
A History of Infant Feeding

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ABSTRACT

The historical evolution of infant feeding includes wet nursing, the feeding bottle, and formula use. Before the invention of bottles and formula, wet nursing was the safest and most common alternative to the natural mother's breastmilk. Society's negative view of wet nursing, combined with improvements of the feeding bottle, the availability of animal's milk, and advances in formula development, gradually led to the substitution of artificial feeding for wet nursing. In addition, the advertising and safety of formula products increased their popularity and use among society. Currently, infant formula-feeding is widely practiced in the United States and appears to contribute to the development of several common childhood illnesses, including atopy, diabetes mellitus, and childhood obesity.

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The historical evolution of feeding practices for a full-term infant immediately after birth includes wet nursing, the feeding bottle, and formula use. The purpose of this article is to explore each component and their combined impact on current infant-feeding trends and child health. We provide a review of wet nursing, the feeding bottle, and the use of formula from Ancient Roman times to the extinction or peak of the practice, as well as discussion of infant-feeding trends indicating the rise of bottle feeding and the rapid decline of breastfeeding. The literature on key issues pertaining to child health and the development of common health problems among breastfed versus formula-fed infants is briefly reviewed.

WET NURSING

Use of a wet nurse, “a woman who breastfeeds another's child” (Davis, 1993, p. 2111), was a common

practice before the introduction of the feeding bottle and formula. Wet nursing began as early as 2000 BC and extended until the 20th century. Throughout this time period, wet nursing evolved from an alternative of need (2000 BC) to an alternative of choice (950 BC to 1800 AD). It became a well organized profession with contracts and laws designed to regulate its practice. Despite objections during the Middle Ages and the Renaissance, wet nursing continued until the feeding bottle was introduced in the 19th century. With a feasible alternative feeding method available, wet nursing as a profession quickly declined to extinction.

In Israel, as early as 2000 BC, children were deemed a blessing, and breastfeeding was considered a religious obligation (Wickes, 1953a). Breastfeeding was not always possible, however, due to lactation failure of the mother (Wickes, 1953a) or

to the mother dying from childbirth (Fildes, 1986). Lactation failure is mentioned in the earliest medical encyclopedia, *The Papyrus Ebers*, which came from Egypt (1550 BC) and contains a small pediatric section that includes a prescription for lactation failure, as follows:

To get a supply of milk in a woman's breast for suckling a child: Warm the bones of a sword fish in oil and rub her back with it. Or: Let the woman sit cross-legged and eat fragrant bread of soused durra, while rubbing the parts with the poppy plant. (Wickes, 1953a, p. 154)

The prescription demonstrates that lactation failure was a problem during ancient Egyptian times and, as such, wet nursing was the primary alternative-feeding method (Osborn, 1979a). Few writings from this era discuss the use of artificial feeding (Wickes, 1953a).

In Greece circa 950 BC, women of higher social status frequently demanded wet nurses. Eventually, wet nurses acquired a position of great accountability and had authority over slaves (Wickes, 1953a). The Bible also notes several examples of wet nurses, perhaps the most famous being the woman hired by Pharaoh's daughter to nurse Moses, whom she found in the bulrushes (Osborn, 1979a).

At the height of the Roman Empire, between 300 BC and 400 AD, written contracts were formed with wet nurses to feed abandoned infants. The infants were usually unwanted females thrown onto rubbish piles. The wealthy purchased the infant as an inexpensive slave for future use, and the wet nurses—who were slaves themselves—fed the infant for up to 3 years. Contracts provided a detailed account of the wet nursing service, including duration of breastfeeding, clothing supplies, lamp oil, and payment for the service (Anonymous, 1987).

