

Breastfeeding

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Breastfeeding, also known as **nursing**, is the feeding of babies and young children with milk from a woman's breast.^[1] Health professionals recommend that breastfeeding begin within the first hour of a baby's life and continue as often and as much as the baby wants.^{[2][3]} During the first few weeks of life babies may nurse roughly every two to three hours. The duration of a feeding is usually ten to fifteen minutes on each breast.^[4] Older children feed less often.^[5] Mothers may pump milk so that it can be used later when breastfeeding is not possible.^[1] Breastfeeding has a number of benefits to both mother and baby, which infant formula lacks.^{[3][6]}

Deaths of an estimated 820,000 children under the age of five could be prevented globally every year with increased breastfeeding.^[7] Breastfeeding decreases the risk of respiratory tract infections and diarrhea, both in developing and developed countries.^{[2][3]} Other benefits include lower risks of asthma, food allergies, celiac disease, type 1 diabetes, and leukemia.^[3] Breastfeeding may also improve cognitive development and decrease the risk of obesity in adulthood.^[2] Mothers may feel pressure to breastfeed; however in the developed world children generally grow up normally when bottle feed.^[8]

Benefits for the mother include less blood loss following delivery, better uterus shrinkage, weight loss, and less postpartum depression. Breastfeeding delays the return of menstruation and fertility, a phenomenon known as lactational amenorrhea. Long term benefits for the mother include decreased risk of breast cancer, cardiovascular disease, and rheumatoid arthritis.^{[3][7]} Breastfeeding is often less expensive than infant formula.^{[9][10]}

Health organizations, including the World Health Organization (WHO), recommend breastfeeding exclusively for six months.^{[2][11]} This means that no other foods or drinks other than possibly vitamin D are typically given.^[12] After the introduction of foods at six months of age, recommendations include continued breastfeeding until at least one to two years of age.^{[2][3]} Globally about 38% of infants are only breastfed during their first six months of life.^[2] In the United States, about 75% of women begin breastfeeding and about 13% only breastfeed until the age of six months.^[3] Medical conditions that do



A baby breastfeeding

not allow breastfeeding are rare.^[3] Mothers who take certain recreational drugs and medications should not breastfeed.^[13] Smoking, limited intake of alcohol, and coffee are not reasons to avoid breastfeeding.^{[14][15][16]}

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Lactation

The endocrine system drives milk production during pregnancy and the first few days after the birth. From the twenty-fourth week of pregnancy (the second and third trimesters), a woman's body produces hormones that stimulate the growth of the breast's milk duct system. Progesterone influences the growth in size of alveoli and lobes; high levels of progesterone, estrogen, prolactin and other hormones inhibit lactation before birth; hormone levels drop after birth, triggering milk production.^[17] After birth, the hormone oxytocin contracts the smooth muscle layer of cells surrounding the alveoli to squeeze milk into the duct system. Oxytocin is also necessary for the milk ejection reflex, or *let-down* to occur. Let-down occurs in response to the baby's suckling, though it also may be a conditioned response, e.g. to the cry of the baby. Lactation can also be induced by a combination of physical and psychological stimulation, by drugs or by a combination of these methods.^{[18][19]}

Breast milk

Not all of breast milk's properties are understood, but its nutrient content is relatively consistent. Breast milk is made from nutrients in the mother's bloodstream and bodily stores. Breast milk has an optimal balance of fat, sugar, water, and protein that is needed for a baby's growth and development.^[21] Breastfeeding triggers biochemical reactions which allows for the enzymes, hormones, growth factors and immunologic substances to effectively defend against infectious diseases for the infant. The breastmilk also has long-chain polyunsaturated fatty acids which help with normal retinal and neural development.^[22] Because breastfeeding requires an average of 500 calories a day, it helps the mother lose weight after giving birth.^[23]



Two 25ml samples of human breast milk. The sample on the left is foremilk, the watery milk coming from a full breast. To the right is hindmilk, the creamy milk coming from a nearly empty breast.^[20]

The composition of breast milk changes depending on how long the baby nurses at each session, as well as on the child's age.^[24] The first type, produced during the first days after childbirth, is called *colostrum*. Colostrum is easy to digest although it is more concentrated than mature milk. It has a laxative effect that helps the infant to pass early stools, aiding in the excretion of excess bilirubin, which helps to prevent jaundice. It also helps to seal the infants gastrointestinal tract from foreign substances, which may sensitize the baby to foods that the mother has eaten. Although the baby has received some

antibodies through the placenta, colostrum contains a substance which is new to the newborn, secretory immunoglobulin A (IgA). IgA works to attack germs in the mucous membranes of the throat, lungs, and intestines, which are most likely to come under attack from germs.^[25]

Breasts begin producing mature milk around the third or fourth day after birth. Early in a nursing session, the breasts produce *foremilk*, a thinner milk containing many proteins and vitamins. If the baby keeps nursing, then *hindmilk* is produced. Hindmilk has a creamier color and texture because it contains more fat.^[26] The American Academy of Pediatrics (AAP) states that "tobacco smoking by mothers is not a contraindication to

breastfeeding."^[27] In addition, AAP states that while breastfeeding mothers "should avoid the use of alcoholic beverages", an "occasional celebratory single, small alcoholic drink is acceptable, but breastfeeding should be avoided for 2 hours after the drink."^[27] A 2014 review found that "even in a theoretical case of binge drinking, the children would not be subjected to clinically relevant amounts of alcohol [through breastmilk]", and would have no adverse effects on children as long as drinking is "occasional".^[28]



Himba woman and child

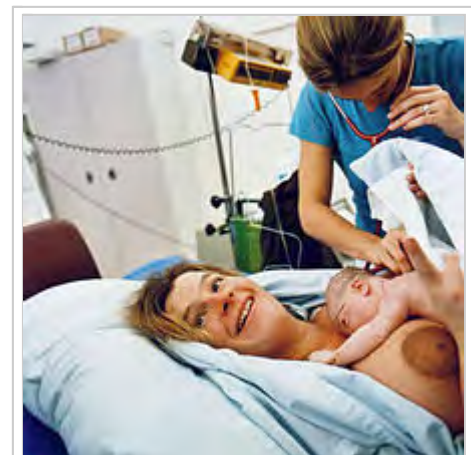
Process

Commencement

Breastfeeding can begin immediately after birth. The baby is placed on the mother and feeding starts as soon as the baby shows interest.

