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Review Article

Food, Nutrition and Preventive Medicine

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Abstract

A person's diet choice is related not only to their biological needs and the availability to the foods, but also to the customs, aspirations, and expectations of their societies. The quantity and quality of the food consumed, the choice of them, and the cultural gastronomies surrounding eating habits have varied throughout history and culture. Moreover, there are consumers that need special requirements for their nutrition to prevent or control diseases. In this context, the consumers could be classified as -common or conservative consumers, -conservative consumers with special regimes due to age, cultural, or religious conditions, (which include infants, vegetarians and vegans, sports, old age, among others), and consumers with physiological and metabolic disorders that are controlled or prevented with special food regimes as well.

In regards to this classification that involve the concept of preventive medicine, it is imperative to select the appropriate food in the diet in order to prevent or control diseases that shall help the progress of the food safety. Hippocrates of Cos (5th century BC - 4th century BC,) was already prematurely involved with the idea of preventive medicine. He postulated "Let food be your best medicine and your best medicine be your food. "It was the first idea conceived regarding special diet regimes; as consequence of observing the environmental causes of illness, emphasizing not only diet, but also general aspects of the patient's life and how this Influences their health and convalescence. Joint WHO/NHD in 2016 throughout of the food standards program Codex committee on nutrition and foods for special regimes, have postulated the 5 keys to a healthy diet: Breastfeed babies and young children, eat a variety of foods, eat plenty of vegetables and fruit, eat moderate amounts of fats and oils, and eat less salt and sugars. At that context, adequate choice of foods in the diet could be the solution of the future health of any type of consumer, but there are few contributions to this area by food industry. Few or nothing prepared foods are offered for this market, to fill the kind of food they are needing. The article will deal with all of these concepts and will review the perceptions of the theme in literature.

Keywords: Nutrition and health; Diets for special regimes; Special regimes foods; Preventive medicine

Abbreviations: WHO: World Health Organization; NCDs: Non-Communicable Diseases; CD: Celiac Disease; HLA: Human Leukocyte Antigen; PKU: Phenylketonuria

Introduction

The people's diet choice is related not only to their biological needs and the availability to the foods, but also to the customs, aspirations, and expectations of their societies. The quantity and quality of the food consumed, the choice of them, and the cultural gastronomies surrounding eating habits have varied throughout history and culture. At present, people from developed countries consume more food for pleasure and social activities than out of necessity which consequent obesity that leads them to chronic diseases. At this context the relation of the preventive medicine with nutrition results in a good panacea. The role of food in the prevention of diseases has been established since ancient times [1]. A Consumer must be a person, which knows what eating is and the effects of the components of food in his or her health. As consumers they must participate searching, selecting, and using the healthy food and refusing the non-adequate food products. Besides, consumers must know who they are in regards to their classifications of their consumer's types. The goal of the paper is

to discuss the classification of consumers and foods for special diet regimes in an overview.

Special Regimes Diet Overview

The role of food in the prevention of diseases has been established since ancient times; Let it recall the aphorism of Hippocrates of Cos (Greece, 5th century BC - 4th century BC), considered the father of modern medicine: "Let food be your best medicine and your best medicine be your food." [1]. At that time, Hippocrates was already prematurely involved with the idea of the preventive medicine. It was the first idea conceived of special diet regimes; as a consequence of observing the environmental causes of illness, emphasizing not only diet, but also general aspects of the patient's life and how this Influences their health and convalescence [2]. In that context, adequate choices of foods in the diet could be the solution of the future health of any type of consumer. Joint WHO/NHD in 2016 [3] through the food standards program Codex committee on nutrition and foods for special regimes, have postulated the 5 keys to a healthy diet.

Breastfeed Babies and Young Children: From birth to 6 months of age, feed babies exclusively with breast milk (i.e. give them no other food or drink) and feed them "on demand" (i.e. as often as they want, day and night). -At 6 months of age, introduce a variety of safe and nutritious foods to complement breastfeeding, and continue to breastfeed until babies are 2 years of age or beyond. -Do not add salt or sugars to foods for babies and young children

Why?

On its own, breast milk provides all the nutrients and fluids that babies need for their first 6 months of healthy growth and development. Exclusively breastfed babies have better resistance against common childhood illnesses such as diarrheic, respiratory infections and ear infections. In later life, those who were breastfed as infants are less likely to become overweight or obese, or to suffer from Non-Communicable Diseases (NCDs), such as diabetes, heart disease and stroke.

Eat a Variety of Foods: Eat a combination of different foods, including staple foods (e.g. cereals such as wheat, barley, rye, maize or rice, or starchy tubers or roots such as potato, yam, taro or cassava), legumes (e.g. lentils, beans), vegetables, fruit and foods from animal sources (e.g. meat, fish, eggs and milk) Why? Eating a variety of whole (i.e. unprocessed) and fresh foods every day helps children and adults to obtain the right amounts of essential nutrients. It also helps them to avoid a diet that is high in sugars, fats and salt, which can lead to unhealthy weight gain (i.e. overweight and obesity) and no-communicable diseases (NCDs) diseases. Eating a healthy, balanced diet is especially important for young children's and development; it also helps older people to have healthier and more active lives.

