Beyond Conventional Management: Establishing Lactase Enzyme Supplementation as an Evidence Based Intervention for Colic Relief

Reviewed by:

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Infantile Colic: A Common Yet Largely Unknown Problem

Infantile colic is a common condition characterized by unexplained, inconsolable crying episodes in otherwise healthy infants without any identifiable cause. It can lead to significant parental distress, increase the risk of child abuse, and contribute to early cessation of breastfeeding.[1] According to Wessel's criteria, also known as the 'rule of threes,' colic is defined as episodes of irritability, fussing, or crying lasting at least 3 hours per day, on 3 or more days per week, for at least 1 week, in an otherwise healthy infant aged 2 weeks to 4 months.[2]

Burden of Infantile Colic

Infantile colic affects approximately 3% to 28% of infants worldwide, although some studies report prevalence rates as high as 40%. One study found an incidence of 17% to 25% among newborns and infants younger than 6 weeks, 11% among those aged 8 to 9 weeks, and 0.6% among those aged 10 to 12 weeks. Despite variations in prevalence, no consistent association has been established with gender, feeding type (breastfed or formulafed), gestational age at birth, socioeconomic status, or birth order. Interestingly, colic appears to be more common among White infants living in industrialized countries located farther from the equator. Although difficult to measure precisely, caregiver stress, marital discord, family tension, and low parental self confidence during pregnancy have all been linked to an increased risk of infantile colic.[3]

Clinical Features

Infant colic is often characterized by facial flushing, frowning, abdominal tension, clenched fists, and drawing up of the legs. Key clinical features include its prolonged duration, difficulty in soothing, and the absence of an identifiable cause. The length and intensity of inconsolable crying episodes are strongly associated with caregiver frustration. During the 1st 4 months of life, the inability to calm the infant can be particularly distressing for parents, as they often feel helpless in managing the persistent crying.[3]

Potential Causes of Infantile Colic

The underlying cause of infantile colic is unknown, it may be to be due to multiple factors:

- Cows' milk protein allergy.
- Transient lactose intolerance and excessive gas production.
- Infantile colic as excessive, difficult to soothe, poorly understood crying in an otherwise healthy infant.
- Painful gut contractions (hyperalgesic colonic hyper-peristalsis).
- Increased levels of gut hormones (motilin and ghrelin) causing colonic hyperperistalsis.
- Maternal smoking which increases the hormone motilin.
- Imbalance in intestinal microflora towards more gas producing pro inflammatory coliforms.
- Behavioral problems resulting from a less than optimal parent infant interaction.[4]

Lactose Intolerance: A Potential Cause of Infantile Colic

Transient lactose intolerance is considered one of the immediate causes of infantile colic, although research is still ongoing to clarify the role of lactose in its pathogenesis. Lactase, an enzyme located on the brush border of the small intestine, hydrolyzes lactose into glucose and galactose. When lactose remains undigested, it is fermented to produce lactic acid and hydrogen, leading to bloating, flatulence, and diarrhea in infants. Studies demonstrating reduced crying duration when formula or breast milk is pretreated with lactase enzyme supplements further support the potential involvement of lactose intolerance in infantile colic.[5]

To investigate whether lactose malabsorption could be a potential cause of infantile colic, a study was conducted in healthy newborns. Breath Hydrogen (H_2) levels were measured after feeding lactose (either from human or formula milk) in infants with and without colic, with assessments performed at 6 weeks and 3 months of age. Both breath H_2 concentrations and the number of positive breath tests were significantly higher in infants with colic compared to non colicky counterparts. Baseline breath H_2 values were notably elevated in colicky infants at both 6 weeks (40.6 ± 41.4 *vs.* 14.8 ± 32.9 ppm) and 3 months (27.7 ± 38.1 *vs.* 8.5 ± 18.2 ppm) compared with non colicky infants (Fig. 1).[6]

In infants with colic, 78% showed positive breath H_2 tests at 6 weeks and 89% at 3 months, compared to 36% at 6 weeks and 45% at 3 months in infants without colic (Fig. 2). Thus, colicky infants produce more breath H_2 in the fasting state and in response to feedings containing lactose than non colicky infants. Breath hydrogen test is more sensitive method of detecting lactose malabsorption in all age group.[6]

