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Breastfeeding: How Long is Best?

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Introduction

The unique composition of human milk and the health effects accrued by infants has long been the basis for encouraging breastfeeding. Studies indicate that breastfeeding provides protection against infections and allergies and improves cognitive outcomes in children. Yet, even among professionals, there is considerable controversy regarding the recommended duration of breastfeeding. In 1997, the American Academy of Pediatrics (AAP) commented that "exclusive breastfeeding is the ideal nutrition and sufficient to support optimal growth and development for approximately the first 6 months after birth" and that breastfeeding should continue "for at least 12 months, and thereafter for as long as mutually desired" (1). However, even in recent years, physicians are not recommending extended breastfeeding. For example, a 1999 survey of 1602 members of the AAP revealed that only 37% (of those pediatricians responding) recommended breastfeeding for 1 year (2). In another AAP survey published in 2000, 25% of the participants discouraged breastfeeding after two years (3). The global philosophy on breastfeeding is more proactive in the support of breastfeeding. In 1999, the World Health Organization (WHO) and UNICEF stated that breastfeeding should be continued for the first 2 years of life (4). Many studies support the WHO's recommendations, especially in settings with poor sanitation and an inadequate water supply (5,9). Extensive, worldwide research documents the advantages of extended breastfeeding to the general health, growth and development of infants at every socio-economic level, while the optimal duration of breastfeeding continues to be debated and investigated globally. Finally, recognizing that the scientific evidences indicates that breastfeeding is one of the most important contributors to infant health, the United States has set an objective to increase breastfeeding. The new recommendations in the National Health Observations for 2010 include goals of 75% of mothers initiating breastfeeding, 50% of infants still receiving breast milk at 6 months, and 25% of infants still breastfed at 12 months (6). It appears that, as far as the United States is concerned, extended breastfeeding is a duration of 12 months or longer.

Historical Information

Historically, both Western and Eastern civilizations thrived with a longer duration of breastfeeding. Examining sources such as the Talmud (Hebrew), the Koran (Islam), medical texts from India, and wet nursing Sumerian scripts from Babylonia indicate that breastfeeding lasted for two to three years. Two Roman physicians, Soranus and Galen, recommended breastfeeding until the age of three, and they dictated infant feeding patterns until the eighteenth century (7). The Chinese, Indians, Egyptians, Romans and Samoans recognized the beneficial qualities of human milk, especially in regards to eye problems. Western civilization, with its desire to be progressive in introducing early mixed feedings, contributed to early weaning patterns. In colonial America, birth-interval patterns of families, indicate that breastfeeding for one year was common. The U.S. census of 1900-1910 showed that breastfed children had a 40% lower mortality rate than formula fed babies (7). The first half of the twentieth century saw declines in breastfeeding in the industrialized world and very little research concerning human milk. By 1950 pediatricians recommended introducing vegetables to the diet at four months, while the advent of commercial interests and the modern professional advice led to a decreased rate and shortened duration of breastfeeding in the twentieth century (7). Anthropologically, primates have a longer period of maternal dependence, which correlates with the full maturation of the immune system. Some researchers suggest that complete weaning not occur until an infant reaches four times his/her birth weight (7).

Worldwide Studies

New methodologies in the fields of cellular and molecular biology and molecular genetics have promoted resurgence in human milk and lactation research. Scientists are investigating the health consequences of breastfeeding in infants and mothers. Many researchers note that it is difficult to amass scientific evidence regarding breastfeeding and morbidity on healthy infants because only observational studies can be conducted, as it would be unethical to randomly assign certain infants to be breastfed vs. formula fed. Observational studies, regardless of controls, restrict the validity of comparisons by inherent differences. All studies have indicated that the mothers who succeed at breastfeeding are, as a group, different from those who formula feed. In general, mothers who breastfeed have a higher educational level, higher socioeconomic status, are more concerned with infant development and provide an enhanced home environment (8, 9, 13, 14). Many people argue that the psychological benefits of breastfeeding play a role

in increasing a child's development because the mother-child bonding is based on hormones produced during the physical act of suckling (18). However, this concept is disputed by Lucas who found that children who had been born prematurely who had been fed breast-milk by a nasogastric tube had an 7.5-point IQ advantage over those children fed commercial formula (15). Regardless of these factors, research has shown that breastfeeding is good for babies as it provides strengthened immune systems, better nutrition and fewer illnesses than formula based diets.

Breastfeeding provides several biochemical and physical barriers against infectious agents. The physical act of breastfeeding limits infant exposure to environmental pathogens that are present in potentially contaminated surfaces. There are bioactive constituents in human milk that aid, develop, and enhance a baby's immune system. Some of these factors work to regulate the immune response, while others act at the mucosal surfaces to prevent adhesion (9).

In developing countries, where food and water are contaminated, infants are vulnerable to a vicious cycle where gastrointestinal infection predisposes them to dehydration and malnutrition. This results in a weakened immune system and leaves the children susceptible to specific enteric pathogens such as rotavirus, *Giardia lamblia*, *Shigella* sp., *Campylobacter* sp., and enterotoxigenic *Escherichia coli* (9). Many studies have been conducted in industrialized countries that have shown a protective effect of breastfeeding on diarrheal disease. A large study involving 1743 infants was conducted in 1999. The results indicated that the risk for diarrhea in each subsequent month of life was lower among exclusively breastfed infants versus those receiving no breast milk (11).

