

Medical students' dietary habits: Motivations and barriers to reaching health goals

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ABSTRACT

Introduction: It has been well reported that medical students do not follow healthy diets overall. Effectively guiding patients to change their health behavior is a crucial skill for primary care providers and family physicians. Our objective was to investigate medical students' dietary decision-making, including the motivations and barriers that influence their dietary choices. **Methods:** A self-administered online questionnaire was conducted among preclinical students at one allopathic medical school in the United States. The survey was comprised of questions about students' dietary goals, habits, and the barriers they face in reaching their nutritional ideals. Trends in the percentage of students who selected each survey answer choice were interpreted. **Results:** Of the 363 preclinical students provided with the optional survey, 71 (19.6%) chose to participate. The participants' dietary decisions were predominately driven by convenience. Most students wanted to eat nutritiously to support their well-being but had been eating less healthily since starting medical school due to financial limitations and limited time. Approximately half (46.5%, 33/71) of the participants stated that they would buy the in-house food provided at the medical school campus more often if it better matched their dietary goals, but 36.6% (26/71) would only do so if the new foods were affordable compared to competitor's prices. **Conclusion:** There is an opportunity to help medical students meet their dietary goals, which are negatively impacted by personal and structural academic barriers. Further research is needed on the obstacles that institutions face in offering healthy, affordable options to medical students.

Keywords: Diet, food, medical education, medical students, nutrition

Introduction

It has been well-reported that most medical students do not live healthy lifestyles.^[1-12] There is a gap in knowledge on the dietary goals that medical students set for themselves, and the barriers that they face in meeting these dietary goals.^[2-7] This information would be helpful for primary care providers evaluating the health-related behaviors of medical students, as patients or pupils. Our aim was to investigate the motivations driving medical

students' dietary decision-making and the challenges affecting their capacities to fulfill personal health goals. Our secondary objective was to determine whether the in-house food and beverage selection matched their dietary preferences.

Material and Methods

Ethics

A self-administered online questionnaire was conducted among preclinical students at one allopathic medical school in the Southeastern United States (U.S.) to investigate their dietary goals. The procedures followed were in conformity with the ethical standards of our Institutional Review Board (IRB) and with the Helsinki Declaration of 1975, as revised in 2000. Our

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How to cite this article: Dumitriu Carcoana AO, Tomlinson S, DeWaay D, Izurieta RF. Medical students' dietary habits: Motivations and barriers to reaching health goals. *J Family Med Prim Care* 2024;13:1739-46.

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Received: 20-06-2023

Revised: 07-12-2023

Accepted: 08-12-2023

Published: 24-05-2024

Access this article online

Quick Response Code:



Website:
<http://journals.lww.com/JFMPC>

DOI:
10.4103/jfmpe.jfmpe_1016_23

IRB Administrative Review determined that this study protocol met the criteria for exemption from IRB review based on the Office for Human Research Protections regulations outlined in the Code of Federal Regulations section 46.104, paragraph d. Our online consenting process was approved by the IRB, which authorized a waiver of written documentation of consent. Students acknowledged the informed consent form prior to gaining access to the survey. Participants did not receive any compensation for their participation in the study.

Selection and description of participants

Preclinical (first- and second-year students) were selected as the population of interest due to the similarities in their curricular schedules and professional environment. All preclinical medical students at the university received an email with the opportunity to participate in the present study. Clinical (third- and fourth-year students) were excluded to avoid introducing potentially confounding variables related to the diversity in their clinical rotation schedules and the dietary options available at different clinical sites.

Questionnaire and data reporting

The questionnaire was available to students from October 2022 to November 2022. It was conducted through Qualtrics with complete anonymity. The survey consisted of questions about participants' gender, year in school, dietary habits and motivations, barriers to reaching dietary goals, and whether the in-house food and beverage selection matched the student's preferences. Of the 14 survey questions, 11 were multiple choice and 3 asked for participants' ratings of the in-house food options. Of the 11 multiple choice questions, 4 questions allowed one choice or "not applicable" (N/A) and the other 7 questions allowed participants to select all answers that applied to them. The data had no identifiers. We reported the data as the number (percentage of cohort), numerator/denominator (percentage), or mean \pm standard error of the mean (SEM), as appropriate. Trends in the most commonly selected responses are discussed.

Results

Of the 363 preclinical medical students at the university, all received an email with the opportunity to participate in the present study, and 71 (19.6%) volunteered to participate. Of the 71 participants, 48 (67.6%) were female, 21 (29.6%) were male, and 2 (2.8%) preferred not to specify. Of the respondents, 46.5% were first-year medical students and 53.5% were second-years. In total, 70.4% of students reported having a specific goal to eat a balanced diet to support both their physical and mental well-being. For 74.7% (53/71) of the students, their education in healthcare made them want to eat healthier in support of their well-being [Table 1].

Despite the majority of students having a goal to eat nutritiously, many reported eating less healthily since starting medical school

due to limited time (29/71), a limited choice of convenient, healthy options (17/71), and financial limitations (9/71; Table 1). When asked to select all the variables that play a role in their dietary decision-making, the most common were convenience (53/71), taste (50/71), cost (49/71), and whether the options met their personal health goals (40/71; Table 1).

