Low Milk Supply

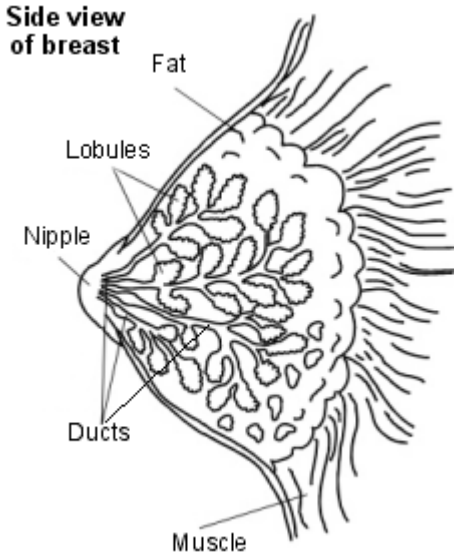
Fact sheet for Health Care Professionals

Most mothers produce plenty (or sufficient) milk to meet their baby's needs. Healthy women in general can produce sufficient quantities of breastmilk and once established breastmilk production is relatively constant over the first 6 months of lactation (Wambach and Riordan, 2016).

While mothers are 'designed to breast feed successfully' (West and Marasco, 2009, p. xxi) there are a small number of women who unfortunately do not make enough breastmilk.

Breastmilk Production

'Lactogenesis describes the multiple stage process during which the mammary gland prepares to secrete milk, begins copious milk production, maintains production over time, and involutes during weaning' (Wilson-Clay and Hoover, 2013, p. 32). The breast contains a number of lobes. Within each lobe is a network of alveoli which contains milk making cells, ductules and then larger ducts or branches, which transport the milk produced within the alveoli to the nipple openings. This is called the functional or glandular tissue of the breast. There is much variability among mothers in breast size and shape, and some mothers may lack sufficient glandular tissue (breast hypoplasia) necessary to produce adequate milk supply. This can occur in one or both breasts (Mohrbacher, 2010).



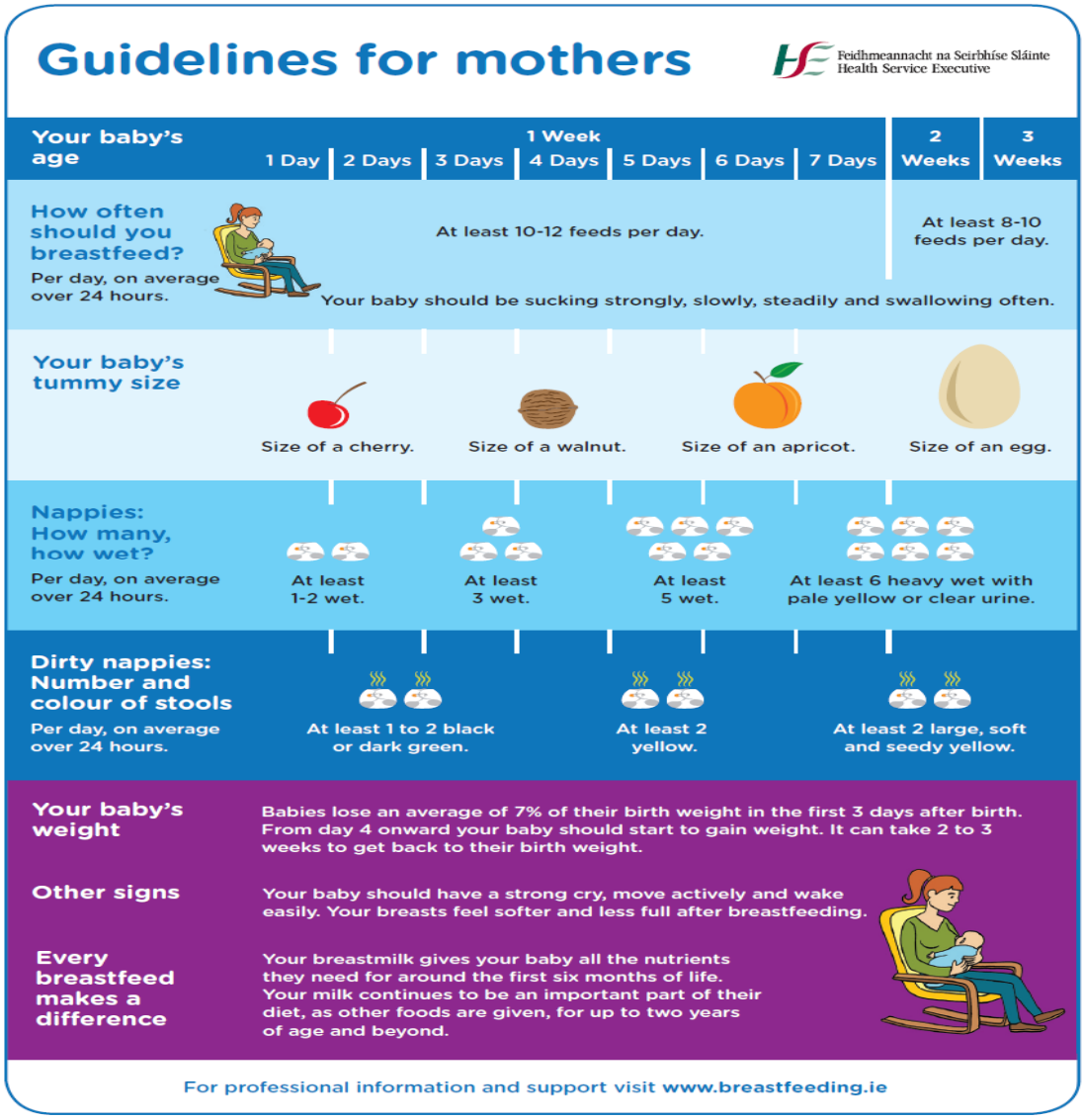
From puberty the hormones oestrogen and progesterone act to develop the ducts and alveoli. Pregnancy causes a much larger increase in both of these hormones including production of prolactin, human placental lactogen, human chorionic gonadotrophin and growth hormone, which all contribute to act on the functional or glandular tissue of the breast. Insulin, cortisol and thyroid hormones also stimulate breast tissue development.

