Clinical nutrition education—relevance and role models1–4

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ABSTRACT Although Hippocrates recognized the importance of a good diet for the prevention of disease, clinical nutrition has emerged only recently as an important discipline in modern medicine. A uniform curriculum for teaching nutrition to medical students can be adapted for use with postgraduate residents and fellows in the setting of referrals of patients with many common diseases. The prospect that the medical profession will accept clinical nutrition as an essential discipline may be enhanced by the realization that cost-effective medical practice is optimized by wider application of nutrition principles to health maintenance and patient care. Am J Clin Nutr 1998;67:192–6.

INTRODUCTION The topic of the nutrition curriculum in medical schools cannot be considered in isolation, but can only be understood in the broader context of how clinical nutrition is viewed and accepted by academic medicine, by the medical profession, and by society. Teaching nutrition in medical schools presumes that nutrition education is essential for future physician practitioners.

Each of my predecessors who received the National Dairy Council Award for Excellence in Medical/Dental Nutrition Education brought his or her unique personal perspective to this address. My perspective will be that of a physician who has viewed this issue from two viewpoints: as a sometime national policy proponent and as a faculty member who has nurtured and vigilantly guarded a curriculum and postgraduate training program at my institution. Much of this struggle has seemed like tilting at windmills. Yet either undying optimism or tenuous reality suggests that the current restructuring of medical practice in the United States may provide new opportunities for physicians trained in clinical nutrition and accentuate the importance of our field to patient care.

NUTRITION IN ACADEMIC MEDICINE: A BRIEF HISTORY AND GUIDE History suggests that nutrition has always been destined to play an essential role in medical practice. In the future, we may regard the past 50 y as an anachronistic era of technology and specialization in which clinical nutrition got shunted to the sidelines. Whereas the ancient Greeks believed that human disease was caused by the capriciousness of their gods, Hippocrates taught that illness is caused by an imbalance of nature and bodily humors and that the goal of medicine should be to ensure health through proper diet and hygiene (1). Indeed, the word diet is derived from the Greek diēta, which implies a way of healthful daily living according to how one selects food and shelter from the environment (2).

Twenty-two centuries after Hippocrates, the golden era of nutrition was ushered in by the British naval surgeon James Lind in 1747. In the first recorded controlled clinical investigation, Lind investigated the potential for dietary treatment of the devastating epidemic of scurvy in seamen on the British ship Salisbury. Lind (3) provided two oranges and one lemon to two scurvy-sick sailors every day for 6 d and cider, vinegar, nutmeg, or seawater to other groups of two each. The sailors who received the orange and lemon diet were cured of all signs of scurvy and resumed full duties, whereas those consuming the other diets became sicker or died.

Additional classic experiments were carried out in the late 19th and early 20th centuries by other careful physician investigators. Eijkman (4) induced beriberi (thiamin deficiency) by feeding polished rice to his animal model, the chicken. Goldberger (5) showed that pellagra was not infectious but was a nutritional disease that could be cured by replacing a corn diet with mixed grains. Minot and Murphy (6) cured pernicious anemia by injecting a water extract of calf liver into their patients. Later, Castle (7) showed that patients could be treated orally with a mixture of beef (containing the “extrinsic factor” later isolated as vitamin B-12) that was predigested in vivo in a healthy person’s stomach contents, which contained the “intrinsic factor” specifically lacking from patients with pernicious anemia. Soon after World War II, the Dutch pediatrician Dicke (8) published his thesis on the deleterious effect of wheat on the intestinal absorption of children with celiac disease. This event led to the identification of dietary gluten as the offending agent and the effective use of gluten-restricted diets in the treatment of this common disorder affecting 1 in 300 whites.

