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EFFECTS OF THE TYPE OF FEEDING ON MATERNAL ASPECTS AND HEALTH CONDITIONS OF BREASTFEEDING-AGED CHILDREN

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ABSTRACT

Objetivos: Investigar as repercussões do tipo de aleitamento sobre ocorrência de afecções respiratórias e diarreia nas crianças, involução corpórea materna e auto-eficácia da amamentação. **Método:** Estudo transversal com 205 mulheres, de 20 e 34 anos de idade, gestação única, com seus filhos vivos nascidos no ano de 2014. Os dados foram submetidos à análise estatística descritiva e as comparações entre o tipo de aleitamento, saúde da criança e a involução corpórea materna foram realizadas por meio de Análise de Variância. **Resultados:** A média de idade das mulheres foi de 27,0 ± de 5,65 anos, idade gestacional de 38,5 ± 2,38 semanas. Notou-se a opção materna pelo aleitamento artificial (35,1%) e ocorrência de diarreia em 51,2% das crianças. Observou-se índices elevados de auto eficácia na amamentação, apontados no *Breastfeeding Self-efficacy Scale – Short form*. **Conclusão:** Não houve associação entre o tipo de aleitamento e a presença de diarreia e afecções respiratórias, porém, houve associação entre o tempo de aleitamento e episódios de diarreia. A involução corpórea materna foi maior nas lactantes de aleitamento exclusivo (8,9 kg), em relação ao artificial (6,72Kg) e misto (6,42 kg), em até seis meses após oparto.

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INTRODUCTION

Breastfeeding should not be characterized as purely physiological, the biological and social aspects that will determine the practice, frequency, and duration of breastfeeding should beconsidered (Zugaib, 2012). According to the World Health Organization (WHO), breastfeeding provides the newborn with all the nutrients needed for healthy growth. The recommendation is that the baby exclusively receives breast milk up to six months and then be associated with other foods until the child reaches two years ormore (Brasil, 2015). Three types of breastfeeding are highlighted, and the ideal is the exclusive one, in which milk is extracted from the mother's breast, without the inclusion of any other liquid or solid or more. In the mixed feeding, the child receives breast milk and another type of food or liquid. The artificial feeding consists of feeding without breast milk (Narchi, 2009). The practice of breastfeeding, according to the recommendations for each age, has a positive impact on the nutritional status, health, and development of breastfed children (Gomes, Gubert, 2012). Breast milk is considered a food source that exerts curative and preventive action on various diseases of the childhood and adulthood; it provides all the macro and micronutrients necessary for the human growth and the physical, intellectual, and emotional development during one of the most important periods of life (Teresa Neto, 2006). It protects the newborn (NB) from gastrointestinal, respiratory and systemic infections, in addition to producing long-term effects, reducing the incidence of infections, allergies and other pathological entities, reducing the risk of acute and persistent diarrhea, neonatal sepsis and respiratory diseases (Almeida, Martins Filho, 2004), protecting the health of 6 million children a year (Zugaib, 2012). Children who are not breastfed present greater risk of death due to diarrhea (risk 14.2 times higher), respiratory diseases (3,6 times) compared to children who were exclusively breastfed (Zugaib, 2012). The practice of

breastfeeding may also reduce hospital admissions for pneumonia, especially in the first three months of life (Boccolini *et al,* 2011; Brasil, 2010). The Ministry of Health (MH) envisages the promotion, protection, and support of breastfeeding as one of the priority care lines of the Technical Area of Child Health and Breastfeeding. Such action is part of the strategies for reducing infant mortality, which was a commitment made by Brazil at the international (Millennium Development Goals) and national levels through the Pact for the Reduction of maternal and infant mortality (Pacto de Redução da Mortalidade Materna e Neonatal), Pact for Life (Pacto pela Vida), and the More Health Program (Programa Mais Saúde) (Brasil, 2010). The WHO recommends exclusive breastfeeding up to six months of age and continued breastfeeding along with appropriate complementary food up to two years of age or beyond. Despite the large campaigns in the general media, the understanding of women regarding the practice of breastfeeding is still poor (Narchi, 2009). Several actions are performed by the MH aiming to encourage exclusive breastfeeding. The National Campaign of Breastfeeding (Campanha Nacional de Amamentação) and the National Campaign of Human Milk Donation (Campanha Nacional de Doação de Leite), which are linked to the Human Milk Banks (Bancos de Leite Humano); the Kangaroo Mother Method (Método Canguru); the Brazilian Breastfeeding and Feeding Strategy (Estratégia Amamenta e Alimenta Brasil), which focus on Basic Attention; the Support to the women who Breasfeed (Apoio à mulher Trabalhadora que Amamenta), the Stork Network (Rede Cegonha); and the Baby Friendly Hospital (Hospital Amigo da Criança) are actions and strategies that allow dissemination and orientation to the breastfeeding process. Some actions are stimulated by the of the Family Health Strategies (FHEs) (Brasil, 2013). Thus, this study aimed to investigate the effects of the type of feeding on the occurrence of respiratory diseases and diarrhea in children, maternal body involution and self- efficacy of breastfeeding.

