MIDWIFERY BASICS: Infant feeding

Infant feeding: is the twelfth series of 'Midwifery basics' targeted at practising midwives, and aims to raise awareness of the impact on the work of midwives and the woman's experience of maternity care. In this first article Joyce Marshall reviews the anatomy and physiology required to underpin the information and support provided to breastfeeding women. Midwives are encouraged to seek further information through a series of activities.

1. Anatomy and physiology

Introduction

In order for midwives to support women who have chosen to breastfeed effectively it is essential that they provide women with good up-to-date evidence-based information. In 2010 in the UK around 81 per cent of women started to breastfeed their babies (The NHS Information Centre 2011) but by 6 weeks many women have stopped (Bolling *et al.* 2007). A range of cultural, psychosocial and practical factors may influence women's decisions at this time but it is likely that if women receive clear and useful information and emotional support as they start to breastfeed they will build a good relationship with their baby and enjoy breastfeeding. This article outlines the basic knowledge of anatomy and physiology required by midwives to underpin the information and support they provide for breastfeeding women. This includes an understanding of the external and internal anatomy of the breast, the mechanism of suckling, the innate infant reflexes that enable a newborn to breastfeed instinctively and the physiology of lactation.

Scenario

Harry is a few hours old and is beginning to stir in his cot. He opens his eyes, lifts his head slightly and yawns. His mother watches him sleepily from her bed wondering if he is ready for another breastfeed. Slowly, feeling rather sore, she eases herself out of bed and lifts him out of the cot. Murmuring softly to him she settles in to the chair beside the bed and holds him close to her, as she touches his cheek he turns his head towards her and opens his mouth. 'You're hungry aren't you Harry,' she said and prepared to breastfeed him.

Anatomy of the breast

The breast is made up of glandular and adipose tissue supported by Cooper's ligaments (a framework of fibrous connective tissue) and lies over the pectoral muscles of the chest wall. Externally the nipple is in the centre of the areola which is a darker pigmented area. There is variation in the size and shape of women's nipples and the size and colour of the areola. Within the areola are sebaceous glands called Montgomery's tubercles. These secrete an oily substance that lubricates the nipple, protects against infection and is believed to provide a scent that guides a newborn infant to the nipple (Riordan & Wambach 2010). During pregnancy the breasts increase in size, the areola darkens in colour and Mongomery's tubercles become bigger (Geddes 2007).

The glandular tissue within the lactating breast is made up of alveoli. Each of these is a cluster of acini (milk producing) cells surrounded by myoepithelial (muscle) cells that eject milk into the ducts. Between 10 and 100 alveoli are grouped into lobes that are entwined and interconnected. Milk is continuously secreted into the alveoli where it is stored until the muscle cells contract to eject the milk into the ducts. These join together, rather like the branches of a tree, to become single ducts that pass through and open at the end of the nipple.

The internal anatomy of the breast has relatively recently been investigated using high resolution ultrasound and this has led to revised descriptions of breast anatomy. Research by Ramsey et al (2005) showed that there are between 4 and 18 ducts at the nipple (mean of 9), that these ducts branch close to the nipple and although they widen at multiple branch points, there are no sinuses as previously described. Lactiferous ducts are small, superficial, intertwined and are easily compressed. Their function is now thought to be transport rather than storage (Geddes 2007). It is important that mothers understand that breasts do not store large quantities of milk (i.e. are not containers of milk) but rather that breastmilk is produced constantly in small amounts.

Activity 1

What aspects of the anatomy of the breast are important for women to know to enable them to understand the flexible nature of breastfeeding? Breasts vary greatly in size and shape. Do women with larger breasts produce more breastmilk? There is more of what kind of tissue in a larger breast?

How a baby breastfeeds (mechanism of suckling / reflexes)

It is important to consider how a baby breastfeeds in relation to the anatomy of the breast especially in the light of the recent knowledge that lactiferous sinuses do not exist. It is generally believed that breastmilk is removed by peristaltic action of the infant's tongue on the roof of the mouth, however, recent ultrasound studies have demonstrated that milk flows into the infant's mouth when a vacuum is created by lowering of the infant's tongue (Geddes 2007) and this vacuum is likely to be an important aspect of milk removal. This may be important in clinical practice to enable diagnosis and management of infants with sucking abnormalities.

The newborn's mouth is well designed for suckling; the normal resting position of the tongue is with the tip over the bottom lip where it can easily make contact with the breast (Genna & Sandora 2008). The lips are flexible and when breastfeeding the lower lip is usually rolled outwards but if the upper lip is also turned out this can be a sign of poor attachment. Newborns have good airway protection in that the epiglottis and soft palate touch at rest, this and the short upper airway reduce the risk of aspiration. Infants are born with three reflexes that are important to enable them to breastfeed: 1. The rooting reflex – when something touches his cheek he turns his head and opens his mouth and brings his tongue down and forward; 2. The sucking reflex – when something touches the infant's palate he sucks to draw it into his mouth and 3. The swallowing reflex – when his mouth fills with milk he raises his jaw to swallow (UNICEF Baby Friendly Initiative UK 2009). These later two reflexes are co-ordinated for a baby to feed.

