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Parental Responses to Infant Crying and Colic: The Effect on Breastfeeding Duration

CYNTHIA R. HOWARD,[1] NANCY LANPHEAR,[3] BRUCE P. LANPHEAR,[3] SHIRLEY EBERLY,[2] and RUTH A. LAWRENCE[1]

ABSTRACT

Context: **Infant crying can cause parental distress, and colic is associated with low maternal self-efficacy and heightened risk for depression. Breastfeeding is recognized as an effective method of calming infants, but the relationship of colic and the use of breastfeeding to remedy infant crying have not been tested for any effects on breastfeeding duration.**

Objective: **To evaluate the effects of infant colic (colic analysis) and breastfeeding as a method of infant calming (calming analysis) on breastfeeding duration.**

Design: **The authors followed 700 healthy breastfeeding mother–baby dyads from birth to 1 year. Maternal interviews were conducted postpartum, and at 2, 5, 10, 16, 24, 38, and 52 weeks to ascertain demographic factors, infant crying patterns, comforting practices, physician-diagnosed colic, and breastfeeding behaviors. Cox survival analyses were used to evaluate the independent effects of: (a) physician diagnosed colic; and (b) breastfeeding as a comforting practice on breastfeeding duration. Data from all 700 breastfeeding dyads were used in the colic analyses. In the calming analyses, to assure that breastfeeding was appropriately established, data were used from the 617 couplets that had breastfed for at least 2 weeks. Using a stepwise process, models, adjusted for typical predictors of breastfeeding duration, were developed for exclusive, full and partial breastfeeding duration. Variables of interest (i.e., colic diagnosis, breastfeeding for comfort) were then forced into the baseline models to determine any independent effects.**

Results: **In the first 16 weeks, parents found that holding (87%), breastfeeding (82%), walking (67%), and rocking (63%) were highly effective calming practices. Mothers who rated breastfeeding as highly effective had a higher frequency of breastfeeding at all contacts ($p < 0.05$). In adjusted analyses the use of breastfeeding to comfort infants was a significant predictor of longer partial (overall) ([hazard ratio] HR = 0.6, 95% CI 0.4 to 0.9; $p = 0.02$) but not exclusive or full breastfeeding duration. By 6 months, 44 mothers (6.3%) reported a diagnosis of colic. Mothers of infants with a diagnosis of colic were less likely to report breastfeeding as effective method of infant comforting ($p = 0.03$). In adjusted analyses the authors found that a diagnosis of colic predicted shorter full breastfeeding duration (HR = 2.4, 95% CI 1.4 to 4.2; $p = 0.001$) but not exclusive or partial duration.**

[1]Department of Pediatrics, [2]Department of Biostatistics, The University of Rochester School of Medicine and Dentistry, Rochester, New York.
[3]Cincinnati Children's Hospital Medical Center; Department of Pediatrics at the University of Cincinnati, Cincinnati, Ohio.

Conclusions: **Breastfeeding to comfort a crying infant is a strong predictor of partial (overall) duration and is rated as a highly effective calming method by parents. These data suggest that parents may benefit from education about normal infant crying patterns and effective methods of infant comforting, including breastfeeding. However, mothers of infants diagnosed with colic are at risk for shortened duration of full breastfeeding. Although the reasons for this are unclear, it may be helpful to specifically address the subject of colic and infant feeding and encourage mothers to fully breastfeed for the recommended 6 months.**

INTRODUCTION

Breastfeeding is widely acknowledged as optimal infant nutrition. Significant efforts are ongoing to encourage women to begin breastfeeding and to do so exclusively for 6 months and thereafter for a minimum of 1 to 2 years.[1–5] Yet many mothers quit breastfeeding within the first few weeks and introduce formula or other foods in early infancy, thus depriving them and their infants of many benefits associated with longer-term breastfeeding.[3] A number of factors affect breastfeeding duration, including maternal age and education, social support, return to work or school, previous formula feeding experience, parity, and personal goals for infant feeding.[6] In addition to these factors, a number of studies have shown that a mother's lack of confidence in her ability to breastfeed can result in early termination.[7,8]

