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Food for Thought

The Importance of Nutrition for Cognitive and Physical Well-Being

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Abstract

The purpose of this paper is to examine the effects of nutrition upon the physical development and health of an individual. The main focus is on proving through the examination of various literature and the effects of specific nutrients that nutrition has a great impact on mental and physical well-being. The reasons which people give for not having proper nutrition are taken into consideration as well, and an overall conclusion can be made that nutrition is very important and should be taught to all consumers.

Food for Thought

The Importance of Nutrition for Cognitive and Physical Well-Being

The brain and body function like a data superhighway. As the center of the nervous system the brain receives and processes all of the various stimuli which the body absorbs throughout the day. The traveling of this information through the synaptic relays is what allows humans to have feeling and thoughts. Together the mind and body form a complex system, and like any other system it must be properly developed and well maintained. In doing so, one component which must be considered is proper nutrition. The effect that nutrition has upon both mental and physical health is exceedingly important.

Nutrition is a key component for mental development, mood alteration, behavior, and physical health. It has been found that nutrition is important all throughout the lifespan of an individual (Tapsell, 2007). It affects people at every stage of their lives. People form eating habits, whether poor or healthy, based on many different circumstances. However, an attempt should be made to eat healthily, as certain foods contain nutrients that are essential to a person's health. By examining the effects of these nutrients it can safely be concluded that nutrition is indeed extremely important to the health and wellbeing of both body and mind, and consumers should be educated as to its importance.

Nutrition is important because of the way in which it affects development. Research has shown that nutrition can change the way in which a certain genetic factor is expressed by supplying the gene with specific molecules or nutrients which are required to express the full potential for development (Rosales, Reznick & Zeisel, 2009). In other words, it is nutrition which controls how the brain and body develop. Without the proper

nutritional stimulus the physical development of both brain and body may be stunted and important traits will not be expressed.

Nutritional Components

Lipids, or fats, are essential to the proper development of the brain. This is because the brain is composed primarily of fatty tissue. Lipids in the brain "represent about 60% of its dry weight and more specifically they make up 80% of nerve cells. Fatty acids play an important structural role in membranes… such that communication both from and to the cell is facilitated" (Benton, 2008b). The amount of lipids within the brain allows for the rapid transfer of impulses and data. This is what allows humans to process rapid thoughts and actions.

Protein serves as the foundation of the body. German scientist Gerardus Mulder discovered the importance of protein in 1838. He found that it is protein which serves as the base of all living tissue (Insel, Turner & Ross, 2004). Protein is what makes up a person's skin, muscles, fingernails, and even hair. Without adequate protein intake a person who is injured will not heal as quickly. Those who are athletes must be especially careful to get enough protein, as vigorous exercise tears down the muscles and protein is needed in order to rebuild and repair the damage.

Protein is also important in allowing the brain to progress to a higher level of thought. A study of toddlers from Egypt and Kenya found that those who received a proper nutritional intake of protein engaged in symbolic play at an earlier stage (Sigman, 1995). The level of protein is important to cognitive development at this young age because it gives the brain the energy it needs to grow and develop, as well as providing energy for physical stimulation.

Water is essential for life because it allows the body to process many key vitamins and minerals. The body contains more water than any other substance. The average body is composed of sixty percent water. Inside the body water carries the dissolved minerals into the cells and helps to maintain the balance of electrolytes (Insel et al., 2004). Without water the body would quickly cease to function as the cells would be unable to receive many of the nutrients they need.

Vitamin A is a very important nutrient for the development and maintenance of the body. It serves a multitude of purposes and must not be overlooked. Vitamin A is best known for the role it plays in building good vision. Inside the retina of the eye there are small rods and cones which light bounces off when it enters the eye. The reflection of light breaks these rods and cones down, and it is vitamin A which helps them to regenerate (Thompson & Manore, 2006). If a person does not get enough vitamin A these rods and cones will eventually wear down, making it difficult to see properly in certain lighting.

