

# Current Perception of Nutrition Education in U.S. Medical Schools

David J. Frantz · Craig Munroe · Stephen A. McClave · Robert Martindale

Published online: 20 May 2011  
© Springer Science+Business Media, LLC 2011

**Abstract** Historically, physicians have perceived the quality of nutrition training during medical school as inadequate. A literature review suggests that this perception has not significantly changed since the 1950s. Many schools have worked to create clinical nutrition curricula for use during medical school. Interestingly, data suggest that medical students' perception of the importance of clinical nutrition can decrease during medical school. Recent data support the importance of targeted nutritional therapy to reduce morbidity and mortality, yet the number of physicians interested in nutrition appears to be declining, and fewer hours of nutrition training are occurring in medical school. One possible solution to improve both training and awareness of the

problem is to implement a certification program for both students and preceptors modeled after the Cardiac Life Support training offered by the American Heart Association.

**Keywords** Nutrition education · Nutrition · Review · Education · Graduate Medical Education (GME) · Perception · Medical student · Medical school

## Introduction

Over the past decades, graduate medical education has changed dramatically. The unprecedented rate of scientific discovery has led to a seemingly exponential increase in the amount of material that students should be taught. Emerging topics, such as molecular biology and human genetics, compete with traditional subjects, such as anatomy and biochemistry, for limited teaching time. In addition, newer nontraditional topics, such as complementary medicine and ethics, are routinely added to medical school curricula in an effort to produce well rounded physicians. The role of the modern physician is changing. Many tasks that were once responsibilities of physicians are increasingly being relegated to physician extenders, further changing what physicians must be taught. Clearly, the education that physicians received just 20–30 years ago is dramatically different today.

The subject of clinical nutrition is one area of the curriculum that has dramatically changed over time. During the 1970s, when total parenteral nutrition (TPN) became available, hospitals created metabolic/nutrition wards dedicated solely to the practice of clinical nutrition. As the need for qualified physicians increased, medical schools offered more education. This changed dramatically during the late 1980s and early 1990s, when two large studies showed significant harm from the overuse use of TPN [1,

---

D. J. Frantz  
Departments of Medicine, University of North Carolina  
School of Medicine,  
Chapel Hill, NC, USA

C. Munroe  
Department of Medicine, Division of Gastroenterology and  
Hepatology, Stanford University,  
Palo Alto, CA, USA

S. A. McClave  
Department of Medicine, Division of Gastroenterology,  
Hepatology and Nutrition, University of Louisville,  
Louisville, KY, USA

R. Martindale  
Department of Surgery, Oregon Health and Sciences University,  
Portland, OR, USA

D. J. Frantz (✉)  
Department of Medicine,  
Division of Gastroenterology and Hepatology,  
130 Mason Farm RD, Campus Box # 7080  
Chapel Hill, NC 27599–7080, USA  
e-mail: dfrantz@unch.unc.edu

2]. As the widespread use of TPN fell out of favor and the number of physicians who practiced clinical nutrition declined, courses in nutrition were dropped or shortened to make room for other topics.

Despite the decline of clinical nutrition taught in medical school, the field has continued to advance, and over the past few decades, nutritional therapy has changed from a traditional supportive role to a therapeutic role, wherein focused nutrition therapy can be used to optimize outcomes. Early enteral-nutritional therapy has been shown to reduce morbidity and mortality, and evidence supports the idea that the appropriate choice of specific nutrients can improve clinically important outcomes, such as decreased length of stay, fewer days on the ventilator, and decreased mortality in defined patient populations [3•, 4•, 5•, 6•]. Nutritional therapy is becoming an active, rather than passive, treatment modality.

Currently, the medical education program is reaching an inflection point. The decreased emphasis placed on nutrition during medical school and the increasingly important role of clinical nutrition creates a dichotomy. Experienced providers are needed, yet less time is devoted to train physicians in nutrition during medical school. As evidence of the current problem, professional clinical nutrition societies have seen a dramatic decrease in the number of physicians in their membership over the past few years. To increase the number of physicians interested in clinical nutrition, we must first understand the historical and current perceptions of nutrition that lead us to our current situation. In this manuscript, we present a brief historical overview of the perception of medical education training, and conclude with some ideas on how to implement change.

### Historical Perspective

Over 60 years ago, Edward High, PhD from the Medical College of Nashville, surveyed 66 medical schools in the United States, asking about their current implementation of nutrition education. He reported a response rate of 91% [7]. The majority of schools integrated nutrition into other courses, such as biochemistry or internal medicine. Twelve schools (20%) reported offering a special course in nutrition with an average 21 h of instruction time. Interestingly, half of the schools reported that they felt their respective curricula were insufficient, and many administrators and course directors commented on the need for change. Dr. High concluded his study by reiterating the appeal by medical school administrators for a reform of clinical medical education.

