

Is there a Relationship between Medical Students' Personal Lifestyle Behaviors and their Knowledge, Confidence, and Attitudes towards Nutrition in Patient Care?

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Abstract

Objective: The majority of US medical school curricula do not meet the recommended 25 minimum hours of nutrition. This lack of nutrition education is producing a cohort of future physicians that doesn't feel confident enough to educate their patients on lifestyle and dietary changes. Several studies have reported associations between doctors who eat healthier and their increased frequency of nutrition counseling, however, there is little data examining the relationship between medical students' healthy choices and their knowledge and confidence in providing lifestyle modification education to patients. We aimed to examine how medical students' personal lifestyle behaviors affected their knowledge, attitudes and confidence in nutrition counseling.

Methods: This was a cross-sectional study of Keck School of Medicine students from years one to three (n=190). Pearson correlations were conducted to assess the relationship between students' lifestyle behaviors and their knowledge, confidence and attitudes. One-Way ANOVAs were used to assess for any temporal differences.

Results: One-hundred and ninety medical students from the Keck School of Medicine (55% female and 45% male) with a response rate of 33% participated in the survey (MS1=67 students, MS2=70, MS3=53). We found a positive correlation between students' lifestyle behaviors and confidence in nutrition counseling ($r=0.26$, $p<0.001$). Medical students who ate fruits and vegetables ($r=0.28$, $p<0.001$) and cooked for themselves ($r=0.42$, $p<0.001$) were more confident in their ability to provide nutrition counseling. The relationship between personal lifestyle behaviors and nutrition knowledge or attitudes was not statistically significant.

Conclusions: Our findings suggest that students who eat healthier and have baseline knowledge in cooking have higher levels of confidence in translating dietary meal plans and counseling into patient care. In order to promote students' healthy lifestyle behaviors medical school nutrition curricula should transition from lecture-based courses to more hands-on nutrition and student-centered classes.

Keywords: Nutrition; Health; Lifestyle; Physicians

Introduction

Over the past 20 years, mounting evidence has illustrated that diet and physical activity interventions can have a significant impact on the course of disease, with suggested improvements equal to or greater than pharmaceutical interventions [1]. However, despite the medical community's acknowledgement of the importance of nutrition, there has been no improvement in the average 25 hours of nutrition education within US medical schools over the past 10 years [2, 3]. Past medical students' lack of confidence in nutrition during their medical training has resulted in current physicians who rate their nutrition knowledge and skills as inadequate [4]. This has further translated into less education and preventative services for patients, with only 14% of surveyed internal medicine residents feeling prepared to provide nutrition education to their patients [5]. Primary care physicians identify lack of knowledge, skills, and confidence in nutrition as their primary barriers to providing nutrition counseling [5-7]. Moreover, in order to improve the amount of lifestyle modification and nutrition counseling patients receive, we believe that medical schools must work towards graduating a new generation of physicians who have a higher degree of knowledge, positive attitudes, and confidence in nutrition counseling within patient care.

Several studies have reported positive associations between doctors who eat healthier and provide an increased frequency of nutrition counseling to patients [8-10]. However, there is little data on the relationship between medical students' healthy choices and their confidence and knowledge in nutrition counseling [10]. With the goal of creating more effective nutrition curriculum, the primary aim of this study was to examine the relationship between medical students' personal lifestyle behaviors and their knowledge, attitudes and self-perceived confidence in counseling patients in lifestyle modification. The secondary aim was to describe any changes in students' nutrition knowledge and attitudes towards the importance of nutrition in patient care as they matured in clinical training. Additionally, we measured students' current satisfaction with the available nutrition resources and previous exposure to nutrition education.

Methods

Study design and recruitment of students

All active, registered first through third year medical students at the Keck School of Medicine (KSOM) (n=574) were eligible for the study and asked to participate in this voluntary, anonymous, 67-item survey in September 2016. Hard copies of the survey were distributed before the beginning of a lecture for each class year and were re-collected at the end of the lecture. The data was then manually input into the Qualtrics (© 2015) software. Fourth year medical students were not included in the study due to the variability in students' schedules and the difficulty in reaching all fourth years in one setting. A total of 235 students submitted surveys. However, only 190 surveys were completed in full and included in the final analyses.