Eat Plenty of Vegetables and Fruit: Eat a wide variety of vegetables and fruit for snacks, choose raw vegetables and fresh fruit, rather than foods that are high in sugars, fats or salt. -Avoid overcooking vegetables and fruit as this can lead to the loss of important vitamins. -When using canned or dried vegetables and fruit, choose varieties without added salt and sugars. Why? Vegetables and fruit are important sources of vitamins, minerals, dietary fiber, plant protein and antioxidants. People whose diets are rich in vegetables and fruit have a significantly lower risk of obesity, heart disease, stroke, diabetes and certain types of cancer.

Eat Moderate Amounts of Fats and Oils: Use unsaturated vegetable oils (e.g. olive, soy, sunflower or corn oil) rather than animal fats or oils high in saturated fats (e.g. butter, ghee, lard, coconut and palm oil). Choose white meat (e.g. poultry) and fish, which are generally low in fats, in preference to red meat. Eat only limited amounts of processed meats because these are high in fat and salt. Where possible, opt for low-fat or reduced 'fat versions of milk and dairy products -Avoid processed, baked and fried foods that contain industrially produced trans-fat Why? Fats and oils are concentrated sources of energy, and eating too much fat, particularly the wrong kinds of fat, can be harmful to health. For example, people who eat too much saturated fat and trans-fat are at higher risk of heart disease and stroke. Trans-fat may occur naturally in certain meat and milk products, but the industrially produced trans-fat (e.g. partially hydrogenated oils) present in various processed foods is the main source.

Eat Less Salt and Sugars: When cooking and preparing foods, limit the amount of salt and high-sodium condiments (e.g. soy sauce and fish sauce). Avoid foods (e.g. snacks), that are high in salt and sugars. Limit intake of soft drinks or soda and other drinks that are high in sugars (e.g. fruit juices, cordials and syrups, flavored milks and yogurt drinks). Choose fresh fruits instead of sweet snacks such as cookies, cakes and chocolate. Why? People whose diets are high in sodium (including salt) have a greater risk of high blood pressure, which can increase their risk of heart disease and stroke. Similarly, those whose diets are high in sugars have a greater risk of becoming overweight or obese, and an increased risk of tooth decay. People who reduce the amount of sugars in their diet may also reduce their risk of noncommunicable diseases such as heart disease and stroke. The diet choices of people are related not only with their biological needs and the availability of the foods, but also with the customs, aspirations, and expectations of their societies. The quantity and quality of the food consumed, the choices of them, and the cultural gastronomies surrounding eating have varied though history and culture. Nevertheless, the major influence on the daily diet has been the availability of food. Humans can survive only a few days without water and, while the average healthy person can stay alive for weeks or even months without food, this will have adverse effects and cause health problems.

Classification of Consumers

With technological advances in the food processing and its advertising, consumers have wide eating food choices that could be sometime non-nutritive, and that are affecting their health.

Despite of these developments, there are not much healthy choices or specific foods for special requirements. In this context, regarding food security and commercial issues, two categories of consumers must be noted:

Conventional consumers

This categorization is subdivided in: Common and conservatives without special diets.

Consumers with special diets regimes

This category is subdivided in: Conservatives with special diets regimes due to age, cultural or religious conditions. Consumers with special diets regimes, which control or prevent him/her illness [4].

Common and Conservative Consumers: Definition and Description

i. Common consumers are those people whose diets are related to their biological needs and availability of the foods, but also in some occasions depends of the customs, aspirations, and expectations of their societies. They usually do not select their food diets, and consequently through time, they might be a candidate for the special diets regime.

ii. Conservative consumers Contrarily, the conservative consumers can be defined as those that choose different varieties of conventional, healthy or organic foods. This kind of consumer is a regular reader of any healthy information advertised, labels the food him/her consumes, and considers relevant information regarding their diets before ingesting the foods.

Consumers with Special Diets Regimes. Definition and Description

The close relationship between health and food is now been recognized. Foods are being modified by reducing, eliminating or adding nutrients in order to avoid deficiencies and prevent harmful excesses. At the context two important definitions involved that are: Food for Special Dietary uses and Noncommunicable Diseases (NCDs).

Foods for Special Dietary Uses

The definition of foods for special dietary uses has been restricted to foods that

a) Furnish a particular dietary requirement that exists because of a physical or physiological condition, such as convalescence, pregnancy, lactation, infancy, and specific diseases and disorders

b) Supply a vitamin, mineral, or other dietary property to supplement the diet by increasing total dietary intake

c) Meet a special dietary need when such foods are the sole item of the daily diet (21 Code of Federal Regulations Part, 1974, cited by Chopra, 1976 [5], Code of Federal Regulation, 1999 cited in [6]). However, the term food for Special Regimes has been wide defined from CODEX STAN 146-2009 [4]. As diets in which processed or specially prepared foods are required to meet particular dietary needs, as determined by particular physical or physiological conditions and / or specific diseases or disorders presented as such. The composition of such foods should be fundamentally different from the composition of ordinary foods of a similar nature, should such foods exist.

Consumers with Special Diets Regimes due to Age, Cultural or Religious Condition

This categorization includes the infants, vegetarians and vegans, athletes, and old age consumers among others.

