

Nutrition Education in U.S. Medical Schools: A History and Proposal for the Future
(Chapel Hill, NC)

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Introduction:

The obesity epidemic is a formidable public health challenge facing the United States. It has resulted in unprecedented levels of lifestyle-related chronic diseases, such as cardiovascular disease (CVD), type 2 diabetes mellitus (T2DM), and hypertension (HTN).¹⁻⁶ In fact, eight of the ten leading causes of morbidity and mortality in the United States are nutritionally related.⁷ With nearly 90,000 registered dietitians (RDs) in the United States,⁸ it seems appropriate to assume RDs would be equipped to handle all nutritional counseling needs. However, there are more than 3,000,000 physicians, physician assistants, nurse practitioners, and registered nurses in the United States.⁹ Logistically, non-RDs are dealing with everyday nutrition issues; the patient load is simply too great to depend solely on RDs. Although physicians are not traditionally thought of as nutrition counselors, patients believe physicians are “very credible” sources of nutrition information, depending on them for accurate, relevant, and science-based nutrition information.^{10, 11} Therefore, physicians bear a great responsibility in addressing obesity and everyday nutritional concerns. However, physicians continually rate their knowledge of nutrition principles, skills in nutrition counseling, and confidence in nutrition counseling as being poor.^{10, 12-18} The hope is not to train physicians as RDs, but to adequately train physicians to handle basic, nutrition-related concerns and defer to RDs in situations requiring expertise.¹⁹ If physicians are not adequately taught nutrition in medical school, they cannot be expected to deal with patients’ nutrition issues.⁹

Materials & Methods:

PubMed and Web of Science were used for journal article sourcing. Search terms included nutrition, education, nutrition education, physician, doctor, medical school, and select combinations of these words and phrases. This search found 3,423 articles, 97 of which were deemed to be relevant. 47 articles were ultimately referenced in this review.

Results:

Nutrition education during medical school in the United States has remained static over the past 58 years. A study of medical schools published in 1958 reported 21 average hours of nutrition education.²⁰ An additional study published in 1985 *also* found an average of 21 hours of nutrition education.²¹ Current data is tracked by the Nutrition in Medicine (NIM) group at the University of North Carolina at Chapel Hill (UNC). They have been publishing results of

national surveys every five years since 2006.^{13, 22-23} Table 1 is a summary of the above-mentioned national surveys, which explore average hours of nutrition education, median hours of nutrition education, percentage of schools having a dedicated nutrition course, and, if applicable, the percentage of surveyed schools meeting the 1985 National Academy of Sciences recommendation of 25 or more hours.

Table 1: Hours of Nutrition Education at U.S. Medical Schools

Year	1958	1985	2000	2006	2010	2015
Average hours of nutrition education	21	21	20.4	22.3	19.5	19
Median hours of nutrition education			18	20	16	17
% Schools with required nutrition course	20%	27%	35%	30%	25%	18%
% Meeting 1985 rec. >25 hours			23-44%	41%	27%	29%
Sample Size; Response Rate	n=66	n=125	n=100; 89%	n=99; 93%	n=90; 86%	n=121; 91%

Expanded from¹³ including information from^{13, 20-23}

The trends seen in this table demonstrate how static the quantity of nutrition education in medical schools has been over the past 58 years, in spite of significant advances in nutrition research. From 2000-2015, the mean hours of nutrition education is greater than the median, indicating a positive (right) skew. Most medical schools report little nutrition education, but some report high averages. Indeed, it is difficult to fathom how physicians can be adequately trained, educated, and be sufficiently confident to address patients' nutrition concerns with less than 20 average hours of nutrition education.¹³ Comparatively, RDs require, at minimum, a bachelor's degree in nutrition as well as 1200 hours of post baccalaureate dietetic internship.⁸ Though the quantity of nutrition education has not changed, evolution of nutrition in medical school has been seen in the *method* of education.

In recent years, the percentage of medical schools offering stand-alone nutrition courses has decreased, while average hours of nutrition education have remained consistent (Table 1). This indicates that nutrition education is becoming incorporated into existing curriculum. In fact, 60% of nutrition is currently taught in an integrated setting, often being incorporated into lectures covering organ systems or being included in case studies. Still, the focus is largely treatment, not prevention, of nutrition-related chronic disease.¹³

Residency is an additional opportunity for nutrition education. Medical residents are expected to counsel their overweight and obese patients. However, few residency programs provide adequate training and resources to support this expectation.²⁴ In fact, the words “nutrition” and “diet” are not included in a 34-page cardiology residency accreditation guide.²⁵ Additionally, 84% of residency preceptors expected medical students and residents to discuss nutrition with patients. However, fewer than half of preceptors surveyed provided nutritional counseling feedback to their students.²⁶ The expectation of nutrition counseling exists during residency, but preceptors and programs do not have the skills, training, confidence, or materials to properly train residents.

