

Breastfeeding: Is my baby getting enough milk?

Abstract

Perceived insufficient milk is one of the most common reasons cited for supplementing or discontinuing breastfeeding. However, only a small minority of women experience a true insufficient milk supply. In this article, an overview of the signs of sufficient milk intake will be provided, particularly weight gain and nappy output. Normal newborn and breastfeeding behaviour such as frequency of feeds, growth spurts and sleeping patterns will also be explained. This may assist clinicians to support breastfeeding mothers to recognize the signs that breastfeeding is going well and when intervention is required.

In 2003, the UK adopted the recommendations of the World Health Organization (WHO) (2002) that babies should be exclusively breastfed for the first 6 months, and this advice stands despite recent controversy (Fewtrell et al, 2011). However, many women raise concerns about not making enough milk, and this is of the most common reasons worldwide that mothers give for supplementing or discontinuing breastfeeding (WHO, 2006; West and Marasco, 2009). Perceived insufficient milk supply is the erroneous belief that the mother is not producing enough milk for her infant, when in reality she is (Powers, 2009: 325).

The majority of women can make enough milk to feed their infants (West and Marasco, 2009). Mothers need to have the knowledge to assist them to recognize the signs of sufficient milk intake. The only reliable way to know if the baby is getting sufficient breast milk is to evaluate weight gain and nappy output (WHO, 2006; West and Marasco, 2009). A baby's behaviour will also provide information on milk intake. A high rate of breastfeeding cessation occurs during the first 1–4 weeks postpartum. Gatti (2008) suggested that the very early postpartum period is a critical time for a mother to develop a belief of perceived insufficient milk. A midwife assisting a mother to breastfeed can point out the reliable signs of milk transfer, and normal baby and breastfeeding behaviours to the woman and her partner/support person. This information will empower women and increase their confidence in their ability to exclusively breastfeed their babies.

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Signs of adequate milk intake

Weight gain

Weight gain is the most accurate indicator that the baby is getting sufficient breast milk. Some babies lose 5–7% of their birth weight in the first days after birth. This weight loss represents extra fluid that the baby stored during uterine life (WHO, 2006). A weight loss of more than 7% from birth weight may be an indicator of breastfeeding difficulties and requires observation and evaluation of breastfeeding (Powers, 2009).

The total weight loss should not exceed 7–10% of birth weight (WHO, 2006). Babies regain weight by 10–14 days of age and then gain weight consistently with an average of 1 oz (30 g) per day or 6 oz (180 g) per week for the first 3 months, and on average, 0.6 oz (18 g) per day from 4 to 6 months. From 7 to 9 months the average expected weight gain is at least 0.4 oz (12 g) per day and from 10 to 12 months, at least 0.3 oz (9 g) per day (West and Marasco, 2009).

It is crucial to obtain an accurate weight and consideration must be given to the scale accuracy, accurate readings, removal of all clothing including nappy, consistent time intervals to include time of day, and timing the weights after a bowel movement and prior to a feed (West and Marasco, 2009). A regular and consistent completion of a growth chart can show the baby's pattern of growth (WHO, 2006). Babies exhibit a range of normal growth patterns and predicted growth rates are only guidelines. Growth is one factor that provides information on milk transfer and good health.

If there are concerns about adequate milk transfer, pre- and post-feed weights can be used to provide objective data to estimate milk transfer (Wolf and Glass, 2008; Cadwell et al, 2006). Test weighing involves the use of a sensitive scale (accurate to 2 g or less) with computer integration for movement and a digital read-out (Powers, 2009). Weight gain in grams is approximately equal to infant intake in millilitres (Powers, 2009). Cadwell et al (2006) pointed out that many experienced assessors of milk transfer have been surprised to learn that little or no milk was transferred during a breastfeed that had all the hallmarks of an optimal feed. Instead, infants that appeared to be breast-

Table 1. Summary of expected output and weight gain for most healthy full-term breastfeeding infants

Day	1	2	3	4	5
Urine output	1-2	2-3	3-4	6 or >	6 or >
Stool output	1 or > Meconium	3	3-8 Transitional Stool	3-8 Normal Breast milk Stool	3-8
Weight gain			Weight loss no more than 7% of birth weight		20-35 g or 2/3-1 oz each 24 hours

feeding passively transferred a large amount of milk. However, breastfed infants have a large feed-to-feed variability and the use of test weighing during one breastfeed does not offer an adequate representation of an 'average' feed (Powers, 2009). Therefore serial weights are required to obtain an accurate account of milk intake.