It is unknown whether colic affects how long a mother breastfeeds her infant. However, infant colic is a significant source of stress for parents and is associated with decreased maternal self-efficacy and postpartum depression.[9] Colic, defined as persistent crying that lasts more than 3 hours per day and affects 8% to 40% of children, has been reported to occur equally in breastfed and formula fed infants.[9–18] Given its effect on maternal stress and self-efficacy, and anecdotal evidence that mothers may interpret the associated crying as inadequate milk supply, the authors posited that a diagnosis of colic might result in shortened breastfeeding duration.[7]

However, empiric data demonstrate that breastfeeding, in addition to its nutritive value, is an effective method of calming distressed infants.[19,20] Barr et al. found that the frequency of breastfeeding and maternal response latency independently affected crying or fretting behavior in 2-month-old infants.[21] Moreover, nursing stimulates the release of oxytocin and prolactin that, in addition to their role in milk production, produce profound feelings of love and relaxation in the mother.[22–25] Thus, breastfeeding an infant for comfort could help extend breastfeeding duration and provide an effective method of infant calming.

METHODS

During the conduct of a randomized clinical trial on pacifier use and breastfeeding, a cohort of 700 healthy term breastfed infants and their mothers were followed from birth to 12 months. Detailed infant feeding, demographic, family composition, maternal work, and infant and maternal health information was gathered. In a planned secondary study, the authors prospectively gathered additional information on infant crying, colic, and methods used by parents to comfort their infant to evaluate the independent effects of these factors on breastfeeding duration.

Data from a cohort of 700 breastfeeding mother–baby dyads who participated in a randomized clinical trial of the effect of pacifiers on breastfeeding duration were analyzed.[26] Prenatal contacts were made with approximately 3700 expectant women, preregistered for obstetric admission to Rochester General Hospital, a 526-bed community hospital affiliated with the University of Rochester School of Medicine and Dentistry. Women who intended to breastfeed their infants for at least 4 weeks, with uncomplicated, singleton pregnancies, were eligible. Additional postnatal eligibility requirements included the delivery of a healthy infant weighing $\geq$2200 g, of 36 to 42 weeks gestation, with Apgar scores $\geq$7 at 1 minute and $\geq$8 at 5 minutes, and with a normal newborn hospital course.

Before delivery, 807 mothers were identified as potentially eligible. Of this group, 107 dyads were not enrolled because the infant required admission to the neonatal intensive care unit ($n = 70$), or the mother decided not to breastfeed ($n = 6$) or declined further participation after delivery ($n = 31$). Mothers dropped from the study were more likely to be primiparous ($p = 0.004$) and smokers ($p = 0.03$), but they did not differ in terms of race, age, education, or number of prenatal visits from the 700 mothers who were enrolled.

The original trial involved randomization to two interventions, cup or bottle for supplemental feedings given in the hospital and early (2 to 5 days) versus late (>4 weeks) pacifier introduction. Before discharge a research nurse conducted one-on-one educational sessions with participating parents on a variety of methods to comfort infants, including the use of swaddling, rocking, holding, breastfeeding for comfort, infant swings, and infant massage. Instruction specifically excluded the use of bottle-feeding or pacifier use. A detailed report of the methods and findings of this study is available.[26]

Data were obtained from a variety of sources. Prenatal and perinatal health data and some demographic data were obtained from maternal and infant hospital chart reviews and infant birth certificates. Maternal interviews were conducted by research nurses during the peripartum hospital stay and at 2, 5, 10, 16, 24, 38, and 52 weeks postpartum. With the exception of the hospital interview, interviews were conducted by telephone using standardized questionnaires with categoric or quantitative responses. Detailed infant feeding information was gathered about breastfeeding duration and the timing of introduction of other liquid and solid foods. Demographic, employment, and household composition information was obtained. Parents also were asked to rate the effectiveness (not, a little, a lot; or not used) of a variety of usual infant comforting practices, the frequency and number of hours of infant crying (at ages 2, 5, 10, 16, and 24 weeks), and whether the infant's physician or nurse practitioner had diagnosed colic in the baby since the previous contact (question asked at weeks 5, 10, 16, and 24). On enrollment and completion of the 24- and 52-week interviews, participants were compensated for their participation. Informed consent was required of all participants. This study was approved by the institutional review board of the University of Rochester and Rochester General Hospital.

