REGIONAL AND CULTURAL DIFFERENCES IN NUTRITION

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Summary

Nutrition has become an important global issue in relatively recent times, although local and regional nutrition problems existed for centuries as famines swept the land. To solve the nutritional problems of our present society, simple knowledge of nutrient

needs or dietary guidelines do not appear to be sufficient. A newer approach, dealing with differences in culture, social structure, and dietary behavior should be explored. The evolution of dietary culture throughout history gives us an insight into the function of nutrition to the development of society. The history of dietary culture, starting from the prehistoric age, is briefly discussed.

Discussion topics are divided into religious differences in food practices, differences in food habits of world regions, and differences in nutritional status worldwide.

Many religious practices contribute significantly to a society's adaptation to the environment. The religious restrictions placed on eating certain game animals protects endangered species and discourages hunters from expending energy on the animals that are most difficult to hunt. Many dietary laws define which plant and animal species are fit for human consumption, how they should be prepared ritually, and what food categories may be consumed.
Throughout the couple of million years of human history, global dwellers have found various ways to build up dietary cultures within the wide range of environmental surroundings and cultural patterns. To appreciate the differences in dietary culture and deal with existing nutritional problems, comparisons of world regional and cultural differences in nutrition are examined. Therefore, topics such as the significance of evolution of dietary culture, food habits of various regions of the world, religious differences in diets and regional differences in nutritional status are briefly discussed.

Current nutritional problems, either caused by scarcity or overabundance of food or from various beliefs, should be solved with great concern for the role of food in health, religious beliefs, and dietary diversity. In many countries, industrialization has brought about adverse changes in food consumption, and ultimately in the health of its citizens. The rapid transformation of dietary patterns needs special attention. It is important to analyze the direction of change and examine closely the nutritional consequences of this change.

There needs to be a new attempt to develop a perspective for better nutrition in the world. Priority should be given in the fields guaranteeing the wholesomeness of diet with the changes in the short-term and long-term food selection environment. To achieve the goal of good nutrition, each nation should develop a new set of dietary habits that can reflect its own individual diversity and cultural indigenous characteristics, and yet properly adapt to modern lifestyle.

1. Evolution of Dietary Culture

Nutrition has become an important global issue in relatively recent times, although local and regional problems have existed for centuries as famines swept the land. To solve the nutritional problems of our present society, simple knowledge of nutrient needs or dietary guidelines do not appear to be sufficient. A newer approach, dealing with differences in culture, social structure, and dietary behavior should be explored. The evolution of dietary culture throughout history gives us an insight into the function of nutrition through the development of society. Therefore, the history of dietary culture starting from prehistoric ages will be briefly discussed.

Since the first existence of human species, acquiring food has been a first priority. Throughout the history of the human race, the first means to have access to food was probably hunting and gathering. Later, agricultural systems were developed and these created epochal changes in dietary culture. The hunting and gathering system can be regarded as instant food searching rather than deliberate production of food. Later, from agricultural food production, the concept of economy and social structure were derived. The differences in dietary content may have helped to evolve the human race to a higher level of brain function. Among the various species, Hominids seemed to be closest to modern humans. Genetically *Homo habilis* or *Homo erectus* are closest to modern humans as judged by their brain size, body size, or resting metabolic rate. Their consumption of animal food and protein was higher than Australopithecus. It can be presumed that this kind of diet pattern may have some relation to higher brain activity.

1.5. Hunting and Gathering

For hunting larger or fast moving animals, early humans required relatively keen tools and much wisdom. At first they may have gathered plants or fruits and then developed further to capture relatively small animals (see *Historical Origins of Agriculture*). Hunting has been claimed to be the major contributor to sociological and physiological evolution of humans as stated at the 1966 Symposium on Man the Hunter at Chicago University. Hunting activity stimulated human's capabilities such as higher brain function and skills to make tools and to capture animals. Complicated communication and planning and the division of work between sexes would have been required for hunting. Therefore, it seems possible that not only physiological adaptation but also social functions such as verbal communication and the family system may have evolved from hunting activities.

