CHAPTER 6

The dietary practices and food-related rituals in Indian tradition and their role in health and nutrition

Jamuna Prakash
Ambassador for India, Global Harmonisation Initiative, Vienna, Austria

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6.1 Introduction

Indian civilization is one of the oldest civilizations found on earth and can be traced back to nearly 10,000 years with documentary evidence in support of its vibrant tradition and culture. Among the various South Asian cultures, India stands different due to a diverse dietary pattern and existence of vegetarianism. The present-day Indian food patterns evolved over thousands of years following the paleolithic ages of using stone tools for killing animals, use of fire for cooking, agriculture, domesticating animals, and fabricating metal weapons and artifacts for various purposes as in other parts of the world. Documentary evidence in the form of ancient scriptures, cave paintings, and excavated artifacts give us information regarding the various types of foods available, trading, cooking methods, distribution among people, foods to be offered to

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Gods, etc. (Achaya, 1994; Narasinga Rao, 2005). Dietary practices and food culture were intricately woven into the fabric of religion to ensure compliance. Food was given prominence in every celebration and was an integral part of many rituals and customs. Offering water and food to God and guests was a rich tradition that continued even today. Vegetarianism has been very unique to Indian culture as well as many beliefs of food avoidances and recommendations for special conditions such as infancy, pregnancy, lactation, and sickness signifying that these were recognized as vulnerable periods requiring extra care. Dietary diversification advocated by modern scientists to make the diet nutritionally richer was being practiced fervently and still continues. The very ritual of eating had many do's and don'ts designed to follow optimum hygiene during food preparation and serving. This chapter discusses some of these aspects of Indian traditional dietary practices in the light of health and nutrition.

6.2 Dietary practices

6.2.1 Vegetarianism

The concept of vegetarianism seems to have originated from India with strong followers in different communities. From earlier evidence, it is clear that during the Harappan civilization and Vedic period meat-eating was practiced and it is only later that meat-eating was looked down upon. In earlier documents, at least 50 different animals have been referred to which were used for sacrifice and there is also a mention of domestic rearing of cattle. There are specific instructions for the slaughtering of animals, distribution of meat, and cooking of meat (Auboyer, 1965, Raychaudhari, 1964, Iyengar, 1912, Kosambi, 1975, Ghurye, 1979). In fact, as stated in the "Ramayana" (an old religious epic), rice cooked with deer meat and spices was the favorite food of Sita (wife of Lord Rama, the legendary King of Ayodhya) (Ghosh, 1976). There may have been two reasons for the emergence of vegetarianism. The early Aryan started questioning the "taking of life" or "killing" for humanitarian reasons. With the spread of Buddhism and Jainism, which advocated nonviolence in any form, these beliefs became stronger and were adopted by the royalties (Horner, 1945). Another reason could have been an abundance of food grains due to planned agriculture and settled civilizations making meat a nonessential item of the meal. Both Harappan and Indus valley civilizations provide adequate evidence for the storage of grains that nearly eliminated the essentiality of meat for everyday diets as recorded by Achaya in his beautiful treatise on the history of Indian foods (Achaya, 1994).

At present, a significant Indian population follows vegetarianism, though the consumption of animal foods is gradually increasing. Vegetarians can either be lacto-vegetarians (consuming dairy products and plant foods) or lacto-ovo-vegetarians (consuming dairy products, eggs, and plant foods). Nearly 29% of the population is lacto-vegetarian, while the rest consume animal foods, though with restrictions (SRS, 2014). In a very

strict sense, even among nonvegetarians, the amount eaten may be small or infrequent due to prohibitive cost and self-imposed restrictions on account of religious beliefs. On certain days of the week or certain calendar days, meat foods are not allowed. Plant foods are by far much cheaper and affordable.

