Invited paper

Dietetic practice: the past, present and future

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SUMMARY The history of dietetics can be traced as far back as the writings of Homer, Plato and Hippocrates in ancient Greece. Although diet and nutrition continued to be judged important for health, dietetics did not progress much till the 19th century with the advances in chemistry. Early research focused focuses on vitamin deficiency diseases while later workers proposed daily requirements for protein, fat and carbohydrates. Dietetics as a profession was given a boost during the Second World War when its importance was recognized by the military. Today, professional dietetic associations can be found on every continent, and registered dietitians are involved in health promotion and treatment, and work alongside physicians. The growing need for dietetics professionals is driven by a growing public interest in nutrition and the potential of functional foods to prevent a variety of diet-related conditions.

Introduction

Definition of dietetics

The word diet is derived from the Latin *diaeta*, meaning mode of life, a word that up until the last century was often used in a much broader sense than its current meaning. The word dietetics was noted in the early writings of Hippocrates (460 BC), Plato (460–348 BC), and Galen (130–200 AD) [*1*]. Recently, dietetics as a profession has been defined by the American Dietetic Association as the integration and application of principles derived from the disciplines of food, nutrition, management, communication, biological, physiological, behavioural and social sciences to achieve and maintain human health.

Origin of dietetics and diet therapy

Although not officially recognized as a profession, dietetics (and nutrition) has constituted a branch of the medical art since the time of the ancient Greeks. Intervention in the nutritional habits of the patient was a method of treatment [*2*]. Physicians and philosophers believed that proper diet was a precondition for corporal and intellectual well-being [*3*].

Dietetics was known in the 8th century BC. In Homer's epic *The Iliad*, Podalirius, one of the two physicians mentioned, was recognized for his special interest in dietetics [*3*]. Later, Hippocrates (5th century BC), the father of medicine wrote, "Let thy food be thy medicine, thy medicine be thy food," emphasizing that diet was the best way to treat disease [*1*]. He presented his nutritional concepts in his work *On diet*. Among his aphorisms are found statements which are in agreement with current research, such as "persons who are naturally very fat are apt to die earlier than those who are slender" [*3*].

Another example of the influence of food on many aspects of life in ancient Greek society comes from the famous philosophical works of Plato (5th–4th century BC), who makes frequent references to human diet. According to the philosopher, a moderate and thus healthy diet con-

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sists of cereals, legumes, fruits, milk, honey and fish. In addition, the dietary patterns presented in the Platonic dialogues were very similar to the current Mediterranean diet [*3*]. Plato suggested that the therapeutic approach to human diseases should be made through the regulation of diet rather than with medication, "Wherefore one ought to control all such diseases, so far as one has time to spare, by means of dieting rather than irritate a fractious evil by drugging" (Timaeus verse 89C-D). He recognized the importance of the proper nutrition for corporal development in many passages in his texts "for there ought to be no other secondary task to hinder the work of supplying the body with its proper exercise and nourishment" (Laws verse 807D) [*3*].

In the following centuries, many physicians highlighted the importance of diet in maintaining health and in the treatment of diseases. Members of the famous medical school of Alexandria like Erasistratus and Herophilus (3rd century BC), Celsus (1st century AD) and Galen (2nd century AD), produced many writings on diet [*4*]. Galen was the Roman emperor's physician, an anatomist, physiologist and a fruitful writer and his word in medicine and science became law for the following 12 centuries. He was one of the believers in diet, and said "health depends chiefly on the choice of food." He stressed the therapeutic value of climate and a full diet for tuberculosis, and emphasized the value of milk in the treatment of disease [*3*]. In later years, Boorde, a physician and experienced traveller of the 16th century, wrote 2 short books related to health, *Breuyary of helth* and *A compendious regiment or a dietary of helth*. He included brief chapters on bread, potage (soup), meat, eggs and cheese, fish and fowl, roots, herbs, fruits and spices, and diets for the following: sanguine, phlegmatic, choleric and melancholic temperaments and pestilence, fever, gout, leprosy, consumption, palsy, madness and dropsy.

Hospital dietetics appeared in the 12th century as shown in the records of the history of St. Bartholomew's Hospital in London, the oldest British hospital, established in 1123 [*5*]. In the Middle Ages, and even through the 18th century, hospital diet was based on bread. Other components were beef, beef broth, ale cawdel, beer, mutton, mutton broth, cheese, butter, milk pottage, rice milk, sugar soppes and water gruel [*1*].