According to some authorities, increasing evidence suggests that early skin-to-skin contact (also called kangaroo care) between mother and baby stimulates breastfeeding behavior in the baby.^[29] Newborns who are immediately placed on their mother's skin have a natural instinct to latch on to the breast and start nursing, typically within one hour of birth. Immediate skin-to-skin contact may provide a form of imprinting that makes subsequent feeding significantly easier. In addition to more successful breastfeeding and bonding, immediate skin-to-skin contact reduces crying and warms the baby.

According to studies cited by UNICEF, babies naturally follow a process which leads to a first breastfeed. Initially after birth the baby cries with its first breaths. Shortly after, it relaxes and makes small movements of the arms, shoulders and head. The baby crawls towards the breast and begins to feed. After feeding, it is normal for a baby to remain latched to the breast while



Newborn rests as caregiver checks breath sounds

resting. This is sometimes mistaken for lack of appetite. Absent interruptions, all babies follow this process. Rushing or interrupting the process, such as removing the baby to weigh him/her, may complicate subsequent feeding.^[30] Activities such as weighing, measuring, bathing, needle-sticks, and eye prophylaxis wait until after the first feeding."^[27]

Children who are born preterm have difficulty in initiating breast feeds immediately after birth. By convention, such children are often fed on expressed breast milk or other supplementary feeds through tubes or bottles until they develop satisfactory ability to suck breast milk. Tube feeding, though commonly used, is not supported by scientific evidence as of October 2016.^[31] It has also been reported in the same systematic review that by avoiding bottles and using cups instead to provide supplementary feeds to preterm children, a greater extent of breast feeding for a longer duration can subsequently be achieved.^[31]

Timing

Newborn babies typically express demand for feeding every 1 to 3 hours (8-12 times in 24 hours) for the first two to four weeks.^[32] A newborn has a very small stomach capacity. At one-day old it is 5 to 7 ml, about the size of a marble; at day three it is 0.75-1 oz, about the size of a "shooter" marble; and at day seven it is 1.5-2 oz, or about the size of a ping-pong ball. The amount of breast milk that is produced is timed to meet the infant's needs in that the first milk, colostrum, is concentrated but produced in only very small amounts, gradually increasing in volume to meet the expanding size of the infant's stomach capacity.^[25]

According to La Leche League International, "Experienced breastfeeding mothers learn that the sucking patterns and needs of babies vary. While some infants' sucking needs are met primarily during feedings, other babies may need additional sucking at the breast soon after a feeding even though they are not really hungry. Babies may also nurse when they are lonely, frightened or in pain....Comforting and meeting sucking needs at the breast is nature's original design. Pacifiers (dummies, soothers) are a substitute for the mother when she cannot be available. Other reasons to pacify a baby primarily at the breast include superior oral-facial development, prolonged lactational amenorrhea, avoidance of nipple confusion, and stimulation of an adequate milk supply to ensure higher rates of breastfeeding success."^[33]

During the newborn period, most breastfeeding sessions take from 20 to 45 minutes.^[32] After one breast is empty, the mother may offer the other breast.

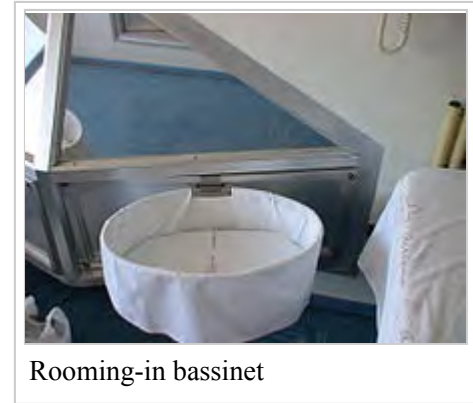
Location

Most US states now have laws that allow a mother to breastfeed her baby anywhere. In hospitals, rooming-in care permits the baby to stay with the mother and simplifies the process. Some commercial establishments provide breastfeeding rooms, although laws generally specify that mothers may breastfeed anywhere, without requiring a special area. Breastfeeding in public remains controversial in many developed countries.

In 2014, newly elected Pope Francis drew world-wide commentary when he encouraged mothers to breastfeed babies in church. During a papal baptism, he said that mothers "should not stand on ceremony" if their children were hungry. "If they are hungry, mothers, feed them, without thinking twice," he said, smiling. "Because they are the most important people here."^[34]

Position

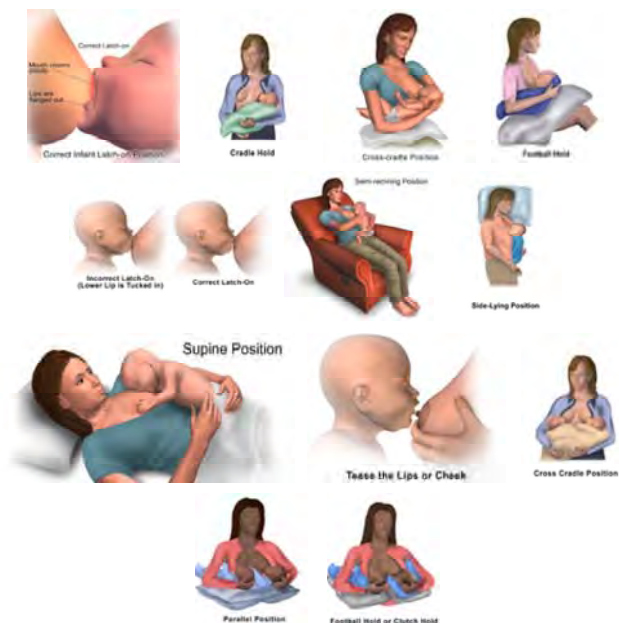
Correct positioning and technique for latching on are necessary to prevent nipple soreness and allow the baby to obtain enough milk.^[35]