Infants: Feeding of infants is of vital importance, because it involves the healthy physiological growth of the child [7,8]. In this framework, it is important to emphasize the value of breast milk as an ideal food for the child during the first six months of life [9-12]. According to Ballard and Morrow, 2013 [13], lactation has two stages: colostrum production and production of transitional and mature milk.

a) Colostrum. The first fluid produced by mothers after delivery is colostrum, which is distinct in volume, appearance and composition. Colostrum, produced in low quantities in the first few days postpartum, is rich in immunologic components such as secretory IgA, lactoferrin, leukocytes, as well as developmental factors such as epidermal growth factor. Colostrum also contains relatively low concentrations of lactose, indicating its primary functions to be immunologic and trophic rather than nutritional. Levels of sodium, chloride and magnesium are higher and levels of potassium and calcium are lower in colostrum than later milk. As tight junction closure occurs in the mammary epithelium, the sodium to potassium ratio declines and lactose concentration increases, indicating secretory activation and the production of transitional milk. The timing of secretory activation (lactogenesis stage II) varies among women, but typically occurs over the first few days postpartum. Delayed onset of lactogenesis is defined as onset >72 hours after delivery and appears to occur more often with preterm delivery and maternal obesity, and may be predicted by markers of metabolic health [7,8]. Biochemical markers in early milk for onset of secretory activation include its sodium content, the sodium to potassium ratio, citrate, and lactose.

b) Transitional milk shares some of the characteristics of colostrum but represents a period of "ramped up" milk production to support the nutritional and developmental needs of the rapidly growing infant, and typically occurs from 5 days to two weeks postpartum, after which milk is considered largely mature. By four to six weeks postpartum, human milk is considered fully mature. In contrast to the dramatic shift in composition observed in the first month of life, human milk remains relatively similar in composition, although subtle changes in milk composition do occur over the course of lactation.

c) Mature Milk. Mature milk begins to appear near the end of the second week after childbirth. It is produced in great volume as transitional milk but is thinner and waterier or even bluish; sometimes it's described as looking like skim milk when it is first secreted, until the fat is released later in the feeding and it becomes creamier.

As general definition breast milk is an aqueous suspension of nutrients, cells, hormones, growth, immunoglobulins, enzymes, etc., which exert a complex interrelation between the mother and her baby. Human milk contains hundreds to thousands of distinct bioactive molecules that protect infants against infection and inflammation and contribute to their immune maturation, organ development, and healthy microbial colonization. Some of these molecules, e.g., lactoferrin, are being investigated as novel therapeutic agents. A dynamic, bioactive fluid, human milk changes in composition from colostrum to late lactation, and varies within feeds, diurnally, and between mothers [13]. The nutritional status of the mother seems to influence the concentration of fat and therefore the energy content of the breast milk, as well as its composition of fatty acids and immunological properties. It has been found that the composition of human milk varies between different parts of the world, and even more varies among women living in the same locality and changes dramatically during the first few days after delivery; As well as changes in the secretion of colostrum into milk. The concentration of certain components of milk, especially fat, varies substantially during one feeding and during the day [14]. Milk composition appears to be dependent on parity and age of the mother [13-20].

Beside the hundreds to thousands of distinct bioactive molecules present, human milk contains 3% - 5% fat, 0.8% - 0.9% protein, 6.9% - 7.2% carbohydrate calculated as lactose, and 0.2% mineral constituents expressed as ash. Its energy content is 60-75 kcal/100 ml. Protein content is markedly higher and carbohydrate content lower in colostrum than in mature milk. Fat content does not vary consistently during lactation but exhibits large diurnal variations and increases during the course of each nursing [21].Water is the most abundant component, contributing to the mechanism of regulation of new-born body temperature [22]. In women who breastfeed water consumption is increased and regulated by thirst (it is not clinically important to insist that the mother drink more water than she needs). It has been shown that the needs of infants in a warm climate can be fully satisfied by the water of breast milk.

There are two classes of protein in breast milk: Casein and whey. Casein becomes clots or curds in the stomach; while whey remains as a liquid and is easier to digest. Depending on the stage of milk, 80% to 50% of protein in breast milk is whey [23]. The most abundant proteins are casein, α-lactalbumin, lactoferrin, secretory immunoglobulin IgA, lysozyme, and serum albumin. Non-protein nitrogen-containing compounds, including urea, uric acid, creatine, creatinine, amino acids, and nucleotides, comprise ~25% of human milk nitrogen [13]. The casein content (mg/ml) of mature human milk was reported by Lönnerdal and Forsum, 1985 (24) varying from 1,80 to 2,96 measured by three different methods with trace elements and minerals of total Ca 10%, Mg 5%, Zn 28%, Cu 17%, and Fe 27% are bounded to casein. The essential amino acid pattern of human milk closely resembles that found to be optimal for human infants [21]. Since the protein ratio of human milk is considered a guideline when manufacturing infant formulas, these findings should be considered with regard to infant nutrition [24]. About 25% of the total nitrogen of human milk represents nonprotein compounds including urea, uric acid, creatine, creatinine, and a large number of amino acids. Of the latter, glutamic acid and taurine are prominent [21].