Thus, during the first half of the 20th century, medical students,

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physicians in training, and medical practitioners encountered several examples of the importance of the diet in the pathogenesis and cure of several diseases. It was left to chemists and biochemists to complete the full characterization of the structure and properties of the vitamins. As McLaren (2) observed, by the 1940s nutrition had become but a subset of biochemistry and clinical nutrition was regarded as a focused therapeutic modality in the province of dietitians but not physicians. In the half century after World War II, clinical nutrition lost its way as academic medicine was partitioned into organ- or disease-agent-based specialties. For example, obesity and lipid disorders became the province of endocrinology and metabolism, vitamin B-12 and folate metabolism and their deficiency syndromes fell into hematology, malabsorption disorders were consolidated into gastroenterology, and the new discovery of parenteral nutrition was integrated mainly into surgical metabolism and pharmaceutical therapy.

After the founding in 1959 of the American Society for Clinical Nutrition (ASCN) by a group of physician members of the American Society for Nutritional Sciences (formerly the American Institute of Nutrition), the orphaning of clinical nutrition became a topic of several Society conferences that defined the discipline and imperatives of nutrition education in the medical school curriculum. A 1985 National Research Council report defined the sorry state of neglect of our specialty and made specific recommendations for introducing a required 25–30 h course on the basic principles of nutrition in the preclinical years of every US medical school (9). In 1988 the Surgeon General’s Report on Nutrition and Health defined the clear relation between improper diet and 5 of the top 10 causes of mortality in Americans: coronary artery disease, stroke, cancer, diabetes, and chronic alcoholic liver disease (10). The Food and Nutrition Board of the National Academy of Sciences produced a definitive treatise on the strong relation of diet with many common chronic diseases (11), and the Department of Health and Human Services recommended that ≥75% of primary-care physicians should be able to provide nutritional assessment and accurate patient counseling by the year 2000 (12). Finally, the National Nutrition Monitoring Act of 1990 mandated that “students enrolled in United States medical schools and physicians practicing in the United States have access to adequate training in the field of nutrition and its relationship to human health” (13). However, this mandate proved hollow with neither funding nor specifics for its implementation.

The percentage of the 124 US medical schools that required a separate course in nutrition grew from 19% in 1976 to a peak of 37% in 1981 (14), but fell back to 26% in 1991 (15). About two-thirds of schools reported that they integrated nutrition concepts into other courses (9). During the past 20 y, about two-thirds of medical schools have consistently provided elective courses in nutrition at some stage in the curriculum, but <10% of medical students have taken advantage of this opportunity. Ironically, one survey showed that about two-thirds of graduating medical students in the United States and Canada considered their exposure to nutrition to be inadequate and close to the bottom of a laundry list of “orphan” topics in the medical curriculum (16).

Postgraduate clinical nutrition training has been a positive outcome of the advent of nutrition support services in many academic medical centers. A 1991 ASCN survey of directors of residency training programs identified programs with some component of nutrition in 160 institutions, especially in departments of family medicine, pediatrics, surgery, and medicine. The survey identified several strong programs, including 18 with a freestanding section of clinical nutrition and a dedicated faculty member and 22 with a multidisciplinary nutrition support service and elective rotations for an average of seven residents per year (17). The latest ASCN survey in 1993 identified 38 fellowship programs with ≥1 y of training in clinical nutrition (18). Twenty-three of these programs were in departments of internal medicine, 12 were in pediatrics, and 3 were in surgery. For the most part, these fellowships provided a mixture of comprehensive conferences, a clinical experience that focused on nutrition assessment and support, and, in some instances, a third year for research (18).

For the past 40 y the American Board of Nutrition has provided a comprehensive, rigorous examination to certify the competency of individuals trained in clinical and human nutrition. Although the board originally examined experienced individuals from a variety of disciplines, for ≥15 y it has required candidates to complete an approved clinical nutrition training program. Among the ≥400 persons who have received American Board of Nutrition certification, two-thirds are physicians in internal medicine, pediatrics, or surgery. Reflecting the overall difficulty in integrating clinical nutrition into academic medicine, the recent American Board of Nutrition application to become a member board of the American Board of Medical Specialties failed to win approval on the grounds of a lack of standardization of postgraduate training programs and inadequate numbers of training program graduates eligible as candidates for the annual examination. As one who was much involved in the unsuccessful American Board of Medical Specialties inclusion initiative, I believe that we have an opportunity to reverse this temporary setback by increasing the numbers of programs and candidates in response to the changing realities of academic medicine and practice (19).

