Exclusive breastfeeding protects against postpartum migraine recurrence attacks?

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Exclusive breastfeeding protects against postpartum migraine recurrence attacks?

O aleitamento materno exclusivo protege contra a recorrência de crises de enxaqueca no pós-parto?

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ABSTRACT

Objectives: To observe postpartum migraine recurrence among migraine sufferers before pregnancy, its classifications and associated factors and to compare women, who were exclusively breastfeeding, with those that used other forms of infant feeding. **Methods:** Out of 686 consecutively assisted women, at the first postnatal week, 266 were identified as migraine sufferers before pregnancy. Among those, one in five that were exclusively breastfeeding (53) and all the ones consecutively using others forms of infant feeding (40) were interviewed at the first and forth postpartum weeks. **Results:** After multivariable analysis, exclusive breastfeeding, no breastfeeding problems, and low income were associated with decrease in migraine recurrence at the first postpartum week. At the fourth week, exclusive breastfeeding continued to be a protective factor. **Conclusions:** A decrease in postpartum migraine recurrence seems to be another advantage of exclusive breastfeeding.

Key words: migraine without aura, migraine with aura, breast feeding, postpartum period.

RESUMO

Objetivos: Observar a recorrência de enxaqueca no período pós-parto em mulheres com enxaqueca antes da gestação, suas classificações e fatores associados e comparar mulheres que apenas amamentavam com aquelas que alimentavam seus filhos de outro modo. **Métodos:** De 686 mulheres consecutivamente assistidas na primeira semana pós-parto, 266 foram identificadas como portadoras de enxaqueca antes da gestação. Destas, uma em cada cinco que se encontravam amamentando exclusivamente (53) e aquelas que usavam outras modalidades de alimentação (40) foram entrevistadas na primeira e quarta semanas pós-parto. **Resultados:** Após análise multivariada, observou-se que praticar aleitamento materno exclusivo, não ter problemas relacionados à amamentação e ter baixa renda estavam associados à diminuição da recorrência da enxaqueca na primeira semana pós-parto. Na quarta semana, a prática do aleitamento materno exclusivo continuou sendo fator protetor em relação à enxaqueca. **Conclusões:** A diminuição da recorrência da enxaqueca pós-parto parece ser uma vantagem adicional do aleitamento materno exclusivo.

Palavras-Chave: enxaqueca sem aura, enxaqueca com aura, aleitamento materno, período pós-parto.

Migraine, mainly without aura, is influenced by cyclical hormones changes that occur during the women's reproductive life[1-4]. It is predominantly during the menstrual period that attacks occur and, in some cases, exclusively[5]. The most accepted hypothesis for the physiopathology of attacks during menstruation lies in the sharp decrease of estrogens during the premenstrual period[1,5,6].

However, the majority of the pregnant women that are migraine sufferers before pregnancy show migraine improvement or even disappearance during pregnancy[7,8]. Absence of cyclical hormonal fluctuations during pregnancy, mainly estrogens that rise during this period, is pointed as one of the most important causes of such behavior[4,8].

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The protective effect of the gestational period ceases rapidly in the postpartum period and migraine returns to its normal course[7]. However, a protective association between breastfeeding and migraine recurrence in the postnatal period was previously observed[7].

There are countless benefits attributed to breastfeeding, not only for the woman[9,10], but for the child, and, particularly when exclusive breastfeeding is used[10-12]. One must refer not only the nutritional aspects of breastfeeding, but the prevention of deficiencies, diseases, and death[10-12]. It is also necessary to cite breastfeeding as a program agent with potential long-term biological effect for the structure and function of the organism[13,14]. These are some of the reasons why breastfeeding practice has been internationally recommended[15]. The objective of the present study was to observe migraine recurrence in the first postpartum week and to follow it up prospectively in the fourth week after delivery among antenatal migraine sufferers, comparing this recurrence between women that were exclusively breastfeeding with those that used other forms of infant feeding (OFI).