ANALYSIS

For the purposes of this study the authors chose to quantify breastfeeding dose using categories of exclusive, full, and partial breastfeeding.[27] Exclusive breastfeeding signifies the time from birth for which the infant received breast milk without the addition of any other foods or liquids. Full breastfeeding duration encompasses exclusive duration extending further to the time for which breast milk was the infant's predominant source of nutrition, including the occasional but less than daily use of another source of nutrition; once nutritional sources other than breast milk were added on a daily basis, full breastfeeding duration ended. Partial or overall breastfeeding indicated the time from birth for which the infant was breastfed at any level and overlaps both exclusive and full breastfeeding.

Data were analyzed using SAS. Analyses of breastfeeding duration were conducted using the Kaplan-Meier method (SAS, PROC LIFETEST) and the Cox proportional hazards model (SAS, PROC PHREG).[28] Complete information on breastfeeding duration was obtained for 686 (98%) of the 700 participants; the remaining observations ($n = 14$) were included in analyses as censored values. For each of the three breastfeeding cessation variables (exclusive, full, and partial breastfeeding duration), a stepwise process was used to select predictor variables from the following list: maternal race (white versus non-white), previous live births, baby's sex, receives federal assistance, plans to return to work or school, mom smokes, any smoker in the household, previously breastfed an infant, baby's father lives with mother, Cesarean section delivery, birth weight, gestational age, maternal age, maternal education, and personal breastfeeding goal. Predictors with p values ≤ 0.10 were retained in the baseline model. A timed variable indicative of paci-

fier introduction was included in all baseline models. Students' *t*-tests and chi-square tests were used to compare baseline characteristics of the full cohort ($n = 700$) to mother–baby couplets who continued to breastfeed after 2 weeks of infant age ($n = 617$).

Colic analyses

Data from all 700 mother baby couplets were included in this analysis. To examine the effect of physician diagnosis of colic on breastfeeding duration, a timed variable for colic diagnosis was forced into the baseline models for exclusive, full, and partial breastfeeding.

Comforting analysis

Nursing to comfort an infant may be more likely to occur when breastfeeding is established. To assure that all infants included in this analysis had successfully established breastfeeding, data from couplets that terminated breastfeeding in the first 2 weeks postpartum were excluded *a priori*. Data from 617 mother–baby couplets that breastfed for 2 weeks or more are presented. Baseline models were additionally adjusted for the mother's assessment of how well breastfeeding was going (Likert scale 1 to 10) and the use of bottle-feeding to comfort the infant; these data points were reported at each contact and entered in the Cox model as timed variables. Finally, a timed variable reporting the use of breastfeeding to comfort (use, yes or no at weeks 2, 5, 10, 16, 24) was forced into the model to assess any independent effect of this practice on breastfeeding duration.

RESULTS

Demographic and baseline characteristics of participating mothers and infants included in both sets of analyses can be found in Table 1. The majority of mothers were well educated, white, married, and intended to return to work or school postpartum. Thirty-nine percent (39%) of mothers were primiparous and more than half had breastfed before. The majority of fathers supported the mother's choice to breastfeed.

Median breastfeeding duration ($n = 700$) was 25 days of exclusive (95% CI 21 to 28 days), 49 days of full (95% CI 42 to 56 days) and 150 days of partial breastfeeding (95% CI 135 to 165 days). Eighty-five percent (85%) of infants were breastfed at some level at 1 month, 42% at 6 months, and 17% at 12 months. Women who continued breastfeeding after 2 weeks were somewhat more likely to be white and married, have breastfed another child, have partners who support breastfeeding, and have plans for longer durations of breastfeeding than those who did not continue ($p > 0.05$).

Table 1. Group Characteristics

Characteristic	*Entire cohort* (n = *700*)	*Dyads breastfed for ≥2 weeks* (n = *617*)
White	87%	89%
Primiparous	39%	37%
Maternal age (y)	29.0 (SD 5.3)	29.4 (SD 5.1)
Maternal education (y)	14.3 (SD 2.1)	14.5 (SD 2.1)
Father lives with mother	91%	91%
Married	81%	83%
Mother smokes	5%	4%
Planned return to work/school	70%	69%
Federal assistance	14%	13%
Previously breastfed	54%	57%
Infant birth weight (g)	3550 (SD 462)	3651 (SD 457)
Infant gestational age (wk)	39.7 (SD 0.9)	39.7 (SD 0.9)
Delivery by Cesarean section	16%	16%
Father supports breastfeeding	53%	55%
Weeks planning to breastfeed	27.7 (SD 16.8)	28.9 (SD 16.7)