Only little change in the type or amount of the daily food allowance for patients at St. Bartholomew's was noticed a century later [*6*]. Four different kinds of diet existed at that time; the common diet, the broth diet, the thin or fever diet, and the milk diet. The common diet was simply the normal diet. The broth diet was the same as the common diet but without any meat. The thin or fever diet did not include meat, beer or butter and consisted of 1 pint of milk with tapioca, arrowroot, sago or rice as prescribed, and barley water. The milk diet consisted of milk porridge, 12 ounces of bread, 2 pints of milk with tapioca, arrowroot, sago or rice as prescribed, barley water, 1 ounce of butter and bread pudding 3 times a week when ordered. At that time, most of the other hospitals in London used the same terms to describe their diets, with some including such terms as full, middle, and low diet, and spoon or fever diet [*1*].

By the early part of the 20th century, therapeutic diets had become more common and were usually named after the physician who prescribed them, such as Meulengraght's diet and the Sippy diet and the various adjustments of each. Nowadays, emphasis in diet therapy is placed on a diet adequate in all nutrients, with minimal modifications in quantity, consistency and texture of food according to patient needs [*1*].

Development of dietary studies and dietary standards

Diseases of dietary origin

Major progress in dietetics was made through the contribution of science, the emergence of diseases of dietary origin and the discovery of vitamins and minerals. The writings of keen observers and experienced physicians opened up new chapters in the history of nutrition and dietetics.

Iron deficiency anaemia, the most commonly occurring type of anaemia in many parts of the world today, was described in 17th century writings as the "green sickness" and was treated either with herbs or iron preparations [*1*]. The early history of goitre, a disease characterized by a swelling at the front of the neck, goes back to 1820 when Coindet used a tincture of iodine to paint goitre, and to Boussin-Gault's recommendation in 1833 that salt containing iodine should be used in the treatment of this disease. The latter observed the communities in the Andes, and noted that the difference between goitrous and non-goitrous communities was related to the iodine content of the salt they used [*1*].

The early years of the 20th century witnessed an enormous expansion in nutrition knowledge. Carpenter, in his work on the history of nutritional science, described what is called the vitamin era. Most vitamins were discovered in the 19th and 20th centuries [*7*].

A scheme for identifying vitamins by letter began before their chemistry had been worked out. Labelling of the vitamins was done according to their sequence of discovery. Factor A, found in leaves, and deficiency of which resulted in severe ophthalmia, was the first to be discovered. Next, McCollum and his colleagues agreed upon a water-soluble factor, factor B, as the antiberiberi factor, a cure for a deficiency observed in rice-eating countries (parts of Japan and China, the Philippines, India, etc. and coastal areas of South America and Africa) and which could develop in chickens and pigeons fed white rice. It was then realized that factor B was a complex of factors; these were called B1 and B2. Riboflavin (vitamin B_2), isolated, synthesized and named in 1935, was then discovered to save some dogs on a "blacktongue" diet (deficient in the B complex vitamins) that had collapsed with a prior condition of "yellow liver", a condition with marked fatty infiltration. Pantothenic acid, B_6 and biotin were added to the list of water-soluble vitamins in 1937 [*8*].

After the discovery in Wisconsin in 1924 of the curative effects of ultraviolet light on rachitic rats, many groups tried to determine the factor implicated in this operation. It was quickly traced to vitamin D (the letter C had already been given to the antiscorbutic vitamin, isolated by Albert Szent-Gyorgi from lemons in 1928) [*7*].

A factor found to prevent a number of clinical conditions, including abortion, impotence, and various forms of muscular dystrophy, was isolated in 1935 and named vitamin E. Haemorrhaging in chicks, which was at first thought to be caused by a deficiency of vitamin E, was later cured by a new fat-soluble vitamin, which was named vitamin K, recognized as having an essential role in blood coagulation [*7*].

The first dietary studies

Quantitative nutritional studies expanded with the progress in chemistry in the 19th century. Lavoisier (1743–1794) was the first to report that a labouring man needed more food than one at rest [*9*]. Furthermore, many researchers of the 19th century such as Mulder, Edward Smith and Lyon Playfair tried to quantify the amount of protein needed by humans. Values based on di-

etary studies and ranging from 60 g/day to 120 g/day were proposed; in contrast to Mulder's figures, which were based merely on the Netherlands army rations, Smith's and Playfair's figures were based on dietary studies of workers, soldiers, sailors, unemployed men, doctors and housewives [*1*].

