

Gastro-esophageal Reflux in Breastfed Babies: What's Missing?

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ABSTRACT

Breast milk is the food of choice for babies under six months. However, babies experiencing gastro-esophageal reflux (GER) are often prematurely weaned from the breast. A discursive literature review method was used to identify how research available to health care professionals considers the place of breast milk and breastfeeding (BF) in the presence of GER. Searching PubMed and CINAHL for the terms “gastroesophageal reflux” OR “gastroesophageal reflux” in healthy babies, and in articles that discuss non-pharmacological management of babies with GER, 54 articles were located and 27 articles related to babies with GER met the inclusion criteria. The articles are divided into three groups: those that make frequent reference to breastfeeding/breast milk, those that mention breastfeeding/breast milk briefly, and those that make no mention at all—resorting to management strategies that focus on the formula-fed baby. This discursive literature review demonstrates that breast milk and breastfeeding are not widely considered in publications about GER. Formula milk would appear to be the default food for babies who have GER. There is a need for more research, new recommendations and support for breastfeeding mothers who have babies experiencing GER.

KEY WORDS

Breastfeeding, breast milk, gastro-esophageal reflux, thickened formula, cow's milk allergy

INTRODUCTION

The health benefits of breastfeeding for mothers and babies are numerous with an impact lasting till adulthood (Allen & Hector, 2005; Gartner et al., 2005; Godfrey & Lawrence, 2010; Ip et al., 2007). According to the World Health Organisation (WHO) (World Health Organisation, 2011) and the American Academy of Pediatrics (AAP) (Gartner et al., 2005) breast milk is the food of choice for babies. They strongly recommend breastfeeding infants exclusively for the first six months of their lives and ongoing breastfeeding for the first year or longer. “Exclusive breastfeeding” means that babies take no other food or liquid, including water, with the exception of vitamins, minerals and medicines or oral rehydration salts, during these first six months (World Health Organisation, 2011).

Breast milk has short- and long-term benefits that protect babies and mothers (Allen & Hector, 2005; Gartner et al., 2005; Godfrey & Lawrence, 2010). Breast milk provides antibodies for newborns and babies to help fight infections. Babies who are exclusively breastfed for the first six months of their lives have a 64% lower incidence of gastrointestinal infections, a 72% reduction in the risk of hospitalisation due to lower respiratory tract infection and a 23% decrease in otitis media prevalence (Ip et al., 2007). Furthermore, breastfed babies have a reduced incidence of sudden unexplained death syndrome (Gartner et al., 2005). As for the long-term benefits, breastfeeding is associated with reduced incidence of other diseases such as insulin-dependent and non-insulin-dependent diabetes, lymphoma, leukemia, Hodgkin's disease, obesity and hypercholesterolemia (Gartner et al., 2005; Ip et al., 2007; Kwan, Buffler, Abrams, & Kiley, 2004). Breastfeeding during the first year of life has a strong association with improved neurodevelopment, attributed to the long-chain, polyunsaturated, fatty acids found in breast milk (Guxens et al., 2011).

GER is the physiologic regurgitation of stomach contents into the esophagus with or without expulsion to the outside, with no other existing medical problems (Vandenplas et al., 2009). Babies experiencing GER are usually irritable, in pain, and unsettled at the breast or bottle, leading parents to seek medical advice (Indrio, Riezzo, Raimondi, Cavallo, & Francavilla, 2009). GER can be categorized as primary or secondary (Salvatore & Vandenplas, 2002). Primary GER is thought to occur in babies owing to the relaxation of an immature lower esophageal sphincter (LES). It is also theorized to be due to the relaxation of LES as a result of gastric distention through a default in the neural pathways. The relaxation of LES leads to the back-flow of gastric contents into the esophagus. This normal physiological reflux accounts for 50% of babies three months old and younger who have GER. As the baby gets older, the LES matures and tightens (Douglas, 2005). By the time they reach their first year, the GER in 95% of these babies will have resolved spontaneously (Sherman et al., 2009). Secondary GER is associated with cow's milk allergy (CMA) or hypersensitivity. Italian research has identified that CMA is responsible for up to 21% of all GER (Salvatore & Vandenplas, 2002).

