the reliability of data derived from recall, which are retrieved when filling out questionnaires or study forms during interviews.

Some of the limitations of data collection during interviews are: poor understanding of the meaning of study questions by respondents, which may lead to erroneous interpretations; the lack of interviewee's willingness to provide the necessary information; and the fact that some important data may be left out⁽⁹⁾. Surveys conducted using questionnaires and forms may be imprecise when the study subjects do not answer exactly what is asked⁽¹⁰⁾. To avoid these limitations in breastfeeding surveys, the World Health Organization recommends that the parameters about breastfeeding and infant feeding should be measured by means of semistructured questionnaires that ask about the previous 24 hours⁽¹¹⁾.

Because of the possible inaccuracy of breastfeeding information obtained using maternal recall, prospective data collection⁽³⁾ at intervals no greater than one week has been recommended⁽¹²⁾. In this study, information about

breastfeeding and infant sucking habits was validated by comparing data derived from prior maternal recall collected along 36 months and current recall collected six years after the beginning of follow-up of a group of individuals in Vitória, southern Brazil.

Methods

This study enrolled mothers that participated in a longitudinal study conducted from 2004 to 2006⁽¹³⁾. For three years, this study examined the prevalence of malocclusion, caries, sucking habits, loss of lip sealing and early weaning in infants younger than three months who had been born in areas of low socioeconomic conditions in Vitória, Brazil.

The infants were selected from two regions with the lowest infant mortality rates in Vitória, São Pedro and Bonfim, both fully covered by the Family Health Strategy program. All infants born in those regions from November 2003 to May 2004 were included in the study. Inclusion criteria were residence in one of the two study areas and registration in one of the family healthcare units of Ilha das Caieiras, Santo André and Thomaz Thommasi.

The initial sample size was calculated for a population of 4,521 infants born in Vitória in 2001 according to the Brazilian Live Birth Information System. For a 10% precision and a level of significance of 5%, in addition to the breastfeeding prevalence rate of 74.8% at ages 151 to 180 days in 1999, sample size was 73 infants. About 20% was added to that number to compensate for possible losses, and the final sample size was 86 infants.

During the study, four observers, in pairs, visited households regularly, when they filled out a form and conducted clinical examinations to collect clinical data about sucking habits, oral breathing, feeding and the development of deciduous dentition. During the visits, the mothers also received instructions about baby care.

Seven house visits were made at regular intervals (every three months in the first two years of the study and every six months in the last year) and data were used to control observations about whether the instructions given in the first visit, when the maternal handling of the baby was recorded, were followed. A new form was filled out for each visit with data from the structured interview and the clinical examination, and the initial instructions were repeated to the mothers. After follow-up for 36 months, only 65 children remained in the study because 21 were no longer found at their addresses.

About six years after the beginning of the study, the 65 children were visited again in their homes between August 2009 and February 2010, and 53 mothers were found and interviewed again. Two dentists filled out a study form according to face-to-face interviews conducted after the participants signed an informed consent term. The form had closed and open questions about their children's feeding and sucking habits in their first months of life. This study was approved by the Ethics in Research Committee of the Health Sciences Center, Universidade Federal do Espírito Santo, under no. 018/09.

The following data about past events were collected: the number of months during which the infant was directly breastfed or received expressed breast milk, as well as the daily frequency of feeding; the month when the ingestion of semisolid foods was introduced; and the months when the nutritional (bottle feeding) and non-nutritional (pacifier, thumb) sucking habits started and stopped. Moreover, data about the reasons for weaning, according to an open question, were recorded in the form and shortly after classified as maternal explanations.

Data collected using the forms in this cross-sectional study were entered into the SPSS 12.0 and added to the database of the prospective cohort⁽¹³⁾. The final sample of 53 mothers was calculated based on the Student *t* test power for paired samples to test mean differences between prior and current maternal recall about the variables associated with feeding and sucking habits. This calculation showed that the sample of 53 pairs detected differences at a power greater than 80% and an alpha error lower than 5%.