METHODS

This is a follow-up study with two components, retrospective and prospective, undertaken at the Breast Milk Bank (BMB) of the *Instituto de Medicina Integral* Professor Fernando Figueira (IMIP) in Recife, Brazil, from June to November, in 2009.

The sample was calculated taking into account information from a study by Sances et al.[7]. In this study, the recurrence of the migraine attacks in the first postpartum week was 21.6% (95%CI 9.8–38.2), among women who breastfeed exclusively, and 80.0% (95%CI 44.4–97.0%), among those who used infant formula. In the first postpartum month, these percentages were, respectively, 43.2 (95%CI 27.1–60.5) and 100.0% (95%CI 74.0–100.0). Given that the accuracy of these estimates can only be considered reasonable, as indicated by their respective confidence intervals, we opted for a more cautious alternative about the possible differences between migraine recurrence in both groups, exclusive breastfeeding (EBF), defined as when the infant is fed exclusively breast milk, except for minerals and vitamins prescribed by a physician and OFI[16]. Regarding the OFI, it has been included women who were predominantly breastfeeding, using total breastfeeding (use of breast milk and also other food or drink) or bottle feeding[16]. Therefore, it was chosen an expected difference of 70.0% for the group of women who adopted OFI and 30.0% for those who were EBF, in order to identify a difference in migraine recurrence between the two groups of 40.0%. Thus, it was considered that a sample of 80 participants (40 for each group of infant feeding) would be enough to identify factors associated with migraine recurrence, both in the first and fourth postpartum weeks.

After signing the informed consent form, at the end of the first postpartum week, a questionnaire was applied to all women that attended the first postnatal visit at the BMB and that had given birth at the Institution. The questionnaire included questions related to some socioeconomic (years of schooling, *per capita* income, age, race/color of the skin, marital status, and occupation), obstetric (number of pregnancies, diseases during pregnancy, type of delivery, and of feeding offered to newborns and breastfeeding problems), and biological factors (with or without aura migraine during pregnancy, with or without aura related to menstruation migraine before pregnancy, presence of tension-type headache (TTH) associated with migraine with or without aura before pregnancy and with or without aura migraine recurrence in the first and fourth postpartum weeks). There were also questions about headache classification before pregnancy and in the first and fourth postpartum weeks[17].

Women affected by migraine with aura (MA), as well as those affected by migraine without aura (MO) before pregnancy, who were related or not to menstruation and classified according to the International Classification of Headache Disorders (ICHD)[17], were included in the study group. Those with contraindication to breastfeed, who did not want to participate in the research project, unable to be contacted for the follow-up interview in the fourth postpartum week and who had neurological diseases that characterized secondary headache were not included in the sample. Postdural puncture headaches, in cesarean section cases, were excluded, analyzing the clinical characteristics of the headache. Epidural anesthesia was not used for vaginal deliveries.

Although the definition of pure menstrual migraine and migraine related to menstruation refers to MO[17], due to the difficulty in identifying retrospectively migraine that occurs only during the menstrual period and distinguishing it of those that occur both during and outside the menstrual period[18], we grouped these two categories and called them menstrually-related migraine. This nomenclature was used in both MO and MA cases (when MA sufferers referred migraine attacks related to the menstrual period or not in it).

The first interview was intended to select the sample. Out of all the identified MO and MA sufferers, it was decided to interview one woman in every five, who was using exclusively breastfeeding as a feeding method in the first postpartum week and was a migraine suffer prior to pregnancy, because, according to the BMB of the IMIP records, the prevalence of EBF at the end of the first postpartum week was of 83.0%. While for the OFI Group, all the women consecutively attending the BMB/IMIP that were not exclusively breastfeeding were interviewed, until it was reached 40 women of the sample size calculation.

In the fourth postpartum week, the second part of the questionnaire was applied, investigating again the type of infant feeding, migraine recurrence, and its classification[17].

To compare the type of infant feeding offered by the women, EBF or OFI, with migraine recurrence in the first and fourth postpartum weeks, the χ^2 was used.

