Continuing Professional Development

CPD

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60 Second Summary

Infancy is a time of rapid growth. Breastmilk provides all the nutrition an infant requires as well as having many non-nutritional functions. Support for breastfeeding can be sought from midwives, IBCLCs, public health nurses, doctors, mychild.ie and voluntary agencies. Most medications are safe for use when breastfeeding and specialist breastfeeding resources should be used for information.

If families choose to use a breastmilk substitute or formula milk, this should be one suitable for use from birth. There is no evidence that formulas designed for special indications such as colic or reflux are beneficial. Regurgitation or reflux is a normal phenomenon in infancy. Treatment is usually only required if infants have failure to thrive and are under medical supervision. 'Hungry baby' formulas are not recommended. First infant milk is suitable for use until the age of one and thereafter breastmilk or regular cows' milk is recommended.

Colic is described as recurrent and prolonged periods of infant crying, fussing or irritability starting and ending before five months with no obvious cause, which cannot be prevented or resolved by caregivers, with no evidence of failure to thrive, fever or illness (Rome IV).

The mainstay of treatment for colic is reassurance and support. Excessive infant crying is a risk factor for non-accidental injury. Dietary modification of breastfeeding mothers has not been found to be of benefit. Use of hydrolysed formula has not been shown to reduce crying in any clinically meaningful way. Use of the probiotics have been shown to reduce daily crying times by approximately 30 minutes per day, the most commonly studied agent is lactobacillus reuteri. There is insufficient evidence to recommend their use for formula feeding infants.

1. REFLECT - Before reading this module, consider the following: Will this clinical area be relevant to my practice?

2. IDENTIFY - If the answer is no, I may still be interested in the area but the article may not contribute towards my continuing professional development (CPD). If the answer is yes, I should identify any knowledge gaps in the clinical area.

3. PLAN - If I have identified a knowledge gap - will this article satisfy those needs - or will more reading be required?

4. EVALUATE - Did this article meet my learning needs - and how has my practise changed as a result?Have I identified further learning needs?

5. WHAT NEXT - At this time you may like to record your learning for future use or assessment. Follow the 4 previous steps, log and record your findings.

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Infant Nutrition

The importance of nutritional support in infants and coping with colic in babies

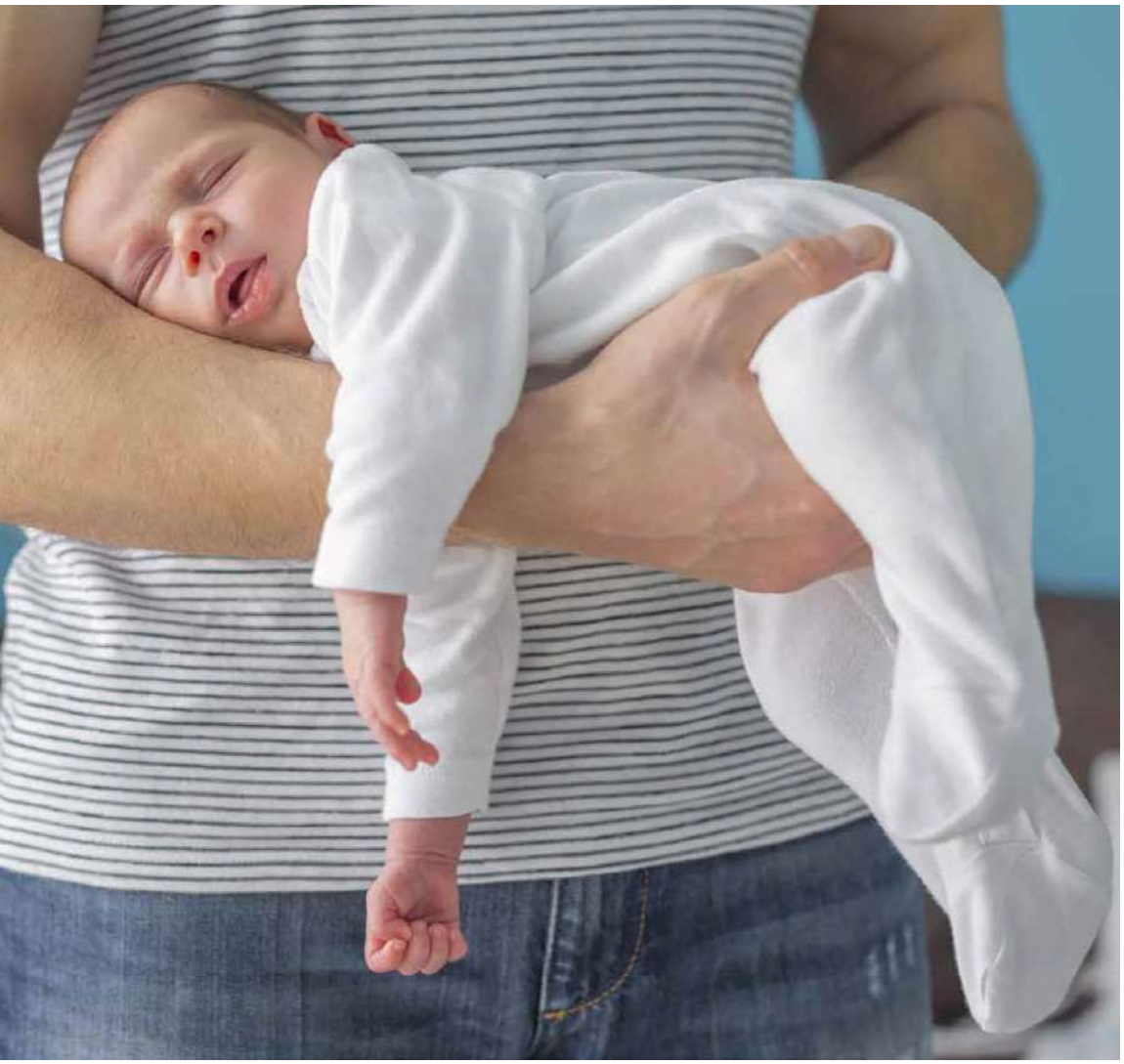
Introduction:

