

The challenges of breastfeeding faced by women with diabetes

Valerie Finigan

Article points

1. Breastfeeding provides many health benefits for women with diabetes and their babies; it may even limit the baby's risk of developing type 1 diabetes later in life.
2. A mother with diabetes who is breastfeeding will not only need less insulin, but she will also return to a normoglycaemic status earlier than her bottle-feeding counterpart.
3. Mothers with diabetes are more susceptible to poor milk supply, thrush and mastitis.

Key words

- Maternal diabetes
- Benefits of breastfeeding
- Healthy baby
- Diabetes prevention

Pregnant women may attend for midwifery care with known type 1 diabetes or may present with gestational diabetes during their pregnancy. Riordan (2005) suggests that both types of mothers with diabetes should be encouraged to breastfeed their babies in order to incur the known health benefits. In addition to the physiological benefits of breastfeeding for the infant, women report breastfeeding helps them to fulfil their need to feel 'normal' despite their diabetes.

Breastfeeding is important for a mother and her baby. However, it also poses many challenges, particularly when a mother with diabetes wishes to breastfeed exclusively for the first 6 months of her baby's life as is currently recommended (Department of Health [DOH], 2003). It is important that health professionals prepare her by providing the right type of information and support.

With the marked improvement in the monitoring and control of maternal blood glucose levels, women with insulin-dependent diabetes can usually look forward to a safe and relatively healthy pregnancy and birth. With improvements in maternity care it is commonplace for a woman with diabetes to deliver vaginally and to remain on the postnatal ward with her baby following birth.

Health benefits for mother and baby

Breastfeeding has a major role to play in promoting health in the short and long term for both mother and baby (Dyson et al, 2005). As well as providing complete nutrition to healthy

infants, human milk has an important role to play in the protection against gastrointestinal and respiratory infections in the child (Howie et al, 1990; Wilson et al, 1998; Cesar et al, 1999; Kramer et al, 2001). There are also strong indications that breastfeeding contributes to the prevention of otitis media (Duncan et al, 1993; Aniansson et al, 1994), urinary tract infection (Marild et al, 1990; Pisacane et al, 1992; Marild et al, 2004), atopic disease (Burr et al, 1989; Lucas et al, 1990; Saarinen and Kajosaari, 1995), type 1 diabetes (Mayer et al, 1988; Virtanen et al, 1991; Sadauskaite-Kuehne et al, 2004), raised blood pressure (Frewtrell, 2004; Martin et al, 2004) and obesity (Dewey et al, 1992; von Kries et al, 1999; Gillman et al, 2001; Arenz et al, 2004; Frewtrell, 2004) in the child.

Breastfeeding is also beneficial for the mother's health: women who do not breastfeed are significantly more likely to develop epithelial ovarian cancer (Gwinn et al, 1990; Rosenblatt and Thomas, 1993) and breast cancer (United Kingdom National Case-Control Study Group, 1993; Newcomb et al, 1994; Beral, 2002) than women who do breastfeed.

Valerie Finigan is Infant Feeding Coordinator, Pennine Acute NHS Hospitals Trust, Antenatal Clinic, Royal Oldham Hospital.

Benefits of breastfeeding on the reduction of type 1 and type 2 diabetes

Exclusive breastfeeding for 2–3 months was reported to significantly reduce the risk of developing type 1 diabetes in Finnish studies (Kimpimäki et al, 2001; Virtanen et al, 1991; Virtanen et al, 1992). The risk was also lower if supplementary feeding was not introduced until a baby was 4 months of age or older.

The protective effect of breastfeeding was greater in those children that were genetically predisposed to type 1 diabetes. Some studies propose that this effect was because breastfeeding limits the exposure to cows' milk peptides, which may be a trigger for diabetes (Karjalainen et al, 1992; Dosch et al, 1999). However, other studies disagree with this assumption and the hypothesis is still being researched and debated (Hummel et al, 2000).