Based on the literature[7], independent variables that constituted risk or protection factors for migraine recurrence in the first and fourth postpartum weeks were selected. Socioeconomic and demographic factors formed the first block of variables (maternal education, *per capita* income, maternal age, race/color of the skin, marital status, and maternal occupation). The second block included variables related to obstetric factors and type of infant feeding (number of pregnancies, diseases during pregnancy, type of delivery, type of feeding offered to newborns, and breastfeeding problems). The third block included biological factors related to migraine.

The outcome was represented by migraine recurrence in the first and fourth postpartum weeks.

The bivariate analysis allowed identifying the explanatory variables considering as screening criteria the associations with $p<0.20$. The statistical significance of each variable was calculated using the Wald test for heterogeneity. Then, a multivariate analysis using Poisson's multiple regression with robust standard error was performed, the adjusted prevalence ratios, their respective 95% confidence intervals, and their statistical significances were estimated, adopting $p<0.05$, using the same tests described before. The χ^2 was used to compare the type of infant feeding with migraine recurrence in the first and fourth postpartum weeks. Stata 9.2 SE was used to analyze data.

The research project, under the number 1389, was approved by the Ethics Committee for Research in Human Beings of IMIP, in an Ordinary Meeting on April 16th, 2009.

RESULTS

During the six months of the sample selection, 686 women were assisted at the BMB/IMIP for the first postnatal visit. Of these, 266 (38.8%) were identified as MO or MA sufferers before pregnancy. Of the 266 women, 98 were selected as a sub-sample for the current study, with 5 exclusions (in the EBF Group) due to the impossibility of locating them for the follow-up interview in the fourth postpartum week. Therefore, the final sample was composed of 93 women, 53 were EBF their newborns and 40 were using OFI.

Among the 93 women and according to the ICHD[17], there were 82 (88.2%), 27 (29.0%) and 44 (47.3%) MO sufferers, respectively, before pregnancy and in the first and fourth postpartum weeks. In relation to MA, there were 11 (11.8%), 6 (6.5%) and 7 (7.5%) sufferers, respectively, before pregnancy and in the first and fourth postpartum weeks.

The women's mean age was 27 years-old, with a standard deviation of 6.6 years. Most of them reported themselves as black/colored (68.0%), were married or had a consensual union (82.8%), did not work (58.0%), had finished High School (71.0%) and were poor, with a *per capita* income bellow half of the minimum national wage (80.6%). Most of the women were primigravid (63.4%). Twenty-nine (31.2%) had diseases during pregnancy. Of these, eight (8.6%) had high-blood pressure, seven (7.5%) had diabetes and six (6.5%) had urinary tract infections. Most of them had vaginal deliveries (63.4%).

None of the women experiencing migraine remission during the first and second trimesters of pregnancy showed migraine attacks in the third trimester. Only ten women continued to have migraine attacks during all their gestation period. Migraine returned after delivery in 9 (9.7%) women in the first 48 hours, in 33 (35.5%) and in 51 (54.8%) women, respectively, in the first and fourth postpartum weeks.

In relation to the association between type of infant feeding and migraine recurrence, both in the first and fourth postpartum weeks, there was a statistically significant difference ($p<0.001$) among migraine sufferers prior to pregnancy, when women that exclusively breastfed were compared to those that used OFI (Table 1).

Tables 2 and 3 present the results of the crude and adjusted prevalence ratios (PR), which were calculated with Poisson's multiple regression analysis for the associated factors to migraine recurrence, respectively, in the first and fourth postnatal weeks.

After bivariate analysis, *per capita* income, disease during pregnancy, type of infant feeding and breastfeeding problems showed a statistically significant association with migraine recurrence in the first postpartum week. After multivariate analysis, in the final model, only *per capita* income, type of infant feeding, and breastfeeding problems remained statistically significant (Table 2).