The dietary patterns and nutritional status of people from this period can be extrapolated from hunter-gatherers living today. The overall nutritional quality of the food these people eat seems quite appropriate. The predicted daily intake of energy, in animal food and plant food is 3000 kcal, 800 gr and 1450 gr, respectively. Nutrient analysis showed that the fat content of wild game averages one-seventh that of domesticated meat (fat content of 4 g / 100 g versus 29 g / 100 g meat). There is about five times more polyunsaturated fat in free game animals compared with the fat of supermarket meat. Much less intake of sodium can be noticed. The daily total sodium intake of hunter-gathers was tabulated to be about 700 mg, which is much less than today's average consumption of 2300 mg to 6900 mg. The average daily intakes of potassium and fiber appeared to be higher compared with modern people. A high level of fiber intake (150 g per day) in comparison with 20 g for modern people exhibits another type of nutritional adequacy. It also has been presumed that micronutrient deficiencies, especially vitamin and iodine deficiencies, were rare because the foodstuff they collected were quite versatile ranging from animal to plant origin.

1.6. The Era of Agricultural Food Production

There are several causes for the transition from the hunter-gatherer period to agricultural age. If life in the hunter-gatherer period was successful and ecologically adaptable, why then would humans change their lifestyle? In addition to the social viewpoints of

encountering restrictions in the evolutionary stage or of the necessity of forming larger communities or of cultural changes in meal composition, a geographical reason could be a major one. About 14 000 years ago, relatively recent on the entire geological time scale, there was a drastic change in climate at the end of the glacial age. The appearance of tundra, where grassland gave way to forest, may have made hunting and gathering difficult (see *Forests and Grasslands as Cradles for Agriculture*). This climate and environmental change spiked the transit into the agricultural age approximately 9000 years ago to 12 000 years ago. Initially, agricultural practices started from the warm areas and spread out to the temperate regions (see *Historical Origins of Agriculture*).

Rather definite dates for the appearance of agricultural production were 10 000 years ago for Palestine and Asia and about 8000 years ago for Central and South America. The use of more complicated tools such as plows (see *Food Agriculture and the Use of Natural Resources*) or the advanced supply of water such as irrigation systems started about 4000 years ago. The major crops and vegetables cultivated in the Fertile Crescents of Asia were wheat, barley, various legumes, grapes, watermelons, melons, dates, almonds, and from the Mediterranean coasts olives, grapes, figs, and many kinds of grains were harvested. West Africa was planting yams, palm trees, and other tropical plants and from the eastern part of Africa millet and sorghum were grown. In East and South Asia, many kinds of wild plants were domesticated—taro, yams, breadfruits, sago palms, coconuts, and bananas. The estimated actual date of the start of rice plantations is not clear. Some scholars suggest 2000 years ago, but there is evidence that it may have started around 5000 years ago. However, it is unclear as to the period rice became a staple food in Asia. In Central America, corn, beans, squash, and tomatoes were grown. White potatoes were first cultivated in the Andean Mountains, and manioc and sweet potatoes originated from the basin areas of the Amazon River. These crops became staple foods in regions far from origin.

Lactating animals, as a result of domestication, have undergone great changes. The size of animals decreased greatly, and the body composition has been altered to have more subcutaneous fat and intermuscular fat. The ratio of brain to body has decreased, and the acuity of sense organs has decreased. Domesticated animals have a juvenile appearance compared with the wild ones. The domestication of goats was aboutaround 9000 years ago, and that of dogs dates earlier at 12 000 years ago. In West Asia, swine raising started about 8000 years ago. Equine domestication started from 6000 years ago in Central Asia, donkeys in Arabia and North Africa, and chicken 4000 years ago in South Asia, and turkeys were domesticated 1500 years ago in North America (see *Animal Husbandry, Nomadic Breeding, and Domestication of Animals*).

The nutrition of people in horticultural societies appeared to be inferior to that of hunters and gatherers (see *Ethnographic Aspects of Human Nutrition*). The farmers were burdened by onerous and protracted workloads, and labor became excessive to grow surplus food, in many cases, to pay debts. The concept of work was probably first introduced from this agricultural period. The food choice became narrower for this period than in the previous one. People were drawn into eating an affordable high carbohydrate diet and hence a low-protein diet. The nutritional quality of a meal decreased and thus the problems of malnutrition, contagious diseases, and parasitic

infections were common to those people who consumed inadequate diets. Dental cavities became known for the first time in history.

Population increase started with the appearance of agricultural society. The population density rose from about 1 per km^2 to about 34 per km^2. The urban explosion started as a result of the settlement of Mesopotamia 5000 to 6000 years ago. This coincided with the establishment of the first cities.