The principal sugar of human milk is the disaccharide lactose but 30 or more oligosaccharides are present in low concentration, in human milk, depending on stage of lactation and maternal genetic factors; colostrum has high concentration of it. Some of them may function to control intestinal flora because of their ability to promote growth of certain strains of lactobacilli [13,21,23]. The main lipid fraction in human milk is triglycerides, which account for about 95% of total lipids. The human milk fat is characterized by high contents of palmitic and oleic acids. Near half of milk fatty acids are saturated fatty acids (23% palmitic acid (C16:0) in total fatty acids), with the monounsaturated fatty acid; oleic acid (18:1w9), in the highest percentage (36%) in human milk. Human breast milk also contains two essential fatty acids, linoleic acid (C18:2w6) at 15% and alpha-linolenic acid (C18:3w3) at 0.35%. These two essential fatty acids are, respectively, converted to arachidonic acid (AA, C20:4w6) and eicosapentaenoic acid (EPA, C20:5w3), the latter of which is further converted to docosahexaenoic acid (DHA, 22:6w3). AA, EPA and DHA are important for regulating growth, inflammatory responses, immune function, vision, cognitive development and motor systems in new-born [23,24].

Fatty acid composition of milk varies with mother diet, particularly the fatty acids which it supplies. Phospholipids include phosphatidyl ethanolamine, phosphatidyl choline, phosphatidyl serine, phosphatidyl inositol, and sphingomyelin [13]. Trans-vaccenic acid (VA) is also the predominant fatty acid comprising trans-fat in human milk [25,26]. VA is the only known dietary precursor of c9,t11 conjugated linoleic acid (CLA), but recent data suggest that consumption of this trans-fat may impart health benefits beyond those associated with CLA [27,28]. Human milk provides the normative standard for infant nutrition. Nevertheless, many micronutrients vary in human milk depending on maternal diet and body stores including vitamins A, B1, B2, B6, B12, D, and iodine [23]. The major mineral constituents of human milk are Na, K, Ca, Mg, P, and Cl and its contents could vary considerably. All of the vitamins, except K, are found in human milk in nutritionally significant concentrations [13,21,23].

d) Human vs Animal Milk. Animal milk is a product of the evolution designed for the nutrition of the mammals [9]. Animal milks are different in composition, in terms of concentration

of macronutrients and micronutrients. The same nutrients are present in the milk of all species, although in different proportions. Such quantitative differences appear to be an adaptation to the nutritive requirements of the young of each species [8,9,27] [29-32]. Since, the most usual to drink by the human is the cow's milk in this section it will be compared to human milk. The Cow's milk is different in the types of fatty acids present and the factors that affect their absorption. it is also important to highlight the presence of long chain polyunsaturated fatty acids, especially those with 20 to 22 carbon atoms, because of their importance for the growth and maturation of the nervous system of the neonate, which are absent in cow's milk. Particularly noteworthy are arachidonic (20:4 n6) and docosahexaenoic (22: 6n3). These fatty acids are also related to visual function and it has been shown that formula-fed children have less visual acuity than those fed with breast milk. Human milk is high in cholesterol, its levels decrease in the first few days and then stabilize [9,13,21].

The types of proteins present and their relative proportions and qualitative and quantitative differences in the non-protein nitrogen fraction. Cow milk contains more protein than does human milk and differ in the amounts of various proteins they contain. Unlike cow's milk, human milk is characterized by a predominance of whey proteins (60-70%) over casein (40-30%). Caseins can form leathery curds in the stomach and be difficult to digest, being the predominate β-casein. Human milk does not contain β-lactoglobulin, one of the main proteins associated with cow milk allergy [33]. There is much less lactose in cow's milk, than in breast milk and the oligosaccharide fraction is very different [13,33].

There are large differences in the content and rates of absorption of vitamins and minerals from breast milk compared to cow's milk or formula's milk. Vitamin D and vitamin K are potential problems for the breastfed baby in certain circumstances. The total salt content of cow's milk is three times higher than the human milk. Therefore, the renal load of solutes from cow's milk is considerably higher than the breast milk. And it is further increased with the products of the digestion of the high protein content of cow's milk. In this way, the breastfed child handles water more easily for temperature control through sweat and insensitive loss. One of the most significant points in terms of minerals in human milk, for example calcium, magnesium, iron, copper, zinc, is its high bioavailability when compared to cow's milk or formulas [8].

e) Human milk and formulas. The response of human milk-fed and formula-fed infants differs with respect to endocrine function, fecal motility, immune function, and renal function. Infant milk preparations are designed to mimic human milk as much as possible, but this is unlikely to always be a complete success. However, there are a number of important differences in composition between breast milk and formula milk. This includes the types and proportions of fatty acids present (which may be of importance for development), the nature of the non-protein nitrogen component (developmental potential is also possible), and the presence of immunoglobulins and fibronectin to the child against infection) [8]. However, poor health status and certain social conditions can reduce lactation by decreasing or avoiding breastfeeding. Under these circumstances, mother should use alternative foods or infant formulas for feeding the babies. During the 19th century, reasonably safe breast milk substitutes started to be developed, that was advanced into modern infant formulas during the 20th century using human milk composition as reference and cow's milk as protein source. Even with a composition similar to human milk there are differences in performance between formula-fed and breastfed infants. Novel ingredients and new techniques within the dairy industry will contribute to minimize these differences and so might techniques in molecular biology allowing large scale production of recombinant human milk proteins [34].