Table 3 shows that, after the bivariate analysis, years of schooling, type of infant feeding and breastfeeding problems showed a statistically significant association with migraine recurrence in the fourth postpartum week, but after Poisson's multiple regression analysis only EBF maintained a significant association.

Table 1. Type of infant feeding and migraine recurrence in the first and fourth postpartum weeks among 93 with and without aura migraine sufferers before pregnancy.

Type of infant feeding	Migraine recurrence in the 1st postpartum week	Migraine recurrence in the 4th postpartum week
Exclusive breastfeeding, n/total (%)	4/53 (7.5)*	17/53 (32.1)**
Other forms of infant feeding, n/total (%)	29/40 (72.5)*	34/40 (85.0)**

* χ^2; **$p<0.001$.

Table 2. Crude and adjusted prevalence ratios (PR), with 95% confidence interval (95%CI), according to socioeconomic and demographic, obstetric, related to breastfeeding and biological factors for migraine recurrence in the first postpartum week among 93 with and without aura migraine sufferers.

Independent variables	Migraine recurrence n/total (%)	Crude PR	95%CI	p-value*	Adjusted PR	95%CI	p-value*
Years of schooling				0.563			–
1st to 8th	6/20 (30.0)	0.8	0.4–1.7		–	–	
9 or more	27/73 (37.0)	1					
Per capita income (minimum wage)							
<0.5	22/75 (29.3)	0.5	0.3–0.8	0.011	0.5	0.3–0.9	0.020
≥0.5	11/18 (61.1)	1			1		
Maternal age				0.467			–
<27 years-old	15/47 (31.9)	0.8	0.5–1.4		–	–	
27 and + years-old	18/46 (39.1)	1					
Race/skin color				0.546			–
White	9/29 (31.0)	0.8	0.4–1.6		–	–	
Black/colored	24/64 (37.5)	1					
Marital status				0.335			–
Married	29/77 (37.7)	1.5	0.6–3.7		–	–	
Single	4/16 (25.0)	1					
Occupation				0.165			0.503
Do not work	16/54 (29.6)	0.7	0.4–1.2		0.8	0.5–1.5	
Work/s tudy	17/39 (43.6)	1			1		
Number of pregnancies				0.067			0.211
1	25/59 (42.4)	1.8	0.9–3.5		0.7	0.4–1.2	
>1	8/34 (23.5)	1			1		
Disease during pregnancy							
Yes	16/29 (55.2)	2.1	1.2–3.5	0.008	1.3	0.9–2.0	0.138
No	17/64 (26.6)	1			1		
Type of delivery				0.186			0.645
Normal	18/59 (30.5)	0.7	0.4–1.2		1.1	0.7–1.6	
Cesarean	15/34 (44.1)	1			1		
Type of infant feeding							
Exclusive breastfeeding	4/53 (7.5)	0.1	0.0–0.3	<0.001	0.1	0.05–0.40	<0.001
Other forms of feeding	29/40 (72.5)	1			1		
Breastfeeding problems							
Yes	23/45 (51.1)	2.5	1.3–4.6	0.002	1.8	1.1–3.0	**0.025**
No	10/48 (20.8)	1			1		
Menstrually related MO before pregnancy							
Yes	19/47 (40.4)	1.3	0.8–2.3	0.314	–	–	–
No	14/46 (30.4)	1					
Menstrually related MA before pregnancy							
Yes	4/7 (57.1)	1.7	0.8–3.4	0.213	–	–	–
No	29/86 (33.7)	1					
TTH before pregnancy							
Yes	4/12 (33.3)	0.9	0.4–2.2	0.868	–	–	–
No	29/81 (35.8)	1					
Migraine during pregnancy							
Yes	25/64 (39.1)	1.4	0.7–2.8	0.284	–	–	–
No	8/29 (27.6)	1					
Migraine in the 3rd trimester of pregnancy							
Yes	5/10 (50.0)	1.5	0.7–3.0	0.310	–	–	–
No	28/83 (33.7)	1					

*Wald test for heterogeneity; variables highlighted in black were included in the multivariate analysis.