The primary medical approach for managing symptoms of GER is non-pharmacological interventions, like lifestyle changes and the management of feedings. The goal is to ensure babies with GER continue to gain weight despite being restless during feeding time (Vandenplas et al., 2009). When babies fail to respond to conventional therapies and complications like esophagitis, respiratory problems and failure to thrive arise, they are known to suffer from gastro-esophageal reflux disease (GERD) and more intensive management like pharmacological therapy and even surgery might be needed. (Vandenplas et al., 2009). Given the importance of breast milk for babies and mothers, this review focuses on how breast milk and breastfeeding are considered in medical approaches to GER. GER and GERD are sometimes used interchangeably; this article will focus only on GER.

We have used a discursive literature review method in order to ascertain the literature available to health professionals around GER and how breastfeeding enters into discussions of GER. Although we have followed a typical method of searching the literature, our focus here was different. We are not interested in the findings of these studies, or in the evaluation of the robustness of their recommendations. Instead, we wanted to explore the

explicit and implicit positions the authors take on the issue of breastfeeding in their studies of babies with GER. This question emerged from the fact that a standard literature search revealed a paucity of information about the management of primary GER in breastfed babies. This is thought to be because health care practitioners do not know enough to advise breastfeeding mothers (Hogan, 2001; Kirkland & Fein, 2003; Sherman et al., 2009).

METHOD

We used a method pioneered by one of our authors (AJ), entitled a “discursive systematic review method” (Jutel, 2010). This method uses the conventional methods of the systematic review to establish a sample. However, there it leaves the systematic method. The focus of the subsequent analysis is on the discursive positions adopted by the authors, rather than on the research findings. The intent of this approach is to obtain insight into the beliefs and positions of the authors in relation to the subject of study—in this case, breastfeeding of a baby with GER. However, we were specifically interested in articles likely to contribute to the evidence base of practice recommendations around breastfeeding babies with GER, so we only retained research-based articles focusing specifically on non-pharmacological interventions.

We therefore searched the PubMed database for core clinical journals with date or language restriction using the search terms: (“gastroesophageal reflux” OR “gastroesophageal reflux”) NOT (“premature” OR “preterm” OR “congenital”), without restricting the terms to field. We limited our search to infants aged 0-23 months, and to articles published within the last ten years, as our intent was to capture current positions. We restricted our search to the English language, but included articles from non-English speaking countries. We also undertook a hand search of the articles cited in these studies for other relevant work.

We then read each study to decide its suitability for the review. We retained all articles that presented research-based, non-pharmacological management strategies for GER (independent of the author’s method), intended for health professionals. We excluded articles that were not research-based, were not directed at health professionals, were not discussing management of GER, focused on GERD as opposed to GER, or sought to validate a non-breastfeeding management approach (Table 1). The reason for excluding validating studies of non-breastfeeding approaches was that it would weight the body of the articles towards a discourse not intended by the authors.

All articles located by this method were then read thoroughly to get a sense of how breastfeeding figured in the authors’ reckoning and recommendations. Via a process of reading and re-reading, we identified common ways in which breastfeeding and breast milk were considered in the non-pharmacological management of the babies with GER, and we then classified all the articles accordingly.

RESULTS

The search method described above retrieved 54 articles in total, of which 27 met the inclusion criteria (Table 2). All of the articles approached breastfeeding and breast milk for non-pharmacological interventions in one of three ways:

- Frequent reference to breastfeeding (12 papers).
- Passing reference to breastfeeding (9 papers).
- No reference to breastfeeding (6 papers).

Frequent reference of breastfeeding/breast milk for non-pharmacological interventions

Twelve articles out of the 27 mentioned breastfeeding or breast milk, although there were no research articles focusing specifically on the issue of managing GER in breastfed babies. (There were, however, brochures and guidelines written by lactation consultants who discussed breastfeeding. However, these were practical guidelines, not research-based and, consequently, were excluded from consideration in this study). One article

proposed a theoretical argument to underpin future research. Using an evolutionary biological approach, Douglas (2005) presented numerous theoretical links between formula feeding and the unsettled baby with reflux (Douglas, 2005). The core reason behind gastro-esophageal distress, she suggested, was the discrepancy between the baby’s biological expectations and Western practices around feeding. In other words, the newborn digestive system is sensitive and immature, requiring frequent feeding. Longer gaps lead to a considerable increase of acid secretions and to an increase in esophageal acid exposure. This is because the amount of residual milk in the stomach is not enough to neutralize gastric acids. In modern society women do not expect to feed frequently, exacerbating the underlying cause. Another factor that contributes to reflux, she postulated, is milk formula itself. Formula milk takes twice as long to digest than breast milk, resulting in distention of the stomach, back-flow of milk-acid mixture into the esophagus and increased incidence of GER.