Babies can successfully latch on to the breast from multiple positions. Each baby may prefer a particular position. The "football" hold places the baby's legs next to the mother's side with the baby facing the mother. Using the "cradle" or "cross-body" hold, the mother supports the baby's head in the crook of her arm. The "cross-over" hold is similar to the cradle hold, except that the mother supports the baby's head with the opposite hand. The mother may choose a reclining position on her back or side with the baby laying next to her.^[36]

Latching on

The "rooting reflex" is the baby's natural tendency to turn towards the breast with the mouth open wide; mothers sometimes make use of this by gently stroking the baby's cheek or lips with their nipple to induce the baby to move into position for a breastfeeding session, then quickly moving the baby onto the breast while its mouth is wide open.^[37] To prevent nipple soreness and allow the baby to get enough milk, a large part of the breast and areola need to enter the baby's mouth.^{[38][39]} Failure to latch on is one of the main reasons for ineffective feeding and can lead to infant health concerns.



Weaning

Weaning is the process of replacing breast milk with other foods; the infant is fully weaned after the replacement is complete. Psychological factors affect the weaning process for both mother and infant, as issues of closeness and separation are very prominent.^[40] If the baby is less than a year old substitute bottles are necessary; an older baby may accept milk from a cup. Unless a medical emergency necessitates abruptly stopping breastfeeding, it is best to gradually cut back on feedings to allow the breasts to adjust to the decreased demands without becoming engorged. La Leche League advises: "The nighttime feeding is usually the last to go. Make a bedtime routine not centered around breastfeeding. A good book or two will eventually become more important than a long session at the breast."^[41]

If breastfeeding is suddenly stopped a woman's breasts are likely to become engorged with milk. Pumping small amounts to relieve discomfort helps to gradually train the breasts to produce less milk. There is presently no safe medication to prevent engorgement, but cold compresses and ibuprofen may help to relieve pain and swelling. Pain should go away in one to five days. If symptoms continue and comfort measures are not helpful a woman should consider the possibility that a blocked milk duct or infection may be present and seek medical intervention.^[42]

When weaning is complete the mother's breasts return to their previous size after several menstrual cycles. If the mother was experiencing lactational amenorrhea her periods will return along with the return of her fertility. When no longer breastfeeding she will need to adjust her diet to avoid weight gain.^[43]

Methods

Exclusive

Exclusive breastfeeding is defined as "an infant's consumption of human milk with no supplementation of any type (no water, no juice, no nonhuman milk and no foods) except for vitamins, minerals and medications."^[27] Exclusive breastfeeding till six months of age helps to protect an infant from gastrointestinal infections in both developing and industrialized countries. The risk of death due to diarrhea and other infections increases when babies are either partially breastfed or not breastfed at all.^[2]

Measuring how many calories a breastfed baby consumes is complex, although babies normally attempt to meet their own requirements.^[44] Babies that fail to eat enough may exhibit symptoms of failure to thrive.^[45]

La Leche League says that mothers' most often asked question is, "How can I tell if my baby is getting enough milk?" They advise that for the first few days, while the baby is receiving mostly colostrum, one or two wet diapers per day is normal. Once the mother starts producing milk, usually on the third or fourth day, the baby should have 6-8 wet cloth diapers (5-6 wet disposable diapers) per day. In addition, most young babies have at least two to five bowel movements every 24 hours for the first several months.^[46]

La Leche League offers the following additional signs that indicate a baby is receiving enough milk:

- Averages at least 8-12 feedings per 24-hour period.
- Determines the duration of feeding, which may be 10 to 20 minutes per breast or longer.
- Swallowing sounds are audible.
- Gains at least 4-7 ounces per week after the fourth day.
- Is alert and active, appears healthy, has good color, firm skin and is growing in length and head circumference.^[46]

Mixed feeding

Predominant or mixed breastfeeding means feeding breast milk along with infant formula, baby food

and even water, depending on the child's age.^[47]

Expressed milk

A mother can "express" (produce) her milk for storage and later use. Expression occurs with massage or a breast pump. It can be stored in freezer storage bags, containers made specifically for breastmilk, a supplemental nursing system, or a bottle ready for use. Using someone other than the mother/wet nurse to deliver the bottle maintains the baby's association of nursing with the mother/wet nurse and bottle feeding with other people.

Breast milk may be kept at room temperature for up to six hours, refrigerated for up to eight days or frozen for six to twelve months.^[48] Research suggests that the antioxidant activity in expressed breast milk decreases over time, but remains at higher levels than in infant formula.^[49]

Mothers express milk for multiple reasons. Expressing breast milk can maintain a mother's milk supply when she and her child are apart. A sick baby who is unable to nurse can take expressed milk through a nasogastric tube. Some babies are unable or unwilling to nurse. Expressed milk is the feeding method of choice for premature babies.^[50] Viral disease transmission can be prevented by expressing breast milk and subjecting it to Holder pasteurisation.^[51] Some women donate expressed breast milk (EBM) to others, either directly or through a milk bank. This allows mothers who cannot breastfeed to give their baby the benefits of breast milk.