Prolactin is the hormone most responsible for producing breastmilk, it rises during pregnancy and peaks at the birth of the baby (West and Marasco, 2009). There is also the development of prolactin receptors in the breast in response to the early sucking of the baby and frequent milk removal. The more the baby feeds the more receptors are laid down in the breast and as the milk supply becomes established the levels of prolactin reduce. The 'milk making process' then changes from hormone controlled (endocrine) to more local control (autocrine) (West and Marasco, 2009, p. 9). The 'golden rule' of milk production according, to West and Marasco (2009, p.10), is, the emptier the breast is kept, the harder the baby works to restock and the higher the rate of production'.

Lactogenesis Stage 1 and 2

Lactogenesis stage 1 is the early phase of milk production, the milk is called colostrum, and it occurs during the second half of pregnancy (Wilson-Clay and Hoover, 2013).

Lactogenesis stage 2 occurs 30-40 hours after the birth of the baby and is commonly described as the 'milk coming in' (Wilson-Clay and Hoover, 2013, p.32). 'When the onset of copious lactation has not occurred by 72 hours, lactogenesis stage 2 is characterised as delayed' (Wilson-Clay and Hoover, 2013, p.32). The breastmilk when lactogenesis occurs is 'lighter in colour, thinner and more watery than colostrum' (West and Marasco, 2009, p. 7). There is a gradual increase in breastmilk volume which is ideal for the baby's expanding stomach size. The early days of life the baby's stomach is the size of a cherry, and then over the next few days it is the size of a walnut, then an apricot etc. See below 'Guidelines for mothers information leaflet' (HSE).



The baby's stomach empties the breastmilk in approx 60 - 90 minutes (Wambach and Riordan, 2016). Because of the baby's stomach capacity and the rapid emptying of breastmilk from his stomach, a baby will breastfeed many times by day and by night (Wambach and Riordan, 2016), in the early weeks often 10 - 12 times or more in the 24 hours. See above 'Guidelines for mothers information leaflet' (HSE).