The deficiency of nutrition training during medical school and residency has resulted in a poorly educated physician population, which lacks confidence in basic nutrition counseling skills. Only a quarter of physicians stated they were able to calculate daily energy and protein requirements.¹⁴ Block et al. found that 60% of internal medicine residents did not know the Body Mass Index (BMI) cutoffs for diagnosing obesity, and 69% of those residents did not recognize waist circumference as a predictor of metabolic syndrome.¹⁵ If obesity cannot be correctly and accurately diagnosed, how it be treated correctly? This knowledge gap expands from basic measures to the more complicated task of preventing hospital-induced malnutrition. Although most physicians believed that they received adequate training to identify patients at risk of malnutrition, only 30% correctly identified at-risk patients.¹⁴ This presents ample reason for concern because malnutrition is a predictor of mortality, length of hospital stay, and cost of treatment.²⁷ Medical students, physicians, and residents consistently rate their confidence in nutritional counseling as poor, although they often recognize nutrition’s role in the prevention and treatment of chronic disease.^{16, 18, 22, 28} In fact, only 14% of residents believed they had received adequate training to counsel patients in nutrition and reported especially struggling to counsel obese patients^{15, 18}

Not surprisingly, lack of knowledge and confidence in nutritional counseling have adverse clinical ramifications. Only 24% of primary care patients received any nutritional counseling from their physicians. Furthermore, just 45% of diabetic patients, 25% of patients with CVD, and 33% of obese patients received any nutritional counseling.²⁹ Ideally, these populations should receive nutritional counseling at least every primary care visit. This same study found that the average time spent on nutrition counseling during primary care visits was 55

seconds.²⁹ Physicians' lack of training in nutrition and nutrition-related topics is evident in inadequate counseling rates. Clearly, physicians can and should be doing much more in addressing the current obesity epidemic and working on upstream prevention measures.

Physicians recognize their weaknesses and lack of basic competencies in nutritional knowledge. Since the 1950s, physicians and physician educators have advocated for increased nutrition training in medical school and residency.²⁰ A vast majority of physicians feel additional nutrition training would be valuable, especially given the increasing nutritional science evidence-base.^{14, 19} Medical school and residency program administrators have expressed the need for additional nutrition education.^{22, 30} However, nutrition education, as previously stated, has remained frustratingly stagnant.^{13, 20-23}

It seems obvious, given physicians' roles in nutrition counseling and the associated nutrition knowledge gap, that medical school administrators would be actively looking to incorporate nutrition into existing curriculum. Unfortunately, incorporating an entire branch of science into an already overloaded curriculum is no simple endeavor.

Barriers to incorporation of nutrition education include: pessimistic or apathetic attitudes about nutrition's efficacy, insufficiency of nutrition faculty at some medical schools, lack of time for additional curriculum, sub-optimal RD insurance reimbursement, and failure of accrediting bodies to mandate nutrition education. These barriers will be discussed in further detail.

Physicians often feel pessimistic or apathetic about nutrition and/or obesity interventions.³¹ As medical students advance through their formal training, they become less convinced that nutrition is an important part of a physician's practice.³² Adding to the trend, 31% of internal medicine residents believed obesity interventions to be futile.¹⁵ Perhaps even more concerning, only 21% of family practice physicians reported personal satisfaction in nutrition counseling with their patients, decreasing the likelihood of physicians engaging in nutritional counseling with their patients.¹⁶ Finally, many faculty members and administrators do not believe that nutrition has a sufficient evidence-base to be taught in the medical school setting.³³ Physicians who do not perceive nutrition to be an efficacious part of medicine and who are pessimistic about nutrition interventions will not engage in nutrition counseling with their patients.

Insufficient nutrition experts serving as faculty in many medical schools also presents a substantial barrier. When RDs are not utilized for training medical students or residents in

nutrition, advocacy for nutrition education and applied nutrition training are not emphasized. This produces physicians who do not recognize the paramount role of nutrition in both treatment and prevention. RDs must be utilized not only to teach nutrition, but to develop nutrition curriculum and nutrition-based learning objectives.^{30, 34} Equally important are cooperation and partnership between RDs and other medical school faculty. If more faculty are needed but budgets do not allow for additional employees, partnerships provide an opportune space for additional interdisciplinary work.

