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Underpinnings

Nutrition, Normal and Therapeutic, for Health and Longevity

Sheel Sharma[1] and Deepika Dhawan[2]

Department of Food Science & Nutrition

Bansthali Vidyapith, Rajasthan

Abstract

Life and nourishment are inextricably linked. Human beings need to lead an eat-to-live life, with balanced diet ensuring optimum physiological functioning, health and longevity. In today's time of knowledge era, food awareness becomes indispensable. The function that nutrients performs in providing energy, growth and maintenance and the role normal and therapeutic diets play to promote health and quell disease is immense. These alphabets of Nutrition are a 'must to know' for people making healthy food choices.

Keywords

Nutrition, Food, Nutrients

1. Eat to Live Dictum

An urge to eat almost anything one manages to get into one's mouth is the instinctive reaction to hunger as it is present at birth. It is only later experience of life that makes one distinguish food from inedible material. That is why in ancient times, even before the dawn of civilization, human beings believed in 'live to eat' or 'eat to live' notions, because probably, these were the first and fundamental lessons they could learn from the experience of existence and survival. It was Socrates, the great Greek philosopher of olden times, who put the matter in correct perspective by stating, "Other people live to eat while I eat to live". Obviously, he wanted every human being to eat only to live. As time passed, with the advent of civilization, more facts about food and eating came to the limelight. Humans also acquired discretion and realized that one of the important determinants of quality life is the nature and content of food that they eat. Maharshi Charaka, the sage and physician of ancient times, emphatically observe "The body is the outcome of food; the distinction between ease and disease arising, totally or partially, due

to faulty food or diet"- thus laying down the bedrock of foods, nutrition and health relationship (Diamond, 2006; Nestle, 2013).

The term 'Food' is conventionally used while referring to the materials of solid or liquid nature which, when ingested, serve one or more functions of growth, maintenance and energy provision. Consuming foods appropriate in both content and kind, promotes nutrition and health (Whitney & Rolfes, 2018).

Nutrients are the components of food and drink that provide for growth, replacement and energy needs of the body. Not all components of food can qualify for this distinction, some of them, such as those providing flavour, colour or aroma; undoubtedly enhance our pleasure of eating food, yet they are not branded as nutrients. A nutrient. therefore, can be defined as the chemical substance or active principle present in food which acts as the nourishing material to ensure proper growth and maintenance. Chemically, nutrients are the different classes of molecules, atoms or ions, that are indispensable to the functioning of body. Components of food that do not serve any nourishing function are called non-nutrients. For example, the compound that gives garlic its pungent flavour, the pigments that give tomato its dark red colour are non-nutrients. There are a large number of such compounds present in various types of foodstuffs. Many of them act as health promoters and others prove toxic. For instance, lycopene present in tomato is a beneficial substance but a goitrogen present in cabbage is harmful, though these substances are present in the foodstuffs in very small amounts (Gropper et al., 2018).

Hence food is a complex mixture of nutrients and non- nutrients. Nutrients present in food have been classified into six groups- carbohydrate, protein, fat, water, vitamins and minerals. Whereas carbohydrate and fat primarily act as energy sources, proteins perform body building and maintenance functions. Together, these three are termed as macronutrients as they quantitatively comprise the bulk of our diet. Vitamins and minerals are present in the diet in much smaller amounts and thus they are called micronutrients. They are needed for the utilization of macronutrients as well as for some other essential functions of the body. Water is the solvent vehicle required for the processing and utilization of nutrients and thus acts not less than a nutrient. Human body is made up of nutrient materials arranged in different ways. Of late, dietary fibre, has also been included in the list of nutrients (Whitney et al., 2019).

Apart from nourishment, people also turn to food for comfort and pleasure; even for seeking cure for some ailments. Thus food means many things to people, and many cultural and social traditions have been attached to the preparing, serving, eating and sharing of food. Due to the interplay of these factors, some people can he omnivores, who eat foods of all kinds of both plant and animal origin including animal flesh, or they can be vegetarians who exclude from their diet animal flesh and possibly eggs, milk and cheese (Barr, 2003). Vegetarians can be of three types:

i. Lactovegetarians: Vegetarians who use milk and milk products in their diets
ii. Lacto-ovo-vegetarians: Vegetarians who use milk, milk products and also eggs in their diets.
iii. Vegans: Vegetarians who include no animal derived products, not even milk, cheese and other milk products (Mangels, 2006).

