



Health and Nutrition across the Lifespan

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Abstract

Good health is determined by the kind of nutrition /diet intake of an individual. Good nutrition starts right from pregnancy and it helps in proper growth and development of the fetus. Good nutrition is also promoted during infancy to adulthood in order to maintain good health and prolong lifespan of a person. Healthy and active lifestyle, such as exercise, rest and sleep and good nutrition make up the full complement of factors that promote good health. Some nutrients are needed in the greatest amount during pregnancy like folic acid available in vegetables and fruits which support the placenta and prevent spina bifida and other neural tube defects, calcium found in bones, is good nutrient in pregnancy because it creates strong bones and teeth, helps muscles and nerves function. Pregnant women should have a diet that consists of a variety of foods. From these foods nutrients, pregnant women get the right nutrients and vitamins for healthy mother and child. Proper balancing of every classes of food is important for one's growth and development across lifespan. Eating fruits and vegetables every day and limiting the consumption of junk food is essential for healthy living across life span.

Key words: Health, Nutrition and Lifespan.

Introduction

Good nutrition has been observed across the globe to be a gate way to a healthy life. Good nutrition maintains and promotes healthy living across life span starting from time of conception till old age. Nutrition is linked to the physical, social and psychological wellbeing of an individual and as a result the quality of an individual's food intake be evaluated across life for a healthy and old age to be attained. According to Peter, Eggersdorfer, Asselt, Buskens, Detzel, et.al (2014), about two billion people worldwide have a diet insufficient in micronutrients. Even among the developed world, an increasing number of people eat poorly on a regular basis which leads to malnutrition, sickness and death at times. Therefore, improving nutrition protects health, prevents disability, boosts economic efficiency and saves lives. Investments to improve nutrition make a positive input to long-term national and global health, economic productivity and societal resilience.

Good nutrition can be defined as the process of obtaining quality food necessary for health and growth. It can also be the process of eating the right kind of food so that an individual can grow properly and be healthy. Furthermore, nutrition is fundamental to growth, good health and a potential cause or contributing factor in illness. There are six classes of food namely carbohydrates, fat and oil, protein, vitamins, minerals and water. All these classes of food are important to an individual's growth and when in right proportion in a meal, it is called balanced diet. When one or two classes of food are taken in excess or in deficient quantity that is poor-nutrition, it can cause illness. The key determinants of an individual's health are lifestyle, environment and biomedical. Health and nutrition are interconnected; therefore, good nutrition which entails an adequate well balanced diet combined with regular physical activity is a cornerstone of good health.

Malnutrition is state of nutrition in which a deficiency, excess or imbalance of energy, protein, and other nutrients causes measurable adverse effects on tissue/body form (body shape, size and composition) function, and clinical outcome (Lochs, Allison, Meier, Pirlich, Kondrup, et. al, 2006). It includes both over nutrition (too many nutrients) and under nutrition (insufficient nutrition). In this paper, malnutrition refers to under nutrition. Malnutrition in all its forms is closely linked, either directly or indirectly, to major causes of death and disability worldwide. WHO (2013) asserted that globally about 101 million children under 5 years of age were underweight and 165 million stunted. At the same time, about 43 million children under 5 were overweight or obese. Its causes are directly related to inadequate dietary intake as well as disease, but indirectly to many factors like security, maternal and child care, health services and the environment.

Health according to World Health Organisation (WHO) (2001) is a state of complete physical, mental and social well being and not merely the absence of disease or infirmity. Obi -Nwosu (2014) also defined health as a state or status somewhere after the midpoint of a continuum which at one point is bad (ill health) and at the other is superlative (devoid of biological, physical or psychological disturbances)

Relationship between Health and Nutrition

Nicoletto and Rinaldi (2011) reported that the nutrient intake of pregnant women affects essential the fetus in the womb and determines to later physical health and development, and that a lack of nutrition at this time point could result in the later development of diseases such as cardiovascular disease and diabetes. It has also been noted by Seidl, Santiago, Bilyk and Potashkin (2014), that nutrition can play a part in preventing Parkinson's disease along with treating it.