Voit (1831–1908), a dominant figure in physiological chemistry in the latter half of the 19th century, developed the techniques for metabolic studies which instituted nutrition as a science. In 1881, he recommended a daily dietary allowance for an average labourer of 118 g protein, 500 g carbohydrate, and 56 g fat. Rubner (1854–1932), one of the most distinguished of the many pupils of Voit, worked with caloric needs and established the law of surface area in basal metabolism. He determined the caloric values of protein (4.1 kcal/g), fat (9.3 kcal/g), and carbohydrate (4.1 kcal/g) which for many years were the standard for dietary energy calculations. He also investigated protein foods and their digestibility. He was an advocate of a high-protein content of the diet: 127 g/day for the average worker and 165 g/day for those doing hard labour or soldiers in the field [*1*].

In the United States of America (USA), Atwater, on the basis of numerous dietary studies, recommended 125 g/day of protein in the diets of labouring men, along with 400 g/day carbohydrate, 125 g/day fat and 3230 kcal [*10*]. Chittenden (1856–1943), based on nitrogen balance studies, recommended 50 g/day protein for soldiers, a diet considered too low in protein compared to other recommendations [*11*]. In England, Hutchison, an advocate of the high-protein allowance, recommended that a diet of 3000 calories should supply 75 g protein [*12*].

Sherman, an authority on dietary standards, proposed 75 g protein/man per day as a low-protein diet, and for an average diet 100 g protein/day [*13*]. At this same time, he introduced recommendations for dietary requirements of iron (15 mg/day) and a minimum requirement of 0.7 g/day calcium oxide, preferably 1.0 g/day. By 1941, in the 6th edition of his text, Sherman preferred to use the term dietary allowance instead of requirement and recommended 75 g protein, or 10–15% of total calories, 0.8–1.0 g calcium and 12 mg iron daily. Balance studies formed the basis of his recommendations. He took the average from these studies as the minimal requirement and then added a safety margin of 50% for each nutrient. Sherman also made recommendations for desirable dietary intakes of vitamins A, C, D, thiamin and riboflavin [*1*].

Development of food composition tables

Food composition tables are the basis of the science of nutrition. They are essential to the dietitian to evaluate the adequacy of diets of individuals and groups and to plan therapeutic diets and set dietary recommendations. Until suitable methods of chemical analysis were developed, however, no accurate data on food composition could be obtained. In 1864, the Weende method for measuring crude fibre was developed by William Henneberg and Fredrick Stohmann and was used in Europe [*1*].

In 1877, Atwater ran extensive analyses of foods in America that led to the publication of food composition tables [*10*]. Later, similar tables were developed for use in other parts of the world, such as those of McCance and Widdowson [*14*], for tropical countries [*15*], the Middle East [*16*] and for international use [*17*]. Later on, food tables for use in Latin America [*18*], Africa [*19*] and the Near East were developed by

the Food and Agriculture Association of the United Nations [*20*].

Food enrichment and fortification

The enrichment of certain foods with specific nutrients was another step toward dietary improvement for the general population. In the USA in 1924, the State Medical Society of Michigan agreed on using iodized table salt as a remedy for iodine deficiency [*1*].

After the production of several nutrients in inexpensive form became possible, the enrichment of bread, flour, cornmeal and grits became mandatory in some 30 states of the USA. After the approval of salt iodization and the addition of vitamin D to milk, the Council on Foods of the American Medical Association discussed the possibility of improving the health of the public by the addition of other nutrients to food. Later on, fortification of margarine with vitamin A and the addition of calcium and iron to cereals were approved [*21*].

Dietary standards and recommendations

Finding adequate dietary standards continued to be the goal for those working in nutrition and dietetics. In September 1932, the health committee of the League of Nations met in Rome to "consider the question of dietary standards and draw up a scale of family coefficients for international use in order that the enquiries on the state of nutrition in various countries might be comparable." International dietary standards agreed upon were: calorie allowance for an adult not doing manual work should be 2400 calories net/day, with increases for light work of 75 calories per hour of work, moderate work 75–150 calories per hour of work, hard work 150–300 calories per hour of work, and very hard work up to 300 calories per hour of work. Concerning mothers and children under 18 years, energy requirements were obtained from a table of coefficients; for example, a child aged 3–5 years had a coefficient of 0.5 (1200 calories/day) and a nursing mother 1.25 (3000 kilocalories/day). Recommended protein requirement was 1 g/kg body weight per day [*1*].

