

This essay details the advice that would be given to Mary, a first time mother, who wishes to breastfeed her baby. Mary is confused because her mother has suggested she would find it easier to bottle feed and wants midwifery advice on the matter. In order to educate Mary in this regard, the benefits of breastfeeding for both the mother and baby will be outlined. These benefits will be contrasted against the use of infant formula to demonstrate why breast milk is superior. Evidence shows that the most effective way to encourage mothers to breastfeed is to educate them about the ways in which breastfeeding will benefit both them and their babies (Blincoe, 2005, p.400). The benefits of breastfeeding include, the provision of all the babies required nutrients, protection of the baby from infection, maturation of the babies immune system and adequate colonisation and development of gastrointestinal bacteria; these benefits lead to better health outcomes for breastfed babies compared to formula-fed babies. The benefits of breastfeeding for the mother include, reduced risk of breast and ovarian cancer, more rapid involution of the uterus, enhanced postpartum weight loss, increased bone density, an enhanced bonding experience with her baby, a more calm disposition and lower perceived stress levels. To dispel the myth that bottle feeding is easier, some challenges of bottle feeding will be explained to Mary, followed by possible challenges when breastfeeding. Methods of enhancing and extending Mary's breastfeeding experience will be explored. The aim of education is to present Mary with the facts regarding both breastfeeding and bottle feeding so she is able to make an informed decision on how she will feed her baby (Blincoe, 2005, p.400). It is acknowledged that the content of this essay is detailed and lengthy and not appropriate to use directly when educating mothers. For the sake of education this information would be summarised and simplified to enhance understanding and retention.

Breast milk has the right balance of macronutrients¹ and micronutrients² required for the growth and development of a baby (Armogida, Yannaras, Melton & Srivastava, 2004, p.297; Blincoe, 2007, p.582; Blincoe, 2005, p.398; Leung & Sauve, 2005, p.1010; Sarkar, 2004a, p.151,152) and supplementary feeding is not required for at least the first

¹ Lipids, protein and carbohydrates

² Vitamins, minerals and trace elements

six months of life (Blincoe, 2007, p.582; Kramer & Kakuma, 2008). Breast milk provides nourishment which is always ready, cheaper than infant formula, environmentally friendly, the right temperature and fresh (Hale, 2007, p.369). The nutrients contained in breast milk are shown to be more bio-available and digestible than those in infant formula (Sarkar, 2004a, p.151). This is thought to be due to the differing nutrient content in breast milk which encourages the appropriate absorption of each nutrient (Leung & Sauve, 2005, p.1012). The composition of the breast milk adapts to meet the changing needs of the baby as it grows (Hale, 2007, p.369), beginning with the immunologically dense colostrum, which cannot be reproduced in infant formula (Blincoe, 2007, p.582; Niers, Stasse-Wolthuis, Rombouts, & Rijkers, 2007, p.347; Sarkar, 2004b, p.108). Colostrum is specialized milk produced for the first few days of breastfeeding and is much richer in immunoglobulins, antimicrobial factors and growth factors and differs in macronutrient ratio to more mature milk (Sarkar, 2004a, p.152; Sarkar, 2004b, p.108;). The variation in content of breast milk is not mimicked in infant formula therefore any benefits obtained by this variation will not occur in formula-fed infants (Niers et al, 2007, p.351).

New born babies have a functional but immature immune system which has not reached its potential. Their ability to resist infections is impaired as T and B lymphocytes have not been exposed to antigens and memory lymphocytes haven't been developed. (Niers et al, 2007, p.347). Breast milk contains immune factors which help to protect the baby from micro-organisms which cause disease (Newburg, Ruiz- Palacios & Morrow, 2005, p.38; Tarcan, Gurakan, Tiker, & Ozbek, 2004, p.22). These immune factors include a combination of antibodies, immunoglobulins, macrophages, nucleotides, leukocytes, enzymes, anti-microbial peptides, lymphocytes and cytokines (Blincoe, 2007, p.582; Hale, 2007, p.369; Niers et al, 2007, p.347; Sarkar, 2004b, p.108; Sollid, 2002, p.767; Tarcan et al, 2004, p.23) which work synergistically to protect the baby from invading pathogens and infection (Newburg et al, 2005, p.39; Sarkar, 2004b, p.109). The most important immunological factor in breast milk is immunoglobulin A (IgA) which is transferred to the baby via breast milk (Niers et al, 2007, p.347). IgA is the most prominent immunoglobulin in breast milk but cannot be replaced in infant formula like some immunological factors (Niers et al, 2007, p.347). The high complexity and

specificity of immune components in breast milk make it difficult to replicate in infant formulas. The immune factors present in breast milk work synergistically and their affiliation to each other is difficult to imitate; this makes breast milk superior to infant formula (Armogida et al, 2004, p.303).