Secondly, vitamin A boosts the immune system. It serves much the same function as vitamin C in that it acts as an antioxidant to destroy free radicals in the body. It also plays a role in physical growth and cellular reproduction. Vitamin A is essential in cell differentiation (Thompson & Manore, 2006). Differentiation is the process through which cells split and begin to perform different functions. Without the proper amount of vitamin A cells could not possibly perform their tasks properly. And without differentiation there would be no children, as the embryos would never form into a baby, and the lungs that allow a child to breathe would never form.

Carotenoids are small nutrients which can convert to vitamin A under the proper circumstances. However, on their own they serve as a powerful antioxidant and boost the immune system (Carpenter & Finley, 2005). Because carotenoids bind and remove free radicals from the blood they help protect the body from certain types of cancer. Eating fruits and vegetables rich in carotenoids can help individuals live a healthy life and avoid many dangerous diseases.

The B vitamins, such as B_{12} and B_6, are very important vitamins because they help keep the digestive system working properly. These nutrients are key components of the metabolic processes (Blake, 2008). Without these nutrients it would be impossible for people to properly digest their food. The B vitamins allow the body to digest other nutrients properly, and in doing so they allow people to gain the nutrition they need to function.

One nutrient that is especially important for maintaining a healthy immune system is vitamin C. Vitamin C helps boost the body's ability to fight off illnesses before they become a serious problem. Vitamin C is also an antioxidant which helps protect the body from free radicals in the cells, and by doing so it can reduce the chances that an individual will develop cancer or other life threatening conditions (McGuire & Beerman, 2007). The beneficial characteristics of vitamin C for the immune system make it a very important nutrient for people to consume.

Vitamin D is best known for its role in helping calcium protect the bones. The body can manufacture vitamin D using sunlight. New research has shown that vitamin D may also help the elderly maintain a sense of balance (Vitamin D, 2009). Vitamin D may help with stability because it strengthens the bones. Vitamin D also helps to prevent

rickets, a childhood disease in which the bones are weakened and deformed (Insel et al., 2004). The effect that a proper amount of vitamin D has on the bones makes this nutrient absolutely essential.

Vitamin E is another important nutrient. Eating foods rich in vitamin E can help to prevent and treat diseases such as anemia. This vitamin helps prevent these diseases by promoting the flow of blood in the body and proper blood cell development (Blinn, 1983). Vitamin E helps keep the blood cells healthy, and in doing so enables the blood to continue moving freely to all parts of the body.

Vitamin K is well known for helping clot the blood (Blinn, 1983). Even a small injury could prove problematic if vitamin K did not promote clotting to prevent the loss of too much blood. Severe injuries could be potentially fatal without this nutrient. Vitamin K slows and stops bleeding, enabling injured people to survive long enough to receive treatment.

Carnitine is a nutrient similar to some vitamins. This nutrient performs many functions essential to good health. Carnitine carries fatty acids through the blood stream to the mitochondria where they are used in the citric acid cycle. This nutrient allows for the production of energy, and also cleanses the blood of any toxic components which it encounters. In large doses it has been observed that carnitine can help reverse muscle atrophy (McGuire & Beerman, 2007).

Pantothenic acid is a component of yeast. It is also an important nutrient which the human body needs to work the metabolic system. Without this coenzyme the body would not be able to process the fatty acids it needs to create energy. The amount of this

nutrient which must be consumed is negligible, and there are few known cases of pantothenic acid deficiency (Thompson & Manore, 2006).

A nutrient which is important for development even before a person is born is folic acid. Proper nutrition is essential during the gestational period. Nutrients such as folate have some influence on cell differentiation and growth during the fetal stage, and help to influence the growth of the central nervous system (Zhang, Huang, Tian, Ren, & Wilson, 2009). Without a properly developed nervous system a child may be crippled or impaired for life. Folate is clearly a very important nutrient.

