LEARNING & DEVELOPMENT

Giving advice on bottle-feeding

In terms of infant feeding, although “breast is best”, for various reasons it is not always possible. **Wendy Jones** looks at the current recommendations for formula milks and advice pharmacists can give.

**READERS** will be aware that exclusive breastfeeding is the best way to feed babies for the first six months of life because it provides the perfect balance of nutrients to support development as well as protecting against a wide range of illnesses, particularly diarrhoeal disease. This is the recommendation of the Department of Health and the World Health Organization. However, according to a survey into infant feeding, less than 1 per cent of mothers achieve this. In addition, 22 per cent of babies are exclusively formula fed from birth. When asked why they chose to formula feed from birth, 25 per cent of mothers said that it gave more flexibility (other people were able to feed the baby), 32 per cent said that they simply did not like the idea of breastfeeding (this was higher in first time mothers; 45 per cent) and 13 per cent believed that bottle-feeding fitted better with their lifestyle. Moreover, 31 per cent of women who had chosen to bottle-feed were aware that this was less advantageous to their child.

Many women do plan to breastfeed. Reasons for doing so include health benefits for the child and mother, convenience, low cost, the view that it is natural and promotes bonding, and the influence of healthcare professionals. However, by the age of six weeks, 79 per cent of breastfed babies have been given some infant formula. Reasons for this could range from breastfeeding difficulties, such as sore nipples, to lactose intolerance. Whatever the reason, it is important that parents make informed decisions, using the best available evidence.

In 2006, guidelines on the preparation and storage of formula milk were changed to minimise gastrointestinal problems in babies due to microbiological growth in milk stored for too long at too high a temperature. However, there is surprisingly little research on how to bottle-feed safely and, worryingly, the infant feeding survey also revealed that almost half of mothers who had prepared formula in the previous seven days had not followed the key recommendations for preparation and storage. It is clear that parents need advice on reducing the risk of infection and avoiding over- or under-concentrated feeds.

**Infant formulas**

Formula milks provide nutrition that is adequate to support a baby’s development. The constituents are governed by national committees, EEC regulations and the Codex Alimentarius. Infant formula is predominantly based on processed cow’s milk with additives, such as soy and corn, and the nutrient composition is carefully regulated. However, there are questions that pharmacists may have about different types of infant formula.

**Reflect on knowledge gaps**

1. Should soya formula be recommended for babies who are allergic to cow’s milk proteins?
2. Why should ready to feed formula rather than reconstituted formula be used for premature babies?
3. Are you able to advise on long chain fatty acids in formulas?

Before reading on, think about how this article may help you to do your job better.

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as vegetable oils, vitamins, minerals and fatty acids, to replicate breastmilk as closely as possible. (Cow’s milk itself is unsuitable as an infant feed because it does not contain all the necessary nutrients.) Traditionally, cow’s milk based formula can be divided into two categories, based on the dominant milk protein. Whey-dominant formula, often known as first milk, is suitable from birth onwards — it is easy to digest and more closely resembles breastmilk, having a whey to casein ratio of 60:40. Casein-dominant formula (whey to casein ratio 20:80), often known as second milk, is processed to take longer to digest, so is claimed to keep a baby feeling fuller for longer. Some parents use second milk to help regulate feeds, reducing the number of feeds needed or removing the need to feed through the night. However, the current recommendation is that babies are fed on demand and because the calorie content is the same in both milks, reducing the number of feeds may have a detrimental effect on healthy weight gain.

Bentley et al suggest there are no published data to substantiate the claim that casein-dominant formula satisfies hungrier babies more than whey-dominant formula but this may be because little independent research is undertaken in this area.

Pharmacists may be asked which brand is best but there is no proven difference between them. There is no merit or harm in switching brands and alternatives can be used if a regular make is unavailable. However, it is important that the scoop provided by that manufacturer is used because the volume of scoops varies and using the wrong one can result in over concentration or over dilution of formula.