From approximately 100 AD through 400 AD, medical authors such as Soranus of Ephesus, Galen of Pergamus, and Oribasius listed the qualifications for a wet nurse (Radbill, 1981). For example, Soranus of Ephesus (98 AD to 117 AD) composed an obstetrical and gynecological treatise of 23 chapters that provided a model for infant feeding (Osborn, 1979a). The treatise included the choice of and regimen for a wet nurse. It also described the fingernail test used for assessing the quality and consistency of breastmilk. When a drop of breastmilk was placed on a fingernail and the finger moved, the milk was not supposed to be so watery

that it ran all over the surface of the nail. When the fingernail was turned downward, the milk was not to be thick enough to cling to the nail. The consistency of the milk should range between the two extremes. Soranus' criterion was used for the next 1,500 years to determine breastmilk quality (Wickes, 1953a). Galen of Pergamus (130 AD to 200 AD) advised the wet nurse on how to soothe infants through swaddling, movement, rocking, and singing lullabies (Osborn, 1979a). The Roman physician Oribasius (325 AD to 403 AD) wrote that the wet nurse should be required to do a certain amount of physical work in addition to her nursing obligations. The physical work was to incorporate chest and shoulder movements to enhance the flow of milk. Oribasius recommended activities such as grinding, weaving, and walking. He also advised that a wet nurse should be a healthy 25- to 35-year-old woman who had recently delivered a male child (Osborn, 1979a).

Writings from the Middle Ages also outlined specific qualities and duties of the wet nurse. For instance, between 1220 AD and 1250 AD, Bartholomeus Anglicus, a Franciscan friar, listed some of these qualities and duties in his references regarding wet nursing:

A nurse rejoices with a boy when it rejoices and weeps with him when he weeps, just like a mother. She picks him up when he falls, gives the little one milk when he cries, kisses him as he lies, holds him tight and gathers him up when he sprawls, washes and cleans the little one when he makes a mess of himself. . . . (Osborn, 1979a, p. 305)

Despite Bartholomeus Anglicus' recommendations, the first objections to wet nursing appear in the same era. During the Middle Ages, society regarded childhood as a special time of fragility and vulnerability. Breastmilk was deemed to possess magical qualities, and it was believed that breastmilk could transmit both physical and psychological characteristics of the wet nurse. The belief resulted in protests against the hiring of women for wet nursing and, once again, a mother nursing her own child was valued as a saintly duty (Osborn, 1979a).

Use of a wet nurse, "a woman who breastfeeds another's child," was a common practice before the introduction of the feeding bottle and formula.

Throughout the Renaissance period, wet nursing remained the best alternative for infants whose mother could not breastfeed. However, just as in the Middle Ages, society during the Renaissance period displayed a widespread disapproval of wet nursing and a preference for mothers breastfeeding their own children (Osborn, 1979b). During the mid-16th century, increased concerns about wet nursing surfaced along with statements expressing the importance of the natural mother breastfeeding. The *Treatise on Children*, published in 1577 and authored by the Italian Omnibonus Ferrarius, stressed that the mother was a better choice than a wet nurse for infant feeding except when the mother was ill or unable to breastfeed. Ferrarius worried that infants would “savour of the nature of the person by whom they are suckled” (Osborn, 1979b, p. 347), or in other words, would come to love a wet nurse because she had nurtured and cared for them more than their own mother (Osborn, 1979b).

In the early 17th century, the French obstetrician Jacques Guillemeau supported the premise that the natural mother should nurse her child (Wickes, 1953b). His work, *The Nursing of Children*, included an eight-page preface addressing this advice. Guillemeau stated four main objections to a wet nurse: 1) the child may be switched with another put in its place, 2) the affection felt between the child and the mother will diminish, 3) a bad condition may be inherited by the child, and 4) the nurse may transmit an imperfection of her own body to the child that could then be transmitted to the parents. However, if circumstances necessitated a wet nurse, Guillemeau recommended a happy, healthy, conscientious, well behaved, observant, sober female who was willing to breastfeed. Most importantly, according to Guillemeau, the wet nurse should not have auburn hair because redheads were known to have a hot temperament that was harmful to their breastmilk (Wickes, 1953b).