In general, the daily food choices of people are based on the following factors:

i. Personal preference: People like to eat those foodstuffs the most which they like.
ii. Habit: Familiar foods are eaten more than those that are less familiar.
iii. Tradition, values and beliefs: Foodstuffs of our ethnic group and those compatible with our cultural traditions and religious beliefs are preferred the most.
iv. Availability, convenience and economy: Foods that are there to readily choose from, easy to prepare and within our means, are eaten more than others.
v. Social pressure: Foods that are offered the most are eaten more frequently.
vi. Positive associations: Foods eaten by people admire, or the ones that imply status are preferentially partaken.
vii. Emotional needs: Foods that we think can make us feel better, become our choicest ones
viii. Nutritive value: As aware individuals, we tend to place preference on nourishing and health promoting foods (Drewnowski, 1997; Story & Stang, 2005; World Health Organization, 2019).

2. Food as Fuel for Human Body

To live, human body needs food as fuel, to supply energy for moving and doing work. The energy that fuels the body for doing work comes indirectly from the foods via plants. Plants trap and store energy of the sun in the tissues as they grow. Thus by eating plant based

foodstuffs such as grains, vegetables and fruits; we obtain and utilize the energy of sun, stored in various structural forms of foods by the plants. When animals cat plant based foodstuffs, they also obtain and utilize solar energy in way similar to that in humans. When we eat animal derived foodstuffs, such as milk and meat, we again obtain and utilise energy originally coming from the sun. As a matter fact, energy from the sun is first stored in the plants, then they are consumed by animals and the same energy stored plants is passed on to the animal tissues which eventually gets transferred to human beings through the consumption of milk and meat (Aloia & Mikhail, 2014; Simpson & Raubenheimer, 2012).

3. Nutrition as a Science

The study of how food nourishes the body is Nutrition. It's is a field of knowledge that consists of facts which scientist have obtained by systematically observing what people eat and evaluating how healthy they are. These facts have also been obtained and validated by experimentation to see the effects of various foods and diets on human health (Mahan & Raymond, 2017).

Because science is a step by step information gathering and testing process from finding after finding, the information thus collected is assembled to make the conceptual framework of a specific area of the scientific discipline of Nutrition, such as diet therapy or food analysis. To understand this, we take the analogy from the example of movie making. One single picture frame can make a movie. In fact, we need one picture frame after the other to make the characters of the movie make dance and fight. Exactly in the same vein, we need a trail of facts, one after the other, established through evidence, to create knowledge base and build up a scientific discipline such as Nutrition. Unlike other sciences, such as physics and chemistry Nutrition is a young science as most of the facts have come up as a consequence of research conducted in the last century after 1900. However, this science of Nutrition is an active growing and changing body of knowledge with new concepts and interpretations finding acceptance and recognition, some of them, even at the expense of earlier ones. It is only when a research finding stands upto rigorous, repeated testing in several kinds of experiments performed and validated by different research groups, it is finally considered confirmed (National Academies of Sciences, Engineering, and Medicine, 2019; Katz & Meller, 2014; Willett, 2019).

Frontiers of the science of Nutrition, therefore, extend from food analysis, selection, preparation; to its digestion, absorption, assimilation, nutrient requirements of the body, their metabolic functions and health implications, to under and over nourishment. Besides, nutrition also integrates itself with certain facets of health, biological, agriculture and social sciences and food processing, food technology and biotechnology. So it is but natural that this science incorporates those aspects of these disciplines which are relevant to its study (Table 1). Nutrition, therefore, has the distinction of transcending various scientific disciplines and hence is also termed as inter-disciplinary science in the true sense of the term (Farnworth & Mainville, 2008; Probst et al., 2019).

1. In food selection and preparation
2. In understanding metabolic functions of nutrients.
3. In application of nutritional principles to health and disease.
4. In understanding sociological impact of nutrition in communities.
5. In assessing nutritional implications of food processing and food technology.
6. In integration of nutrition and agriculture.