Babies feed differently with artificial nipples than from a breast. With the breast, the infant's tongue massages the milk out rather than sucking, and the nipple does not go as far into the mouth. Drinking from a bottle takes less effort and the milk may come more rapidly, potentially causing the baby to lose desire for the breast. This is called *nursing strike*, *nipple strike* or *nipple confusion*. To avoid this, expressed milk can be given by means such as spoons or cups.^[47]

"Exclusively expressing", "exclusively pumping", and "EPing" are terms for a mother who exclusively feeds her baby expressed milk. With good pumping habits, particularly in the first 12 weeks while establishing the milk supply, it is possible to express enough milk to feed the baby indefinitely. With the improvements in breast pumps, many women exclusively feed expressed milk, expressing milk at work. Women can leave their infants in the care of others while traveling, while maintaining a supply of breast milk.^[52]



Formula and pumped breastmilk, side-by-side. Note that the formula is of uniform consistency and color, while the milk exhibits properties of an organic solution, separating into the creamline layer of fat at the top, milk and a watery blue layer at the bottom.



Manual breast pump

Shared nursing

Wet nursing was common throughout history. It remains popular in some developing nations, including those in Africa, for more than one woman to breastfeed a child. Shared breastfeeding is a risk factor for HIV infection in infants.^[53] A woman who is engaged to breastfeed another's baby is known as a wet nurse. Shared nursing can sometimes provoke negative reactions in the Anglosphere.^{[54][55]}



Expressed breast milk or infant formula can be fed by bottle

Tandem nursing

Feeding two children at the same time who are not twins or multiples is called *tandem nursing*. Appetite and feeding habits of each baby may differ, so they may feed at the same or different times, which may involve feeding them simultaneously, one on each breast.

Breastfeeding triplets or larger broods is a challenge given babies' varying appetites. Breasts can respond to the demand and produce larger milk quantities; mothers have breastfed triplets successfully.^{[56][57][58]}

Tandem nursing occurs when a woman gives birth while breastfeeding an older child. During the late stages of pregnancy, the milk changes to colostrum. While some children continue to breastfeed even with this change, others may wean. Breastfeeding a child while pregnant with another may be considered a form of tandem feeding for the nursing mother, as she provides nutrition for two.^[59]

Induced lactation

Induced lactation, also called *adoptive lactation*, is the process of starting breastfeeding in a woman who did not give birth.^[60] This usually requires the adoptive mother to take hormones and other drugs to stimulate breast development and promote milk production. In some cultures, breastfeeding an adoptive child creates milk kinship that built community bonds across class and other hierarchal bonds.^[60]

Re-lactation

Re-lactation is the process of restarting breastfeeding.^[60] In developing countries, mothers may restart breastfeeding after a weaning as part of an oral rehydration treatment for diarrhea. In developed countries, re-lactation is common after early medical problems are resolved, or because a mother changes her mind about breastfeeding.

Re-lactation is most easily accomplished with a newborn or with a baby that was previously breastfeeding; if the baby was initially bottle-fed, the baby may refuse to suckle. If the mother has recently stopped breastfeeding, she is more likely to be able to re-establish her milk supply, and more likely to have an adequate supply. Although some women successfully re-lactate after months-long interruptions, success is higher for shorter interruptions.^[60]

Techniques to promote lactation use frequent attempts to breastfeed, extensive skin-to-skin contact with the baby, and frequent, long pumping sessions.^[60] Suckling may be encouraged with a tube filled with infant formula, so that the baby associates suckling at the breast with food. A dropper or syringe without the needle may be used to place milk onto the breast while the baby suckles. The mother should allow the infant to suckle at least ten times during 24 hours, and more times if he or she is interested. These times can include every two hours, whenever the baby seems interested, longer at each breast, and when the baby is sleepy when he or she might suckle more readily. In keeping with increasing contact between mother and child, including increasing skin-to-skin contact, grandmothers should pull back and help in other ways. Later on, grandmothers can again provide more direct care for the infant.^[61]

These techniques require the mother's commitment over a period of weeks or months. However, even when lactation is established, the supply may not be large enough to breastfeed exclusively. A supportive social environment improves the likelihood of success.^[60] As the mother's milk production increases, other feeding can decrease. Parents and other family members should watch the baby's weight gain and urine output to assess nutritional adequacy.^[61]

A WHO manual for physicians and senior health workers citing a 1992 source states: "If a baby has been breastfeeding sometimes, the breastmilk supply increases in a few days. If a baby has stopped breastfeeding, it may take 1-2 weeks or more before much breastmilk comes."^[61]

Extended

Extended breastfeeding means breastfeeding after the age of 12 or 24 months, depending on the source. Worldwide, infants are weaned on average between ages two and four. Breast-feeding continues until children are six or seven years old in some cultures but in other countries extended breast-feeding is less common. In Western countries such as the United States, Canada, and Great Britain, extended breastfeeding is relatively uncommon and can provoke criticism.^{[62][63]}

In the United States, 22.4% of babies are breastfed for 12 months, the minimum amount of time advised by the American Academy of Pediatrics. In India, mothers commonly breastfeed for 2 to 3 years.^[64]

Health effects

Breastfeeding decreases the risk of a number of diseases in both mothers and babies.^[65] The US Preventive Services Task Force recommends efforts to promote breastfeeding.^[66]

Baby

Early breastfeeding is associated with fewer nighttime feeding problems.^[67] Early skin-to-skin contact between mother and baby improves breastfeeding outcomes, increases cardio-respiratory stability and decreases infant crying.^[68] Reviews from 2007 found numerous benefits. Breastfeeding aids general health, growth and development in the infant. Infants who are not breastfed are at mildly increased risk of developing acute and chronic diseases, including lower respiratory infection, ear infections,

bacteremia, bacterial meningitis, botulism, urinary tract infection and necrotizing enterocolitis.^{[69][70]}