Despite the recommendations, wet nursing remained a popular, well paid, and highly organized profession during the Renaissance period. Thus, the occupation became a prime choice for many poor women. A common practice among young, unmarried or married women was to have a child and then get rid of it prior to seeking employment as a wet nurse (Osborn, 1979b). As a result, in France, wet nurses were registered at a municipal employment bureau, and laws were developed and enforced to regulate their employment. The laws required a wet nurse to undergo a medical examination and

forbade her to breastfeed another child until her own infant was 9 months old (Osborn, 1979b).

During the same time period, societal class tended to dictate breastfeeding practices. It was unusual for aristocratic women to breastfeed because the practice was considered unfashionable and because the women worried it would ruin their figures (Wickes, 1953b). Breastfeeding also prevented many women from wearing the socially acceptable clothing of the time (Fildes, 1986), and it interfered with social activities such as playing cards and attending theater performances (Wickes, 1953b). The wives of merchants, lawyers, and doctors also did not breastfeed because it was less expensive to employ a wet nurse than it was to hire a woman to run their husband’s business or take care of the household in their place (Fildes, 1986).

From the end of the 18th century through the 19th century, the practice of wet nursing shifted away from wealthy families to laboring, lower-income families (Osborn, 1979b). With the onset of the Industrial Revolution, entire families relocated from rural to more urban areas. The increased cost of living and poor wages forced many women to seek employment and contribute financially to their family, which made it virtually impossible for many mothers to breastfeed and attend to their children. Consequently, many of these children were farmed out to destitute peasant women. By law, peasant wet nurses were required to obtain a license from local authorities and to report the death of any infant receiving their care. Unfortunately, the laws were ignored and created little change with regard to the high infant mortality rate of all infants (Osborn, 1979b).

Although wet nursing continued to exist at the end of the 18th century, the natural mother was still preferred for breastfeeding and raising her children. In 1779, William Buchan published *Domestic Medicine*, which displayed an open distrust of wet nurses and their use of home remedies (Osborn, 1979b; Wickes, 1953c). Opiates such as Godfrey’s Cordial were among the home remedies. Wet nurses referred to opiates as “Quietness.” Buchan wrote that the use of opiates as a sleep aid for infants was a great fault among wet nurses (Osborn, 1979b).

In the 19th century, artificial feeding became a feasible substitute for wet nursing. Advancement in the feeding bottle and the availability of animal’s milk (Osborn, 1979b) began to slowly, but steadily, affect the use of wet nurses (Wickes, 1953d). By 1900, the once highly organized wet-nursing profession was extinct (Wickes, 1953d).

THE FEEDING BOTTLE

Although wet nursing was the alternative feeding method of choice, evidence suggests that artificial feedings were also used in ancient times (Osborn, 1979a). Vessels of all shapes and sizes have been found, dating back thousands of years BC. Crude feeding bottles and issues with their cleanliness were written about through the Roman Era, Middle Ages, and the Renaissance. It was not until the Industrial Revolution that a refined, hygienic feeding bottle became available (Wickes, 1953d).

Clay feeding vessels dating from 2000 BC onwards have been found in graves of newborn infants (Wickes, 1953a). The vessels are oblong with a nipple-shaped spout (Osborn, 1979a). At first, the objects were thought to be containers for filling oil lamps. However, chemical analysis revealed casein from animal's milk in the containers' residue (Weinberg, 1993), which suggests that animal's milk was used in ancient times as an alternative to breast-milk (Wickes, 1953a).

Many different devices were used to feed animal's milk to infants. Some of the devices found were made from wood, ceramics, and cows' horns. In fact, a perforated cow's horn was the most common type of feeding bottle during the Middle Ages. By the 1700s, many infant-feeding devices were made from pewter and silver (Weinberg, 1993). The pewter bubby-pot was among these devices. Invented in 1770 by Hugh Smith, a physician at the Middlesex Hospital in London, the bubby-pot was similar to a small coffeepot with the exception of the neck arising from the bottom of the pot (Wickes, 1953c, 1953d). The end of the spout formed a knob in the shape of a small heart, with three to four small holes punched into it. A small rag was tied over the holes for the infant to play with and suck milk through (Wickes, 1953d). During the same era, rags, small pieces of linen cloth, and sponges were often used as a teat or nipple (Weinberg, 1993).