A deficiency of folate during the stages of early pregnancy can be linked to the increased risk of giving birth to a child with physical defects (Carpenter & Finley, 2005). Before a child is born the nutrients which it receives come through its mother, and the window of opportunity for nutritional impact may be small. Folic acid is only exceedingly important until the spinal cord closes. The fetus needs this nutrient in order to properly develop its spinal cord. A lack of proper nutrition for the expectant mother can have devastating, lifelong consequences for her unborn child.

Another mineral that is essential, yet has only a small time in which to make a difference is choline. Choline is necessary during the stage in which the fetus' mind is being formed (Rosales et al., 2009). The small amount of time in which these nutrients have opportunity to work makes it essential that the mother is conscientious about her intake of these nutrients before the opportunity passes.

Choline is important as it influences the growth and change of stem cells, and alters the way in which the brain functions (Benton, 2008a). Without this nutrient the stem cells cannot form into the various functioning parts of the fetus. Choline also helps

"to maintain the structural integrity of cell membranes" (Insel et al., 2004). Without this vital nutrient the cell walls would collapse.

One mineral which is often overlooked when considering health benefits is zinc. Zinc is a tremendously important nutrient. The American Dietetic Association stated that "zinc is critical to the proper function of more than 80 enzymes" (Insel et al., 2004). This seemingly insignificant mineral is vastly important to the proper functioning of the body. Zinc is considered a trace element, yet its partnership with these enzymes makes it a nutrient which is essential for good health.

Zinc is also a very important component of every living cell. Zinc helps to form the structure of the bodies' cells, preventing them from losing their shape and collapsing (Blake, 2008). Without the structure that zinc provides for the cells it would be impossible for humans to function at the cellular level, and as a result they would not be capable of function as human beings.

Fluoride is also considered a trace mineral. Fluoride is a mineral which is essential for the proper maintenance of one's teeth. A proper intake of fluoride can help to prevent tooth decay and strengthen the enamel (Thompson & Manore, 2006). Proper care of our teeth is important. The amount of fluoride which needs to be consumed is negligible, but the benefits are immense. If one gets enough fluoride they can maintain good dental health into their old age and be able to continue eating nutritious food.

Another trace mineral which is often overlooked, yet which is one of the most common nutrient deficiencies in the world is iodine. It is believed that areas which suffer severe iodine deficiency over a long period of time show a tremendous drop in intellectual ability, and also associated with iodine deficiency disorder is a lack of

coordination and hearing impairment (Benton, 2008a). The development of the brain segment which controls these functions is dependent on iodine. All of these problems can come about as the result of lacking one seemingly insignificant nutrient.

In contrast, many of these problems can also be solved by iodine supplementation. In Albania children who suffered from iodine deficiency showed a marked improvement in the ability to process information after receiving iodine supplementation for a period of time. There was also a large improvement in coordination and vision after having received the iodine supplements (Benton, 2008a). This shows that the problems caused by a deficiency are not always permanent. Instead these problems can sometimes be treated with proper nutrition to produce great improvements. Benton states that the supplementation "improves cognitive and motor function…and improves somatic growth (2008a).

Another important nutrient which many people overlook is copper. Copper serves as part of the electron transfer chain and helps produce the skin pigment melanin. Copper is also essential in the production of collagen and elastin (Thompson & Manore, 2006). Collagen and elastin are connective tissues which give the skin elasticity and resilience. The role of copper in producing this tissue helps protect the skin from being damaged by outside forces.

Manganese is a trace mineral which is present in small quantities throughout the body. Manganese is used to construct cartilage in bones and skin, and it is "concentrated primarily in the bone, liver, pancreas, and brain" (Insel et al., 2004). Manganese is important because it helps the body heal from injuries. This nutrient allows new skin to form and bones to heal.

Sodium is a mineral which often brings to mind negative connotations. Many people know of the link between sodium and high blood pressure, but they often forget that a certain amount of sodium is necessary for proper bodily function. Sodium is essential to the proper function of the nerves and muscles throughout the body. Sodium helps the body absorb other nutrients and regulates the level of acidity within the body (McGuire & Beerman, 2007). It is not difficult to get enough sodium for the body to function properly, but people need to realize that balance is the key to proper nutrition.

