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Original articles

Investigation of maternal practices of breastfeeding and their relation with the infection of the upper airways and otitis media

Investigação das práticas maternas sobre aleitamento materno e sua relação com a infecção de vias aéreas superiores e otite média

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ABSTRACT

Purpose: to investigate the practices of mothers during breastfeeding and infant's position and their relationship with the infection of the upper airway and otitis media.

Methods: this is a descriptive exploratory study. Semi-structured interviews were conducted with 60 mothers, with questions about breastfeeding, the position of the infant during breastfeeding and the occurrence of infection of the upper airways (IUA) and otitis. In the infants, otoscopy and otoacoustic emissions were performed in both ears.

Results: out of the 60 infants, 49 were exclusively breastfed and 11 were not. Regarding the position, 20 mothers reported breastfeeding their infants in the seated position and 40 in the lying position. The occurrence of IUA reported by the mothers was in 10 infants and from these, 6 were breastfed lying down and 4 infants sitting. As for the occurrence of otitis media, according to the mothers, 6 infants had at least one episode of otitis. Out of these infants, 2 were breastfed sitting and 4, lying down. The results indicate no significance between the position during breastfeeding and the occurrence of upper airway infection and otitis media.

Conclusion: the practices of mothers during breast-feeding and infant's position are not related to infection of the upper airways and otitis media.

Keywords: Breast Feeding; Otitis Media; Infection; Speech, Language and Hearing Sciences

RESUMO

Objetivo: investigar as práticas das mães durante o aleitamento e o posicionamento do bebê e sua relação com a infecção de via aérea superior e a otite média.

Métodos: estudo descritivo exploratório. Realizou-se entrevistas semi-estrututadas com 60 mães, sobre aleitamento materno, posição do lactente durante a amamentação e ocorrência de infecção de vias aéreas superiores e otites. Nos bebês, realizou-se otoscopia e emissões otoacústicas, em ambas as orelhas.

Resultados: dos 60 lactentes, 49 eram amamentados exclusivamente e 11 não exclusivo. Com relação à posição, 20 mães relataram amamentar seus filhos na posição sentada e 40 na posição deitada. A ocorrência de IVAS relatada pelas mães foi de 10 bebês sendo que destes, 6 mamavam deitados e 4 bebês sentados. Quanto à ocorrência de otite média, segundo as mães, 6 bebês apresentaram pelo menos um episódio de otite. Destes bebês, 2 eram amamentados sentados e 4 deitados. Os resultados indicam que não há significância entre a posição durante a amamentação e a ocorrência de infecção de via aérea superior e otite média.

Conclusão: as práticas das mães durante o aleitamento e o posicionamento do bebê não possuem relação com a infecção de via aérea superior e a otite média.

Descritores: Aleitamento Materno; Otite Média; Infecção; Fonoaudiologia

INTRODUCTION

The advantages of breastfeeding for infant health are widely recognized and the World Health Organization recommends that the infant receives exclusive breastfeeding for six months and in addition way to two years-old[1].

One of the most common problems found in pediatric care services is otitis media. Otitis media is considered a secondary infection to upper airway infection (RAI). IVAS results in significant morbidity worldwide and it is the most common cause of illness in children treated with acute respiratory infection. IVAS is defined as any viral or bacterial infectious process affecting the nasal region, breasts of the face, ear, pharynx and larynx[2].

In the anatomical context, the upper respiratory tract consists of a communication system comprising the anterior nostrils, nasal cavity, nasopharynx, sinuses, Eustachian tube, middle ear cavity, oral cavity, oropharynx and larynx, forming the interface between the external environment and the lower respiratory tract and gastrointestinal tract[3,4].

The nasal cavity serves as the site for collection of secretions of the frontal, maxillary, ethmoidal, and sphenoidal sinuses and constitutes a continuum with the nasopharynx, which is located more posteriorly, and extends from the nasal choanae (anterior region) to the posterior wall (Nasopharynx) and it is covered with adenoid gland tissue. The lateral wall of the nasopharynx contains the pharyngeal ostium of the auditory tube, which connects the nasopharynx to the middle ear[4].