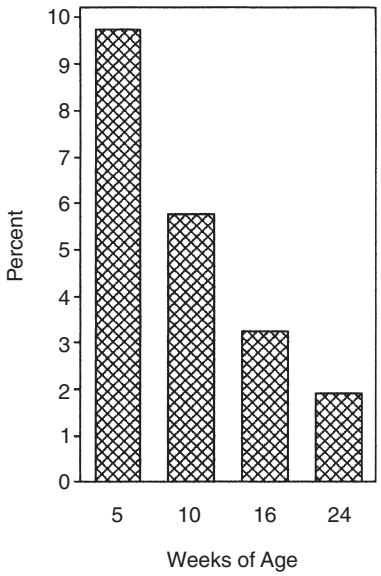

FIG. 1. Percent of mothers who report their infant "cries too much" by week of age.

Colic analyses

Overall, 109 women (15%) reported that their infant cried too much at one or more contacts between 5 weeks and 6 months (Fig. 1). Of those women, 14% reported that the infant cried at least 3 hours per day and 99% reported excessive crying 3 or more days per week. Using modified Wessel criteria, only 2% (14/700) of infants qualified for a diagnosis of colic;[9,11] however, a diagnosis of colic was made by a physician or nurse practitioner in a total of 44/700 or 6.3% of infants. Of the 44 infants diagnosed with colic, 41% were diagnosed by 5 weeks, 43% between 5 and 10 weeks, 7% between 10 and 16 weeks, and 9% between 16 and 24 weeks of age.

Mothers whose infants were diagnosed with colic reported a number of different recommendations or treatments made by their infant's medical care provider (Table 2). The most commonly recommended treatments were increased burping and anti-gas medications. Formula changes were less commonly recommended. About one-half of breastfeeding mothers received recommendations to make changes to their diet, most commonly by eliminating cow milk protein.[29,30] When asked about other methods of comforting, there were some differences in what parents reported was helpful. At 10 weeks, mothers of infants *without* colic were significantly more likely to report that breastfeeding was highly effective (77%) as compared with mothers whose infants were diagnosed with colic [(59%) $p = 0.031$]. Breastfeeding frequency did not differ between these groups [6.35 breastfeedings/day (colic group) versus 6.37 breastfeedings/day (no colic).] More mothers of infants with colic reported that walking was highly effective (85%) compared with those whose infants did not develop colic [(72%) $p = 0.071$].

Using Cox proportional hazard analyses to evaluate the effect of a diagnosis of colic on exclusive, full, and partial breastfeeding dura-

TABLE 2. TREATMENTS RECOMMENDED BY MEDICAL CARE PROVIDERS FOR INFANTS DIAGNOSED WITH COLIC (*N* TOTAL = 44)

Recommendation	*Total numbers given recommendation N (%)*	*Proportion helped N (%)*	*Proportion given recommendation by age at diagnosis*			
			5 Weeks (n = 18)	*10 Weeks (n = 19)*	*16 Weeks (n = 3)*	*24 Weeks (n = 4)*
Mother avoids cow milk products*	14/27 (52%)	6/14 (43%)	5/11 (45%)	6/12 (50%)	2/2 (100%)	1/2 (50%)
Mother avoids certain fruits or vegetables*	11/27 (41%)	4/11 (36%)	4/11 (36%)	5/12 (42%)	1/2 (50%)	1/2 (50%)
Mother avoids spicy foods*	10/27 (37%)	5/10 (50%)	4/11 (36%)	5/12 (42%)	1/2 (50%)	0/2 (0%)
Mother avoids caffeine*	9/27 (33%)	3/9 (33%)	3/11 (27%)	4/12 (33%)	2/2 (100%)	0/2 (0%)
Anti-gas medication	33/44 (75%)	23/33 (70%)	14/18 (78%)	14/19 (74%)	3/3 (100%)	2/4 (50%)
Increased burping	27/44 (61%)	21/27 (78%)	11/18 (61%)	12/19 (63%)	3/3 (100%)	1/4 (25%)
Change in formula	20/44 (45%)	12/20 (60%)	9/18 (50%)	8/19 (42%)	1/3 (33%)	2/4 (50%)
Pacifier	17/44 (39%)	12/17 (71%)	5/18 (28%)	10/19 (53%)	1/3 (33%)	1/4 (25%)
Other medication	7/44 (16%)	6/7 (86%)	3/18 (17%)	3/19 (16%)	1/3 (33%)	0/4 (0%)

*Among mothers still breastfeeding at time of contact.

