

## ORIGINAL RESEARCH

## The effects of breastfeeding position and the change in nutritional habit on infantile colic: A randomized clinical trial

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### Abstract

**Purpose:** This study aimed to investigate the role of non-pharmacological method of breastfeeding and maternal nutrition in the treatment of infantile colic in order to reduce the role of pharmacological method.

**Methods:** This study was a double-blinded clinical trial study on 62 infants less than 4 months of age referred to Emergency ward of Mofid Hospital in 2014. The infants were randomly divided into two groups that one group received routine colic treatment without any intervention (as the control group) and the other group received hypoallergenic lactation and also were trained on how to breastfeed appropriately. On the second and tenth days, all mothers were contacted and the duration of crying and restlessness of the infant was assessed.

**Results:** The severity of colic significantly lower in intervention group as compared to control group on the second and tenth days of intervention. In this regard, the mean change in severity of colic at the end of assessment was  $2.4 \pm 2.2$  in intervention group and  $0.7 \pm 1.5$  in control group ( $p < 0.001$ ). The mean change in colic intensity in subgroups with complete, partial and low adherence was  $4.1 \pm 2.4$ ,  $2.5 \pm 1.6$ , and  $0.2 \pm 1.6$  respectively indicating a significant difference ( $p < 0.001$ ).

**Conclusion:** Comprehensive mothers' training on how to breastfeed and determine the best breastfeeding position along with the change in nutritional habit can significantly reduce colic severity.

**Keywords:** Colic, Breastfeeding, Nutrition

## Introduction

Infantile colic is actually a behavioral syndrome that is characterized by over-the-counter crying and restlessness, which is unjustifiable without cause and occurs most in the afternoon.<sup>1,2</sup> Colic is often defined by the “rule of three”: crying for more than three hours per day, for more than three days per week, and for longer than three weeks in an infant who is well-fed and otherwise healthy.<sup>3</sup> Colic is one of the most common causes of parental referral to an emergency at the age of three to six months.<sup>4</sup> Colic accounts for approximately 10% to 30% of infants worldwide.<sup>5-7</sup> The prevalence of colic is similar in breast-fed and formula-fed infants.<sup>8</sup> The cause of infantile colic is unknown. The underlying organic cause may be the cause of excessive crying after evaluation. Organic causes account for less than 5 percent of the causes of excessive crying that include infantile migraine, subdural hematoma, allergy to milk protein, lactose intolerance, rectal invagination and fisher, inguinal hernia, strangulation, and some of infections such as meningitis and otitis media.<sup>9-12</sup> Even the mother's position during lactation is known to be an important cause of the development or decrease of colic.<sup>13</sup> There is evidence to suggest that the position and attachment of the neonate to the breast during breastfeeding and the semi-seated position during bottle-feeding in infants will reduce colic due to the prevention of aerophagia.<sup>14</sup> If the baby does not stick well to the breast, it consumes less milk fat during breastfeeding, leading to faster gastric emptying, and the baby becomes hungry faster and receives more milk.<sup>15</sup> According to the WHO statement, infants should be exclusively breastfed for up to six months because breastfeeding boosts the baby's immune system and strengthens the body's defense mechanisms.<sup>16</sup> This is due to the presence of biologic factors such as hormones, growth factors, nutrients suitable for the colon, and factors promoting gastrointestinal mucosal membrane depletion and exposure to foreign food antigens in infants.<sup>17</sup>

Treatment of colic due to its many unknown causes depends on the education and personal and social support of the parents. Addressing the issue of infant colic to improve maternal and child health is one of the factors in

ensuring community health. Considering the important role of nursing education, especially continuous education in promoting family health and community health, we decided to investigate the role of non-pharmacological method of breastfeeding and maternal nutrition in the treatment of infantile colic in order to reduce the role of pharmacological method.

## Materials and Methods

This study was a double-blinded clinical trial study on 62 infants less than 4 months of age referred to Emergency ward of Mofid Hospital in 2014. Breastfeeding infants with IUGR or LBW or history of asphyxia and underlying diseases were excluded from the study. After a visit by a pediatrician to rule out organic and other causes of restlessness, infants were randomly divided into two groups that one group received routine colic treatment without any intervention (as the control group) and the other group received hypoallergenic lactation and also were trained on how to breastfeed appropriately. In intervention group, the training given to mothers was related to how to breastfeed gradually over a period of ten days and be careful not to overuse the usual medication or formula milk for the infants. The following rules were considered for the intervention: 1) Breastfeeding should not be less than five minutes and not more than twenty-five minutes; 2) Hold the infant in a gentle embrace for ten to fifteen minutes until the swallowed air comes out. If the air does not come out, slide the infant at a 30-degree angle; 3) Mothers should make sure that no more than two servings of milk are less than one hour. If the infant wishes to breastfeed for more than an hour earlier, he or she will be embraced for five minutes and refrained from breastfeeding. But if asked after this time, he will be given milk; 4) gradually try not to drink more than one to one and a half hours of milk earlier in the day (the distance between two servings of milk) and no later than two hours at night; 5) If the infant is asleep and not breastfeeding, it is permissible for up to three hours a day and up to four hours at night, although this is only a few months after the baby is born; 6) During this time, mothers avoid bloating foods such as legumes; 7) If you use pasteurized milk, be sure to boil it. Also consume less cheese, cream and yogurt as much as possible. On the second and tenth