Otitis media is an inflammation of the middle ear with rapid onset, most often presenting local symptoms (the two most common are ear pain and rubbing of the affected ear) and systemic (fever, irritability and lack of sleep) [5]. It is caused mainly by viruses or bacteria that often interact with each other[6]. These pathogens, originating from the nasopharynx, ascend to the Eustachian tube to the middle ear space, initiating an inflammatory response and accumulation of fluid, which causes bulging of the tympanic membrane, pain, fever and possible redness[7].

Generally, when acute otitis media occurs, it is preceded by a viral infection of the upper respiratory tract. Inflammation leads to edematization of the nasal and nasopharynx cavities, causing functional obstruction of the auditory tube and development of negative pressure of the middle ear, due to lack of balance. Microbes, contained in the secretions of the upper airway mucosa, move to the middle ear due to the pressure differential, where they are retained[8].

It is believed that the incidence of otitis media in infants is related to artificial breastfeeding and the lack of immunological properties found in breast milk[9,10].

In the infant, the auditory tube presents a more horizontal position. For this reason, the orientation usually offered by health professionals is the elevation of the baby's head during breastfeeding, since it is believed that the elevated position is related to a preventive action of otitis media[11]. The literature refers to the term "positional otitis media" in cases of infants who are breastfed in the lying position because they present a higher risk of developing otitis media[12,13].

In view of this, it is questioned whether such guidance also refers to babies who are breastfed in the mother's womb. The main immunoglobulin in breast milk is IgA (Immunoglobulin A), whose main function is the binding to microorganisms and macromolecules, preventing them from adhering to the mucosal surfaces, preventing the contact of pathogens to the epithelium. Thus, the mother secretes IgA in the milk, which protects the child from pathogens to which she has been exposed throughout her life[14]. Still, according to the Ministry of Health, the position of breastfeeding should be the most comfortable for the mother and the baby, sitting or lying down, as long as the baby's body and head are aligned, that is, the head and the spine in a straight line on the same axis[15].

Therefore, the objective of the present study was to investigate the practices of mothers regarding the positioning of the baby during breastfeeding and its relationship with AVAS and otitis media in infants.

METHODS

The project was approved by the Ethics Committee of the State University of the Western Center - Universidade Estadual do Centro Oeste/UNICENTRO, according to opinion number 358.809. All the participants signed the free and informed consent form.

It is an exploratory descriptive study that consists of the organization, presentation, analysis and synthesis of numerical data of the sample. Data collection was performed with the mothers and infants who attended the Hearing Test of a Clinic School of Speech Therapy.

Interviews were conducted with 60 mothers. The inclusion criterion was that the mothers were in adequate general health condition to participate in the interview. Mothers of infants with congenital malformations, respiratory, cardiac and neurological

abnormalities were excluded. To collect information on maternal practices and the presence of IVAs and otitis in infants, a semi-structured questionnaire was applied, which was related to the exclusivity of breastfeeding, the position of the infant during breastfeeding and the occurrence of infection in upper airways and ear infections. The questions asked were: "Does the baby receive exclusive breastfeeding?"; "Does the baby tend to nurse at night? If so, what position does he do it?"; "What position is the baby breastfed?"; "Has the baby ever had any upper respiratory infections, such as colds or flu?"; "Has the baby ever had otitis or ear pain?" And "Do you believe that the position of the baby during the feeding interferes with the presence of the cold, the flu or the earache?" It should be mentioned that there were no examinations in infants to verify the presence of IVAs, so little data collection was done in medical records. These data were obtained from the mothers' responses. The answers of the interviews were categorized and analyzed using Fisher's exact test, with significance level of $p < 0.05$, using Statistica software.