METHODS

Cross-sectional exploratory study with women and their live children, born in the year 2014, who were notified and monitored in the areas covered by the Six Strategies of the Family Health Strategies (FHSs), from the city of Bauru, SP, with prior documented authorization by the Municipal Secretary of Health of Bauru. Data from the 2010 census indicate that the city of Bauru (SP) has 177,288 women and 253,171 babies born alive (Instituto Brasileiro de Geografia e Estatística, 2009). The average number of live births attended by the six Teams of the dos FHSs was 400, in 2014, according to the data from the Prenatal Information System (SISPRENATAL) and the Basic Attention Information System (BAIS) (http://www.ibge.gov.br/home/estatistica/populacao/indic_sociosaude/2009/). The sampling process used the multi-stage technique with stratified sampling, proportional to the number of live births by FHS. The number of participants in each place was determined by random sampling. Thus, the calculation resulted in 205 women, between 20 and 34 years of age, who had only one gestation, their children were born alive in 2014 and belonged to the areas covered by the FHS, Bauru /SP. The maternal and infant variables (survey of the number of live births in each strategy) were collected in the family history of the FHS and confirmed in the SISPRENATAL, in the Child Health Handbook, in the consolidated report of families registered in 2014 of the Basic Attention Information System (BAIS), besides the confirmation at the time of the home interviews (http://www.ibge.gov.br/home/estatistica/populacao/indic_sociosaude/2009/). Mothers were randomly drawn and approached at home, which was monitored by FHSs Community Agents. A pre-structured instrument that comprises sociodemographic (age, marital status, skin color, family arrangement, and schooling) and socioeconomic aspects (schooling and income) (Instituto Brasileiro de Geografia e Estatística, 2009), was applied in the interviews, according to theoretical bases, and allowed the characterization of participants (Brasil, 2016). The researchers approached the mothers at their homes, which were randomly drawn, and FHSs Community Agents monitored the visits. The home visit was chosen because the free demand of the unit was lower than expected, which is justified by the lack of adherence to the programs and the limitations regarding financial and social issues of the study population. The independent variable was characterized by the type of feeding; considering exclusive breastfeeding when there was no addition of any liquid or solid (tea, water or fruit) other than breast milk, up to the child's six months of age[3,13]. Mixed feeding was characterized by the addition of food or liquid other than breast milk. The artificial consisted of feeding with no breast milk (Narchi *et al*, 2009). Regarding the mothers, control variables were represented by the mothers' age (in full years), final gestational age (at the time of delivery), last weight record during pregnancy (kg), and weight gain (difference between the last weight during pregnancy and pre-pregnancy weight). Regarding the children, control variables were defined by gestational age at birth - classified as preterm (<37 weeks) and term (≥ 37 weeks); weight of the newborn – measuredinkilogramsandclassifiedin<or≥than2.500gandApgar index–categorizedin< and ≥ than seven (Victora, 2014). Dependent variables were characterized by the feeding time (< six months, > six months, 1 year or more); episodes of diarrhea and respiratory tract infections, maternal body involution (categorized in Kg, by the difference between the last weight and the weight 6 months after delivery) (Narchi, 2009). Diarrhea and respiratory tract infections were considered by a doctor diagnosis within the first six months of the child's life (Fechina Schuwaecz, Díaz, 1996).

