

The Benefits of Breastfeeding: An Introduction for Health Educators

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Abstract

Currently 16% of Americans breastfeed their children for at least 12 months as recommended by the AAP, which is well below the HP 2010 goal of 25%. Breastfed infants receive benefits that can improve their health throughout their lives. The benefits of breastfeeding for children include increased resistance to infectious diseases, such as gastroenteritis, respiratory tract infections, and ear infections. Breastfed children also display lower rates of chronic diseases including diabetes, obesity, asthma, and leukemia. The choice to breastfeed results in economic benefits from lower health care costs and from reduced spending on infant formula. The Healthy People 2010 targets are reviewed along with several studies of interventions to increase breastfeeding rates. Health educators must work to increase breastfeeding rates.

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Breastfeeding is recognized as the preferred form of infant nutrition by the American Academy of Pediatricians (AAP), the American Academy of Family Physicians (AAFP) and the American College of Obstetricians and Gynecologists (ACOG). Infants who are breastfed experience nutritional and developmental advantages that enhance their health throughout their lives. The choice to breastfeed conveys health benefits to the mother as well. Breastfeeding also imparts economic benefits for families as well as savings for our society. Several studies have established that education and support for pregnant women can dramatically increase breastfeeding rates (Arora, McJunkin, Wehrer, & Kuhn, 2000; Chezem, Friesen, & Boettcher, 2003; Gross et al., 1998). Currently 16% of Americans breastfeed their children for at least 12 months as recommended by the AAP, which is below the goal of 25% set in the *Healthy People 2010* [HP2010] document. This manuscript will present a review of the benefits associated with breastfeeding, and provide suggestions on how to attain the HP2010 goals.

Benefits for Children

Parents who breastfeed their children are rewarded with a lengthy list of benefits.

Breastfed children exhibit greater resistance to infectious disease and stronger immune systems than their formula fed peers. They also experience lower rates of chronic diseases. The ideal composition of human milk provides nutritional, growth, and developmental advantages to the child (U.S. Department of Health and Human Services, [USDHHS], 2000b).

Lower Rates of Infectious Disease

Research has repeatedly demonstrated lower rates of infectious diseases among breastfed babies. The explanation for this enhanced resistance to disease can be found in the biology of human milk. When a lactating mother is exposed to an infectious agent, her mature immune system begins to produce secretory immunoglobulin A [S-IgA], a compound that is the primary disease fighter in the human immune system. This substance is secreted into her breastmilk and consumed by her nursing baby. The child's own immune system may also be producing S-IgA, but children under the age of two have immature immune responses (USDHHS, 2000b) that are sometimes incapable of preventing disease. The consumption of the mother's S-IgA not only provides active resistance to disease, it also stimulates the

production of additional S-IgA in the infant, resulting in stronger immune responses among breastfed infants than in their formula fed peers (Cunningham, 1995).

Gastroenteritis, or the family of digestive diseases whose primary symptom is diarrhea, occurs less often among breastfed children and is less severe when it does occur. Howie, Forsyth, Ogston, Clark, and du V Florey (1990) studied rates of gastrointestinal illness in infants in Dundee, U.K. The mothers were recruited while pregnant and were visited at home by a nurse at 2 weeks postpartum and again at 1, 2, 3, 4, 6, 9, 12, 15, 18, 21 and 24 months. Health and illness data were reported based on the mother's recollection of her child's health as well as information on the method of infant feeding. The prevalence of gastrointestinal disease among fully breastfed infants (defined as infants who received no supplemental nutrition until at least 13 weeks of age) was 2.1%, whereas 19.5% of the formula fed babies suffered diarrhea. This trend continued throughout the first year even if the child was weaned at 13 weeks (Howie et al, 1990).

Howie et al. (1990) also analyzed data on respiratory tract infections in the same study. Respiratory tract infections were observed in 23% of the breastfed and 38.9% of bottlefed infants. This finding suggests that breastfeeding is beneficial in preventing respiratory tract infections.

