Eating Your Way to Health

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Eating Your Way to Health

Abstract
In lieu of an abstract, below is the first paragraph of the paper.

Nutrition is a factor that affects an individual throughout the course of his or her life, beginning in the prenatal form and continuing through childhood and into adulthood. Infants and children are very susceptible and vulnerable to the nutritional choices made primarily by their parents, which may affect them for the remainder of their lives. Various studies have been done to show that incorporating a nutritious diet, including breast milk, has a positive effect on the physical, cognitive, and social development of a child. Mothers are ultimately in total control of what their child comes in contact with and should be aware of how important nutrition and breastfeeding are to the overall health of their child. In my opinion, most women in today’s society aren't handling this factor as seriously as they should, which is one of the reasons for the alarming statistics in the overall well-being of our children.
Nutrition is a factor that affects an individual throughout the course of his or her life, beginning in the pre-natal form and continuing through childhood and into adulthood. Infants and children are very susceptible and vulnerable to the nutritional choices made primarily by their parents, which may affect them for the remainder of their lives. Various studies have been done to show that incorporating a nutritious diet, including breast milk, has a positive effect on the physical, cognitive, and social development of a child. Mothers are ultimately in total control of what their child comes in contact with and should be aware of how important nutrition and breastfeeding are to the overall health of their child. In my opinion, most women in today's society aren’t handling this factor as seriously as they should, which is one of the reasons for the alarming statistics in the overall well-being of our children.

Pre-natal development is the development that occurs between the moment the sperm joins the egg and the beginning of the birth process in which nutrition has been proven to play a pivotal role (Shaffer, Kipp 119). What a mother puts - or fails to put - into her body during this time period can have a serious impact on the development of the child physically, cognitively and socially. Vitamins and minerals help to ensure a healthy pregnancy, but many mothers in today’s era fail to meet the required supplementation. Magnesium and zinc help to improve the function of the placenta and reduce the risk of many complications with birth. Folic acid and B-complex vitamins found in fresh fruits, beans, liver, tuna, and green vegetables, have been found to help prevent Down syndrome as well as spina bifida, anencephaly, and other deficiencies of the neural tube. Most women consume far too little folic acid, when it is recommended at least 0.4mg a day. Folic acid enrichment is particularly essential from conception through the first eight weeks of pregnancy when the neural tube is developing (138-139).

Pre-natal nutrition also plays a critical role in both the cognitive and social development as seen in malnourished babies and the pregnant woman’s emotional well-being. Autopsies of stillborn infants whose mothers were malnourished showed fewer brain cells and lower brain weights than babies born to well-nourished mothers. It is seen in various studies that babies born to malnourished mothers sometimes show cognitive deficits later in childhood and often become apathetic and irritated when aroused, which can negatively affect the mother-infant relationship, and ultimately, their social and intellectual development (137). What happens when the pregnant mother battles increased stress levels; will the baby be affected? This is a heavily researched question which shows that stress-induced changes in the fetus may be caused by the sensory experience that the fetus has, as well as maternal heart rate and hormones that cross the placental barrier. Emotionally stressed mothers may be inclined to eat poorly, smoke, or use alcohol and drugs which are all known to increase fetal growth retardation and low birth weight babies, which can result in many permanent cognitive and social deficits (139-140). Stress levels in the mother are very important issues that should be examined and taken care of in order to promote an optimal living environment, aiding in the prenatal development of an infant.

Once the baby is born, it enters in a period called infancy, where nutrition is vital for the proper overall development of a child. Recent studies have shown that infants should take vitamin D supplements to meet the daily requirement of 400 units. Vitamin D is crucial for keeping bones strong, and lowering the risk of cancer, diabetes and heart disease. Breast milk is sometimes deficient in vitamin D, so it is imperative that children begin taking these extra doses of vitamin D on a daily basis to have a large impact on them later in life. Also, because there is a greater risk of skin cancer when being exposed to the sun without sun without sunscreen for too long, incorporating vitamin D
supplements, according to researcher Adrian Gombart, would help increase protein levels that kill bacteria. He, along with many other experts, feels that 800 to 1,000 units of vitamin D on a daily basis would be more effective in fighting disease (Tanner E.2).

