

An Interprofessional Nutrition Education Session for Senior Medical Students on Evidence-Based Diet Patterns and Practical Nutrition Tips

Jonathan Berz, MD, MSc*, Kate Donovan, MS, RD, LDN, Mara Eyllon, PhD

*Corresponding author: jonathan.berz@bmc.org

Abstract

Introduction: Dietary factors are recognized as a major contributor to the global burden of disease, and the obesity epidemic continues to be a major public health problem. Patients rely on doctors for dietary advice and to serve as role models for health behaviors. However, nutrition content is significantly underrepresented in medical school curricula. **Methods:** We created an interactive session to address this gap during the ambulatory medicine rotation for senior medical students and delivered it as a 90- to 120-minute interactive monthly didactic session. We focused on reviewing evidence-based diet patterns for weight loss and hypertension and on use of practical tools for diet assessment and counseling. Immediately and 1 month after delivery, we administered a knowledge and confidence assessment survey to evaluate the session impact. **Results:** We incorporated the session into the regular didactic time of the clerkship. Sixty-six students attended over an 8-month period, of whom 42 completed the survey. Immediately and 1 month after delivery, participants reported statistically significant improvements ($p < .001$) in their confidence in the domains measured. Participants' knowledge scores increased immediately and 1 month after the session compared to before participation. **Discussion:** We delivered a single recurring seminar on diet patterns and practical tips that was well received by fourth-year medical students during the ambulatory medicine clerkship. The seminar was a practical and interactive way of delivering important nutrition content to the medical school curriculum, and we demonstrated retention of confidence and knowledge of the delivered content.

Keywords

Nutrition Assessment, Healthy Diet, Diet Patterns, Nutrition Education, Prevention, Case-Based Learning

Educational Objectives

By the end of this session, learners will be able to:

1. Describe and practice an effective and efficient way to take a diet history.
2. Describe the rationale behind the use of three diet patterns—DASH (dietary approaches to stop hypertension), low-carbohydrate, and Mediterranean-style diets—for weight loss and other health benefits.
3. Describe the health effects of the types of dietary fat.
4. Demonstrate use of a set of practical tools in dietary counseling.

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Introduction

Dietary factors are well recognized as a major contributor to the development of chronic disease and a key contributor to burden of disease on a public health scale.¹ The epidemic of obesity continues mostly unabated, especially in underserved populations.² Given the attention that nutritional studies get from the news media, it is understandable that patients often receive mixed messages about what constitutes healthy eating, and doctors need basic tools to engage in informed discussions with patients. In addition, studies have shown that doctors who model healthy lifestyle behaviors may have a significant impact on patients' health.³ However, despite the importance of diet on health, nutrition content is significantly underrepresented in most medical school curricula, and there have been numerous calls to action to increase this content.^{4,5}

Our experience is that although there is a subset of medical students with interest in nutrition who participate in nutrition electives or have developed expertise on their own, many demonstrate a need for basic nutrition education. In this context, we developed our session for senior medical students during

their internal medicine ambulatory clerkship at Boston University School of Medicine. Although no time is too early to introduce concepts of diet and health, basic nutritional epidemiology, and practical nutrition tips, we felt the fourth-year ambulatory medicine clerkship was an opportune time to introduce such a session because students could immediately translate their new knowledge and skills into practice during their clinical time in ambulatory medicine.

Several publications in *MedEdPORTAL* address topics in nutrition education, including the use of interprofessional education in diet assessment and counseling, obesity management, and online learning modules for obesity management and exercise.⁶⁻⁹ Our interactive didactic session adds to this group of resources by addressing select popular diets and diet patterns and providing practical tools that clinicians can use in dietary assessment and counseling. This combination of teaching both key evidence-based nutrition information and basic nutrition tools makes the session high yield and directly applicable to clinical care. In addition, our session is designed to be delivered by a primary care-oriented team—the primary care provider and a colleague dietician—although it delivers information that is generalizable enough to be useful to any medical provider who performs direct patient care. We expect it will be useful as students make their way through the final clerkships of medical school and into residency training and beyond.