The most prevalent barriers students reported to meeting their dietary goals were a lack of adequate money (30/71) and time (31/71) to buy their ideal foods, a lack of time to prepare meals (58/71), and stress making them prioritize professional duties over diet (43/71; Table 1). Approximately half (47.8%, 34/71) of the participants were not willing to spend more than 15 min obtaining or preparing a meal during a typical day, and 33.8% (24/71) would spend up to 30 min [Table 1]. Nine participants (12.7%) reported that they have eaten healthier since beginning medical school because they learned more about dietary recommendations [Table 1].

Despite its convenient location, 71.9% of students bought food from the in-house food merchant no more than a few times per month due to its high prices (40/71) and a lack of healthy (40/71) or high-protein (27/71) options [Table 2]. Approximately half (46.5%, 33/71) of the participants stated that they would buy in-house food more often if it better matched their dietary goals, but 36.6% (26/71) would only do so if new foods were also more affordable compared to competitor's prices [Table 2].

When asked about what in-house food options they wish there were more of, the most popular responses were cheaper (40/71), healthier (40/71), higher protein (27/71), and with more wholesome ingredients (26/71). Participants also noted several dietary preferences, including high protein (14/71), vegetarian (8/71), pescatarian (6/71), and vegan or flexi-vegan (5/71) diets [Table 2]. Many students reported food allergies, including dairy (8/71), tree nuts (4/71), and gluten (3/71; Table 2). In total, 7/71 students wished that more of the in-house food were free of allergens [Table 2]. Only 4/71 students said they had no preferences regarding the in-house food options [Table 2].

Discussion

Key findings

It is well-described that medical students make poor dietary choices on average, but questions still remain regarding whether most medical students would like to eat healthily and, if so, which barriers they face in achieving this goal.^[1-2] Our data show that a majority of medical students want to eat nutritiously in support of their well-being, often influenced by their choice to enter the healthcare field. However, students reported eating less healthily since starting medical school due to financial limitations, insufficient time to buy or prepare ideal foods, and stress making diet less of a priority, similar to the barriers reported by dietetics students.^[1,3] The

Table 1: Participants' dietary decision-making

Questions and Responses	n (%) N=71
Select all the answers that apply to you	
What goes into your dietary decisions while studying?	
Convenience	53 (74.7)
Taste	50 (70.4)
Value	49 (69.0)
Whether it fits my health and/or dietary goals	40 (56.3)
Do you currently have any of the following dietary goals?	
Eat a balanced diet to support my mind/body health	51 (71.8)
Eat convenient options to save time	40 (56.3)
Eat cheaper options to save money	36 (50.7)
Eat to support a healthy weight (lose weight)	30 (42.3)
Eat to support a healthy weight (gain weight)	4 (5.6)
Eat to support my workout regimen	25 (35.2)
Eat to maintain or obtain a specific physical appearance	24 (33.8)
Eat what makes me happy, with no particular focus on the health value	17 (23.9)
Eat to support my body in the context of a chronic health issue	2 (2.8)
No dietary goals	0
Does your interest in healthcare influence your dietary choices?	
Yes, it makes me want to eat healthier for my well-being.	53 (74.7)
Yes, to avoid the irony of telling my patients to eat healthier.	30 (42.3)
Yes, it makes me pay attention to and follow dietary guidelines.	19 (26.8)
No, my dietary choices are not influenced by healthcare.	12 (16.9)
Has your decision-making changed since starting medical school?	
Yes, I eat less healthily than I would like due to limited time.	29 (40.9)
Yes, I eat less healthily than I would like due to the convenient options.	17 (23.9)
Yes, I eat less healthily than I would like due to financial limitations.	9 (12.7)
No, I eat the same as I did before starting medical school.	25 (35.2)
Yes, I eat healthier because I have learned more about the recommended healthy diet.	9 (12.7)
Yes, I eat healthier because I cook for myself.	8 (11.3)
Yes, I eat healthier to support good study habits.	4 (5.6)
Yes, I eat healthier because I have more time.	3 (4.2)
Yes, I eat healthier due to the healthy and convenient options.	2 (2.8)
Yes, I eat healthier because I have more financial freedom.	0
What are the barriers to meeting your dietary goals?	
Time in my schedule to make/prepare the food	58 (81.7)
Stress about school makes me prioritize other things over diet	43 (60.6)
Time in my schedule to buy the food	31 (43.7)
Money to buy the food I want	30 (42.3)
The in-house food is not usually supportive of my goal(s)	28 (39.4)
Self-discipline when making my dietary decisions	20 (28.2)
No barriers	0
What are your dietary restrictions, if any?	
High protein content is an important consideration in my meals/snacks.	14 (19.7)
Dairy sensitivity or allergy	8 (11.3)
Vegetarian	8 (11.3)
Pescatarian	6 (8.5)
Vegan or flexi-vegan	5 (7.04)
Tree nut sensitivity or allergy	4 (5.6)
Gluten sensitivity or allergy	3 (4.2)
Sugar sensitivity or allergy	3 (4.2)
Sugar alcohol sensitivity or allergy	1 (1.4)
Egg sensitivity or allergy	0
Soy sensitivity or allergy	0
Low FODMAP diet	0

Contd...