WHAT ARE WE DOING WRONG, OR, THE ENEMY IS US

Why has the field of clinical nutrition failed to achieve full acceptance in the curricula of US schools of medicine, full competitive subscription in residency programs, and substantial and sufficient numbers of postgraduate trainees? One universal cause is the intense competition for time in the increasingly crowded medical school curricula nationwide. Furthermore, clinical nutrition lacks a defined system or technology and, as clinical nutritionists, we often fail to agree on a clear definition and scope of the field.

Our lack of consensus on the scope of clinical nutrition is not surprising in view of the variety of related specialties that we consider as our primary or secondary homes. These competing allegiances include endocrinology, gastroenterology, hematology and oncology, surgery, pediatrics, family practice, and public health. The eclecticism of clinical nutrition was borne out by the 1989 ASCN membership survey, which identified a wide range of primary research interests including alcoholism, nephrology, AIDS, aging, nutrition support, public health, growth and development, vitamins and minerals, obesity and energy, lipids, and prevention of cardiovascular disease (20).

Those of us who have labored diligently through the years to advance our field are up against the formidable Catch-22 that there are too few academic clinical nutritionists to go around. With clinical nutrition curricula and training programs present in less than one-fourth of academic medical institutions, our field
assumes a low national visibility. This translates into insufficient clout with the academic medicine establishment, too few role models for future academic leaders, and too few academic clinical nutritionists to build the programs we need to train the practitioners and role models of tomorrow. What we need is a catalytic series of circumstances to break out of this mold.

WHAT IS CLINICAL NUTRITION AND HOW SHOULD IT BE TAUGHT?

Like the blind men and the elephant, most academic clinical nutritionists focus on only a few parts of the overall entity of clinical nutrition. Yet introduction of our specialty into medical school curricula and postgraduate training programs demands broad consensus on what should be taught. According to our Hippocratic legacy, nutrition is in reality an environmental science that seeks to ensure the proper balance between what is consumed from plant and animal dietary sources and the maintenance of health (1). Clinical nutrition broadens this definition by its concern for the use of proper diet in the prevention of disease and the use of nutrients as an essential component of the medical treatment of acute and chronic illness. Thus, a reasonable definition of clinical nutrition is “a science that is concerned with basic knowledge relating to the diagnosis and treatment of diseases that affect the intake, absorption, and metabolism of dietary constituents, and to the promotion of health through prevention of diet-related diseases” (21).

As recommended by the National Research Council report of 1985 (9) and consistent with other courses of study in medicine, the principles of nutrition and their clinical relevance should be taught in a comprehensive and organized fashion to medical students in the preclinical years, then reinforced by elective rotations in the clinical years. Although no standard curriculum is available, the preclinical course is an opportunity to introduce the basic principles of dietary requirements and regulation of the intake, absorption, and metabolism of all nutrients, and the national and international public health importance of diet to health. Clinical applications of these basic principles can be discussed in relation to obesity, eating disorders, lipid disorders, diabetes, intestinal malabsorption syndromes, hepatic and renal failure, starvation, and micronutrient deficiencies. The physiologic principles of nutritional assessment and support in management of acute and chronic illness are also essential topics. Ideally, these concepts should be reinforced by direct patient interactions in the clinical years and in the various postgraduate residency programs.