Vegetarianism can be associated with two distinct positive influences, one on health and the other, on the environment. The potential health benefits of vegetarian diets and a reduction of risk for many chronic degenerative diseases and total mortality have been documented in many studies during the last three decades (ADA, 2009). A systemic review by McEvoy et al. (2012) brings out the pros and cons of vegetarian diets concluding that vegetarians by far have lower rates of obesity, cardiovascular diseases, and lower lipid levels. A well-balanced diet should take care of possible vitamin deficiencies. Vegetarians have a much larger variety of foods to choose from and diets are varied. Generally, Indian traditional diets are a combination of cereals, pulses, vegetables, dairy foods, and nuts.

The food system is responsible for more than a quarter of all greenhouse gas emissions, while unhealthy diets and high body weight are among the greatest contributors to premature mortality. Industrialized agriculture and mass animal production is associated with various negative influences on the environment and health. Vegetarian diets protect the environment, reduce pollution, and minimize global climate changes (Leitzman, 2003). Springmann et al. (2016) in their analysis of health and climate change cobenefits of global dietary changes for major regions of the world report that as the fraction of animal-sourced foods in our diets is lowered, higher benefits are gained. Transitioning toward more plant-based diets that are in line with standard dietary guidelines could reduce global mortality by 6%–10% and food-related greenhouse gas emissions by 29%–70% by 2050 amounting to an estimated economic benefit of 1–31 trillion US dollars. The water footprints of producing animal meat are also very high and can become a major concern in the future. For example, the water needed to grow 1 kg of food in liters is around 3400 for rice, 1600 for maize, 1300 for bread (wheat) in comparison to beef requiring 15,500, chicken 3900, and pork 4800 L. Vegetables need much lesser: tomato, 180, potato, 250, and cabbage, 200 L per kg. Coarse grains (which were being used traditionally in India) require only one-fourth of water required by rice and wheat for production. Hence, overall, vegetarian diets impose less water stress on the environment (Chapagain and Hoekstra, 2004; Hoestra, 2008).

6.2.2 Recognizing food for their health-promoting properties

Indian culture also offers certain beliefs regarding food, which were handed down from generation to generation. Foods were associated with many medicinal properties, and at times used for curing a disease. For example, foods are classified as having digestive properties, for immune functions, to support growth and development, for

energy, for cognitive performances, etc. A detailed description of dietary advice for different disease conditions is also available (Ksemasarma, 2009). Another notable belief was regarding "hot" and "cold" foods. This seems to have been developed during Indo-Aryans and was integrated with the theory of ill-health through a humoral imbalance. This belief seems to have made its way around the world in the course of time. It was deeply entrenched in patterns of seasons, temperature, and geographical locations. Thus a "hot" food of one region may be considered as "cold" of another. Although scientific evidence of such beliefs is lacking, these had a basis of observational concept and a systematic investigation could tell us of their veracity. Another food belief revolves around the foods avoided during vulnerable conditions such as pregnancy, lactation, and sickness. In rural Karnataka, a state in Southern India, the foods avoided during pregnancy are papaya, drumstick leaves, and egg. During lactation, there are a number of foods that are prohibited such as cowpea, potato, brinjal, pumpkin, cold fruits (banana, guava), jackfruit, and papaya. These are linked to the health of newborns. Although there is no scientific basis at present for the avoidance of these foods, the beliefs could have stemmed from certain food allergies or body adaptation to new food in individual cases.

A document written during the 17th century compiling all the available knowledge on therapeutic properties of various foods, as well as the method of preparing dishes from different sources, is a valuable source of knowledge and beliefs pervading at that time and also serves as an authentic source of information (Raghunathsuri, 2012). For example, general therapeutic properties of milk are described as conducive, tasty, unctuous, alleviates "vata" and "pitta" (humoral imbalances as described in Ayurveda, the ancient medical science of India; good for complexion, intellect, growth and nourishment; can be used as an aphrodisiac; is heavy to digest, confers strength, cures tiredness, giddiness, cough, dyspnea and hunger. This is followed by a description of the properties of milk obtained from different animals such as sheep, goat, elephant, camel, and donkey. Further, it also elaborates on how the properties of cow's milk would differ depending on the color of the cow, time of consumption, mode of consumption, time of parturition, etc. Modern science is yet to understand these; however, the compositional differences in milk based on the time of parturition is well known. Recent research also shows that depending upon species of cow, the properties of milk differ as is the case with so-called A1 and A2 milk originating from different species of a cow with different protein structures and the consequent effect on health (Boro et al., 2016).