Infancy is a time of rapid growth. Babies double their birth weight by about 5 months and triple it by their first birthday. A healthy baby born at full term (37-42 weeks), requires about 100kcal per kilogram per day to grow normally. This would equate to 7000kcal per day for a 70 kg person! Babies who were born prematurely (born <37 weeks), were low birth weight (<2.5kg at birth) or have medical conditions such as congenital heart disease may have even higher energy requirements and need careful growth monitoring. Babies lose up to 10% of their birth weight in first few days of life. It is expected that they would regain their birth weight by two weeks of life, thereafter, weight gain is 150-210g per week for the first three months of life.

Supporting breastfeeding:

The WHO recommends that infants should be breastfed until 6 months with continued breastfeeding alongside the introduction of complementary foods until two years and beyond. Breastmilk contains all the nourishment a baby needs for the first six months, however food is only one of its functions. It contains essential amino acids for muscle and brain development, fats which are important components of the immune, cardiovascular and nervous systems and enzymes to encourage chemical reactions in the body. Human milk oligosaccharides are present to feed healthy bacteria in the gut. Breast milk contains live cells to fight infection and hormones which help regulate appetite and feelings of well-being. Nucleotides are contained in breastmilk which are the building blocks of genetic proteins and help send messages between cells. Growth factors and inflammatory mediators are present to help protect the growing bowel.

Breastmilk composition varies from person to person and changes from feed to feed. While the calorific content of breast milk remains fairly constant over time at approximately 67 kcal/100ml, the protein content decreases as the baby gets older. In the first few days of life, protein content of breast milk is as high as 1.8g/100ml (Gidrewicz & Fenton (2014) BMC Pediatrics), falling to 1.2g/100ml by the end of the first month and below 1g/100ml by the end of the third month. This reflects the rapid initial growth of the baby which slows by around 3 months of age. Breast milk composition is tailored to the age of the baby.



When babies are breastfeeding, it is not possible to determine the volumes of milk that the baby is receiving. If babies are gaining weight appropriately 150-210g per week, are having 5-7 wet nappies and are passing 2-3 yellow, seedy stools a day, these are all reassuring signs that breastfeeding is going well. Some babies will pass stools more or less frequently and this can be very normal. Volumes of milk produced when expressing can be different to what the baby receives when directly feeding from the breast. It is not usually useful to ask mothers to express milk simply to measure the volumes that the baby is ingesting. In warm weather, breastfeeding babies may feed more often, however they do not need additional fluids such as water. If breastfeeding babies have vomiting or diarrhoea, they should continue to breastfeed, but should seek medical attention as young babies may get dehydrated quickly if not tolerating milk.