During the Second World War it became essential for every country to make use of all the nutritional knowledge it had in order to maintain the health, morale, and working efficiency of its populace. In 1940, the US National Research Council appointed a Committee on Food and Nutrition (later called the Food and Nutrition Board). The committee's main concern was to define in accordance with newer information the recommended daily allowances for various dietary essentials for people of different ages. This was not an easy task because of the lack of data, especially regarding vitamins. After rigorous research, however, the committee finally formulated tentative allowances that were adopted in May 1941. The Food and Nutrition Board has continued to evaluate current research and whenever sufficient new information or more reliable data became available, changes were made in the recommended allowances [*1*].

Following the example of the USA, several other countries prepared their own dietary allowance tables. Each was formulated on a group or population basis, serving to evaluate the national food supplies and helping meet certain dietary goals [*1*].

Evidence-based medical nutrition therapy

Rapidly advancing nutritional knowledge and science led to the development of evidence-based nutrition. Nowadays, official nutrition bodies such as the American Die-

tetic Association are promoting evidence-based medical nutrition therapy, a practice that evolved from judicious use of published scientific evidence and best practices.

Moreover, evidence-based medical nutrition therapy means that nutrition advice and recommendations are based on evidence which has been assessed in an unbiased or impartial manner. Recommendations related to relationships between a specific nutrient or food component and a disease should only be made if there is sufficient evidence to support them.

Experimental studies conducted in laboratories have been used to show how a certain nutrient or food works to provide benefit or damage. Being able to prove how a food contributes to the health outcome adds credibility to the hypothesis. Intervention studies supplied the best evidence for determining how a nutrient affects health.

Studying the relationship between diet and health was not an easy task. To begin with, dietary recall methods have their limitations and nutrient composition data of foods consumed must be available and accurate, which is not always the case. In addition, it takes many years for the effect of diet to manifest itself and so studies need to be conducted over long periods. Finally, large numbers of people are required as participants in a study to detect an effect from diet. For this reason, evidence to support nutrition recommendations is sometimes incomplete or inconsistent.

The evolution of dietetics as a profession

Rise of the dietetic profession

War, which has always influenced man's lifestyle, food and health, ought to take some credit for the rise of the dietetic profession. Florence Nightingale (1820–1910), founder of the nursing profession, was also designated the first hospital dietitian. She said, "You cannot diet a patient from a book; you cannot make up the human body as you would a prescription." On November 5, 1854, she arrived at the barracks hospital in Scutari with a small band of nurses during the Crimean War. They found a hopeless confusion, lack of supplies and patients who were almost starved. The next day she began to cook extra from food supplies she had brought and within a week she had an extra diet kitchen established. In addition, due to her organizing ability (characteristic of a dietitian today), the purveyor's department was reorganized, a corps of medical orderlies was established and the cooking service of the soldier-patients' food was rearranged and improved [*1*].

Alexis Soyer (1809–1858), a famous chef born in France, also went to the Crimea, where he was recognized as the first army dietitian and was given credit for the rise of the dietetic profession. He taught the soldiers how to cook and to make their rations delicious and nutritious [*22*]. After his return to London, at the request of Miss Nightingale, he organized schools of hospital cookery, planned kitchens and general diets and wrote a booklet on the preparation of diets for sick soldiers which was adopted by the military hospitals. During Soyer's, time and despite his leadership, dietetics was considered a woman's profession. However, the year 1936 saw the first male member of the American Dietetic Association, and an increasing number of young men followed. In the Second World War they served not only as dietitians in military services but with the Veterans Administration and in civilian positions [*1*].

In the United Kingdom, dietitians who first followed Miss Nightingale's example came from the nursing profession, but the

progress in the science of nutrition and the specialized knowledge required for modern therapeutic diets led to dietetics becoming a specialized field of training with specific academic qualifications as well as hospital training [*23*].

International dietetics

Dietetic associations now exist in many countries on every continent. They all have their own qualifications for academic and professional education and may differ in the scope of their dietetic and nutritional activities, as these are adapted to the needs of the individual countries and the opportunities available. Few studies in the scientific literature have described the field of international dietetics.

Dietetics in the USA

Sarah Tyson Rorer (1849–1937) was the first American dietitian. She founded the Philadelphia Cooking School in 1881 so she could teach dietetics as well as cooking. In addition, she started a diet kitchen "where physicians could send a prescription and get food prepared for special diseases." She also gave physicians classes in dietetics and lectured 4th-year medical students at the University of Pennsylvania [*1*].

In October 1917, under the leadership of Lenna Cooper and Lulu Graves, dietitians met and organized the American Dietetic Association, which immediately concerned itself with qualifications and standards of training for members of this new profession.