days, all mothers of patients were contacted and the duration of crying and restlessness of the infant was assessed. The results were presented as mean  $\pm$  standard deviation (SD) for quantitative variables and were summarized by absolute frequencies and percentages for categorical variables. Normality of data was analyzed using the Kolmogorov-Smirnov test. Categorical variables were compared using chi-square test. For the statistical analysis, the statistical software SPSS version 16.0 for windows (SPSS Inc., Chicago, IL) was used. P values of 0.05 or less were considered statistically significant.

## Results

In total 74 neonates were initially considered in intervention and control groups. 7 patients in intervention group and 5 in control group were excluded because of lack of proper intervention. Thus, 31 patients in intervention group and 31 in control groups were finally analyzed. There was no difference between the two groups in baseline variables including gender ( $p = 0.796$ ), mean age of infants ( $p = 0.865$ ), the history of neonatal colic in other infants of family ( $p = 0.428$ ), the daily weight gain ( $p = 0.577$ ), and age of colic onset ( $p = 0.195$ ) (Table 1).

Table 1: Baseline characteristics in intervention and control groups

Item	Intervention group (n = 31)	Control group (n = 31)	P value
Male gender	58.0%	61.0%	0.796
Mean age, day	41.1 $\pm$ 18.3	41.7 $\pm$ 18.9	0.865
History of neonatal colic	42.0%	53.0%	0.428
Daily weight gain, gram	34.7 $\pm$ 20.8	32.2 $\pm$ 13.2	0.577
Age of colic onset, gram	17.8 $\pm$ 16.2	13.4 $\pm$ 8.8	0.195

The mean severity of colic at baseline was 7.1  $\pm$  2.2 in intervention group and 6.8  $\pm$  2.2 in control group with no difference ( $p = 0.097$ ). In intervention group, the colic had increasing trend and despite the intervention, colic pain worsened, the severity of colic remained unchanged in 4 neonates, but calmed in 25 neonates, while in control group, worsened, unchanged, and calmed colic was revealed in 3, 13, and 15 neonates respectively. As shown in Table 2, the severity of colic significantly lower in intervention group as compared to control group on the second and tenth days of intervention.

Table 2: The severity of colic intensity within the assessment time

Item	Intervention group (n = 31)	Control group (n = 31)	P value
At baseline	7.1 $\pm$ 2.2	6.8 $\pm$ 2.2	0.097
2 days after	5.4 $\pm$ 6.2	6.2 $\pm$ 2.7	< 0.001
10 days after	4.7 $\pm$ 2.0	6.1 $\pm$ 2.6	< 0.001

In this regard, the mean change in severity of colic at the end of assessment was 2.4  $\pm$  2.2 in intervention group and 0.7  $\pm$  1.5 in control group ( $p < 0.001$ ). With respect to adherence to intervention, mothers in intervention group were classified as complete adherence ( $n = 8$ ), partial adherence ( $n = 16$ ), and low adherence ( $n = 7$ ). The mean change in colic intensity in subgroups with complete, partial and low adherence was 4.1  $\pm$  2.4, 2.5  $\pm$  1.6, and 0.2  $\pm$  1.6 respectively indicating a significant difference ( $p < 0.001$ ).

## Discussion

As shown well in the present study, comprehensive mothers' training on how to breastfeed and determine the best breastfeeding position can significantly reduce colic severity. This also significantly eliminates the use of medications. According to the literature, different recommendations have been delivered to calm colic in neonates that can be classified as five approaches including a) safe swaddling carefully, covering the head, and allowing the hips to be flexed,<sup>18,19</sup> b) holding a baby on the back, making a strong shush sound near the baby's ear.<sup>20,21</sup>

4. Swinging the baby with tiny jiggly movements (no more than 1" back and forth) always supporting the head and neck,<sup>22</sup> and letting the baby suckle on the breast. Numerous studies mentioned above have shown that when key components of the pointed rules are used all night they can improve sleep or reduce crying; and, when these rules done correctly and in combination, they offer significant potential to promptly reducing infant crying and promote sleep. Of course, it should be noted that the cause of infantile colic is multidimensional. In other words, many probable reasons have been suggested to cause colic and thus several strategies should be considered for calming colic including modification of dietary pattern

