Review Article

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Analyzing the Effects of Nutrients on Joints and Muscles in Human Beings: Systemic Review

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Abstract

Food is the most basic prerequisite of living organisms. Food builds the body, provides energy for living and working, and regulates the mechanisms essential for health and survival of life. It therefore constitutes the foundation of health of humans and animals. According to a report on health for all: an alternative Strategy [1]. human health is a function not any of medical care but of the overall integrated development of society, culture, economic, education, social, and political. It also depends on a number of supportive services, nutrition, improvements in environment, and health education. Food being the basic vehicle of satisfying man's hunger, it is intimately woven into the physical, economic, psychological, intellectual, and social life of human beings. Our food has several dimensions, the most obvious being the quantitative one. Insufficiency of food leads progressively from mild discomfort to severe hunger and ultimately to health hazards. There can be atrophy of joints, muscles and increase fatigue. Its qualitative dimension is equally important, because low-quality or improper diets lead to malnutrition and diseases. Food affects health, life span, physical fitness, body size, and mental development. Food also has a cultural dimension. The food habits of people are part of their cultural and emotional life, and preferences for food are ingrained [2]. People may cling for generation to their food habits, which may become rituals and patterns of daily routine life. A satisfying meal soothens both the body and mind and determines quality of human life.

Keywords: Nutrients; Muscles; Joints.

Introduction

According to the laws of thermodynamics, the human body exchanges both mass and energy from the environment: mass for growth and replacement of worn-out parts and for reproduction and energy to the biochemical processes taking place in the body and for various types work. Food provides both the mass and energy. The system operates under the steady-state conditions that is with a net gain or loss of mass or energy so that the expenditure is balanced by the intake meeting the demand by the supply. Too little intake leads to hunger and starvation, too much of it will result into obesity and other related disorders. Food and feeding, seems to be very simple and straight forward phenomena are indeed very complex and subjects of scientific studies invoice disciplines such as biology, biochemistry, medicine, nutrition, and psychology [2].

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Material and Method

Food nutrients when consumed in adequate amounts fulfill various functions of the body. The nutrients present in the foods may be classified into the following six broad categories

1. Carbohydrates
2. Proteins
3. Lipids (fats and oils)
4. Vitamins
5. Minerals
6. Water

The human body requires 17 vitamins and 24 mineral elements; it contains about 54% 62% water. 15% to 17% proteins, 14% to 25% fat, 5% to 6% mineral matte, and about 1% carbohydrates. Though

carbohydrates, broad groups of food nutrients, represent the smallest proportion in the human body (about 1%), they make up the bulk of our diet and constitute the chief source of energy (about 70%). Carbohydrates are burned in animal cells (biological) respirations using oxygen to produce energy. They help in the utilization of proteins and fats for more complex functions than production of energy. The carbohydrates consumed in excess of the body's needs are convened into fats (and glycogen) to be used when needed. Starches and sugars are the main sources of carbohydrates in our diet and are obtained from cereal grains such as wheat, rice, corn, sorghum, and millet as well as from tubers such as potato, sweet potato, and cassava. Sugarcane, beets and fruits provide sugars and sweetness to the diet.

Proteins are the major source of building material for the body and play an important role as structural constituents of the cellular membranes. Proteins function in the maintenance and repair of wont tissues. Enzymes, which are primarily proteins, are biological catalysts necessary for various biochemical reactions. The food value and quality of proteins is determined by the nature and amount of amino acids (essential amino acids). Proteins, if necessary, may he used to produce energy.

Body Composition

The weight of the human body increases about 20-fold during its growth and development from baby to adult. Barring the oxygen inhaled from the respired air, all the remaining mass enters the body through food and water, in addition to the material gained during intrauterine growth from the mother's diet. Thus, the human or animal body is literally what is consumed in the form of food or drinks that is one is what one eats.

Table 1: Composition of Human Body (%)

Nutrients	Man	Woman
Water	60-62	54
Protein	17	15
Fat	14	25
Minerals	6	5
Carbohydrates	1	1
Vitamins	Trace	Trace

Body Fat

Based on the assumption that the fat and the fat free tissues of the body have a fairly constant composition, efforts have been made to measure the energy stores of the individual indirectly through in vivo methods of determining fat and fat-free mass. Manay et al. [3] employed body specific gravity (density) as an index of obesity. Gamow [4] et al. also measured the density of human tissues. The excess weight of Football players may be due to their extra muscle and not fat; the latter tend to lower the body density. Human fat at body temperature has a density of 0.900g/cm and that of a-fat-free tissue is around 1.100g/cm. Thus, a person having body weight as fat will have an average body density of 1.00. Any mixture of fat and lean tissue will calculate the fat percentage of a body with an average density. Garrow et al. [6]. pointed out that very fatty or severely malnourished persons, the hydration of the fat-free body is altered, which may cause a small error m the estimation of body fat from density [5]. It is rather difficult to estimate accurately the volume of

Table 2: Composition of Human Body and Fat-Free Tissue as Influenced by Growth. Malnutrition and Obesity