Nappy output

In the first 2 days when the baby is receiving colostrum, the expected output is 1-2 pale yellow urinations per day. After day 4 or 24 hours after the woman's milk comes in, the infant should pass at least five to six or more soaking wet nappies in 24 hours of pale, diluted urine (Newman and Pitman, 2006; WHO, 2006). Urinary output is an important indicator of kidney function, but according to Cadwell and Turner-Maffei (2008) urinary output does not reliably indicate intake as the baby is born with extra fluid that is excreted over the early neonatal period.

Pink 'brick dust' stains that appear with urination on the baby's nappy are urate crystals whose presence represents excess uric acid (Lauwers and Swisher, 2010). Urate crystals are generally not considered significant in the first 1-3 days of the newborn period. If the stains appear after 3 days, assessment of the baby's hydration status is indicated (Lauwers and Swisher, 2010).

Observable changes in a baby's stooling pattern can be used as a partial indicator of milk intake (Smith and Riordan, 2009). Babies usually pass meconium (tarry, black stool) within the first 24 hours of life (Table 1). Colostrum is a laxative and helps the baby expel the meconium. Between days 2 and 3 the baby's stools change from meconium to green and then to yellow, with 'seeds' or 'curds' by day 5 (West and Marasco, 2009). Newman and Pitman (2006) highlighted that the early change to mustard colour is a good sign of milk transfer. If the baby is still passing meconium after the fourth

day this indicates low milk intake and requires urgent evaluation. After day 4 the baby should pass three to four or more substantial bowel movements in 24 hours. 'Substantial' means that the stool may even leak out the side of the nappies (Newman and Pitman, 2006). The breastfed baby's stools are a pasty to mushy consistency, mustard coloured and usually has a characteristic sweet, 'yeasty' cream cheese odour, but can vary considerably from mustard colour to green to orange (Newman and Pitman, 2006; Riordan and Hover, 2009). Babies often have a bowel movement with a feed due to the gastro-colic reflex, in which a bowel movement occurs when the stomach fills (Newman and Pitman, 2006).

As babies grow older than 6 weeks, stools may be less frequent (one bowel movement every few days) but are larger in size (WHO, 2006; West and Marasco, 2009). The stool consistency may be firmer but is still soft and may be passed slightly less frequently, reflecting the change in the whey-casein ratio from 90:10 (90% whey and 10% casein) to a ratio of 80:20. This gradual increase in casein relative to whey results in slightly thicker, more formed stools that may be passed less frequently (Smith and Riordan, 2009).

A baby's digestive system and thus stooling pattern is individual to that particular baby (Lauwers and Swisher, 2010). The baby's stool output is more important than urine output because babies who are not getting sufficient breast milk may still be taking in enough to urinate, but not enough to gain weight and produce stools (West and Marasco, 2009). Any baby between 5-21 days of age who does not pass at least one substantial bowel movement within a 24-hour time frame should be reviewed at a breastfeeding clinic and a complete feeding assessment undertaken on the same day (Newman, 2005). While some babies may be exceptions, this generally indicates that the baby has insufficient intake.

Additional signs of sufficient intake

Weight gain is the most reliable sign of sufficient milk intake, followed by nappy output. Normal baby and breastfeeding behaviours are additional important indicators of sufficient milk intake. A mother may perceive that she does not have enough milk because of the way her baby behaves. Women use infant satisfaction cues as their main indication of milk supply (Gatti, 2008). If there are signs such as baby not sleeping for long periods, wants to be at the breast frequently, stays on the breast for long periods of time and does not seem content, many mothers will conclude that they do not have enough milk (WHO, 2006).

Frequency of feeds

It is normal for babies to breastfeed frequently particularly in the first weeks (West and Marasco, 2009). Babies are usually alert for the first 2 hours after birth and are eager to breastfeed. This is followed by deeper sleep which may last several hours. Increased interest in breastfeeding follows during which the baby will feed frequently, alternating between short periods of light sleep and quiet wakefulness (Riordan and Hover, 2009). In the first 2 to 3 days a breastfed baby can feed as often as every 30 minutes, counting from the beginning of one feed to the beginning of the next (West and Marasco, 2009). After the breast milk comes in (lactogenesis stage II) most babies' breastfeed at least 8–12 times in 24 hours, approximately 2 to 3 hours apart.