Providing a nutritious diet during the first two years of infancy may not show many positive short term effects, but that is not the case for its long term effects. In eight years, starting in 1969, four villages in Guatemala’s northeast Highlands were used as test subjects to determine if those given a protein-rich porridge at infancy had a greater developmental edge than those given a sugary flavored beverage with no nutritional value. Three decades later, the children who were two years of age or under were tested again to see if, in fact, nutrition during infancy played a role in how they developed physically, cognitively, and socially. The adults who were children at the time of the study were given multiple tests to test their reading abilities and nonverbal skills. By being exposed to the porridge of greater nutritional value for the first two years, they showed a greater performance on these tests later on in life. As a whole, Guatemalans averaged four years of school, but those that received the protein-rich porridge averaged half a year more than those who drunk the sweetened beverage. Eating the porridge also affected the physical development of the adults by possibly boosting the formation of their brains as well as being 0.8 inches taller on average. The adults who ate this protein-rich porridge during infancy interacted better with their environment later on in life and absorbed more from their schooling, as evidenced by hourly earnings that were 46% higher than those who consumed the beverage with no nutritional value during infancy (Times –Colonist C.3).

Adequate nutrition is critical to the positive physical growth of a child during childhood, and if this nutrition is lacking, then serious physical consequences can arise. Prolonged under-nutrition has a very severe impact, especially during the first five years of life: brain growth may be seriously retarded, and the child may remain relatively small in stature for the remainder of its life (Shaffer, Kipp 232). Worldwide, 9.7 million children under the age of five died in 2006, with the number one cause being under nutrition at 53% (Time 18). This is a very serious statistic, with a majority of these deaths occurring in developing countries of Africa, Asia and Latin America.

When children lack the proper nourishment, they are likely to become a victim of either one or two nutritional diseases, marasmus or kwashiorkor. Marasmus affects babies who receive insufficient protein and few too calories, and it often results in a child very small in stature with impaired social and intellectual development. A baby with marasmus becomes very frail and wrinkled in appearance because the body tissues begin to waste away (Shaffer, Kipp 232). When subcutaneous fat and muscle are lost due to endogenous mobilization of all available energy and nutrients, marasmus is diagnosed (Muller, Krawinkel 279). The second common nutritional disease in developing countries is kwashiorkor, which affects children who receive enough calories but little, if any, protein. The physical symptoms of a child undergoing this disease are that the child’s hair thins, the face, legs and abdomen swell with water, and severe skin lesions may develop (Shaffer, Kipp 232). Other symptoms of this horrific disease include anemia, hepatomegaly (enlargement of liver), lethargy, severe immune deficiency and early death (Muller, Krawinkel 279). As will soon be discussed, breast milk is a very good source of protein, so breast-fed infants do not normally suffer from marasmus unless the mothers are severely malnourished. Once the infants are weaned from their mother’s milk, however, kwashiorkor may arise and develop (Shaffer, Kipp 232).

Other nutritional deficiencies that affect a child’s physical and cognitive development which are very common in western societies include vitamin and mineral deficiencies. Iron and zinc deficiencies are especially common among children because they are undergoing rapid growth and thus require more of these
minerals. Without enough of these minerals, children will grow much slower physically, mentally, and socially. Between the ages of 4-6 months and 10-12 months, iron requirements double. During this period of rapid growth, an increased intake of iron is needed to maintain the infant's hemoglobin concentration (Pulse 44). A prolonged deficiency in iron, however, can lead to a condition called iron deficiency anemia. This condition can retard a child's growth rate, make children inattentive and listless, and impair motor skills and intellectual development. This deficiency in iron, which is very hard to completely overcome, has resulted in children performing poorly on school achievement tests (Shaffer, Kipp 232).