1.7. The Middle Ages—Agriculture and Dietary Habits

The revolution of the means to acquire food by agriculture has brought a great change in world population. During the Middle Ages, AD1100 to AD1350 and AD1450 to AD1650 were marked with large increases in population. The population density of ancient civilization areas was 9.57 per km^2 to 24.8 per km^2 between AD1300 and AD1800. The average population densities in AD1600 were 17.2 per km^2 in Italy, 15.6 per km^2 in The Netherlands, 13.3 per km^2 in France, 11 per km^2 in Germany, 6.6 per km^2 in Siberia, 5.5 per km^2 in Prussia of Poland, 0.6 per km^2 in Sweden, Norway, and Finland, and 7.8 per km^2 in China. In the Middle Ages, people were mainly dependent on plant food.

Large parts of Europe, the American continents before the discovery of Columbus, Africa, and Asia consumed diets that consisted of mainly plants and few meats. In Asia, rice became the staple diet and the production of rice per km^2 was greater than wheat. Therefore, there was an increase in population faster than in any other region. Animal food intake was restricted mainly to the upper class in Europe from the fifteenth century to the eighteenth century, and the type of food consumed was one of the determinants of social and cultural status. In AD1000 in China, the officials who could afford meat were considered to be higher class. In Asia, white rice was for the upper class only, and likewise in Europe refined bread was for the upper class, while the lower class had to eat coarse bread. The average energy intake of the upper class in Europe was about 3500 to 4000 kcal per day. The average energy intake of sailors in Spanish Ships of the Middle Ages was 3500 kcal whereas that of commoners in France was only 2000 kcal. The average amount of carbohydrate in European meals was 58% of total energy.

1.8. The Industrial Revolution and Dietary Habits

Industrialization along with the advancement of agriculture strongly affected the dietary life of people. The following developments of agricultural techniques and food processing methods have emerged.

1. More efficient ways to cultivate crops were developed. For example, planting different products in the same soil, or revitalization of soil by skipping cultivation for a certain period of time, or the use of various fertilizers were applied. In the Tokugawa period of Japan fermented sardines and human feces were used as sources of fertilizer.
2. The use of pesticides and herbicides became universal. The initial attempt to develop pesticides came from 1845 Irish famine from the failure of potato crops due to fungus disease.

3. Advancement in storage and distribution of food were accomplished. The development of mechanical techniques along with transportation accelerated changes in food distribution.
4. The storage of food produced on a large scale became possible. The primary method was drying. Later salt preservation and fermentation were developed.
5. Dramatic changes in food processing occurred. The first idea came from Nicholas Appert in 1809 who preserved food in vacuum glass bottles. Later, canning in tin-lined containers was introduced by Bryan Donkin in 1812 for delivering military supplies to Napoleon's Army. Ice preservation existed from early periods, but the making of ice with machines became available in 1830.

The commercialization of food products became a great commercial resource since the Industrial Revolution. The abundance of food production and processing affects the economy greatly in modern days.

In the past it took a considerable time to establish the connection between disease and nutrition. People believed disease occurred from the power of a supernatural being. Even until the nineteenth century this belief was prevalent. For example, the recurrent epidemics of bubonic plague that swept Europe during the Middle Ages were believed to be the work of the devil. With scientific progress, many diseases were understood and treated. In the sixteenth and seventeenth centuries, nutritional deficiency diseases such as scurvy resulted in the massive death of sailors. The discovery of vitamins made it possible to control many nutritional deficiencies.

Nowadays, the shift of large numbers of the population toward affluence, accompanied by technological development and economic progress, has brought about the prevalence of degenerative diseases (see *Nutrition and Human Life Stages*). The direction of health management has been focused on curing existing diseases. Therefore, extensive analysis of disease cause was emphasized and concentrated efforts were placed upon the elimination of those causes. However, this kind of approach can be effective in controlling contagious diseases or nutrient deficiency diseases. Slowly we are moving toward prevention of disease. Clearly, nutrition plays an important role in the management of health (see *Adequate Diet of Essential Nutrients for Healthy People*). Today many diseases are linked to lifestyle patterns of nutrition, smoking, lack of exercise, and other habits (see *Malnutrition: Hunger and Satiety, Obesity and Anorexia*). However, due to the complexity in dealing with modern health problems, simple advice such as increase intake of fruits and vegetables seems not sufficient for curing degenerative diseases. It is the time to present a more holistic concept in the management of health through nutrition taking into consideration regional tradition, culture, and ecology.