Table 3. Crude and adjusted prevalence ratios (PR), with 95% confidence interval (95% CI), according to socioeconomic and demographic; obstetric and related to breastfeeding, and biological factors for migraine recurrence in the fourth postpartum week among 93 with and without aura migraine sufferers.

Independent variables	Migraine recurrence n/Total (%)	Crude PR	95%CI	p-value*	Adjusted PR	95%CI	p-value*
Years of schooling							
1st to 8th	7/20 (35.0)	0.6	0.3–1.1	0.044	0.7	0.4–1.2	0.186
9 ou more	44/73 (60.3)	1			1		
Per capita income (minimum wage)							
<0.5	38/75 (50.7)	0.7	0.5–1.0	0.099	0.9	0.7–1.2	0.578
≥0.5	13/18 (72.2)	1			1		
Maternal age							
<27 years-old	25/47 (53.2)	0.9	0.7–1.4	0.747	–	–	–
27 and + years-old	26/46 (56.5)	1					
Race/skin color				0.965			–
White	16/29 (55.2)	1.0	0.7–1.5		–	–	
Black/colored	35/64 (54.7)	1					
Marital status				0.126			0.138
Married	45/77 (58.4)	1.6	0.8–3.0		1.6	0.9–2.8	
Single	6/16 (37.5)	1			1		
Occupation				0.270			–
Do not work	27/54 (50.0)	0.8	0.6–1.2		–	–	
Work/study	24/39 (61.5)	1					
Number of pregnancies							–
1	35/59 (59.3)	1.3	0.8–1.9	0.252	–	–	
>1	16/34 (47.1)	1					
Disease during pregnancy							
Yes	20/29 (69.0)	1.4	1.0–2.0	0.065	1.1	0.8–1.5	0.435
No	31/64 (48.4)	1			1		
Type of delivery				0.059			0.962
Normal	28/59 (47.5)	0.7	0.5–1.0		1.0	0.7–1.4	
Cesarean	23/34 (67.9)	1			1		
Type of infant feeding							
Exclusive breastfeeding	17/53 (32.1)	0.4	0.3–0.6	<0.001	0.4	0.3–0.6	**<0.001**
Other forms of feeding	34/40 (85.0)	1			1		
Breastfeeding problems at the 1st postpartum week							
Yes	31/45 (68.9)	1.7	1.1–2.4	0.008	1.3	0.9–1.8	0.116
No	20/48 (41.7)	1			1		
Breastfeeding problems at the 4th postpartum week							
Yes	9/15 (60.0)	1.1	0.7–1.8	0.661	–	–	–
No	42/78 (53.8)	1					
Menstrually related MO before pregnancy							
Yes	29/47 (61.7)	1.3	0.9–1.9	0.179	1.2	0.9–1.7	0.265
No	22/46 (47.8)	1			1		
Menstrually related MA before pregnancy							
Yes	3/7 (42.9)	0.8	0.3–1.8	0.508	–	–	–
No	48/86 (55.8)	1					
TTH before pregnancy							
Yes	8/12 (66.7)	1.3	0.8–2.0	0.378	–	–	–
No	43/81 (53.1)	1					
Migraine during pregnancy							
Yes	39/64 (60.9)	1.5	0.9–2.4	0.079	1.4	0.9–2.1	0.058
No	12/29 (41.4)	1			1		
Migraine in the 3rd trimester of pregnancy							
Yes	6/10(60.0)	1.1	0.6–1.9	0.728	–	–	–
No	45/83(54.2)	1					

*Wald test for heterogeneity; variables highlighted in black were included in the multivariate analysis.

DISCUSSION

Migraine attacks return quickly in the postpartum period, after a decline or even disappearance during pregnancy[1,7,19]. Sances et al.[7], studying only MO individuals, have demonstrated that 34.0 and 55.3% of women had MO recurrence, respectively, in the first and fourth postpartum weeks. The present study showed similar recurrence rates, 35.5 and 55.9%, respectively, at the end of the first and fourth postnatal weeks, in both MO and MA sufferers.