Whether or not the early introduction of cows' milk or gluten plays a part in the risk of developing type 1 diabetes remains unclear. From the evidence available what we do know is that breastfeeding has a positive effect on the health of both the mother and her baby.

Pettitt et al (1997) suggest that after adjustments for possible confounding factors the relative risk of an exclusively breastfed baby developing type 1 diabetes by the age of 40 years was half that of a baby fed formula milk. In this study, those babies that were mixed fed (breast milk and formula milk) fell somewhere between the two. Since susceptibility to type 1 diabetes is inherited it is of particular benefit to the baby to be breastfed.

More recently, researchers in the USA have concluded that breastfeeding is also associated with a reduced incidence of type 2 diabetes in the mother (Stuebe et al, 2005). Stuebe et al concur that the longer the duration of breastfeeding, the lower the incidence of diabetes. The researchers suggest that improved glucose homeostasis is the responsible factor in this outcome.

Kjos et al (1993) propose that a mother presenting with diabetes during her pregnancy who does not breastfeed or lactate following the pregnancy in which her diabetes developed is twice as likely to go on to develop type 1 diabetes later in life. Lactation, even for a short period,

improves glucose metabolism and is a low-cost intervention that may reduce the risk of diabetes or delay diabetes in this group of women.

Arenz et al (2004) agree that exclusive breastfeeding reduces the risks of later obesity and diabetes. Type 2 diabetes is associated with obesity and breastfeeding uses 500–600 calories per day (Riordan, 2005). Women who present with gestational diabetes during their pregnancy often have a tendency to be obese and lactation may be a way to improve their situation alongside dietary guidance.

Blood glucose levels are generally lower during lactation, even in the face of a markedly higher calorific intake (given the continuous conversion of glucose to galactose and lactose during milk synthesis), thus less insulin is required by the mother during lactation.

Davies (1989) showed that women with diabetes may need to reduce their pre-pregnancy insulin dose by approximately 27% to avoid hypoglycaemic reactions. The mother may also benefit from a reduction in the dose of long-acting insulin to prevent nocturnal hypoglycaemia (Piercy and Williamson, 2002).

A mother with diabetes who is breastfeeding will not only need less insulin, but she will also return to a normoglycaemic status earlier than her bottle-feeding counterpart (Yang et al, 1994).

The challenges of breastfeeding for a mother with type 1 diabetes

It has been proposed that women with diabetes may have lower prolactin levels than women without this condition (Ostrom and Ferris, 1993; Arthur et al, 1994). Prolactin is the hormone that is released within a woman's body to produce milk following the birth of the baby. Milk production (lactogenesis II) usually increases by the third or fourth postpartum day. However, the lower levels of prolactin found in women with diabetes may delay the milk's 'coming in' to the seventh day postpartum (Arthur et al, 1994; Bitman et al, 1998; Murtaugh et al, 1998).

Stress, anxiety and poorly-controlled diabetes are also known to affect a mother's ability to produce and 'let down' (the process of milk ejection) her milk (Riordan, 2005). In general, a tight metabolic control, particularly the avoidance

Page points

1. In Finnish studies, exclusive breastfeeding for 2–3 months was reported to significantly reduce the risk of developing type 1 diabetes.
2. Researchers in the USA have concluded that breastfeeding is also associated with a reduced incidence of type 2 diabetes in the mother.
3. Women who present with gestational diabetes during their pregnancy often have a tendency to be obese and lactation may be a way to improve their situation alongside dietary guidance.