In relation to the data collection of the babies, meatoscopy was performed in both ears, as well as the Otoacoustic Emissions exam. Otoacoustic emissions were recorded when recorded at least 6dB above background noise and normal examination when present at least three of the five frequencies tested. The infants who participated in the study had 4 to 180 days, with a mean age of 40 days, half of them being female and the other male. All the infants presented right and left meatoscopy without impediment at the time of the interview. The results of otoacoustic emissions were also normal in all infants.

RESULTS

From the 60 infants, 49 were breastfed with exclusive breast milk and 11 were breastfed exclusively. Regarding the position, 20 of the 60 mothers reported breastfeeding their children in the seated position and 40 in the lying position.

The occurrence of IVAS reported by the mothers was 10 babies, from whom 6 babies were feeding in the lying position and 4 babies in the sitting position, as shown in Table 1.

Table 1. Distribution of 60 infants according to the relationship between the position during breastfeeding and the occurrence of superior airway infection (IVAS) reported by mothers

Position of the infant during breastfeeding	Presence of IVAS	%	Absence of IVAS	%	Total	%	Value of p
Sitting	4	20	16	80	20	33,3	0,718
Laying	6	15	34	85	40	66,7	
Total	10	16,6	50	83,3	60	100	

Caption: Fisher's exact test $p < 0.05$
IVAS: Infection of the upper airways

As for the occurrence of otitis media, according to the mothers, 6 babies had at least one episode of otitis. From these infants, 2 were breastfed seated and 4 were lying down, according to Table 2.

Regarding the type of suckling and the occurrence of IVAS, 6 of 49 infants exclusively breastfed had RAI and 4 of the 11 infants who did not receive exclusive breastfeeding presented IVAS, as shown in the following Table 3.

Table 2. Distribution of the 60 infants according to the relationship between the position during breastfeeding and the otite occurrence reported by mothers

Position of the infant during breastfeeding	Presence of Otite	%	Absence of Otite	%	Total	%	Value of p
Sitting	2	3,3	18	30	20	33,3	1
Laying	4	6,7	36	60	40	66,7	
Total	6	10	54	90	60	100	

Caption: Fisher's exact test p <0.05

Table 3. Distribution of 60 infants according to the relationship between the type of breastfeeding and occurrence of superior airway infection (IVAS) reported by mothers

Breastfeeding type	Presence of IVAS	%	Absence of IVAS	%	Total	%	Value of p
Exclusive	6	10	43	71,7	49	81,7	0,074
Non-exclusive	4	6,7	7	11,6	11	18,3	
Total	10	16,7	50	83,3	60	100	

Caption: Fisher's exact test p <0.05
IVAS: Infection of the upper airways

From the 60 infants, 6 reported episodes of otitis. From the 49 infants breastfed exclusively with exclusive breastfeeding, 3 presented otitis and 3 of the 11 infants who did not receive exclusive breastfeeding reported an episode of otitis, as shown in Table 4.

Table 4. Distribution of the 60 infants according to the relationship between the type of sleep and the otite occurrence reported by the mothers

Breastfeeding type	Presence of otite	%	Absence of otite	%	Total	%	Value of p
Exclusive	3	5	46	76,7	49	81,7	0,06
Non-exclusive	3	5	8	13,3	11	18,3	
Total	6	10	54	90	60	100	

Caption: Fisher's exact test p <0.05

Thus, from the 49 infants exclusively breastfed, only 9 presented otitis or IVAS. From the 11 infants without exclusive breast-feeding, 7 presented otitis or IVAS. Regarding the p values presented in Table 1 and 2, it can be seen that there is no statistical difference between the groups, i.e., there is no association between the position of the infant during breastfeeding and the occurrence of AAS and otitis, since they present respectively $p = 0.718$ and $p = 1$.

However, the p values observed in Tables 3 and 4 indicate that, although there is no statistical difference between the groups, the p values are borderline, since they present, respectively, $p = 0.074$ and $p = 0.068$. It is possible that there is a type II statistical error, that is, by increasing the value of the sample there is a probability that these values will become statistically significant.