Chloride is a nutrient found in some fruits and vegetables. This nutrient does not work inside the body cells, but rather shifts about in the bloodstream. The major function of chloride is to destroy harmful bacteria which enter the stomach or bloodstream (McGuire & Beerman, 2007). Without this nutrient humans would become ill much more frequently than is normal.

Magnesium is one of the most prevalent minerals in the body. It can be found in almost any unrefined food source, but food is stripped of much of the magnesium content when it goes through the refining process. The body uses magnesium as a catalyst for more than 300 enzyme-reactions throughout the body and for the contraction of muscles (Insel et al., 2004). Without this mineral the body would simply cease functioning at the cellular level, meaning it would completely shut down.

Selenium is an element of many proteins in the body. Selenium is used as a component of the thyroid hormone as well as an antioxidant, and it is best known for its use in preventing damage to cell membranes. As an antioxidant selenium binds highly reactive free radicals to prevent them from causing damage to the cells and setting off a chain reaction among other free radicals (Blake, 2008).

Cognitive Development

One area of development in which nutrition plays a very important part is the development of the mind. There are many diverse areas relating to cognitive development which are influenced by nutrition. According to Bonnie Kaplan nutritional status affects factors such as social stimulation, mood, behavior, and physical development of the brain (1988). The area in which nutrition has the greatest effect is the physical development of the brain and body, which relate to numerous other factors that affect cognitive development.

Nutrition has a tremendous impact on children. The development of a child's mind is very important, and proper development is dependent on proper nutrition. Nutrition is particularly important during early childhood. The brain is undergoing a major growth spurt during this time period, thus increasing the body's demand for nutrients. Children require a nutritionally balanced diet in order to meet the demands of their growing brain. Without the necessary intake of nutrients the brain will be stunted in its growth, which may possibly lead to mental impairment or retardation.

It has been said that "although all nutrients play a role in brain development some are critical, because they play important roles and are more likely to be deficient" (Benton, 2008a). One nutrient that is crucial for proper brain development is iron. Iron is a key component in hemoglobin, which transports oxygen through the bloodstream. Without proper levels of oxygen the brain cannot grow and function properly. According to specialist Neil Gordon a deficiency of iron in early childhood causes oxygen deprivation of the brain, which can result in a lack of memory and learning impairment (2003).

Iron deficiency also contributes to a lack of mental stimulation. According to psychologist Pierre Guesry iron deficiency decreases the strength of the body's muscles (1998). This lack of muscle strength makes it difficult for iron deficient children to participate in social activities and physical games. The result is a lack of stimulation that significantly slows the process of brain development and decreases the amount of enjoyment that the child gains from participation in social events.

A study done of children who were adopted from China found that "improved nutrition and psychosocial stimulation lead to gains in height, weight, and head circumference" (Cohen, Lojkasek, Zadeh, Pugliese, & Kiefer, 2008). This study shows the link between both physical growth from nutrition, and the social stimulation needed for cognitive development. Without proper nutrition the child lacks the energy to socialize, and thus the child is doubly stunted in cognitive development.

A study done by Lewit and Kerrebrock found that improper nutrition impairs cognitive development because the body is attempting to survive by saving as much of its energy as it possibly can. In order to do so it cuts back on the child's socialization (1997). The lack of proper socialization deprives the child of stimulation, and as a result the brain will fail to develop at a normal rate. Children need to socialize with others to develop into well-rounded adults.

Caffeine is a nutrient which is often considered to be bad for health, yet in small doses it can actually boost cognitive performance. Andrew Foskett, Ajmol Ali, and Nicholas Grant found that when taken in small increments caffeine actually boosted the concentration of athletes (2009). Caffeine may allow for better concentration by

providing a surge of energy to the brain. This energy can then be directed towards the task that the individual is attempting to complete.

