

## The evaluation and management of an incessantly crying infant

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### Introduction

Crying is the normal physiological response to many stimuli in nonverbal children. Healthy children cry for about 3 hours per day on an average at 6 weeks of age with the peak occurrence between 3 PM and 11 PM<sup>1</sup>. There is little consensus about the definition of abnormal cry in the literature. A variety of terminologies are used to describe it such as incessant cry, persistent cry, excessive cry and problem crying<sup>2</sup>. The available definitions focus on duration and the inconsolable nature of the cry. The most widely used definition is “fussing or crying lasting for a total of more than three hours per day and occurring on more than three days in any one week”<sup>3,4</sup>. The incidence varies from 1.5% to 11.9% depending on the case definitions and age group<sup>2</sup>. It is high in infants below 3 months of age and decreases considerably beyond 6 months of age<sup>5</sup>. Incessant crying is one of the common reasons for many emergency visits during infancy which often lead to considerable parental stress and anxiety<sup>6,7</sup>.

Consequences of incessant crying may range from economical burden to long-term disturbances in parent-child relationships and child maltreatment problems like shaken baby syndromes resulting in brain damage<sup>8,9</sup>. A few studies have reported early weaning in these babies because of mothers' perception of incessant crying as hunger cries or due to inadequate milk<sup>10</sup>. Sleep and feeding disturbances are also associated with incessant crying<sup>5</sup>. Reported incidence of serious underlying organic causes is around 5 to 10% in babies with incessant crying<sup>11,12</sup>. An inconsolable cry without any obvious causes such as hunger, thirst, loneliness, wet diaper, loud noise, requires detailed search for a medical cause even if it does not fulfill time criteria. This review article attempts to focus on a convenient approach to incessantly crying infants as this group has diagnostic difficulties and wide differential diagnoses.

### Method

The term “incessant cry” was combined with each of the following words: definition, prevalence, infant colic, clinical features, aetiology, investigations and management. These search strings were used to retrieve articles from Pubmed, Medscape, MDConsult, Google and Cochrane databases. Due to scarcity of articles, we included abstracts, textbook chapters and online materials without date restriction. We identified sixteen descriptive studies, thirteen narrative reviews, nine systematic reviews, two e-articles and one text-book chapter as relevant. All articles were reviewed independently by all authors for supporting evidence for the evaluation and management guidelines.

### Evaluation

Most parents consult the paediatrician if they are not able to either identify the cause for crying or if the child is difficult to console. Examination and arriving at a diagnosis is always a concern when evaluating a crying infant at the emergency department. The element of missing out a small percentage of underlying serious illness adds stress to the health care professionals<sup>13</sup>. Gormally<sup>14</sup> and Treem<sup>15</sup> have identified the following pointers for underlying organic causes:

- High-pitched/abnormal sounding cry.
- Lack of a diurnal rhythm.
- Presence of frequent regurgitations, vomiting, diarrhoea, blood in stools, weight loss, failure to thrive.
- Positive family history of migraine, asthma, atopy, eczema.
- Maternal drug ingestion.

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- Positive physical examination (including eyes, palpation of large bones, and neurologic, gastrointestinal, and cardiovascular assessment).
- Persistence of crying past 4 months of age.

The causes of incessant crying range from trivial illness to life threatening diseases<sup>6,16</sup>.

## **Causes**

### **1. Infantile colic and behavioural cries**

Infantile colic is defined as paroxysmal crying more than 3 hours/day occurring, more than 3 days/week, lasting more than 3 weeks in an otherwise healthy child who is more than 3 weeks and less than 4 months of age<sup>17</sup>. Some consider it as a spectrum ranging from a normal cry to a distinct behavioural syndrome<sup>13</sup>. Colic is a diagnosis of exclusion made after performing a careful history and physical examination to rule out less common organic causes. Two studies have shown that colic is the leading cause of incessant crying during infancy<sup>6,18</sup>. The occurrence of infantile colic in community-based samples varies from 5 to 25 percent of infants<sup>19</sup>. Organic aetiologies with causal relationship for infantile colic are likely to account for less than 5% of cases. Reflux oesophagitis, urinary tract infections, intolerance to cow's milk and lactose are some causes with varying strength of evidence for colic<sup>13</sup>. These episodes usually resolve by about 4 months of age.