Activity 2

Watch the video clip of a peer supporter helping a breastfeeding woman to position and attach her baby http://www.unicef.org.uk/BabyFriendly/Resources/AudioVideo/ and the short clip on the biological nurturing website on laid back breastfeeding http://www.biologicalnurturing.com/video/bn3clip.html – consider how the reflexes the baby is born with help in each of these situations.

Physiology of lactation

Prolactin

Prolactin is the hormone responsible for production of breastmilk. During pregnancy levels of prolactin increase steadily but are inhibited by high levels of progesterone. Once the placenta has been expelled levels become higher and this combined with suckling initiates lactation. Prolactin is secreted by the anterior pituitary gland into the blood stream in response to suckling and nipple stimulation and acts on receptor sites on the walls of the acini cells to synthesise milk. It is secreted during breastfeeding and levels peak about 40 - 45 minutes after a feed acting on the acini cells in both breasts to produce milk for the next feed. Prolactin levels are highest at night as they follow a circadian rhythm (Riordan & Wambach 2010). There is a theory that the initial release of prolactin after birth primes and stimulates prolactin receptor sites in the acini cells and that frequent milk removal in the early days primes more receptor sites leading to improved milk production (Pollard 2012).

Activity 3

How do you think a retained segment of placenta might affect breastfeeding? What suggestions might you offer a woman who desperately wants to breastfeed but is very tired following the birth of her baby? Consider routines of care in your unit both around birth and postnatally, what more could be done to ensure women have early opportunity to breastfeed after birth and continuing support to ensure feeding gets off to a good start?

Oxytocin

Oxytocin is responsible for milk ejection – the 'let down' reflex. It is released from the posterior pituitary gland and acts on the myoepithelial cells that surround the alveoli to move milk from the alveoli into the ducts. Shortening of the ducts increases pressure helping to eject milk and duct diameter increases. Levels of oxytocin in the blood rise within 1 minute of stimulation and this is essential for breastfeeding as only small volumes of milk (1 – 10 mls) can be removed by the infant before milk ejection (Geddes 2007). In the first few days after birth the let-down reflex is stimulated by the infant suckling and by the mother seeing, touching, hearing and smelling her baby but can (usually in the short term) be inhibited by anxiety and stress. Some women sense the let-down reflex as a sensation within their breast whereas others do not. As breastfeeding continues the let-down reflex can occur in response to other stimuli such as hearing another child crying or thinking about feeding. As well as stimulating milk ejection, oxytocin also dilates blood vessels on the chest meaning that mothers transfer warmth to their baby. Oxytocin contributes to increased maternal interaction and bonding, enhances the mothers sense of well-being and may even be health-promoting (Uvnas-Moberg & Petersson 2005).

Activity 4

Speak to several women who have or are breastfeeding and ask them what sensations (if any) they experience as the milk starts to flow. Do women experience this during a feed as well as at the beginning? Access your trust breastfeeding policy and look for recommendations that affect breastfeeding hormones? How might you encourage a mother who is anxious to relax so that oxtocin is released and the let-down reflex occurs?

Feedback inhibitor of lactation

Feedback inhibitor of lactation (FIL) is whey protein that is produced by acini cells and inhibits milk production at the local level (i.e in each breast independently). As the alveoli distend with milk the concentration of FIL increases and it this rather than pressure that controls the amount of milk produced. When milk is removed concentrations of FIL drop and milk is synthesised once more (Pollard 2012).

Activity 5

If a woman's breasts are very full and the baby is unable to latch on to the breast to feed what would you suggest to her to ensure a continued good milk supply and reduce the effect of FIL? What would happen if a woman consistently breastfed from one breast only and did not touch the other?

Reflection on the scenario

Harry is displaying several signs of a baby who is ready to breastfeed. His mother responds to these cues and confidently starts to breastfeed even though she is tired from giving birth. Early recognition of feeding cues is important as breastfeeding is often easier at this time. Once a baby is crying a valuable opportunity has been missed. What information about feeding might Harry's mother have been given or experienced? Who might have provided this information and when. Might she have seen breastfeeding mothers at a local Baby Bistro or Children's Centre? What support might Harry and his mother require at this time? How would early support for breastfeeding mothers be provided in your unit and by whom? Does this early support consist of emotional care and confidence building as well as attention to the physical aspects and nutritional aspects of breastfeeding?

Conclusion

Breastfeeding is the optimum nutrition for babies but it is much more than that as it involves emotions and confidence. Mothers often feel uncertain at this time and may need information to understand what to do and confirmation that they are doing well. Midwives have an important role to play by providing women with enough evidence-based information of the anatomy and physiology of breastfeeding to enable them to understand what might work. Equally important is good communication and emotional support that takes account of their individual choices in relation to infant feeding.

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