Table 3. Cox Proportional Hazard Model, Diagnosis of Infant Colic and the Effect on Duration

Effect of colic diagnosis on breastfeeding duration	*Hazard ratio*	*95% CI*	p-*Value*
Exclusive	1.84	0.78–4.34	0.16
Full	2.43	1.42–4.18	0.0012
Partial (i.e., any)	1.35	0.88–2.06	0.17
	Model for full breastfeeding		
Factor	*Hazard ratio*	*95% CI*	p-*Value*
Colic diagnosis	2.43	1.42–4.18	0.0012
White race	0.58	0.46–0.74	<0.0001
Pacifier	1.58	1.23–2.04	0.0004
Mother's goal for breastfeeding (wk)	0.97	0.97–0.98	<0.0001
Plans to work/school	1.36	1.15–1.62	0.0004
Mother smokes	2.12	1.48–3.03	<0.0001
Mother's education (y)	0.93	0.89–0.96	<0.0001

tion, the authors found a significant negative effect on full (HR 2.43; 95% CI 1.42 to 4.18; $p = 0.0012$) but not on exclusive (HR 1.84; 95% CI 0.78 to 4.34; $p = 0.16$) or partial breastfeeding (HR 1.35; 95% CI 0.88 to 2.06; $p = 0.17$). With regard to full breastfeeding duration, other significant predictors of duration included mother's planned weeks of breastfeeding, plans to return to work or school, smoking, white race, years of education, and infant pacifier use (Table 3).

Comforting analyses

The authors evaluated parental ratings of the effectiveness of a variety of methods of infant comforting over contacts at 2, 5, 10, and 16 weeks (Table 4). The methods rated most effective by this cohort of parents required the parent to actively maintain physical contact with the infant. More than 80% of parents reported that holding and breastfeeding "helped a lot" to comfort their infant. Walking and rocking also were rated highly effective by the majority of parents. Although the effectiveness of walking, holding, breastfeeding, and rocking remained high throughout infancy, the effectiveness of some methods varied significantly as infants aged. For example, the effectiveness of infant swings increased up until 10 weeks and declined thereafter (data not shown).

Among mothers who used breastfeeding to comfort their babies, daily frequency was significantly higher in mothers who reported it "helped a lot" compared with those who stated that they had not used the method or rated it as little help (Fig. 2).

Cox proportional hazard analyses to evaluate the effect of breastfeeding to comfort on exclusive, full, and partial breastfeeding duration demonstrated a significant protective effect on partial (HR 0.60; 95% CI 0.40 to 0.91; $p = 0.02$) but not exclusive (HR 0.91; 95% CI 0.45 to 1.85; $p > 0.05$) or full (HR 0.96; 95% CI 0.55 to 1.67; $p > 0.05$) breastfeeding. With regard to partial

Table 4. Parental Comforting Methods ($n = 617$)

Method	*Not tried*	*No/little help*	*Helped a lot*
Holding	1%	12%	87%
Breastfeeding*	3%	15%	82%
Walking	2%	31%	67%
Rocking	3%	34%	63%
Swing	23%	43%	35%
Sounds	13%	55%	32%
Car ride	29%	38%	33%
Pacifier	15%	59%	26%
Bottle	45%	38%	17%
Swaddling**	26%	59%	15%
Massage	24%	60%	16%
Infant carrier (e.g., Snugli™)	62%	25%	12%
Hammock	91%	8%	1%

Responses are averaged over weeks 2, 5, 10, and 16.
*Among those still breastfeeding.
**Asked at 2, 5, and 10 weeks only.