On the other hand, pasteurized donor milk is now commonly provided to high risk infants and most mothers in the U.S. express and freeze their milk at some point in lactation for future infant feedings. It is important to be aware that many milk proteins are degraded by heat treatment, and by the effect of the freeze-thaw cycles. However, proteins may not have the same bioactivity after undergoing these treatments [13]. This technique may be used as palliative in critical missing of the fresh human milk or formulas. it will be extremely important that their safety and efficacy are rigorously evaluated because 'functional effects' are not necessarily the same as health benefits.

Vegetarians and Vegans

With the increasing attention to health nutrition, vegetarianism is it the focus of several consumers. Neither vegans nor vegetarians eat meat, moreover, there are varying degrees of vegetarianism, depending on the extent to which animal product are avoided. Veganism adopted by vegans is the most extreme or pure form of vegetarianism where all animal product is excluded, and this condition is considered as lifestyle, they also are excluding inedible animal-based products, such as leather, wool, and silk. Less strict forms exist, for example semi-vegetarian (eat chicken), lacto-ovo-vegetarian, where there is selective exclusion of meat, fish and poultry, but with the retention of eggs and dairy products, ovo-vegetarians and lacto-vegetarians (eat eggs and dairy, product respectively). A similar form but not excluding fish is called lacto-ovo-pisco vegetarianism [35], and lastly, it is mentioned the raw veggies consumers that base their diet on uncooked foods; Consequently, they do not consume foods of animal origin, nor starches derived from cereals that are only consumed cooked.

According to Grunert [36], the raw veggies consumers are eating only raw fruits and vegetables. Its diet is called a raw food diet, living foods diet, or a raw vegan diet. Going raw, as proponents call it, entails a transition period from the typical standard American diet of cooked, processed and refined foods sprinkled with some fruits and vegetables to a diet based entirely on plant-based products. Such a diet is rich in vitamins, minerals, and fiber, but may be lacking in certain essential nutrients. The essential beliefs of a raw

food diet include: Eating only foods that have not been heated above 116-118 degrees Fahrenheit. The belief is that heating foods above these temperatures destroys vital life-giving enzymes. Different raw food coaches set the temperature bar at different rates, but the range of 116-118 degrees is typical. Eliminating white sugar, flour, caffeine and alcohol from the diet. Basing the diet primarily on raw plant foods, such as fruits, vegetables, sea vegetables, nuts, seeds, and oils. Abstaining from meat and animal products. Some raw food followers will eat raw meat or unprocessed dairy products, but most believe these to be detrimental to health and eat only uncooked fruit and vegetable diets [36].

It has been postulated that certain illness; such as obesity, non-insulin dependent Diabetes Mellitus sand coronary artery disease is occurring less in vegetarians than in omnivores. But not only dietetic pattern is associated to this healthy advantage of vegetarianism, but it may also reflect upon other factors often associated to them such as non-smoking, regular exercises, avoidance of alcohol and caffeine, low fat intake, vitamin and mineral supplementation, increasing dietary fiber, periodic fasting and other health promoting activities [37]. Vegetarians often choose their diet based on its reported health, ethical, economic, environmental, cultural, and social concerns or for religious or political reasons. In general, vegans have much stronger political beliefs regarding their diet, and also with animal welfare [38].

Athletes or Sports

The daily intake of energy from food provides the athlete with immediate energy needs; such as, those for body functions, activity and growth. In addition, energy intake also influences the body's energy storage. Energy storage (fat and glycogen) play a number of important roles related to exercise performance, since they contribute to the size and physique of the athletes and their function. Rodriguez et al. [39] and also pointed out that adequate intake of fat is necessary for numerous metabolic activities that promote optimal health. For example, vitamins A, D, and E require fat for proper absorption. Fat intake for an athlete should range between 20-35% of total daily calories. Current dietary guidelines recommend that 10% of fat intake should come from monounsaturated sources, 10% from polyunsaturated sources, and no more than 10% from saturated fat. Research does not show any beneficial effects from a diet that includes excessive fat intake (>70% of total energy) [39,40].

At that point, the control and modification of corporal weight should be strictly controlled, in order to limiting the body fat and to provide a maximum value of muscle strength (muscular mass), endurance and speed. As consequence, a well-chosen diet for athletes offers many benefices to them. This diet has to be adequate, specific and balanced for each sport, in order to provide the necessary fuel and the best advantageous training. The diet has to also be adequate for achievement and maintenance of an ideal body weight and physique, good recovery after sport events, reduction of supplement intake, reduction of risk injury, overtraining fatigue and illness, confidence for be in good shape, enjoyment of food and social eating occasions at home and during travel [41].