Figure 2: Colicky and Non Colicky Infants with Positive Breath H_2 Tests After Lactose Ingestion

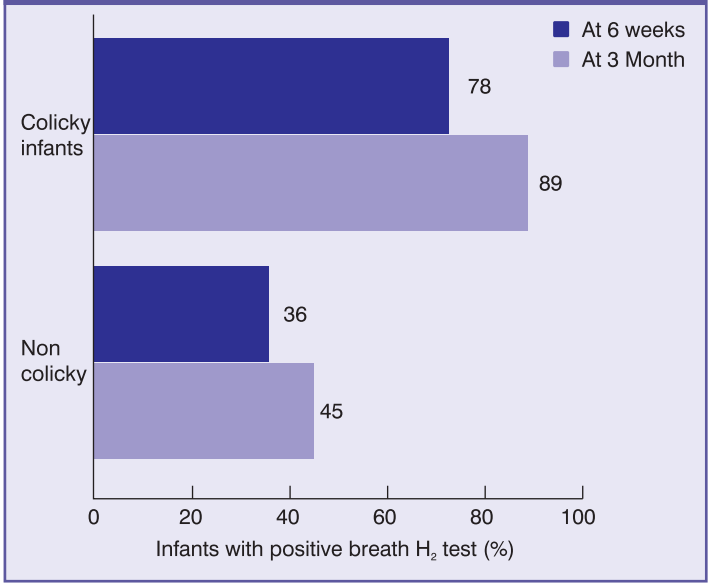
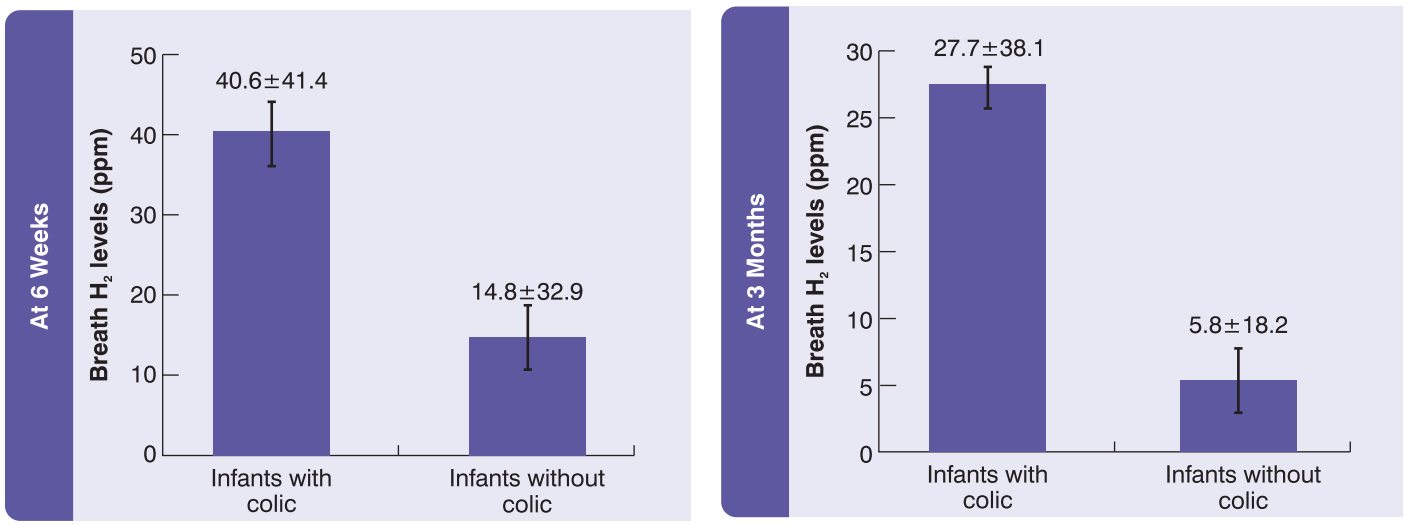