Page points

1. Stress, anxiety and poorly controlled diabetes are known to affect a mother's ability to produce and 'let down' her milk.
2. To ensure adequate milk production, the mother can be taught the techniques of breast massage and hand expression, antenatally.
3. Oxytocin is released in response to hand expression causing contraction of smooth muscles within the body, including the uterine muscle.
4. About half of all babies born to mothers with diabetes will develop hypoglycaemia.
5. It is important that we aim to reduce the risks of hypoglycaemia in the newborn by keeping the baby warm, as hypothermia and hypoglycaemia are closely related.
6. Best practice includes encouraging the baby to breastfeed within the first hour or two after birth.

of maternal hypoglycaemia, is recommended (Abayomi et al, 2005; Hartmann and Cregan, 2001; Walker, 2002). Therefore, good support from a knowledgeable practitioner is crucial to the mother's success.

Antenatal hand expression of the breasts

To positively influence adequate milk production the mother can be taught the techniques of breast massage and hand expression antenatally (see *Figure 1*). The technique can be practised after 36 complete weeks of gestation. This will encourage increased production of colostrum. Leaked colostrum can be collected, frozen and stored for use in the immediate postpartum period if, and as, required to supplement the baby's diet.

Hand expression has several benefits for a mother with diabetes: it stimulates production of colostrum; it encourages the mother to become acquainted with her own breasts; and it helps the mother understand how her breasts function in lactation. Oxytocin is released in response to hand expression causing contraction of smooth muscles within the body, including the uterine muscle. This effect may lead to cervical ripening and early labour, reducing the need for induction of labour. If the woman requires induction of labour, a better response may be seen as the cervix may have begun to ripen (Riordan, 2005).

Challenges relating to the baby of a mother with diabetes

About half of all babies born to mothers with diabetes will develop hypoglycaemia (Riordan, 2005). The chances of this are reduced if the mother maintains good glucose control during her pregnancy. The fetus of a woman with diabetes may be exposed to higher levels of glucose *in utero* than is normal, which will be stored in the body organs as fats. This high level of glucose can cause the baby to produce excess insulin at birth and thus lead to the development of low blood glucose levels in the immediate postpartum period.

When a baby is born, its continuous transplacental blood glucose supply is cut off with the clamping and cutting of the umbilical cord. There is prompt adaptation of the baby's cardiovascular, respiratory and metabolic systems. Enzymes are released into the baby's body that

breakdown and synthesise glycogen into glucose. This response begins as the blood glucose levels fall and occurs physiologically following birth, irrespective of feeding. During this period of counter-regulation, the ketone bodies and free-floating lactates play an important part in the maintenance of adequate food for the brain (World Health Organization [WHO], 1997).

Many babies adjust readily; others, such as premature infants, may require additional milk feedings or even warrant treatment with intravenous glucose until their condition is stable. The mother should always be encouraged to give her baby colostrum and this has a ketogenic effect and helps release alternative food for the brain. The baby should be closely monitored to assess its hypoglycaemic status during the first 48 hours of life (WHO, 1997) and frequent feedings with good positioning and attachment at the breast should be encouraged. Frequent feedings will assist the mother in establishing a good milk supply. If a supplement is needed in addition to breastfeeding, the mother's antenatal colostrum can be given by cup, syringe drip-feeding, dropper or nasogastric tube.

Hypothermia and hypoglycaemia

It is important that we aim to reduce the risks of hypoglycaemia in the newborn by keeping the baby warm, as hypothermia and hypoglycaemia are closely related. The best way to achieve this is to place the baby in direct skin-to-skin contact with its mother. If the baby is cold, a thermogenic response is initiated. The mother's body temperature will rise by up to 2°C to warm her baby and then respond to her baby's requirements, stabilising its temperature (Bergum, 2005). Skin contact between a mother and her baby also encourages early and frequent feeding in an unrestricted way, which reduces the risks of hypoglycaemia (WHO, 1997; Bergum, 2005).

Best practice includes encouraging the baby to breastfeed within the first hour or two after birth. If the baby does not breastfeed, hand-expressed colostrum should be given and the baby woken at regular intervals until it is feeding well and on demand. The baby's blood glucose levels should be monitored pre-feed and serve as

a guideline for the baby's response to feedings; the aim is to maintain the blood glucose levels above 2.6 mmol/l (WHO, 1997). The baby will continue to be monitored for both its well-being and its blood glucose control within the first 24 hours of life.