Another common childhood infection, otitis media or ear infection, was also found to occur less often among breastfed infants in an Arizona-based cohort study. Data were gathered from the health records of a health maintenance organization (HMO). Infant feeding method was determined from health records or from questionnaires sent to parents. Infants were divided into five groups: no breastfeeding, breastfeeding less than 4 months, breastfeeding plus supplemental formula begun before 4 months, breastfeeding plus supplements begun between 4 and 6 months, and exclusive breastfeeding until at least 6 months. After controlling for potential confounding variables, such as family history of allergy, use of day care

and maternal smoking, the researchers found a clear trend toward fewer episodes of otitis media in breastfed infants. The data illustrated a dose-response relationship with a decreasing risk for infants who were exclusively breastfed for longer periods, peaking with a 61% reduction in risk for those infants breastfed exclusively for at least 6 months. The researchers proposed two possible explanations for this protective effect. The mechanics of breastfeeding are significantly different than those of bottlefeeding and result in better drainage of fluids. Also, the general protection from infection offered by breastfeeding may aid in the prevention of otitis media (Duncan et al., 1993).

A study of risk factors for antibiotic-resistant pneumonia revealed that breastfeeding also protects children from this infectious disease. This case-control study analyzed the rates of antibiotic-resistant pneumonia in children ages 2 – 59 months in North America. Parents were interviewed by telephone regarding various risk factors including the diet of the child. Interviews were based on a standard questionnaire and were conducted by experienced surveillance personnel. Current breastfeeding proved to be a strong protective factor against invasive pneumococcal disease among 2- to 11-month olds, reducing their risk for this disease by 73%. The study did not analyze the impact of past infant feeding choices on current health, nor did it propose an explanation for reduced risk among children currently being breastfed (Levine et al., 1999).

The protective effect of breastfeeding against infection also extends to the urinary tract according to a study of infants up to 6 months of age. Researchers conducted a case-control study with participants recruited from the hospital of the Medical School of Naples, in Italy. Information on feeding method was collected from clinical charts. Infants were divided into groups based on the extent and exclusivity of breastfeeding. The study found that ever being breastfed reduced an infant's risk of contracting a urinary tract infection (UTI) by 62%. Current breastfeeding exhibited a stronger protective effect with an 82% risk reduction. The researchers concluded that “breastfeeding seems

to protect against UTI during the first 6 months of life” (Pisacane, Graziano, Mазzarella, Scarpellino, & Zona, 1992).

Lower Rates of Chronic Disease

The preceding studies demonstrate the protective effect breastfeeding offers from infectious disease. Recent research also indicates that breastfed infants suffer lower rates of chronic disease. Since human milk is ideally composed for the infant, certain metabolic diseases are less likely to occur in breastfed infants (Cunningham, 1995; Pettitt and Forman, 1997). Chronic digestive and respiratory diseases are also less common (Cunningham, 1995; Oddy et al., 1999), and studies show that breastfeeding reduces risk for childhood cancer (Shu et al., 1999).

Type 1 diabetes (previously known as juvenile diabetes) has become more prevalent as rates of breastfeeding have decreased. Twenty-five percent of Type 1 diabetes cases are directly attributable to a lack of breastfeeding. Research shows that a primary trigger for the development of type 1 diabetes in susceptible children is exposure to cow's milk protein. A particular protein fragment which is found in cow's milk and cow's milk-based formula stimulates an immune response, but the structure of this protein is similar enough to that of the human system that antibodies produced to fight the bovine protein end up destroying human pancreatic beta cells as well. This autoimmune response worsens over time until clinical diabetes is developed (Cunningham, 1995).

