



ABSTRACT

Introduction: The purpose of this study was to describe the current beliefs about the etiology of colic as well as current management approaches used by pediatric health care providers.

Method: An open-ended, short-answer survey concerning beliefs about the etiology and treatment of colic was conducted at major National Association of Pediatric Nurse Associates and Practitioners and American Academy of Pediatric meetings. The two groups of providers surveyed, pediatric nurse practitioners (PNPs) (n = 216) and pediatricians (n = 215), were similar in age and years of practice.

Results: PNPs were more likely to define colic as "excessive crying." No differences were found in the beliefs regarding etiology of colic. Pediatricians reported seeing more colicky infants per month. A strong relationship existed between etiology and primary treatment approach. Statistically significant differences were found between PNPs and pediatricians in approaches to management of colic.

Discussion: Colic remains a prevalent and mysterious malady, with a critical need for more evidence-based treatment protocols. Differences in approaches used by providers were found, with PNPs more likely to use behavioral and environmental approaches to treatment.

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Current Beliefs and Management Strategies for Treating Infant Colic



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Infant colic, also known as unexplained infant irritability, continues to be a frustrating and exhausting challenge for parents and providers alike. The complaint of persistent unexplained crying is one of the parental concerns most frequently encountered by pediatric health care providers (Barr, 1998). Colic occurs during the first few months of the newborn's life and was originally characterized by Wessel and associates as crying in infants that occurred for 3 or more hours per day on 3 or more days per week and that persisted for at least 3 weeks (Wessel, Cobb, Jackson, Harris, & Detwiller, 1954). A comprehensive review of recently published literature found inconsistencies in definitions of colic, drop-out rates, and data gathering in determining occurrence rates (Lucassen et al., 2001). Although colic

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is a very common occurrence in young infants, effective treatment is lacking, and the criteria for defining colic are vague (Helseth & Begnum, 2002). Parental distress is exacerbated by the lack of conclusive information regarding the cause and best management strategies for treating colic. Parents receive confusing and contradictory information, and treatment regimens often are based on anecdotal reports and current trends in health care rather than on evidence-based practice (Keefe, 1988).

Persistent infant crying has been identified as a leading cause of child abuse in the very young infant (Krugman, 1993). Evidence also exists that shaken-baby syndrome is precipitated by bouts of excessive infant crying (Morris, Smith, Cressman, & Ancheta, 2000). Therefore, it is critical that health care providers gain a thorough understanding of the potential causes of colic and effective interventions to alleviate the distress for both the infant and family.

The primary aim of this study was to assess the current beliefs about the etiology of colic as well as current treatment strategies among clinically based pediatric health care providers. A review of the literature found no studies comparing the beliefs of pediatric nurse practitioners (PNPs) and physicians about the etiology and approaches to management of infant colic. The secondary aim of this study was to compare these two groups of providers. This study also served as a precursor to a randomized clinical trial to evaluate a new approach to the management of colic.

REVIEW OF THE LITERATURE

Infant irritability or colic is the most common pediatric problem in the first year of life (Lindberg, 2000). Investigators and care providers have increasingly identified the potential for abuse and neglect in families with irritable infants. The cause of infant irritability continues to be debated in the literature; various explanations for the crying episodes range from gastrointestinal dysfunction, an immature nervous system, anxious new parents, and other unsubstantiated causes (Lindberg, 2000). With the lack of understanding of the cause of colic comes a lack of consensus on the definition and management strategies. The literature is replete with suggestions for management strategies, some evidence based and some

anecdotal (Garrison & Christakis, 2000; Lucassen et al., 1998).

Because of the lack of consensus in the literature about the definition, etiology, and management of colic, providers do not have a consistent explanation or approach to management to share with distressed parents. The lack of consistency in practice leads to confused parents, who are unsure about whom they should turn to or what advice they should follow. In addition to advice from providers, parents also receive advice from friends and family that may conflict with that given by health care providers.

Etiology

A variety of etiologies for colic are presented in the literature. In a review of the extant literature, Lucassen et al. (1998) found milk intolerance cited in the literature as a cause of colic; however, a recent prospective study found no relationship between the source of infant nutrition and colic (Clifford, Campbell, Speechley, & Gorodzinsky, 2002). Neurologic immaturity also has been suggested as a cause of colic (Barr, St. James-Roberts, & Keefe, 2001; Kirjavainen et al., 2001). Some authors have proposed gastrointestinal problems (Clemons, 2000), whereas others have suggested parenting styles as a precipitating factor or a trigger to crying that leads to disorganized responses, reinforcing the crying (Boukydis, 1985; Weissbluth, 1987). Some investigators have tried to identify behavioral and physiologic responses or greater hypersensitivity to stimulation than in infants without colic, with varied results (Keefe, 1988; White, Gunnar, Larson, Donzella, & Barr, 2000). The literature varies greatly, with little differentiation between case studies, controlled research investigations, and clinical reports. The diverse etiologies proposed make it difficult for practitioners to both diagnose and treat colic in their practices.