As well as immune factors, breast milk contains substances called pre and probiotics which are responsible for preventing the growth of pathogenic flora in the gut and are intricately linked with the functioning of the immune system in both babies and adults (Leung & Sauve, 2005, p.1010). Oligosaccharides are pre-biotic compounds and the third largest component of breast milk. They are made-up of thousands of components which combine to form anti-infective agents which have the ability to inhibit pathogens from binding to cell receptors in the gastro-intestinal tract; this accounts for their protective and immune function (Boehm & Stahl, 2007, p.847; Newburg et al, 2005, p.37,39; Newberg, Ruiz-Palacios, Altaye, Chaturvedi, Meinzen-Derr, Guerrro, Morrow, 2004, p.253; Niers et al, 2007, p.350; Sarkar, 2004b, p.109). Oligosaccharides also promote the proliferation of bifidobacteria and lactobacilli in the intestinal tract. These pro-biotic microflora are believed to have health-promoting effects because they produce acids which retard the growth of pathogens (Niers et al, 2007, p.350). The effect of breast milk on the postnatal development of the babies' intestinal tract cannot be attributed to a single ingredient, though oligosaccharides are thought to play a significant role (Boehm & Stahl, 2007, p.847). Due to the complexity of the oligosaccharide structure, they cannot be replaced in infant formula, therefore infant formula contains substances which are thought to have a similar effect to oligosaccharides, but this is not yet supported by evidence (Boehm & Stahl, 2007, p.847). The microflora of breastfed babies is dominated by bifidobacteria but babies fed on infant formula have an abnormal mix of microflora (Hale, 2007, p.369; Sarkar, 2004b, p. 109). Infant formulas are unlikely to be able to mimic the effect of breast milk upon the babies' intestinal tract, due to the absence of vital complementary substances in infant formula which are present in breast milk (Boehm & Stahl, 2007, p.847).

Due to the afore mentioned benefits of breastfeeding, babies who are breastfed experience a reduction in the incidence of infectious disease (Leung & Sauve, 2005, p.1010; Newburg et al, 2005, p.38), allergies (Leung & Sauve, 2005, p.1012; Niers et al, 2007, p.349; Sarkar, 2004b, p.110), respiratory infection (Blincoe, 2005, p. 398; Newburg et al, 2005, p.38; Sarkar, 2004b, p.110), gastrointestinal illness (Blincoe, 2005, p. 398; Leung & Sauve, 2005, p.1012; Newburg et al, 2005, p.37; Sarkar, 2004, p.110), otitis media (Blincoe, 2005, p. 398; Leung & Sauve, 2005, p.1012; Newburg et al, 2005, p.38), autoimmune diseases (include coeliac disease and type one diabetes) (Leung & Sauve, 2005, p.1010), obesity (Leung & Sauve, 2005, p.1010; Sarkar, 2004a, p.151; Wellbery, 2005, p.1870), tumours (Armogida et al, 2004, p.302), asthma and eczema (Blincoe, 2005, p. 398; Leung & Sauve, 2005, p.1012) and sudden-infant-death syndrome (Leung & Sauve, 2005, p.1013) compared to formula-fed infants. This translates into less money and time spent on medical care and fewer hospitalisations for breastfed babies compared to formula-fed babies. Furthermore, breastfeeding for longer than four months has a positive effect on a child's mental development (Gomez-Sanchiz, Canete, Rodero, Baeza & Gonzalez, 2004, p.753) and breastfed infants show better cognitive and neurological development and then formula-fed infants (Bouwstra, Boersma, Boehm & Dijck-Brouwer, 2003, p.4243)

While much of the attention regarding the benefits of breast milk and breastfeeding focuses on the baby, substantial evidence exists for the effects of breastfeeding on the mother. Women who have breastfed are at reduced risk for both breast cancer and ovarian cancer (Blincoe, 2005, p.398; Hale, 2007, p.370; Leung & Sauve, 2005, p.1010; Mezzacappa, 2004, p.261). This is attributed to anti-tumour substances contained in breast milk which benefit both the mum and baby (Armogida et al, 2004, p.302). Breastfeeding increases the bone density of women who had breastfed compared to mothers who had not breastfed, which can be protective against osteoporosis later in life (Blincoe, 2005, p.399; Hale, 2007, p.370). Women who breastfeed, experience more rapid involution of the uterus due to the release of oxytocin during breastfeeding. This will allow the breastfeeding mother a more rapid physical return to her pre-pregnant state and reduce the risk of post-partum haemorrhage (Blincoe, 2005,

p.399; Hale, 2007, p.370; Leung & Sauve, 2005, p.1010). Women who breastfeed find it easier to lose weight and sustain weight loss compared to women who choose not to breastfeed (Blincoe, 2005, p.399; Hale, 2007, p.370; Kramer & Kakuma, 2008; Leung & Sauve, 2005, p.1014). Breastfeeding increases the level of prolactin within the mother's body; this hormone has a calming effect on the mother changing the way she perceives daily stressors. Breastfeeding mothers also have a dampened response to adrenaline which contributes to their feeling of calm (Hale, 2007, p 370). Mothers who breastfeed are shown to have, lower perceived stress levels, fewer depressive symptoms, decreased negative mood and enhanced physical and mental health compared with non-breastfeeding mothers (Blincoe, 2005, p.400; Mezzacappa, 2004, p.261). Breastfeeding is thought to promote a healthy relationship between mother and baby; the closeness experienced during breastfeeding encourages bonding (Leung & Sauve, 2005, p.1010).