The demands of the Second World War gave even greater impetus to the recognition of the work of the dietitian: almost 2000 dietitians were commissioned by the armed services [*1*]. By the turn of the century, through annual meetings, the provision of quality education, networking opportunities and new products and services, and with nearly 70 000 members, the American Dietetic Association had become the world's largest organization of food and nutrition professionals.

Today, the American Dietetic Association is led by a board of directors comprised of national leaders in nutrition and health. "Leading the future of dietetics" is the mission of the association; its vision resides in its members as being the "most valued source of food and nutrition services." The role of the association does not end at the national level. Fifty state dietetic associations, along with the District of Columbia, Puerto Rico and the American Overseas Dietetic Association (comprised of American-trained dietitians who are living and working abroad) are affiliated.

Being the world leader in dietetics, the American Dietetic Association offers an array of services, including a website and the association journal. The website, www.eatright.org, contains a wealth of nutrition information. The journal is the most widely read peer-reviewed periodical in the dietetics field and can be accessed via the website at www.adajournal.org. In addition the association runs a public charity, the American Dietetic Association Foundation, established in 1966 to improve the nutritional health of the public by providing support for research, education and public awareness programmes. The foundation is also a large grantor of scholarships in the nutrition and dietetics fields. For government and public issues, the American Dietetic Association's government affairs office, based in Washington DC, works with state and federal legislators, departments, and agencies on public policy issues affecting the practice of dietetics. The association's position statements are derived from the

latest available research, addressing issues such as children's health, food technology and safety, public health, consumer education, health care reform, nutrition in the elderly and health care provider education.

The Commission on Accreditation for Dietetics Education is the association's accrediting agency for education programmes preparing students for careers as registered dietitians or dietetics technicians. It serves the public by establishing and enforcing eligibility requirements and accreditation standards that ensure the quality and continued improvement of nutrition/dietetics education programmes. Registered dietitians have to study a wide variety of topics focusing on food, nutrition, and management. The purpose of registration is to protect the nutritional health, safety and welfare of the public by encouraging high standards of performance in the profession.

More than 75 000 dietitians and dietetic technicians from the USA and the rest of the world have taken the registration examination over the past few decades.

Dietetics in Asia

In Japan, hospital dietitians were studied by Nakamura of the Department of Nutrition in St. Marianna University, Yokohama [*24*]. Dietetics started in 1925 with the foundation of the first dietetic school and the graduation of the first Japanese dietitians a year later. The Japanese Dietetic Association was established in 1945. In 1962, the old dietetic education system was revised and a new system offering a 4-year study programme was introduced to endorse the growth of registered dietitians. The law in Japan defines a registered dietitian as a dietitian who is registered through a national examination by the government in any nutrition-related area.

Though changes have been made to improve the quality of food service in Japan, attempts to change or improve dietitians' duties were not obvious. The main duties were to plan menus, prepare and cook meals, store ingredients and provide food guidance. Dietitians in Japan were never involved in any clinically-related nutrition care or assessment. According to Nakamura there are many food service dietitians in Japan, however, there are no clinical dietitians.

Tarvady described nutritional care in Indian hospitals [*25*]. The nutrition and dietetics branch of study was created in 1980, yet the profession did not progress much because dietitians, who were mostly women, had no access to hospitals or medical universities to support their teaching and learning programmes. Moreover, dietitians were not able to receive the dignified status that other members of the heath care team usually obtained.

Later, the Department of Clinical Nutrition at the College of Allied Health Sciences initiated and implemented a 1-year postgraduate diploma course in clinical nutrition that gives practical hands-on training. The course content was inspired by the certified nutrition support dietitian syllabus of the American Society of Parenteral and Enteral Nutrition. The department established links with the Nutritional Science Education and Research Foundation in New York and created the first Regional Training Centre in Nutrition Support Systems.

Dietetics in Africa

The actual shape of hospital dietetics in this continent can be depicted from a survey conducted by Calabro, who surveyed 61 counties including Gambia, Malawi, Nigeria and Sudan [*26*]. The results revealed that professional associations, credentialing

requirements and a code of ethics did not exist in most countries and that 60% did not have academic programmes for dietetics. Clinical dietetics was the most frequently selected area of practice, teaching was the second most common and food services the third most common. The author concluded that, with only a few dietitians in each country, the profession badly needed to be developed [*26*].