Douglas, Hill and Brodrigg (2011) emphasize the importance of supporting parents with unsettled babies experiencing GER, since it is a self-limiting condition, which is usually resolved within a few months. Even though the joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) mention that breastfeeding should not be discontinued because of GER, they propose no breastfeeding specific management recommendations beyond a maternal dairy-free, egg-free diet (Vandenplas et al., 2009).

Three of the reviewed articles (Hegar et al., 2009; Nevo, Rubin, Tamir, Levine, & Shaoul, 2007; Osatakul, Sriplung, Puetpaiboon, Junjana, & Chamnongpakdi, 2002) emphasized to parents, who were enrolled in their study, the importance of exclusively breastfeeding their babies. Nevo et al. (2007) argued that milk formula with added thickening agents provides babies with empty calories without the additional nutrition that is found in breast milk. This in turn may lead to obesity and diet-related chronic diseases later in adult life. They advised parents against supplementing their breastfed babies with formula (unless the babies were failing to thrive) because it may lead to early cessation of breastfeeding (Nevo et al., 2007).

Only two of the 12 articles provided non-pharmacological management suggestions for dealing with reflux in the preferably-breastfed babies. Osatakul et al. (2002) advised parents to avoid sudden changes in baby’s position or abdominal compression after feeding, and Yalcin and Kuskonmaz (2011) highlighted the importance of health care providers observing babies during breastfeeding in order to determine underlying problems, such as latching or sucking issues, yet did not make further suggestions.

Four of the reviewed articles that discussed cow’s milk allergy (CMA) and GER (De Greef, Hauser, Devreker, Veereman-Wauters, & Vandenplas, 2012; Ewing & Allen, 2005; Palumbo, Dolen, & Good, 2003; Salvatore & Vandenplas, 2002) were slightly more directive. They encouraged mothers to continue breastfeeding their babies, and recommended eliminating cow’s milk and eggs from the woman’s diet along with taking a calcium supplement. In addition, they advised supervision by appropriate health care professionals like lactation consultants, allergists, and nutritionists. However, Ewing and Allen (2005) warned mothers that if they were unable to follow the elimination diet and the baby’s growth was compromised owing to persistency of symptoms, breastfeeding should be stopped. A study, conducted by Parilla Rodriguez, Davilla Torres, Gonzalez Mendez and Gorrin Peralta (2002) to identify the knowledge of mothers about breastfeeding babies and their experience of GER, reported that GER was one of the reasons for stopping breastfeeding. This could be attributed to a recommendation from pediatricians, with 53.3% found to recommend that mothers change to infant formula, as a means of improving reflux.

Passing reference to breastfeeding/breast milk for non-pharmacological interventions

Nine of the 27 articles including reviews and clinical guidelines were quasi-silent on breastfeeding. These articles mentioned breastfeeding, but did not

focus on breastfed babies. One article recommended an alginate preparation mixed with water to help with the symptoms of GER. An alginate preparation is a medication used to increase the consistency of gastric contents to a gel like substance once it gets in contact with gastric acid, thus preventing the backflow into the esophagus (Gaviscon infant oral powder, 2012) (Managing gastro-oesophageal reflux in infants, 2009). Other authors dismissed the idea of thickened feedings as an option for breastfed babies outside of formula feeding (Arguin & Swartz, 2004; Carroll, Garrison, & Christakis, 2002; Henry, 2004).

Two articles advised the increased frequency of winding (burping) of babies during feeds, or keeping them upright following a feed with head of bed elevated to 30 degrees (Gremse, 2009; McPherson & Towner Wright, 2005).

Another article made brief mention of the differences that were inherent in breastfeeding such as breastfed babies having a lower esophageal acid exposure than formula-fed infants owing to faster gastric emptying rate (Bhatia & Parish, 2009). Others observed that breastfed babies regurgitate their feeds but they do so less often than formula fed babies (Hegar et al., 2009; Lawson, 2003) and one suggested that they stop vomiting earlier (Campanozzi et al., 2009). McPherson and Towner Wright (2005) suggested that they could not recommend an optimum treatment for breastfed infants with GER owing to the lack of evidence.