The study noted the importance of different nutrients and minerals and their role within the disease, especially that of omega-3 fatty acid docosahexaenoic (fish and salad greens) which has been shown to be neuro-protective in terms of Parkinson's. Ajmera (2013) opined that poor nutrition such as a high intake of fried foods, sugar, salt and fast food has also been linked to obesity, hypertension, heart disease, gout, diabetes among others.

According to Hark, Deen and Morrison (2014), excess adipose tissue in the body due to obesity can cause alterations in the hormone metabolism process in the body and it is proposed that high insulin levels in individuals who are overweight can promote tumor growth in the body which can ultimately lead to the development of cancer cells. To buttress the importance of nutrition on health UNICEF (2012) stated the importance of certain nutrients such as Vitamin A for a healthy immune system, iodine and its importance for a healthy thyroid which promotes healthy growth and development, and iron for the healthy formation of red blood cells which is critical for oxygen to be regulated around the body.

Severe vitamin A deficiency (VAD) in infants can cause visual impairments, anaemia and weakened immunity, with an increased risk of morbidity and mortality from measles or diarrhoea (Sommer & West, 1996). WHO estimates that 9.8 million women are affected by night blindness, a problem related with insufficient vitamin A (WHO, 2009). They also estimated that there are 469 million women of reproductive age and about 600 million preschool and school-age children worldwide anaemic, with at least half of these cases attributable to iron deficiency (iron deficiency anaemia). Infants and children under the age of five are at risk of developing iron deficiency anaemia because of their increased requirements for rapid growth and diets that are often lacking in sufficient absorbable iron (Dewey & Brown, 2003). Iron deficiency, with or without anaemia, may have important health consequences for young children, including increased perinatal mortality, delayed mental and physical development, negative behavioural consequences, reduced auditory and visual function, and impaired physical performance (Algarin, 2003). World Health Organization (2013) asserted that maternal short stature and iron deficiency which leads to anemia, which can increase the risk of death of the mother at delivery, contribute to at least 18% of maternal deaths in low- and middle-income countries.

Six Classes of Food

There are six classes of food which the body needs in the right proportion in order to live healthy and they include: protein, carbohydrates, fat, fibers, vitamins and minerals and water.

Proteins

Protein supplies amino acids to build and maintain healthy body tissue. There are 20 amino acids considered essential because the body must have all of them in the right amounts to function properly. Twelve of these are manufactured in the body but the other eight amino acids must be provided by the diet. Foods from animal sources such as milk or eggs often contain all these essential amino acids while a variety of plant products must be taken together to provide all these necessary protein components.

Fat

Fat supplies energy and transports nutrients. There are two families of fatty acids considered essential for the body: the omega-3 and omega-6 fatty acids. Essential fatty acids are required by the body to function normally. They can be obtained from canola oil, flaxseed oil, cold-water fish, or fish oil, all of which contain omega-3 fatty acids, and primrose or black currant seed oil, which contains omega-6 fatty acids. The American diet often contains an excess of omega-6 fatty acids and insufficient amounts of omega-3 fats. Increased consumption of omega-3 oils is recommended to help reduce risk of cardiovascular diseases and cancer and alleviate symptoms of rheumatoid arthritis, premenstrual syndrome, dermatitis, and inflammatory bowel disease.

Carbohydrates

Carbohydrates are the body's main source of energy and should be the major part of total daily intake. There are two types of carbohydrates: simple carbohydrates (such as sugar or honey) or complex carbohydrates (such as grains, beans, peas, or potatoes). Complex carbohydrates are preferred because these foods are more nutritious yet have fewer calories per gram compared to fat and cause fewer problems with overeating than fat or sugar. Complex carbohydrates also are preferred over simple carbohydrates by diabetics because they allow better blood glucose control.