HSE guidelines recommend 5 micrograms of Vitamin D daily for babies who are breastfeeding or receiving less than 300ml per day of formula milk from birth to 12 months. Routine iron or other multivitamin supplementation is not recommended unless prescribed. If a breastfeeding woman requires either prescribed or over the counter medication, it is important she receives accurate information about safety of use in breastfeeding. Most medications are safe for use when breastfeeding, however occasionally a more suitable medication is advised. Please see table for resources for healthcare professionals about medications in breastfeeding.

Parents can access support for breastfeeding from the public health nurse, midwife, maternity unit, International Board Certified Lactation Consultant (IBCLC), GP or voluntary/peer support groups.

Support for families who are formula feeding:

Some families will choose to use formula only from birth and some will use formula alongside breast milk for many different reasons. It is important for HCPs to adhere to the WHO Code of Marketing of Breast Milk Substitutes (WHO Code) and to share factual advice with families. Infant formula contains adequate nutrition for babies but it confers none of the other health benefits of breast milk. Breast milk continues to be of benefit, even in small amounts.

Babies who receive formula milk typically drink approximately 150ml/kg day and gain 150-210g per week. Formula should be made up according to manufacturer's instructions. The Food Safety Authority of Ireland does not recommend the use of formula preparation machines because of hygiene concerns. Impartial advice about preparation of formula milk is available on mychild.ie.

Many types of formula are available to buy and this can be confusing for parents who are selecting an appropriate formula for their baby. First infant milk suitable for use from birth can be used as a breast milk substitute from birth to 12 months, at which point regular cows' milk can be used. Switching to 'follow-on' or 'stage 2' milk has no benefits for a baby. The existence of these products is because in Ireland, the WHO Code has been interpreted to allow marketing of breast milk substitutes from 6 months and beyond. There is no biological need to switch milks at 6 months of age.

Many formulas claim they have added ingredients to make their product more like breast milk. However many of these additions are derived from cows' milk and have not been shown to have benefits for human babies. First Steps Nutrition is an excellent resource for HCPs and parents. This website reviews all the formula products available on the UK market and fact checks their claims of benefit. There is large variation in the price of different formulas, with no demonstrable benefit of the more expensive formula over a less expensive product. The HSE recommends that families should consult a healthcare professional before changing their baby's formula.

Many specialist-type formulas are available to buy over the counter. Goats milk is a suitable alternative to a cows' milk based formula, once it is nutritionally complete and suitable for infants from birth. There is no evidence that goats' milk is less allergenic than cows' milk. 'Hungry baby milk' is a product which contains more casein than whey protein which makes the milk harder to digest. There is no evidence to suggest that babies settle better or drink less milk when fed this type of formula. Also, because it is harder to digest, it can cause constipation.

Reflux or regurgitation is a normal physiological event in infancy. NICE guidelines do not recommend treatment of simple reflux in infants. For babies who are being formula fed, conservative management of reflux involves reducing feed volumes and increasing feed frequency. Where there is significant, frequent

regurgitation anti-reflux formula may be recommended and used under medical supervision. These milks are thickened with potato starch, carob or locust bean gum. These milks do not seem to reduce regurgitation but may reduce overt vomiting. Because of the thickening agents present in these milks, they are recommended to be reconstituted with cool water rather than at a temperature of 70°C as per HSE guidelines. This increases the risk of bacterial contamination and infection.

'Hypoallergenic formula' is 100% whey protein and is partially hydrolysed. It is marketed as reducing the risk of atopic dermatitis, however this claim has not been supported by the European Food Safety Authority (EFSA). This milk is not suitable for babies who have diagnosed food allergy. Only breastmilk has been shown to reduce the risk of allergy and atopy. Diagnosis and treatment of proven cows' milk protein allergy is outside the scope of this article. Soya protein-based formula should only be used if prescribed by a doctor for specific conditions such as galactosaemia. Some families wish to use them because of a history or suspected cows' milk protein allergy, but these milks have not been shown to prevent allergy and many children who have cows' milk protein allergy will also react to soya protein. Because of the presence of phyto-oestrogens and the potential to have a negative effect on future reproductive health, they are not recommended for infants under 6 months (unless prescribed). The primary source of carbohydrate is maltodextrin rather than lactose which can have a negative effect on the baby's dental health.