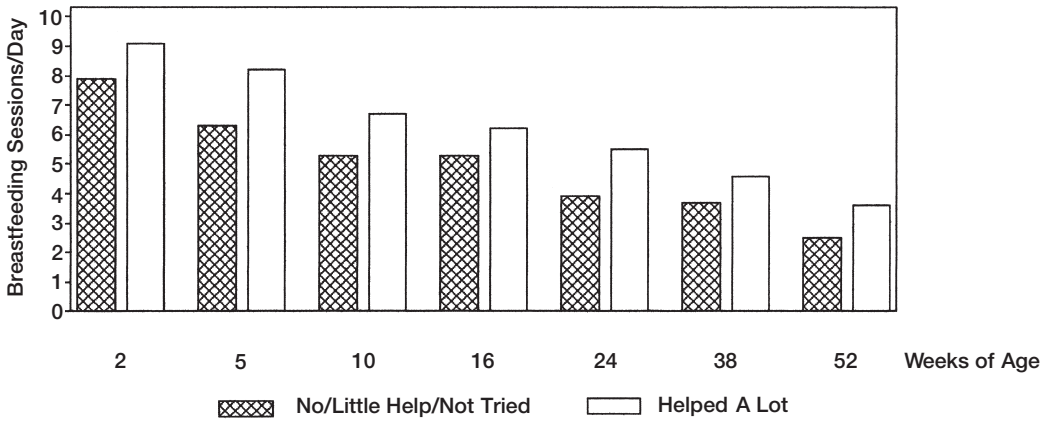

FIG. 2. Frequency of daily breastfeeding by effectiveness of nursing to comfort (differences at all weeks; $p < 0.05$).

breastfeeding duration, other significant predictors included mother's planned weeks of breastfeeding, plans to return to work or school, maternal smoking, years of education, and bottle use (Table 5).

COMMENT

To the authors' knowledge, this is the first study to document an inverse association between physician-diagnosed infant colic and breastfeeding duration. These data also provide some possible insight into this observation. The authors observed significant differences in parental reports of the effectiveness of breastfeeding as a comforting method among infants with and without a diagnosis of colic. However, it was not possible to document a difference in breastfeeding frequency between these groups, and thus a biologic mechanism to explain the results was not identified. It is plausible, however, that breastfeeding was less pleasant for mothers of infants with colic, and that this ultimately resulted in shortened

TABLE 5. COX PROPORTIONAL HAZARD MODEL, BREASTFEEDING FOR COMFORT AND THE EFFECT ON DURATION

Effect of breastfeeding for comfort on breastfeeding duration	*Hazard ratio*	*95% CI*	p-*Value*
Exclusive	0.91	0.45–1.85	NS
Full	0.96	0.55–1.67	NS
Partial (i.e., any)	0.60	0.40–0.91	0.02
	Model for partial breastfeeding		
Factor	*Hazard ratio*	*95% CI*	p-*Value*
Breastfeeding for comfort	0.60	0.40–0.91	0.02
Bottle for comfort	2.23	1.78–2.78	<0.0001
Pacifier	1.02	0.63–1.64	0.94
Mother's rating of breastfeeding	0.84	0.79–0.88	<0.0001
Mother's goal for breastfeeding (wk)	0.96	0.96–0.97	<0.0001
Plans for work/school	1.38	1.12–1.69	0.002
Mother smokes	1.91	1.20–3.06	0.007
Other smokers at home	1.12	0.86–1.45	0.40
Mother's education (y)	0.94	0.90–0.99	0.01

breastfeeding by altering maternal plans, confidence, or commitment in regard to breastfeeding.

The reason that full breastfeeding was impacted, whereas exclusive and partial were not is unclear but could have resulted from an insufficient number of cases of colic in this cohort. There was trending toward shortened exclusive and partial breastfeeding and a larger sample size might have allowed the documentation of effects.

Similarly, this is the first study to suggest that breastfeeding to comfort an infant is an independent predictor of longer partial breastfeeding duration. In this study, breastfeeding to comfort was associated with increased frequency of breastfeeding at every contact. Barr et al., in a study of crying behavior in early infancy, found that both maternal response latency and nursing interval independently predicted crying or fretting behavior in 2-month-old infants.[21] The authors speculate that more frequent breastfeeding is the biologic mechanism behind the finding of longer partial breastfeeding duration. Alternatively, mothers may simply continue to breastfeed as an effective way to comfort their child.

In recent years a number of studies have documented the effectiveness of skin-to-skin contact and breastfeeding on reducing infant distress during painful procedures.[19,20] The present findings that the most effective methods of infant comforting were those that required active physical contact of the parent and infant are consistent with these studies.[21] Parents may benefit from instruction that emphasizes the simple principle that distressed infants may respond best to physical contact. This study also suggests that pediatricians can simultaneously offer breastfeeding mothers an effective method of infant comforting and encourage longer breastfeeding duration by recommending frequent breastfeeding as a specific response to infant crying.