An example of how a chronic deficiency in iron during infancy can have persistent cognitive problems throughout one's life is shown in a study completed by Lozoff, Jimenez and Smith. In this study, the objective was to examine the changes in cognitive functioning after chronic iron deficiency in infants depending on socioeconomic status. The participants included 185 individuals who enrolled at 12 to 23 months of age. The participants were evaluated at infancy, 5, 11 to 14, 15-18 and 19 years of age. Individuals who had chronic iron deficiency in infancy were compared to those who had quality iron intake during infancy. The results showed that, for middle socioeconomic participants, standardized test scores at each age averaged at 101.2 in the group that were chronic iron deficient compared to 109.3 in the group that were given quality and sufficient iron during infancy. This 8-9 point gap between the two groups remained like so until the end of the study to age 19. For low socioeconomic participants, the gap for standardized test scores widened from 10 points to 25 points by the end of the study. The conclusion was that the group with chronic iron deficiency in infancy did not catch up to the group with sufficient iron intake in cognitive test scores over time. Also, when looking at socioeconomic factors, there was a widening gap for the low socioeconomic families. Finally, these results suggest how serious iron deficiency can be to the proper cognitive development of a child over time, and how important it is to try and prevent this condition (Lozoff, et.al. 1108).

Another form of poor nutrition becoming very prevalent in Western societies is obesity, which can have several long-term health effects. Obesity is an epidemic that the United States is facing, both in childhood and adolescence. To define obesity, it is a medical term describing individuals who are at least 20% above the ideal weight for their height, age and sex (Shaffer, Kipp 233). The prevalence of overweight has doubled for US children ages 6-11 and tripled for American teenagers over the past two decades. Approximately 17% of children and adolescents between the ages of 2-19 are obese, and another 34% are at a risk of becoming overweight. Obesity can lead many long-term health effects, including type 2 diabetes, orthopedic complications, and increased risk of heart disease. Children's obesity can result in an increase in stress on weight-bearing joints and is the leading cause of pediatric hypertension (Shaya, et. al. 189). New research suggests that the arteries of obese children may be aging 30 years faster than normal. A recent study consisting of 70 obese children and adolescents, both boys and girls, found that they have thicker carotid arteries and abnormal cholesterol. Dr. Geetha Raghuvéer, associate professor of pediatrics at the University of Missouri Kansas City School of medicine, and cardiologist at Children's Mercy Hospital, says that the neck arteries of obese 13 year old children are, “looking like those of a 45-year-old.” Based on these findings, Dr. Raghuvéer, and many others, is concerned that this may lead to premature cardiovascular disease as early as in their 30’s (Kirkey A.6).

Although childhood overweight is often accompanied with many serious long-term health effects, possibly the most damaging consequence is the social effect it can have on an individual. Obese children become targets for discrimination at an early age in schools, sporting activities, and everyday life. Cultures and societies also play a huge role in this discrimination factor portraying the “ideal"
figure as one that is very thin. A number of studies have been done to show that children are de-sensitized to obesity and show cultural preferences towards thinness. Preference tests have shown that 10 to 11 year old children prefer a wide variety of handicapped friends over those who are overweight. Overweight children are ranked lowest in the group of friends that a “normal” or average sized child would choose. Even though overweight children are discriminated against from an early age, they do not exhibit a low self-esteem or negative self-image. This is seen when the child begins growing up in the adolescent stage where self-image is directed from one’s culture as opposed to one’s parents when in childhood (Dietz 518). With childhood overweight and obesity being such a large problem in today’s society, changes need to start being made in children’s lifestyle choices, which will help tackle this growing epidemic. These changes need to be incorporated at home with better nutritional choices and physical activities as well as at school, which will improve both the physical and social development of obese children.

Breastfeeding is the process of providing milk, which contains many essential components, to an offspring in order to sustain life. This act of providing milk for one’s young is seen not only in humans but in all mammals because this is a characteristic that sets them apart from other animals. According to Riordan, human breast milk is rich in nutrient proteins, non-protein nitrogen compounds, lipids, oligosaccharides, vitamins and certain minerals. It also contains hormones, enzymes, growth factors, and many types of protective agents. About 10 percent of human milk contains solids for energy and growth and the rest is water to prevent dehydration (98-99).