For Athletes, the intake of carbohydrates includes both complex and simple sugars. Carbohydrates maintain blood sugar levels to fuel exercise. They also replenish glycogen which is the storage form of carbohydrates within muscles. The recommended daily carbohydrate intake for athletes ranges from 6-10 g/kg body weight [39,40]. According to the Nutrition Working Group of the International Olympic Committee, 2010 [41], to choose nutrient-rich carbohydrates and to add other foods to recovery meals and snacks to provide a good source of protein and other nutrients is quite valuable. These nutrients may assist in other recovery processes, and in the case of protein, may promote additional glycogen recovery when carbohydrate intake is below targets or when frequent snacking is not possible. Carbohydrate-rich foods with a moderate to high Glycaemic Index (GI) provide a readily available source of carbohydrate for glycogen synthesis and should be the major fuel choices in recovery meals. Protein plays an important role in the response to exercise. Amino acids from proteins form building blocks for the manufacture of new tissue, including muscle, and the repair of damaged tissue. They are also the building blocks for hormones and enzymes that regulate metabolism, support the immune system and other body functions. Protein provides a small source of fuel for the exercising muscle.

Endurance athletes are advised to ingest between 1.2-1.4 grams of protein per kilogram of body weight each day. The use of protein supplements in sports programs is encouraged for the athlete participants. The timing and use of these supplements in conjunction with the knowledge of the daily amount required provides optimal results for the endurance athletes. There are many different supplements of protein that are commercially available at any given supermarket. Creatine, a protein supplement, was used in a study for endurance athletes metabolic rate changes based on plasma and urinary samples gathered throughout. The conclusion of this study showed a decrease in muscle glycogen and protein degradation after long endurance exercises [42]. Knowing the optimal time to take these supplements to increase performance and health is valuable information to be considered along with daily recommended amounts (42). Ultra-endurance athletes who participate in continuous training for several hours or consecutive days should consume slightly more protein than this; however, consumption of more than 2 grams of protein per kg of body weight is not recommended. Strength athletes are encouraged to consume protein in the range of 1.2-1.7 g/kg body weight. This amount is generally easy to obtain through a normal diet without the use of supplements. High quality protein sources such as whey, casein, or soy are equally effective in the maintenance, repair, and synthesis of muscle proteins [39]. The protein-rich diet of strength athletes sparks certain health risks questions about possible renal or kidney disease. Understanding contributing factors to possible diseases allow for people to prevent and induce these diseases before they can affect a person's health (https://www.ncbi.nlm.nih.gov/

pubmed/15558517). Preliminary studies [43] have been suggested that strength athletes with high protein diets are less likely to develop kidney disease, diabetes, or hypertension. However, these studies contradict the belief that a high protein diet will promote risk factors involving kidney disease. These experiments found that people with existing kidney disease would be negatively affected by a protein-rich diet while those without preexisting diseases showed only marginal effects.

These nutrients, as well as others, are best obtained from a varied and wholesome nutrient-rich diet based largely on vegetables, fruits, beans, legumes, grains, lean meats, dairy foods and healthy oils. Dietary surveys show that most athletes are well able to meet the recommended intakes for vitamins and minerals by eating everyday these foods. Electrolyte replacement for the athlete who is sweating abundantly is provided by minerals in the athlete's generous, mixed diet. Moreover, antioxidant nutrients help the body neutralize harmful oxidizing products that may accumulate during intense or prolonged training and potentially damage healthy tissues and impair proper recovery.

Another concern of these athletes are the exhaustion cramps and the so-called heat stroke disorders that result from varying degrees of bodily fluid deprivation with the danger of producing circulatory inefficiency. Exercised muscle, with an inadequate circulation of body fluids, induces cramps. The sudden acute loss of plasma volume and inadequate circulation to the central nervous system causes heat exhaustion. Severe reduction of circulatory efficacy limits the athlete's ability to transport and dissipate body heat, thus increasing the threat of heat stroke [44]. Monitoring water needs, scheduling the intake of cold and clean water regularly during training and competition, and being attentive to adverse environmental conditions prevent these adversities. Water is an important nutrient for the athlete. Water loss during an athletic event varies between individuals. Sweat loss can be tracked by measuring weight immediately before and after exercise.

To avoid dehydration, an athlete should drink 5 to 7mL per kilogram of body mass approximately four hours before an event. Throughout the event, they should drink chilled water or electrolyte drinks, consuming enough to match sweat losses. Chilled fluids are absorbed faster and help lower body temperature. After exercise, 16-24 oz., of water should be for every pound that was lost during the athletic event. By routinely tracking pre- and post- exercise weight changes, sweat rates can be estimated, allowing for more efficient hydration during athletic events. An individual should never gain weight during exercise; this is a sign of excessive hydration, which can lead to electrolyte imbalances, and potentially hyponatremia. It is important to account for environmental concerns when considering water consumption. Sweat rates may increase dramatically in hot and humid weather, and it is increasingly important for an athlete to stay hydrated [40].

Elderly People

Ageing at a biological level, is associated with the gradual accumulation of a wide variety of molecular and cellular damage. Over time, this damage leads to a gradual decrease in physiological reserves, an increased risk of many diseases, and a general decline in the capacity of the individual. Consequently, older people have intrinsic needs for especial food. So, this population must be taken care of in its specific nutritional requirements as a part of state policies of food security. WHO, in 2014, 2015 [45,46] has work on this context and has defined the term Healthy Ageing as the process of developing and maintaining the functional ability that enables well-being in older age. Therefore, a fraction of the food researching, and processing must be focused to this direction.