Every time the baby sucks at the breast the hormone oxytocin is released by the pituitary gland. This hormone causes the muscles around the alveoli to release breastmilk. This is termed the milk ejection reflex or let down reflex or according to West and Marasco (2009, p. 7) 'Nature's Delivery System'. This can be triggered several times during a breastfeed and it is not only controlled by touch but also by thoughts and feelings. If a mother has a history of breast surgery or injury this may

interfere also with the milk ejection reflex as there may be damage between the nerve pathways between the brain and the breast (Mohrbacher, 2010).

Getting breastfeeding established takes a 'time investment' and the first 40 days can be challenging, this investment however is paid back many times (Mohrbacher and Kendall-Tackett, 2010, p.105). It is really important that parents have realistic expectations of the frequency of both day and night breastfeeds. Hence scheduling feeds, use of formula supplements, pacifier use and other factors that reduce the time the baby spends feeding at the breast may inhibit milk production (Wambach and Riordan, 2016). 'Mothers need accurate, careful guidance in milk supply calibration for the critically sensitive period during the first 2 weeks postpartum. Failure to stimulate sufficiently during this phase may prevent these mothers from establishing adequate lactation' (Wilson-Clay and Hoover, 2013, p. 32). Perceived insufficient milk supply is one of the main reasons for breastfeeding discontinuation (Wood *et al,* 2016) and interventions that enhances a mother's knowledge about her baby's behaviour and how to respond to this behaviour will 'ultimately overcome perceived insufficient milk and continue exclusively breastfeeding for the first 6 months' (Wood *et al,* 2016, p. 306)

The 4 basic Dynamics of Milk Production (Mohrbacher, 2010, p.390)

- Sufficient glandular/ functional breast tissue
- + Enough intact nerve pathways and milk ducts
- + Adequate hormones and functional hormone receptors
- + Frequent and effective milk removal and breast stimulation
- = Ample milk production

The Causes of Reduced Milk Production (Walker, 2016, p.129)

Hormonal causes

- 'Retained placenta that is failure of progesterone withdrawal, or reduced prolactin release or other placental abnormalities such as increta
- Gestational ovarian theca lutein cysts that elevate testosterone levels hence suppressing milk production

Glandular causes

- Surgical procedures
- Insufficient mammary tissue

Post glandular

- Ineffective or infrequent milk removal
- Ineffective breastfeeding' this would include baby's oral anatomy (e.g. tongue tie), birth injuries, breathing challenges, health or neurological issues (Mohrbacher, 2010)
- 'Caesarean birth
- Primiparity
- Peripartum complications' – hypertension, anaemia, excessive blood loss
- 'Formula supplementation'

Others

- Preterm birth
- Insulin Dependent Diabetes Mellitus
- Gestational Diabetes
- Metabolic status or health
- Obesity
- Older maternal age
- Stress
- Hypertension
- Excessive blood loss
- Thyroid imbalance or disease
- Polycystic Ovary Disease
- Luteal phase defect (Mohrbacher, 2010).

Signs of good milk intake

- Feeds are comfortable for mother, with no pain or nipple damage
- Baby feeds 10 - 12 times or more in the 24 hours (during the early weeks) then 8 - 12 times or more as baby gets a little older
- Baby feeds actively for between 10-40 minutes (approximately)
- Audible swallowing is often heard during the breastfeed however, swallowing may be less audible until arrival of more milk on day 3-4 (Lactogenesis 2)
- Baby is gaining weight, the average breastfed baby doubles his birth weight by 5-6 months (Mohrbacher, 2010) https://www.breastfeeding.ie/First-few-weeks/Weight-Gain
- Wet nappies
  Day 1 - 2 = 1 - 2 or more wet nappies
  Day 3 - 4 = 3 or more, heavier wet nappies with pale coloured urine
  Day 7+ = 6 or more, heavy wet nappies with pale coloured urine
- Stools

Day 1 - 2 = 1 or more, black or dark green meconium stools
Day 3 - 4 = 2 or more changing stools, brown, green, yellow coloured
Day 7 = At least 2 large soft and seedy yellow stools

- Baby is satisfied and content after many feeds

Signs of insufficient milk intake or possible low milk supply

- Mother notices no breast changes or fullness in pregnancy (West and Marasco, 2009)
- Breastfeeds may take a long time with little intervals between feeds and baby does not appear satisfied
- Baby may sometimes sleep for longer than 3 - 4 hours at a time, or may tire easily on the breast
- Baby may appear thin and sometimes anxious looking
- Urine is dark and concentrated
- There is often inadequate or absent stooling
- There may be slow weight gain with more than 7 % weight loss in the early days after the birth and birth weight is not regained by 2 weeks of age. Some degree of weight loss is common after birth. It is expected that babies will regain their birth weight by day 10-14. Any loss greater than 10% of birth weight requires a full breastfeeding evaluation.

