Continuing Professional Development

CPD

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60 Second Summary

During the first two to three days of life, it is common for full term infants lose weight. It is important to recognise normal weight loss and gain patterns in order to put early feeding difficulties in context. In the first five to seven days, infants lose up to 10 per cent of birthweight, although this weight loss usually stops after about 3 or 4 days of life, and the majority of infants have returned to their birth weight by 3 weeks of age.

Infants develop at different stages, so solids should be introduced when the individual infant is ready - usually around 6 months. For a premature baby (born before 37 weeks) food should be introduced sometime between their 'corrected age' 4 and 6 months.

Usually people start with spoon feeding at four to six months of age, but by twelve months, the infant will be able to enjoy family meals. The vast majority of foods are suitable for infants as long as they are prepared appropriately.

Current World Health Organisation guidance, as well as the more local HSE guidance recommend that infants are initially offered smoothly blended foods, progressing in texture, until at 12 months, infants should be eating family foods.

Food, particularly that has round/spherical shapes, should be cut before offering to an infant or toddler, e.g. grapes, cherry tomatoes. Items like popcorn, marshmallows and hard sweets are a choking hazard so are best avoided until the child is about 5 years of age.

Pre- and postnatal flavour experiences can affect liking of flavours at weaning in infants. A research group in Philadelphia found that babies of pregnant and breastfeeding women who drank carrot juice were more likely to eat carrot-flavoured cereal than infants of women who did not.

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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A-Z of Infant Nutrition

Introduction

During the first two to three days of life, it is common for full term infants lose weight. It is important to recognise normal weight loss and gain patterns in order to put early feeding difficulties in context. In the first five to seven days, infants lose up to 10 per cent of birthweight, although this weight loss usually stops after about 3 or 4 days of life, and the majority of infants have returned to their birth weight by 3 weeks of age[1].

Feeding in the first 2 years of a child's life are particularly important: research has shown that adequate nutrition during this time decreases morbidity and mortality, reduces the risk of chronic disease, and contributes to optimal development[2,3]. Breast milk, when it is the sole source of nutrition for infants in the first six months of life, plays a critical role in development. WHO and UNICEF recommend[2]:

- Early initiation of breastfeeding (within 1 hour of birth)
- Exclusive breastfeeding for the first 6 months of life
- Introduction of nutritionally adequate and safe solid foods at 6 months together with continued breastfeeding up to 2 years of age or beyond.

However, only about 36% of infants aged 0–6 months worldwide were exclusively breastfed over the period of 2007-2014.