6.2.3 Dietary diversification

Dietary diversification is considered as a food-based approach to treat malnutrition (Frison et al., 2006). This was being practiced by incorporating a variety of food in the diet. The traditional diet pattern depended on the availability of food, following

the cycles of seasons and limited to geographical locations. Man was forced to eat whatever was available, so diets were diversified. The dietary diversity in India is symbolized by significant regional differences in diet patterns. Although the basic structure of diet may remain similar, comprising cereals, pulses, vegetables, milk products, and animal foods, the type of cereals or legume used, the methods of cooking, and the spice combinations vary greatly among regions. However, all diets contribute to a healthy proportion of carbohydrates, proteins, and fats. In the coastal region, we observe a dominance of seafood. India is blessed with nearly 8000 km of the sea coast, where the staple foods are mostly rice and fish, fish being an important source of protein. Legumes or beans are used in lesser quantities. Coastal areas of Kerala, Karnataka, and Tamil Nadu use coconut in cooking abundantly. As we move inland, there are mixtures of cereals and millets used with varieties of legumes. Among cereals, rice, finger millet, and sorghum predominate in Southern states while wheat is the staple in Northern states. Pearl millet is used as a staple in Western India. Vegetables are used depending upon the type grown in local areas. The type of oil used traditionally also differed considerably. The state of Kerala predominantly used coconut oil (which is still common), while Tamil Nadu used gingelly oil. Groundnut oil was used more in Karnataka, Andhra Pradesh, and Gujarat, while Eastern states used mustard oil. The traditionally used oils are now being replaced with other new arrivals such as sunflower, palm, and rice bran oil.

From the nutritional point of view, the diversity of foods has been a significant feature of traditional dietary patterns. For instance, in rural Karnataka, the practice of eating locally available mixed green leafy vegetables that grow naturally in fields with other crops is very common. They are the best examples of dietary diversification not only because of their nutritive value but also because of many health-promoting properties, which have been documented in the literature (Wealth of India, 1992). Nutritional analysis of these green leafy vegetables revealed that, in general, they were rich sources of many nutrients, some being exceptionally rich in iron (*Celosia argentea*, *Centella asiatica*, *Amaranthus tricolor*, and *Digera arvensis*), calcium (*D. arvensis*, *Boerhaavia diffusa*, *Cucurbita maxima*, and *A. tricolor*), magnesium and zinc (*C. asiatica*), and copper (*Delonix elata*, *C. asiatica*, *B. diffusa*, and *Cocculus hirsutus*). These were also very rich sources of total and β-carotene as other conventional greens (Gupta et al., 2005; 2006).

6.2.4 Foods in natural form

With advances in food technology, the amount of processed foods available has increased tremendously. Within an Indian context, this brought about a major change in the type of food eaten during the last 50 years. Although processing has its advantages, it also offers food in a refined form. For example, rice was primarily used in the unpolished form (hand-pounded every day for domestic consumption because of low

keeping quality) until about a century ago before the introduction of mechanized paddy hullers. This way, the inherent nutrition of rice grain, was being utilized in totality. Modern technology gave us white polished rice, which is easy to cook, but devoid of many essential nutrients (Gopalan et al., 1996). The separated rice bran is used for extraction of oil, the nutritional virtues of which are well documented (Orthoefer, 2005, Prasad et al., 2011). Refined oils are odorless, colorless with a long shelf life but are also devoid of many natural constituents extracted in crude oil. Roller milling of wheat is a technical marvel but removes the bran and germ, which are most nutritious parts of the grain (Oghbaei and Prakash, 2013, 2016). Processed foods are best when presented in natural form, that is, without removing any edible part of the food. The traditional meal patterns were healthier because of the inclusion of unrefined foods.