With the advent of TPN, pioneered by Drs. Dudrick and Rhoads in the 1960s, the perception of the importance of nutrition began to change. By the 1980s, there was a strong resurgence in the number of clinicians who practiced clinical nutrition [8]. This prompted a movement among schools to

offer more graduate-level training. The training improved dramatically, and by 1983, a survey of the majority of medical schools and universities in the United States found enough trainees to warrant a call for the formation of a formal fellowship that would be recognized and certified like all other medical specialties [9]. This same year, Dr. Young, from the University of Texas Health Sciences Center at San Antonio, surveyed 782 department heads from all of the medical schools in the United States in an effort to codify the major nutritional topics that should be taught. He compiled a list of 50 core competencies in clinical nutrition that were to form the base of future clinical nutrition training programs [10].

Also during the mid-1980s, three publications reported the results of the Southeastern Medical School Cohort. This cohort was established to assess the level and perception of training at 11 different medical schools in the southeastern United States. Representatives from all of the schools developed a standardized test that was administered to all graduating medical students. The results of the test showed a wide variance in the level of competency between students at the various schools. In addition, 85% of graduating students were dissatisfied with some aspect of their nutrition training [11]. This concerned the authors, and they postulated that the variance either reflected baseline differences in the knowledge that medical students obtained prior to medical school, or more problematically, it represented differences in training between the schools. To address this question, the authors repeated the study on incoming medical students to measure the baseline variance of knowledge in incoming students. The testing showed that first-year medical students, as a whole, had a very homogeneous understanding of nutrition. The authors concluded that the variation in test scores was a direct result of not having a standardized curriculum among the different medical schools. To remedy the disparity between programs, the authors worked with school administrators and educators to develop a core curriculum consisting of 26 relevant topics that could be taught in approximately 40 h of instruction [12, 13].

These studies showed the importance of having a standardized core curriculum, and in the 1990s, the National Institute of Health awarded the University of North Carolina (UNC) a research grant to create a national curriculum. According to the Association of American Medical Colleges (AAMC), during this time period, only 23% of schools had a required nutrition course [14]. Researchers from UNC examined the different programs at all medical schools in the US, and developed a standardized curriculum based on available guidelines and survey results. The curriculum was entitled, “Nutrition in Medicine,” (NIM) and it was made available as a computer-based interactive teaching tool to all medical schools. In 2000, followup data became available. Despite 120 (88%) schools owning a copy of the NIM tool, only 76 (55%) were utilizing or had plans to utilize the curriculum [15].

Other schools attempted to address the lack of a standardized curriculum on their own. In the early 2000s, schools such as The University of California, Los Angeles, The University of Pennsylvania, and Harvard all reported the results of standardized curricula they had developed and implemented [16–18]. Students who had participated in these curricula showed improvements in the perception of their training as well as increased knowledge. During this same time, the major professional nutrition societies, with funding from the National Institutes of Health, formed an intersociety consortium tasked with defining the role of a physician-specialist in nutrition. After surveying teaching hospitals and experts in the field, they defined the role and developed the Physician Nutrition Specialists program, which offered accreditation after completion of 6 months of clinical nutrition training [19].

Despite multiple attempts at creating core nutrition curriculum programs, these efforts still did not produce the desired improvements in training physicians to practice nutrition. Further research into the perspective of educators proved enlightening. In 2004, Wong et al. [20] surveyed preceptors responsible for teaching medical students at Boston University. Despite the fact that 84% of preceptors reported that nutrition was an important part of medical practice, fewer than 50% gave nutrition-specific feedback to trainees. In addition, 25% of respondents either neglected to reference, or could not remember which nutrition guidelines they utilized in patient care or while teaching. In 2006, Kahn [21] published a review of surveys done among physicians during different stages of their careers, and concluded that no matter how good preclinical nutrition training is during medical school, enthusiasm for practicing clinical nutrition rapidly wanes if not reinforced during clinical years. Spencer [22] confirmed these results by showing that interest in nutrition rapidly declines during medical school. He surveyed students at 16 different medical schools and found that 72% of first-year students perceived nutrition as an important part of a physician's practice. But by the fourth year, only 46% continued to feel this way [22]. Clearly, to be successful, clinical nutrition training must be integrated throughout the training process, and it is important to note that something about our current training process decreases students' enthusiasm and interest in nutrition.