School curriculum and medical student participants

Currently the KSOM follows a fairly traditional four-year curriculum. During the first two years the students spend the majority of their time in the classroom setting and participate in a weekly four-hour Introduction to Clinical Medicine course led by a faculty attending. In 2016, the year this study took place, the KSOM had approximately 4 hours of preclinical lectures dedicated to nutrition. The majority of the pre-clinical curriculum was presented in an organ-systems based curriculum and nutrition was primarily taught in small segments integrated into various topics with no dedicated block throughout the two-year curriculum.

Survey development

In order to assess students' attitudes, knowledge, and personal health behaviors in nutrition, the survey was divided into three main sections: attitudes and lifestyle behaviors, knowledge, and demographics. Two resources were used to create our 67-question survey. The first was a survey adapted from Walsh et al. who assessed Harvard Medical School students' nutrition attitudes and knowledge [11]. To measure

students' attitudes towards nutrition in patient care the attitudes section was comprised of two parts: the first 25 questions came from an existing validated Nutrition in Patient Care Survey (NIPS) [12] that was developed to assess students' perceived opinions about the importance of nutrition in patient care. The NIPS survey can be further divided into 5 subscales. We included 4 subscales: "nutrition in routine care" (questions 1-8), "physician patient relationship" (9-16), "physician efficacy" (17-22), and "patient behavior/motivation" (23-25). The second half of the attitudes section (26-34) focused on questions related to students' satisfaction with their medical school nutrition education (26-27) and questions related to students' personal health behaviors (28-34). All of the 34 attitude questions were rated on a 5-point Likert scale.

The knowledge section of the survey contained 21 single-answers multiple choice questions that were taken from Walsh et al. study and originated from an online curriculum, Nutrition in Medicine (NiM) [13]. This survey was designed by the nutrition faculty at the University of North Carolina and funded by the National Institute of Health. Walsh chose 22 questions from the online modules using a discrimination index (DI) that was derived from data of online users of the NiM website in order to ensure that the questions had a high ability to distinguish overall high performers from low performers [11].

Data analysis

Pearson correlations were conducted to assess the relationship between students' lifestyle behaviors and their knowledge, confidence and attitudes towards nutrition in patient care. The following factors were included as "self-reported lifestyle behaviors": knowing how to cook, eating three or more servings of fruit/vegetables a day, and exercising at least 30 minutes a day for 5 days a week. Confidence in providing nutrition counseling was assessed based on the following question: "I feel confident discussing meal plans and dietary interventions with patients." All items used a 5-point Likert Scale from strongly disagree to strongly agree. Participants who responded "Not Applicable" were excluded from the analysis. One-Way ANOVAs were conducted to assess any temporal differences in students' attitudes towards the importance of nutrition in patient care or knowledge in nutrition as they matured in training.

This study received exempt status from the Institutional Review Board and Committee on Human Studies of the University of Southern California and was performed in accordance with all of the ethical policies of this organization. The requirement for signed consent was waived due to the implied consent assumed by participants when they agreed to complete and submit their surveys.

Results

Response rate and demographics

One hundred and ninety students completed the entire survey (response rate 33%; MS1=67 students, MS2=70,

MS3=53). The respondents were 55% female and 45% male. The average BMI for the students was 24 kg/m² (range 17-51), within the range of a healthy BMI as defined by the World Health Organization [14]. The majority of students (83%)

reported no prior experience with nutrition education before entering medical school. The descriptive statistics of students' attitude towards nutrition in patient care (NIPS) at item and sub-scale level are listed in **Table 1**.

Table 1 Medical students' response to nutrition in patient care survey (NIPS) questions (n=190).