Experience of working with mothers with diabetes and their babies leads the author to conclude that early and frequent feeding at the breast or with hand-expressed colostrum greatly reduces the risk of hypoglycaemia in these babies.

Jaundice

Sirota (1992) suggests that babies of mothers with diabetes are at greater risk of developing jaundice. However, Sirota is clear that the jaundice will resolve without treatment in most babies. Encouraging early, frequent and unrestricted feedings is the most effective way to reduce the risks of a baby developing jaundice. Colostrum is a natural laxative and will promote gut evacuation; excess bilirubin is then excreted with the passage of meconium (the baby's first stools; Riordan, 2005). The protein in colostrum lines the baby's gut and thus prevents reabsorption of bilirubin via the gut.

Challenges for the mother

Thrush

Thrush in the breasts and vaginal thrush are more prevalent in mothers with diabetes, particularly if their blood glucose levels become elevated (Riordan, 2005). Preventing this problem involves careful control of blood glucose levels, air-drying the nipples after feeds and ensuring the mother is familiar with the signs and symptoms of thrush in the breast in order to seek early treatment.

Thrush in the breast is experienced as a painful condition and often causes mothers to find breastfeeding uncomfortable. If the right treatment is not provided early on then thrush can invade the lactiferous ductal system within the breasts, making the pain even more severe (deep, burning pain that can last up to 1 hour after a feed). Women who are prone to thrush may take acidophilus capsules or add live yoghurt (with added lactobacillus) to their

diet as a prophylactic measure (Breastfeeding Network [BFN], 2006), wear cotton underwear, reduce the amounts of yeast- and sugar-based foods in their diet and take simple hygiene measures to prevent the spread of thrush among their family.

If thrush does occur it can be managed topically with miconazole cream. This is applied to both nipples and areola after each feed and an oral gel applied to the baby's oral mucosa after feeds, four times a day (BFN, 2006). If thrush invades beyond the lactiferous ductal system, systemic antifungal treatment will be required, e.g. fluconazole.

Mastitis

Mothers with diabetes are also susceptible to mastitis, particularly if their diabetes is not well controlled. Mastitis is an inflammatory condition of the breasts and can quickly progress to an infective state that warrants antibiotic use. Any infection will raise the level of blood glucose and the woman's diabetes will quickly become unstable. Self-care education should emphasise early recognition of the symptoms of mastitis and early management to prevent infection of the inflammation. The woman should know when to seek medical treatment to ensure the mastitis is not allowed to develop further and lead to a breast abscess.

If a mother presents with mastitis, in the author's view it is of paramount importance that she is encouraged to continue to breastfeed

Page points

1. Thrush in the breasts and vaginal thrush are more prevalent in mothers with diabetes, particularly if their blood glucose levels become elevated.
2. Mothers with diabetes are susceptible to mastitis, particularly if their diabetes is not well controlled.



Figure 1. Hand expression of breast milk.

Page points

1. If a mother presents with mastitis it is of paramount importance that she is encouraged to continue to breastfeed, and if possible use the mastic breast as the first breast at each feed until her problem resolves.
2. Mastitis is linked to fatigue, therefore rest should be encouraged.
3. Breastfeeding provides many health benefits for women with diabetes and their babies; it may even limit the baby's risk of developing type 1 diabetes later in life.
4. It is the health professional's responsibility to provide information to support the woman's right to choose and to be successful at her intended feeding method.

and, if possible, use the mastic breast as the first breast at each feed until her problem resolves. The baby will suckle more vigorously on the first breast and frequent feedings will keep the breast soft to allow it to recover and recuperate more quickly. Mastitis is linked to fatigue, therefore rest should be encouraged. When breastfeeding the mother should gently massage the affected area, working from the chest wall towards the nipple to encourage the milk to flow freely. If the breast remains full after feedings, gentle hand expression, breast massage, a warm shower or bath and the use of a breast pump will assist in removing the backlogged milk.