DISCUSSION

The reports of the practices of the mothers who participated in the study reveal that it is not possible to establish a direct relationship between the positioning practiced during breastfeeding and the presence of AVS and otitis media. It should be mentioned that, although the auditory tube presents a more horizontal position,

the physiology of sucking during breastfeeding differs greatly from the suction that occurs during the bottle.

During suckling in the womb, in the act of deglutition, anterioration and lowering of the anterior region of the soft palate occurs. At the same time, it rises its vertical part, which allows the oropharynx to close. In this way, there is no possibility of milk entering the ear tube, even with the baby lying down.

Even though there is breast milk entry, it is worth remembering that human milk is specific to the human species and has a protective effect due to the presence of immunoglobulins. In addition to the protective effects, natural breastfeeding provides a good positioning of the infant during breastfeeding due to the support of his head in the mother's arm at a more horizontal height, preventing the milk from flowing through the auditory tube[9]. Therefore, exclusive breastfeeding is safe, promotes sensory and cognitive development, and contains antibodies that protect children from common childhood illnesses[15].

Differently, when the baby feeds on artificial milk by bottle, the muscle contraction is reduced, with consequent sagging of the musculature of the soft palate. In this way, milk enters the oropharynx and reaches the auditory tube. Artificial milk, on the other hand, does not have antibodies such as breast milk, and may favor the rapid proliferation of bacteria, leading to otitis media. It is worth mentioning that the tensile muscle of the soft palate is the main responsible for the opening of the auditory tube. Because it is flaccid and hypofunctioning in bottle-fed babies, the weak activity of the soft palate tensor muscle favors the entry of large volumes of milk into the middle ear.

The results of the present study are in agreement with studies that relate breastfeeding to the occurrence of AVS and otitis. Prolonged breastfeeding was associated with significant reductions in both upper respiratory tract infections and acute otitis media. When it is compared with previous decades, the incidence of acute otitis media decreased as a result of several factors such as the advent of conjugate pneumococcal vaccines, routine use of influenza vaccines in infants and children, decreased smoking rates, and increased rates breastfeeding[16].

By reducing nasopharyngeal colonization rates, Secretory Immunoglobulin A (IgA S) from human milk can protect against otitis media. Studies show that IgA S hinders the adhesion of the microorganism on the surface of the mucosa, reducing colonization. It is possible that IgA S, bathing the oropharynx during breastfeeding, interacts with the mucins and the glycocalyx in the nasopharynx, exerting its protective effect[17]. These antibodies represent the predominant class of immunoglobulin in the external secretions and provide specific immunological protection on all mucosal surfaces, blocking the entry of pathogens[18,19].

There is much evidence that breastfeeding protects against acute otitis media by age 2, but protection is greater for exclusive breastfeeding and long-term breastfeeding. Exclusive breastfeeding during the first 6 months was associated with a reduction in acute otitis media of around 43% in the first 2 years-old. After 2 years-old, there is no evidence that breastfeeding protects against acute otitis media, however, studies in this age group are scarce[20].

The protective and preventive role of breast milk was evaluated and related to the length of hospital stay and/or morbidity under study with 232 infants less than six months of age. It was evidenced that hospitalization time and morbidity were lower in breastfed babies, with significance in cases of otitis media, gastroenteritis, broncho-pneumonia and skin diseases[21].

The tympanometric results of a study carried out with six-month-old infants demonstrated that breastfeeding acts as a protective factor against tympanometric alterations[21].

The influence of the type of breastfeeding on the conditions of the middle ear of infants from zero to four months was analyzed in a study with 60 children. It was observed that infants who received exclusive breastfeeding had fewer changes in the otorhino-laryngological evaluation and acoustic immitance measures, thus enabling otoacoustic emissions to be present. In addition, infants who received exclusive breastfeeding had fewer changes in the tympanic membrane, while infants who received bottle or mixed suckling had more alterations in otolaryngological evaluation[10].