Kappa was used to test maternal recall about feeding and sucking habits and to measure the level of agreement according to Landis and Koch⁽¹⁴⁾: almost perfect (0.80–1.00), substantial (0.60–0.79), moderate (0.41–0.59), fair (0.21–0.40) or poor (≤ 0.20). In addition, the McNemar tests were used to define the direction (tendency) of disagreement, the Student *t* test, to compare means, and the intraclass correlation coefficient, to evaluate the direction and levels of correlation. The level of significance was set at 5%.

Results

The results in Table 1 show that current maternal recall tends to deny the practice of thumb and pacifier sucking by their infants in their first years of life. The disagreement is demonstrated by the results of the McNemar tests, whose levels of significance were set at less than 5%. In

Table 1 - Agreement between prior and current maternal recall about feeding and sucking habits in the first semester of life of their infants

	Answers	Current recall		McNemar	p	kappa	p	
		Yes	No					
Prior recall	Breastfeeding	Yes	51	1	0.00	1.000	0.66	0.001
		No	0	1				
	Thumb sucking (up to 6 months)	Yes	2	22	20.05	0.001	0.09	0.056
		No	0	29				
	Pacifier (up to 6 months)	Yes	15	13	6.67	0.007	0.45	0.001
		No	2	23				
	Bottle feeding (up to 6 months)	Yes	21	10	2.77	0.096	0.52	0.001
		No	3	19				
	Introduction of semisolid foods (up to 4 months)	Yes	4	12	2.12	0.145	0.13	0.153
		No	5	32				

contrast, kappa coefficients suggested that there is substantial agreement between prior and current memories about breastfeeding practices, and agreement was moderate for information about pacifier and bottle use up to their infants' sixth month of life.

The comparisons of means using the Student *t* test, shown in Table 2, revealed that there were no differences between prior and current recall about breastfeeding duration in months. However, mean differences were significant for reports about the age when bottle feeding and semisolid food consumption started. Those analyses revealed that current maternal recall overestimates ages at the beginning of those practices. Other analyses in Table 2 show that the variable for the breastfeeding duration has a high intraclass correlation coefficient, followed by age at cessation of pacifier use and age at introduction of bottle feeding.

Table 3 shows the reasons for weaning given by mothers in prior and current reports. Five reasons remained in current maternal memories, although the levels of agreement were low. In addition, four new reasons appeared in maternal reports.

Discussion

Some of the most relevant factors in infancy to determine breastfeeding duration are the nutritious and non-nutritious sucking habits. The use of bottles⁽¹⁵⁾, pacifiers⁽¹⁶⁾ and the early introduction of semisolid foods in the infant's diet⁽¹⁷⁾ are factors that limit breastfeeding substantially. Therefore, information about these variables should be accurate if they are to be used in rigorous scientific studies about breastfeeding, which may guide pediatric interventions.

The agreement between data from prior and current maternal recall about breastfeeding is substantial, whereas data about breastfeeding duration in months had a high intraclass correlation, which suggests that maternal memories are valid, even after five or six years from their child's birth. However, no validity can be assigned to data about the daily frequency of breastfeeding at six months of life.

In a similar study, Kark *et al*⁽¹⁸⁾ validated a questionnaire about maternal breastfeeding history about 20 years after their child's birth. The comparison of retrospective and prospective data revealed substantial agreement. A study conducted in Canada⁽¹⁹⁾ compared maternal reports immediately after birth with maternal recall eight years after their infants were born and found an almost perfect agreement for breastfeeding duration and exclusive breastfeeding duration. The study conducted by Huttly *et al*⁽²⁰⁾, who also validated maternal recall about breastfeeding duration, compared data in the 11th month after delivery and at two other time points. They found a rate of response disagreement below 30%, and the mothers with a higher income and education were those that reported longer breastfeeding durations.