Culture plays an important role in determining behavior toward food and its out nutritional consequences. Culture means "learned way of life shared by the members of a society, consisting of the totality of tools, techniques, social institutions, attitudes, beliefs, motivations, and systems of values known to the group." Since culture is comprised of norms, beliefs, values, and broader conceptions about life, it is not directly observable. Culture is expressed in the behavior of people and the tools they use. Through observation, it is possible to uncover the traditions that guide an individual's

behavior. Groups choose cultural traits that are compatible with other traits comprising the cultural whole. When the societies undergo rapid change, there are many controversies in cultural practice. Culture, while a powerful conceptual tool, cannot explain all of the interesting diversity in human dietary practices today. However, the overall evaluation of regional and cultural differences in nutrition gives some idea where we are now, and where we should be heading to ensure sound nutritional practice. Discussion topics are divided into religious differences in food practices, differences in food habits of world regions, and differences in nutritional status worldwide.

2. Food and Religion

Religion is a system of beliefs that is expressed mostly through rituals and symbols and that are concerned with the supernatural. Food is an important part of religious symbols, customs, and rituals because food is used to communicate with God, to demonstrate faith through acceptance of divine directives concerning diet, and to develop discipline through fasting. Unlike food taboos for certain periods in a life cycle, religion is involved in permanent food prohibitions and prescriptions.

Religious dietary restrictions include what foods may and may not be eaten; when to eat; how to prepare food; and when and how long to fast. The ecological function of restriction and food taboos should be explored in depth. Even though some of the practices may lead to nutritional aggravation, religious ritual practices of food can offer some of the beneficial psychological effects of nutrition such as getting comfort from identity, unity, or security of food supply. The most prevalent religions are Christianity, Islam, and Judaism in the West and Buddhism and Hinduism in the East. This section will briefly discuss major dietary practices of the world's major religions and sects.

2.1. Western Religions

2.1.3. Christianity

Christianity is regarded as the most widely spread of the world's religions. It has the greatest number of adherents. The three dominant Christian branches are Roman Catholicism, Eastern Orthodox, and Protestantism.

The US Catholic Conference abolished most dietary restrictions in 1966. However, many Catholics are still required to abstain from eating meat on Fridays during Lent, in remembrance of the sacrificial death of Christ, and to fast and abstain on Ash Wednesday and Good Friday. Catholics are required to avoid liquids (except water) and food one hour before receiving communion. For Catholics, the most important feast days are Christmas (the birth of Christ) and Easter (the resurrection of Christ after the crucifixion). Holiday fare depends on the country. For example, French have buche de Noel (a rich cake in the shape of a Yule log) for Christmas dessert, while Italians have panettone (a fruited sweet bread).

The Eastern Orthodox Church is as old as the Roman Catholic branch of Christianity. There are 14 self-governing Eastern Orthodox churches, for instance, Constantinople,

Alexandria (the Egyptian Coptic Church), Antioch, Jerusalem dating from the Byzantine Empire; Russian, Rumanian, Yugoslavian, Bulgarian, Greek, and Georgian national churches; and three minority churches in other countries. In Eastern Orthodox churches, leavened bread is used for communion, the clergy are allowed to marry before entering the priesthood, and the authority of the Roman Pope is not recognized.

Dietary practices of the Eastern Orthodox include fasting on every Wednesday and Friday, and in other specific periods such as Advent and Lent. Fasting means avoiding certain foods, but not all foods. All meat and animal products, including milk and milk products and fish are avoided on days of fasting. Easter is the most important holiday in the Eastern Orthodox Churches. Specific culture and nationality play a part in the role determining specific feast days.

In Protestantism, there is little emphasis on fasting and holy days except for Christmas and Easter (the primary holidays celebrated by the Protestants). The choice of food items served in these holidays is considerably different, depending upon family ethnicity and preference. Otherwise, most protestant groups have not dietary laws.

A few of the Protestant denominations such as the Mormons and the Seventh-Day Adventists have dietary practices integral to their faith. For example, the Mormon laws of health deal with dietary practices. They do not use tobacco, strong drink, or hot drinks. Many Mormons do not take tea, coffee, alcohol, or tobacco products. Seventh-Day Adventists exercise the Christian belief that the human body is the temple of the Holy Spirit, hence, one should preserve health by eating the right kinds of foods in moderation and by getting enough rest and exercise. Overeating is discouraged. Many Adventists are lacto-ovo-vegetarian (eating milk products and eggs, but not meat). Some do consume meat, although they avoid pork and shellfish. They use nuts and beans instead of meat, vegetable oil rather than animal fat, and whole grains in breads. Like Mormons, the Adventists do not use tea, coffee, alcohol, or tobacco products. Water is considered the best liquid and should be consumed only before and after the meal, not during the meal. Eating between meals is discouraged so that food can be properly digested. Meals are not highly seasoned.

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