Finally, mothers were invited to answer the questionnaire *Breastfeeding Self-Efficacy Scale-Short Form (*BSES-SF), whose purpose is to evaluate the self-efficacy of breastfeeding. This questionnaire, validated for the Brazilian Portuguese language, comprises 14 items that deal with two domains: Technical (8 items) and Intrapersonal Thoughts (6 items). Each item is rated according to a Likert scale that comprises the following scores: 1. Totally disagree, 2. Disagree, 3. Sometimes disagree 4. Agree, and 5. Totally agree, so that the total score will be between 14 and 70 points. The efficacy identified through the scale was distributed according to the scores obtained from the sum of each item: low efficacy (14 to 32 points); medium efficacy (33 to 51 points), and high efficacy (52 to 70 points) (Zambon, 2015). In this study, the answers were categorized by grouping the "totally agree" and the "agree" scores into "agree". The same was done with the scores related to the answers "totally disagree" and "disagree" that were grouped into "disagree". Data were submitted to descriptive analysis and the results were shown in tables by the distributions of absolute and relative frequencies. The comparisons between the type of feeding (exclusive, artificial, and mixed) and the child's health and the maternal body involution were conducted by the Analysis of Variance. The associations were tested using the Chi-square test. The types

of feeding exclusive and nonexlusive (artificial and mixed) were considered for the association with other variables. All analyzes were performed at a 5% level of significance (Otsuka, 2008). This study was approved by the Institutional Review Board of the Universidade do Sagrado Coração (nº. 1.226.386). Every participating woman signed the Free and Informed Consent Form.

RESULTS

The mean age of the women interviewed was 27.0 ± 5.65 years, with the gestational age at delivery of 38.5 ± 2.38 weeks, weight at the end of pregnancy of 77.6 ± 15.5 kg, and weight gain of 14.5 ± 2.2 kg. The analysis of maternal body involution showed that women who chose exclusive breastfeeding lost an average of 8.9 kg, while those who offered artificial feeding (6.72 kg) and mixed (6.42 kg) in up to six months after the childbirth. The participants' profile according to race, marital status, schooling, and income identified the percentage of white women was 104 (50.7%); in a stable union, 123 (60%); with elementary school, 85 (41.5%); and family income, from 1 to 5 current minimum wages 108 (52.7%). Regarding the obstetric history of the interviewed women, 77 (36.7%) had 1 to 3 pregnancies; vaginal delivery, 98 (47.8%); cesarean section, 107 (52.2%), and abortions, 43 21.0%). The participants reported on the indication of cesarean, according to the medical conduct taken due to comorbidities such as arterial hypertension, absence of dilatation, positioning of the baby, previous cesarean sections, rupture of the amniotic sac, gestational diabetes, and fetal distress, among others.

Data from the children showed a higher male prevalence 106 (51.7%), with an Apgar score > 7 in the first minute of life in 187 (91.2%) and in the fifth minute of life in 204 (99.5%). Respiratory infection was observed in 55 (26.9%) and diarrhea in 105 (51.2%). Regarding the type of feeding, the option of exclusive breastfeeding was observed in 69 (33.7%); mixed, in 64 (31.2%); and artificial, in 72 (35.1%) of the participants. The reasons that led the mothers to choose exclusive breastfeeding were their own will, associated with the medical orientation and the health team. The reasons that led mothers to choose the practice of artificial and mixed feeding 136 (66.3%) were their own will, 72 (35.1%); cracked nipples, 30 (14.7%); extinction of milk, 13 (6.3%); maternal employment, 13 (6.3%), and difficulty getting the proper baby latch, 7 (3.4%). Regarding the time, it was possible to observe a period < 6 months in 35 (17 .0%) and ≥ 6 months in 168 (82,0%) of the participants. There was no association between the type of feeding and the episodes of diarrhea and respiratory infections, p=0.323 and p= 0.87 (Table 1), respectively. There were significant associations between the time of offer of breastfeeding over the types of feeding, indicating a statistical difference (p <0.05). Results showed no association between the time of feeding and the respiratory affections with the type of feeding *(p> 0.05)*. However, there was an association between the time of feeding and the episodes of diarrhea in children, identifying a statistical difference (Table 2). Table 3 shows the answers of the participants regarding the domains Technical and Intrapersonal Thoughts of the *Breastfeeding Self-efficacy Scale-Short Form (BSES-SF)* and its association

Table 1. Association between the type of lactation and episodes of diarrhea and affections of the respiratory tract

	Breastfeeding type					
AFFECTIONS	Exclusive		Non-exclusive		Total	$x^2$and p-value
	No	Yes	No	Yes		
Diarrhea	37	32	63	73	205	0,976 p>0,05
Respiratórias	50	19	100	36	205	0,026 p>0,05

Source: Prepared by the author.