Although there is no extensive literature on the condition of hospital dietetics in Africa, Fairfull, an American volunteer dietitian who went to Liberia with the aim of making significant contribution to dietetics in that country, gave a brief description of dietetic practice in Africa in 1987 [*27*]. Her observations and activities were carried out in 2 hospitals, ELWA Hospital, and JFK Hospital. JFK Hospital was better equipped and had 2 dietitians with training whereas ELWA Hospital had no dietitian, only a missionary kitchen employee, trained as a registered nurse who served primarily as a purchasing agent.

Dietetics in Latin America

According to Mackinnon, the outstanding figure of South American dietetics was Dr Pedro Escudero of Argentina, the founder of the National Institute of Nutrition and the School of Dietetics in Buenos Aires [*28*]. He had looked at the European and American models and selected from them what suited the needs of his country. The School of Dietetics was established in 1938 as an autonomous institution of the Argentine government, and the requirements for entrance were the same as those for the National University. The course of study offered a good foundation in biochemistry and physiology, and the students were to become medical nutritionists (*medico-dietologo*), the equivalent of internists, specializing in diet therapy and group feeding.

At the same time, Brazil witnessed the foundation of a 1-year course in dietetics. Peru established its school of dietetics during the 1940s at the Obrero Hospital in Lima, and Uruguay and Venezuela have had schools for about the same length of time. During this period, the Institute of Nutrition in Colombia also started a 4-year course with a university affiliation to train nutritionists and dietitians. There was no effort made in Central America as regards the development of dietetics as a profession until 1960 when the Institute of Nutrition of Central America and Panama in Guatemala started a course for dietitians and nutritionists, drawing on North American models.

Following a conference held in Caracas in 1966, supported by the Pan-American Health Organization and with the assistance of the Venezuelan government, on the training of public health nutritionist-dietitians, 13 of the 20 participating schools, which formerly had 2–3-year dietetic training programmes, started offering a 4-year university degree course. In addition, the general plan of the university programme for nutritionist-dietitians recommended at the Caracas conference included a period of practical experience under supervision in a health centre or a hospital. Most of these new degree programmes in nutrition and dietetics were affiliated to university schools of public health and as such had the assistance of the medical faculty for their instructional programme, and had the university hospitals for practical experience.

During the 1970s, there were already 8 dietetic associations in Central and South America with the Central American Association covering 6 countries. Moreover, 7 associations at that time reported a total

membership of 1515. Some time later, other specialized associations were established in the region. The Latin American Federation for Parenteral and Enteral Nutrition was created in 1985 in Buenos Aires, Argentina. This society incorporates the health personnel working in clinical nutrition in Latin America. It organizes an international congress every other year where advancements in the field, as well as clinical and basic research in nutrition from the region, are presented.

Jonkers-Schuitema et al. provided information on the current standing of dietetics in Latin America [*29*]. Towards the end of the 1970s, Dr Jose Felix Patino at Hospital de la Samaritana in Bogotá started the first nutrition team in Colombia as a branch of the department of surgery. In 1986, some members of this team, with the support of the Colombian Surgical Society, founded the Colombian Association for Clinical Nutrition. The society main's activities were education, with the subsequent development of educational courses and congresses. Efforts were also directed at modifying the curricula in schools of nutrition and dietetics to include more training in clinical nutrition and to move the dietitian into clinical work with critically ill patients. Nutrition in Colombia was later directed more towards community activities, leaving inadequate resources for clinical nutrition and hospital programmes. With the launching of the new health system, however, where health care is paid by private companies, costs of approved basic therapy are covered, including clinical nutrition support.

In summary, the field of nutritional support in this part of the world is growing. This growth is supported by many educational activities and promoted by the Colombian Association for Clinical Nutrition. Clinical trials as well as papers on nutrition are being presented at every meeting and more individuals are looking for additional training in order to be better qualified.

Dietetics in Europe

With the establishment of an official definition by the International Labour Office in Geneva, the profession of dietetics was recognized among the paramedical professions and coded under group 0.69 [*30*]. Calabro investigated the profession in 12 European countries: Austria, the Czech Republic, Germany, Greece, Ireland, Italy, Luxembourg, Poland, Slovakia, Spain, Switzerland and the United Kingdom, [*26*]. High scores for overall professionalization of dietetics were found in these countries. Professional associations existed in most; dietetics was recognized as job title and clinical dietetics was a common area of practice. In addition, all these countries had academic programmes and dietetic curricula which included a mandatory period of practical experience before students could embark on professional practice. Unfortunately, few descriptions of dietetic practice in individual European countries exist in the literature.