Ageing is normally measured by chronological age and, as a convention, a person aged 65 years or more is often referred to as 'elderly'. However, the ageing process is not uniform across the population due to differences in genetics, lifestyle, and overall health [47]. A first attempt to internationally define age was made by the World Health Organization (WHO) and United Nations in 2002 [48] declaring that "old age" is denoted by the age of 60-65 years in the developed world. Gorman, 1999 [49] pointed out that in contrast to the chronological milestones which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible. Forman et al. [50] who categorized generation 60+ in the "young old" (60-69 y), the "middle old" (70-79 y), and the "very old" (80 + y) persons or Zizza et al. [51], who divided the elderly in the three categories of "young olds" (65-74 y), "middle olds" (75-84 y), and "oldest olds" (85+ y). Globally, the number of older persons (aged 60 years or over) is expected to more than double, from 841 million people in 2013 to more than 2 billion in 2050 [52].

Due to physiological changes associated with ageing older people can have different nutritional needs to younger people, for example, the over 75s are at greater risk from malnutrition than obesity and many over 60s would benefit from higher vitamin D intake. Current dietary recommendations do not distinguish between different age groups of older people, despite the fact that a 55-year-old and an 80-year-old can have some significantly different nutritional needs and there is very little research into what the oldest old (the over 80s) actually eat [53]. Healthy ageing is associated with a number of physiological, cognitive, social and lifestyle changes that influence on their dietary intake and nutritional status. The changes in body composition and physiology process from the ageing process involves every tissue and all vital organs. These changes have a profound influence on the nutritional status of the ageing adult and affect: the body's metabolism, nutrient intake, absorption, storage, utilization and excretion of nutrients, nutrient requirements, and the ability to choose, prepare and eat a variety of foods, bringing as a consequence some associated illness:

Sarcopenia: As a natural part of the aging process, come the sarcopenia, which is an inevitable loss in lean body mass (skeletal muscle and bone) and a relative increase in fat mass over time (WHO 2002). Bones loss Calcium absorption is known to decrease with age in both genders, then ageing is associated with a loss of

bone and total body calcium [48]. Osteoporosis is a skeletal disorder associated with aging and characterized by compromised bone strength due to reduced bone mass and reduced bone quality [54]. Adequate calcium and vitamin D status is essential for minimizing bone loss following menopause and preventing fractures [55].

Arthritis: The term defines around 200 rheumatic disease and conditions that affect joints when prolonged inflammation results in long-term pain and deformity [56]. Osteoarthritis is common in the elderly and usually affects the hip and knee joints that limit their functional capacity. Consequently, they may become unable to shop, handle and prepare food and cook. There is increasing research being conducted into the use of diet to prevent and manage arthritis [57].

Declining of Gastrointestinal Digestive and Absorptive Functions: As consequence of the changes in the oral sphere, decrease in the number of oro-sensory receptors (mechano- and gustative receptors), decline in saliva secretions, esophageal dysphagia, alterations in chemosensory perception, tooth loss and oral disorders related decline of the absorptive function for several reasons make elder consumers a strictly target to be monitored from a nutrition point of view [57-59].

Additional to the mechanical disintegration of food, it is decreased the gastrointestinal motor function, food transit, chemical food digestion, and functionality of the intestinal wall. These alterations progressively decrease the ability of the absorption intestinal to provide the aging organism with adequate levels of nutrients, what contributes to the development of malnutrition. Malnutrition, in turn, increases the risks for the development of a range of pathologies associated with most organ systems, in particular the nervous-, muscoskeletal-, cardiovascular-, immune-, and skin systems. Therefore, the elaboration of food with special characteristic to solve these elderly needs have to be innovated and a intense participation from institutional bodies, thus contributing to limiting the impact of malnutrition on the health status of elderly. Indeed, the access to and consumption of healthy food for older people is influenced by the wider determinants of health. These determinants include cultural, social, historical and economic factors. A life course approach to ageing recognizes that the effects of these determinants accumulate throughout the life span and have an impact on health. Because of this cumulative impact, interventions modifying the determinants of health are important at all stages of life [60].

Consumers with Special Diets Regimes, which Control or Prevent him/her Illness

They are defined as consumers that need those preparations that are specially processed or formulated to meet the particular physical or physiological needs and/or specific diseases and disorders that occur as such. The Non-Communicable Diseases (NCDs), that have become a major health priority, are closely related to this kind of consumers. Foods, diet and nutritional status, including overweight and obesity are not only risk factors for Noncommunicable Diseases (NCDs), but major causes of illness themselves. Undernutrition, and its effects on growth, development and maturation, has numerous detrimental outcomes, including the potential to increase risk of developing an NCD later in life [61]. NCDs, also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviors factors [62].