By affecting a child's physical growth, malnutrition is affecting cognitive development in an indirect fashion. Children who are malnourished do not have as much energy, and as a result are much less active then a normal, healthy child. One study found that children who suffer from malnutrition will also be smaller than their peers. A direct result of this is that the child is less likely to be urged to attempt things that are challenging (Lewit & Kerrebrock, 1997). Children need this mental stimulation in order to develop. The lack of mental stimulation due to small size will further slow the child's development.

In the past few years improved nutrition has led to an increase in height and a larger brain in childhood. The height of a person, as well as the size of his brain, has been associated with greater intelligence. According to one study much of this intelligence is seen in young children (Colom, Lluis-Font, & Andres-Pueyo, 2005). This trend provides even more supporting evidence for the impact that improved nutrition has on cognitive abilities.

A hypothesis was made that if nutrition truly impacts cognitive abilities it will be evidenced by increased intelligence in the bottom half of the population, while the upper half would remain at a constant level (Colom et al., 2005). The increased awareness of the importance of nutrition has primarily benefitted those people of a lower social standing. Those children who were raised in upper-class homes would have had better nutrition consistently, which would account for the stability of their scores.

Several other studies have shown strong supporting evidence for the nutritional hypothesis. As predicted, the results show that the greatest increase in intelligence is concentrated in the lower portion of the population, although the results are not conclusive (Colom et al., 2005). These studies provide a stronger body of supporting evidence together than a single study would have been able to demonstrate.

Behavior and Mood

The relationship between the quality of an individual's diet and his behavior is apparent from a very young age. According to one nutritionist a correlation can be seen between behavior and the quality of nutrition that is received before infants are even six months old (Sigman, 1995). Children that receive adequate nutrition are less likely to be under stress, because they do not need to worry about getting enough to eat. As a result of this lowered stress level they will exhibit fewer behavioral problems.

Malnutrition or nutritional imbalance can also affect a person's mood, which in turn affects the behavior of the individual. The levels of specific nutrients in the brain stimulate particular reactions. Carbohydrates are a good example of this. In general, high levels of carbohydrates in a person's system cause a decrease in cognitive performance. However, a study observed that in some cases small doses of carbohydrates serve as a mood elevator (Kaplan, 1988). A person's mood then influences his pattern of behavior, as he is less likely to lash out when in an elevated mood or state of mind.

A study conducted by Liu and Raine found that children who were undernourished were more likely to demonstrate behavioral problems, and to be more aggressive with other children (Benton, 2008b). This may be because of a psychological

need to compete for what food is available to them. The lack of nutrients would make them extremely competitive with those around them. In addition, the lack of nutrients would make them irritable, causing them to lash out at those around them.

Research on the effects of supplementation supports the theory that nutrition has an effect on a person's mood. Psychologist David Benton noted that children who received micronutrient supplements after having had a deficiency displayed a notable improvement in mood, attention span, and memory (2008a). The improvement shown after supplementation is further proof of the influence which nutrition has upon the attitude.

The supposition that malnutrition has an impact on a consumer's mood is correlated by young women experiencing menses. The amount of iron lost in the bloodstream can deplete the body's store, leading to temporary iron deficiency. Benton claimed that people suffering from micronutrient deficiencies often display this through psychological channels such as mood (2008a). Many young women demonstrate an increased level of irritable behavior during their menses, which may reflect the influence that the depletion of iron in their systems has on their mood.

Micronutrients such as iron are not the only nutritional components which have an effect on the mood and behavior of children. Researchers Liu and Raine concluded that both micronutrients and macronutrients have a noticeable effect on childhood behavior (Benton, 2008b). Children need a balanced diet to help them overcome any nutritional deficiencies. Supplements can only do so much, and there is no substitute for a steady supply of proper nutrients throughout the lifespan.