Fiber

Fiber is the material that gives plants texture and support. Although it is primarily made up of carbohydrates, it does not have a lot of calories and is usually not broken down by the body for energy. Dietary fiber is found in plant foods such as fruits, vegetables, legumes, nuts, and whole grains. There are two types of fiber: soluble and insoluble. Insoluble fiber, as the name implies, does not dissolve in water because it contains high amount of cellulose. Insoluble fiber can be found in the bran of grains, the pulp of fruit and the skin of vegetables. Soluble fiber is the type of fiber that dissolves in water. It can be found in a variety of fruits and vegetables such as apples, oatmeal and oat bran, rye flour, and dried beans.



Although they share some common characteristics such as being partially digested in the stomach and intestines and have few calories, each type of fiber has its own specific health benefits. Insoluble fiber speeds up the transit of foods through the digestive system and adds bulk to the stools, therefore, it is the type of fiber that helps treat constipation or diarrhea and prevents colon cancer. On the other hand, only soluble fiber can lower blood cholesterol levels. This type of fiber works by attaching itself to the cholesterol so that it can be eliminated from the body. This prevents cholesterol from recirculation and being reabsorbed into the bloodstream

Vitamins and minerals

Vitamins are organic substances present in food and required by the body in a small amount for regulation of metabolism and maintenance of normal growth and functioning. The most commonly known vitamins are A, B1 (thiamine), B2 (riboflavin), B3 (niacin), B5 (pantothenic acid), B6 (pyridoxine), B7 (biotin), B9 (folic acid), B12 (cobalamin), C (ascorbic acid), D, E, and K. The B and C vitamins are water soluble, excess amounts of which are excreted in the urine. The A, D, E, and K vitamins are fat-soluble and will be stored in the body fat.

Minerals are vital to our existence because they are the building blocks that make up muscles, tissues, and bones. They also are important components of many life-supporting systems, such as hormones, oxygen transport, and enzyme systems. There are two kinds of minerals: the major (or macro) minerals and the trace minerals. Major minerals are the minerals that the body needs in large amounts. The following minerals are classified as major: calcium, phosphorus, magnesium, sodium, potassium, sulfur, and chloride. They are needed to build muscles, blood, nerve cells, teeth, and bones. They also are essential electrolytes that the body requires to regulate blood volume and acid-base balance.

Unlike the major minerals, trace minerals are needed only in tiny amounts. Even though they can be found in the body in exceedingly small amounts, they are also very important to the human body. These minerals participate in most chemical reactions in the body. They also are needed to manufacture important hormones. The following are classified as trace minerals: iron, zinc, iodine, copper, manganese, fluoride, chromium, selenium, molybdenum, and boron. Many vitamins (such as vitamins A, C, and E) and minerals (such as zinc, copper, selenium, or manganese) act as antioxidants. They protect the body against the damaging effects of free radicals. They scavenge or mop up these highly reactive radicals and change them into inactive, less harmful compounds. In so doing, these essential nutrients help prevent cancer and many other degenerative diseases, such as premature aging, heart disease, autoimmune diseases, arthritis, cataracts, Alzheimer's disease, and diabetes mellitus.

Water

Water helps to regulate body temperature, transports nutrients to cells, and rids the body of waste materials.

Effects of Poor Nutrition in Children

1. Kwashiorkor: Kwashiorkor, also known as edematous malnutrition because of its association with edema (fluid retention), is a nutritional disorder most often seen in regions experiencing famine. It is a life-threatening and debilitating form of malnutrition and it is caused by a lack of protein in the diet. Kwashiorkor is easily treated with a change in diet and those who are treated early usually have a full recovery. It can be prevented by eating a balanced diet with enough carbohydrates, fat, and protein. Children who develop kwashiorkor may not grow or develop properly and may remain stunted for the rest of their lives. There can be serious complications when treatment is delayed, including coma, shock, and permanent mental and physical disabilities. It can cause major organ failure and eventually death