Apart from colic, conditions such as persistent mother-infant distress syndrome, temperamentally difficult and deregulated infant syndromes are described in older infants<sup>13</sup>. As persistent cry and irritability are components of the above behavioural disturbances, these should be considered during work up<sup>20,21</sup>. Postpartum depression in mothers is a known risk factor for behaviourally disturbed infants and this should also be screened<sup>22</sup>. Incessant crying beyond 3 months of age is associated with hyperactivity, cognitive deficits, poor fine-motor abilities and disciplinary problems when children reach 5 years of age<sup>23</sup>.

### **2. Genitourinary system**

Urinary tract infection (UTI) was the most common occult infection in one cohort study, accounting for 25% of all serious aetiologies<sup>16</sup>. Incessant crying may be the main symptom of UTI in some afebrile infants<sup>24</sup>. Other less common causes include torsion

of testis, urinary retention, obstructed inguinal and femoral hernia which warrant thorough clinical examination of genitals and ultrasonogram to confirm the diagnosis<sup>6,16,18</sup>.

### **3. Other Infections**

An underlying infective cause should be searched for in any febrile infant with incessant crying. Apart from urinary tract infections, other conditions such as acute otitis media (AOM), meningitis, herpes infection, pneumonia, cellulitis and viral illness were reported in incessantly crying children<sup>6,16,18</sup>. Two studies have shown that AOM is the most common problem among infants with unexplained crying<sup>6,18</sup>.

### **4. Gastrointestinal system**

The causes under this category include constipation with or without anal fissure, gastro-oesophageal reflux disease (GORD), intussusceptions and intestinal obstructions<sup>6,16,18</sup>. Diagnosis of this group is not difficult as they present with a history of vomiting, feeding difficulties, abdominal distension, etc. GORD is often aetiologically implicated in infantile colic but concrete evidence is lacking in the literature<sup>14</sup>. Intussusception needs a high index of suspicion as a combination of mass in the abdomen, rectal bleeding and vomiting, is present in only about one third of the cases<sup>25</sup>.

### **5. Musculoskeletal system**

Non accidental trauma with fractures especially to ribs, skull bones and long bones should arouse suspicion of conditions such as shaken baby syndrome and child abuse<sup>9,26</sup>. Incessant crying is a precipitating factor as well as a sequel of child abuse. One should gently palpate the whole body and look for restriction of movements, skin bruises and muscle haematoma. Other causes such as septic arthritis, osteomyelitis, tourniquet entrapment of the digits and penis should also be considered<sup>27</sup>.

### **6. Eyes**

Examination of eyes is not given due importance during physical examination by physicians. Corneal abrasions, ocular foreign body, retinal haemorrhage, retinal detachment and glaucoma should be ruled out in every crying infant<sup>6,16</sup>. If corneal enlargement is present, glaucoma should be suspected and the child referred to an ophthalmologist immediately<sup>27</sup>. Presence of retinal haemorrhage and retinal detachment indicate child abuse.

## 7. *Other causes*

The following are some cases where incessant crying is one of the presenting symptoms<sup>6,16,18,27</sup>.

- Foreign body in airway
- Supraventricular tachycardia
- Burns
- Diaper rash
- Cow's milk allergy
- Sickle cell anaemia and crisis
- DTP immunization
- Insect bites
- Pseudotumor cerebri
- Electrolyte and acid base imbalance

### **Diagnostic Approach**

#### *History*

Although some infants cry more than others, the triggers for crying remain a puzzle. Comprehensive history taking and physical examination should be the cornerstone in approaching a crying infant. Duration, frequency, periodicity and intensity of crying episodes with aggravating and alleviating factors should be recorded. History should also focus on co-morbid medical conditions, sibling and family history, recent vaccination, photophobia, feeding and sleep behaviour. It is also important to assess the mother – infant relationship, maternal fatigue and stress. Parents are excellent observers and are often able to find subtle signs and symptoms.