  Weight gain 'for the first three months: approximately 1oz (30g) per day or 6 oz (180g) per week' (West and Marasco, 2009, p.30). Other more recent references state even higher early weight gain '35g per day at 1 month' (Wambach and Riordan, 2016, p.674) and Walker (2016, p. 417) stated 'between 2 and 6 weeks the average breastfed female infant is expected to gain approximately 34g/day and the male breastfed infant should gain about 40g/day with the minimum expected gain for both boys and girls being about 20g/day'.

  In Ireland the Health Care Professional (HCP) uses a 'Growth Monitoring Chart' to record and track the baby's individual growth pattern. On this chart the baby's weight, length and head circumference are recorded at regular intervals to give an overall picture of their growth pattern. The current Growth Monitoring Charts used in Ireland are accurate for breastfed babies. It is now national policy that the World Health Organisation Child Growth Standards (WHO 2006) are adopted and integrated into child health programming in Ireland (HSE, 2012). This is the link to the section on growth monitoring on www.HSE.ie
  http://www.hse.ie/eng/health/child/growthmonitoring/

Below is the expected weight gain for term infants based on the current WHO growth charts. It relates to the infant/child who is growing along the 50thcentile.

Average weekly weight gain	Boys (g/week)	Girls (g/week)
0-3 months	240	210
4-6 months	130	120
7-9months	80	75
10-12months	65	60

It can often be an extremely anxious and upsetting time for parents if the breastmilk being produced is not sufficient and if their baby has signs of insufficient milk intake. Mothers may feel many emotions such as anger, guilt, and sadness. It is really important to allow the mother to acknowledge her feelings in a non judgmental and empathetic environment. Breastfeeding can continue however if the mother decides she would prefer to stop breastfeeding that too should be respected. The mother should be supported to make the choice that works best for her. However that choice should ideally be an informed decision. The following is the management strategy if there are signs of insufficient milk intake or possible low milk supply

Milk Management Strategy

It would be necessary to refer the mother to specialised breastfeeding support if there were signs of insufficient milk intake or possible low milk supply. The ideal health care provider for breastfeeding support is an International Board Certified Lactation (IBCLC). Some maternity units have Clinical Midwife/Nurse Specialists in Lactation and some PHNs are also qualified IBCLCs. The health care professional would undertake the history and assessment to support the milk management strategy. The IBCLC would assist in helping to identify concerns and make a plan with parents towards improved breastfeeding in conjunction with the health care team.

To find International Board Certified Lactation Consultants (IBCLC)
http://www.alcireland.ie/find-a-consultant/

The 3 rules for solving breastfeeding challenges include

'Feed the baby

Protect the milk supply

Find and fix the problem' (West and Marasco, 2009, p.37).

The milk management strategy involves the following:

1) Get a detailed history to ascertain if any of the above causes of reduced milk production are present. This history taking involves mother's own history, breastfeeding history, pain history (if applicable), and baby's history
2) The mother's general appearance and nipples and breast need to be examined. When inspecting the mother's breast and nipples, this is done with her permission and ensure mother is treated with dignity and respect at all times
3) Assessment of the baby should include his general condition and his weight. It should also include an assessment of his oral anatomy and function of the tongue (See Tongue Tie - Fact sheet for Health Care Professionals). Evidence of palate abnormality and submucosal cleft should also be out ruled.