Another feeding device used from the 16th to 18th centuries in Europe was a pap boat. The device was used to feed infants pap and panada. Pap consisted of bread soaked in water or milk (Radbill, 1981), and panada consisted of cereals cooked in broth (Wickes, 1953b). Both substances were used as a supplement to animal's milk, especially when the infant showed a failure to thrive. The pap boat included a spoon with a hollow stem so that the pap or panada could be blown down the infant's throat. Compared to breastfeeding, the use of the pap boat enabled the

infant to receive food quickly and in much larger quantity during feeding (Weinberg, 1993).

Unfortunately, feeding bottles, pap boats, and teats during the 16th to 18th centuries were difficult to clean. Subsequently, the build-up of bacteria made the feeding devices detrimental to the infant's health. In the early 19th century, the use of dirty feeding devices, combined with the lack of proper milk storage and sterilization, led to the death of one third of all artificially fed infants during their first year of life (Weinberg, 1993).

During the mid-19th century, great strides were made in the development of the feeding bottle and the nipple. Glass bottles were used, and the evolution of the modern bottle began. The first feeding bottles, created in 1851 in France, were elaborate. They contained a cork nipple and ivory pins at air inlets to regulate flow. However, during this time in France, it was still more popular to spoon-feed the infant or have the child suckle directly from an animal's teat. In 1896, a simpler, open-ended, boat-shaped bottle was developed in England, became popular, and was sold well into the 1950s (Wickes, 1953d). Teats or nipples introduced in the 19th century were originally made from leather and were preferred over the use of devices made from cork. In 1845, the first Indian rubber nipple was introduced (Osborn, 1979b). Although the first rubber nipples had a repulsive odor and taste, they were refined and adapted by the beginning of the 20th century (Wickes, 1953d). With the invention of the modern feeding bottle and nipple, the availability of animal's milk, and the change in society's acceptance of wet nursing, artificial feeding became a popular choice. As a result, medicine began to focus on infant nutrition from an alternative milk source.

INFANT FORMULA

The use of animal's milk for infant feeding is noted as far back as 2000 BC. Since then, alternative milk sources have evolved to include the synthetic formulas of today. The use of artificial feeding substances grew rapidly and was significantly influenced by advertising campaigns. This had a profound negative effect on breastfeeding trends, despite research that revealed many discrepancies between breastfed and artificially fed infants (Greer & Apple, 1991;

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Wolf, 2003). Although artificial or formula-feeding of infants is presently much safer than it has been in decades, breastmilk is still considered the best source of infant nutrition (Leung & Sauve, 2005).

Throughout the ages and until the end of the 19th century, animal's milk was the most common source of artificial feeding. As mentioned earlier, pap and panada were used only as supplements to animal's milk when the infant failed to thrive. The type of animal's milk used was dependent on the kind of animal that was available—goats, sheep, donkeys, camels, pigs, or horses. The most common and universally used milk for artificial feeding, however, was cow's milk (Radbill, 1981).

In the 18th century, the first chemical analyses of human milk and animal's milk began to appear. Jean Charles Des-Essartz published his *Treatise of Physical Upbringing of Children* in 1760, which discussed and compared the composition of human milk to that of the cow, sheep, ass, mare, and goat. Based on chemical characteristics, Des-Essartz justified human milk as the best source of infant nutrition. With mother's milk as the ideal, many scientists tried to formulate nonhuman milk to resemble human milk (Radbill, 1981). In 1865, chemist Justus von Liebig developed, patented, and marketed an infant food, first in a liquid form and then in a powdered form for better preservation. Liebig's formula—consisting of cow's milk, wheat and malt flour, and potassium bicarbonate—was considered the perfect infant food (Radbill, 1981).