of the mothers, paying attention to medications used by the mother, and even psychological aspects of the mother. In this regard, Along with enhancement of breastfeeding position, considering all pointed issues are important. Hewston et al in 2007,<sup>23</sup> showed that a group of infants who completely emptied a breast and received more fat of breast milk had less colic. Also in 2006, the Savino,<sup>24</sup> study used low-fat lactose in infants' nutrition which reduced colic pain in comparison to normal infant. Both studies show that lactose intolerance caused by excessive lactose intake causes colic. In total, considering good position in breastfeeding along with modification of dietary pattern can lead to successful calm infantile colic. Because infantile colic is a common complaint in infancy and infancy, and because infantile colic is a self-limiting and benign disease, lacks effective treatment, and is associated with parental anxiety and referral to pediatric

emergencies. Moreover, although, in our study, taking hard on diet for mothers was lower than similar studies, however, the results obtained by adding dietary strategies to the diet resulted in a reduction in restlessness and severity of infant colic according to mothers' self-report. One of the most important points of our study was the feasibility of our interventions in diet modification and lactation techniques and avoiding excessive strictures, at no cost and not excluding the mother from breastfeeding. Overall, in this study, the effect of the combination of breastfeeding position as well as nutritional recommendation on the treatment of infantile colic was evaluated and its beneficial effect was demonstrated.

#### **Conflict of interest**

Authors declare no conflict of interest.

## References:

1. Pauli-Pott U, Becker K, Mertesacker T, Beckmann D: Infants with “Colic”—mothers’ perspectives on the crying problem. *J Psychosom Res* 2000, 48(2): 125–132.
2. Roberts DM, et al: Infantile colic. *Am Fam Physician* 2004, 70: 735.
3. Colic: The Merck Manuals: The Merck Manual for Healthcare Professionals; <http://www.merckmanuals.com/professional/sec19/ch266/ch266f.html>. Accessed Feb. 28, 2011.
4. Savion F: Focus on infantile colic. *Acta Paediatrica* 2007, 96: 1259.
5. Clifford TJ, Campbell MK, Speechley KN, et al. Infant colic: Empirical evidence of the absence of an association with source of early infant nutrition. *Arch Pediatr Adolesc Med* 2002; 156: 1123–1128.
6. Barr RG. Colic and crying syndromes in infants. *Pediatrics* 1998, 1025(suppl E): 1282–1286.
7. Poole SR. The infant with acute, unexplained, excessive crying. *Pediatrics* 1991; 88: 450–455.
8. Søndergaard CH, Skajaa E. Fetal growth and infantile colic. *Arch Dis Child Fetal Neonatal* 2000; 83: 44–47.
9. Resolution of lactose intolerance and colic in breastfed babies. presented at the ALCATIC (melburne)conference of the 1st November 1997.
10. Saavedra MA, Dacost JS. Infantile colic incidence and associated risk factors: a cohort study. *J Pediatr (Rio J)* 2003; 79(2): 115–122.
11. Schach B. Colic and food allergy in the infant: it is possible for an exclusively breastfed infant to suffer from food allergy? *J Hum lact* 2002; 18(1).
12. Haward CR, Lanpher N. Parents responses to infant crying and colic: the effect on breastfeeding duration. *Breastfeed Med* 2006; 1(3): 146–55.
13. Sally Wade, Teresa Kilgour Extracts from “Clinical Evidence” Infantile colic. *BMJ* 2001; 323( 25).
14. Hewseon R, Ayre C. Colic in babies :an NCT evidence based briefing. *New Digest*; 38. 2007 april.
15. Waddell L. Infantile colic: a practical approach to management. *J Fam Health Care* 2006; 16(5).
16. Jakobsson I, Lindberg T. Cow's milk proteins cause infantile colic in breast-fed infants: A double –blind crossover study. *Pediatrics* 1983; 71(2): 268–271
17. Lucas A. Colic, Crying, Fussing, and Feeding. Florida, November, 1994.
18. Van Sleuwen BE. Swaddling: a systematic review. *Pediatrics*. 2007;120(4): [www.pediatrics.org/cgi/content/full/120/4/e1097](http://www.pediatrics.org/cgi/content/full/120/4/e1097).
19. Gerard CM. Physiologic studies on swaddling: an ancient child care practice, which may promote the supine position for infant sleep. *J Pediatrics* 2002; 141: 398–403.
20. Brackbill Y, Adams SG, Crowell DH, et al. Arousal level in neonates and preschool children under continuous auditory stimulation. *J Exp Child Psychol* 1966; 4: 178–188.
21. Brackbill Y. Cumulative effects of continuous stimulation on arousal levels in infants. *Child Dev* 1971; 42: 17–26.
22. van den Daele L. Modification of infant state by treatment in a rockerbox. *J Psychol* 1970; 74: 161–165.
23. Hewston R. Pract Midwife. 2007. Researching colic: a crying matter. Part 1: Causes and risk factors.
24. Savino F, Palumeri E, Castagno E, et al. Reduction of crying episodes owing to infantile colic: A randomized controlled study on the efficacy of a new infant formula. *Eur J Clin Nutr* 2006; 60(11): 1304–1310.