Over the past decade, UNC has continued to modify and track the curriculum it developed. In 2006, 30% of all medical schools reported having a dedicated nutrition course, with an average of 23.9 h of instruction [23]. To help improve training, UNC adapted the NIM curriculum for use on the web to make it more accessible [24]. Despite these efforts, in 2010, the number of schools requiring a dedicated nutrition course dropped to 25%, and the average number of hours of instruction also dropped to 19.6. In an effort to improve exposure of clinical nutrition to physicians, the NIM

program is currently developing a series of online modules for postgraduate/practicing physicians. The Nutrition Education for Practicing Physicians (NEPP) curriculum aims to teach clinical nutrition skills to fill the gap between theory and practice. The NEPP modules are offered to residents and other physicians in training, free of charge [25••].

## Discussion

In Dr. High's report from the 1950s, he quotes one of his colleagues, Dr. Stare, regarding the state of clinical nutrition education at the time, "...yet in most medical schools, organized instruction in nutrition is sadly neglected, despite 'lip service' to the contrary." Unfortunately, this statement is still as true today as it was over 60 years ago. Our current literature review shows that future physicians expect to be trained in nutrition and intuitively seem to understand the importance of nutrition in clinical practice, but something happens during training, and students become disillusioned or misguided with their understanding of the importance of nutrition in clinical practice. In addition, no matter how well students are prepared by their medical school courses, if their preceptors do not emphasize nutrition in clinical practice, that training is not effective. Unfortunately, trends in membership in the national nutrition societies indicate that fewer physicians are interested in the practice of clinical nutrition. At the same time, current research indicates that targeted nutritional therapy is important for the critically ill. Clearly, more physicians trained in nutrition are needed, yet the approach over the past decades to increase interest has not been working. Perhaps the most important idea that can be learned from reviewing perceptions of students and educators is that there remains a need to further train both medical students and their mentors.

One novel idea that would both improve education, as well as raise awareness, is the creation of a certification program modeled after the Basic Cardiac Life Support and Advanced Cardiac Life Support programs offered by the American Heart Association. Certification in Basic Nutrition Life Support could be required of all students before starting medicine or surgery rotations, and would focus on key core nutritional concepts, such as the importance of early enteral feeding, and perioperative nutritional support. In contrast, residents, fellows, and attendings on the surgical and medical intensive care unit wards could require certification in Advanced Nutrition Life Support. Advanced Nutrition Life Support would focus on nutritional therapies specifically related to the critically ill, such as the role of enteral feeding to modulate the inflammatory response, or proper feeding of intubated patients.

The NIM, or a similarly available curriculum, could be modified and used for certification. The advantage of NIM is that it is a module-based, self-paced learning program that is freely available over the Internet. It has been

continually studied and updated over the past 2 decades. Certification could require completion of a prescribed number of NIM modules that are specific to basic or advanced nutritional support with a subsequent half-day course taught by faculty that have completed the Physician Nutrition Specialist training, or similar training.

## Conclusions

The approach to graduate medical education and the role of clinical nutrition are evolving. The importance of appropriate clinical nutrition is increasingly being supported by research, yet medical students continue to perceive inadequate training during medical school and beyond. Over the past decades, multiple standardized curricula have been developed to address this problem. Rather than using resources to create new curricula, as some researchers are advocating, efforts to implement existing programs and raise awareness of the problem should be increased. We recommend the creation of a competency-based certification program that could be offered to students and practicing physicians alike.

**Disclosure** D.J. Frantz: Received travel and living expenses for the Nestle Nutrition Fellowship; R. Martindale: None; S.A. McClave: Received honoraria from Nestle Pharmaceuticals and Abbott Pharmaceuticals, and worked as a consultant for Kimberly Clark and Covidien Pharmaceuticals; C. Munroe: Received a grant from Nestle Enteral Nutrition.

## References

Papers of particular interest, published recently, have been highlighted as:

- Of importance
- Of major importance

1. Detsky AS, Baker JP, O'Rourke K, et al. Perioperative parenteral nutrition: a meta-analysis. *Ann Intern Med.* 1987;107(2):195–203.
2. al., W.e. Perioperative total parenteral nutrition in surgical patients. The Veterans Affairs Total Parenteral Nutrition Cooperative Study Group. *N Engl J Med* 1991;325(8):525–32.
3. • Doig GS, Heighes PT, Simpson F, et al. Early enteral nutrition reduces mortality in trauma patients requiring intensive care: A meta-analysis of randomised controlled trials. *Injury* 2010. *An article showing that early enteral feeding saves lives.*
4. • Doig GS, Heighes PT, Simpson F, et al. Early enteral nutrition, provided within 24 h of injury or intensive care unit admission, significantly reduces mortality in critically ill patients: a meta-analysis of randomised controlled trials. *Intensive Care Med* 2009;35(12):2018–27. *An article showing that early enteral feeding saves lives.*
5. • Lewis SJ, Andersen HK, Thomas S. Early enteral nutrition within 24 h of intestinal surgery versus later commencement of

feeding: a systematic review and meta-analysis. *J Gastrointest Surg: official journal of the Society for Surgery of the Alimentary Tract* 2009;13(3):569–75. *A systematic review of the benefits of early enteral feeding.*