If the mother becomes hyperpyrexial (temperature above 38.5°C) or increasingly unwell ('flu-like symptoms), or if inflammatory mastitis does not resolve with good management over a 12-hour period, then antibiotics should be commenced promptly. The antibiotics should be broad spectrum, such as flucloxacillin (or erythromycin in penicillin-sensitive women) and the course should be continued for 10–14 days to reduce the risk of recurring mastitis (Royal College of Midwives, 2002). Antibiotics are known to alter gut flora, thus rendering the mother at risk of an attack of thrush. Commencing acidophilus capsules while taking antibiotics may lessen this risk. Analgesia will provide relief from the discomfort in the breasts; paracetamol and ibuprofen are both safe to use during lactation (Hale, 2005).

Breastfeeding and introducing weaning

Additional calories are used during the feeding experience but as the child weans from the mother's breast she will need to make alterations to her diet and also insulin doses to compensate for the decrease in milk production (Butte et al, 1987; Davies, 1989). Fewer problems will occur if the mother is encouraged to gradually wean.

Conclusion

Breastfeeding provides many health benefits for women with diabetes and their babies; it may even limit the baby's risk of developing type 1 diabetes later in life. However, it also

brings many challenges for the mother. It is the health professional's responsibility to provide information to support the woman's right to choose and to be successful at her intended feeding method (Dyson et al, 2005).

Mothers with diabetes are more susceptible to poor milk supply, thrush and mastitis. Providing information on how to manage these occurrences and providing access to friendly and confident support networks can help the mother to exclusively breastfeed her baby for the first 6 months of life and even longer if she wishes. ■

- Abayomi J, Morrison G, McFadden K et al (2005) Can CSII assist women with type 1 diabetes in breastfeeding? *Journal of Diabetes Nursing* **9**(9): 346–51
- Aniansson G, Alm B, Anderson B (1994) A prospective cohort study on breastfeeding and otitis media in Swedish infants. *Pediatric Infectious Disease Journal* **13**: 183–8
- Arenz S, Ruckerl R, Koletzko B, von Kries R (2004) Breastfeeding and childhood obesity: a systematic review. *International Journal of Obesity* **28**: 1247–56
- Arthur PG, Kent JC, Hartmann PE (1994) Metabolites of lactose synthesis in milk from diabetic and non-diabetic women during lactogenesis II. *Journal of Pediatric Gastroenterology and Nutrition* **19**: 100–8
- Beral V (2002) Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50 302 women with breast cancer and 96 973 women without the disease. *Lancet* **360**: 187–95
- Bergum N (2005) Kangaroo mother care. *Lactation Consultants of Great Britain Conference Breastfeeding beginnings* Bristol, 12 March
- Bitman J, Hamosh M, Hamosh P et al (1998) Milk composition and volume during the onset of lactation in a diabetic mother. *American Journal of Clinical Nutrition* **50**: 1364–9
- Breastfeeding Network (2006) *Thrush and Breastfeeding*. www.breastfeedingnetwork.org.uk (accessed 13.10.06)
- Burr ML, Miskelly FG, Butland BK (1989) Environmental factors and symptoms in infants at high risk of allergy. *Journal of Epidemiology and Community Health* **43**: 125–32
- Butte NF, Garza C, Burr R et al (1987) Milk composition of insulin-dependant diabetic women. *Journal of Pediatric Gastroenterology and Nutrition* **6**: 936–41
- Cesar AJ, Victora CG, Barros FC et al (1999) Impact of breast feeding on admission for pneumonia during post-neonatal period in Brazil: nested case-control study. *British Medical Journal* **318**: 1316–20
- Davies HA (1989) Insulin requirements of diabetic women who breastfeed. *British Medical Journal* **298**: 1357–8
- Department of Health (2003) *Infant Feeding Recommendation*. The Stationery Office, London
- Dewey KG, Heinig MJ, Nommsen LA et al (1992) Growth of breastfed and formula-fed infants from 0–18 months: the DARLING Study. *Paediatrics* **89**: 1035–41