Table 2. Association between time and type of lactation of the 205 women interviewed and between the time of lactation with episodes of diarrhea in children

Variables	Responses	Lactation time			
		< 6 months	≥6 months		
	Exclusive	3 (8,1%)	66 (39,3%)	69	13,199
	No exclusive	34 (91,9%)	102 (60,7%)	136	p < 0,05
	Total	37	168	205	
Episodes of diarrhea	Yes	13 (35,1%)	92 (54,8%)	105	4,674
	No	24 (64,9%)	76 (45,2%)	100	p < 0,05
	Total	37	168	205	

Source: Prepared by the author.

Table 3. Association between the Breastfeeding Self-efficacy Scale Short Form (BSES-SF) and the type and enter BSES-SF and the duration of breastfeeding offered by the participants to their children

Breastfeeding Self-efficacy Scale Short Form (BSES-SF)					
	I disagree	Sometimes agree	I agree	Total	Teste and p value
Type Breastfeeding					
Exclusive	2	2	65	69	11,706
Non Exclusive	25	2	109	136	p=0,039
Total	27	4	174	205	
Time Breastfeeding					
< 6 months	11	2	24	37	25,305
≥6 months	16	2	150	168	p=0,0001
Total	27	4	174	205	

Source: Prepared by the author.

Table 4 - Distribution of participants' responses according to the Technical domain of the *Breastfeeding Self-efficacy Scale Short Form (BSES-SF)*

Technical Domain	I agree		Sometimes I agree		I disagree	
	N	%	N	%	N	%
1.I always feel when my baby is breastfeeding enough	137	66,8	18	8,7	50	24,5
3.I always feed my baby without using powdered milk as a supplement.	94	45,8	9	4,3	102	49,8
4.I always notice if my baby is holding the breast properly during the whole feeding.	179	87,2	2	1,0	24	11,7
6.I can always breastfeed even if my baby is crying.	160	78,0	13	6,3	32	15,7
11.I always breastfeed my baby on one breast and then move on to the other.	176	86,0	2	1,0	27	13,3
12.I always continue to breastfeed my baby with every feeding (every feeding).	176	85,7	7	3,4	22	10,8
13.I can always adapt my needs to the baby's needs. (organizing my needs for bathing, sleeping, feeding with the baby's breastfeeding).	159	77,5	17	8,2	29	14,2
14.I always know when my baby finished feeding.	172	83,8	3	1,4	30	14,7

Source: Prepared by the author.

Table 5 - Distribution of responses from participants according to the Intrapersonal Thoughts domain of *Breastfeeding Self-efficacy Scale Short Form (BSES-SF)*

INTRAPERSONAL THOUGHTS	I agree		Sometimes I agree		I disagree	
	N	%	N	%	N	%
2.I always deal with breastfeeding successfully, just as I deal with other challenges. (Successfully overcomes breastfeeding and other life situations).	152	74,1	15	7,3	38	18,7
5.I always deal with breastfeeding in order to satisfy myself	174	84,8	4	2,0	27	13,2
7.I always feel like continuing to breastfeed.	176	85,7	7	3,4	22	10,8
8.I can always breastfeed comfortably in front of people in my family.	151	73,6	8	4	46	22,6
9.I am always satisfied with my experience of breastfeeding.	157	86,4	4	2,0	24	11,7
10.I can always deal with the fact that breastfeeding takes time. (Even though it consumes my time I want to breastfeed).	166	80,9	11	5,3	28	13,7

Source: Prepared by the author

with the type and time of feeding, respectively, as pointed by the statistical test ($p<0.05$). Table 4 shows the answers of the participants regarding the Technical domain of the BSES-SF (items 1, 3, 4, 6, 11, 12, 13, and 14). The agreement index between the majority of the items in the Technical domain was high, ranging from 65.8% to 87.2%. Only item 3 presented a mean efficacy of 45.8%. Such data corroborates with the highest frequency of the option nonexclusive feeding type. The answers of the participants regarding the domain Intrapersonal Thoughts (items 2, 5, 7, 8, 9, and 10) are shown in Table 5. There is also a high agreement index for this domain, which varied from 74.2% to 86.4%, evidencing high efficacy for breastfeeding.