The curds formed by human milk digest quickly (Riordan and Hover, 2009). A baby's stomach is approximately the size of a small marble and empties of human milk in approximately 60–90 minutes, and therefore the baby will feed frequently (Smith and Riordan, 2009). Riordan and Hover (2009) suggested that using a visual aid such as a marble or the size of the baby's fist to demonstrate the size of the newborn's stomach is one way of illustrating to the parents why their baby needs frequent feeds. A series of frequent closely-spaced feeds by the baby is usually followed by a period of deep sleep. Breastfeeding may be more often at night than during the day.

Babies may not feed at regular intervals, with some babies 'cluster feeding'. During cluster feeds babies will breastfeed several times close together over a period of hours and then go for a longer period between feeds at other times (West and Marasco, 2009). Cluster feeds are common and occur more often in the late afternoon, evening and early morning. As babies grow, the period of cluster feeding decreases. If a mother does not recognize this pattern she may be concerned that this habit has developed because she does not have enough breast milk to satisfy her baby.

Cluster feeding may coincide with a baby's 'fussy period' (Bonyata, 1998; Smith and Riordan, 2009). This is characterized by a baby who breastfeeds for a few minutes, pulls off, fusses/cries and feeds again for a few minutes, and this cycle continues. This may be associated with a slow milk flow which can occur in the evening and be frustrating for some babies. The fussiness usually ends by 3–4 months (Bonyata, 1998).

Baby-led feeding supports early onset of lactogenesis II and an increased milk supply (Smith and Riordan, 2009). A woman with a large



Toward the end of the feed, the baby's fists open up and arms relax.

storage capacity which may or may not be related to breast size, may find that her baby goes longer between feeds. A growing baby is able to transfer larger volumes of milk and may go longer between feeds (West and Marasco, 2009). Explaining to a mother that the initial frequent feedings may change as breastfeeding progresses can support her to continue to breastfeed.

If a newborn baby is feeding fewer than eight times in 24 hours after the first few days, this may be because the baby is conserving calories due to not getting enough milk (West and Marasco, 2009). An assessment of output and weight gain will inform the midwife.

Growth spurts

It is also important to inform mothers of the pattern of feeding that may correspond to 'frequency days' and growth spurts. Babies have frequency days during which they feed more often than their usual pattern. A mother may report that she doesn't have enough milk for her baby as her breasts feel soft and the baby is extra fussy. Frequency days may occur around 2 to 3 weeks, 6 weeks, 3 months and 6 months (West and Marasco, 2009). Babies will usually return to their usual feeding pattern in 3 to 7 days. During frequency days, babies stimulate temporary increases in milk production that reverts back down again when the growth spurt is over (West and Marasco, 2009).

Frequency of feedings is not a reliable way of determining how much milk the baby is transferring at a feed. A baby may go longer between feeds

after a really good feed or because the baby has got insufficient milk and is conserving calories and may be too weak and lethargic to breastfeed.

How long should a baby feed?

There is a wide variation in length and duration of breastfeeds (Hörnell et al, 1999). Some babies are able to transfer large amounts of breast milk in as little as 5–10 minutes (West and Marasco, 2009). Other babies spend longer (15–20 minutes). The length of a breastfeed will be affected by fluctuations in milk supply that occur throughout the 24-hour cycle (West and Marasco, 2009). Some babies will stop breastfeeding early because of discouragement or lethargy (West and Marasco, 2009). Consistently long feedings (more than 30 minutes) may be an early indication of breastfeeding problems or may be characteristic of the mother's and baby's breastfeeding style (Cadwell et al, 2006).

Observing infant behaviour for signs of milk intake

Infant crying or fussiness has been identified as a primary indication of perceived insufficient milk (Gatti, 2008). Contentment after a breast feed may be a sign that baby is getting enough breast

milk. However, babies who are getting insufficient milk can initially fall asleep and appear content. Observing the baby's expressions and postures will help distinguish between the baby who is truly full and one who appears content but still hungry (West and Marasco, 2009).

The midwife and mother will observe the following behaviours in a baby who is receiving adequate milk during a breast feed. The baby who is well latched onto the breast will cover more of the areola with the lower lip than the upper lip. The baby's lips will be turned outward and the chin—but not the nose—will be touching the mother's breast (Newman and Pitman, 2006).