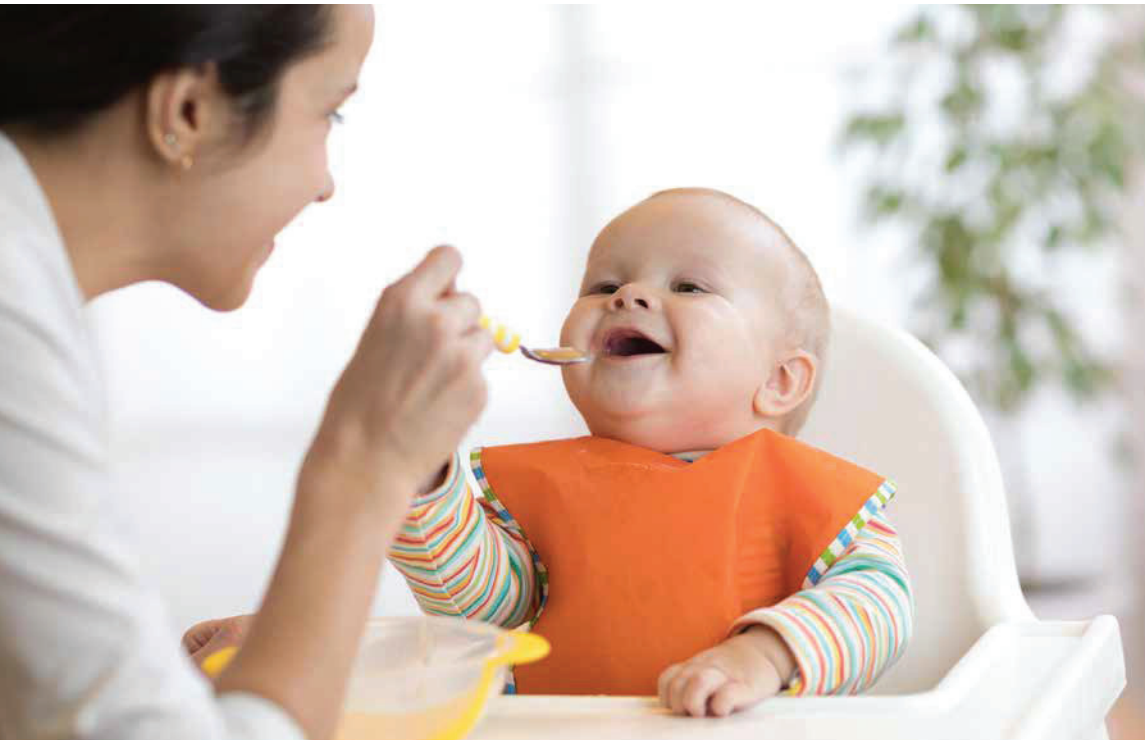
Human breast milk contains many compounds as well as living cells, hormones, active enzymes, immunoglobulins, and a additional bioactive compounds. These unique nutrients in breast milk cannot all be included in infant formulas, and as a result formula composition cannot exactly match human milk. Furthermore, some nutrients in human milk vary not only from the beginning to the end of each feed, but also between the stages of lactation, and as a result of different maternal diets[4]. The actual impact of these nutritional variations is not fully understood, as specific roles in affecting nutritional outcomes have not been determined. Research into the benefits of breastfeeding is still needed to distinguish which factors in human milk are most beneficial, but also to determine how much of the beneficial effect arises from breast milk ingestion as opposed to the act of breastfeeding itself[3]. There is compelling scientific evidence to support the association between breastfeeding and reduced risk of some illnesses e.g. gastrointestinal infections; however, it has been suggested that some links between breast feeding and other desirable outcomes are from studies that do not control adequately for confounding variables, leading to biased results[4, 5]. There are many women who do not breast feed, some who choose not to and some who are unable to, for a range of different reasons. In these situations the importance of sound knowledge, insight and high ethical awareness for healthcare workers has been identified by a Norwegian study on the experience of not breastfeeding in a predominantly breastfeeding culture[6]. The care and education of a mother and formula fed infant should be of a high standard even if formula feeding is not the preferred choice for the healthcare worker.

Weaning

Infants develop at different stages, so solids should be introduced when the individual infant is ready - usually around 6 months. For a premature baby (born before 37 weeks) food should be introduced sometime between their 'corrected age' 4 and 6 months[7]. A small amount of food should be offered initially, and increased gradually as the child gets older, along with gradually introducing variety in food and texture. The number of times that the child is fed should be increased from e.g. 2 to 3 meals per day for infants aged 6 to 8 months of age to 3 to 4 meals per day for infants 9 to 23 months of age (with 1 to 2 additional snacks as required).

Babies should not be given solid foods before 17 weeks (4 months) because[7]:

- Their kidneys are not mature enough to handle food and drinks other than milk
- Their digestive systems are not yet developed enough to cope with solid foods



- Breast milk or formula milk is enough to meet nutritional needs until 6 months old
- Introducing other foods or fluids can displace the essential nutrients supplied by breast or formula milk
- Introducing solids too early can increase the risk of obesity in later life
- It can increase their risk of allergy

Waiting until after 26 weeks (6 months) is not recommended because:

- The infant's energy needs can no longer be met by either breast milk or formula milk alone
- Iron stores from birth are used up by 6 months and their iron needs can no longer be met by milk alone
- It delays their opportunity to learn important skills, e.g. self-feeding
- Introducing different textures stimulates the development of muscles involved in speech

The baby will show certain signs that they are ready to start on solid food, such as:

- Sitting up without support and being able to control head movements
- Not appearing to be satisfied after their milk feed
- Increased frequency and demand for milk
- Showing an interest in food/ reaching out for food
- Watching people eating with interest
- Chewing and dribbling (although this may be a sign of teething)

Usually people start with spoon feeding at four to six months of age, but by twelve months, the infant will be able to enjoy family meals. The vast majority of foods are suitable for infants as long as they are prepared appropriately. However, foods to avoid under 12 months are raw shellfish (as this can cause food poisoning); swordfish, shark, marlin or fresh tuna (these may contain high levels of mercury); unpasteurised dairy products; undercooked eggs, sugar, tea or coffee, liver, and processed or cured meats like ham, bacon or sausage. Babies should not be given foods that contain added salt, e.g. gravy, jars or packet sauces, stock cubes; because their kidneys are still developing (although baby-friendly stock cubes are available). Honey is not suitable until the infant is over 12 months due to the potential for it to carry bacterial spores.