No reference to breastfeeding/breast milk for non-pharmacological interventions

There were six articles that did not discuss breastfeeding at all when considering the non-pharmacological management of babies with GER. Instead they considered care from a formula fed perspective (Falconer, 2009; Indrio et al., 2009; Sandritter, 2003; Vandenplas, Salvatore, & Hauser, 2005). These articles described conservative, dietary and non-pharmacological management, not including breastfeeding, as the first line of management. The treatments promoted included changing from formula to thickened formula or adding thickening agents to formula, despite a lack of convincing evidence about the therapeutic use of thickening agents (Indrio et al., 2009; Vandenplas et al., 2005). Thickening agents like guar gum, carob bean gum, rice cereal and soybean polysaccharide can cause a decrease in intestinal absorption of nutrients and minerals and an increase in cough incidence (Vandenplas et al., 2005). Another mode of management discussed was the use of hydrolysate amino-acid based formula, where there is CMA (Falconer, 2009; Indrio et al., 2009; Sandritter, 2003; Vandenplas et al., 2005). Indrio et al. (2011) discuss the use of low-fat formula, probiotic and prebiotic, to aid in faster gastric emptying. This is achieved through the use of formula supplemented with prebiotics and is not considered in relation to the breastfed babies. A study conducted by Myazawa et al. (2002) in Japan about prevalence of GER, showed that regurgitation was almost resolved by the age of 10-12 months compared to 12-14 months in Western countries. However, the rate of continuing and managing breastfeeding are not mentioned.

DISCUSSION

This discursive literature review demonstrates a gap in the literature where health care research and guidelines do not consider breastfeeding in the context of supporting babies experiencing GER. This lack of information leads to the potential risk that babies with GER might be weaned from breastfeeding, thus missing out on the health benefits of breast milk and breastfeeding (Yalcin & Kuskonmaz, 2011). The review has found that instead of breast milk, either thick formulas or regular formulas with added thickening agents, are the feeding methods advised within the majority of recently published literature. Most of the articles located do not advise/support breastfed babies with GER. Not surprising then is the deduction that health practitioners have little understanding and knowledge of how to support breastfeeding when breastfed babies experience GER (Hogan, 2001; Kirkland & Fein, 2003; Sherman et al., 2009; Vandenplas et al., 2009). The exceptions are the articles that discussed the management of breastfed babies with cow's milk allergies and GER as a symptom and/or studies conducted

in non-western countries. Lack of knowledge and support have been identified as two of the reasons for early cessation of breastfeeding.

Despite the recommendations of the NASPGHAN and the ESPGHAN which call the symptoms of GER in infants "...almost never so severe" that the mother cannot continue breastfeeding (Vandenplas et al., 2009), the authors (members of these societies) did not provide a management plan for breastfed babies diagnosed as experiencing GER (Vandenplas et al., 2009). This makes continuing breastfeeding challenging and harder to successfully maintain in the presence of GER symptoms—the goal that these two societies identify in their recommendations.

Breastfeeding remains the optimal nutrition for babies in developed and developing countries. The WHO recommends exclusive breastfeeding for a minimum of six months and up to two years as a complementary food (World Health Organisation, 2011). Babies experiencing GER, are not only missing out on the benefits of breastfeeding and breast milk, but also are disadvantaged as current management strategies are not clear. Thickened formula and thickening agents are not without risk and are controversial. Yet in the absence of research on non-pharmacological support of breastfeeding in GER, they remain the first-line therapeutic measure in relieving regurgitation (Chao & Vandenplas, 2007; Vandenplas et al., 2005). The important point here is that there is little current research on how to support babies to continue to breastfeed when they have GER. Additionally, it is at odds with the aims of the WHO and professional bodies supporting pediatric practice. Given the importance of breastfeeding and the high prevalence of GER, we argue that exploring the optimum management of breastfed babies with GER should be a research priority.

Not surprisingly, breastfeeding and GER does feature amongst information and discussions generated by lactation consultants. For example, Kombol (2009) and Bonyata (2011) discuss in detail the non-pharmacological management of breastfeeding a baby with GER. Whilst not able to claim it is research evidence based, they do provide some practical advice based on physiology which may improve symptoms of GER for breastfed babies. Management advice includes: holding a baby in an upright position while breastfeeding, giving the baby short and frequent breastfeeds, avoiding sudden movements, wearing the baby upright in a sling for 20-30 minutes after a feed, and assessing for allergies.

