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1A. functional foods are foods given an additional function often relating to health promotion or disease prevention by adding new ingredient or more existing ingredient.

Functional foods are natural or processed foods that contains known biologically active compound which when in defined quantitative and qualitative amount provides a clinically proven and documented health benefit and therefore an important source in the prevention, management and treatment of chronic diseases in the modern age.

1B. different types of functional foods

Conventional foods: these are foods that have not been modified by enrichment or fortification. They are still in their natural state. Most whole fruits fall in this category because they are rich in phytochemicals e.g rutin, lutein

Medical foods: these are foods formulated to be consumed or administered enterally under the supervision of a physician and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional recognition based on recognized scientific principle are essential for medical evaluation.

Modified foods: these are foods that have been enriched, fortified or enhanced with nutrient or other beneficial ingredient. E.g salt fortified with vitamin A.

Food for special dietary use: these are foods available commercially and do not require the supervision of a health care provider. These foods fill special dietary needs that are due to specific health conditions such as lactose intolerance, obesity, gluten free foods are considered foods for dietary use if one has those conditions.

1C. with relevant examples, give clinical implications of functional foods

Prevention of nutrient deficiencies: functional foods are typically high in important nutrients including vitamins, minerals, healthy fats and fiber. Filling one's diet with a variety of functional foods including both conventional and fortified foods can help ensure one gets the nutrient one needs and protect against nutrient deficiencies. For instance, iron fortified wheat flour has reduced the rates of iron deficiency anemia among children in Jordan.

Promotion of proper growth and development: certain nutrients are essential to proper growth and development in infants and children. Cereals, grains and flours are often fortified with B vitamins like folic acids which is essential for fetal growth. Low levels of folic acid can increase the risk of neural tube defects, which can affect the brain, spinal cord.

Protection against diseases: functional foods provide important nutrients that can help protect against diseases. Many are especially rich in antioxidants. These molecules help neutralize harmful compounds known as free radicals helping prevent cell damage and certain chronic conditions, including heart diseases, cancer and diabetes. Some are high in omega 3 fatty acids, a healthy type of fat shown to reduce inflammation, boost brain function and promote heart health.

2A. Nutritional status assessment is a measure of an individual health status based on many interrelated factors. It is influenced by food intake, quality and physical health. The spectrum of nutritional status spread from obesity to severe malnutrition. The purpose of nutritional assessment are;

To identify individuals or population groups at risk of becoming malnourished,

To identify individuals or population groups who are malnourished,

To monitor the development of health care programs that meet the community needs which are defined by the assessment,

To measure the effectiveness of the nutritional programs and intervention once initiated.

There are two methods involved in assessing nutritional status.

Direct method: it deals with individuals and measure objective

Indirect method: it deals with community health indices that reflect nutritional influences.

Direct methods include;

Anthropometric method

Biochemical laboratory method

Clinical method

Dietary evaluation methods.

2B. Anthropometric techniques and its application

Anthropometry is the measurement of body weight, height and proportions. It is used to evaluate both under and over nutrition. Other anthropometric methods are mid- arm circumference, skin fold thickness, head circumference, head/chest ratio and hip/waist ratio and body mass index.

Accurate measurement of height and weight is essential. The results can be used to evaluate the physical growth of an individual.

In measuring height of an individual, the subject stands erect and bare footed on a standiometer or with a movable headpiece. The headpiece is levelled with skull vault and height is recorded to the nearest 0.5cm.

Nutritional indices in adults

The international standard for assessing body size in adults is the body mass index. BMI is computed using the following formula

BMI= weight(kg)/height(meter square).

BMI less than 18.5 – underweight

BMI 18.5-24.5 – healthy weight range

BMI 25-30- overweight

BMI greater than 30-40 – obese

BMI greater than 40- very obese.

Waist/hip ratio is measured at the level of the umbilicus to the nearest 0.5cm. The subject stands erect with relaxed abdominal muscles, arms at the side, and feet together. The measurement should be taken at the end of a normal expiration.

Waist circumference predicts mortality better than any other anthropometric measurement.

Hip circumference is measured at the point of greatest circumference around hips and buttocks to the nearest 0.5cm. The subject should be standing and the measurer should squat beside him. Measurement should be taken with a flexible, non stretchable tape in close contact with the skin, but without indenting the soft tissue.

3. Nutrition as it relates to life stages

It is important to maintain good health through life. There are some key stages in life. They are pregnancy, infancy, childhood, adolescence, adulthood.

Pregnancy: a varied diet provide adequate amounts of energy and nutrients. Mothers diet

influences health of the body. Being underweight can make it more difficult to conceive. Being overweight increases the risk of complications such as high blood pressure and diabetes during pregnancy. Folate, natural form of folic acid is needed for rapid cell division and growth in the fetus that takes place during pregnancy. It has been shown to reduce neural tube defect such as spina bifida, in unborn babies.

Pregnant women should take oranges, green leafy vegetables, bread, fortified breakfast cereals, 400 microgram of folic acid supplement every day. All women of child bearing age are also advised to consume adequate amounts of folate.

During pregnancy, a woman's nutritional needs increase to help the growth of breasts, uterus, and placenta, and meet the needs of the growing fetus and lay down stores of nutrients to help.

Too much of vitamin A has been linked to birth defects vitamin A. Unpasteurized dairy product can cause miscarriage or infect the baby such as brie and camembert, may be ontaminated by listeria. Shark, swordfish contain high levels of mercury which can harm an unborn baby's developing nervous system.

A normal pregnancy is between 37 and 41 weeks. New born babies weigh around 3.3kg. In the first 3 days after birth, the mother produces a special form of breast milk called colostrum. It contains less fat, more protein and more protective factors than the breast milk produced later.

If a mother does not wish to breast feed her baby, or finds it difficult, she can use an infant formula from a bottle with a teat. The department of health advise exclusive breast feeding for the first 6 month of life.

After 4 to 6 months of age, milk no longer fulfils all the baby's needs for energy and nutrients. The baby must be given other foods in addition to breast milk or infant formula. This process is called weaning.

Childhood: the energy requirements of children increases rapidly because they grow quickly and become more active. Young children do not have large stomachs to cope with big meals. A healthy family lifestyle can help in the weight measurement of children.

Foods to avoid in childhood are nuts, which should not be given to children under 5 years to void choking, and deep sea fish, as it may have high levels of mercury which may damage the developing nervous system of children.

Adolescence: after menstruation, girls need more iron than boys to replace losses. It is recommended that teenage girls and women require 14.8mg of Iron each day, while adolescent boys only need 11.3mg of Iron per day.

Adulthood: nutritional requirements do not change much between the ages of 19 to 50, except during pregnancy and lactation. A poor diet lead to diseases such as obesity, cardiovascular diseases, cancer and type 2 diabetes. A balanced diet for adults reduces the risk of developing the above mentioned diseases; it is important to eat a balanced diet with plenty of fruit and vegetables, keep well hydrated and stay active.