Pregnancy and EBF suppress ovulation and the menstrual cycle, and, the hormonal changes involved affect the frequency of migraine attacks in the majority of the women, even in those with no history of menstrual migraine[1,7]. During pregnancy, the *corpus luteum* and later the placenta and fetal adrenal tissues secrete increasing quantities of estrogen[1,20]. These increasing estrogen levels are attributed as one of the reasons why there is a decline in migraine attacks[1,20]. However, within the first hour after delivery, estrogen levels fall by around 80.0% and similar ones encountered in the follicular stage of the menstrual cycle are found approximately 35 hours after delivery[21]. Early migraine attacks are probably triggered by this abrupt fall in estrogen levels[1,7]. After multivariate analysis, the present study showed that the absence of EBF in the first postpartum week is a risk factor for migraine recurrence among migraine sufferers before pregnancy. Increased levels of hormones and antinociceptive neurotransmitters during breastfeeding period may be part of the explanation of the difference found in migraine recurrence after delivery[22,23]. Oxytocin, for example, reduces the behavioral and neuroendocrine responses to stress and together with vasopressin are key mediators of the complex social behavior, including attachment and social recognition[24]. Thus, psychological repercussion of the interruption of EBF[25] can contribute as a possible associated factor with migraine recurrence in the postnatal period[7].

Hormonal fluctuations due to the return of ovulation occur approximately in 3, 6, and 27 weeks after delivery, respectively, in cases of lactation suppression, nonbreastfeeding, and EBF[26]. This may be one of the explanations for the protection of EBF found in both bivariate and multivariate analysis, in relation to the recurrence of migraine attacks in both MO and MA sufferers, in the fourth postpartum week.

The recurrence of migraine attacks, in the first and fourth postpartum weeks, among menstrually related MO and MA sufferers, was not statistically significant in the present study, probably due to the definition used for menstrually related migraine, which included both pure menstrual migraine and that related to menstruation in MO and MA sufferers.

In addition to the menstrual cycle hormones, endogenous opioids, serotonin and adrenergic central system of many pure menstrual migraine or menstrually related migraine sufferers may be altered in the premenstrual syndrome[3,27]. Therefore, studies are needed to investigate the pattern of these hormones during the lactation period and their association with the reduction of migraine recurrence during postpartum. The presence of beta-endorphin, for example, may be one explanation for the present findings, especially in the first week after delivery, when endogenous opioids levels are greater in the woman and consequently in breast milk[28].

Breastfeeding problems are associated with early weaning[25,29]. Probably this was the reason why there was a statistically significant difference in both bivariate and Poisson's multiple regression analysis, for migraine recurrence in the first week after delivery. In the fourth week, this variable was considered for the multivariate analysis, but it was not significant.

In the first postpartum week, the higher the income, the greater was the risk of migraine recurrence after multivariate analysis in the present study. In the literature search, this variable was not evaluated as a possible risk factor. However, most of the articles were originated from samples of women of high socioeconomic level[7,8].

The present study had the limitation of a retrospective recruitment. However, its prospective part with a follow-up in the fourth week after delivery, in both MO and MA sufferers, showed a group mostly formed by poor, black/colored women, with only regular schooling, reflecting the population assisted by IMIP, a charity hospital in Recife, Brazil. These characteristics are added to the study of Sances et al.[7], which showed similar results, studying only MO patients, in regards to breastfeeding being a protective factor for migraine recurrence in the first and fourth postpartum weeks in a white, well-educated, and middle class population. Delay in the return of migraine attacks is not only reflected in the pain experienced by migraine sufferers, but it also helps to alleviate social, family, and work issues[30].

In conclusion, we reiterate a new and important role of EBF and the prevention of breastfeeding problems, avoiding one of the most important causes of early weaning, the protective factor associated with the decline in postpartum migraine recurrence among MO and MA sufferers.

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