Descriptive Statistics (N=235) expressed as percentage (%)					
NIPS scores ¹ (expressed as percentages)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Nutrition in Routine Care (8-40)² sum score = 31.32, SD=4.97					
1. Preventative healthcare is boring.	4.2	11.1	16.3	36.3	32.1
2. Nutrition counseling should be part of routine care by all physicians, regardless of specialty.	26.3	35.3	20.5	13.2	4.7
3. Nutritional assessment and counseling should be included in any routine appointment, just like diagnosis and treatment.	24.2	44.7	19.5	10	1.6
4. Nutrition Counseling is not an effective use of my personal time.	1.6	8.9	13.7	45.3	30.5
5. Individual physicians have little impact on patient's ability to lose weight.	2.6	16.9	17.5	36.5	26.5
6. I have an obligation to improve the health of my patients including discussing nutrition with them.	43.4	45.5	8.5	2.1	0.5
7. All physicians, regardless of specialty, should counsel high-risk patients about dietary change.	38.9	39.5	13.7	5.8	2.1
8. It is not worth the time to counsel patients with poor dietary patterns about nutrition.	1.1	6.8	6.3	41.1	44.7
Physician-Patient Relationship (8-40)² Mean =34.07 SD=3.30					
9. Patient motivation is essential to achieving dietary change.	80	17.9	2.1	0	0
10. Most obese patients want to lose weight but feel frustrated and confused about how to do it.	17.4	46.3	28.9	6.3	1.1
11. Patients need good-tasting alternatives in order to change their eating patterns.	25.8	45.3	19.5	8.4	1.1
12. A change toward a healthier lifestyle is important at any stage of life.	72.4	22.1	2.1	2.1	0.5
13. Most physicians are not adequately trained to discuss nutrition with patients.	27.4	37.4	26.3	6.3	2.6
14. Patients need specific instructions about how to change their eating behaviors.	43.4	45	11.1	0.5	0
15. Specific advice about how to make dietary changes could help some patients improve their eating habits.	56.8	35.8	6.8	0.5	0
16. Patients need ongoing counseling following my initial instruction to maintain behavior changes consistent with a healthier diet.	39.5	49.5	10	0.5	0.5
Physician Efficacy (6-30)² Mean =19.13 SD=3.71					
17. Most patients will try to change their lifestyle if I advise them to do so.	2.6	9.5	41.1	40.5	6.3
18. Physicians can have an effect on a patient's dietary behavior if they take the time to discuss the problem.	16.3	58.4	21.1	3.7	0.5

19. For most patients, health education does little to promote adherence to a healthy lifestyle.	4.2	14.7	27.9	45.3	7.9
20. After receiving nutrition counseling, patients with poor eating habits will make major changes in their eating behavior.	1.1	11.1	46.3	35.8	5.8
21. My patient-education efforts will be effective in increasing patients' compliance with nutritional recommendations.	4.7	34.7	48.4	11.6	0.5
22. After receiving nutrition counseling, patients with poor eating patterns will make moderate changes in their eating behavior.	2.6	44.2	40.5	11.6	1.1
Patient Behavior/motivation (3-15)2 Mean =9.73 SD=2.74					
23. Patients are not motivated to change unless they are sick.	9	36.5	27	24.3	3.2
24. Patients will change their eating patterns only if faced with a significant health problem (e.g. heart attack).	9.5	32.8	25.9	28	3.7
25. Patients will rarely change their behavior if they do not have active symptoms of a disease.	10	44.2	24.2	19.5	2.1

Relationship between students' lifestyle behaviors and their knowledge, attitudes and confidence in nutrition counseling

In analyzing the relationship between students' personal lifestyle behaviors and their knowledge, attitudes and confidence in nutrition counseling, we found a moderate positive correlation between students' personal lifestyle behaviors and their confidence in nutrition counseling ($r=0.26$, $p<0.001$). The relationship between personal lifestyle

behaviors and other variables (knowledge and attitudes) did not reach statistical significance. Interestingly, in evaluating the three factors used to determine a student's "healthy lifestyle behaviors" both medical students who ate fruits and vegetables ($r=0.28$, $p<0.001$) and cooked for themselves ($r=0.42$, $p<0.001$) were more confident in their ability to provide nutrition counseling. **Table 2** demonstrates the descriptive statistics for the lifestyle behavior questions asked and the breakdown of each question.

Table 2 Medical students' personal health behaviors, confidence in nutrition counseling and satisfaction with the current nutrition curriculum (n=190).