Studies suggest that mothers forget important information about the first months of life of their infants as data are collected at more distant times from the moment when it was experienced. However, Promislow, Gladen and Sandler⁽²¹⁾ found a good correlation for breastfeeding duration in a group of US women interviewed 34 to 50 years after their child's birth. Their findings suggest that the distance between time points when information was collected did not affect negatively the quality of data about maternal breastfeeding according to maternal reports, which was confirmed by our findings.

Table 2 - Comparison of means and correlation between prior and current maternal recall about feeding and sucking habits in the first months of life of their infants

Variables	Prior recall	Current recall	Student t test	p	Intraclass correlation	p
	Mean±SD	Mean±SD				
Daily breastfeeding frequency at 6 months	7.5±5.2	6.0±2.1	1.582	0.125	0.207	0.281
Breastfeeding duration	17.1±10.1	16.4±10.1	0.997	0.324	0.923	0.001
Age at introduction of pacifier (months)	1.0±1.5	1.4±3.1	-0.595	0.561	0.355	0.177
Age at cessation of pacifier use (months)	18.4±9.6	14.3±10.9	1.503	0.171	0.688	0.040
Age at introduction of bottle feeding (months)	4.2±5.4	8.9±13.9	-2.107	0.043	0.418	0.017
Age at bottle feeding cessation (months)	20.9±7.4	16.9±5.9	1.157	0.281	-0.190	0.625
Age at introduction of semisolid foods (months)	5.2±1.1	7.8±5.4	-3.574	0.001	0.155	0.268

SD: Standard deviation

However, some authors do not fully support the use of data that depend on recalling distant memories. The systematic review conducted by Li, Scanlon and Serdula⁽²²⁾ found that information about breastfeeding duration was more accurate when weaning took place at an interval shorter than three years. Santos Neto *et al*⁽³⁾ recommend that studies about breastfeeding should be prospective to approximate weaning time from the time when data are collected. Bland *et al*⁽¹²⁾ recommended that maternal follow-up should be weekly after birth, because breastfeeding data collected retrospectively in a rural South African community were not very accurate.

Of the nutritious sucking habits, the use of bottles is the first choice made by mothers when replacing maternal breast milk with animal milk or formulas. Foucault⁽²³⁾ reported that, in the 18th century, there was a myth that prohibited women to have sexual relations during the time when they were breastfeeding because, if they did, their milk would be spoiled, which motivated rich women to wean their infants early and send them to a wet nurse to be able to resume sexual relations with their husbands. In that context, in 1876, the modern bottle was created, and its use became popular because of the book *Maniere d'allaiter les enfants a la main au defaut de nourrices*, the French version of a text written by an Italian called Baldini.

Results showed a moderate agreement between prior and current maternal recall about the use of a bottle from birth to six months of life, and there was no significant tendency in the disagreement test. However, the mean difference, in

months, of maternal reports about age at introduction of bottle feeding is significant: after five or six years, mothers say that bottle feeding was introduced later. In contrast, the intraclass analysis had a low, but significant, correlation ($\rho < 0.05$). These findings are in agreement with those reported by Launer *et al*⁽²⁴⁾, who found a lower percentage of agreeing answers about age at introduction of bottle feeding than about other infant feeding events. In a similar way, another review⁽²²⁾ concluded that the correlation between reported and actual age at introduction of semisolid foods and liquids was less satisfactory.

This study did not find any level of significant agreement about introduction of semisolid foods into the infant's diet up to four months of life. In addition, mothers reported substantially older ages at the introduction of these foods. The difference in age at introduction of solid foods was also detected by Vobecky, Vobecky and Froda⁽¹⁹⁾, who found a significant difference between data collected prospectively about the introduction of meat and cereals and maternal recall. In a group of Australian mothers, Tienboon, Rutishauser and Wahlqvist⁽²⁵⁾ also found little agreement about age at introduction of solid foods when comparing variables associated with breastfeeding. These findings are relevant for population surveys about the duration of exclusive breastfeeding, which require a definition of the time when liquid and solid complementary foods were introduced⁽²⁶⁾. Therefore, it seems to be more reliable to collect information about infant feeding recalled by the mothers in the last 24 hours⁽¹¹⁾.