- Dosch MH, Cheung RK, Karges W et al (1999) Persistent T-cell anergy in human type 1 diabetes. *Journal of Immunology* **1163**: 6933–40
- Duncan B, Ey J, Holberg CJ (1993) Exclusive breastfeeding for at least 4 months protects against otitis media. *Pediatrics* **91**: 867–72
- Dyson L, Renfrew MJ, McFadden A et al (2005) *Effective Action Briefing on the Initiation and Duration of Breastfeeding. Effective Action Recommendations*. National Institute of Clinical Excellence, London
- Frewtrell MS (2004) The long-term benefits of having been breastfed. *Current Paediatrics* **14**: 97–103
- Gillman MW, Rifas-Shiman SL, Camargo CA et al (2001) Risk of overweight among adults who were breastfed as infants. *Journal of the American Medical Association* **285**: 2461–7
- Gwinn ML, Lee NC, Rhodes RH et al (1990) Pregnancy, breastfeeding and oral contraceptives and the risk of epithelial cancer. *Journal of Clinical Epidemiology* **43**: 559–68
- Hale T (2005) *Mother's Milk and Medication*. Hale Publishers, London
- Hartmann P, Cregan M (2001) Lactogenesis and the effects of insulin-dependant diabetes mellitus and prematurity. *Journal of Nutrition* **131**(11): 3016S–3020S
- Howie PW, Forsyth JS, Ogston SA et al (1990) Protective effect of breastfeeding against infection. *British Medical Journal* **300**: 11–6
- Hummel M, Füchtenbusch M, Schenker M et al (2000) No major association of breastfeeding, vaccinations and childhood viral disease with early islet autoimmunity in the German BABYDIAB Study. *Diabetes Care* **23**(7): 969–74
- Karjalainen J, Martin JM, Knip M et al (1992) A bovine peptide as a possible trigger of insulin-dependant diabetes mellitus. *New England Journal of Medicine* **327**: 302–7
- Kimpimäki T, Erkolla M, Korhonen S et al (2001) Short-term exclusive breastfeeding predisposes young children with increased genetic risk of type 1 diabetes to progressive beta-cell autoimmunity. *Diabetologia* **44**(1): 63–9
- Kjos SL, Henry O, Lee RM et al (1993) The effect of lactation on glucose and lipid metabolism in women with recent gestational diabetes. *Obstetrics and Gynaecology* **82**: 451–5
- Kramer MS, Chalmers B, Hodnett ED et al (Probit Study Group) (2001) Promotion of breastfeeding intervention trial (PROBIT): a randomised trial in the Republic of Belarus. *Journal of the American Medical Association* **285**: 413–20
- Lucas A, Brooke OG, Morley R et al (1990) Early diet of preterm infants and the development of allergic or atopic disease: randomised, prospective study. *British Medical Journal* **30**: 837–40
- Marild S, Jodal U, Hanson LA (1990) Breastfeeding and urinary tract infection. *Lancet* **336**: 942
- Marild S, Hansson S, Jodal U et al (2004) Protective effect of breastfeeding against urinary tract infection. *Acta Paediatrica Scandinavica* **93**(2): 164–8
- Martin RM, Ness AR, Gunnell D et al (2004) Does breastfeeding in infancy lower blood pressure in childhood? *Circulation* **109**: 1259–66
- Mayer EJ, Hamman RF, Gay EC (1988) Reduced risk of IDDM among breastfed children: the Colorado IDMM Registry. *Diabetes* **37**: 1625–32
- Murtaugh MA, Ferris AM, Capacchione CM, Reece EA (1998) Energy intake and glycaemia in lactating women with type 1 diabetes. *Journal of the American Diabetic Association* **98**: 642–8
- Newcomb PA, Storer BE, Longnecker MP (1994) Lactation and the reduced risk of premenopausal breast cancer. *New England Journal of Medicine* **330**: 81–7