Breastfeeding may protect against sudden infant death syndrome,^[71] insulin-dependent diabetes mellitus, Crohn's disease, ulcerative colitis, lymphoma, allergic diseases, digestive diseases and may enhance cognitive development.^[27]

Growth

The average breastfed baby doubles its birth weight in 5 to 6 months. By one year, a typical breastfed baby weighs about 2½ times its birth weight. At one year, breastfed babies tend to be leaner than formula-fed babies, which improves long-run health.^[72]

The Davis Area Research on Lactation, Infant Nutrition and Growth (DARLING) study reported that breastfed and formula-fed groups had similar weight gain during the first 3 months, but the breastfed babies began to drop below the median beginning at 6 to 8 months and were significantly lower weight than the formula-fed group between 6 and 18 months. Length gain and head circumference values were similar between groups, suggesting that the breastfed babies were leaner.^[73]

Infections

Breast milk contains several anti-infective factors such as bile salt stimulated lipase (protecting against amoebic infections) and lactoferrin (which binds to iron and inhibits the growth of intestinal bacteria).^{[74][75]}

Infants who are exclusively breastfed for the first six months are less likely to die of gastrointestinal infections than infants who switched from exclusive to partial breastfeeding at three to four months.^[76]

During breastfeeding, approximately 0.25–0.5 grams per day of secretory IgA antibodies pass to the baby via milk.^{[77][78]} This is one of the important features of colostrum.^[79] The main target for these antibodies are probably microorganisms in the baby's intestine. The rest of the body displays some uptake of IgA,^[80] but this amount is relatively small.^[81]

Maternal vaccinations while breastfeeding is safe for almost all vaccines. Additionally, the mother's immunity obtained by vaccination against tetanus, diphtheria, whooping cough and influenza can protect the baby from these diseases, and breastfeeding can reduce fever rate after infant immunization. However, smallpox and yellow fever vaccines increase the risk of infants developing vaccinia and encephalitis.^{[82][83]}

Mortality

Babies who are not breastfed are almost six times more likely to die by the age of one month than those who receive at least some breastmilk.^[84]

Diabetes

Infants exclusively breastfed have less chance of developing diabetes mellitus type 1 than those with a shorter duration of breastfeeding.^[70] Breastfed infants appear to have a lower likelihood of developing diabetes mellitus type 2 later in life.^{[69][70][85]} Breastfeeding is also associated with a lower risk of type 2 diabetes among mothers who practice it.^[86]

Childhood obesity

The protective effect of breastfeeding against obesity is consistent, though small, across many studies.^{[69][70][87]} A 2013 longitudinal study reported less obesity at ages two and four years among infants who were breastfed for at least four months.^[88]

Allergic diseases

In children who are at risk for developing allergic diseases (defined as at least one parent or sibling having atopy), atopic syndrome can be prevented or delayed through 4-month exclusive breastfeeding, though these benefits may not persist.^[89]

Other health effects

Breastfeeding may reduce the risk of necrotizing enterocolitis (NEC).^[70]

Breastfeeding or introduction of gluten while breastfeeding don't protect against celiac disease among at-risk children. Breast milk of healthy human mothers who eat gluten-containing foods presents high levels of non-degraded gliadin (the main gluten protein). Early introduction of traces of gluten in babies to potentially induce tolerance doesn't reduce the risk of developing celiac disease. Delaying the introduction of gluten does not prevent, but is associated with a delayed onset of the disease.^{[90][91]}

About 19% of leukemia cases may be prevented by breastfeeding for six months or longer.^[92]

Breastfeeding may decrease the risk of cardiovascular disease in later life, as indicated by lower cholesterol and C-reactive protein levels in breastfed adult women.^[69] Breastfed infants have somewhat lower blood pressure later in life, but it is unclear how much practical benefit this provides.^{[69][70]}

A 1998 study suggested that breastfed babies have a better chance of good dental health than formula-fed infants because of the developmental effects of breastfeeding on the oral cavity and airway. It was thought that with fewer malocclusions, breastfed children may have a reduced need for orthodontic intervention. The report suggested that children with a well rounded, "U-shaped" dental arch, which is found more commonly in breastfed children, may have fewer problems with snoring and sleep apnea in later life.^[93] A 2016 review found that breastfeeding protected against malocclusions.^[94]

Intelligence

It is unclear whether breastfeeding improves intelligence later in life. Several studies found no relationship after controlling for confounding factors like maternal intelligence (smarter mothers were more likely to breastfeed their babies).^{[70][95]} However, other studies concluded that breastfeeding was associated with increased cognitive development in childhood, although the cause may be increased mother–child interaction rather than nutrition.^[69]

Mother

Breastfeeding aids maternal physical and emotional health. Breastfeeding and depression in the mother are associated.^[96] Mothers who successfully breastfeed are less likely to develop postpartum depression.^[97]

Maternal bond

Hormones released during breastfeeding help to strengthen the maternal bond.^[21] Teaching partners how to manage common difficulties is associated with higher breastfeeding rates.^[98] Support for a breastfeeding mother can strengthen familial bonds and help build a paternal bond.^{[21][99]}

Fertility

Exclusive breastfeeding usually delays the return of fertility through lactational amenorrhea, although it does not provide reliable birth control. Breastfeeding may delay the return to fertility for some women by suppressing ovulation. Mothers may not ovulate, or have regular periods, during the entire lactation period. The non-ovulating period varies by individual. This has been used as natural contraception, with greater than 98% effectiveness during the first six months after birth if specific nursing behaviors are followed.^[100]