People of all age groups, regions and countries are affected by NCDs. These conditions are often associated with older groups in low- and middle-income countries were a rapid unplanned urbanization and unhealthy lifestyles. Children, adults and the elderly are all vulnerable to the risk factors contributing to NCDs, whether from unhealthy diets, physical inactivity, and exposure to tobacco smoke or the harmful use of alcohol. Unhealthy diets and a lack of physical activity are correlated with people having raised blood pressure, increased blood glucose, elevated blood lipids, resistance to the action of insulin, and obesity. These are called metabolic risk factors that can lead to cardiovascular disease, the leading NCD in terms of premature death [63].

Chronic noncommunicable diseases are typically characterized by: absence of causative microorganism, multiple risk factors, prolonged latency, long duration with periods of remission and recurrence, importance of lifestyle factors and the physical and social environment, long-term consequences (physical and mental handicaps). Examples include cardiovascular disease, cancer, diabetes, arthritis, asthma, and mental illness. However, more specifically there are manifestations and prevention of some of the most important chronic diseases that are associated with nutrition as an example: atherosclerotic heart disease, high blood pressure or hypertension, diabetes Mellitus, cancer, osteoporosis, mental diseases, obesity and other conditions, such as: celiac disease, phenylketonuria, lactose intolerance, and proteins, among others [63].

In some of these diseases the cause is clearly food; In others, diet can contribute significantly to the cause or treatment; and in others, the relationship with the diet is suspected, but has not yet been established. In spite of all the information and discussion at the global level, it is only during the last decades that the role of food in the prevention of diseases has been justified [46,63].

Diabetes: For instance, there are two main forms of diabetes: Type 1 diabetes is due primarily to autoimmune-mediated destruction of pancreatic b-cell islets, resulting in absolute insulin deficiency. People with type 1 diabetes, beside to control diet, must take exogenous insulin for survival to prevent the development of ketoacidosis. Its frequency is low relative to type 2 diabetes, which accounts for over 90% of cases globally. Type 2 diabetes is characterized by insulin resistance and/or abnormal insulin secretion, either of which may predominate. People with type 2 diabetes are not dependent on exogenous insulin but may require

it for control of blood glucose levels if this is not achieved with diet alone or with oral hypoglycaemic agents [64].

Celiac Disease (CD) is an immune-mediated enteropathy triggered in genetically susceptible individuals by the ingestion of gluten-containing grains (wheat, barley, and rye). The disease is associated with Human Leukocyte Antigen (HLA) DQ2 and DQ8 haplotypes. In the continued presence of gluten, CD is self-perpetuating. Given the undisputed role of gluten in causing inflammation and autoimmunity, CD represents a unique example of an immune-mediated disease for which early serologic diagnosis and dietary treatment can prevent severe, sometimes life-threatening complications [65]. Osteoporosis is a chronic noncommunicable diseases, in which the diet can contribute significantly to its cause or treatment. It has been suggested a diet with an adequate content of calcium. After 50 years, it must contain approximately 1-200mg of calcium per day. This is contributing mostly with dairy products, preferably those that are fortified with calcium, since they contain 40-100% more calcium than non-fortified products. In case of intolerance to dairy products can be used lactose-free milks, or supplements can be given calcium pharmaceuticals, which should be indicated by the doctor to assess the dose, the duration of treatment and the type of calcium salt to be used [66,67].

Phenylketonuria (PKU) is one of the most common of over 200 known such diseases, at least 30 of which have treatments to ameliorate the adverse effects. PKU is one of the first diseases causing mental and physical disability for which successful treatment has been developed. The cause of PKU is defective function of the enzyme phenylalanine hydroxylase (EC 1.14.16.1) which converts phenylalanine to tyrosine. The subsequent elevation of phenylalanine in the blood and brain results in profound, irreversible, mental retardation in a large number of the affected individuals [68]. In 1954 Bickle [69] and associates were the first to introduce treatment for PKU with a phenylalanine restricted diet. The first efforts were very crude and the initial patient was an older child already damaged. The improvement in behavior prompted more refined efforts. It became obvious that very early diagnosis was crucial as much of the adverse effect on the brain in the first few months of life were irreversible, hence the initiation of universal newborn screening [70].

Conclusion

When defining the state policies of Food Security, all of these categories must be recurrently considered as regular and important groups. Moreover, all state entities must to stablish policies in order the perform researching and to processing lots of specific foods for the different consumer above classified. The elaboration of these foods has to be done including inside its formulation and processing, those issues social, religious, cultural, gastronomy, accessibility, cost, and health. Their production might have practical implications in terms of improved space management in supermarkets and better and innovative targeted promotions of healthy products. The food processors and distributors also must support them in a commercial context. In other words, putting the food researching and processing in the framework of preventive medicine. Prevention of diseases through food is a challenge that have be faced by health professionals; such as, doctors and nutritionist, however speaking in a very strict term; it is also imperative to involve technologists and food processors. This relationship between health and food, even though it was postulated as mentioned above very remotely and is handled in the medical-nutritionist slang, is not yet achieved because food science and technology have very little participation in this situation. Although there is consensus that there are conditions in the lives of normal consumers, or with physiological or metabolic disorders that must be prevented and/or controlled with diets, there is still no specific and committed sector in food production that fills this space. In addition to food production, aimed at conventional consumers with dietary regimes, there should also be food for consumers with noncommunicable diseases that can be controlled or with special dietary regimes.

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