From about 6 months of age, the HSE recommends[8] starting with food in the form of thin purées (Stage 1). This allows the infant to learn how to take food from a spoon, move it to the back of the mouth and swallow. From 6 to 9 months (Stage 2), thicker purées are recommended, progressing to smooth mashed foods, and mashed food with lumps. The infant will learn how to chew lumps, and may start to feed themselves small bite size pieces of food. During this stage, the baby should also be offered a cup or beaker of water to drink. Between 9 and 12 months of age (Stage 3), the baby can try lumpier textures, harder finger foods, drinking from a cup, and may attempt eating with a spoon themselves. This getting used to lumpy textures can also help with muscle and speech development. The HSE website provides more specific recommendations of particular foods that are suitable at each of these stages, and The FSAI provide sample meal planners for Stages 2 and 3[10]. If the infant is breastfed or taking less than 300mls of infant formula a day, 5 micrograms of vitamin D3 should be given every day from birth to 12 months. If the baby is fed more than this, they do not need a supplement.

By the time infants are between 9 – 12 months of age, milk intake should decrease to about 3 milk feeds (maximum 600mls milk if not breastfed) per day. If an infant is drinking more than this, or in excess of requirements, it can be useful for the parent or caregiver to space out milk feeds and meals and offer food before milk at mealtimes. Increasing the amount of food offered to 3 nutritious meals and 2-3 small snacks per day may help decrease milk requirements. To maintain hydration, cooled boiled water should be offered.

In the 1990s, it was thought that avoidance of allergenic foods in pregnancy, breastfeeding, and even until the infant is 12 months old could help prevent the onset of allergic diseases in infants with atopy in first degree relatives[11]. However, even when typical allergens were being avoided, the rate of food allergies (FA) in childhood continued to increase in Western countries, with delayed exposure even potentially increasing FA frequency. Consequently, updated guidelines changed previous recommendations, recognising that there was no evidence that a delayed introduction was useful for the primary prevention of FA. Gluten can be introduced gradually from four months of age. Other potential allergens such as peanuts (as a smooth spread), dairy, eggs and fish can be introduced from 6 months.

Baby-Led Weaning

Current World Health Organisation guidance, as well as the more local HSE guidance (above) recommend that infants are initially offered smoothly blended foods, progressing in texture, until at 12 months, infants should be eating family foods. Over the last 10–20 years, an alternative approach known as 'baby-led weaning' (BLW) has grown in popularity[12]. This involves allowing infants to self-feed family foods, encouraging the infant to set the pace and intake of the meal. Proponents of the BLW believe it promotes healthy eating behaviour and weight gain. It is still not generally considered in guidelines for new parents, partly as a result of an emerging but small evidence base. In reality this approach is likely what mothers did for millennia before the introduction of specially prepared foods. This increase in BLW may be due at least partly to the WHO increasing the age recommendation at which solid food is offered from four months to six months: the majority of infants of around 6 months have developed the skills needed

Figure 1. Positions to aid a choking infant[10]

to self-feed, including being able to sit up unsupported, bring food to their mouth, chew and swallow food. Few infants at 4 months old would be able to do this, meaning that puréeing and spoon-feeding was a necessity.

Some parents try a combination of baby-led weaning and spoon feeds. This can work well, particularly if your baby is less independent in their eating. It can ensure that they eat well and get all the nutrients they need[7]. It is important to allow infants to make a mess while learning to become independent feeders.

Concerns are often raised about the safety of BLW, particularly with respect to potential choking risk. In one study[13], authors compared the results of a survey taken by mothers of infants. They were grouped into mothers and infants who used the traditional weaning method, those who used BLW, and those who used a loose BLW approach, or a mixture of both. In total, 11.9% of the strict BLW group, 15.5% of the loose BLW approach and 11.6% of the traditional group had ever choked. Although the authors point out several limitations in the study, they suggest that these results support to the safety of the baby-led approach in terms of choking risk compared to traditional weaning.

Choking Risk

Food, particularly that has round/spherical shapes, should be cut before offering to an infant or toddler, e.g. grapes, cherry tomatoes. Items like popcorn, marshmallows and hard sweets are a choking hazard so are best avoided until the child is about 5 years of age.