2. Marasmus: This is a childhood disease caused by lack of adequate carbohydrates and protein in a child's diet. Marasmus is a form of severe malnutrition which occur in anyone who has severe malnutrition, but it usually occurs in children. It typically occurs in developing countries. Children with marasmus tend to lack the energy or will to do anything. Marasmus is difficult to diagnose using blood tests. Its main symptom is being underweight, others include loss of muscle mass and subcutaneous fat, chronic diarrhea, respiratory infections, intellectual disability and stunted growth. Initial treatment of marasmus often includes dried skim milk powder mixed with boiled water. Later, the mixture can also include a vegetable oil such as sesame, casein, and sugar.

3. Rickets: This is childhood disease caused by lack of calcium in child's diet. This manifests in children with bow legs and k-shaped legs. It is defective mineralization or calcification of bones before epiphyseal closure in immature mammals due to deficiency or impaired metabolism of vitamin D, phosphorus or calcium, potentially leading to fractures and deformity. Nutritional rickets, also called osteomalacia, is a condition caused by vitamin D deficiency. Signs and symptoms of rickets include bone pain or tenderness, dental deformities, delayed formation of teeth, decreased muscle strength, impaired growth, short stature, and a number of skeletal deformities, including abnormally shaped skull (craniotabes), bowlegs, rib-cage abnormalities (rachitic rosary), and breastbone, pelvic, and spinal deformities.



4. Low mental ability: Poor nutrition causes low mental ability in a child due to poor brain development. The children who do not have access to proper nutrition are much more likely to suffer from psychological disorders such as anxiety and learning disabilities.

Major Effects of Poor Nutrition in Adults

1. Obesity: It is as a result of the imbalance decline energy expenditure due to physical inactivity and high energy in the diet (Excess calories whether /non sugar starches, or fat). Increasing physical activity plus reducing intake of foods high in fat and foods and drinks high in sugar can prevent unhealthy weight gain. Taking these simple goals to concrete action require major social and environmental changes in order to effectively promote and support healthier choice at the individual level.

2. Diabetes: is caused as a result of excess weight gain and physical inactivity account for. Diabetes leads to increased risk of heart disease and kidney disease, stroke and infection, increased physical activity and maintaining a healthy weight play critical roles in the prevention and treatment of diabetes. What an individual eats is closely connected to the amount of sugar in the individual's blood, therefore, eating the right food in the right proportion helps control blood sugar level.

3. GOITRE: A goiter is an enlarged thyroid gland that causes neck to swell. Lack of iodine in diet causes goiter, use of iodized salts in cooking food prevents goitre.

4. CARDIOVASCULAR DISEASE: This is believed to be among the major killers worldwide and to a great extent it is due to unbalanced diets and lower physical activity. Risk of this form, heart disease and stroke is reduced by eating less saturated and trans fats and sufficient amounts of (n-3 and n-6) poly unsaturated fats, fruits and vegetables and less salt as well as physical activity and controlling weight. Reduction of salt intake helps reduce blood pressure and is a major cause of cardiovascular diseases.

5. Cancer: Tobacco is the number one cause of cancer which affects the lungs but dietary factor contribute significantly to some types of cancer. Maintaining a healthy weight will reduce the risk of cancers of the oesophagus, colorectum, breast, endometrium and kidney. Also, limiting alcohol intake will reduce the risk for oral cavity, oesophagus stomach and colorectal cancer.

6. Osteoporosis and bone fractures: Fragility fractures are a problem of older people. Adequate intake of calcium (500mg per day or more) and of vitamin D in population with high osteoporosis rate helps to reduce fracture risk over the years.