Hormonal

Breastfeeding releases beneficial hormones into the mother's body.^[78] Oxytocin and prolactin hormones relax the mother and increase her nurturing response.^[101] This hormone release can help to enable sleep. Breastfeeding soon after birth increases the mother's oxytocin levels, making her uterus contract more quickly and reducing bleeding. Pitocin, a synthetic hormone used to make the uterus contract during and after labour, is structurally modelled on oxytocin. Syntocinon, another synthetic oxytocic, is commonly used in Australia and the UK rather than Pitocin.^[102]

Weight loss

It is unclear whether breastfeeding causes mothers to lose weight after giving birth.^[70]

Reduced cancer risk

For breastfeeding women, long-term health benefits include reduced risk of breast cancer, ovarian

cancer, and endometrial cancer.^{[27][70][103]}

Decision factors

The majority of mothers intend to breastfeed at birth. Many factors can disrupt this intent. Research done in the U.S. shows that information about breastfeeding is rarely provided by a women's obstetricians during their prenatal visits and some health professionals incorrectly believe that due to recent improvements commercially prepared formula is equal to breast milk in terms of its health benefits.^[104] Many hospitals have instituted practices that encourage breastfeeding, however a 2012 survey in the U.S. found that 24% of maternity services were still providing supplements of commercial infant formula as a general practice in the first 48 hours after birth.^[3] *The Surgeon General's Call to Action to Support Breastfeeding* attempts to educate practitioners.^[105]

Social support

Work is the most commonly cited reason for not breastfeeding.^[106] In 2012 Save the Children examined maternity leave laws, ranking 36 industrialized countries according to their support for breastfeeding. Norway ranked first, while the United States came in last.^[107] Maternity leave in the US varies widely, including by state, despite the Family Medical Leave Act (FMLA), which guarantees most mothers up to 12 weeks unpaid leave. The majority of US mothers resume work earlier.

- Mother – Adolescence is a risk factor for low breastfeeding rates, although classes, books and personal counseling (professional or lay) can help compensate.^[108] Some women fear that breastfeeding will negatively impact the look of their breasts. However, a 2008 study found that breastfeeding had no effect on a woman's breasts, other factors did contribute to "drooping" of the breasts, such as advanced age, number of pregnancies and smoking behavior.^[109]
- Partner – Partners may lack knowledge of breastfeeding and their role in the practice.

Healthcare

Infants that are otherwise healthy uniformly benefit from breastfeeding. "No known disadvantages" stem from breastfeeding.^[110] However, extra precautions should be taken or breastfeeding be avoided in circumstances including certain infectious diseases, or use of certain medications.^[111] In some cases it may not be feasible for the mother to continue breastfeeding.^[112]

A number of hospital-employed procedures have been found to interfere with breastfeeding, including routine mother/baby separation, delayed initiation, vigorous routine suctioning, medications and mode of delivery.^[113]



Famille d'un Chef Camacan se préparant pour une Fête ("Family of a Camacan chief preparing for a celebration") by Jean-Baptiste Debret shows a woman breastfeeding a child in the background.

Pain caused from mis-positioning the baby on the breast or a tongue-tie in the infant can cause pain in the mother and discourage her. These problems are generally easy to correct (by re-positioning or clipping the tongue-tie).^[114]

Breast surgery, including breast implants or breast reduction surgery, reduces the chances that a woman will have sufficient milk to breastfeed.^[115] Women whose pregnancies are unintended are less likely to breast feed their babies.^[116]

Maternal infections

The central concern about breastfeeding in the presence of maternal HIV is risks of the child becoming infected. Factors such as the viral load in the mother's milk complicate breastfeeding recommendations for HIV-positive mothers.^[117]

In mothers who are treated with antiretroviral drugs the risk of HIV transmission with breastfeeding is 1 to 2%.^[2] Therefore, of breastfeeding is still recommended in areas of the world with death from infectious diseases is common.^[2] Infant formula should only be given if this can be safely done.^[2]

WHO recommends that national authorities in each country decide which infant feeding practice should be promoted by their maternal and child health services to best avoid HIV transmission from mother to child.^[118] Other maternal infection of concern include active untreated tuberculosis or human T-lymphotropic virus.

Medications

Breastfeeding mothers should inform their healthcare provider about all of the medications they are taking, including herbal products. Nursing mothers can safely take many over-the-counter drugs and prescription drugs and receive immunizations, but certain drugs, including painkillers and psychiatric drugs, may pose a risk.

The U.S. National Library of Medicine publishes "LactMed", an up-to-date online database of information on drugs and lactation. Geared to both healthcare practitioners and nursing mothers, LactMed contains over 450 drug records with information such as potential drug effects and alternate drugs to consider.^{[83][119]}

Some pollutants in the mother's food and drink are passed to the baby through breast milk, including mercury (found in some carnivorous fish),^[120] caffeine,^[121] and bisphenol A.^{[122][123]}

Socioeconomic status

Race, ethnicity and socioeconomic status affect choice and duration in the United States. A 2011 study found that on average, US women who breastfed had higher levels of education, were older and were more likely to be white.^[124]

The reasons for the persistently lower rates of breastfeeding among African American mothers are not well understood, but employment may play a role. They tend to return to work sooner than white mothers, and are more likely to work in unsupportive environments.

Although return to work is associated with early discontinuation, a supportive work environment may encourage mothers to continue.

Low-income mothers are more likely to have unintended pregnancies.^[124] Mothers whose pregnancies are unintended are less likely to breastfeed.^[116]

Social acceptance

Negative perception of breastfeeding in social settings has led some women to feel discomfort when breastfeeding in public.^[125] Public breastfeeding is forbidden in some places, not addressed by law in others, and a granted legal right in others. Even given a legal right, some mothers are reluctant to breastfeed,^{[126][127]} while others may object to the practice.^[128] Some public places and workplaces, rooms for mothers to nurse in private have been designated.