- Ostrom KM, Ferris AM (1993) Prolactin concentration in serum and milk of mothers with and without insulin-dependant diabetes mellitus. *American Journal of Clinical Nutrition* **58**: 49–53
- Pettitt DJ, Forman MJ, Hanson RL, et al (1997) Breastfeeding and incidence of non-insulin dependant diabetes mellitus in Pima Indians. *Lancet* **350**(9072): 166–8
- Piercy CN, Williamson C (2002) Medical disorders in pregnancy. In: Chamberlain G, Steer P (eds) *Turnbull's Obstetrics*. Third edition. Churchill Livingstone, Oxford
- Pisacane A, Graziano L, Mazzarella G et al (1992) Breastfeeding and urinary tract infection. *Journal of Pediatrics* **120**: 87–9
- Riordan J (2005) *Breastfeeding and Human Lactation*. Third edition. Jones and Bartlett, London
- Rosenblatt KA, Thomas DB (1993) Lactation and the risk of epithelial ovarian cancer. The WHO collaborative study of neoplasia and steroid contraception. *International Journal of Epidemiology* **22**: 499–503.
- Royal College of Midwives (2002) *Successful Breastfeeding*. Third edition. Churchill Livingstone, London
- Saariinen UM, Kajosaari M (1995) Breastfeeding as prophylaxis against atopic disease: prospective follow up study until 17 years old. *Lancet* **346**(8982): 1065–9
- Sadauskaite-Kuehne V, Ludvigsson J, Pagaiga Z et al (2004) Longer breastfeeding is an independent protective factor against the development of type 1 diabetes mellitus in childhood. *Diabetes Metabolic Research Review* **20**(2): 150–7
- Sirota L (1992) Beta glucuronidase and hyperbilirubinaemia in breastfed infants of diabetic mothers. *Archives of Disease in Childhood* **67**: 120–1
- Stuebe AM, Rich-Edwards JW, Willett WC et al (2005) Duration of lactation and incidence of type 2 diabetes. *Journal of the American Medical Association* **294**: 2601–10
- United Kingdom National Case-Control Study Group (1993) Breastfeeding and the risk of breast cancer in young women. *British Medical Journal* **307**: 17–20
- Virtanen SM, Räsänen L, Aro A et al (1991) Infant feeding in Finnish Children <7 years of age with newly diagnosed IDDM. *Diabetes Care* **14**(5): 415–7
- Virtanen SM, Räsänen L, Aro A et al (1992) Feeding in infancy and the risk of type 1 diabetes mellitus in Finnish children. *Diabetic Medicine* **9**: 815–9
- von Kries R, Koletzko B, Sauerwald T et al (1999) Breastfeeding and obesity: cross sectional study. *British Medical Journal* **319**: 147–50
- Walker M (2002) *Core Curriculum for Lactation Consultant Practice*. Jones and Bartlett, London
- Wilson AC, Forsyth JS, Greene SA et al (1998) Relation of infant diet to childhood health: seven-year follow up of cohort of children in Dundee infant feeding study. *British Medical Journal* **316**: 21–5
- World Health Organization (1997) *Hypoglycaemia of the Newborn: A Review of the Literature*. WHO, Geneva
- Yang JQ, Xu YH, Gai MY (1994) Breastfeeding in reducing regular insulin requirement in postpartum for insulin-dependant diabetes mellitus. *Zhonghua Fu Chan Ke Za Zhi* **29**(3): 135–7, 188

‘Mothers with diabetes are more susceptible to poor milk supply, thrush and mastitis. Providing information on how to manage these occurrences and providing access to friendly and confident support networks can help the mother to exclusively breastfeed her baby for the first 6 months of life and even longer, if she wishes.’