Human milk has many different physical functions for a developing child, such as transporting nutrients, affecting biochemical systems, enhancing immunity, and destroying pathogens (Riordan 97). Nutritionally speaking, human milk contains fat, which provides half of its calories, lactose, which accounts for most of the carbohydrates in human milk, and both casein and whey proteins. Human milk is a good source of essential vitamins and minerals such as vitamins A, E, K, very little D, B₁₂, B₆, sodium, zinc, small doses of iron and calcium, and finally magnesium (103-109). Breast milk also offers the newborn protection against several diseases such as gastroenteritis and diarrheal disease, respiratory illness, Otitis media, and chronic disease protection. This is due to the human milk or “white blood” containing enzymes, immunoglobulins, and leukocytes in abundance. These components work together to enhance one another, and thus account for most of the unique anti-infective properties of human milk (111-115). Breast milk is also involved in the process of immunity and destroying pathogens since it is densely packed with antibodies. Human milk contains two types of white cells called phagocytes and lymphocytes. Phagocytes engulf and absorb pathogens as well as releasing IgA. Lymphocytes, with a majority being T cells, function by destroying cell wall viruses, which help protect infants. Antibodies are immunoglobulins that act against specific antigens or pathogens, which are passed from the mother’s mucosa to the mammary gland (breast milk) through lymphocyte traffic pathways (117-122). After researching the nutritional aspect of breast milk, I was amazed at how important it actually is and how much it offers to a developing newborn.

There are many positive effects that are supported by research on how breast milk is correlated to intelligence and cognitive development. Possibly the most important benefit to breastfeeding an infant is that it enhances brain development (97). A number of studies suggest that breastfeeding an infant will result in a more intelligent child and increased cognitive development during childhood and into young adulthood (509). A meta-analysis of 11 studies testing if breastfed children were more intelligent than children not breastfed, showed an average 3.2 points higher cognitive development score among breastfed infants. This intellectual advantage was seen early on in development and carried on through childhood.
Another study looking at breastfeeding and children’s intelligence was done by Johnson et al., in 1996 in the United States. They used 204 children and measured them at 3 years of age. The Stanford-Binet, Hollingshead Index of Social Status was used, which controlled for socioeconomic status, mother’s intelligence, smoking behavior, gender, and birth order of the child. Johnson and his coworkers found that initiation of breastfeeding predicted scores on intelligence tests at age 3. Children that were breastfed associated with a 4.6 higher mean in intelligence (510).

As we know, breastfeeding plays a role in both physical and cognitive development, but maybe the biggest impact breastfeeding has on an infant is their social development. The infant mother relationship is a heavily researched topic in child development, which includes mother-infant, attachment and John Bowlby’s Attachment Theory. According to Bowlby, “People who are securely attached, take pleasure in their interactions and feel comforted by their partner’s presence in times of stress or uncertainty,” (Shaffer, Kipp 435). Bowlby was a firm believer in the ethological model to attachment which says that human infants, similar to primates and lower order species, have many built-in behaviors which promote proximity to their mothers for safety and comfort (439). While nearly all infants become attached to their caregiver, breastfeeding aids in them becoming “securely” attached. An infant who is securely attached can use the mother as a secure base for exploration, and the attachment figure acts as the outer ring of homeostasis for the infant and a buffer against distress. Breastfeeding thus is a possible mechanism for this form of secure attachment which promotes the maternal bond and mother-infant interactions (Jansen et. al).