Methods

We delivered a monthly session using a PowerPoint slide set as the framework for a highly interactive, lecture-based, 90-minute session during the medical school fourth-year ambulatory medicine clerkship. This 1-month rotation was elective and taken primarily, although not exclusively, by students entering careers in primary care-oriented specialties. One day every week was devoted to classroom-based teaching, and our session occurred during one of these days, once per month. The presenters (an internal medicine primary care physician and a dietician) had experience performing nutrition counseling in the ambulatory clinical setting and a background in nutritional epidemiology.

We organized the session into three sections. The session agenda was as follows.

The first section had two parts: (a) dietary assessment and (b) role-play in dietary assessment using a 24-hour recall format. For part a, using a PowerPoint presentation (Appendix A), we reviewed methods of performing dietary assessments in clinical

practice, describing the 24-hour recall (Appendix B), food diaries, and smartphone apps such as MyFitnessPal and Loselt (20 minutes). For part b, the role-play in dietary assessment using the 24-hour recall format, the clinical dietician acted as an adult medical patient with chronic disease risk factors, and the group completed a 24-hour dietary recall together, going around the room one by one to ask the patient questions. As members of the group did so, they received live feedback from faculty on how to most effectively elicit an accurate diet history (10 minutes).

The second section covered diet patterns and evidence-based nutrition. We described highlights of the most recent US Department of Agriculture dietary guidelines and introduced four popular diet patterns, namely, the DASH (dietary approaches to stop hypertension), low-fat, Mediterranean, and low-carbohydrate diets, reviewing characteristics of these diets and presenting a selection of high-quality studies with a focus on the effects on weight loss and hypertension. We chose these health outcomes because of their frequency in ambulatory medical practice. We then discussed types of dietary fat and the related physiologic and clinical effects and public health implications. Next, we offered practical tools for dietary counseling such as estimating daily caloric needs using an online calculator and easy-to-remember tips for estimating fruit and vegetable serving size measurement in the context of promoting the recommendation to consume four to five servings per day of each. We used audience-response multiple-choice questions in this section to assess learners' knowledge and stimulate interest in the topics presented (45 minutes).

In the last section of the session, we asked the group to imagine setting goals for the case patient presented at the start of the session and left time for questions (15 minutes).

Evaluation Method

To evaluate the sessions, we (the two faculty delivering the teaching sessions) developed a survey of 10 questions. Using a 5-point scale (1 = *not confident*, 5 = *very confident*), the first four questions gauged learners' confidence. The six multiple-choice questions that followed gauged learners' knowledge of a selection of key principles discussed in the session. At the end of the survey, there were four prompts asking for learner feedback on the session, which we used to make improvements in the sessions. Two of us reviewed the open-answer questions and identified common ideas shared by learners. We then organized these ideas into major themes and identified illustrative quotations for each theme.

We handed out a paper version of these questions to students immediately before the session and immediately after the session (Appendix C). One month after the session (follow-up), we sent an email with a link to a web-based version of the survey of knowledge and attitudes using Qualtrics online survey software (Qualtrics, Provo, Utah) and incentivized participants to complete the survey by offering entry into a lottery for a gift card.

Attitudes: After determining that all variables met the assumptions for repeated-measures analysis of variance (ANOVA), we moved forward with a series of repeated-measures ANOVA tests to determine whether participants' confidence in accomplishing specific tasks significantly varied across pretest, posttest, and follow-up. All statistical analyses were run using Stata 15.0 (StataCorp, College Station, Texas). The user-written program MAUCHLY was used to test the sphericity assumption for dependent variables.¹⁰

Knowledge: As described previously, to assess improvements in knowledge, participants were given a six-item test of dietary knowledge at pretest, posttest, and follow-up. Due to the nonnormal distribution of participants' scores, we compared scores between pretest and posttest, between posttest and follow-up, and between pretest and follow-up using the sign test.