Type 2 diabetes (formerly known as adult onset diabetes) is also less likely to occur when a history of breastfeeding exists. A study of Pima Indians, a population with very high rates of type 2 diabetes, uncovered an association between breastfeeding and reduced risk for the disease. Trained interviewers questioned the mothers of study participants regarding infant feeding choices from the subjects' childhoods. Participants were classified as exclusively breastfed, partially breastfed or exclusively bottlefed. The study analyzed rates by age and weight. In all age and weight ranges, participants who were exclusively breastfed until at least

four months of age showed lower rates of type 2 diabetes. Even some breastfeeding demonstrated a protective effect as the highest rates of disease were found when a history of exclusive bottlefeeding existed. The researchers noted that subjects with a history of breastfeeding showed lower rates of obesity and suggested that this factor could explain the protective effect of breastfeeding against type 2 diabetes (Pettitt & Forman, 1997).

As with type 1 diabetes, several chronic digestive diseases have been linked to early exposure to cow's milk proteins. Inflammatory bowel disease, Crohn's disease and celiac disease are intestinal conditions that stem from immunological issues. Signs of these conditions have been detected as early as 2 weeks of age in bottlefed infants. The occurrence of these diseases has been strongly associated with lack of breastfeeding or with its early termination. Research does not conclusively indicate whether these diseases stem from early exposure to foreign antigens, from the lack of protections found in human milk, or from some combination of both factors, but breastfeeding was once again observed to be a protective factor (Cunningham, 1995).

Another example of the dose-response relationship between breastfeeding and chronic disease has been reported for childhood leukemia. Researchers using a case-control design analyzed a large number of childhood leukemia cases for risk factors in an effort to determine causes of this disease. Infant feeding method was determined through a structured telephone interview conducted with the subjects' mothers. Participants were classified as not primarily breastfed, breastfed 1-6 months and breastfed longer than six months. A 21% risk reduction was seen in children who were ever primarily breastfed, but this protection increased as breastfeeding duration increased. The risk of acute leukemia was reduced by 43% if a child was primarily breastfed for longer than 6 months. The authors theorized that the stronger immune systems of breastfed children might account for their reduced risk (Shu et al., 1999).

Stronger immune systems may also help protect children from chronic respiratory conditions. Asthma and allergies, chronic respiratory diseases typically diagnosed during childhood, are observed less often in children with a history of breastfeeding. In one study over 2000 Australian children were followed from birth to six years to determine incidence of these diseases. Infant feeding method was determined by a questionnaire that was completed by parents when their children were one year old. History of breastfeeding was categorized by both duration of any breastfeeding and duration of exclusive breastfeeding. Children who were exposed to cow's milk- or soy-based formulas before four months of age were 25% more likely to have diagnosed asthma, 40% more likely to have wheezed three times or more in the past year, and 30% more likely to have had a positive skin test for allergies by the age of six years. Duration of exclusive breastfeeding proved to be a stronger protective factor than the duration of breastfeeding. The researchers concluded that interventions promoting an increased duration of exclusive breastfeeding may help to reduce the morbidity and prevalence of childhood asthma (Oddy et al., 1999).

In addition to offering protection from a wide range of infectious and chronic diseases, breastfeeding has the potential to improve a child's future health by reducing the risk of being overweight or obese. A cross sectional study conducted in Germany assessed height and weight measurements of over 100,000 children. Infant feeding method was further investigated on a subset of nearly 10,000. Breastfeeding exposure was classified as none, less than two months, three to five months, six to twelve months or greater than twelve months. After adjusting for confounding factors including social class and parental education, a dose-response relationship between exclusive breastfeeding and protection from being overweight or obese emerged. For the longest period of exclusive breastfeeding studied, 12 months or greater, risk of overweight was reduced by 57% and risk of obesity was reduced by 72%. The researchers suggested that the respect for infants' satiety signals normally developed during breastfeeding helped parents

to offer appropriate portions to their children, and that the lower intake of protein among breastfed infants also contributed to the decreased risk (von Kries et al., 1999).