Descriptive Statistics (n=190) expressed as percentages (%)					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I am satisfied with the quantity of nutrition education	2.6	15.8	19.5	41.1	21.1
I am satisfied with the quality of nutrition education	1.6	15.8	23.7	39.5	18.9
I am personally interested in nutrition	28.4	43.2	16.3	9.5	2.6
I would consider myself to have a healthy, well-balanced diet	14.7	42.6	20.5	20	2.1
I eat at least three servings of fruit/vegetables daily	22.2	29.6	21.2	24.3	2.6
I consider exercise as an important aspect of my life and try to exercise at least the recommended amount of 30 minutes a day, 5 days a week	36.8	21.6	15.8	21.1	4.7
I know how to cook for myself	52.6	30.5	7.9	6.8	2.1
I feel confident discussing meal plans and dietary interventions with patients	12.6	22.1	23.2	32.1	10

I have counseled a patient on lifestyle recommendations	13.8	25.9	15.3	21.2	23.8
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Changes in nutrition knowledge and attitudes towards the importance of nutrition in patient care as students matured in clinical training

The mean knowledge score for all class years (n=190) was 58.6% (range=24-91%). A One-Way ANOVA found a significant difference between class years in their nutrition knowledge scores (F (2,187)=21.801, p<0.01) with higher class years achieving higher scores. Pair-wise comparisons show that year 2 class scores (M=59.11, SD=11.43) were significantly higher than year 1 (M=52.14, SD=11.44; t(134)=-3.45, p=0.001) and year 3 (M=66.04, SD=10.97) scored significantly higher than years 1 and 2 (t(117)=-6.57, p<0.001; t(121)=-3.47, p=0.001).

Overall, attitudes toward nutrition in patient care (based on mean NIPS responses) did not differ based on class year (F(188)=1.79, ns). It is interesting to note that the majority of the respondents (62%) agreed that "nutrition counseling should be part of routine care by all physicians, regardless of specialty" and 65% of students agreed that "most physicians are not adequately trained to discuss nutrition with patients" while only 40% of students supported the belief that "my patient education efforts will be effective in increasing patients' compliance with nutritional recommendations" as seen in **Table 1**.

Students' satisfaction with nutrition education and previous exposure to nutrition

The majority of students (72%) were not satisfied with the quantity or quality of nutrition education they were receiving at the time of the survey and considered themselves to be personally interested in nutrition (**Table 2**). Additionally, the majority of students (83%) reported no prior experience with nutrition education before entering medical school.

Discussion

Although there have been studies that measure students' baseline attitudes and knowledge in nutrition, none analyzes the relationship between medical students' personal lifestyle behaviors and how they correlate to their level of nutrition knowledge and their perceived attitudes and confidence in nutrition in patient care [15]. There has also been no evidence supporting the transfer of knowledge between self-care and patient-care among trainees when it comes to nutritional counseling. The aim of this study was to assess if students who practiced healthier behaviors had higher baseline levels of knowledge in nutrition, more positive attitudes towards nutrition in patient care, or had higher self-reported levels of confidence in counseling patients in diet and exercise. We found that students' self-reported health behaviors had no correlation with their NIPS attitude score. Interestingly, however, students who ate healthier defined as eating at least 3 fruits/vegetables daily and knowing how to cook for

themselves, were more likely to state they felt confident in discussing meal plans and dietary interventions with patients.

This positive association between students who had healthier self-reported dietary behaviors and more confidence in nutrition has been documented in previous studies in different capacities. Spencer et al. found that medical students who placed a higher personal emphasis on preventive medicine and consumed more fruits and vegetables perceived nutrition counseling to be more important in clinical care [10]. Additionally, Eisenberg et al. argued that there may be a causal relationship between populations that cook more frequently and having lower obesity rates [16]. One possible explanation for why cooking and eating healthier appear to be positively correlated with having more confidence in nutrition counseling is because these students have prior experiences with "hands-on nutrition". From choosing fresh produce in a grocery store to preparing poultry, to using knives and washing vegetables, we believe that these simple hands-on skills create a foundation in nutrition knowledge that students can reference as medical professionals when providing lifestyle modification counseling to patients. As Eisenberg et al. states, "one's ability to translate nutrition information is essentially limited or enhanced by one's ability to cook or, at the very least, better understand how foods are typically prepared" [16]. The findings of this study suggest that while nutrition knowledge is something that must be taught, the traditional approach with textbooks and PowerPoint's may not be the best solution to maximize learning and translate nutrition knowledge into clinical care for patients.