Results

A total of 66 fourth-year medical students attended the monthly diet and health sessions over 8 months between June 2018 and January 2019.

Forty-two students completed the 1-month follow-up survey, but because of errors in students entering their study identification, 12 students could not be matched with the pre- and posttests; thus, 30 participants' data were analyzed. We ran a series of parametric and nonparametric analyses to test changes in students' attitudes and knowledge before and after participating in the session (Table 1).

Immediately and 1 month after the session, participants reported statistically significant improvements ($p < .001$) in their confidence in obtaining accurate dietary histories, describing healthy meal patterns, counseling patients on nutrition, and setting achievable goals for patients' healthy behavior. A series of pairwise comparisons revealed that the improvements in confidence were statistically significant between pretest and

Table 1. Participant Confidence Over Time ($N = 30$)

Topic	Pretest (T1) ^a		Posttest (T2) ^a		Follow-up (T3) ^a		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Diet	3.0	.94	4.1	.64	4.2	.68	<.001
Meals	3.3	.65	4.3	.52	4.0	.57	<.001
Nutrition	3.3	.69	4.1	.51	3.9	.61	<.001
Goals	3.2	.68	4.2	.59	4.2	.70	<.001

^aRated on a 5-point confidence scale (1 = not confident, 5 = very confident).

posttest and between pretest and follow-up. However, there was a small yet statistically significant decrease in participants' confidence describing healthy meal patterns between posttest and follow-up ($\Delta = -0.31, p = .022$; see Table 1).

For the knowledge test, the maximum score possible was 6 points. The mean pretest (T1) score was 4.3 ($SE = .93$), the mean posttest (T2) score was 5.8 ($SE = .39$), and the mean 1-month follow-up (T3) score was 5.2 ($SE = .77$). Results of the sign tests are displayed in Table 2. Scores decreased slightly between posttest (T2) and follow-up (T3; $p < .001$); however, the net effect of the curriculum was positive.

In addition, when participants were asked to give written free-text feedback on positive aspects of the seminar and areas to improve, they generally reviewed the session positively and gave examples of specific areas for seminar improvement. Key themes and representative quotes are shown next.

Practicality of Curriculum

Students valued information presented in the curriculum and found it useful for future practice:

- “One of the most useful didactic sessions I have had in 4th year. Will definitely impact my practice as a clinician.”
- “This was very helpful and I would love more formalized nutrition training earlier in medical school.”
- “Really enjoyed the session—very helpful to go through specifics such as what’s a serving size.”

Table 2. Sign Tests of Changes in Knowledge Over Time ($N = 30$)

Comparison	Negative Differences	Ties	Positive Differences	<i>p</i>
Pretest (T1)-Posttest (T2)	28	2	0	<.001
Posttest (T2)-Follow-up (T3)	1	13	16	<.001
Pretest (T1)-Follow-up (T3)	22	7	1	<.001

Something for Everyone

Students valued the balance between evidence- and practice-based information that was presented. Although more research-oriented students enjoyed going over the clinical evidence behind the diets, other students found this to be too much information and preferred the practical skills taught (e.g., 24-hour recall; specific, measurable, attainable, relevant, and timely goals; and basal metabolic rate calculator):

- “I really liked going through how to take a 24 hour food recall.”
- “Love going over the evidence and different diet types. Enjoyed the behavioral component as well.”
- “Case presentation mixed with objective data.”

Length of Session

Some students felt a 2-hour session was too long:

- “The length of the talk (a lot in 2 hrs).”