DISCUSSION

The results of this study demonstrate that all mothers started exclusive breastfeeding. The criterion of classification by the longer time in a given type of feeding was used to analyze the types of feeding, which may have benefited the children who were not exclusively breastfed since they had contact with the colostrum. The colostrum has a high concentration of vitamin A, proteins, antibodies and leukocyte in its composition, which leads to the passive protection of the children (Zugaib, 2012). The time of artificial feeding was equal to or higher than 6 months. A study conducted in Itaúna (MG) verified the prevalence of time over six months for artificial or mixed feeding in 33.7% of the interviewees and up to the sixth month in 5.3% for the exclusive one. The study also observed that the mean time of exclusive breastfeeding was 40 days while the time of artificial or mixed was 237 days, which is definitely considered worrying, as it demonstrates the early introduction of water, teas, juices, supplementary and also complementary food (such as non-human milk), fruits, and salty baby food that may be associated with increased risk for atypical diseases and type I diabetesmellitus (Chaves, 2007).

Studies have shown that breastfeeding has a significant capacity to produce long-term effects, reducing the incidence of infections, allergies and other pathological entities [5,7]. Furthermore, exclusive long-term breastfeeding exerts a curative and preventive action on a range of childhood and adulthood diseases, providing macro and micronutrients that are necessary for human growth and physical, intellectual, and emotional development (Gomes, Gubert, 2012). Such fact demonstrates that despite current knowledge confirming the importance of exclusive breastfeeding for children up to six months of age, the early introduction of artificial liquids and foods into breastfed infants continues to be common in Brazil. This practice is associated with the fact that mothers believe the insertion of other foods does not influence the duration of exclusive breastfeeding (Soares *et al*., 2013). Changes in dietary patterns that interfere with the duration of breastfeeding, the use of complementary foods and milk formulas contribute to the reduction of breastfeeding and the prevalence of artificial feeding. Other causes compromising exclusive breastfeeding are related to specific health conditions of the mother and child, by psycho-emotional factors and the mother's desire. Artificial feeding does not equate to the physiological properties of human milk, which are specific from the mother for the child. The sources of carbohydrates, proteins, and other components of formulas for infants differ in the identity and quality of the components of human milk (Melo, 2014). In this study, diarrhea was associated with feeding time, and there was a prevalence of nonexclusive (artificial and mixed) feeding time equal to or higher than 6 months. Such data are pointed out in the literature with concern. Literature indicates that, up to nine months of age, the child presents great permeability of the intestinal mucosa, presenting total benefit in the immunoglobulin absorption when the child breastfeeds exclusively (Teresa Neto, 2006). The absence of this benefit, its early interruption or the introduction of other foods into the child's diet may cause important health consequences, such as

the exposure to infectious agents, contact with foreign proteins, and impairment of digestion and assimilation of nutritive elements (Kummer *et al*., 2000). On one hand, the results of this study showed that there was an association between the time of feeding and the episodes of diarrhea. On the other hand, they did not point statistical significance regarding the association between the time and the respiratory affections. A study conducted in 2011 showed that the practice of breastfeeding can reduce hospital admissions due to acute respiratory infections and has a protective effect on hospitalization due to pneumonia, especially in the first three months of life (Boccolini *et al*., 2011). Similar findings also found in 2008, in a study with 164 children, in the area covered by a Family Health Unit (Unidade Saúde da Família) in Londrina, State of Parana, belonging to the childcare program, demonstrated that the more common problems in infants who were not breastfed exclusively were the respiratory complications, which were the main causes of hospitalizations and the second major cause of infant mortality affecting mainly children under five years of age (Abe, Ferrai, 2008). The present study highlights the high agreement indexes of the Technical and Intrapersonal Thoughts domains of the Breastfeeding Self-efficacy Scale-Short Form that confirm the participant's perception related to maternal self-efficacy for breastfeeding. The Technical domain of the BSES-SF reflects more physical actions that mothers should take to breastfeed successfully.