The recommended content of clinical nutrition specialty fellowship programs has been defined by recent ASCN committees (18, 21). In general, fellows should receive comprehensive exposure to basic nutritional concepts through frequent conferences, courses in basic nutrition, and an intensive clinical experience in the academic hospital setting that focuses on assessment and management of patients with a wide variety of clinical conditions related to under- or overnutrition. Because malnutrition is a component of nearly one-half of medical illnesses requiring hospitalization (22), clinical nutrition teaching material is readily available for a well-structured inpatient consultation and nutrition support program with active outpatient clinics for patient referrals. Busy medical and surgical services typically include many inpatients with chronic wasting diseases such as AIDS and cancer, intestinal diseases including malabsorption syndromes and renal or hepatic failure, cardiorespiratory complications of severe obesity, acute pancreatitis, and postsurgical complications limiting nutritional intake. A typical successful clinical nutrition outpatient experience includes exposure to patients with obesity and its many complications, hyperlipidemias, eating disorders, and chronic intestinal problems that require specialized diets or nutritional support. Recognition by primary-care physicians of the persisiveness of diet-related disorders in all aspects of medicine should prompt a steady flow of patient referrals for future physician nutrition specialists in well-structured clinical nutrition programs.

THE IMPERATIVE FOR CLINICAL NUTRITION EDUCATION AND TRAINING

American physicians are, by and large, ignorant of the importance of diet to health, despite the abundant epidemiologic evidence and the near-obsession of the American public with this relation. Although the Surgeon General’s report provided the first wake-up call on the relation between diet and mortality, especially from heart disease, stroke, and diabetes (10), a more recent survey underscored that 19% of deaths in the United States can be attributed broadly to lifestyle choices related to diet and exercise and excessive use of alcohol (23). The increase in the prevalence of obesity from 25% to 33% of American adults in the past decade (24) has raised the national risk and frequency of the common obesity comorbidities of hypertension, type 2 diabetes, and hyperlipidemia, as well as the risk of life-threatening cardiopulmonary complications in the 1.5 million Americans with a body mass index (in kg/m²) > 40, who are classified as morbidly obese. Common cancers, such as those of the breast, endometrium, and colon, are also clearly related to improper dietary habits.

A recent workshop that evaluated the practices of primary-care physicians from 11 countries found that most physicians were aware of a relation between diet and many common disorders, but had little practical nutrition knowledge and underserved the resource of dietitians (25). In the absence of knowledgeable advice from their physicians, the American public falls prey to a confusing array of dietary and diet supplement recommendations from unscrupulous yet highly profitable marketing practices. Vast numbers—perhaps even the majority—of Americans believe that multivitamins and other supplements are uniquely essential to health. Meanwhile, the costs of various unregulated obesity treatment programs reach the billions of dollars.

The gullibility of Americans for unproved health schemes and fraudulent dietary promises is underscored by recent data from the National Science Foundation’s National Science Board. These data show that most adult Americans say they are interested in science and technology, but less than one-third have more than rudimentary knowledge of the scientific process. For example, <50% of Americans recognize that the earth goes around the sun once per year, that human biology evolves from animals, and that dinosaurs and humans did not cohabit the earth (26).

THE WAY AHEAD, OR, RESPONDING TO PRESENT AND FUTURE REALITIES

The field of clinical nutrition is at a crossroads defined by three factors. First, it must be increasingly evident to the medical profession that a major public health issue of our society is the
epidemic of bad nutrition, exemplified by continued high death rates from cardiovascular disease and from obesity in association with the common and costly diseases of hypertension, diabetes, and certain cancers. In the new era of managed care, public education about diet and health and accurate nutrition counseling of patients are clearly the only effective strategies for reducing the costs and suffering associated with these illnesses.

Second, exciting basic nutritional and epidemiologic discoveries that bear directly on diet and health are reported in the medical literature and media with increasing regularity. Exciting examples include the discoveries of several different obesity genes that regulate food intake and energy metabolism, the role of antioxidants such as vitamin E in reducing atherosclerosis, and the relations between folic acid and neural tube defects and among folic acid, elevated plasma homocysteine, and cardiovascular risk. Nutrition science has clearly reached a point where new discoveries must affect the medical profession’s understanding of the importance of diet and health, eventually translating into more effective ways to counsel and treat our patients.