#### *Physical examination*

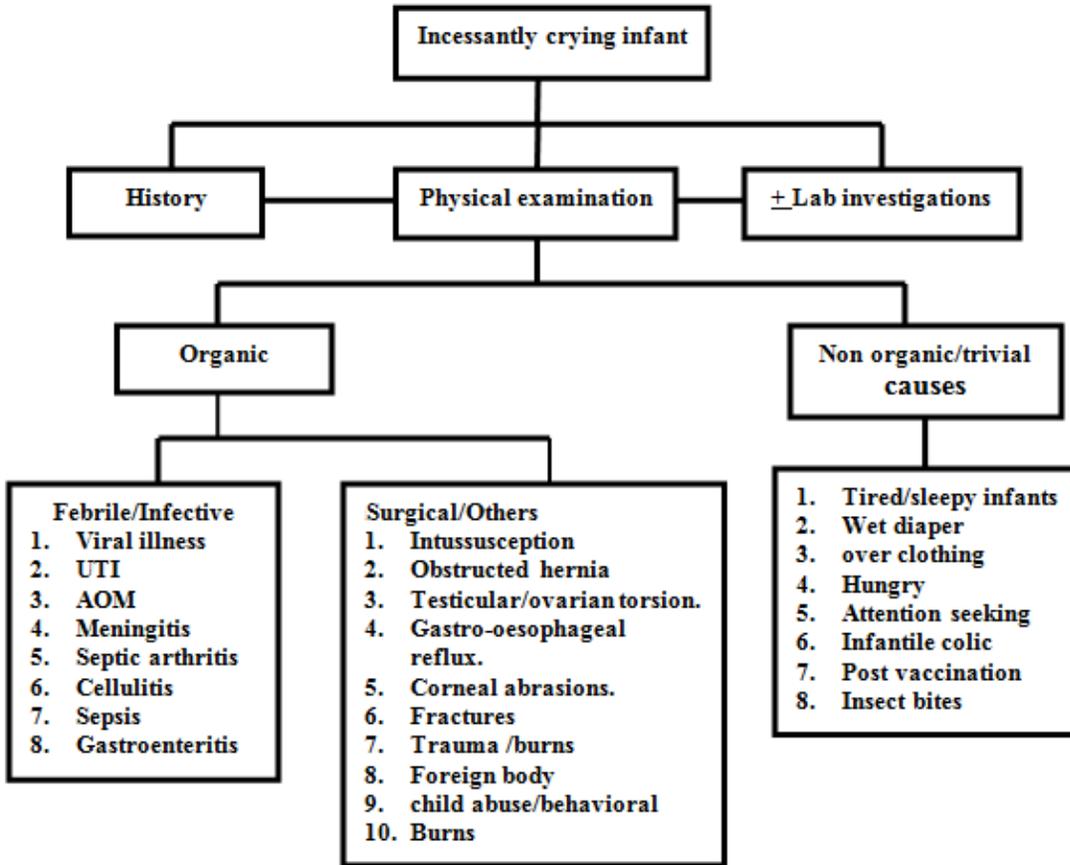
Physical examination should first ascertain whether the infant is healthy or ill- looking as life threatening conditions are not uncommon with incessant crying<sup>27</sup>. Vital signs should be recorded first and the entire body, including genitals, should be thoroughly

inspected. Eyelids have to be everted for ocular foreign bodies. Infants who continue to cry throughout the initial assessment should be observed further and re-examined during normal periods. The infant's crying behaviour should be documented, including time of day, length of episodes, and how often the infant is ill. Detailed observation of cry often gives diagnostic clues. For example, high pitched incessant cry may indicate central nervous system infection. A continuous cry associated with grunting may indicate respiratory infection / foreign body. Screaming with pulling at the ears may indicate AOM. Intermittent bouts of crying associated with pallor, with the knees drawn up over the abdomen may indicate intussusception. Paroxysmal crying episodes in an otherwise healthy infant less than 4 months of age typically occurring in the late afternoon and evening suggest infantile colic.

Physical examination should be systematic including head to foot examination. Some parts of examination may be repeated if required as examining a fussy infant is not easy. The following are some commonly missed findings during physical examination:

- Anal fissure
- Corneal abrasion / ocular foreign body
- Retinal haemorrhage / detachment
- Bulging tympanic membrane
- Incarcerated hernia
- Hair tourniquet
- Rib fractures
- Open diaper pin injury
- Teething- tender swollen gums
- Megalocornea – glaucoma

With the history and examination findings one should be able to categorize the crying infant into any one group (refer flow chart) and the child investigated further.