The lack of time to incorporate additional curriculum is another valid barrier to more comprehensive nutrition education. Multiple studies find the primary barrier to nutrition curriculum incorporation is simply insufficient time.^{13, 22-23, 30} In an already rigorous curriculum, it is understandably difficult to find the time to include nutrition education, in addition to the countless advances in medicine each year.

Another barrier is the sparse compensation or reimbursement for nutrition services. Many physicians recognize that patients would benefit from counseling sessions with an RD, but they are reluctant to refer patients if medical nutrition therapy (MNT) is not covered by insurance companies.³⁵ Recent trends in insurance coverage for RDs are positive, especially after the passing of the Affordable Care Act (ACA) and its shift toward coverage of preventative services.^{36, 37} As nutrition services become increasingly covered by insurance, this barrier has the chance to be mitigated. However, with the recent change of the political climate in the U.S., the future of the ACA and the greater emphasis on preventative medicine is unknown.

Finally, perhaps the most significant barrier to nutrition education is the failure of accrediting bodies to mandate minimum nutrition curriculum standards.³⁸ Accrediting bodies for medical schools include the Association of American Medical Colleges (AAMC) and the Liaison Committee on Medical Education (LCME).³⁹ Without a requirement for nutrition to be integrated into existing core curricula, it is reasonable to believe that medical schools will continue to deliver sparse, sub-par nutrition education, as they have for the past 60 years.

There has been some effort to advocate for nutrition education standards. The most prominent example occurred in 1985, when The National Research Council's Committee on Nutrition in Medical Education published a report recommending 25-30 hours of nutrition instruction for medical students.¹³ This recommendation is considered a *minimum* estimate. Bearing in mind the incredible advances in nutrition since 1985 and advancing incidence and

prevalence of obesity, these hours likely represent a far underestimated recommendation.¹³ Because there are no official accreditation requirements for nutrition education in medical school, schools have no obligation to implement extensive nutrition education.³⁸⁻⁴⁰ As a result, no improvements in total hours of nutrition education have been implemented since the release of the 1985 recommendations.^{13, 22-23}

In spite of the barriers to nutrition curriculum implementation in medical schools, it is essential that medical schools adapt and change to keep up with current research as opposed to remaining rooted in static educational methods.⁴¹

Discussion:

Given the current state of nutrition education in medical schools, it is clear that something must be changed. Nutrition education must have a place in medical school curricula. A vast amount of research has been dedicated, especially in recent years, to addressing the above-mentioned barriers and the development of novel inclusion strategies.^{13, 22-23, 34, 42-47}

After a careful review of the literature, it seems there are two factors that would contribute substantially to addressing the lack of nutrition education in medical school. First, the accrediting bodies must require minimum nutrition education standards. Second, a minimum requirement for nutrition education must be included in Continuing Medical Education (CME) credits for certain specialties or fields of medicine. Recommendations alone are not enough; requirements must be mandated to gain and renew accreditation. By pushing for minimum nutrition education requirements from accrediting bodies, many of the barriers previously explored would be at least partially resolved.

Accreditation requirements would result in nutrition faculty becoming integral members of medical school faculty. Dedicated nutrition faculty will also be able to demonstrate efficacy of nutrition interventions in acute, chronic, long-term, and preventative settings. Physicians' confidence in nutrition interventions will increase, leading to increased prevalence and efficacy of nutritional counseling with patients. RDs are qualified to develop nutrition-based learning objectives, ensuring medical students gain clinically relevant nutritional knowledge and skills.

Nutrition as an accreditation requirement would also further expand interdisciplinary teamwork and collaboration. Research has shown that integration between courses leads to better application of nutrition skills in the clinical setting than when courses are taught separately.³⁸ Additionally, by incorporating nutrition into an integrated, interdisciplinary setting, students'

knowledge extends beyond only nutrition to include strengths in collaborative skills, interdisciplinary teamwork, and a greater understanding of the many facets of healthcare.⁴⁷ Mandated nutrition curriculum inclusion would also lead to nutrition-related proficiencies being tested in United States Medical Licensing Examination (USMLE) and board certification exams, ensuring basic nutrition competencies are met. A hopeful final result of all of these positives would be expansion of MNT reimbursement by insurance companies.

Although accreditation standards dictate minimum competencies and learning objectives to be met, each medical school designs and implements its curriculum in slightly different ways. Thus, recommending a singular strategy for nutrition incorporation is unreasonable.