Another important scientific advancement of the 19th century was food preservation. In 1810, Nicholas Appert developed a technique to sterilize food in sealed containers. His development was followed by the invention of evaporated milk, which was patented in 1835 by William Newton. In 1853, Texan Gale Borden added sugar to the evaporated milk, canned the substance, and sold it as Eagle Brand Condensed Milk, which became a popular infant food. In 1885, John B. Myerling developed an unsweetened condensed milk, labeling it as "evaporated milk." Myerling's product was also a popular choice for infant feeding and was highly recommended by pediatricians from the 1930s to the 1940s (Radbill, 1981).

Many other commercial products and formulas were rapidly introduced after the marketing of Liebig's infant food and the invention of evaporated milk (Radbill, 1981). By 1883, there were 27 patented brands of infant food (Fomon, 2001). These commercial products came in powdered form

and consisted of carbohydrates such as sugars, starches, and dextrans that were to be added to milk. Name brands for the products included "Nestlé's Food®, Horlick's Malted Milk®, Hill's Malted Biscuit Powder®, Mellin's Food®, Eskay's Food®, Imperial Granum®, and Robinson's Patent Barley®" (Radbill, 1981, p. 619). The foods were fattening but lacked valuable nutrients like protein, vitamins, and minerals. Over time, the nutrients were individually added (Radbill, 1981).

The use of artificial formula was associated with many summertime infant deaths (Wickes, 1953d) due to the spoilage of milk left in bottles (Weinberg, 1993). This association was not understood, however, until the public accepted germ theory. Between 1890 and 1910, emphasis was placed on cleanliness and the improvement in the quality of milk supplies. Improvements included providing better care for dairy cattle and forming infant milk clinics to disburse clean milk to the public (Greer & Apple, 1991). By 1912, rubber nipples that were easy to clean became available, and many homes were able to store milk safely in an icebox (Fomon, 2001).

In the 1920s, scientists also began developing nonmilk-based formulas for infants allergic to cow's milk. The first nonmilk formula was based on soy flour and became available to the public in 1929. Like the first formulas introduced in the late 19th century, soy formula lacked vital nutrients, particularly vitamins. Eventually, the problem was resolved with vitamin fortification (Fomon, 2001).

As formulas evolved and research supported their efficacy, manufacturers began to advertise directly to physicians. By 1929, the American Medical Association (AMA) formed the Committee on Foods to approve the safety and quality of formula composition, forcing many infant food companies to seek AMA approval or the organization's "Seal of Acceptance." Three years later, advertising became regulated so that manufacturers could not solicit information to nonmedical personnel, which facilitated a positive relationship between physicians and the formula companies. By the 1940s and 1950s, physicians and consumers regarded the use of formula as a well known, popular, and safe substitute for breastmilk. Consequently, breastfeeding experienced a steady decline until the 1970s (Fomon, 2001).

Aggressive marketing of formulas in developing countries contributed to a global decline in breastfeeding. The decline generated negative publicity for formula manufacturers, and in the 1970s, a movement began to promote breastfeeding. In the

United States, groups such as the National Council of Churches' Interfaith Center on Corporate Responsibility and the Infant Formula Action Coalition initiated public-awareness campaigns on the importance of breastfeeding. Over the next 30 years, their efforts resulted in a steady increase not only in the percent of infants breastfed in the United States, but also on the duration of breastfeeding (Fomon, 2001).

However, in 1988, the formula industry began advertising directly to the public, which created tension between the medical profession and the formula manufacturers. By 1990, the American Academy of Pediatrics (AAP) released a statement listing reasons for the organization's opposition to advertising infant formulas to the general public. The AAP believed the advertisements created a negative effect on breastfeeding, interfered with physicians' advice on infant nutrition, led to confusion among consumers, and increased the cost of infant formula (Greer & Apple, 1991).

Currently, many believe the development and advertisement of infant formula has once again negatively impacted the practice of breastfeeding. Although the breastfeeding rate was 90% in the 20th century, it has decreased to approximately 42% in the 21st century (Gaynor, 2003; Wright, 2007). Research shows increasing trends of formula-fed children developing atopy, diabetes mellitus, and childhood obesity (Gaynor, 2003; Wolf, 2003). The detrimental effects of formula on children's health, supporting Des-Essartz's claim that breastmilk is superior for infant feeding, have initiated a "Breastfeeding versus Formula-Feeding Era."