When the milk ejection reflex occurs and the milk begins to flow at a rate the baby can handle, the baby starts swallowing with eyes open and an intent look. The wrinkled and perplexed expression the baby may have had will begin to fade away (Wolf and Glass, 2008; West and Marasco, 2009). A suck:swallow ratio of 2:1 or 1:1 is seen and heard in a repeating pattern during the breast feed (Cadwell et al, 2006). A rocker motion of the lower jaw is observed and ear movement is seen during deep sucks. The cheeks remain rounded and full with no dimples or in-drawing, and no

smacking or clicking sounds are heard (Cadwell et al, 2006). Newman and Pitman (2006) highlighted that the baby who is getting substantial quantities of breast milk will demonstrate a very definite pause in the movement of chin as the baby opens the mouth to the maximum while sucking. This visible pause at the breast represents a mouthful of milk. The longer the pause the more the baby takes in (Newman, 2005).

The baby appears comfortable at the breast and relaxes during the feed. Toward the end of the feed, the baby's fists open up and arms relax, dropping away from the face and the eyes close slowly. A 'milk drunk' expression may be seen at the end of the feed where the infant smiles and rolls head in a delighted way. After the feed baby detaches spontaneously from the breast and displays relaxed infant body posture with hands relaxed and toes curled (Cadwell et al, 2006). Riordan et al (2005) suggested that of the commonly-used breastfeeding indicators, audible swallowing best predicts the actual intake of breast milk during a breastfeed. The baby who has not received sufficient milk will suck intermittently and irregularly and fall off to sleep without letting go of the nipple, and may have a puzzled or worried expression. The baby's body never fully relaxes while breastfeeding and hands may remain tightly fistled and close to the face (West and Marasco, 2009). A baby who appears content but who cries when taken off the breast also may not be getting sufficient milk intake (Wolf and Glass, 2008).

Sleeping pattern

Babies should sleep no more than one 4–5-hour stretch once every 24 hours until breastfeeding is well established and baby is growing consistently and appropriately (West and Marasco, 2009). Sleeping more than 4 hours more than once or twice a day in the first month may indicate that the baby is receiving insufficient milk and sleeping to conserve calories (West and Marasco, 2009). As babies grow and mature, breastfeeding behaviours change.

Other factors to be considered

Changes in the mother's breasts

After a mother's milk comes in, some mothers experience fullness and warmth in their breasts before a feed and less full after a feed. This can be used as a sign of baby's milk intake (Newman and Pitman, 2006). After 6 weeks the milk supply becomes more harmonious with the baby's growth needs and the breasts may feel softer and less full more of the time (West and Marasco, 2009).

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Milk ejection reflex

The posterior pituitary gland produces the hormone oxytocin. Oxytocin causes the contraction of the myoepithelial cells surrounding the alveoli and makes milk flow from the alveoli into and down the ducts. This is essential for the removal of milk from the breast (Riordan, 2009). This process is referred to as the oxytocin reflex, milk ejection reflex or let down (WHO, 2006). An increase in milk-duct diameter has been observed on ultrasound when the milk ejection reflex is sensed (Riordan, 2009). After birth, the mother may experience certain signs of the milk ejection reflex and include (WHO, 2006):

- Painful uterine contractions sometimes accompanied by a gush of blood
- Spraying of milk from the breast
- Leaking from the breast not being suckled
- An increase in thirst
- Feeling a squeezing sensation
- A tingling, warm sensation in the breast during milk ejection
- Slow deep sucks and swallowing by the baby.

Mothers are more likely to feel the milk ejection sensation at the beginning of full breast release. After several months the sensations of milk ejection often diminish, may feel different or less noticeable. However, not all mothers feel the milk ejection reflex happen and therefore, taken on its own, cannot be used as a reliable sign of milk sufficiency (West and Marasco, 2009).

Leaking

In the early weeks most women synthesize more milk than their baby requires and they may experience leaking of breast milk from the breast not being suckled and between feeds. While leaking can be a very positive sign that indicates that the mother is producing milk, it does not indicate how much milk the mother is producing (West and Marasco, 2009).

Strategies to alleviate any real or perceived problems with milk supply

A thorough knowledge of the mother's history will assist the midwife to identify risk factors for inadequate milk production and milk transfer. Initiation of skin-to-skin contact at birth and

undisturbed contact for the first hour following birth is associated with an abundant milk supply. The mother should be encouraged to watch the baby, not the clock (Riordan and Hover, 2009). Midwives need to encourage the mother to observe and respond to feeding cues and feed her baby at the earliest signs of hunger: rooting; increasing alertness; wiggling; moving arms or legs; bringing a hand to the mouth; sucking on a fist or finger; and moving the mouth or tongue (Cadwell et al, 2006). Optimal breastfeeding takes place in the quiet alert state (Walker, 2010). Crying is considered a late sign of hunger (Riordan and Hover, 2009) as a vigorously crying infant cannot organize behaviour sufficiently to latch and feed effectively (Walker, 2010).