Definition

Colic or unexplained infant irritability has been defined in many ways (Rejnefeld, Brugman, Hirasings, 2001). Most pediatric texts define colic as "inconsolable crying," whereas others include diurnal references, such as "in the evening" (Lester, Boukydis, Garcia-Coll, & Hole, 1990). A common classic definition quantifies the crying as oc-

curing 3 or more hours per day, 3 or more days per week for at least 3 weeks (Wessel et al., 1954; Zeskind & Barr, 1997), whereas others have stated that 3 hours of crying per day for 3 days per week for only 1 week is sufficient to define colic (Barr, Rotman, Yaremko, Leduc, & Francoeur, 1992). Some authors have focused on the parent and the label of parental anxiety, specifically maternal anxiety, as a definition (Pauli-Pott, Becker, Mertesacker, & Beckman, 2000). As with the diverse beliefs about etiology, the varied definitions present challenges for both the practitioner and the parents who are trying to understand the disorder. This situation is compounded by the developmental patterns and decrease in infant irritability that seems to come with increasing maturity of the infant. In this article, "colic" and "infant irritability" are used interchangeably in an effort to provide a new terminology and frame of reference for the observed persistent crying behavior.

Management

As might be expected, management of colic or infant irritability varies greatly depending on the beliefs about its etiology. Pharmacologic recommendations, specifically for gastrointestinal drugs such as dicyclomine, often are made (Weissbluth, Christoffel, & Davis, 1984). Some researchers have evaluated changing to soy-based formulas or elemental formulas, such as Progestimil, or amino acid-based formulas (Estep & Kulczycki 2000a; 2000b; Jakobsson, Lothe, Ley, & Borschel, 2000). Other authors have advocated behavioral interventions, such as rocking or riding in a car (Huhtala, Lehtonen, Heinonen, & Korvenranta, 2000; St. James-Roberts & Gillham, 2001). Only a few behavioral interventions have been developed and tested specifically for treatment of excessive crying (Keefe, Froese-Fretz, & Kotzer, 1997). Hiscock and Wake (2002) evaluated a behavioral intervention to reduce infant sleep problems in infants older than 6 months.

A nursing intervention recently tested in a randomized clinical trial is the REST Routine. This individualized intervention program is designed to help parents recognize and respond to their infant's cues in an effort to reduce parents' distress and infant crying (Keefe et al., 1997; Keefe et al., under review). The REST Routine program

SURVEY OF PEDIATRIC PRIMARY CARE PROVIDERS APPROACH TO MANAGING INFANT COLIC

Today, we are interested in knowing what primary management strategies you use for Colic, (also known as Idiopathic Infant Irritability)

1. In your own words, briefly describe your current thinking on the definition and etiology of Colic. *(Please be as specific as possible.)*

_____ 6 -
 _____ 7 -
 _____ 8 -
 _____ 9 -

2. On an average approximately how many infants do you treat each month for Colic? *(Please write a number. If none, please write in a "0".)*

_____ # of Colic infants treat per month (10-11)

IF "NONE" SKIP TO DEMOGRAPHICS

3a. Please identify the intervention you use **most often** for the treatment of Colic under column 3a.

3b. Then under column 3b, please indicate any other methods you use to treat Colic. *(Please list up to two methods only.)*

	3a TREATMENT USE MOST OFTEN	3b OTHER TREATMENTS FOR COLIC
	12-	16-
	13-	17-
	14-	18-
	15-	19-

4. What factors influence your current approach to treating Colic? *(Please be as specific as possible.)*

_____ 20-
 _____ 21-
 _____ 22-
 _____ 23-

DEMOGRAPHICS

1. Please indicate your gender. 21-1 Female -2 Male
2. In what year were you born?19____ (25-26)
3. In which type of practice setting(s) do you currently work? *(Please check all that apply.)*