Physical Maintenance

Nutrition also influences the body's ability to fight off illnesses. The effects of proper nutrition on the body are especially important for those who have weaker immune systems. According to one study as people grow older they have a greater appreciation for the connection between the choices they make and their health (Chung et al., 2006). These nutritional choices may save their lives! This is very important for those who are already ill or have a weakened immune system, such as the very young and the very old. Proper nutrition can help a person's body fight off illnesses, and it can help lessen the symptoms of some chronic illnesses.

Proper nutrition can help people lead a longer and healthier life. The effects of nutrition are widespread, and they affect many areas of physical health. One health issue that nutrition affects is the risk of developing heart problems such as cardiac arrest. A study done on the effects of nutrition and the risk of developing a heart problem found that those with an imbalanced diet and little knowledge of proper nutrition were more likely to have heart problems (Antal et al., 2005).

The effects of some diseases can be reduced by consuming nutrient dense foods, such as meat. Meat is an important part of most healthy diets because it contains many essential amino acids and vitamins (Tapsell, 2007). These nutrients are essential to the function of the body and the immune system. Consumption of food rich in these nutrients can help prevent and treat disease of the immune system or obesity.

There is no single food item or nutrient that can serve as a cure-all for the problems of deficiency and disease in the world. It is important to meet all of the needs of the body, and this can only be done by consuming nutrient dense foods (Tapsell, 2007). In order to have a healthy diet that contains the nutrient dense foods needed for

optimal health it is important that the foods one eats are a balanced mix of all the various food groups available.

The leading causes of death in America are often associated with choices in lifestyle, and these choices include choices in nutrition. Cardiovascular diseases, diabetes, and cancer are among the top ten fatal diseases which can be linked to nutrition. The correlation between these fatal diseases and nutrition clearly show that a lack of proper nutrition can lead to the development of chronic health problems (Mead, 2009). A lack of proper nutrition can have serious long-term health effects that may someday be fatal if they are not addressed.

Mandal and Dr. Bose point out that "undernutrition continues to be a primary cause of ill-health and premature mortality among children in developing countries" (2009). Without proper nutrition to sustain them children in third world countries all around the world are falling ill and dying at a young age. Nutrition is needed to meet the demands of a growing body, but without it the body is unable to fight off the many parasites and illnesses that these children come in contact with. By examining this research people can see the importance of promoting nutrition.

Nutrition also has an effect on diseases such as idiopathic pulmonary fibrosis, or *IPF*. A study of patients in Japan found that people who consume a significant amount of varied fruits can greatly reduced the chances that they will contract IPF. This is most likely due to the fiber which is present in the fruits that are eaten (Miyake et al., 2004). The nutrition present in the food eaten allows people with IPF to live a longer, less painful life.

IPF is also affected by the intake of green and yellow vegetables. A study of eating habits for those with IPF showed a marked improvement in those who had a high intake of green and yellow vegetables (Miyake et al., 2004). These vegetables are rich in nutrients such as iron that the body needs to fight off diseases. A diet which includes these foods will have a marked effect on diseases that build on lack of nutrition. It has been found that eating vegetables and other plant foods can have a significant effect on disease prevention because of the fiber and other nutrients which they contain (Lea et al., 2006).

Obesity is very closely tied to nutritional habits. Studies have shown that those who regularly consume foods with high energy and high lipid concentrations without adequate exercise exponentially increase their chances of obesity (HealthMED, p. 237). The body will only process a limited amount of fat, and the rest will then be stored for later use. Without the energy expenditure to remove these stored lipids the individual will continue to gain weight until he is considered obese.

Experts state that a balanced diet and regular exercise is the best way to prevent the development of obesity and other weight related disorders or diseases (HealthMED, 2009). Obesity is a disease that harms the body and opens the gateway for more serious disease such as diabetes and cardiac arrest. Eating right and exercising is the best way to remove the risks of being overweight.

One disease which is fairly common today is hypertension, or high blood pressure. Hypertension, however, can be helped by a heightened intake of potassium. Potassium is often used by doctors to regulate blood pressure (Insel et al., 2004). People

who receive the proper amount of potassium can often balance their blood pressure without having to resort to medication.