6.3 Food consumption patterns

6.3.1 Dietary patterns

Discovery of nutrients, their physiological functions, requirements, and deficiencies were the foundations of modern nutrition science. These were the basis of determining nutrient intakes and subsequently, for foods to be included in daily diets to obtain all the required nutrients. For Indians, the recommended dietary allowances (ICMR, 2010) and food composition database are also available (Gopalan et al., 1996; Longvah et al., 2017). On comparing the present-day recommendations of food intake and what is prescribed in the ancient text, it is evident that the amounts and kinds of food recommended in the ancient literature must have been based on very rightful observations and are similar to today's balanced diets. Notable is the fact that foods from all groups (cereals, pulses, fruits, vegetables, nuts, sugar, fats, and meat) were recommended. The *Arthashastra* of Kautilya recommended a gentleman's meal to be containing the following: pure unbroken rice—1 prastha (454 g), pulses—1/4 prastha (114 g), *ghee* (clarified butter) —1/6 prastha (77 g), and salt—1/64 prastha (7 g) (Shamashastry, 1967). Except for the higher amount of *ghee*, other recommendations are nutritionally comparable to present recommendations, guidelines for a desirable meal for a man (moderate physical work) suggest an intake of 450 g of cereals, 90 g of pulses, and 30 g of oil/ghee per day (NIN, 2011). A higher amount of ghee prescribed in older document could also be accepted on the fact that the physical activities would have been to a much higher extent allowing higher energy intakes, there was no other source of added fats in diets and foods were unrefined.

6.3.2 Food preparation protocols and etiquettes of eating

The womenfolk of the household were generally responsible for cooking and serving meals, a practice continued even today. The menfolk, elders, and children of the

home are served first followed by the women partaking the meal. A meal is always to be taken in a comfortable squatting position (sitting on the floor), which signifies a stress-free environment and consuming the right quantities of food as well as enjoying a meal. Meals are always eaten together emphasizing the family eating together and never in isolation.

There have been certain suggestions of the order of serving dishes in each culture. The sweets are served first or in between the meal followed by other foods. Scientifically, this practice is beneficial because of the sugar being washed off in the mouth with other food; hence, protection from dental caries. It is possible that consuming sugar, in the beginning, raises the blood glucose level quickly giving a feeling of satiety; hence, overeating could be avoided. The meals were to be ended with drinks (water or beverages) and chewing of betel leaves (a practice, which possibly aids in secretion and action of digestive enzymes) (Prabhu et al., 1995). The concept of hygiene and sanitation must have been very well understood, and strict adherence would conform to the standard of modern hazard analysis and critical control point. The person responsible for cooking was required to bathe and wear clean clothes. Only he/she handled entire cooking and serving, with nobody being allowed to touch them in the process or the food thereby limiting any contamination. The cooked food was not carried outside the cooking/dining area. The drinking water was stored in clean copper vessels after filtering making it virtually organism free. The meal had to be prepared afresh every day, and eating of stale foods was not permitted. These practices certainly would have protected the inmates of a home from any foodborne pathogenic organism.

6.4 Cultural influences

6.4.1 Religion

Many dietary practices such as fasting and feasting were routed through religion for better compliance and acceptance without questioning. Certain calendar days were designated as fast days, wherein, eating was totally prohibited or certain types of foods were permitted. These practices differed based on the religious sects, each one laying down specific rules to be followed (Sethi and Jain, 2008). This was one way to rest the digestive organs, lower calorie intake, lower lipid levels, and also to have control over one's mind and body. Feasting was associated with the preparation of special foods on festivals and occasions for celebrations such as weddings, childbirth, and other events. Specifically, sweets were prepared on such occasions; hence, this is another example of dietary diversity signifying the inclusion of foods with different compositions (particularly with high energy and fat density) but only occasionally to avoid excessive intakes. The ritual of offering food to God before eating ensured food quality in terms of using the best of the ingredients available in pure form, and food prepared under hygienic conditions. This, in turn, ensured that the quality of food was

maintained by everyone with no knowledge of quality parameters from a scientific point of view. In addition, as the food was prepared fresh every day for such a religious offering, there was no question of stored foods being used. This ensured no nutrient losses in foods due to storage and avoided intake of spoilt or contaminated foods.