27-1 <input type="checkbox"/> Private practice (solo)	-4 <input type="checkbox"/> Hospital	-7 <input type="checkbox"/> Other: _____ 28-
-2 <input type="checkbox"/> Group practice (3 or more)	-5 <input type="checkbox"/> Health Department	<i>(please specify)</i>
-3 <input type="checkbox"/> HMO	-6 <input type="checkbox"/> Clinic	
4. What type of healthcare provider are you? *(Please check only one.)*

29-1 <input type="checkbox"/> PNP	-4 <input type="checkbox"/> RN	-7 <input type="checkbox"/> Other: _____ 30-
-2 <input type="checkbox"/> PA/CHAP	-5 <input type="checkbox"/> Family Medicine	
-3 <input type="checkbox"/> FNP	-6 <input type="checkbox"/> Pediatrician	
5. How many years, in total, have you been in practice?..... # years (31-32)
6. In what type of area is your practice located? *(Please check only one.)*

33-1 <input type="checkbox"/> Urban	-2 <input type="checkbox"/> Suburban	-3 <input type="checkbox"/> Rural
-------------------------------------	--------------------------------------	-----------------------------------
7. In what state is your practice located?..... (34-35)

FIGURE Survey of pediatric primary care providers' approach to managing infant colic.

targets both the parent and infant. The infant component includes (a) regulation, the additional support infants need for organizing their state behavior and for protection from overstimulation during the first few months of life; (b) entrainment, the process of synchronizing the infant's behavior with relevant aspects of the environment; (c) structure and repetition create a predictable recurrent pattern of events each day; and (d) touch, involving chest to chest or skin to skin contact, promoted by positioning. The parent component of the REST Routine includes (a) reassurance (let parents know, after a thorough nursing assessment, that their infant is not ill or in pain); (b) empathy, which means listening and acknowledging the challenge of caring for a colicky infant; (c) support, which is offered when the nurse acts as an advocate for the parent; and (d) time out, which legitimizes the parents' critical need to take care of themselves, specifically with break time each day (Keefe et al., 1997).

There is no consensus in the literature as to the most efficacious management of irritable or colicky infants. The primary aim of the research team was to assess pediatric health care providers' current beliefs about the etiology and approaches to management of colic to inform the clinical trial under development. In addition to obtaining this baseline, the team wanted to describe any differences between PNPs and pediatricians, because no studies have been found comparing or contrasting treatment approaches by type of provider.

Current Trends

Knowledge of the current thinking and approach to treatment was identified as an important baseline measurement for the evaluation of the impact of a new approach to caring for these infants. The new intervention was built on a developmental, behavioral framework that views infant irritability as a state regulation disorder related to the neurologic maturation of the infant. This new approach departs from the traditional views of colic as a gastrointestinal disorder and focuses on helping parents integrate understanding of infant cues and infant state into the care of their infant (Keefe et al., 1997). With the great variability in published reports of the etiology, definition, and manage-

ment of colic or infant irritability, a study to determine the current beliefs of practitioners treating colic was needed.

METHOD

The research question guiding this study was, "What are the current beliefs about the etiology of infant colic and the treatment approaches most frequently used by clinically based pediatric health care providers?"

A survey entitled "Primary Care Provider's Perspectives on Infant Irritability or Colic" was developed and pilot tested in Denver, Colorado, with a local group of PNPs. The survey underwent three modifications and format revisions. Initially a closed-ended questionnaire was designed. The research team was concerned that the response sets developed by the team members reflected their own beliefs and biases and would not provide adequate detail about the beliefs and management strategies of other practitioners. An open-ended, short-answer survey form was constructed to avoid influencing respondents with preconceived categories and items for their selection. The survey went through several iterations to ensure that questions were structured to avoid leading the respondent. Face validity was established by a team of five advanced practice nurses experienced in working with families with irritable infants. (See the [Figure](#) for a copy of the survey instrument).

The survey focused on the following five areas of practice: (a) provider's definition of colic, (b) provider's proposed etiology of colic, (c) prevalence of colic in the practice, (d) most common treatment strategies or recommendations for infant irritability or colic, and (e) factors influencing the provider's selection of treatment modality or approach to management. In addition, demographic data were collected to identify the respondent's age, sex, years in practice, type of practice and practice setting, and geographic location. The open-ended, short-answer survey was distributed to participants at the 1999 spring meeting of the American Academy of Pediatrics (AAP) and the annual meeting of the National Association of Pediatric Nurse Practitioners and Associates (NAPNAP). A booth was set up for persons attending the conventions, and a T-shirt was offered for those taking the time to stop and complete the

survey. The participants' anonymity and confidentiality were assured. Participants were informed that the data would be used in an aggregate summary report of current approaches to the treatment of colic. In addition, attendees of a pediatric continuing education conference held in South Carolina during 1999 were surveyed. This sampling strategy was designed to maximize the number of participants; however, it also introduced a potential bias. The practitioners surveyed were a subgroup more likely to engage in continuing education and participate in their professional specialty organizations.