A cross-sectional study correlated the time of exclusive breastfeeding with the number of infections of the respiratory and gastrointestinal systems in children in the first two years of life. It was observed that the mean number of upper respiratory tract infections, including cases of otitis media, in the first two years of life was higher in the exclusively breastfed group of less than four months[22].

A review of epidemiological studies indicates that the introduction of infant formula in the first 6 months of life is associated with an increased incidence of acute otitis media in early childhood compared with children who had 6 months of exclusive breastfeeding[23].

Regarding the age of the babies participating in the present study, the mean age of 40 days was observed, that is, the young age may be one of the reasons for the non-occurrence of AVS and otitis media. Therefore, it is pointed out the need to investigate maternal practices and babies for a longer period, longitudinally and in a larger sample, in future studies. In addition, it is also pointed out the need, in future studies, that maternal practices evaluated in a more objective way, in a film for example, for a greater trustworthiness of the data.

It should be noted that there are other factors that contribute to otitis media, among them environmental risk factors. These factors include the season of the year, presence of viral respiratory infection (due to overcrowding and spread of aerosols in winter), exposure to other children or the presence of siblings of school age, exposure to environmental tobacco smoke (which reduces mucociliary function), reduced air clearance, lack of hygiene and the use of pacifiers. In addition to environmental factors, there is also a lack of maternal breastfeeding, early age and immature immune system, and possible genetic factors as a risk factor for otitis media[24,25]. Most of these risk factors increase the chances of colonization of the upper respiratory tract and nasopharynx by bacterial pathogens[9]. The environmental factors were not controlled in the present study and it is recommended that they be investigated in future research.

As for the position in which the babies are breastfed, it was noticed that the number of mothers who breastfeed in the lying position is twice the number of mothers who report breastfeeding their children in the seated position. This shows that, although professionals advise mothers to breastfeed seated, in practice, most choose the most comfortable position for themselves and the baby, following what is recommended by the Ministry of Health[15].

It is emphasized that experiencing breastfeeding means experiencing moments of fatigue, since the act of breastfeeding depends on the physical state of the mother, implying a great energy expenditure[26]. Women report that the practice of breastfeeding involves insecurity, distress, anxiety, fatigue and worry. This is mainly due to the multiple roles of nursing mothers and, often, to lack of family support and support[27,28]. It is noteworthy that, despite previous orientations and experiences received by mothers, adequate breastfeeding practice is not always observed, since other factors may interfere with this issue, such as socioeconomic and cultural factors[29].

The present study is careful to show that maternal practices in the breastfeeding process are related not only to the aspects of breastfeeding position, associated with professional orientations or the presence of IVAS and otitis. Especially when analyzing the origin of the justification of positioning the baby more upright to prevent otitis media, it is verified that this justification is anchored in two studies, which they denominate "positional otitis media" [11,12]. It is noteworthy that the two studies were carried out on babies fed on the bottle and artificial feeding has a number of implications for child health, as discussed previously.

The orientation that the baby should be positioned in a high way makes sense in feeding the bottle as a preventive measure for otitis media for two main reasons. The first concerns the lack of protective substances that do not exist in artificial milk. The second one is related to the physiological difference of the types of suction, being distinct in the breast and in the bottle, as mentioned previously. In this way, the results of the present research direct and support that the breastfed baby is protected against IVAS and otitis media, regardless of the position in the mother's lap. Historically, health professionals recommend that mothers should breastfeed their babies in a more upright position in order to prevent otitis media. Thus, it is suggested that such a recommendation be rethought for infants fed exclusively on maternal breast.

In the present study, the occurrence of AVS and otitis media was verified from interviews with the mothers. Although this methodology has been used in similar studies[22,30], it is suggested that in future studies the occurrence of both IVAS and otitis should be investigated objectively or clinically.

CONCLUSION

In the present study, it was verified that the practices of mothers during lactation and the positioning of the baby during lactation are not related to upper airway infection and otitis media.

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