Health professionals need to provide evidenced-information for parents who have a baby with GER. This is difficult when there is so little evidence published which supports breastfeeding for babies with GER and when research analysis and critique are absent in the literature. Critiquing and analyzing research involve more than simply evaluating the quality of the research summaries provided in the literature. They also involve assessing the research question itself for its cultural and social content. This is particularly applicable in areas where there are contests or tensions about different approaches to the management of GER.

Without a critical review of the literature, such as the one we have undertaken, it is difficult to see absences. When the authors of studies or guidelines do not explore particular treatment modalities, or ask questions about a particular set of individuals (in this case, breastfed babies experiencing GER), the proposed solutions may not provide a perspective of the full armory of possibly managements.

This discursive literature review has identified the urgent need for primary research to identify the best non-pharmacological and therapeutic management approach for breastfed babies experiencing GER. It is clear that caring for a newborn with GER can be very tiring especially when there is a lack of guidance for parents. Therefore, it is essential to reassure, educate, and support parents that GER is usually a self-limiting disorder that improves as the baby gets older and the lower esophageal sphincter matures. This in itself may be a reassurance for some women, enabling them to continue to breastfeed.

Table 1: GER Discursive Literature Review – Excluded Articles

Reason	Reference
Studies testing one particular approach	<ul style="list-style-type: none"> • Horvath, A., Dziechciarz, P., & Szajewska, H. (2008). The effect of thickened-feed interventions on gastroesophageal reflux in infants: systematic review and meta-analysis of randomized, controlled trials. <i>Pediatrics</i>, 122(6), e1268-1277. • Chao, H. C., & Vandenplas, Y. (2007). Effect of cereal-thickened formula and upright positioning on regurgitation, gastric emptying, and weight gain in infants with regurgitation. <i>Nutrition</i>, 23(1), 23-28. • Ostrom, K. N., Jacobs, J. R., Merritt, R. J., & Murray, R. D. (2006). Decreased regurgitation with a soy formula containing added soy fiber. <i>Clinical Pediatrics</i>, 45(1), 29-37. • Puntis, J.W. (2005). Re: Effect of locust bean gum in anti-regurgitant milk on the regurgitation in uncomplicated gastroesophageal reflux. <i>Journal of Pediatric Gastroenterology and Nutrition</i>, 40(1), 101-102. • Vandenplas, Y. (2009). Thickened infant formula does what it has to do: decrease regurgitation. <i>Pediatrics</i>, 123(3), e549-e550. • Vanderhoof, J.A., Moran, J.R., Harris, C.L., Merkel, K.L., Orenstein, S.R. (2003). Efficacy of a pre-thickened infant formula: a multicenter, double-blind, randomized, placebo-controlled parallel group trial in 104 infants with symptomatic gastroesophageal reflux. <i>Clinical Pediatric</i>, 42(6), 483-495. • Wenzl, T. G., Schneider, S., Scheele, F., Silny, J., Heimann, G., & Skopnik, H. (2003). Effects of thickened feeding on gastroesophageal reflux in infants: a placebo-controlled crossover study using intraluminal impedance. <i>Pediatrics</i>, 111(4 Pt 1), e355-e359. • Xinias, I.F., Mouane, N., Le Luyer, B., Spirolou, K., Demertzidou, V., Hauser, B., Vandenplas, Y. (2005). Cornstarch thickened formula reduces oesophageal acid exposure time in infants. <i>Digestive and Liver Disease</i>, 37(1), 23-27. • Barak, M.F., Lahav, S., Mimoun, F.B., Dollberg, S. The prevalence of regurgitations in the first 2 days of life in human milk- and formula-fed term infants. <i>Breastfeeding Medicine</i>, 1(3), 168-171. • Martin, A.J., Pratt, N., Kennedy, J.D., Ryan, P., Ruffin, R.E., Miles, H., Marley, J. (2002). Natural History and Familial Relationships of Infant Spilling to 9 Years of Age. <i>Pediatrics</i>, 109(6), 1061-1067. • Heine, R.G. (2008). Allergic gastrointestinal motility disorders in infancy and early childhood. <i>Pediatric Allergy and Immunology</i>, 19(5), 383-391.