6.4.2 Philosophy of life

Food was also a medium to understand the philosophy of life and brace human beings to face all situations in life. The new year as per the Hindu Lunar calendar is celebrated sometime during March/April in Southern Indian states with a mixture of jaggery (unrefined sugar), and neem flowers (*Azadirachta indica*) that are bitter in taste. This bitter + sweet mixture signifies good and bad or happy and sad events, which a person has to face in life on a continuous basis. For example, birth is a joyous occasion and death is a sad occasion, but we need to prepare for both events with equanimity. For every happy occasion, sweets are prepared and offered as human beings primarily like the sweet taste, and hence it enhances the pleasurable feeling. The festival of "*Sankranti*" celebrated during the months of January signifies new harvest season; hence, a nutrient-dense mixture of sesame seeds, jaggery, groundnuts, dry coconut, and chickpea is shared with everyone with a saying—"*Eat this sweet and let your tongue always have good words for everyone*." Hence food also becomes a driver of good behavior for harmonious living in society.

6.4.3 Harmony with nature

Since all food-related operations utilize natural resources, worshiping nature was integrated into agriculture and food preparation. This manifested as respecting and worshiping all objects, living or nonliving related to food operations. All sources of water, rivers, wells, ponds, lakes, etc. were highly respected and worshiped, and polluting them was a punishable offense. Trees were worshiped as providers of all utility items ranging from wood, fuel, and flowers to food items. Cattle used for agricultural operations such as bullocks were taken care of very well as farmers were dependent on them for their livelihood. Cows were worshiped and respected immensely because of their utility as providers of milk (which was recognized as the most nutritious food product and could be used in many ways). Even today certain rituals demand to worship objects of kitchen use such as pounding or grinding stone, the hearth, storage utensils for water, and pounding staff to express our gratefulness to them for fulfilling the basic need of food.

6.4.4 Concept of sharing and giving

Adequate food at every stage of life is a necessity. We are aware of the hungry populations around the world as well as the shortages or excesses of food. In traditional

Indian culture, the concept of sharing the food was very strongly advocated. Food must be given to every needy person who comes in search of food. No individual was supposed to be sent away without food from the doorstep. All guests were to be treated with the best of sumptuous food at all times of the day (Bajaj and Srinivas, 1996). This practice signified the sharing of food without expecting anything in return and ensured that nobody remained hungry.

6.5 Processed foods and tradition—preserving tradition in a modern context

During the last two decades, the Indian market has seen the entry of foods from other ethnic regions, specifically from Western, European, and Oriental cuisines. Some of these such as Chinese noodles, Manchurian, and Italian pasta are becoming household names and are popular street foods too. However, these are not a replacement for traditional foods but are only additions. Traditional foods routinely prepared in households have moved out to catering facilities and are also available as processed packaged products. Automation has been introduced successfully for many products cutting down on laborious time-consuming preparation processes. Technological upgradation has helped in modernizing the traditional food industry through automation and understanding science behind the tradition handed down from generations as skill. Understanding the principles of the science behind the manufacture of traditional foods has assisted in improving the quality and shelf life of the product. The research sector also paved the way for regulatory compliance.

To summarize, Indian traditional diets are definitely healthy, and vegetarian diets have their own benefits if chosen properly. A diversified diet provides many advantages, whereas an excess of processed refined foods are to be avoided. Certain cultural practices may not have a scientific basis, while others may have provided a good ground for health and freedom from disease. The sense of hygiene and sanitation was very well developed and followed strictly, part of which is lost at present. The science behind the tradition of eating developed by our ancestors was indeed appreciable and based on observations, experience, and wisdom.

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