In Britain, the British Dietetic Association was set up in 1936, with the majority of members being clinical dietitians. It offers continuous training and facilities to dietitians. The association now has more than 5000 members, mostly qualified dietitians holding a degree or postgraduate diploma recognized for registration by the Health Professions Council.

Except in the Netherlands, one of the early founders of the profession, dietetics education in European countries was at a lower level than that in the United Kingdom, Ireland and the Scandinavian countries. In most European countries, the dietitian's major tasks are still food preparation and guidance [*29*].

Dietitian training has existed in the Netherlands since 1935. This country of 15 million inhabitants currently has 5000 trained dietitians (2% men), half practising in the profession. Academic training is usually 4 years, including a 6-month period of practical, hands-on training. There are 4 colleges of nutrition and dietetics, located in Groningen, Nijmegen, the Hague and Amsterdam. The universities of Maastricht and Wageningen have Master's programmes in nutrition [*29*].

Since the first International Congress of Dietitians, held in Amsterdam in 1952, Dutch dietitians have always been in contact with colleagues abroad. In 1993, the Dutch Association of Dietitians signed a reciprocity agreement with the American Dietetic Association. Accordingly, Dutch dietitians are qualified to take the registration examination offered by the Commission on Dietetic Registration to become a registered dietitian in the United States [*29*].

Dietetics in the Netherlands stands on the threshold of a new era. After 60 years this profession has risen from a health professional who evaluates and controls food and diet preparation to a health professional who is an important component of health care. Today's dietitians work in various fields of dietetics and nutrition, including university hospitals, community hospitals, nursing homes, regional health work, private practice, advice and prevention bureaux, research institutions, education, industry and government. In addition, the Dutch Association of Dietitians provides professionals with protocols and guidelines that promote quality assurance, continuous appraisal and improvement of the profession.

Dietetics in the Middle East

Turnlund and Tannous studied dietetic practice in the Middle East in 1983 [*31*]. Of the 15 hospitals surveyed, 2, both in Saudi Arabia, had trained dietitians. One of these hospitals had registered dietitians trained in the United States, the other had dietitians registered in Great Britain. None of them spoke Arabic, so it was recognized that there was a need for Arabic-speaking trained individuals. In Lebanon only 1 hospital had dietitians, and 9 of the 15 hospitals surveyed employed a person with some background in nutrition as head of dietetics and/or food service.

An evaluation of the nutritional adequacy of normal diets given to patients was made according to the 4 basic food groups; 7 hospitals supplied an adequate diet and only 3 had their own diet manual. Through this survey, it was noticed that only limited counselling was given to patients, either during their hospital stay or at discharge. The authors acknowledged that hospitals in the Middle East area needed Arabic-speaking dietitians, familiar with the food habits of the countries in which they were working. Dietetics training programmes in the area were also among the recommendations [*31*].

Education and training in dietetics in Lebanon

In Lebanon, university training in dietetics started in 1981 when the American University of Beirut developed a nutrition and dietetics programme aimed at providing dietitians for the country and the Middle East as a whole. Academic requirements were based on the standards of the American Dietetic Association. Up until 2003 this was the only university in Lebanon offering an undergraduate programme in nutrition and dietetics. Active dietitians in Lebanon are almost all graduates of the American University of Beirut or have had training in the USA or Europe. Besides nutrition courses, the programme includes courses

in biology, chemistry, biochemistry, sociology and psychology. The 3-year programme is usually supplemented by an 11-month supervised internship in the dietary department of any hospital in Beirut. Master's degree programmes in nutrition are also offered.

The Lebanese Dietetic Association was founded in 1993. It is considered a reliable reference for scientifically based nutrition information in the country. With nearly 200 active members, it is currently working on forming a credentialing body responsible for establishing and enforcing standards and qualifications for dietetic registration. Currently, dietitians and nutritionists are employed in a variety of situations. Some work as members of the medical team treating persons with illnesses or injuries by providing therapeutic nutrition services. They are called clinical or therapeutic dietitians, and they constitute a vital component of health care teams in hospitals, nursing homes, health maintenance organizations and other healthcare facilities. They assess, evaluate, educate, and plan diets for patients in need. Each hospital in Beirut has to have at least 1 clinical dietitian. In addition, some hospitals in Beirut have specialized dietitians such as a diabetic specialist dietitian, a paediatric dietitian or a renal dietitian.

Nutrition, health and fitness have become major concerns in Lebanon, and in Beirut in particular. As a result, community nutritionists/dietitians are becoming a common sight on television and are now more widely available in health clubs. They are responsible for teaching, monitoring and advising people on proper nutrition to improve their quality of life.