6. • Osland EJ, Memon MA. Early postoperative feeding in resectional gastrointestinal surgical cancer patients. *World J Gastrointest Oncol* 2010;2(4):187–91. *Early feeding in GI surgery patients reduces morbidity.*
7. High EG. A survey of the teaching of nutrition in medical schools. *J Med Educ.* 1958;33(11):787–9.
8. Wilmore DW, Dudrick SJ. Growth and development of an infant receiving all nutrients exclusively by vein. *JAMA J Am Med Assoc.* 1968;203(10):860–4.
9. Howard L, Bigaouette J. A survey of physician clinical nutrition training programs in the United States. *Am J Clin Nutr.* 1983;38(5):719–29.
10. Young EA, Weser E, McBride HM, et al. Development of core competencies in clinical nutrition. *Am J Clin Nutr.* 1983;38(5):800–10.
11. Weinsier RL, Boker JR, Feldman EB, et al. Nutrition knowledge of senior medical students: a collaborative study of southeastern medical schools. *Am J Clin Nutr.* 1986;43(6):959–68.
12. Morgan SL, Weinsier RL, Boker JR, et al. A comparison of nutrition knowledge of freshmen and senior medical students: a collaborative study of southeastern medical schools. *J Am Coll Nutr.* 1988;7(3):193–7.
13. Weinsier RL, Boker JR, Brooks CM, et al. Priorities for nutrition content in a medical school curriculum: a national consensus of medical educators. *Am J Clin Nutr.* 1989;50(4):707–12.
14. Cooksey K, Kohlmeier M, Plaisted C, et al. Getting nutrition education into medical schools: a computer-based approach. *Am J Clin Nutr.* 2000;72(3 Suppl):868S–76S.
15. Plaisted CS, Kohlmeier M, Cooksey K, et al. The development of “Nutrition in Medicine” interactive CD-ROM programs for medical nutrition education. *J Cancer Educ.* 2000;15(3):140–3.
16. Hark LA, Morrison G. Development of a case-based integrated nutrition curriculum for medical students. *Am J Clin Nutr.* 2000;72(3 Suppl):890S–7S.
17. Hodgson CS, Wilkerson L, Go VL. Changes in nutrition knowledge among first- and second-year medical students following implementation of an integrated nutrition curriculum. *J Cancer Educ.* 2000;15(3):144–7.
18. Conroy MB, Delichatsios HK, Hafler JP, et al. Impact of a preventive medicine and nutrition curriculum for medical students. *Am J Prev Med.* 2004;27(1):77–80.
19. Heimburger DC. Physician-nutrition-specialist track: if we build it, will they come? Intersociety Professional Nutrition Education Consortium. *Am J Clin Nutr.* 2000;71(5):1048–53.
20. Wong V, Millen BE, Geller AC, et al. What's in store for medical students? Awareness and utilization of expert nutrition guidelines among medical school preceptors. *Prev Med.* 2004;39(4):753–9.
21. Kahn RF. Continuing medical education in nutrition. *Am J Clin Nutr.* 2006;83(4):981S–4S.
22. Spencer EH, Frank E, Elon LK, et al. Predictors of nutrition counseling behaviors and attitudes in US medical students. *Am J Clin Nutr.* 2006;84(3):655–62.
23. Adams KM, Lindell KC, Kohlmeier M, et al. Status of nutrition education in medical schools. *Am J Clin Nutr.* 2006;83(4):941S–4S.
24. Lindell KC, Adams KM, Kohlmeier M, et al. The evolution of Nutrition in Medicine, a computer-assisted nutrition curriculum. *Am J Clin Nutr.* 2006;83(4):956S–62S.
25. •• Adams KM, Kohlmeier M, Powell M, et al. Nutrition in medicine: nutrition education for medical students and residents. *Nutr Clin Pract* 2010;25(5):471–80. *The most recent article from the NIM curriculum group. This program is free of charge and more information can be found at <http://www.med.unc.edu/nutr/nim/>.*