**Flow chart**

*UTI – urinary tract infections, AOM- acute otitis media*

### **Laboratory investigations**

The role of investigations in identifying the cause of crying in infants is limited. According to a few cohort studies, it may help in only 3-5% cases where history and examination findings are inconclusive<sup>6,18</sup>. The yield of the laboratory investigations vary with the context of screening test or confirmation test. For example, corneal fluorescein staining is done as a screening test for abrasions and USG abdomen for intussusception is done as a confirmation test. There is no clear role for routine screening tests such as corneal fluorescein staining<sup>28,29</sup>, urine microscopic examination and culture<sup>26</sup>, stool occult blood testing and rectal examination<sup>30</sup> in all cases of unexplained crying. Testing for gastro-oesophageal reflux is not done routinely as there is no strong causal relationship with infant crying and irritability reported in the literature<sup>3,31</sup>.

The clinical assessment should guide decision making about sequential investigations. If there are no clues in the patient's history or by physical

examination suggesting a specific infection or area of suspicion, it is unlikely that diagnostic studies will be helpful in identifying the aetiology. A period of observation or follow up would be desirable in those cases till diagnosis is established. At times negative results help in ruling out serious illness and for reassurance before discharge.

### **Treatment**

Crying is a 'common denominator' for a variety of illnesses and physiological disturbances. Management of these incessant crying episodes will depend on the diagnosis obtained. Ruling out apparent causes of crying such as hunger, sleepiness and tiredness is the first step in treating an infant with persistent crying. In febrile crying infants with or without a focus of infection, the management should be based on any standard guidelines for sepsis work up. Other surgical and miscellaneous conditions should be managed accordingly.

Treatment strategies for infant colic include drugs, dietary modifications and behavioural interventions. Behavioural interventions should be tried first as it has documented efficacy<sup>32</sup>. If they fail to produce relief, drug and dietary management may be tried<sup>32</sup>. Dicyclomine has been shown to effectively reduce infant crying in two randomized controlled trials<sup>33,34</sup>. Risk of apnoea and seizures should be considered before recommending dicyclomine<sup>35</sup>. Simethicone is relatively safe but has no proven effect on infant crying when compared with placebo in randomized controlled trials<sup>33,34</sup>. There may be some benefit in hypoallergenic baby formula or adjusting the mother's diet, but the only proven treatment is time<sup>36</sup>.

Supportive care is very essential when no underlying medical cause is found. Parents and care givers should be given an explanation about normal crying and sleep patterns, and to recognize needs and discomforts of the baby. Mother's emotional state and the mother-baby relationship should be addressed. Ensure that the baby is adequately fed and rested. Some general measures such as firmly holding the baby, swaddling, massaging, singing and playing white noise may be tried. White noise has a soothing effect on crying and irritable infants<sup>37,38</sup>. It is a steady stream of subtle monotonous sound such as vacuum cleaner, water fall, rain shower etc. A noteworthy intervention called 'REST' nursing regimen for babies and parents is found to be somewhat useful in reducing infant crying and parental stress<sup>39,40</sup>. REST for infants consists of Regulation (prevent over stimulation and overtiredness, watch for early warning signs, assist in state transitions and limit crying jags by catching them early), Entrainment (e.g. synchronizing infant behavior with environmental stimuli such as light or noise), Structure (Structured routines include bathing and playtime, as well as consistent sleeping and feeding times), and Touch (e.g., soothing techniques such as holding or rocking). REST for parents includes Reassurance, Empathy, Support from the health care provider and Time out for the parents (e.g., rest and renewal)<sup>41</sup>. As all comforting measures will not work for everyone, parents should be guided to identify a unique, comforting technique that is suitable for their infant. In extreme cases mild sedation and temporary hospitalization is indicated. Professional support with reassurance and empathy from health care providers is critical in dealing with these infants and parents.