The invention of formula was hypothesized as a way for western culture to adapt to negative perceptions of breastfeeding.^[129] The breast pump offered a way for mothers to supply breast milk with most of formula feeding's convenience and without enduring possible disapproval of nursing.^[130]

Western society tends to perceive breasts in sexual terms instead of for their biological purpose.^[131] This view led many to object to breastfeeding because of the implicit association between infant feeding and sex.^[132] Many women feel embarrassed to breast-feed in public.^[126] These negative cultural connotations may reduce breastfeeding duration.^{[126][133][134]} Maternal guilt and shame is often affected by how a mother feeds her infant. These feelings result from her inability to behave according to her definition of a "good mother". These feelings occur in both bottle- and breast-feeding mothers, although for different reasons. Bottle feeding mothers may feel that they should be breastfeeding.^[135] Conversely, breastfeeding mothers may feel forced to feed in uncomfortable circumstances. Some may see breastfeeding as, "indecent, disgusting, animalistic, sexual, and even possibly a perverse act."^[131] Advocates use "nurse-ins" to show support for breastfeeding in public.^[125] Some advocates emphasize providing women with education on breastfeeding's benefits as well as problem-solving skills.^[135]

If someone criticizes breastfeeding in public, the La Leche League offers a few ways to respond:

- Ignore the comment or change the subject.
- Share information on breastfeeding with the other person.



Sign for a private nursing area at a museum using the international breastfeeding symbol

- Make a joke about the situation or yourself to lighten the mood.
- Show that you are recognizing the person's viewpoint by asking further questions without agreeing or responding to the criticism.
- Be empathetic — show that you understand the other person's feeling and meaning.^[136]

Prevalence

Globally about 38% of babies are just breastfed during their first six months of life.^[2] In the United States as of 2012, 75% of women started breastfeeding, 43% breastfed for six months though only 13% exclusively breastfed, and 23% breastfed for twelve months.^{[3][138]}

Breastfeeding rates in different parts of China vary considerably.^[139]

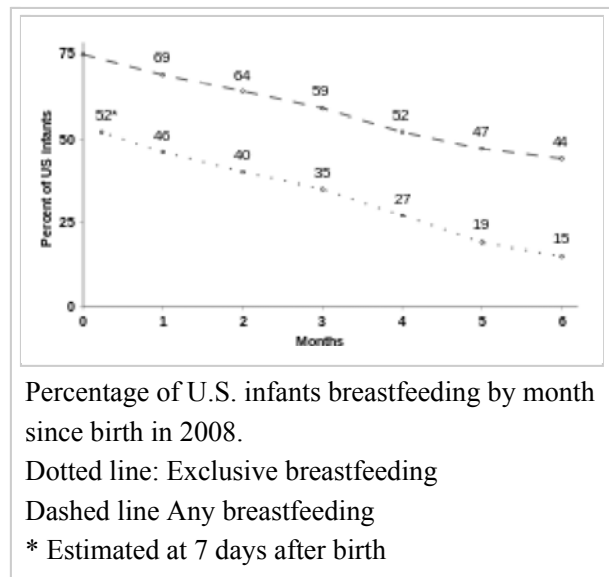
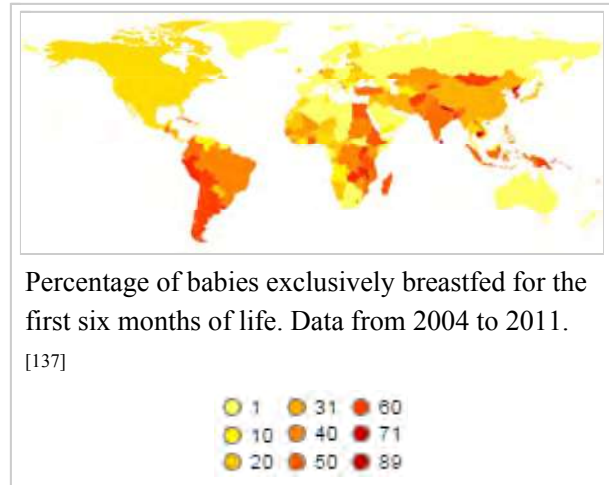
Breastfeeding rates in the United Kingdom were the lowest in the world in 2015 with only 0.5% of mothers still breastfeeding at a year, while in Germany 23% are doing so, 56% in Brazil and 99% in Senegal.^[140]

In Australia for children born in 2004, more than 90% were initially breastfed.^[141] In Canada for children born in 2005-06, more than 50% were only breastfed and more than 15% received both breastmilk and other liquids, by the age of 3 months.^[142]

History

In the Egyptian, Greek and Roman empires, women usually fed only their own children. However, breastfeeding began to be seen as something too common to be done by royalty, and wet nurses were employed to breastfeed the children of the royal families. This extended over time, particularly in western Europe, where noble women often made use of wet nurses. Lower-class women breastfed their infants and used a wet nurse only if they were unable to feed their own infant. Attempts were made in 15th-century Europe to use cow or goat milk, but these attempts were not successful. In the 18th century, flour or cereal mixed with broth were introduced as substitutes for breastfeeding, but this was also unsuccessful.