Breastfeeding is a great example of how infants attach and form a tight bond to their mothers, promoting social development. Mothers and their babies interact and communicate with one another during breastfeeding by using a variety of communications that are visual, tactile, and postural. Babies that are breastfed communicate actively by cooing, babbling, and speech sounds as they look up into their mother’s eyes. These simple interactions between the infant and its mother further bonds and attaches them, which increases the child’s social development over time (Riordan 518). Also, an important predictor of the mother-infant attachment later on in life is the mother’s sensitivity towards the infant’s behaviors during breastfeeding. Formation of a secure attachment between the mother and infant is established by the mother’s sensitive and repeated responses to the infant during the feeding process. While breastfeeding offers the infant many distinct stimuli it also affects the mothers behavior during feeding, which gives the infant many different and new interactive experiences with the mother (Jansen et. al).

In 1993, Epstein completed a study in which he videotaped breastfeeding mothers and their infants to investigate the interactions between the two, thus showing that social development occurs during breastfeeding. The videos were later observed and analyzed and showed that the interactions between the mothers and their infants were elaborate and complex. The mothers showed a great deal of affection and joy in their facial expressions and in their tones of voice when communicating during the breastfeeding periods. The infants made sounds that the mother’s initiated and this resulted in the babies continuing to make the same sound. Some of the infants even smiled and laughed with the mother’s nipple in its mouth (518-519). The way a mother talks to her baby while she is breastfeeding is more important than what she says. By using slowly rising crescendos and decrescendos, it allows the baby to process the information and repeat it. These sing-song styles of speech along with smiling, grasping, and talking are all behaviors that play important roles in the attachment process. During these interactions between the mother and infant, according to Anderson, they act as “mutual caregivers,” because the mother not only gives care to the infant, but the infant
also provides care to the mother (518). Epstein also noted in his video analysis that...

As the mother holds her infant to her breast, assumes the en face position, and talks to her newborn, her eyes are the optimal distance away and her head, mouth and eyes move slowly and within a closely circumscribed range. Her newborn will also be sending stimuli, such as changes in facial expression, vocalizations, and eye-to-eye contact. The mother’s response to such stimuli is immediate (Riordan 518-519).

Overtime, researchers have begun to make a correlation between breastfeeding duration and childhood overweight. As I have already discussed, childhood overweight is a huge problem in western societies today and may be the most significant health issue facing American children today. When faced with the decision of whether to breastfeed their infants or use formula, mothers should seriously take a step back and critically examine how important and beneficial breastfeeding actually is. An additional reason mothers should consider breastfeeding is that recent studies have reported that longer breastfeeding is protective against overweight children ages 4-9. In 2004, Howell Wechsler, acting director of the Centers for Disease Control and Prevention Division of Adolescent and School Health, made it clear in front of a congressional subcommittee that the “promotion of breastfeeding and efforts to increase its duration” is one behavioral approach that we as parents can take part in to decrease this epidemic of childhood and adolescent obesity (Procter, Holcomb 1-2).

A study was completed in Kansas from 1998-2002 by Sandra Procter and Carol Holcomb where they used 3692 children to see if breastfeeding duration was associated with decreased frequency of childhood overweight at four years of age among Kansas women, infants, and children population. Procter and Holcomb linked data on Kansas families from the Pediatric Nutrition Surveillance System and Pregnancy Nutrition Surveillance System. They concluded from their study that breastfeeding showed a significant protective association with childhood overweight at the age of four years for all non-Hispanics. Additional research still needs to be done not only on the association between breastfeeding duration and childhood overweight, but also on the effects of ethnicity and culture, maternal pre-pregnancy BMI, and child’s birth weight and gender (2,4). Even still, in my opinion, this is just another piece of convincing data that illustrates the importance of breastfeeding.

As I have thoroughly looked at, nutrition and breastfeeding are heavily involved in the physical, cognitive, and social development of a child. Being conscience of what goes into your body as a pregnant mother or what you give your growing child will pay huge dividends in the long run. By examining research that has been done, fixing these deficiencies, or incorporating a new nutritional source into a child’s diet can only improve its health and well-being. As a society, we need to start making changes in our diet and lifestyles as well as looking at different alternatives to poor or inadequate nutrition, which will lead to the optimal development of our future generations.

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