RESULTS

Advanced practice nurses experienced in working with families with colicky babies reviewed the data and collapsed the data into categories. Senior members of the research team worked with two coders who independently reviewed and coded the data. If they did not agree on the meaning of the data, the principal investigator of the grant defined the coding category. Data were entered into the Statistical Package for the Social Sciences (SPSS Version 10.0) software. Descriptive statistics were used to summarize the data. Chi-square analyses were performed to compare type of practice, geographic location, and other demographic characteristics between providers. Frequency distributions were used to summarize the provider's definition of colic, provider beliefs about etiology, and provider preference for treatment intervention strategies. Student *t* tests were used to compare age and length of time in practice between types of providers.

A total of 476 completed surveys were collected and entered into SPSS for descriptive analysis. Surveys were collected from a few family practitioners, nurses who were not PNPs, physician's assistants, or other professionals in attendance at these meetings; data from these surveys were not included in the final analysis. This report summarizes the responses of the 216 PNPs and 215 pediatricians in this sample ($N = 431$). Many open-ended questions generated similar answers. These data were interpreted and aggregated. Clusters and categories were developed from the data. For example, "anxious mother" or "worried mother" became a category; "gas" or "excess gas" or "gas from crying" was

grouped together; and "age" or "3 months" were combined into a response category. Content categories were generated and reviewed by two independent researchers. Content analysis was followed by frequency distribution reports and descriptive statistics, including means and ranges of responses. Of the total surveys analyzed for this report, 191 were obtained at the AAP meeting and 205 were obtained at the NAPNAP convention. An additional 35 surveys were obtained at a regional pediatric provider continuing education program held in South Carolina. Data were analyzed for all PNPs and pediatricians completing a survey; however, not all questions were completed. Descriptive statistics and content provider numbers analysis were conducted on each individual item for those responding to each item on the survey. For some items, more than one response was appropriate, and those were included in the analysis to create multiple response categories.

Sample Demographics

As shown in Table 1, participants were predominately women with a mean age of approximately 45 years. There were no significant differences between PNPs and pediatricians in years of practice. Significant differences were found in the geography of the practice sites, as well as the type of practice (see Table 2). The participants came primarily from the Midwest (n = 161, 37.4%), the South (n = 152, 35.4%), and the Northeast (n = 85, 19.7%), with only a few from the West (n = 31, 7.2%). Practice settings include group practice (34%), private practice (23%), clinics (19%), hospital practice (18%), and health maintenance organization (4%).

Definition of Colic

Most pediatric care providers defined infant colic as uncontrollable, excessive crying occurring in infants younger than 4 months (Table 3). There were statistically significant differences in definitions of colic by provider type, with more physicians (16%) describing it as related to "abdominal gas" compared with 27% of PNPs, who defined colic as "excessive crying." Other descriptive attributes or characteristics of infant irritability included "infants who are apparently healthy," "inconsolable," "fussy," specific "diurnal evening pattern," and "stressful to parents."

TABLE 1 Provider demographics

Demographic	PNP n (%)	Pediatricians n* (%)
Sex		
Female	216 (100)	129 (60.3)†
Male	0	85 (39.7)
Age (y) (SD)	45.5 (8.06)	43.18 (10.7)‡
Years in practice	11.51 (8.82)	11.6 (10.49)§

*Sample size varies based on No. of responses to each individual item.
 † $\chi^2 (1, N = 432) = 106.9, P = .000$.
 ‡ $t(421) = 2.516, P = .012$.
 § $t(428) = .09, P = .929$.

TABLE 2 Environments of practice

	PNP n (%)	Pediatrician n (%)
Geographic area of practice*		
Urban	97 (45.3)	92 (43.2)
Suburban	76 (35.5)	98 (46.0)
Rural	41 (19.2)	23 (10.8)
Total	214	213
Type of practice†		
Private practice (solo)	39 (18.1)	54 (25.1)
Group practice (3 or more)	68 (31.6)	84 (39.1)
Health maintenance organization	11 (5.1)	6 (2.8)
Hospital	22 (10.2)	45 (20.9)
Health department	10 (4.7)	1 (.5)
Clinic	57 (26.5)	18 (8.4)
Other	8 (3.7)	7 (3.3)
Total	215	215

* $\chi^2 (2, N = 427) = 7.97, P = .019$.
 † $\chi^2 (6, N = 430) = 41.18, P = .000$.