It is well documented that the later that cow's milk and other common allergens are introduced into the diet of a baby, the less likelihood there is of allergic reactions (7,18). In one of the largest medical studies ever done on breastfeeding, researchers have concluded that breastfed babies are less likely to develop intestinal infections and eczema, a skin condition that is often a sign of food intolerance. This study is significant because researchers examined more than 17,000 pairs of healthy mothers and their babies at 31 hospitals and clinics in Belarus, a former Soviet republic. They found that babies who were still being breastfed at 12 months had a 40 percent lower chance of developing intestinal infections and a 46 percent lower chance of developing eczema (12).

There have been many studies that have shown breastfeeding results in a protective effect against otitis media. One finding supports clinical and laboratory reports indicating that constituents in breast milk may prevent adhesion of respiratory pathogens. In this study nasopharyngeal colonization by *H. influenzae* was inversely associated with the level of secretory IgA antibody in the milk (9). Urinary tract infections have been shown to be more common among formula-fed infants. Marild found that prior breastfeeding was protective of older children with pyelonephritis. It is hypothesized that reduced adhesion of uroepithelial cells by pathogens as mediated by oligosaccharides or secretory IgA is the mechanism for this effect (9). Unfortunately, in most of these studies, few infants were breastfed exclusively longer than the first 3 months, which limits the ability of researchers to determine an optimal duration of exclusive breastfeeding in regards to immunity from disease.

Long-term Benefits

Evidence is building that breastfeeding protects infants against illness beyond weaning. Many studies indicated that protection against infectious diseases is greatest with greater intensity of breastfeeding. The concentrations of immunologic factors in breast milk continue to be relatively stable during the second year of nursing, thereby allowing older infants to still receive immune factors (7). Chronic diseases in pediatrics have been discussed in several reports showing the protective effects of breastfeeding. Reports by Davis and Mathur indicate that the protective effect of breastfeeding on lymphoma is found with a longer duration of breastfeeding, while a report by Shu et al. shows a decrease of childhood leukemia associated with longer breastfeeding (7,13).

Many researchers have reported improved cognitive development for children. A meta-analysis by Anderson et al. found a clear correlation between higher levels of cognitive achievement and an increased duration of breastfeeding (14). This meta-analysis included 20 studies from around the world conducted in

the last three decades and children were observed as early as 6 months and as late as 15 years of age. There was a 3.16-point higher score (IQ) for cognitive development in the breastfed children than the formula-fed children. The greatest difference (5.18-point) was found among low birth weight infants, suggesting that the nutrients present in breast milk may have a significant effect on the neurologic development in premature infants (14). Several of the studies showed that breastfed infants score higher on visual acuity tests and this correlates with the concentrations of docosahexaenoid acid (DHA), a long-chain polyunsaturated fatty acid present in large quantities in the brain and retina. DHA is found in breast milk, but not in commercial formula. Infant formula does have α -linolenic acid (ALA) and linoleic acid, and infants can synthesize DHA from these essential fatty acid precursors, however the conversion is a slower process and is potentially problematic to babies. Without a dietary source, infants must synthesize large amounts of DHA to keep up with the needs of the developing brain (15). Despite the efforts of formula manufacturers, man-made formula remains significantly different from breast milk (16).

Longer duration of breastfeeding has been shown to be beneficial for women as well as their children. A recent study of women in rural China has shown that women who breast-fed their infants for two years or more reduced their risk of breast cancer by 50 percent. The number of children a woman breast-fed, nor her age at first breast feeding appeared to be a factor. Although the study did not explore the reasons for the reduction in breast cancer, two theories are hypothesized. One is that fat-soluble carcinogens and pollutants are not stored as much in lactating breasts, and the other theory is that breast-feeding reduces the exposure to estrogen found in regular female hormonal cycles (17). Other studies have shown that mothers who breastfed less develop ovarian cancer and bone demineralization more so than women who formula feed their infants, although the duration of breastfeeding was not a consideration in these studies (18).

Time to Act

There continues to be a growing body of evidence that supports the idea that extended breastfeeding has multiple health and other benefits for infants and their mothers. The AAP, WHO and UNICEF have all written policies and recommendations that support extended breastfeeding and now is the time for practicing physicians to support these scientific-based statements. Fortunately, most mothers have the ability to successfully breastfeed their infants. Occasionally, there are situations where breastfeeding is contraindicated and physicians must be aware of these situations. Mothers infected with transmissible viral infections, such as HIV, those with herpetic lesions of the breast, and mothers taking certain medications that are potentially harmful to nursing infants should be advised not to breastfeed (19). The adequate, nutritional value of formula is certainly preferable to starvation, inadequate nutrition or the transmission of a potentially fatal disease. However, for the majority of new mothers, the management of breastfeeding should be a central force in good pediatric practice. All physicians, armed with the knowledge that breastfeeding is beneficial to infants and mothers, must encourage breastfeeding until a child is 12 months old. The goals in Healthy People 2010 should be supported fully. In order to create a change in the United States, physicians need to be supported by employers, health insurers, and society itself. The long-term benefits of extended breastfeeding have yet to be studied, because so few mothers are encouraged and supported in their efforts to breastfeed. Physicians must be the bell-ringers who extol the benefits of breastfeeding for at least 12 months. With this, children, mothers, and society have the potential to benefit greatly from a more aggressive extended breastfeeding policy.

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