Studies discussing GERD but not GER	<ul style="list-style-type: none"> • Al-Adnani, M.F., Cohen, M.C., Scheimberg, I. (2011). Gastroesophageal reflux disease and sudden infant death: mechanisms behind an under-recognised association. <i>Pediatric and Development Pathology</i>, 14(1), 53-56. • Mir, A. (2010). Gastro-oesophageal reflux. Issues in clinical practice. <i>British Medical Journal</i>, 341. • Orenstein, S.R. (2008). Crying in infant GERD: acid or volume? Heartburn or dyspepsia? <i>Current Gastroenterology Report</i>, 10(5), 433-436.
Studies which are not treatment oriented	<ul style="list-style-type: none"> • Barbosa, L., Vera, H., Moran, S., Del Prado, M., Lopez-Alarcon, M. (2005). Reproducibility and reliability of the 13C-acetate breath test to measure gastric emptying of liquid meal in infants. <i>Nutrition</i>, 21(3), 289-294. • Castell, D.O., Mainie, I., Tutuian, R. (2005). Non-acid gastroesophageal reflux: documenting its relationship to symptoms using multichannel intraluminal impedance (MII). <i>Transaction of the American Clinical and Climatological Association</i>, 116, 321-333. • Cresi, F., Sanctis, L., Savino, F., Bretto, R., Testa, A., Silvestro, L. (2006). Relationship between gastro-oesophageal reflux and gastric activity in newborns assessed by combined intraluminal impedance, pH metry and epigastric impedance. <i>Neurogastroenterology and Motility</i>, 18(5), 361-368. • Woodley, F.W., Fernandez, S., Mousa, H. (2007). Diurnal variation in the chemical clearance of acid gastroesophageal reflux in infants. <i>Clinical Gastroenterology and Hepatology</i>, 5(1), 37-43. • Woodley, F.W., Hayes, J., Mousa, H. (2009). Acid gastroesophageal reflux in symptomatic infants is primarily a function of classic 2-phase and pH-only acid reflux event types. <i>Journal of Pediatric and Gastroenterology and Nutrition</i>, 48(5), 550-558. • Woodley, F.W., Mousa, H. (2009). "pH-Only" acid reflux events in infants during later phases of the feeding cycle are less acidic and cleared more efficiently than classic 2-phase acid reflux events. <i>Journal of Pediatric and Gastroenterology and Nutrition</i>, 48, 41-47. • Sifrim, D., Castell, D., Dent, J., Kahrilas, R.J. (2004). Gastro-oesophageal reflux monitoring: review and consensus report on detection and definitions of acid, non-acid, and gas reflux. <i>Gut</i>, 53(7), 1024-1031.
Comments, opinions or news articles	<ul style="list-style-type: none"> • Declich, V.F., Badina, L.F., Ventura, A. Does infant gastro-oesophageal reflux really deserve medical attention? <i>Archives of Disease in Childhood</i>, 95(9), 26-30. • Ballantyne, R. (2004). Gastric reflux support network helps parents. <i>Nursing New Zealand</i>, 10(3), 4. • Sondheimer, J.M., Finkel, Y., Molleston, J., Alonsom, E., Olivia-Hemker, M. Am I a heretic if I don't believe in GERD. <i>Journal of Pediatric Gastroenterology and Nutrition</i>, 43(1), 3-4.
Studies not directed at health professionals	<ul style="list-style-type: none"> • Cameron, F.L., Hansen, R., Abdelhadi, A. (2009). The vomiting baby. <i>British Medical Journal</i>, 339. • Gracey, K., Henry, S.M. (2004). Parent's guide to gastroesophageal reflux. <i>Advanced Neonatal Care</i>, 4(4), 248-249. • Barmby, L.C. (1999). Breastfeeding the baby with reflux. <i>La Leche League International</i>, 1-18