Components	Fetus (20-25 wk)	Prematurebaby	Full-termbaby	Infant (1 year)	Adult man	Malnutrition infant	Object
Body weight (kg)	0.3	1.5	3.5	20	70	5	110
Water %	88	83	69	62	60	74	47
Protein %	9.5	11.5	12	14	17	14	13
Fat %	0.5	3.5	16	20	17	10	35
Remainder %	2.0	2.0	3	4	6	2	5
Fat-free weight (kg)	0.30	1.45	2.94	8	58	4.5	65
Water %	88	85	82	76	72	82	79
Protein %	9.4	11.9	14.4	18	21	15	21
Na (mmol/kg)	100	100	82	81	80	88	82
K (mmol/kg)	43	50	53	60	66	48	82
Ca (g/kg)	4.2	7.0	9.6	14.5	22.4	9.0	64
Mg (g/kg)	0.18	0.24	0.26	3.5	0.5	0.25	0.5
P (g/kg)	3.0	3.8	5.6	9.0	12.0	5.0	12.0

Age (years)	(g/kg) Water	Protein (g/kg)	Remainder (g/kg)	Potassium (mmol/kg)	K:N Ratio (mmol/kg)
Far free whole bodies					
25	728	195	77	71.5	2.29
35	775	165	60	--	--
42	733	192	75	73.0	2.35
46	674	234	92	66.5	1.78
48	7.30	206	64	--	--
60	704	238	58	66.0	1.75
Mean	725	205	71	69.0	2.05
Selected organs					
Skin	694	300	6	23.7	0.45
Heart	827	143	30	66.5	2.90
Liver	711	176	113	75.0	2.66
Kidneys	810	153	37	57.0	2.33
Brain	774	107	119	84.6	4.86
Muscle	792	192	16	91.2	2.99

the tissues of a living person. This is often done by submerging the subject in water and measuring the volume of water displaced or the apparent weight loss. a tank with a plastic cover in which the subject stands up to the neck in water, and the volume of air remaining under the cover is measured, by k1nowing the volume of water and of the whole tank, the volume of the subject can be calculated.

Water and protein Content. Potassium and potassium normality ratios (K:N) of the Fat-Free Bodies or Different Age and some Organs.

Body Potassium, Calcium, and Nitrogen

Potassium is labelled with the natural radioactive isotope [40] K, each gram of potassium emending about three gamma rays of high energy (1.46 MeV) each second.

Total body potassium can be estimated by detecting the gamma rays by suitable equipment. Having estimated total body potassium (TBK.), the fat free body mass (FFM) (kg) can be calculated for women and men from formulas, FFM TBK/60 and FFM=TBK/66 respectively, assuming that fat-free tissue of women and men tams 60 and 66 mmol K/g, respectively (1g K = 25.6 mmol).

Garrow [5] described a technique of neutron activation to estimate body Ca or N along with K. The subject is irradiated with a beam of fast neutrons whose energy is captured by the body, same of which become short-lived radioactive isotopes, notably [43] Ca and [15] N, emitting, radiation at characteristic energy bands.

Source of Food

In prehistoric time, humans lived as hunters and gatherers, obtaining their food from wild animal and plants. They expended on fruits, nuts, roots, and other plants foods as well as meat from animals and fish from seas and rivers gradually, humans learned to domesticate plants and animals to provide food. Plant domestication began in China around 10.000 B.C, followed by India, the eastern Mediterranean region, and Africa. Wheat and barley were among the first crops grown from the wild grasses, simultaneously. Livestock such as cows, sheep, and goats were domesticated, milk probably being the first animal product used as food. Small farming communities developed around the river basins, followed by the development of agricultural skills and resulting supply of sufficient food, its preservation, storage, and processing leading to the emergence of urban civilization on and bigger cities.

Food, Diet, Health, and Aging

Food, diet and nutritional factors have been known to influence host susceptibility, immune infections, and other defensive measures against several infection diseases. A complex interrelationship has been envisioned between infection and immune function [9]. Nutrias depletion weakened the host defense are being recognized as expected sequel of acute infections disorders, and conversely the presence or development of an infectious process is around pated in patients with malnutrition, both before and during nutritional rehabilitation.

Discussion

Well balanced diet is important to ensure that the joints receive a good supply of nutrients that actively sustain the cartilage and bones. It is particularly good for both the cartilage and the bones if your diet is rich in vitamin C, D, K and calcium. Vitamin C contributes to normal collagen formation for the normal functioning of the cartilage and bone. And calcium is required for the maintenance of the normal bones. Vitamin D and K and also Zinc and Manganese contribute to the maintenance of the normal bones.

Certain cartilage constituents are especially important; these are glucosamine sulphate, chondroitin sulphate, hyaluronic acid and collagen. They are found in the normal cartilages and tissue and in the joint fluids and are closely connected with each other in the cartilage metabolism.

Glucosamine is an amino sugar which is found in the body in hyaluronic acid for instance the important constituents of the cartilage matrix also includes chondroitin sulphate. The joint fluid contains a particularly large amount of haul.

Conclusion

Body nutrients like lipids, carbohydrates, proteins, vitamins, and minerals are essential for muscle and joints. In joints most of the bones and cartilages are being run up by vitamin C and D as well. Calcium plays an important role for normal functioning of cartilages and bones.

Bones, joints and muscles make up our muscular skeletal system. All these tissues allow for movement and sport, and active life style and also maintain our body posture. It keeps our bones, joints and muscles healthy. An upright posture, walking, standing, gripping and much more would not be possible without cartilages. Together they make our body's movement system which has to cope with a huge range of different responsibilities and enables us to move about easily.

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