Nutrition and Mental Health

Mental health according to World health organization (2014) is when an individual is able to reach full potential, cope with life stressors, work fruitfully and productively, and is able to make an impact on the community. APA (2007) also defines mental health as a state of mind characterized by emotional well-being, good behavioural adjustment, relative freedom from anxiety and disabling symptoms, and a capacity to establish constructive relationships and cope with ordinary demands and stresses of life. The relationship between nutrition and mental health cannot be over emphasized. Schmidt (2007), is of the view that the brain is made up of 60 per cent fat and the ingestion of essential fatty acids and Omega-3 and 6 have effects on the mental health of an individual starting from the gestation period, all the way through until old age. Lacking these essential minerals have been linked to abnormal functioning of the brain such as bipolar, depression, memory loss and alzheimer's and even social skills.

According to Lumey and Vaiserman (2013), the psychological effects of famine outlined the importance of nutrition during pregnancy, as babies exposed to famine doubled the incidences of schizophrenia. When the famine exposed children were re-examined at ages 18-19 there was a twofold rate of schizophrenia. There was also found to be an increase in mood disorders and anti-social behaviour. The results were further supported by findings from Clair et. al (2005), who stated that during the China Famine (1959-1961), prenatal exposure to lack of nutrition saw a dramatic increase in the incidences of schizophrenia seen in the men and woman years later. This study noted that even though the famine involved a different culture than that of the Dutch Famine, the rates of schizophrenia doubled and this is a very important finding in that it outlines the importance of nutrition in the womb.

Foods that are high in Vitamin B such as pork, poultry, fish, bread, whole cereals, eggs and soya beans have been found to be a contributing factor to better mood states and the lowering of cortisol levels in the body. A study done by Coppen & Bolander-Gouaille (2005) stated that nutrition plays a role in prevention and treatment of depression. Results revealed that there is a link between folic acid and antidepressant response rates, as well as Vitamin B12 being associated with better treatment outcomes. Both of these nutrients are associated with adenosylmethionine which is essential in efficient neurological functioning. This idea was further supported in a study done by Bodnar and Wisner (2005), where the importance of nutrition in preventing negative mental health states was investigated. They emphasized the risk that child bearing women are at for developing depression due to the depletion of nutrient reserves during



pregnancy. Pregnancy and lactation are major nutritional stressors for the body and again, omega 3, fish oil, folic acid and proper nutritional care is essential in the positive mental health of the mother and child.

Clearly, there is support for the idea that a diet rich in vegetables, fruit, fish, whole foods, nuts etc. has a positive impact on mental health. Unfortunately, in the last decade, the consumption of processed, sugary and fatty foods has dramatically increased. The growth of popularity in cheap, processed, high fat, high sugar, high salt foods etc. has been a major problem in the last 50 years. Fast food and processed foods are generally extremely high in salt content which has been linked to later decline of cognitive functioning especially when combined with inactivity (Brooks, 2011).

There has been a general decline in the consumption of fruits, vegetables and fish, with individuals having a higher and higher preference for quick, easy, low nutritious, fast food. In conclusion, there is support for the idea that a diet rich in vegetables, fruit, fish, whole foods, nuts has a positive impact on mental health. In order to buttress this point the following recommendations are made:

1. Self-discipline on the correct quantity and quality of food taking by an individual determines to a large extent health status. Maintenance of healthy lifestyles also is vital for good health and to prevent some diseases which can lead to early or sudden death
2. Drinking at least eight glasses of water each day and taking prenatal vitamins (pregnant woman).
3. Healthy Nutritional practices should be considered important for Nigerians at all levels of life. This should be one of the core projects in health service ministries.
4. Campaign against malnutrition and seminars should be organized by the government to educate people on the essentials of good nutrition.
5. Iodized salt should be used in cooking foods.
6. Eating fruits and vegetables every day and limiting the consumption of junk food. Increasing consumption of fruit and vegetables daily could cut cardiovascular risk by 30%. Older adults need more calcium and vitamin D to help maintain bone health. Other calcium rich foods include fortified cereals and fruits juices dark green leafy vegetables and canned fish with soft bones.
7. Exercise, rest and having adequate sleep is highly recommended.

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