Table 2: GER Discursive Literature Review – Included Articles

Category	Article Type	Article
Substantive Mention of BF (n=12)	Guidelines	Vandenplas, Y., Rudolph, C. D., Di Lorenzo, C., Hassall, E., Liptak, G. Mazur, L., ... Wenzl, T.G. (2009). Pediatric gastroesophageal reflux clinical practice guidelines: Joint recommendations of the North American society for pediatric gastroenterology, hepatology, and nutrition (NASPGHAN) and the European society for pediatric gastroenterology, hepatology, and nutrition (ESPGHAN). <i>Journal of Pediatric Gastroenterology and Nutrition</i> 49(4), 498-547. Ewing, W. M., & Allen, P.J. (2005). The diagnosis and management of cow milk protein intolerance in the primary care setting. <i>Pediatric Nursing</i> , 31(6), 486-493.
	Cohort	Hegar, B., Dewanti, N. R., Kadim, M., Alatas, S., Firmansyah, A., & Vandenplas, Y. (2009). Natural evolution of regurgitation in healthy infants. <i>Acta Paediatrica</i> . 98(7), 1189-1193. Osatakul, S., Sriplung, H., Puetpaiboon, A., Junjana, C. O., & Chamnongpakdi, S. (2002). Prevalence and natural course of gastroesophageal reflux symptoms: a 1-year cohort study in Thai infants. <i>Journal of Pediatric Gastroenterology and Nutrition</i> , 34(1), 63-67.
	Descriptive Surveys	Nevo, N., Rubin, L., Tamir A., Levine A., & Shaoul, R. (2007). Infant feeding patterns in the first 6 Months: An assessment in full-term infants. <i>Journal of Pediatric Gastroenterology and Nutrition</i> , 45(2), 234-239 Yalcin, S. S., & Kuskonmaz, B. B. (2011). Relationship of lower breastfeeding score and problems in infancy. <i>Breastfeeding Medicine</i> , 6(4), 205-208. Parrilla Rodriguez, A. M., Davila Torres, R. R., Gonzalez Mendez, M. E., & Gorrin Peralta, J. J. (2002). Knowledge about breastfeeding in mothers of infants with gastroesophageal reflux. <i>Puerto Rico Health Science Journal</i> , 21(1), 25-29.
	Reviews	De Greef, E., Hauser, B., Devreker, T., Veereman-Wauters, G., & Vandenplas, Y. (2012). Diagnosis and management of cow's milk protein allergy in infants. <i>World Journal of Pediatrics</i> , 8(1), 19-24. Salvatore, S., & Vandenplas, Y. (2002). Gastroesophageal reflux and cow milk allergy: is there a link? <i>Pediatrics</i> , 110(5), 972-984. Douglas. (2005). Excessive crying and gastro-oesophageal reflux disease in infants: misalignment of biology and culture. <i>Medical Hypotheses</i> , 64(5), 887-898. Douglas, Hill, P., & Brodrribb, W. (2011). The unsettled baby: how complexity science helps. <i>Archives of Disease in Childhood</i> , 1-5.
	Case Study.	Palumbo, M., Dolen, W. K., & Good, R. A. (2003). A 16-month-old with persistent vomiting. <i>Annals of Allergy Asthma and Immunology</i> , 90(4), 380-382.
PPassing Mention of BF (n=9)	Reviews.	Managing gastro-oesophageal reflux in infants. (2009). <i>Drug and Therapeutics Bulletin</i> , 47(12), 134-137. Gremse, D. (2009). Managing the pediatric patient with GERD: special challenges and considerations. Medscape CME Gastroenterology. Retrieved from http://www.medscape.org/viewarticle/705430 . Arguin, A. L., & Swartz, M. K. (2004). Gastroesophageal reflux in infants: a primary care perspective. <i>Pediatric Nursing</i> , 30(1), 45-51. Bhatia, J., & Parish, A. (2009). GERD or not GERD: the fussy infant. <i>Journal of Perinatology</i> , 29, s7-s11. Carroll, A. E., Garrison, M. M., & Christakis, D. A. (2002). A systematic review of non-pharmacological and nonsurgical therapies for gastroesophageal reflux in infants. <i>Archives of Pediatric and Adolescent Medicine</i> , 156(2), 109-113. Retrieved from http://archpedi.ama-assn.org/cgi/content/full/156/2/109
	Clinical Inquiries	McPherson, V., & Towner Wright, S. (2005). What is the best treatment for gastroesophageal reflux and vomiting in infant? <i>Journal of Family Practice</i> , 54(4), 372-375.
	Guideline Management Review.	Henry, S. (2004). Discerning differences: gastroesophageal reflux and gastroesophageal reflux disease. <i>Advances in Neonatal Care</i> , 4(4), 235-247. Lawson, M. (2003). Gastro-oesophageal reflux in infants: an evidence-based approach. <i>British Journal of Community Nursing</i> , 8(7), 296-301.
	RCT.	Campanozzi, A., Boccia, G., Pensabene, L., Panetta, F., Marseglia, A., Strisciuglio, P., Staiano, A. (2009). Prevalence and natural history of gastroesophageal reflux: pediatric prospective survey. <i>Pediatrics</i> , 123(3), 779-783.
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