Results from this study may not be generalizable to other populations. Families were well educated, primarily white, and socially advantaged; those that were undecided or wished to institute a pacifier were committed to at least 4 weeks of breastfeeding and agreed to participate in a clinical trial.

There are other limitations to these analyses. The study design was a prospective observational study rather than the stronger design of a randomized clinical trial. Although a study of breastfeeding as an infant comforting practice and duration could lend itself to a randomized trial of parental anticipatory guidance around infant comforting, the relatively low incidence of colic makes such a trial impractical. However, data from this study were prospectively collected with an *a priori* plan to examine the study questions. These data also allow for adjustment for a number of potential confounding factors related to breastfeeding duration, such as mothers' personal goals and ratings of the breastfeeding process at multiple contacts.

The incidence of physician-diagnosed infant colic reported in this study is less than that documented in other studies. Primary care for this cohort was provided by more than 100 different pediatricians and family physicians and all infants had access to care. Thus, individual physician diagnostic patterns and access to care should not have affected the rates of colic reported in this study. Maternal report rather than outpatient chart review was used to identify infants with a diagnosis of colic. This is an obvious limitation that may have led to a degree of inaccuracy or under-reporting. Interestingly, the authors found that by maternal report only 2% of infants in this cohort met modified Wessel criteria for the diagnosis of colic.[11] The authors asked mothers to recall the usual amounts of crying at each contact; the authors did not use a crying diary. This may have affected the accuracy of the data with regard to amounts of crying. Contacts also occurred more frequently near birth and spaced out over the early months of infancy. These factors may have led to less accurate crying information than that available to the infant's physician. Alternatively, it is possible that in some instances normal infant crying was misdiagnosed as colic, especially in the face of parents who were distressed and anxious about an infant's behavior. Additionally, as mentioned, the sample size may have been insufficient to detect effects on exclusive and partial duration.

With regard to the breastfeeding to comfort analysis, the possibility of reverse causality is of concern. The obvious concern is that mothers for whom breastfeeding is going well are likely to breastfeed more frequently and for longer periods of time. The authors addressed this concern by adjusting for a variety of predictors, including maternal perceptions of breastfeeding success at each contact, personal breastfeeding goals, bottle introduction, pacifier use, and other relevant demographic and social predictors of breastfeeding duration. Additionally, the authors analyzed data from mother–baby dyads that had already successfully breastfed for longer than 2 weeks to exclude those that experienced problems with breastfeeding initiation. Despite efforts to adjust for relevant factors, the possibility of unmeasured confounding influences remains.

CONCLUSION

The authors found that the behavior of a normal healthy infant and parents' actions in response to that behavior can affect breastfeeding duration. Breastfeeding to comfort was found to be associated with more frequent breastfeeding, was an effective method of infant comforting, and a predictor of longer partial breastfeeding. In contrast, excessive infant crying as defined by a physician diagnosis of colic independently shortened full breastfeeding, possibly because infants with colic were less likely to be comforted by breastfeeding. Although this did not lead mothers of colicky infants to breastfeed less frequently, it may have made breastfeeding less pleasant and ultimately resulted in shorter duration.

These findings indicate that parents need help to understand, interpret, and respond appropriately to infant crying behavior, be it in the usual or heightened range associated with colic. Parents benefit from a discussion of normal infant crying patterns and counseling about effective methods of comforting, including breastfeeding. Parents also benefit from information about the age-dependent effectiveness of different calming methods, recognizing that the most effective calming practices (e.g., holding, breastfeeding, walking, rocking) involve a parent actively holding the infant in close physical contact. Finally, to preserve the benefits of full breastfeeding for infants with colic, it may be helpful for physicians to provide specific education about the lack of a link between feeding type and colic symptoms and encourage full breastfeeding for the recommended 6 months with continued breastfeeding through at least the first year of life.

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Address reprint requests to:
Cynthia R. Howard, M.D., M.P.H.
Department of Pediatrics
University of Rochester School of Medicine and Dentistry
Rochester General Hospital
1425 Portland Avenue, Suite 300
Rochester, NY 14621

E-mail: cindy.howard@viahealth.org