TABLE 3 Definitions of colic by provider type

Definition	PNP n = 150 (%)	Pediatrician n = 143 (%)
Abdominal pain	28 (9.6)	11 (3.8)
Gas	11 (3.8)	37 (16.4)
Excessive crying	80 (27.3)	48 (16.4)
Uncontrolled crying	18 (6.1)	31 (10.6)
Cramping/spasms	8 (2.7)	10 (3.4)
Reflux	4 (1.4)	4 (1.4)
Unspecified pain	1 (.3)	2 (.7)

$\chi^2 (6, N = 293) = 33.50; r = .000$.

Etiology of Colic

When providers were asked to describe the etiology of colic, the most frequent answer was "unknown." Other potential causes identified by the respondents included "possibly gastrointestinal related," "gastrointestinal immaturity," "cramping and spasms," "abdominal

pain and gas," "milk intolerance," "parenting skills," "environment (stress/overstimulation)" and "immature nervous system." Some providers noted that the age of the infant and/or the time of day of the crying episodes influenced their diagnosis of colic without specifying any other etiologic factors.

TABLE 4 Etiology of colic by provider type

Etiology	PNP n = 158 (%)	Pediatrician n = 152 (%)
Time	49 (15.8)	57 (18.4)
Infant healthy	3 (1)	9 (2.9)
Diet	18 (5.8)	16 (5.2)
Temperament	11 (3.5)	3 (1.0)
Environment	9 (2.9)	8 (2.6)
Developmental disorder	23 (7.4)	20 (6.5)
Unknown	45 (14.8)	39 (12.6)

$\chi^2 (6, N = 310) = 8.88, P = .181.$

TABLE 5 Primary treatment for colic by provider type

Treatment	PNP (n = 204) (%)*	Pediatrician (n = 199) (%)
Drugs	44 (10.9)	61 (15.1)
Formula/feeding change	27 (6.7)	23 (5.7)
Behavioral change	63 (15.9)	35 (8.7)
Environmental change	28 (6.9)	20 (5)
Parental interventions	42 (10.4)	60 (14.9)

* $\chi^2 (4, N = 403) = 15.5; P = .004.$

There were no statistically significant differences between PNPs and pediatricians in their beliefs about the etiology of colic. (Table 4).

Prevalence of Colic

Because no specific operational definition of colic or infant irritability was given to the respondents, each provider based his or her prevalence estimates on his or her own experience or working definition. Providers reported caring for zero to 60 infants with colic per month (M = 7.45; SD = 8.27). More than half of the respondents reported seeing an average of more than five colicky infants in their practice each month. Thirty-two percent of the providers reported seeing 10 or more colicky infants each month. Pediatricians saw an average of 8.61 colicky infants per month compared with a reported rate of 6.3 per month by the PNPs ($t(424) = 2.9; P = .004$).

Treatment

The treatments identified by providers varied a great deal, with more than one response frequently provided. The most frequent approaches suggested were various soothing and comforting techniques. Motion, rocking and soothing, or distracting movements were discussed. The next most frequently used treatment

was simethicone, followed by formula changes and/or diet changes for the mother. Frequent burping or change in feeding approach also were incorporated as feeding strategies. Parental support and education was mentioned as an important component of any treatment strategy. Treatment approaches for both PNPs and physicians included medication, feeding observations, parental support, infant massage, environmental change, rocking movement, formula change, and soothing and comforting the infant. As shown in Table 5, PNPs were less likely to use medication and more likely focus on infant behavior, using observations, education, support, and environmental changes, than were the pediatricians. The individual answers were coded by category and collapsed (see Table 5), and significant differences were found between PNP and pediatricians treatment strategies ($\chi^2(4, N = 403) = 15.5; P = .004$).

Etiology and Treatment

An examination of the relationships between etiology and treatment revealed interesting findings. With use of Chi-square analysis, there was a strong relationship between etiology and primary treatment for infants presenting with colic ($\chi^2 (24, N = 244) = 57.80; P = .000$).

Some of the treatment was logically derived from the etiology, such as not using drugs or formula changes if the provider believed temperament was the cause of colic. However, there was no identifiable pattern of treatment choices noted for those who thought immaturity or a developmental disorder was the cause of colic (Table 6).