The primary source of carbohydrate in breast milk is lactose, so 'lactose intolerance' in infants is an extremely rare cause of unsettled behaviour and failure to thrive. Lactose free formulas use glucose as a carbohydrate source and thus are not kind to teeth. They are not recommended in the treatment of infant colic (see below).

Comfort milk is marketed as a type of formula that reduces symptoms of colic and/or constipation, however these claims are unsubstantiated. They contain partially hydrolysed whey protein. They are manufactured with reduced amounts of lactose and this is replaced by glucose, corn syrup or maltodextrin depending on the product. There is insufficient evidence to say they reduce symptoms of colic.

Coping with colic in babies:

What is colic?

Since the 1950's, colic has been described as unexplained paroxysmal crying for longer than three hours per day, for three days per week, for at least three weeks. More recently the Rome IV diagnostic criteria include infants who are less than five months when symptoms start and stop, who have recurrent and prolonged periods of infant crying, fussing or irritability with no obvious cause, that cannot be prevented or resolved by caregivers, with no evidence of failure to thrive, fever or illness. The condition is most frequent within the first six weeks of life and effects up to a quarter of infants. It is equally common in breastfeeding and formula feeding babies. Excessive infant crying is a frequent reason for parents to support from healthcare professionals and is a risk factor for non-accidental injury.

Normal infant behaviour:

Some would argue that the term colic is outdated, and that infant crying is part of normal newborn behaviour. It would be expected that a newborn infant would cry or be unsettled for 2-3 hours a day, with peak incidence of crying occurring at about six weeks of age. Babies have come from a very warm, secure environment and the outside world can be loud and scary. It is normal for a baby to want to be held and kept close to their parents. Physical closeness is important for establishing breastfeeding and the parental response to crying is what keeps babies safe. Parents often perceive a baby's cry as pain, however this is only means they have to communicate any discomfort to their caregiver. Infant crying can lead to parental distress and parents should be encouraged to seek support and also be aware of the risk of postnatal depression.

What red flags should we be aware of?

If parents are concerned about their baby's crying, they should be encouraged to speak to a healthcare professional and have a clinical exam and weight measurement. Reassurance can be beneficial. Fever (>38°C), bilious vomiting, projectile vomiting, poor weight gain, blood in the stool or any signs of injury are all reasons to seek medical attention. Similarly, if parents are struggling to cope, they may also need to speak with their doctor. Typically, the 'colicky' baby gains weight well and is keen to feed. They frequently appear quite happy and content when they visit the doctor!

What causes colic?

The aetiology of colic is undefined and is likely multifactorial – behavioural and biological components, gut microflora and dysmotility factors are the focus of research. Lactose intolerance and presence of allergens in formula or breast milk have been investigated as causes. The intestinal microbiome has been found to be different in infants with and without colic. Immature gut motility has also been investigated.

What is the treatment of colic?

Once no red flags are present, the mainstay of treatment is support and parental reassurance. Babies are unable to self-soothe. Responding to them quickly reduces the crying time. Parents should be reassured that they will not 'spoil' their baby by holding them.

The most recent Cochrane Review on Dietary Modifications for Infantile Colic was published in 2018. 15 studies of 1121 infants were included. Modification of the maternal diet to reduce intake of potential allergens was not found to be beneficial. If the breastfeeding mother decides to exclude allergens from her diet, baby's symptoms should be monitored with reintroduction of normal eating as soon as possible if there is no effect. Longer term dietary modification should be

Colic - recurrent and prolonged periods of infant crying, fussing or irritability starting and ending before five months with no obvious cause, which cannot be prevented or resolved by caregivers, with no evidence of failure to thrive, fever or illness (Rome IV)

Red flags - parental concern, fever, bilious vomiting, projectile vomiting, poor weight gain, blood in the stool or any signs of injury

Treatment – parental reassurance and support

- Probiotics (lactobacillus reuteri) may have a role for breastfeeding infants
- No/insufficient evidence to recommend maternal dietary medication, specialist formulas, medications or manipulation therapies

supported by a dietitian in order to support a healthy balanced diet for the mother.