The second aim of this study was to describe changes in students' nutrition knowledge and attitudes towards the importance of nutrition in patient care as they progressed in their medical training. Similar to previous studies, [17] there was a significant difference between class year and knowledge scores with higher class years achieving higher scores [15]. This indicates that despite the low level of nutrition education currently in the curriculum, students in their clinical years of training do receive some training in nutrition education, although this may be more informal training.

Additionally, in comparing each class years' attitude towards nutrition in clinical care, as measured by NIPS, no significant difference was found between class years. Failure of upperclassmen to have higher scores in regard to their perceived importance of patient behavior motivation, nutrition in routine care, and physician efficacy is concerning. Despite this, however, students were found to have some understanding of the efficacy of nutrition counseling, with 75% of students agreeing that "physicians can have an effect on a patient's dietary behavior if they take the time to discuss the problem" and only 19% of students agreeing that "for most patients, health education does little to promote adherence to a healthy lifestyle", as seen in **Table 1**. These findings indicate that students understand the importance and utility of

nutrition counseling and lifestyle modifications within medicine but may lack the skills or confidence to effectively counsel patients as future providers.

Our final aim was to assess students' current level of satisfaction with our medical school's nutrition curriculum. Less than a fifth of students are satisfied with the quantity and quality of nutrition education at the KSOM. This mirrors the findings of dissatisfaction with nutrition education at other medical schools, as reported in previous literature [10,15]. Studies have suggested that students' knowledge scores can be positively correlated to their assessment of the quantity and quality of nutrition education within their curriculum, indicating that students' low cumulative knowledge score of 59% is in part related to their minimal nutrition training [15].

Limitations

There were several limitations to our study. The sample size (n=190) may limit the generalizability of the findings, however, due to the standardized prerequisite educational requirements of all pre-medical students applying to US medical schools the lack of nutrition knowledge prior to medical school is likely representative of students across the nation. Additionally, in comparing the NIPS results between KSOM and Harvard medical students who completed the same survey with Dr. Walsh's data, the results were similar, suggesting that these findings may be generalizable to medical students across the country [11]. A second limitation of the study is the lack of fourth year medical students within the study. This was done because of both a lack of a standardized nutrition curriculum during the fourth year and students' highly variable schedules during their final year of medical school. Additionally, due to the nature of our study design, recruitment bias is a possible limitation with students more interested in the topic of nutrition education more willing to participate in the study. In the future, we plan to continue to survey the entire student body with higher response rates to limit this bias. Overall, despite these limitations, we believe the information from this limited assessment provides valuable insight to the field of medical education.

Implications for research and practice

In conclusion, the findings of this study suggest that students who eat healthier and have baseline knowledge in cooking have higher levels of confidence when it comes to translating dietary meal plans and counseling into patient care. While students' attitudes towards nutrition was not found to correlate with students' confidence in providing nutrition counseling, the results of this study have significant implications for future nutrition curriculum reform. Currently, of the few medical schools that teach nutrition education within the core curriculum, the majority of the content is taught by passive learning with worksheets, PowerPoint's and reference to textbook chapters. Our study's findings suggest that students need a more hands-on nutrition course that teaches the fundamentals of healthy eating, cooking, and exercise to benefit both the student and their future patients. In addition, new nutrition courses are needed that not only

provide students with personal experiences handling food but teach students how they can translate their nutrition knowledge into practical, lifestyle modification recommendations for the specific patient population they are serving.

Some medical schools have already begun to shift towards a more hands-on approach to nutrition. For instance, Boston University Medical School has created a new hands-on nutrition curriculum that focuses on allowing students to first try lifestyle modifications on themselves before suggesting them to patients [18]. From learning how to conduct a dietary self-assessment on each other, to asking students to use wearable fitness devices to help track their activity and understand the difficulties of exercise on a daily basis, [16] more practical, skill-based learning is needed across the country. We believe that shifting nutrition education away from didactic lectures to hands-on applications is the most effective way to improve medical students' abilities to counsel patients on lifestyle modification. This will bridge the gap between practicing healthy behaviors personally and counseling patients to do the same.

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