Vitamin D deficiency is tied to many diseases. According to the Mayo clinic "lower levels of vitamin D are associated with diabetes, cardiovascular disease, multiple sclerosis, and other autoimmune disorders, infections such as tuberculosis, and periodontal disease" (Vitamin D, 2009). The variety of diseases which can be tied to vitamin D deficiency shows the importance of this vitamin.

Another disease which may be influenced by a lack of proper nutrition is dementia. Dementia and Alzheimer's disease have shown a correlation with high rates of obesity (Docksai, 2008). Teaching people about the importance of healthy and balanced meals can cut down on the rate of obesity. Preventing childhood obesity could help to cut back on the prevalence of mental diseases associated with improper eating.

One specific nutrient deficiency which may be related to dementia and Alzheimer's in thiamine deficiency. The thiamine deficiency disease known as Beri beri has long been associated with memory loss. This has led experts to the conclusion that long-term thiamine deficiency can cause a disruption in cognitive function and memory retention (Benton, 2008a). If a lack of thiamine can cause memory loss, it may be possible that taking a thiamine supplement can help to prevent the conditions which lead to memory loss.

Kidney disease is closely related to a magnesium deficiency. Long-term magnesium deficiency can deplete the levels stored in the bones and lead to serious health problems (Insel et al., 2004). Magnesium controls so many different bodily

functions and reactions that a deficiency of this mineral can be devastating. Serious, long-term magnesium depletion may cause death as bodily functions shut down.

Attention Deficit Hyperactive Disorder (ADHD) may also be influenced by nutrition. Cross-sectional studies have shown that children who have low levels of zinc tissues in their body often test positive for ADHD as compared to control groups (Benton, 2008a). The correlation between a zinc deficiency and ADHD cannot be ignored. Supplementing these children's diet may improve their attention disorder.

According to Professor Helene Payette proper nutrition can help elderly people maintain their independence. Studies done have indicated that malnutrition has a direct correlation to the incidences of hip fractures, the necessity of outside care, and an increased rate of mortality (Payette, 2005). Hip fractures in women are especially linked to nutritional status. Osteoporosis is caused by a calcium deficit in the bones, and this can lead to fragile bones in later life. This makes the bones break more easily, and it may leads to a lack of mobility and independence.

The provision of nutrient supplements can be advantageous to those who are elderly. Studies have shown that those who had nutrient deficiencies and received a supplement showed a significantly increased level of energy, even after the treatment was terminated (Parrott, Young, & Greenwood, 2006). Many times the elderly lose social stimulation because they do not have the energy to participate in social events. Providing a nutrient supplement can give them the energy they need to be a part of their social circle again. The one caution with the use of supplementation is that it must be ensured that the elderly do not cut back on their regular intake of nutrients, as this may cause a deficiency in some other area (Parrott et al., 2006).

Proper nutrition can also increase a person's longevity. Researchers Kate Burge and Boris Gazibarich claim that "nutritional well-being is widely recognized as an important factor in improving longevity and quality of life in older individuals" (Burge & Gazibarich, 1999). Eating properly balanced meals can increase physical well-being, allowing an individual to live a longer and healthier life. Individuals may live to be older, but the satisfaction in life will not be as high if they are not healthy, and eating nutritious food can help them keep good health and satisfaction in life.

In addition, not only does proper nutrition enable the elderly to live healthier lives, but malnutrition can also cause health related problems. A study found that "malnutrition often results in considerable dysfunction and disability, reduced quality of life and, in some cases, increased morbidity and mortality (Burge & Gazibarich, 1999). Proper nutrition can increase the satisfaction that the elderly have in life, but a lack of proper nutrition can cause impairments that lower their quality of life and happiness. Failure to maintain a balanced diet in old age can do more than make an individual unwell; it can actually cause a person to die at an earlier age.