Figure 1: Breath H_2 Levels After Lactose Ingestion in Colic and Non Colic Infants



Management

Management of infantile colic should be guided by the underlying suspected cause. Initial management involves providing all parents with general advice on feeding and behavioral techniques to reduce aerophagia, along with reassurance. The most effective intervention—parental reassurance should be followed by medical evaluation and, if indicated, treatment trial targeting any suspected organic cause such as transient lactose intolerance, cow's milk protein allergy, constipation, or Gastroesophageal Reflux Disease (GORD). In cases without a clear organic etiology, interventions aimed at improving gut microflora balance and reducing hyperperistalsis or visceral hyperalgesia may be beneficial.[4]

General Recommendations

- Correct feeding and winding techniques must be established within the 1st week of life, particularly in a breastfeeding mother, where poor latching on technique is likely to result in breastfeeding cessation.
- As infantile colic is a common condition, management of colic could be provided as part of the health promotion activities of health visiting teams and children's center health staff.
- Smoking cessation advice should be considered, as it has been shown that babies are twice as likely to develop colic if the mother smoked 15 or more cigarettes daily during pregnancy.
- Exclude common causes of crying i.e. discomfort, hunger, and extremes of temperature.[4]

Potential Benefits of Lactase Enzyme Supplementation

Although the etiology of infantile colic remains unclear, therapeutic strategies—including dietary modifications, probiotics, parental education, positional techniques, and enzyme supplementation—primarily target gastrointestinal factors, with no consensus on the most effective approach. Lactase, the enzyme responsible for hydrolyzing lactose into glucose and galactose, has been administered as a supplement in attempts to alleviate colic symptoms.[7]

Clinical Evidence

Recently, a study conducted by Narang M *et al.* to evaluate both the efficacy benefits and safety of lactase drops in infants with colic. A total of 162 infants, age <5 months, with diagnosis of infantile colic were included. Lactase supplements were used at a dose of 5 drops (600 FCC units/mL) added either to expressed breast milk or formula milk given 4 times daily; the other treatment group received placebo. Treatment was given for a period of 4 weeks. Study results showed considerable benefits of lactase treatment, with a significantly shorter crying and fussing treatment compared to placebo (mean 89.9 *vs.* 178.5 minutes/day, respectively ($p=0.001$; Fig. 3). For all 4 weeks taken together, mean crying and fussing duration was 155.1 minutes in lactase treated infants and 234.1 minutes in placebo treated infants; (Fig. 3). Overall, treatment of infantile colic with lactase drops resulted in 35.1-55.2 minutes/day reduction in crying or fussing time. Management of infantile colic includes dietary modifications, probiotics, parental education and enzyme replacement.[1]

Figure 3: Comparison of Lactase Drops *vs.* Placebo on Crying and Fussing Time After 4 Weeks and Entire Duration of 4 Weeks of Treatment in Infantile Colic