Research into the benefits of breastfeeding has created a lengthening list of protections it offers both during and after the period of breastfeeding. Children are protected from infectious and chronic diseases at varying rates when their parents choose to nourish them with breastmilk from birth. These protections derive from the composition of human milk, the mechanics of nursing at the breast, and the biology of milk production. The benefits of breastfeeding, though, are not limited to the health of the infant. Mothers experience health benefits from breastfeeding, and families and society can also benefit from the improved health and lower costs that result from this infant feeding choice.

Other Health Benefits

Choosing to breastfeed can also have a significant impact on cancer rates. First, it has been demonstrated that a female infant who is breastfed can expect a 25% reduction in risk for breast cancer later in life (USDHHS, 2000b). Also, a large case-control study of breast cancer patients in several U.S. states shows a reduction in risk when a woman has a history of lactating for 24 cumulative months over the course of her childbearing years. More than 5800 cases and 8200 controls were interviewed by telephone regarding their lactation and reproductive history. After adjusting for confounding factors, breastfeeding for at least 24 months showed a risk reduction of 28% for premenopausal breast cancer. Early initiation of breastfeeding strengthened this protection with an odds ratio of .54 for women whose first period of lactation started before 20 years of age. The researchers suggest that lactation "may reduce the risk of breast cancer simply by interrupting ovulation or by modifying pituitary and ovarian hormone secretion" (Newcomb et al., 1994).

Economic Benefits

Clearly the choice to provide breastmilk to an infant provides a substantial health benefit to the child, but that choice will also result in an

economic benefit for the family. Based on infant formula prices, the cost of feeding a child artificial baby milk (ABM) will total \$1200 - \$2700 per year, depending on the preparation purchased (Baumslag & Michels, 1995). When these numbers are extended to include large numbers of children, such as those serviced by Women, Infants and Children (WIC) clinics, the savings become impressive. WIC spent \$661.9 million in its 2001 fiscal year on ABM, whereas breastmilk is available for the slight additional cost of food to meet the mother's increased nutritional needs, less than \$10 per month for WIC clients in 2001 (U.S. Department of Agriculture [USDA], 2003). When the USDA estimated the cost savings of increasing breastfeeding rates to the goals set in HP2010, they considered the resulting reduced rates of only three diseases – otitis media, gastroenteritis, and necrotizing enterocolitis – and estimated a yearly cost savings of \$3.6 billion (USDA, 2001).

Healthy People 2010 Goals

The goals used by the USDA to project the cost savings above were established in *HP2010* (USDHHS, 2000a). Current breastfeeding rates were established in 1998 as a baseline, then goals were set for 2010. For the early postpartum period, the 1998 rate was 64% and the target rate is 75%. At 6 months postpartum, the 1998 rate was 29% and the target rate is 50%. At 12 months postpartum, the 1998 rate was 16% and the goal rate is 25%.

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Interventions to Increase Breastfeeding Rates

Increasing breastfeeding rates in the U.S. is listed as a critical health need in HP2010. Education is a powerful method for addressing this need. In fact, education, or breastfeeding knowledge, proved to be the most powerful factor in determining a mother's ability to meet her breastfeeding goals in a recent study. Women with scores above the mean on a test of breastfeeding knowledge were 10 times more likely to meet their personal breastfeeding goals than their peers with less breastfeeding education (Chezem et al., 2003). Simply playing an informational videotape in the waiting room of a WIC clinic in Baltimore doubled breastfeeding rates at 8 and 16 weeks postpartum (Gross et al., 1998). Education should also be available for expectant fathers as Arora et al. (2000) found that the most common reason women choose to feed with ABM is their perception of the father's attitude about breastfeeding.

Interventions aimed at increasing breastfeeding rates do not have to be expensive and complicated to be successful, and a successful program can have a substantial impact on the health of its participants and their children. The choice to breastfeed carries with it a host of health and nutritional benefits for the infant and can improve the health of the mother as well, as recognized in HP2010. Families and government can experience savings in billions of dollars by increasing breastfeeding rates. As a logical consequence of these substantial advantages, breastfeeding is the preferred choice for infant nutrition.

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