In the UK, the marketing of infant formulas is strictly regulated under The Infant Formula and Follow-on Formula Regulations 1995. Under these regulations and their code of ethics, pharmacists may not promote or encourage the use of infant formula through advertising, special displays designed to promote sales, providing free samples or discounting. A MORI poll in 2009 found that 75 per cent of mothers believed that they had seen advertisements for infant formula. They had in fact seen adverts for follow on milk (see below) and associated them with infant formula through brand recognition.

**Specialised formulas** A variety of specialised infant formula is available but these should only be used on medical advice — ideally, a dietitian will have taken a feeding history and a doctor will have undertaken a full clinical examination.

**Hydrolysed formula** In hydrolysed formula the structure of the protein is changed so it is not recognised as foreign. This type of formula is therefore less likely to provoke an allergic response. It is used for babies with proven cow’s milk intolerance and in malabsorption syndromes.

Incidence of cow’s milk allergy is around 2 per cent, with risk greatest in those with a family history. However, a study in Australia showed self-diagnosis to be 10 times higher than true incidence. Intolerance should be proven by allergy challenge testing.

Symptoms of IgE mediated reactions include skin problems (eg, eczema, urticaria), gastrointestinal problems (eg, nausea, vomiting, diarrhoea) and respiratory problems (eg, wheezing, coughing, rhinitis). Although rare, anaphylactic reactions to cow’s milk protein can occur following contact with the mouth or lips. Symptoms of non-IgE mediated reactions include gastrointestinal and respiratory problems.

Some formulas are marketed as “hypoallergenic” (eg, Nutramigen), but on closer inspection, this appears to indicate the inclusion of hydrolysed proteins among other anti-allergy measures.

According to National Institute for Health and Clinical Excellence Medical and Child Nutrition Guidelines, there is insufficient evidence to suggest that such formula helps to prevent allergies.

**Lactose free formula** Lactose intolerance is not the same as allergy to cow’s milk protein. True lactose intolerance manifests shortly after birth with symptoms of liquid, frothy stools, frequent flatulence and irritability. A baby who is truly intolerant to this milk protein will fail to thrive from birth (ie, no weight gain), and show obvious symptoms of malabsorption and dehydration. Most babies with “lactose intolerance” have temporary (secondary) intolerance, where damage to villi (following gastrointestinal disease) has temporarily depleted the bowel of lactase and other brush-border enzymes.

Formulas for proven lactose intolerance include Enfamil-O-Lac and SMA LF. It should be noted that some milks merely have a reduced lactose content (eg, Aptamil Pepti) and the description of each formula should be interpreted carefully. Nutramigen is lactose free but is also described as “extensively hydrolysed hypoallergenic infant formula for the management of cow’s milk and other food, allergies.”

**Soya formula** Soya formulas have, in the past, been widely used for babies who are suspected to be allergic to cow’s milk protein. However, it has been shown that 15–40 per cent of children who have cow’s milk intolerance will also develop an intolerance to soya milk or formula.

It is a myth that using soya formula prevents eczema, asthma, hay fever or other allergic disorders. Furthermore, in 2003, the Committee on Toxicology in Food recommended that soya milk should not be used for babies due to the high levels of phytoestrogens contained. These have been linked with hormone dependent conditions and, theoretically, might affect future reproductive health. However, it may be used where clinical need outweighs the risk (eg, galactosaemia).

It should also be noted that the carbohydrate in soya formulas is often glucose rather than lactose so there is an increased risk of cariogenicity. If used, soya formula should be fed by cup as soon as possible and any teeth brushed frequently. Soya formula has an unusual odour and taste.

**Goat’s milk formula** There was a belief that formulas based on goat’s milk protein (eg, Nanny) were suitable alternatives to cow’s milk formulas but some of the proteins in goat’s milk are similar to those found in cow’s milk and many...
LEARNING & DEVELOPMENT

Panel 1: Preparing formula
- Each bottle should be made up fresh for each feed.
- Ensure that hands, all equipment and preparation surfaces are clean.
- Boil fresh tap water — do not reboil water because it concentrates salts.
- Allow the water to cool to no less than 70°C (a typical way to do this is to leave the water covered for 30 minutes).
- Add the required volume of water to the sterilised bottle.
- Add the formula as instructed by the manufacturer. Level scoops should be used and the powder should not be compacted.
- Assemble the bottle — shake to mix the contents thoroughly before cooling to feeding temperature by running under a cold water tap or placing the bottle in a cold water bath. (When shaken onto the inside of the wrist the milk should feel lukewarm.)
- Discard any milk remaining two hours after a feed.