Children under the age of three are at the highest risk of choking due to the small size of their respiratory tract. A baby should never be left unsupervised during food intake due to the risk of choking. Choking occurs when the airway suddenly becomes fully or partially blocked and interrupts breathing. An infant who is choking will be distressed and may be unable to cry, cough or breathe.

The following instructions should be used when advising parents/carers in case of infant choking[10]:

1. Lie the infant face down along your forearm or thigh with their head lower than their body. Support their head, jaw and neck
2. Give up to five firm slaps to the infant's back between the shoulder blades with the heel of your hand (the heel is between the palm of your hand and your wrist)
3. Check if the blockage has cleared. Look inside the infant's mouth and remove any obvious blockage. Do not poke your fingers into the infant's mouth unless you can see and reach the blockage. You may push it further in
4. If the airway is still blocked lay the infant along your forearm on their back with their head low, supporting their back and head, and give up to five chest thrusts. Chest thrusts can be performed by placing two fingers over the lower half of the infant's breastbone, below an imaginary line between the nipples. Using two fingers, push inwards and upwards (towards the head) against the infant's breastbone, one finger's breadth below the nipple line
5. Check if the blockage has cleared after each thrust, by looking inside the infant's mouth and removing any obvious blockage. Do not poke your fingers into the baby's mouth unless you can see and reach the blockage as you may push it further in
6. Keep doing 5 back blows and 5 chest thrusts until the object pops out and the infant begins to breathe again
7. If the infant becomes unresponsive, call for help and send someone to dial 999 or 112.

Colic

Colic is usually defined as crying for at least three hours per day, on at least three days per week, for at least three weeks. The definitive cause of colic is still unclear although trapped wind is what appears to cause most of the symptoms. A Cochrane review evaluated the effects of dietary modifications for colicky infants versus another intervention or placebo, with duration of crying or frequency of crying episodes reported as the main outcome[14]. Some studies reported beneficial effects supporting certain interventions, but due to overall small sample sizes and poor quality of the studies, the authors do not recommend any of dietary modifications assessed in the review. A second Cochrane review found that, although probiotics made little or no difference to the occurrence of infantile colic, they appeared to reduce crying time[15]. Cow's milk protein allergy (CMPA) should be considered if symptoms persist. If CMPA is suspected, a diary of feeds (even if exclusively breastfeeding) and symptoms is useful to help with diagnosis. Pharmacists are in a position to reassure parents that there are alternative hypoallergenic milk substitutes available if their infant is diagnosed with CMPA. Studies suggest that most children with CMPA will be milk tolerant by the age of three (non-IgE-mediated CMPA) and five years (IgE-mediated). Different "extensively hydrolysed formulas" (with the protein constituent already partially broken down) are available. These are either whey based (containing lactose) e.g. Aptamil Pepti; or casein based (gluten and lactose free) e.g. Nutramigen LGG. Amino acid formulations are also available e.g. Neocate LCP.

Introducing Flavours to Infants

Pre- and postnatal flavour experiences can affect liking of flavours at weaning in infants. A research group in Philadelphia found that babies of pregnant and breastfeeding women who drank carrot juice were more likely to eat carrot-flavoured cereal than infants of women who did not[16]. Similarly, when mothers ate fruits or vegetables, leading to infants experiencing the flavours in amniotic fluid and then mother's milk, this increased the palatability of these foods for the infant.

A systematic review[17] performed by the same research group concluded that there is limited but consistent evidence to indicate that flavours contained in foods and drinks in the maternal diet during pregnancy can transfer to and flavour amniotic fluid, and that foetal exposure to these flavours increases acceptance of the exposed flavour during infancy and potentially during childhood. Studies have shown that flavour transfer to amniotic fluid takes place after pregnant women ingest alcohol, anise, carrot, or garlic, although these findings may not be generalisable to all foods in the maternal diet during pregnancy. There is also evidence that flavour transfer to breast milk occurs after ingestion of alcohol, anise, caraway, carrots, eucalyptus, garlic, or mint.

Repeated dietary exposure to a fruit or vegetable also increases

the likelihood of the infant eating it. Infants repeatedly exposed to different vegetables on alternate days ate more of not only the vegetables to which they were exposed, but also novel vegetables. It can take up to 10-15 tries for a child to accept a new food so persistence can pay off! Children older than infants can continue to learn to like foods, but it is more difficult as they grow older.

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