BREASTFEEDING VERSUS FORMULA-FEEDING

Throughout the history of wet nursing, the feeding bottle, and formula, breastfeeding has remained the medically preferred method of infant feeding. Despite this preference, since 1865 scientists have tried to create a synthetic formula equal to human milk. The Infant Formula Act of 1980 authorized the Food and Drug Administration (FDA) to assure quality control of infant formulas (Fomon, 2001). Based on the recommendations of the AAP, the FDA requires the following nutrients be present in all infant formulas: protein; fat; vitamins C, A, D, E, K, B1, B2, B6, and B12; niacin; folic acid; pantothenic acid; calcium; phosphorous; magnesium; iron; zinc; manganese; copper; iodine; sodium; potassium; and chloride (Stehlin, 1993). Although the nutrients in

synthetic formulas appear almost identical to the nutrients in breastmilk, manufacturers acknowledge on formula labels that breastmilk is the ideal form of nourishment for infants (Stehlin, 1993). The amount of each formula nutrient varies significantly compared to breastmilk. Moreover, formulas do not change in composition as the infant ages. Thus, formula is not responsive to a growing infant's nutritional needs, which makes the digestive process more difficult (Lawrence, 1994). The differences in digestion and absorption of breastfeeding versus formula-feeding have been linked to key issues involving poor child health outcomes. Three key issues are atopy (Chandra, 1997; Dell & To, 2001; Kull, Wickman, Lilja, Nordvall, & Pershagen, 2002; Wilson et al., 1998); diabetes mellitus (Berdanier, 2001; Couper, 2001; Gimeno & De Souza, 1997; Kimpimaki et al., 2001; Ludwig & Ebbeling, 2001; Young et al., 2002); and childhood obesity (Butte, 2001; Gillman et al., 2001; Hediger, Overpeck, Kuzmarski, & Ruan, 2001; Kries et al., 1999).

Atopy

Atopy is a Type I hypersensitivity or allergic reaction for which there is a genetic predisposition (Davis, 1993). Atopy includes eczema, asthma, and allergic reactions to food (Kull et al., 2002). Over the past 10 to 15 years, the prevalence of these conditions has increased steadily in children 1 to 5 years of age (Chandra, 1997), with asthma exacerbations accounting for 50% of all emergency hospital visits (Dell & To, 2001). Atopy causes considerable health-care costs and significantly reduces the quality of life in young children (Chandra, 1997). Currently, many believe breastmilk may prevent atopy by decreasing allergic sensitizations through avoidance of allergens and by modulating the infant's immune system (Dell & To, 2001).

Several research investigations support the prevention of atopy by breastfeeding. For example, in a randomized study of 216 high-risk infants, Chandra (1997) found a significant relationship between the presence of atopy and the use of formulas. Atopy was least likely to occur in children who were breastfed. Wilson et al. (1998) and Kull et al. (2002) found that the probability of asthma was significantly reduced in children who breastfed exclusively for at least 15 weeks. Additionally, Kull et al. (2002) followed 4,089 infants from birth to 2 years of age and found that exclusive breastfeeding for 4 months or longer significantly reduced the development of asthma and eczema.

Diabetes Mellitus

Diabetes mellitus is a chronic disorder of carbohydrate metabolism resulting from an inadequate production of insulin (Type 1) or an inadequate use of insulin (Type 2) (Davis, 1993). Autoimmune destruction of pancreatic beta cells resulting in absolute insulin deficiency is usually the cause for Type 1 diabetes mellitus (Ludwig & Ebbeling, 2001). Risk factors for autoimmunity include genetic susceptibility and exposure to environmental factors that initiate beta-cell destruction (Couper, 2001). Type 2 diabetes mellitus is usually caused by insulin resistance and compensatory hyperinsulinemia. Risk factors for insulin resistance include obesity, puberty, sedentary lifestyle, and low birth weight. Both Type 1 and Type 2 diabetes mellitus can cause serious health complications from microvascular and macrovascular diseases such as myocardial infarction, stroke, renal failure, blindness, and neuropathy (Ludwig & Ebbeling, 2001).