Making up bottles
Midwives and health visitors are discouraged from demonstrating formula preparation to groups of mothers antenatally because this could normalise bottle-feeding. However mothers who choose to use infant formula are shown how to make up a feed before leaving hospital or the birth centre (or before the mother is left after a home birth).

Formulas
- Formula powder is not sterile so good hygiene practices are essential in preparation and storage. Water at 70°C kills most of the bacteria present in formula, which are likely to be Enterobacter sakazakii and salmonella. Bacteria multiply rapidly between 7°C and 63°C so it is important to cool formula below 7°C if it is not being used immediately. Moreover, because 70°C does not kill all bacteria, prolonged storage increases the risk of infection from which bottle-fed babies have little protection compared with breastfed babies. Parents who are away from home or do not have access to freshly boiled water are advised to store boiled water in a vacuum flask or to use ready to use feed cartons of milk. Panel 1 lists other recommendations for preparing formula.

Storage, rewarming and transport
Bacterial contamination is most likely between preparation and use. If bottles must be prepared in advance (eg, to leave at a nursery), they should be stored at below 5°C. They should be kept at the back...
Panel 2: Frequently asked questions about feeding

**How frequently should a baby feed?** Bottle-fed or breastfed babies should be fed on demand (this will generally be every three to four hours) and should be allowed to stop feeding when they are full. Any milk remaining in the bottle should be discarded after two hours.

**How do you know when a baby is full?** Amounts recommended on the packaging of formula are only a guide. If a baby spits out the bottle teat and appears content after winding it is likely that he or she is full. Some carers “jiggle” the bottle to encourage the baby to finish it and this may be one of the reasons why bottle-fed babies are generally heavier than breastfed babies. It can be difficult to judge how long a tin of formula will last so it is useful to check how much a baby needs so stock can be ordered in time for prescriptions.

**How frequently should a baby be weighed?** After the first week, if feeding is established, babies need only be weighed at eight, 12, 16 weeks of age and one year. They should be weighed no more than once a month before six months, every two months between six and 12 months and once every three months after one year. Growth charts are available at www.rcpch.ac.uk.

**Do babies need fluids other than milk?** Breastfed babies do not need to be given water because at the beginning of a feed breast milk is watery. It has long been suggested that bottle-fed babies need additional water during hot weather but there is no evidence to support this as long as the formula is reconstituted correctly. The predominant need of babies is for feeds offered as required. Fruit juices are a good source of vitamin C but can reduce appetite so that rate can be changed by withholding them for a meal or two. Some carers “jiggle” the bottle to encourage the baby to finish it and this may be one of the reasons why bottle-fed babies are generally heavier than breastfed babies. It can be difficult to judge how long a tin of formula will last so it is useful to check how much a baby needs so stock can be ordered in time for prescriptions.

**Is mineral or bottled water better than tap water for drinking?** Where required, cooled boiled tap water is the best drink for babies. Some mineral waters are a good source of vitamin C but can reduce appetite so that rate can be changed by withholding them for a meal or two. Some carers “jiggle” the bottle to encourage the baby to finish it and this may be one of the reasons why bottle-fed babies are generally heavier than breastfed babies. It can be difficult to judge how long a tin of formula will last so it is useful to check how much a baby needs so stock can be ordered in time for prescriptions.

**Do babies need formulas with added iron?** Formula should not be stored for more than 24 hours.

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**When can ordinary cow’s milk be introduced?** Cow’s milk should not be offered as a drink before a baby is a year old. Cow’s milk can be used cooked foods for children over six months of age. If milk is given to babies older than one year, it should be full fat. Semi-skimmed milk can be used as a drink for children aged over two years.