Due to the comments by Mary's mum that bottle feeding would be easier than breastfeeding, the challenges of bottle feeding will be discussed with Mary to help her make an informed decision. Infant formula needs to be reconstituted with boiled, sterilised or purified water. If the water has not been prepared properly or contaminated during preparation, the baby can suffer from gastrointestinal upsets due to bacteria such as E.coli and Clostridium (Sarkar, 2004b, p.110). These bacteria are less harmful in adults but because of the baby's immature immune system and altered gastrointestinal bacteria (when bottle fed) babies can become ill (Newburg et al, 2005, p. 37). Similarly, feeding equipment including bottles and teats need to be adequately sterilized (Hale, 2007, p.370). Sterilizing equipment and formula's may be required which can be expensive and time consuming. Incorrect sterilization can cause infection in young babies (Sarkar, 2004b, p.110; Hale, 2007, p.370). Infant formula needs to be stored correctly in order to prevent growth of unhealthy bacteria (Hale, 2007, p.370). Infant formula which has been reconstituted must be consumed within six hours of preparation or be discarded. Similarly, powdered formula, if not stored correctly can spoil causing bacterial levels to exceed safety limits (Sarkar, 2004b, p.110). Infant formula's often cannot be kept for long and need to be replaced regularly, this can become expensive. In this regard, breastfeeding is safer for babies as there is no risk of bacterial contamination; storage and

sterilisation issues are eliminated. When reconstituting infant formula it is important that mothers check the temperature of the water and formula, if the mixture is too hot it may scald the baby (Hale, 2007, p.370).

Just as there are challenges to bottle feeding, mothers can find it difficult to breastfeed. The following advice can be given to Mary to encourage and enhance her breastfeeding experience in the hope of extending the time she breastfeeds her baby. Breastfeeding is a skill that needs practice, guidance and perseverance (Blincoe, 2005, 400), because of this Mary should be encouraged to actively pursue someone she can rely on to give her encouragement and advice. While in the care of midwives, Mary can be encouraged and supported as she learns to breastfeed (Blincoe, 2005, 400). Having this support and encouragement is important to ensure Mary continues to breastfeed her baby when midwifery care ceases; the largest proportion of breastfeeding cessations occur in the first five weeks (Blincoe, 2007, 584). The main reasons for cessation include lack of confidence, problems with attachment and sucking and lack of encouragement; it is important that midwives teach mothers the correct breastfeeding technique and encourage women to enhance their confidence (Blincoe, 2007, 584). Midwives should also support 'rooming-in' while the mother and baby are in hospital to increase the chances of mothers succeeding in breastfeeding (Blincoe, 2007, p.582). Mary should be encouraged to pursue relationships with peers who are supportive of breastfeeding. Dennis, Hodnett, Gallop, & Chalmers (2002) found that women who have peer support are more likely to breastfeed and will breastfeed longer than those without support. Grassley & Eschiti (2007) found that women will sooner turn to their mothers than midwives for advice, highlighting the need to include grandmothers in education regarding breastfeeding. They also highlight that Grandmothers active encouragement of mothers' breastfeeding increases the likelihood of their daughters initiating breastfeeding. In light of this information, and Mary's mother's attitude to breastfeeding, I would encourage Mary to invite her mother to education sessions in the hope that she can provide Mary with positive re-enforcement to improve Mary's chances of breastfeeding.

In conclusion, breast milk is the most appropriate food for infants for at least the first six months of life. Breast milk is cheap, always ready, the correct temperature, environmentally friendly and safe. It is perfectly balanced, bio-available nutrition, can adapt in content to the babies changing needs, contains vital and irreplaceable immune components and encourages healthy development of all body systems including the immune and digestive systems. The same cannot be said for infant formula. Breastfed infants experience less illness and have enhanced cognitive and neurological development compared to formula-fed infants. Breastfeeding mothers enjoy reduced risk of breast and ovarian cancer, increased bone density, more rapid involution of the uterus, easier weight loss and reduced perceived stress and negative mood than mothers who don't breastfeed. Bottle feeding and using infant formula can be challenging as water and feeding equipment need to be sterilised, formula must be stored and prepared correctly and it is more expensive than breastfeeding. Breastfeeding requires skill, practice and perseverance on the mother's part and support and encouragement from family, friends and professionals. Armed with this information and education, Mary can make an informed decision about how she wishes to feed her baby and encourage her to breastfeed for her own health and the health of her baby.

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