Evidence suggests that a short duration of breastfeeding and an early introduction of cow's milk may trigger pancreatic beta-cell autoimmunity resulting in Type 1 diabetes. Gimeno and De Souza (1997) found a moderate hazard for the development of Type 1 diabetes for infants breastfed less than 5 months and for infants introduced to cow's milk products before 8 days of age. Kimpimaki et al. (2001) monitored duration of exclusive breastfeeding in 2,949 infants with an increased genetic risk for beta-cell autoimmunity, until 4 years of age. Results indicated that infants breastfed exclusively for at least 4 months had a lower risk of seroconversion for Type 1 diabetes than infants breastfed exclusively for less than 2 months. Evidence also suggests that breastfeeding results in lower plasma glucose levels than formula-feeding (Young et al., 2002). Additionally, breastfeeding reduces the incidence of childhood obesity (Gillman et al., 2001; Kries et al., 1999), which may prevent Type 2 diabetes mellitus. Young et al. (2002) performed a case-control study of 92 Type 2 diabetic and nondiabetic children and found a strong benefit for infants who were breastfed longer than 12 months.

Obesity


Obesity is an abnormal amount of body fat such that the individual is 20% to 30% over average weight for his or her age, gender, and height (Davis, 1993). Like diabetes mellitus, obesity has increased in epidemic proportion among youth over the past 2 decades (Gaynor, 2003). Obesity is associated with Type 2

diabetes (Ludwig & Ebbeling, 2001), cardiovascular risk, orthopedic conditions, low self-esteem, adverse social outcomes, and adverse economic outcomes in young adulthood (Gillman et al., 2001). The causes of obesity are multifactorial, involving interactions between genes and the environment. Thus, infant nutrition is a powerful determinate (Butte, 2001). Evidence suggests that breastfeeding may prevent the development of childhood obesity because breastmilk is not calorie dense like formula and does not increase insulin levels for digestion like formula does (Hediger et al., 2001).

Kries et al. (1999) examined the impact of breastfeeding on the risk of childhood obesity in 9,357 children who were 5 to 6 years of age and were participating in a mandatory school health examination. Results indicated that breastfeeding prevented childhood obesity and that breastfeeding for a longer duration enhanced the prevention. Gillman et al. (2001) examined type of infant feeding in association with being overweight in over 15,000 adolescents. Results indicated that breastfed infants who are breastfed for a longer duration have the lowest risk of being overweight as an adolescent.

SUMMARY

The historical evolution of feeding for full-term infants includes wet nursing, the feeding bottle, and formula. Each historical component has contributed to current infant-feeding trends and therefore has a profound impact on child health. Before the invention of bottles and formula, wet nursing was the safest and most common alternative to breastfeeding by the natural mother. Society's negative view of wet nursing, combined with improvements of the feeding bottle and the availability of animal's milk, gradually led to the substitution of artificial feeding for wet nursing. In the 18th, 19th, and 20th centuries, advancements in chemistry and food preservation contributed to the increased replacement of breastfeeding by formulas, which were heavily advertised and considered a safe alternative. Currently, infant formula has a profound effect on the number of mothers who breastfeed their infants. Breastfeeding rates in the United States have decreased significantly in the 21st century, resulting in serious health issues that include atopy, diabetes mellitus, and childhood obesity. Research suggests that breastfeeding prevents adverse health conditions, whereas formula-feeding is linked with their development. This evidence confirms breastfeeding is still the best source of infant nutrition and the safest method of infant feeding.

 The United States Breastfeeding Committee (USBC) is composed of governmental, educational, and not-for-profit organizations that share a common mission "to improve the nation's health by working collaboratively to protect, promote, and support breastfeeding." Lamaze International is a member. For more information, visit the USBC Web site (www.usbreastfeeding.org).

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