**Can medicines be added to a bottle rather than being given with a spoon?** No. If the flavour is unpleasant the baby may refuse to take bottles. And if the baby does not finish the bottle it would be difficult to ascertain how much of the medicine has been taken.

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thickened with Instant Carobel may need to switch to a faster flow teat to help the baby suck it.)

As soon as possible after a feed, the bottle and teat should be scrubbed inside and out to ensure all milk residues are removed. All equipment used in milk-feeding needs to be sterilised until the baby is 12 months old. Water in sterilisation tanks should be changed every 24 hours and all equipment should be submerged. Sterilisation is also possible with steam and microwave sterilisers.

From the age of six months to one year it is recommended that drinks are offered in a non-valved, free-flowing cup. Bottle-feeding is discouraged from one year onwards to prevent dental abnormalities.

The topic of the chemical bisphenol-A (BPA) in baby bottles and food packaging continues to make headlines. Tiny amounts can transfer from plastics into food. Animal studies suggest that the chemical has oestrogen-like properties, and although there is still no conclusive evidence of this in humans, the potential risk has caused concern among parents. Bottles containing BPA may have a number 7 marked on the bottom but manufacturers should be contacted for information. In 2008 Andrew Wadge, the Food Standards Agency’s chief scientist, explained that, in terms of BPA exposure, a number of British women aged 19–24 years and a sixth of those aged 25–34 are at risk of vitamin D deficiency.

Healthy Start also provides free vitamin supplements to qualifying pregnant women, mothers and children. Pharmacists should be aware of the recommendations for Healthy Start vitamins, particularly calcium and vitamin D for mothers and babies at risk of low levels of vitamin D due to a diet deficient in calcium, or living in northern climates with low levels of sunshine. (About a quarter of British women aged 19–24 years and a sixth of those aged 25–34 are at risk of vitamin D deficiency.)

NICE guidelines and FAQs

NICE guidelines encourage healthcare professionals, including pharmacists, to promote breastfeeding but also make recommendations relating to formula feeding or mixed (ie, breast and bottle) feeding. Mothers should have access to independent advice from a qualified health professional on infant feeding and it is clear that pharmacists can act as an important source of such advice. Other questions that pharmacists might be asked are discussed in Panel 2 (p37).

Resources

- Information for health professionals on infant feeding, including weaning, is available at www.healthpromotionagency.org.uk.
- A useful leaflet about bottle feeding, produced by the Department of Health, is available at www.dh.gov.uk.
- Further information on lactose intolerance in babies is available in an article by Anderson J at www.breastfeeding.asn.au.
- Reviews of.mothers’ experiences of bottle-feeding (R Lakshman et al) and formula feed preparation (Bentrew M et al) have been published in Archives of Disease in Childhood (2009;94:596–601 and 2003;88:855–8, respectively).
- National Institute for Health and Clinical Excellence Guidance for midwives, health visitors, pharmacists and other primary care services to improve the nutrition of pregnant and breastfeeding mothers and children in low income households is available at www.nice.org.uk.

References


Wendy Jones PhD, MRPharmS, runs the Breastfeeding Network Drugs in Breastmilk helpline (0844 412 4665).

CPD articles are commissioned by The Pharmaceutical Journal and are not peer reviewed.

Act: practice points

Reading is only one way to undertake CPD and the Society will expect to see various approaches in a pharmacist’s CPD portfolio.

1. Find out where your local Children’s Centre is and signpost access to Healthy Start benefits.
2. Make sure your staff are aware of the new recommendations on preparing and storing bottles of formula milk.
3. Offer to audit your local surgery’s prescribing of infant formulas — many formulas are prescribed unnecessarily.

Evaluate

For your work to be presented as CPD, you need to evaluate your reading and any other activities. What have you learnt? How has it added value to your practice? (Have you applied this learning or had any feedback?) What will you do now and how will this be achieved?

Record

Consider making this activity one of your nine CPD entries this year.