## References

1. Brazelton TB. Crying in infancy. *Pediatrics* 1962; **29**:578–9.

2. Reijneveld SA, Brugman E, Hirasing RA. Excessive infant crying: the impact of varying definitions. *Pediatrics* 2001; **108**:893-7. <http://dx.doi.org/10.1542/peds.108.4.893>
3. Wessel MA, Cobb JC, Jackson EB, Harris GS Jr, Detwiler AC. Paroxysmal fussing in infancy, sometimes called "colic". *Pediatrics* 1954; **14**: 421-34.
4. Zeskind PS, Barr RG. Acoustic characteristics of naturally occurring cries of infants with "colic". *Child Development* 1997; **68**:394–403. <http://dx.doi.org/10.2307/1131667>
5. Von Kries R, Kalies H, Papoušek M. Excessive crying beyond 3 months may herald other features of multiple regulatory problems. *Archives of Pediatrics & Adolescent Medicine* 2006; **160**:508-11. <http://dx.doi.org/10.1001/archpedi.160.5.508>
6. Poole SR. The infant with acute, unexplained, excessive crying. *Pediatrics* 1991; **88**:450–5.
7. Forsyth BW, Leventhal JM, McCarthy PL. Mother's perceptions of problems of feeding and crying behaviours. *American Journal of Diseases of Children* 1985; **139**:269-72.
8. Morris S, St James-Roberts I, Sleep J, Gilham P. Economic evaluation of strategies for managing crying and sleeping problems. *Archives of Disease in Childhood* 2001; **84**:15–19. <http://dx.doi.org/10.1136/adc.84.1.15>
9. Barr R, Trent R, Cross J. Age-related incidence curve of hospitalized shaken baby syndrome cases: convergent evidence for crying as trigger to shaking. *Child Abuse & Neglect* 2006; **30**:7–16. <http://dx.doi.org/10.1016/j.chiabu.2005.06.009>
10. Forsyth BWC, McCarthy PL, Leventhal JM. Problems of early infancy, formula changes, and mothers' beliefs about their infants. *Journal of Pediatrics* 1985; **106**:1012–7. [http://dx.doi.org/10.1016/S0022-3476\(85\)80260-2](http://dx.doi.org/10.1016/S0022-3476(85)80260-2)
11. Armstrong K, Previtera N, McCallum RN. Medicalizing normality? Management of irritability in infants. *Journal of Paediatrics and Child Health* 2000; **36**:301-5. <http://dx.doi.org/10.1046/j.14401754.2000.00509.x>

12. Rautava P, Helenius H, Lehtonen L. Psychosocial predisposing factors for infantile colic. *British Medical Journal* 1993; **307**:600-4. <http://dx.doi.org/10.1136/bmj.307.6904.600>
13. Barr R. Colic and crying syndromes in infants. *Pediatrics* 1998; **102**:1282-6.
14. Gormally S. Clinical clues to organic etiologies in infants with colic. In: Barr R., St. James-Roberts I., Keefe M (editors). New evidence on unexplained early infant crying: its origins, nature and management, Johnson & Johnson Pediatric Institute, Skillman (NJ), 2001:133-49.
15. Treem W.R. Assessing crying complaints: the interaction with gastro-oesophageal reflux and cow's milk protein intolerance. In: Barr R.G., St James-Roberts I., Keefe M (editors). New evidence on unexplained early infant crying: its origins, nature and management, Johnson & Johnson Pediatric Institute, Skillman (NJ), 2001:165-76.
16. Freedman SB, Al-Harthy N, Thull-Freedman J. The crying infant: diagnostic testing and frequency of serious underlying disease. *Pediatrics* 2009; **123**:841-8. <http://dx.doi.org/10.1542/peds.2008-0113>
17. Roberts DM, Ostapchuk M, O'brien JG. Infantile colic. *American Family Physician* 2004; **70**:735-40.
18. Fahimi D, Shamsollahi B, Salamati P, Sotoudeh K. Excessive crying of infancy: a report of 200 cases. *Iran Journal of Pediatrics* 2007; **17**:222-6.
19. Lucassen PL, Assendelft WJ, van Eijk JT, Gubbels JW, Douwes AC, van Geldrop WJ. Systematic review of the occurrence of infantile colic in the community. *Archives of Disease in Childhood* 2001; **84**:398-403. <http://dx.doi.org/10.1136/adc.84.5.398>
20. Stifter CA. Crying behaviour and its impact on psychosocial child development. In: Tremblay RE, Barr RG, Peters RDeV. (Editors). Encyclopedia on Early Childhood Development [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development; 2005:1-7. Available at: <http://www.excellence-earlychildhood.ca/documents/StifterANGxp.pdf>. Accessed March 24, 2010.
21. DeGangi GA, DiPietro JA, Greenspan SI, Porges SW. Psychophysiological characteristics of the regulatory disordered infant. *Infant Behaviour and Development* 1991; **14**:37-50. [http://dx.doi.org/10.1016/0163-6383\(91\)90053-U](http://dx.doi.org/10.1016/0163-6383(91)90053-U)
22. McMahon C, Barnett B, Kowalenko N, Tennant C, Don N. Postnatal depression, anxiety and unsettled infant behaviour. *Australian and New Zealand Journal of Psychiatry* 2001; **35**:581-8. <http://dx.doi.org/10.1080/0004867010060505>
23. Rao MR, Brenner RA, Schisterman EF, Vik T, Mills JL. Long term cognitive development in children with prolonged crying. *Archives of Disease in Childhood* 2004; **89**:989-92. <http://dx.doi.org/10.1136/adc.2003.039198>
24. Du JN. Colic as the sole symptom of urinary tract infection in infants. *CMAJ* 1976; **115**:334-5.
25. Eshel G, Barr J, Heyman E, Tauber T, Klin B, Vinograd I, et al. Intussusception: a 9-year survey (1986-1995). *Journal of Pediatric Gastroenterology and Nutrition* 1997; **24**:253-6. <http://dx.doi.org/10.1097/00005176-199703000-00004>
26. Altimier, Leslie. Shaken baby syndrome. *Journal of Perinatal & Neonatal Nursing* 2008; **22**:68-76.
27. Herman M, Le A. The Crying Infant. *Emergency Medicine Clinics of North America* 2007; **25**:1137-59. <http://dx.doi.org/10.1016/j.emc.2007.07.008>
28. Poole SR. Corneal abrasion in infants. *Pediatric Emergency Care* 1995; **11**:25-26. <http://dx.doi.org/10.1097/00006565-199502000-00007>
29. Levin AV. Eye trauma. In: Fleisher GR, Ludwig S, Henretig FM (editors). Textbook of Pediatric Emergency Medicine. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
30. Reuchlin-Vroklage LM, Bierma-Zeinstra S, Benninga MA, Berger MY. Diagnostic value of abdominal radiography in constipated children: a systematic review. *Archives of Pediatrics & Adolescent Medicine* 2005; **159**:671-8. <http://dx.doi.org/10.1001/archpedi.159.7.671>