Nutrition is of great importance to the elderly, yet many times the elderly suffer from malnutrition. The condition of satiation is the feeling of fullness after eating. In the elderly this condition may cause them to feel full after eating only small amounts (Benelam, 2009). The feeling of persistent fullness can cause the elderly to become undernourished because they do not feel like eating. This method of appetite control may cause problems because they do not receive enough nutrients for their health.

The elderly who are taking medication must consider the effects that drugs have on nutrition. Any drug taken impacts nutritional status and any combination of drugs

increases the risk factor for nutrient deprivation (Burge & Gazibarich, 1999). Drugs are absorbed into the bloodstream and sometimes interfere with the absorption of nutrients, either by blocking their absorption or by using them up at an elevated rate, making it necessary to intake more of a specific nutrient.

Conclusion

The effects of malnutrition may be difficult to overcome, but it can be done in many cases. Malnutrition may cause or contribute to impaired cognitive ability, but that does not mean there is no hope for those who have suffered some form of deficiency during their youth. Some disabilities may be reversed with proper treatment. According to one specialist it may be necessary to provide long-term supplementation, but the benefits will far outweigh the cost of treatment (Gordon, 2002).

The fact that proper nutrition can help an individual overcome some cognitive or physical disabilities is a strong argument for the importance of nutrition education for all consumers. Consumers need to know how to counteract the poor nutrition habits that have already started affecting them. Consumers need to be taught how to change their eating habits.

However, one reason why consumer education about nutrition is important is because not all problems can be reversed once they have been caused. Dr. Payette states that it is difficult to reverse physical impairment caused by nutrient deficiency once the process has been started (Payette, 2005). Once a woman has osteoporosis she cannot fully regain the strength of her bones, and once a child has Spina bifida he will have it for the rest of his life. Consumers need to know the affect that nutrition can have on their

health and development before improper eating habits lead to a more serious health condition.

Consumer education about nutrition is especially important for women. Women today are still largely responsible for preparing the meals eaten in the home. A study found that women make the majority of food purchases, and nearly a third of men make no decisions about the food that they consume (Lea, Crawford, & Worsley, 2006). Women have the responsibility of choosing nutritious food, not only for themselves, but for their families as well.

There are some issues consumers face when trying to alter their diet to make it nutritionally balanced. One nutritional issue is consumers unwilling to make the changes they need to make (Lea et al., 2006). Nutritionally balanced meals are often less convenient than eating at a fast food restaurant. In a world that moves at such a rapid a pace convenience is often more important to people than the nutritional quality of the food eaten; when this is the case people sacrifice nutrition for convenience.

Consumers may also resist changing their diet to more healthy foods simply because they are not used to them. Surveys found that “preparation time, unfamiliarity, and old habits are barriers to eating more fruits and vegetables” (Harvard Heart Letter, 2009). People need to learn to break unhealthy eating habits before they can make new ones. They also have to be willing to take the time to learn how to make a healthy meal instead of eating out all of the time. Only with time and effort can individuals get out of the habit of eating junk food and start a new habit of nutritious eating.

A second issue that consumers face is the cost of healthy foods. A study on the foods available in homes with school age children found that consumers bought fewer

fruits and vegetables when the price was increased (Ard et al., 2007). Consumers spend a lot of money on food each year, and they want to get as much food as possible for their money. The price of fruits and vegetables may make the purchase of these types of food less likely for those who have a lower level of income.

There are many barriers to making a change to healthy eating, but they are not insurmountable. There are programs to help consumers who cannot afford to eat healthily. There are also programs that teach people more about nutrition, such as W.I.C. These programs are very important in teaching people how to eat balanced meals.

As one can see by examining the effects that many specific nutrients have on physical and mental health, proper nutrition is essential to leading a healthy life. Nutrition can either prevent or lessen the effects of many diseases, it can help the elderly enjoy their lives while maintaining their health, and it can help develop and maintain proper cognitive function. The effect that nutrition has on mental and physical development, health, mood, behavior, and overall quality of life make education about proper nutrition imperative for every consumer.

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