The second domain, Intrapersonal Thoughts, reflects the mother's perceptions, attitudes, and believes in relation to successful breastfeeding, referring more to the subjectivity involved in the breastfeeding process. A survey with women from the FHS conducted in the city of Teresina, State of Piauí showed equivalent data. These data demonstrated high and medium efficacy, emphasizing the need for the professional to evaluate and plan actions to promote exclusive breastfeeding in the identification of mothers who are less self-efficacious and present a larger risk for early weaning. The mothers' self-efficacy in relation to the act of breastfeeding should motivate this practice and, consequently, reach the highest goal of breastfeeding that is the health of the children (Soares *et al*., 2013). A study with 155 women of a public maternity hospital from the city of Fortaleza,State of Bahia, identified that 80.6% reported high self-efficacy in breastfeeding their childand observed significant association between self-efficacy and the type and time of feeding (Tavares *et al*., 2010). The perception of women regarding the maintenance of breastfeeding up to six months is determined by social representations (corresponding to the society and the social group in which the individuals are inserted) as well as by how they perceive, express and interpret reality associated with the level of knowledge and the construction of their own knowledge based on their daily experience. The authors observed that 40.6% expressed some form of fulfillment and satisfaction. Establishing a link between mother and child was the second concern, with 31.7% of responses. Other factors were identified as growth and health (20.8%), fear of weaning (4%), and patience (3%). This study demonstrated that the mothers' perception of breastfeeding was not only focused on the child but also on themselves, which allows the inference that he approaches need to stop valuing only the biochemical and physiological advantages the breast milk presents for the health of the child and should incorporate the understanding and the meaning of motherhood and corporeity in the daily life of contemporary women (Carrascoza *et al*., 2011). Although the participants in this study are supported by FHS, there is no effective adherence to the incentive of exclusive breastfeeding; therefore, it is necessary to intervene in a directed and organized way in the promotion of breastfeeding. The perception of the mothers about exclusive breastfeeding induces the practice and maintenance of breastfeeding, and this action is permeated by knowledge. Health education in primary care has a greater meaning for subjects who are able to develop decision-making power over their own health and responsibility for the health of the community in which they live. However, sharing of knowledge and experiences is necessary to make it effective (Barbosa *et al*., 2015). Teamwork should provide subjects with an intervention on the different factors that interfere in the health-disease process and its related impacts through interdisciplinary actions according to the reality. The difficulty of adhering to programs that encourage breastfeeding and the practice implemented by the women are the limitations of this study. Moreover, women's attitudes toward breastfeeding contributed to the determination of the result of this study (Araújo, Rocha, 2007). Without empowerment, women are unable to make decisions that are favorable to their health; they are not aware of their rights and lack sufficient knowledge to identify and judge the care theyreceive.

Therefore, this study allows us to infer the majority of the infants presented APGAR index ≥ 7 in the first and fifth minutes and had a diagnosis of diarrhea in the first six months. There was no association between the type of feeding and the presence of diarrhea. However, there were episodes of diarrhea associated with feeding time, which leads us to consider that there is no protection factor when exclusive breastfeeding is not practiced. Maternal body involution was slightly higher in women who chose exclusive breastfeeding. The reports indicated in the Breastfeeding self-efficacy scale-short form showed high rates of self-efficacy in breastfeeding in this sample. This study supports the actions implemented in public health policies that aim at breastfeeding, aiming to contribute to the increase of exclusive breastfeeding rates, which is widely addressed by researchers from the whole world and recommended by WHO and PAHO as strategies that are necessary to intervene in a targeted and effective way in the promotion ofbreastfeeding. The results of this study demonstrate no association between the type of feeding and episodes of diarrhea and respiratory diseases. There was an association between the time of feeding and the episodes of diarrhea. There was greater maternal bodily involution in women who chose exclusive breastfeeding.

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