Third, the new climate of managed care is forcing radical changes in the way physicians are educated and trained to practice medicine. The mandate (or mantra) of cost-effective managed care has changed patient referral patterns to emphasize the role of primary-care physicians while minimizing the roles of specialists and costly procedural technology. To date, administrators of managed-care plans have paid little attention to preventing illness by appropriate dietary counseling. Yet prevention through physician and patient awareness of the importance of nutrition can contribute significantly to control of health care costs. Our future will be defined by our response to these new professional realities, which present a clear challenge and opportunity to assert highly visible and important leadership in medical education.

RELEVANCE, ROLE MODELS, AND REIMBURSEMENT

As clinical nutritionists, we find ourselves constantly defending and redefining our relevance to medicine. In the last 30 mo of this century, our relevance is increasingly apparent in two main areas: first, the recognition of the importance of nutritional assessment and support of malnourished hospitalized patients, and second, the proper use of diet in cost-effective prevention and treatment of the most common diseases that afflict our society. A recent National Institutes of Health symposium defined the rationale and wide acceptance of nutritional support as a treatment modality for sick patients (27), and the Joint Commission on Accreditation of Health Organizations has provided clear and required standards for the nutritional assessment, treatment plan, and follow-up surveillance of nutrition support by a physician-led team of health care professionals in the hospital setting (28).

In the outpatient arena, the efforts of academic medical centers to widen their community bases as a strategy for survival have, at least in my own institution, greatly enlarged the flow of patient referrals for evaluation and management of obesity, eating disorders, difficult intestinal diseases manifest by severe malnutrition, and patients requiring continuous home nutrition support. Clearly, the imperative for bringing clinical nutrition to bear on cost-effective prevention strategies will require many more well-trained physicians who can recognize the proper role of diet in medicine.

Studies have shown that incorporation of clinical nutrition into medical school curricula and residency programs depends most strongly on the role model of a faculty advocate and leader (17). The ASCN’s Committee on Clinical Practice Issues in Health and Disease recommended that “every major medical center have at least one physician nutrition specialist who will coordinate nutrition care services, be a regional resource for complex nutrition referral, will be responsible for nutrition education, and will be a role model for aspiring physicians” (29). The goal of seeding every medical center with an effective role model in clinical nutrition has been extended by a funding initiative of the ASCN Council and by a recent successful application for funding from the National Institutes of Health to establish an intersociety professional nutrition education consortium that will establish implementation strategies. Clearly, an identified clinical nutrition specialist role model with well-defined educational and practice responsibilities can lead to positive benefits: ensuring a place for nutrition in the medical school curriculum, providing residency training programs for future practitioners, and developing new postgraduate fellowship programs for training inspired new primary nutrition specialists.

Ultimately, full acceptance of clinical nutrition by the medical profession requires that we provide educational programs to practicing physicians and the public and that we make clinical nutrition a valid and reimbursable way for physicians to practice medicine with the same financial security as their peers. In keeping with this national meeting’s joint ASCN/ASPEN (American Society for Parenteral and Enteral Nutrition) Satellite Symposium titled “Clinical Nutrition: Opportunity in a Changing Health Care Environment” (held July 26, 1997), each medical center’s physician nutrition specialist should be charged with providing one or more regional continuing medical education courses per year that will drive home the relevance of clinical nutrition to medical practice in the managed care setting. Public education in nutrition is also vital to the health of the nation. It can be approached by accurate physician counseling of patients, by providing informative articles to the news media, and by ensuring, through appropriate consulting arrangements, that product marketing to consumers is educational and accurate.

Finally, training of adequate numbers of physician nutrition specialists and fully effective application of nutritional concepts to medical practice will require new partnerships with the new powers of health maintenance organizations. Good nutrition-oriented medical practice must ensure adequate time for patient education together with ready access to trained registered dietitians. Concerted efforts must be made to obtain reasonable data on the cost-effectiveness of nutrition counseling in medical care and in prevention of common diet-related diseases. The availability of such data appears to be a prerequisite for ensuring appropriate reimbursement of physicians and other health care professionals who apply clinical nutrition to medical practice.

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