Table 1: Relevance of Nutrition

4. Foods and Nutrition in Social Context

Indispensability of diet for sustaining life is a cardinal fact. Since the evolution of human race on mother earth and throughout its sailing on the high, often stormy, seas of life, on the voyage of survival and development; food has been the focus of importance and attention. Communities or population groups in older times evolved their dietary preferences by the processes of "trial and error" and "natural selection'. However, the present era has witnessed a astonishing change on earth involving degradation of environment, widening of social and economic gulfs, resulting in lopsidedness in food availability and ensuing nourishment levels between the rich and poor (Kennedy, 2014).

A marked effect of such rapidly changing values has been that people became rebellious and less inclined in selecting foods on the basis of tradition and ethos. In turn, factors such as prosperity and availability of foods, dictated the food priorities and choices. Simultaneously, the biological and allied sciences, including Food Science and Nutrition, have taken rapid strides in terms of rapid flow of information and knowledge, applications of which could enrich quality of human life on earth (Popkin, 2001).

Of late, the science of Nutrition has been grappling with problems of finding the subtle relationships between different nutrient components of diet, health and disease. Simultaneously, it is also endeavouring hard to find scientific basis for food selection, cooking, processing and preservation. With the coming of new information and expertise, efforts are being made to solve problems concerning food scarcity and undernutrition (United Nations, 2020).

5. Proximate Principles of Food analysis

Based upon the abundance of a certain type of nutrients in foods, they are grouped into energy rich (carbohydrate and fat rich), body building (protein rich) and protective (vitamin, mineral and protein rich) foods (Mahan & Escott-Stump, 2008).

The total sum of different food combinations consumed over one single day by a person is referred to as his diet. A good diet supplies nutrients in requisite amounts, comprising a variety of foods. 'Nutrition", as a scientific discipline dealing with foods and their nourishing abilities, has come into being as a result of our realization that our well-being and quality of life are clearly influenced by the nature and amount of foods that we eat. Though nutrition can be defined in an array of ways, the most exhaustive of these definitions interprets Nutrition as the- 'science of foods, nutrients and other substances therein, their action. interaction and balance in relation to health and disease and the process by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances'. In addition, Nutrition also studies the social, economical, cultural and psychological implications of food and eating (Whitney & Rolfes, 2008; World Health Organization, 2003).

Thus food gives the sustenance and we eat to keep our bodies effectively functioning getting the necessary inputs for growth and maintenance of tissue components of the body from the diet. However, nutrients present in foods have to undergo mechanical and biochemical processing. in order to render themselves available for the functioning of the body. Nutrition is the science which studies subtleties of these processes and interprets the relationship between intake of foods and functioning of human organism on a rational basis (Academy of Nutrition and Dietetics, 2014).

6. Applying facts of Nutrition to Nourishment and Health

We eat food to satisfy hunger. We also enjoy tasty food and consider it to be an important part of social interaction and a means to satisfy our cultural, social, psychological and emotional patterns within the constraints of our setup or environment. We also need to eat right to lead healthy, happy and productive lives. Scientific evidence suggests that a lopsided or ill-balanced diet is a risk factor for the occurrence of major chronic diseases that become leading cause of adult death, namely coronary heart disease, stroke, hypertension, diabetes mellitus and certain types of cancers. It has also been said that much of the consequences of present day living are afflictions of affluence' or 'diseases of prosperity' and understanding and application of nutritional principles can offer enormous scope in terms of preventive and remedial actions (Bhargava, 2006; Krause & Mahan, 2017).

Nutritional principles can well be applied to therapeutic interventions for individuals down with illness. Diet therapy in the form of diets ranging from moderately modified in texture for being supportive and restorative to majorly altered to cure life threatening ailments by administration through external and parenteral routes, can make combat, manage and overpower diseases (Srilakshmi, 2017).

This becomes possible by the combined effort of nutritionists, medical scientists and physicians. An instance of the significance of diet therapy can be gauged from the fact that despite tremendous technology and biomedical developments of the present era, the means of survival and longevity for patients who suffer from inborn errors of metabolism is prudently modified diets (United Nations., 2021).

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