Table 3 - Agreement between prior and current maternal recall of reasons for weaning in the first months of life

Reasons for weaning	Current recall							Total		
	Activities outside the home	Inability to breastfeed	Mother wanted to stop	Infant already ate everything	Infant did not want to breastfeed	Medical recommendation	Maternal absence		Does not remember	Another pregnancy
Activities outside the home	3	2	0	4	5	1	0	0	1	16
Inability to breastfeed	1	1	0	0	2	0	0	0	0	4
Mother wanted to stop	3	0	1	1	0	0	0	0	0	5
Infant already ate everything	4	0	0	10	0	0	2	1	0	17
Infant did not want to breastfeed	2	0	1	1	1	0	0	0	0	5
Total	13	3	2	16	8	1	2	1	1	47

The analysis of non-nutritious sucking habits reveals that the use of a pacifier substantially reduces breastfeeding duration⁽³⁾. However, even when thumb sucking is not classified as a habit that affects breastfeeding⁽²⁷⁾, the combination of thumb and pacifier sucking is associated with the cessation of breastfeeding at several levels⁽²⁸⁾. When thumb sucking by infants was analyzed, mothers disagreed in the direction of denying the occurrence of that habit. This information is applicable in studies that evaluate the onset of dentoskeletal deformities in the development of infant craniofacial development⁽⁷⁾. For pacifier use, the kappa coefficient indicated moderate agreement between prior and current maternal recall of the habit up to the sixth month of life of their children. Age at the beginning of this type of sucking habit did not have any differences in mean number of months or any significant correlation. However, age at habit cessation seemed to be remarkable for mothers, as the correlation was substantial, with a coefficient close to 0.70. Since the moment when the possible association between pacifier use and breastfeeding duration was first reported⁽¹⁶⁾, most studies have included this variable as an important predictor of breastfeeding duration, although the exact mechanism of how pacifiers may affect breastfeeding remains unclear⁽³⁾. In addition to its negative effect on breastfeeding, pacifier use has important effects on the maxillary arch and is one of the main risk factors for the development of open bite in deciduous dentition⁽²⁹⁾.

The analysis of maternal reasons for weaning confirmed the scattered pattern of the effects of maternal recall shown in category changes and the creation of new discursive categories that justify weaning. For example, of the 16 mothers who first reported having weaned their infants due to activities out of the home, three maintained the same reason, two reported not being able to breastfeed, four reported weaning because their child already ate everything, five because the infant did not want to eat anymore, one because of medical recommendations and one because of another pregnancy. Similar reasons were reported by Ramos and Almeida⁽³⁰⁾ in a qualitative study with 24 women in the process of weaning their infants before their fourth month of life. According to Wayland⁽³¹⁾, 42.0% of the mothers reported that the main reason to stop breastfeeding was the fact that infants refused the breast. Mothers seem to reproduce socially acceptable discourses and to evade the breastfeeding function as they set the responsibility for weaning on the infant, which is translated as “the baby already eats everything” and “the baby did not want to breastfeed anymore”. Bernard *et al*⁽³²⁾

assigned false responses to the deficient interviewee recall, which results in giving socially acceptable, standard responses and has low study validity. According to Marconi and Lakatos⁽⁹⁾, one of the problems inherent to studies based on forms is the lack of willingness of the respondent to provide true answers when the report is about something seen as negative or embarrassing.

The limitations of this study are associated with the low socioeconomic status of the sample selected, which may also be

associated with the low level of maternal education. Mothers with less education tend to remember less about infant feeding and sucking in the first months of life. However, the conclusions of this study point to the fact that maternal information about breastfeeding duration and age at cessation of pacifier use are valid to be used in retrospective studies. Although with a lower validity level, information about pacifier use and bottle feeding in the first six months of life can be used, together with age at introduction of bottle feeding.

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