Factors Influencing Approach to Treatment

Providers would target either the parent or the infant in their treatment approaches to colic, depending on their view of the parent or the child as the etiology of colic. No statistically significant differences existed between PNPs and pediatricians in the factors influencing approaches to treatment. Two major factors influenced the provider's approach to treatment, one related to the parent and one to the infant. The parent's level of frustration and tolerance was coupled with the parent's understanding and experience to determine the parent factor. The infant factor was primarily the observed or described severity, duration, and intensity of the crying episodes. More active, aggressive, or invasive management strategies were more likely to be recommended as the infant and parent factor increased.

Provider Comparisons

Differences in practice patterns appeared to be more likely associated with type of provider than the geographic location, practice setting, and years in practice. As can be seen in Table 7, physicians tended to treat the baby, usually with medications or formula changes, whereas PNPs tended to target the parent, usually with suggestions for environmental and behavioral changes.

DISCUSSION

Although there is an increasing body of literature about infant colic, it remains a mystery to many providers of pediatric health care. Providers do not appear to operate from a common definition of colic, nor do they have a shared belief about its etiology. Thus, the preferred treatment modalities vary greatly among providers, which creates confusion among parents about the causes and best treatment approaches. Their distressed state can be compounded further by the varying beliefs and recommenda-

TABLE 6 Etiology of colic with treatment of colic

Etiology	Primary treatment of colic collapsed				
	Drugs n = 67 (%)	Formula/feeding change n = 37 (%)	Behavioral change n = 24 (%)	Environmental change n = 39 (%)	Parent interventions n = 77 (%)
Time	23 (7.9)	10 (3.4)	24 (8.2)	11 (3.8)	32 (11)
Infant healthy w/crying	2 (0.7)	1 (0.3)	1 (0.3)	1 (0.3)	6 (2.1)
Diet	11 (3.8)	12 (4.1)	6 (2.1)	2 (0.7)	1 (0.3)
Temperament			7 (2.4)	1 (0.3)	6 (2.1)
Environment	1 (0.3)	4 (1.4)	2 (0.7)	3 (1.0)	6 (2.1)
Developmental disorder	10 (3.4)	5 (1.7)	23 (7.9)	5 (1.7)	12 (4.1)
Unknown	20 (6.8)	5 (1.7)	23 (7.9)	16 (5.5)	14 (4.8)

χ^2 (24, N = 244) = 57.80; P = .000.

tions from their friends and family about colic. This conflicting information can result in parents who are very frustrated and overwhelmed as they attempt to care for their colicky infant.

It is of some interest that the type of provider may influence the selection of treatment modalities. Parents who have care provided by a PNP are more likely to have behavioral or environmental modification strategies suggested than are parents who have care provided by a pediatrician. The preferred treatment modality for pediatricians in the survey was more likely to be pharmacotherapeutics or formula changes. These different approaches are supported by conflicting evidence, with little data to support their effectiveness. No consistent management or treatment approach has emerged as recommended for most infants.

Many questions remain about the underlying successes or failures of the treatment modalities and how they affect the outcome. In most infants, colic is time limited, with a decrease in crying as the infant matures, with most infants' colic resolving around 12 weeks of age. However, this situation is not benign or self-resolving for families. Increasing our understanding of the etiology, diagnosis, and treatment of colic is critical given the relationship of persistent, inconsolable infant crying, parental distress, and the potential for child abuse or neglect.

CONCLUSION

More research is needed on the characteristics and etiology of colic; this would improve the likelihood that the

TABLE 7 Provider and target of intervention

Provider	Infant target of intervention	Parent target of intervention
PNP	71 (34.8% of PNP)	133 (65% of PNP)
Pediatrician	84 (42.2%)	115 (57.8% physician)

χ^2 (1, N = 403) = 2.335, P = .07.

definition and treatment will be consistent among providers. It is known that colic usually appears around 2 weeks of age and continues until approximately 3 months of age. There is a need to further understand the role that maturation of the neurologic system plays in this behavioral disorder and the appropriateness of interventions to influence the infant's ability to modulate his or her crying and arousal level. Further investigation is needed into the developmental processes that occur during that period and the physiologic mechanisms that are related to the onset and resolution of the colicky behavior.

In this survey, PNPs reported more frequent use of behavioral and environmental approaches to treatment than did pediatricians. Both groups of providers prescribed various medications to treat the symptoms, although the efficacy of such treatments has not been well established. Although many approaches to the treatment of colic exist, there is a critical need for consistency in the definition and for clinical trials that will lead to evidence-based protocols for the treatment of infant irritability.

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