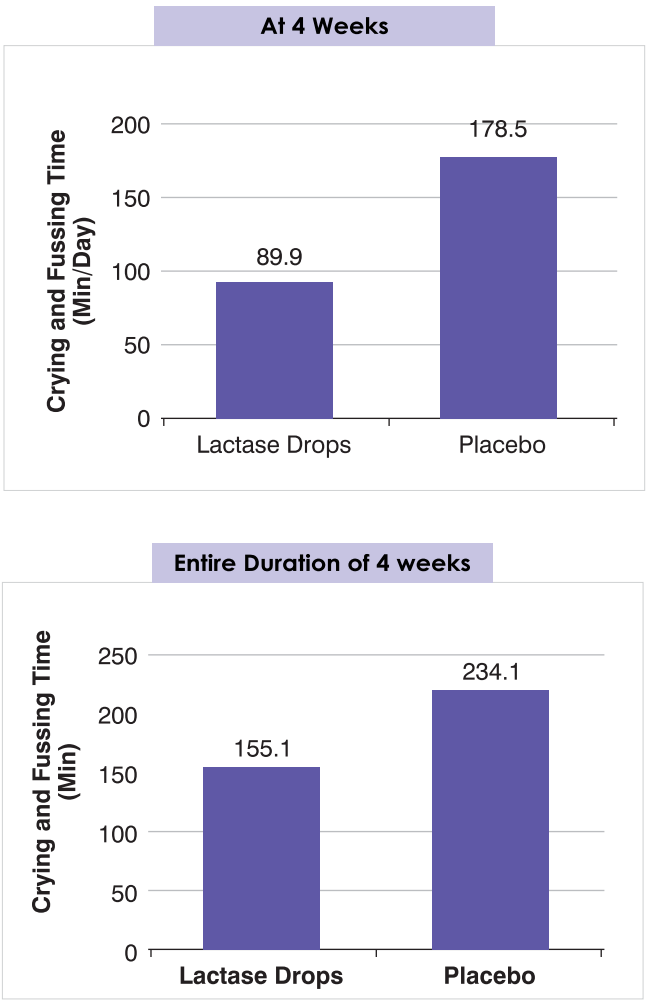


Table 1: Comparison Between the 2 Studied Groups Regarding Radiological Finding

Item		Group (A) (No.=100)		Group (B) (No.=100)		Test value	*p* value*
		No.	%	No.	%		
Abdominal US	Abdominal	0	0.0%	0	0.0%	-	-
	Normal	100	100.0%	100	100.0%		
Abdominal X-ray erect	Gaseous distension	83	83.0%	88	88.0%	1.01	0.315
	Marked gaseous distension	17	17.0%	12	12.0%		

$p \leq 0.05$ is considered statistically significant, $p \leq 0.01$ is considered high statistically significant,
*Chi- Square test

Another study conducted by Ahmad AM *et al.* to determine the efficacy of lactase enzyme supplement in infant colic in the 1st 4 months of life. A total of 200 infants subdivided into 2 groups: Group A includes 100 infants treated by lactase enzyme as 5 oral drops before maternal milk and Group B includes 100 infants treated with placebo. Results showed that regarding X-ray in erect position, at group (A), 83% infants had gaseous distension, and 17% of them had marked gaseous distension. While at group (B), 88% infants had gaseous distension, and 12% of them had marked gaseous distension (Table 1). Thus, oral lactase drops may result in significant symptomatic relief in infantile colic in terms of reducing the crying and number of colic days.[8]

Decrease in Daily Crying: In one parallel randomized controlled trial ($n=104$), a decrease in daily crying was found in the lactase group compared to the placebo group after the 1st and 2nd weeks of treatment. In an analysis of only compliant infants, a decrease in daily crying was noted in the lactase group compared to the placebo group (40.4%, $p=0.0052$). In a another trial, a decrease in mean daily crying time by 1.4 hours per day (SE 0.413, 95% CI, 0.23 to 2.05) was found in the lactase group compared with the placebo group during the 7 days of intervention.[9]

"Lactase enzyme supplementation showed significant reductions in crying duration and symptom severity in RCTs."

Duration of Crying: In one 4th week parallel study, with 154 participants, the mean duration of crying was shorter in the lactase group compared to the placebo group during the 2nd (MD–40.20 min/day), 3rd (MD –52.20), and 4th week (MD–50.10) of treatment. In one cross over study with 46 participants, the median duration of crying was reported in both the compliant and ITT analyses. In the lactase group, it was 520.0 and 657.5 minutes, and in the placebo group, it was 872.5 and 847.5 minutes during the 10 day intervention, respectively.[9]

Conclusion

Infantile colic remains a distressing yet often self limiting condition, posing considerable emotional and psychological burdens on caregivers. Emerging evidence supports transient lactose intolerance as a potential contributor to colic symptoms in a subset of infants. Multiple randomized controlled trials have demonstrated that **oral lactase enzyme supplementation significantly reduces daily crying and fussing durations compared with placebo, offering meaningful symptomatic relief without safety concerns**. Given its physiological rationale, favorable safety profile, and consistent efficacy across studies, **lactase supplementation can be considered a rational, evidence based adjunct in the management of infantile colic, particularly where lactose malabsorption is suspected**.

References

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