The mother's and baby's contribution to the breastfeeding relationship needs to be assessed early in the neonatal period (Powers, 2009; Riordan and Hover, 2009). According to the American

Academy of Pediatrics, formal evaluation of breastfeeding, including observation of position, latch and milk transfer should be undertaken by midwives at least twice daily (Gartner et al, 2005). A mother and midwife can observe cues from the infant suggesting satiety (sucking activity ceases, baby falls asleep and lets go voluntarily) (Riordan and Hover, 2006). The length of the feeding is determined by the baby. Lauwers and Swisher (2010) suggested that if a mother understands that milk removal triggers further milk production, she will have fewer worries about production.

Early discharge from hospital is common with some mothers discharged 6 hours after the birth of their baby. A challenge for the midwife is to discuss and emphasize critical points that parents need to pay attention to in the early neonatal period, without overwhelming them. Parents require simply written materials that provide step-by-step information and are individualized with key points identified through discussion with the parents (Riordan and Hover, 2009) (*Box 1*).

Most importantly, a mother needs reinforcement of her self-confidence in her role as a new mother (Riordan and Hover, 2009). High self-confidence and self-efficacy contribute to a mother's belief in her ability to produce sufficient milk (Lauwers and Swisher, 2010). A definite plan for early follow-up should be established that may include making a phone call to the mother and the provision of contact numbers for the postnatal ward, lactation consultant, feeding clinic and local support groups such as La Leche League leaders in the area and online resources (Riordan and Hover, 2009).

Signs that intervention is needed

Fears about milk sufficiency may reflect either a real problem or a perceived problem (Cadwell et al, 2006). It is important that the health professional and mother recognize the signs that may indicate that the baby is receiving insufficient milk and intervention is needed (*Box 2*).

Conclusions

When women begin to breastfeed they are understandably anxious to ensure that they are doing it correctly, and that they are fulfilling their role in supplying adequate milk for their baby. As it can take time for a mother to learn to read her baby's behaviour and understand individual feeding habits, the role of the midwife is essential in helping to point out the reliable signs of milk transfer, and normal baby and breastfeeding behaviours. By understanding signs of adequate milk intake, how long a baby should feed for and infant behaviour, mothers can be reassured in their ability

Box 1. Points to discuss with a mother prior to discharge

- Breastfeeding cues
- Positioning and latch
- Signs of adequate milk intake
- Listening for and identifying the infant's swallows
- Baby waking on own for at least eight breastfeeds in 24 hours
- Monitoring the nappy output
- Frequency of feeding
- How she can increase her milk supply if required
- Expression of breast milk
- Jaundice
- When to seek help

Box 2. Signs that intervention is required

- Weight gain of less than 20 g per day in the first 3 months
- Scant, concentrated urine, brick dust urine (from urate crystals) after day 3 or no urine output
- Infrequent stools (< three stools per day after day 3) or stools that have not changed to a yellow colour by day 5 or 6 or passing dry hard stools
- The baby is not waking to feed at least 8 times in 24 hours
- Swallowing is not heard during breastfeeds
- The baby is lethargic, has a weak cry, dry mucous membranes, lack of tearing, poor skin turgor, sunken fontanelles, fever or is irritable and not contented after any breastfeed
- The mother is experiencing nipple pain, breast pain (engorgement, mastitis) or other breast-related problems which may lead to insufficient feeds and low milk supply
- If it is established that the baby is not getting enough milk then referral to a lactation consultant and doctor is indicated

Source: Riordan and Hover (2009)

to produce sufficient milk for their babies, or alternatively interventions can be timely to ensure that babies receive the right amount of milk. **BJM**

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Key points

- Concerns about not making enough milk is one of the most common reasons given for supplementing or discontinuing breastfeeding
- The early change of stools to a mustard colour is a good sign of milk transfer. If the baby is still passing meconium after the fourth day this indicates low milk intake and requires urgent evaluation
- Weight gain is the most accurate indicator that the baby is getting sufficient breast milk
- Midwives need to encourage the mother to observe and respond to feeding cues and feed her baby at the earliest signs of hunger

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