Dietitians in education and research dietitians are also available in Lebanon. They usually have a higher education degree. The former work in colleges, universities and community or technical schools, teaching future doctors, nurses, dietitians, and other health professionals the science of foods and nutrition. They also conduct experiments to solve critical nutrition questions and provide dietary recommendation to the public.

The future of dietetics

Trends

Throughout March and April 2002, the American Dietetic Association conducted a scanning process and compiled a list of more than 100 important trends, issues and events that are likely to shape the future of dietetics, dietetics professionals and dietetics associations [*32*].

New opportunities for the profession were recognized by the 2002 environmental scan. Population growth in the USA means more people need dietetics services. This applies to the world population as well, including developing countries. The increasing cultural and ethnic diversity of the USA implies that significant numbers of people may be underserved. There will be a greater need for services as a result of new information about the role of diet in health care, new understanding of the contribution of diet to chronic problems and the demands of an ageing society. Finally, the growing need for dietetics professionals is driven by a growing public interest in nutrition, food safety and the potential of functional food to prevent illness. However, dietetics experts are faced with new sources of competition from web-based information services, food producers, nutritionists and alternative medicine practitioners, among others.

On the 85th anniversary of the American Dietetic Association, the board of directors shared their insights by looking at their vision of the association in the year 2017, the 100th anniversary [*32*]. They

predicted multiple interactions in managing obesity issues, nutrigenomics and the delivery of information and food directly to the home. The future of the association will be closely involved with online communication and commerce. Interpretation of the continually evolving daily recommended intake with regard to particular genetic profiles, specific preferences and lifestyle is expected to be one of the new trends too. Extension of the scientific base of dietetic recommendations is also on the agenda.

Challenges

Given the current trends, the profession is facing technological, social, political, global and environmental forces that are significantly reshaping the world food system. Dietetics professionals are destined to play a role in the future of the food system as advocates of food safety, quality, security and healthfulness.

The emerging modern lifestyle, with its stress on time, changing eating habits, lack of physical activity and busy families with long working hours, puts a lot of pressure on the food system to meet dietary needs. The home is no longer the centre of food and eating. Furthermore, eating habits are associated with leading causes of illness and death such as cardiovascular disease, some cancers, diabetes, hypertension and obesity, a fact that raises the stakes for the dietetics profession.

Keeping pace with science and technology is a challenge in itself for dietetics professionals. Affording the means to learn and interpret new developments effectively as and when needed should be an important component of professional development goals. With the advancement in information technology, dietitians could adopt the Internet for client communications, learning and promotion, taking into account benefits and privacy issues.

Moreover, with the rise of homeopathy and other types of alternative medicine, the public has more options for nutritional guidance. The competitive space of the dietetics profession is being seriously challenged. Dietetic associations must help their members to keep up with this competition through the sophisticated delivery of nutrition and health related information from a variety of sources by building up the dietetics brand. Dietetics professionals and their associations should also exert more efforts to increase diversity in the profession and work cross-culturally.

According to the American Dietetic Association, obesity is a "crisis-opportunity." Dietetics professionals and their associations are uniquely prepared to take the lead on this issue and launch joint projects to bring it to the forefront of public attention. Individuals and societies need to hear and see the bottom-line numbers on what excess weight is costing, and be able to get ongoing support for a healthier lifestyle. More people need nutrition counselling than before; they have a greater, but flawed, knowledge of nutrition and have chronic needs for improving their diets. This ought to be a growth era for dietetics.

Planning and preparation

Following a thorough discussion about the implications of the opportunities and challenges, the American Dietetic Association put forward a strategic plan aimed at serving the public as well as dietetics as a profession [*33*]. The goals for 2004–08 include facilitating research supporting the dietetics profession, empowering members to compete successfully in a rapidly changing environment and proactively focusing on emerging areas of food and nutrition [*33*].

To sum up, the dietetics profession is shaped by powerful trends as well as faced

by even stronger challenges. As the world changes rapidly, the way dietetics professionals deliver services must change to keep pace. Under this pressure, dietitians have the opportunity to transform their field into a cutting edge profession that addresses emerging and evolving needs of their societies. However, there is nothing that automatically gives this opportunity to dietitians [*32*]. They will have to shape their destiny and this can only be achieved by a proper and strategic planning and preparation. And as the Japanese proverb says, "Vision without action is a dream; action without vision is a nightmare." Thus, to be a proper action, any action must be based on a proper vision and strategic planning.

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