Discussion

To address the scarcity of nutrition education in our medical school curriculum, we implemented a 90-minute interactive seminar designed to give students high-yield knowledge and skills that could be used to form a foundation of nutritional knowledge and counseling in clinical care. Overall, the large majority of students rated the session highly and were appreciative of the nutrition content, and our survey demonstrated improved confidence and knowledge immediately and 1 month later. Although ours is one of numerous possible teaching topics on diet and health, the focus on diets for weight loss and hypertension represents areas frequently encountered in ambulatory settings, and therefore, we believe that the session is applicable to any ambulatory medicine curriculum. The timing of our session is also likely to be beneficial if introduced at other points during the 4 years of medical school and need not be limited to the final year. As with other curricular content, repetition throughout the years of medical school is key not only to encouraging students’ proficiency in dietary knowledge and counseling skills but also to elevating the importance of the topic in the overall training of doctors.

Using each month’s presentation as an opportunity for feedback from participants led to improvements over time that we felt increased the value of the curriculum and the receptivity of the students. Even though the overall content did not change substantially over the course of the 8-month rollout, small changes in the length and content areas helped to make the seminar more fluid and receptive to the interests of the

students. We initially delivered the session over a 2-hour block but received feedback that this was too long and thus shortened it to 90 minutes by making certain sections briefer and selectively eliminating content. For example, we eliminated a section describing the details of an important Mediterranean diet study because we received repeated feedback that there was overemphasis on nutritional studies, resulting in part of the session being tedious. Instead, we incorporated the take-home point of that study into a summary slide about the diet. In addition, over the period that we delivered the session, we allowed more time for interactive teaching and questions and minimized long periods of lecturing. After making this change, we observed that students seemed more engaged—they asked more questions and seemed to respond more enthusiastically to the questions we posed to them. Finally, we found that the collaboration between us (internist and registered dietician) was particularly valuable, as each was able to fill in the knowledge gaps of the other and speak to the differing realities of each of our clinical settings.

There are several limitations to the content of our session and to its survey. The content may not be generalizable to all medical school curricula and will depend on other nutrition content existing in the curriculum. Although we found having a dietician and primary care provider working together to deliver the content allowed us to both access specialized nutrition knowledge and take into account the practical limitations of performing nutrition counseling in primary care clinic settings, we recognize that such a team will not be available in all teaching settings. The session could also be delivered by a single individual. Additionally, the content presented in the slide set can be used as a guide or framework to deliver a teaching session on nutrition and health. We were able to deliver the content in 90 minutes after several sessions of practice; however, others may choose to break the content into several shorter sessions.

Although we demonstrated a sustained improvement in knowledge as a result of the session, we did not evaluate behavior change, either in the students and their own diet practices or in their delivery of dietary counseling in clinical settings. Further studies could evaluate whether students change their own dietary behavior based on this new knowledge.

There are several limitations to our evaluation survey. We acknowledge the weakness of not using a validated assessment. However, we wanted to use an assessment that was closely aligned with the goals of the workshop and thus had to create our own. We established face validity via the expertise of the

two presenters in nutrition, and our showing of consistent improvement after participation demonstrates, at least to some extent, that the assessment measured what we intended it to measure.

Future directions include continued presentation of the seminar and evolution of the material as nutritional science changes and new seminal studies occur. We hope that the positive feedback on this session received from students will provide reinforcement to administrators on the importance of dietary knowledge in the medical school curriculum and that they will continue to support such efforts as we and others attempt to broaden and expand them.

Appendices

- A. Diet Health Presentation.pptx
- B. 24-Hour Diet Recall Method.docx
- C. Nutrition Pre-Posttest.docx

All appendices are peer reviewed as integral parts of the Original Publication.

Jonathan Berz, MD, MSc: Assistant Professor, Department of Medicine, Boston University School of Medicine

Kate Donovan, MS, RD, LDN: Clinical Dietitian, Department of Pediatrics, Boston Medical Center

Mara Eyllon, PhD: Postdoctoral Researcher, Department of Medicine, Boston University School of Medicine

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Ethical Approval

The Boston University Institutional Review Board approved this study.

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