   For further information please see
   http://www.bfmed.org/Media/Files/Protocols/persistent%20pain2016%20(2).pdf

4) Correction of any of the above causes of reduced milk production should be committed to, as a matter of urgency.
5) The following management according to Walker (2016, p. 644-650) includes extra feedings, extra pumpings, pumping after a feed, improving baby's positioning and attachment at the breast (See – Positioning and Attachment of Baby to the Breast – Fact sheet for Health Care Professionals). Kent *et al* (2012) refers to optimal milk removal and frequent and thorough breast drainage.
6) Mothers are advised to massage alternate breasts while feeding to increase milk transfer and production and also the use of breast massage while pumping or expressing breastmilk
7) Feed the baby extra breast milk and this can be done by cup, bottle or tube feeding device (under the care of a HCP).
   ' If a baby's weight gain or loss is low enough to be of concern the baby should be given as much extra breastmilk as he will take whenever a supplement is given' (Mohrbacher, 2010, p.237). The volume a baby needs per day to gain weight will, according to Mohrbacher (2010 p.236), vary by age and by baby. A useful guide by Mohrbacher (2010, p.237) shows average

milk intake per feeding and per day for the first 6 months of a baby's life. It is best, when giving the supplement to let the baby set the pace.

Baby's Age	Average Milk Volume per Feeding	Average Milk intake per Day
First Week after Day 4	1 - 2 ounces (30-59mls)	10 - 20 ounces
Weeks 2 and 3	2 - 3 ounces (59-89 mls)	15 - 25 ounces
Months 1 - 6	3 - 5 ounces (89-148mls)	25 - 35 ounces

- It is important if possible to supplement the baby during day time hours to allow the mother to rest at night in between breastfeeds
- Give smaller volumes of supplements more often in order to enable breastfeeding to continue
- Gradually wean from supplements as milk production or baby's breastfeeding effectiveness improves (Mohrbacher, 2010).

8) Skin to skin contact (SSC) improves milk output by releasing oxytocin
9) Measures to help the milk ejection reflex include encouraging the mother to hold her baby in SSC, have her baby's unwashed blanket or clothing next to her face. Listening to her baby's sounds if her baby is near, or a recording of her baby if baby is not nearby
10) Milk expression can be by either hand or pump or a combination of both. It is important the mother is shown the technique of hand expression and also is observed during the first pumping session to ensure her technique, the level of suction of the pump and the fit of the flange of the attachment are all correct. Warm compresses on the breast and a warmed flange further assists milk removal
11) Milk expression may also involve power pumping. This firstly involves the mother massaging her breast then using the pump for 5 - 10 minutes on both breasts (in between breastfeeds) as often as possible, aiming for pumping at least 10 times every day over a 2 - 3 day period (West and Marasco, 2009).
12) Encouraging the mother to use relaxation techniques including music, visualisation, yoga etc
13) Mothers who smoke should be advised to quit or reduce (See Smoking and Breastfeeding - A Factsheet for Health Care Professionals)
14) There is available both medicinal and herbal galactogues and according to Wilson- Clay and Hoover (2013, p.33) 'a galactogue is a medication or an herb believed to help initiate, maintain, or increase the rate of maternal milk synthesis. Publications vary in terms of the recommendation of galactogue

use. According to The Academy of Breastfeeding Medicine (ABM) Clinical Protocol # 9, galactogues should not replace effective breastfeeding

management for the mother and baby dyad where there is reduced milk production, it also concludes (2011, p.43) 'Because current research of all galactogogues is relatively inconclusive and all of the agents have potential adverse effects, ABM cannot recommend any specific pharmacologic or herbal galactogogues at this time'. This protocol by ABM further recommends that the HCP who does proceed to recommend a galactogue having examined the risks versus the benefits, should follow the guidelines within that protocol (Appendix : Specific Galactogogues)
http://www.bfmed.org/Media/Files/Protocols/Protocol%209%20-%20English%201st%20Rev.%20Jan%202011.pdf
There is according to West and Marasco (2009) 'lactogenic foods' some of which include almonds, coconut and sesame seeds which promote 'rich milk' while rice pudding with milk and sugar and pumpkin sunflower seeds may increase production. Oatmeal is also popular as a lactogenic food.

Breastfeeding Support

It is important when a mother is breastfeeding her baby to receive good support. There is a wide range of breastfeeding support available in Ireland offered by Public Health Nurses, voluntary groups such as La Leche League, Cuidiu, Friends of Breastfeeding (social support), Hospital clinics and International Board Certified Lactation Consultant (IBCLCs). Links to nationwide support include:

Nationwide database of hospital, public health and voluntary breastfeeding support
https://www.breastfeeding.ie/Support-search/

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