31. Heine RG, Jaquier A, Lubitz L, Cameron DJS, Catto-Smith AG. Role of gastro-oesophageal reflux in infant irritability. *Archives of Disease in Childhood* 1995; **73**:121-5.  
<http://dx.doi.org/10.1136/adc.73.2.121>
32. Wolke D. Behavioral Treatment of Prolonged Infant Crying: Evaluation, methods and a proposal. In, Barr R, St. James-Roberts I, Keefe M (editors). New evidence on unexplained early infant crying: its origins, nature and management, Johnson & Johnson Pediatric Institute, Skillman (NJ), 2001:187-207.
33. Garrison M, Christakis A. A systematic review of treatments for infantile colic. *Pediatrics* 2000; **106**:184-90.
34. Lucassen PL, Assendelft WJ, Gubbels JW, van Eijk JT, van Geldrop WJ, Knuistingh Neven A. Effectiveness of treatment for infantile colic: a systematic review. *British Medical Journal* 1998; **16**:1563-9.  
<http://dx.doi.org/10.1136/bmj.316.7144.1563>
35. Willimas J, Watkins-Jones R. Dicyclomine: worrying symptoms associated with its use in some small babies. *British Medical Journal* 1984; **288**:901.  
<http://dx.doi.org/10.1136/bmj.288.6421.901>
36. Charles AC, Sarah T. What is the best treatment for infants with colic? *The Journal of Family Practice* 2006; **55**:634-6.
37. Zenwirth H. Sounds for silence: babies' health and settling guide. Ballarat: oKIDokie Pty Ltd, 2005.
38. Hiscock H. The crying baby. *Australian Family Physician* 2006; **35**:680-4.
39. Keefe M, Lobo ML, Froese-Fretz A, Kotzer AM, Barbosa GA, Dudley WN. Effectiveness of an intervention for colic. *Clinical Pediatrics (Philadelphia)* 2006; **45**:123-33.  
<http://dx.doi.org/10.1177/000992280604500203>
40. Keefe M, Kajrlsen KA, Lobo ML, Kotzer AM, Dudley WN. Reducing parenting stress in families with irritable infants. *Nursing Research* 2006; **55**:198-205.  
<http://dx.doi.org/10.1097/00006199-200605000-00006>
41. Keefe M. The REST Regimen: A conceptual approach to managing unexplained early infant irritability. In, Barr R., St. James-Roberts I., Keefe M, editors, New evidence on unexplained early infant crying: its origins, nature and management, Johnson & Johnson Paediatric Institute, Skillman (NJ), 2001:229-44.