One of the most studied incorporation strategies is the previously mentioned NIM project.¹³ In addition to surveying nutrition education in medical schools nationally, the NIM group has developed a series of interactive, free, online nutrition modules on a multitude of topics, from nutritional anemias to interactions between nutrition and aging. The modules are stand-alone, meaning that instructors may assign modules individually to supplement course topics. This is a promising beginning towards nutrition incorporation, but it lacks exposure to visible interdisciplinary collaboration and will not necessarily increase interdisciplinary teamwork in medical school or professional settings.

Various researchers have considered other incorporation strategies beyond adaptation of the NIM curricula. Kushner et al suggest incorporation of nutrition education into organ systems and basic sciences lectures during the first two years of medical school.³⁴ Eliot et al suggest that medical students be required to shadow RDs or that dietetic interns teach residents basics of clinical nutrition.⁴⁷ Some suggest gaining nutrition exposure and generating advocacy through special interest groups in nutrition⁴² or requiring individual behavior change exercises to expose medical students and/or residents to the challenges of diet adherence, food access, and practicality of healthy eating to increase rapport with patients.^{34, 48} More research is needed to ascertain incorporation strategies brainstormed by students, faculty, administrators, RDs, and MDs; which topics are of greatest importance to the above-mentioned populations; which methods lead to the greatest learning; and which methods of education are the simplest to incorporate. Indeed, one strategy will likely not fit each medical school's needs, and methods may need to be combined and/or customized.

The question remains, which topics are most critical in developing physician knowledge

and confidence in dealing with nutrition issues? Sierpina et al suggest nutrition-related learning objectives not only in basic nutritional principles, such as evidence-based diets (D.A.S.H., Mediterranean, etc.), but counseling skills as well. These include: taking a diet history, empowering patients to find success within any budget, cultural competency/sensitivity, motivational interviewing, connecting patients with national and local resources, and identifying patients requiring additional counseling and/or subsequent referrals to appropriate professionals.⁴⁹ Mastery of these learning objectives will lead to not only better rates and increased efficacy of nutrition counseling, but will hopefully improve patient health outcomes as well.

Measurement and evaluation of changes in nutrition education will be essential to the development and evolution of new delivery strategies. Because nutrition curriculum integration will be different from school to school, some outcomes may be difficult to measure. However, outcomes that can be measured would include: mean and median hours of nutrition education, methods of nutrition incorporation, self-assessed student confidence in nutrition topics, self-assessed student knowledge of nutrition topics, and board exam scores in nutrition subcategories.

Ensuring that minimum nutrition and nutrition counseling competencies are met during medical school is the first step in building a workforce of educated and confident physicians. However, this does not ensure physicians remain up to date and informed of new practices and nutrition recommendations. Certain specialties (family medicine, internal medicine, OB-GYN, geriatrics, pediatrics, endocrinology, and cardiology) are innately more connected with nutrition and nutrition counseling and thus will benefit from nutrition CMEs. CME requirements vary widely by state,⁵⁰ making the development of national standards difficult to recommend.

CME courses would ideally be developed by RDs in collaboration with MDs in the aforementioned specialties, to identify knowledge and confidence gaps in regards to nutrition. Topics would be divided into inpatient and outpatient categories, and they could cover topics such as motivational interviewing, local and national food assistance programs, recognizing clinical signs of malnutrition, and reviews of the most current nutritional science recommendations. The courses could be delivered in-person or online. Each course would include a post-quiz to measure knowledge gain.

Conclusions:

The knowledge and confidence gap of nutrition-related skills in the physician population is concerning, but it is a problem that has been, and can be further addressed. Ultimately, it is essential that accrediting bodies require nutrition related core competencies and licensing groups to require a minimum amount of nutrition related CMEs for certain fields of medicine to create large-scale, lasting change toward the inclusion of nutrition curriculum. Without mandated change by the LCME and AAMC, nutrition education in medical schools will continue to remain stagnant and sorely insufficient, as it has for the past 58 years. Without minimum nutrition related CME requirements, the nutrition knowledge gap will remain.

Physicians play an integral role in addressing obesity and obesity-related chronic diseases. However, if training in core nutrition principles and nutritional counseling skills is not required in medical schools, physicians cannot be expected to address root causes of obesity and obesity-related chronic disease with their patients. As awareness increases regarding the need for physicians to gain a core foundation of nutrition as part of their formal education, appropriate changes and implementations will more easily take root. Physicians take an oath to protect patients. We must allow physicians to honor this oath by ensuring proper and complete nutrition education not only during medical school, but also throughout entire careers.

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