During the early 1900s, breastfeeding started to be viewed negatively by Western societies, especially Canada and the US. These societies considered it a low class and uncultured practice.^[143] This coincided with the appearance of improved infant formulas in the mid 19th century and its increased use, which



accelerated after World War II. From the 1960s onwards, breastfeeding experienced a revival which continued into the 2000s, though negative attitudes towards the practice were still entrenched up to 1990s.^[143]

Society and culture

Financial considerations

Breastfeeding is cheaper than alternatives, but is not free of cost. The mother generally must eat more food than otherwise. In the US, the extra money spent on food (about US\$13 each week) is usually about half as much money as the cost of infant formula.^[144]

Breastfeeding represents an opportunity cost, as the mother must spend hours each day breastfeeding instead of other activities, such as paid work or home production (such as growing food). In general, the higher the mother's earning power, the less likely she is to save money by breastfeeding.^[145]

Breastfeeding reduces health care costs and the cost of caring for sick babies. Parents of breastfed babies are less likely to miss work and lose income because their babies are sick.^[144] Looking at three of the most common infant illnesses, lower respiratory tract illnesses, otitis media, and gastrointestinal illness, one study compared infants that had been exclusively breastfed for at least three months to those who had not. It found that in the first year of life there were 2033 excess office visits, 212 excess days of hospitalization, and 609 excess prescriptions for these three illnesses per 1000 never-breastfed infants compared with 1000 infants exclusively breastfed for at least 3 months.^[146]

Recommendations

Support for breastfeeding is universal among major health and children's organizations. WHO states, "Breast milk is the ideal food for the healthy growth and development of infants; breastfeeding is also an integral part of the reproductive process with important implications for the health of mothers."^[147] WHO's guidelines recommend "continue[d] frequent, on-demand breastfeeding until two years of age or beyond."^{[148][149]}



Ilkhanate prince Ghazan being breastfed.



Macierzyństwo ("Maternity"), a 1902 painting by Stanisław Wyspiański

The European Commission,^{[150][151]} the US Centers for Disease Control and Prevention^[152] (CDC), UNICEF, AAP,^[3] Save The Children and the UK National Health Service^[153] (NHS), Australian Department of Health,^[154] Health Canada, Canadian Paediatric Society, Dietitians of Canada, and Breastfeeding Committee for Canada,^[155] recommend exclusive breastfeeding for six months following birth and continued nursing for an additional eighteen months or more.^{[2][156]} Save the Children states, "Six months of exclusive breastfeeding increases a child's chance of survival at least six-fold."^[157]

Authorities generally advise avoiding bottle feeding until the baby is 4–6 weeks old and is nursing successfully.^[158]

Advocacy

International board certified lactation consultants (IBCLCs) are health care professionals certified in lactation management. They work with mothers to solve breastfeeding problems and educate families and health professionals. Exclusive and partial breastfeeding are more common among mothers who gave birth in IBCLC-equipped hospitals.^[160]

There are also controversies and ethical considerations surrounding the means used by public campaigns which attempt to increase breastfeeding rates, relating to pressure put on women, and potential feeling of guilt and shame of women who fail to breastfeed; and social condemnation of women who use formula.^{[161][162] [163][164]} In addition to this, there is also the moral question as to what degree the state or medical community can interfere with the self-determination of a woman: for example in the United Arab Emirates the law requires a woman to breastfeed her baby for at least 2 years and allows her husband to sue her if she does not do so.^{[165][166]}



"See It", a project dedicated to promoting the awareness of breastfeeding in the capital city of Iceland in 2011, by Fiann Paul.^[159]

Infant formula

Advocates oppose marketing of infant formula, especially in developing countries. They are concerned that mothers who use formula will stop breastfeeding and become dependent upon substitutes that are unaffordable or less safe.^{[167][168]} Through efforts including the Nestlé boycott, they have advocated for bans on free samples of infant formula and for the adoption of pro-breastfeeding codes such as the International Code of Marketing of Breast-milk Substitutes by the World Health Assembly in 1981 and the Innocenti Declaration by WHO and UNICEF policy-makers in August 1990.^[167]

LGBTQ

Parents who identify as LGBTQ may encounter unique challenges and opportunities with breastfeeding or chestfeeding.

Chestfeeding

Many transmasculine, gender non-binary, and gender nonconforming individuals prefer the gender-neutral term "chestfeeding."^{[169][170]} Even if they have had chest masculinization surgery as part of their transition, some trans men choose to chestfeed their infants,^[171] which may require use of a supplemental nursing system (SNS) if they do not have a full milk supply.^[172] Individuals who have taken or are currently on hormone replacement therapy to develop male secondary sex characteristics may still chestfeed safely and successfully.^[171]

Induced lactation

Trans women who choose to breastfeed their children have successfully induced lactation.^[173] Similarly, lesbian mothers have co-nursed their infants, either by inducing lactation or by using a supplemental nursing system.^[174]

Research

Breastfeeding research currently focuses on diverse aspects such as prevalence, HIV transmission, pharmacology, costs, benefits, immunology, contraindications, and comparisons to synthetic breast milk substitutes.^{[175][176]} Factors related to the mental health of the nursing mother in the perinatal period have been studied. While cognitive behavior therapy may be the treatment of choice, medications are sometimes used. The use of therapy rather than medication reduces the infant's exposure to medication that may be transmitted through the milk.^[177]

See also

- Baby Friendly Hospital Initiative
- Baby-led weaning
- Breastfeeding in public
- Breastfeeding promotion
- Breast shell
- Child development
- Dairy allergy
- Public health
- World Alliance for Breastfeeding Action
- Lactation failure
- Human–animal breastfeeding
- Infant formula
- Kangaroo care
- Lactation room
- Milk line
- Nursing chair
- Lactational amenorrhea
- International Code of Marketing of Breast-milk Substitutes



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Further reading

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- Breast-Feeding Content Resources (<http://www.who.int/topics/breastfeeding/en/>) WHO reports on Breast Feeding
- Human Milk Secretion: An Overview (<http://mammary.nih.gov/reviews/lactation/Neville001/>) US National Institute of Health
- The World Alliance for Breastfeeding Action (<http://www.waba.org.my/>) (WABA) is a global network of individuals & organisations concerned with the protection, promotion & support of breastfeeding worldwide.
- Center for Disease Control and Prevention Breastfeeding (<http://www.cdc.gov/breastfeeding/index.htm>) CDC
- LactMed (<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?LACT>), a database of the safety of drugs to which breastfeeding mothers may be exposed, by the U.S. National Library of Medicine

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