Use of hydrolysed formula has not been shown to reduce crying times in any meaningful way. Similarly reduced lactase intake or use of lactase drops showed no difference in crying times. There is no evidence to say that changing formula type will influence colic or crying times. The different types of formula have been discussed above.

Probiotics have been studied for use in infantile colic (Cochrane 2019). 6 studies of 1886 infants compared probiotics with placebo. There was no evidence to suggest that probiotic use prevented colic. A meta-analysis of three studies showed a reduction in crying time of approximately 30 minutes per day with use of probiotic when compared with placebo, the most studied agent was Lactobacillus reuteri. A meta-analysis (Paediatrics 2018) of probiotics concluded that there was insufficient data to recommend use in formula fed infants.

Simethicone is an anti-flatulent medication, however it is no better than placebo at treating colic. Gripe water typically contains sodium hydrogen carbonate and some other agents such as fennel which are thought to reduce wind. Gripe water has not been shown to reduce infant colic.

Studies of manipulative therapies (chiropractic, osteopathy or craniosacral therapy) to date have been poorly designed with high levels of bias because of study design and a lack of blinding. While some reduction of crying time has been shown, there is insufficient evidence to recommend these treatments. Infant massage by parents has not been shown to be of benefit in reducing crying, however it is soothing for both parent and child and encourages positive interactions.

For crying infants, once red flag signs and symptoms have been out ruled, no treatments have been found to reduce infant crying by any clinically meaningful amount. Parents need support and reassurance. It should be acknowledged that caring for a crying baby is frustrating and tiring and they should be encouraged to ask for help. New parents are vulnerable and tired. Many breastmilk substitutes and medications that are sold as colic remedies are expensive. We have a responsibility to provide evidence based advice.

Questions:

Q1. Which of the following statements are true?

A. Babies triple their birth weight by 1 year of age
B. Babies need approximately 100kcal/kg per day to grow normally
C. Babies with congenital heart disease often need less than 100kcal/kg per day
D. Babies should regain their birth weight by 4 weeks of age

Q2. Which of the following statements are true regarding breastfeeding?

A. Breastmilk continues to have nutritional and immunological benefits for children for the first 2 years of life and beyond
B. Breastfeeding is only beneficial if it is done exclusively for six months
C. The protein content of breastmilk continues to increase in the first year of life to encourage babies to grow
D. In warm weather breastfed babies do not require extra water, however they may feed more frequently than usual

Q3. Which of the following statements are true regarding formula milk?

A. Formula feeding babies will typically drink 100ml/kg/day of milk
B. The Food Safety Authority of Ireland does not recommend use of formula preparation machines
C. It is recommended that babies move on to Stage 2 formula at 6 months because first infant milk is no longer nutritionally suitable at this age
D. If a baby is allergic to cows' milk, goats' milk is recommended in the first instance

Q4. A parent is concerned that their formula feeding baby vomits after every feed. What is the best advice to give her?

A. You ask about red flags and suggest that they see their GP as soon as possible but you recommend starting anti-reflux formula today without delay
B. You ask about red flags and suggest that they see their GP as soon as possible but you recommend starting a different brand of formula
C. You ask about red flags and suggest that they see their GP as soon as possible but you recommend more frequent, smaller feeds
D. You ask about red flags and suggest that they see their GP as soon as possible but you say that the baby will probably be prescribed anti-reflux medication

Q5. Which of the following statements is true regarding infant colic?

A. Colic most frequently starts when a baby is over 5 months of age
B. Parents should be discouraged from picking their baby up when they are crying because this will 'spoil' them
C. Maternal dietary medication is unlikely to help treat infant colic
D. It may be useful to recommend a probiotic containing lactobacillus reuteri to breastfeeding infants

Visit www.pharmacynewsireland.com for the full article, questions and answers.

Educational resources for Healthcare Professionals
HSEland – Infant Growth and Nutrition, Breastfeeding elearning modules Hale's Medication and Mother's Milk Breastfeeding Network medication factsheets (breastfeedingnetwork.org.uk) First Steps Nutrition (firststepsnutrition.org) Association of Lactation Consultants of Ireland (alcireland.ie)
Resources for families
Local Health Centre/Public Health Nurse HSE – mychild.ie First Steps Nutrition (firststepsnutrition.org) La Leche League Ciudiu Friends of Breastfeeding