Table 1: Contd...

Questions and Responses	n (%) N=71
Select the single answer that best applies to you	
How much time are you willing to spend obtaining or preparing meals during a typical day?	
Up to 5 min per meal	3 (4.2)
Up to 10 min per meal	15 (21.1)
Up to 15 min per meal	16 (22.5)
Up to 30 min per meal	24 (33.8)
Up to 45 min per meal	8 (11.3)
Up to 60 min per meal	1 (1.4)
Over 1 h per meal	0
N/A	4 (5.6)
How much time do you to spend obtaining or preparing snacks and beverages during a typical day?	
Up to 5 min per snack or beverage	35 (49.3)
Up to 10 min per snack or beverage	21 (29.6)
Up to 15 min per snack or beverage	8 (11.3)
Up to 30 min per snack or beverage	3 (4.2)
Up to 45 min per snack or beverage	0
Up to 60 min per snack or beverage	0
Over 1 h per snack or beverage	0
N/A	4 (5.6)

N/A=Not applicable

data in this study suggest that the suboptimal optimal dietary patterns observed among medical students are associated with various barriers that prevent them from reaching their dietary goals.

Strengths and limitations

The strengths of this study are that it identifies and contributes to filling a gap in the knowledge of medical students' dietary decision-making in the current literature. Convenience was the most popular aspect of dietary decision-making, and approximately half of the participants indicated that they would buy in-house options more often if they better matched their goals. By including survey questions that evaluated whether the conveniently located in-house food and beverages matched students' dietary preferences and collecting information on the characteristics of foods that the students would prefer (cheaper, healthier, higher protein, more wholesome; Table 2), we were able to identify a potential solution to the barriers that students reported.

The present study's limitations include the small cohort size of 71 participants. Those who volunteered to participate may have held stronger opinions about dietary decision-making than their peers who did not volunteer to participate, introducing the possibility of a volunteer bias. Furthermore, the study was conducted at an allopathic medical school in an urban setting in the U.S., and the dietary preferences outlined in the present study may represent aspects of the local and institutional cultural settings. To externally validate this study, similar research on the motivations and barriers that influence medical students' dietary decision-making should be conducted at institutions in a variety of regions and cultural settings.

Interpretation and implications

Effectively guiding patients to change their health behavior is a crucial skill for primary care providers and family physicians, practitioners most likely to care for medical students.^[14] The American Academy of Family Physicians endorses that the motivation for behavior modification must arise from the patient and not from the healthcare provider.^[15] Studies conducted in various countries have identified that medical students struggle to follow healthy lifestyles.^[1-12] Nonetheless, gaps in knowledge on the motivations driving medical student dietary decision-making, and the barriers affecting these decisions, have persisted. Studies done in Saudi Arabia and Pakistan reported that although medical students were more aware of what constitutes a healthy dietary and lifestyle pattern compared to nonhealthcare students, there were no differences in their dietary habits, which were poor overall. These studies did not investigate potential reasons why medical students made suboptimal dietary decisions, despite having some knowledge about the recommended practices.^[2,3] The present study attempted to address these gaps in knowledge, which could aid primary care providers in providing comprehensive medical care to medical students.

The study that is most comparable to ours is a pilot conducted by Trahearn *et al.* in the United Kingdom in 2021.^[13] We found that medical students in the U.S. had set personal goals of eating nutritiously and faced barriers similar to those reported by the six dietetics students interviewed by Trahearn *et al.*^[13] Cost and unavailability of healthy food were identified as major barriers in both investigations. Our study had a larger cohort size (71 vs. 6), asked more specific questions regarding dietary decision-making, and evaluated an opportunity for addressing reported barriers (evaluation of the in-house food and beverage options with respect to preference and individual dietary goals).

Table 2: Participants' opinions of in-house food

Questions and Responses	n (%) N=71
Provide a rating on a scale of 0–100 (0=worst, 100=best)	
To what degree do the following in-house options support your dietary goals?	Mean±SEM
Medical school grab-and-go (n=64)	27.6±2.4
Medical school café (n=66)	31.98±2.8
Catered medical school events (n=59)	37.1±3.3
Select the single answer that best applies to you	
If you buy the in-house options, about how often?	
Every day or almost every day	1 (1.4)
Two to three times per week	8 (11.3)
A few times a month	21 (29.6)
Very rarely	30 (42.3)
N/A	11 (15.5)
Would you buy the in-house options more often if they better matched your goals?	
Yes, because of the convenient location.	33 (46.5)
Yes, but only if they were affordable/comparable to competitor's prices	26 (36.6)
No, it is not likely.	4 (5.6)
No, they already match my goals but I prefer to buy from elsewhere.	3 (4.2)
N/A	5 (7.0)
Select all the answers that apply to you	
What in-house food options do you wish there were more of?	
Cheaper	40 (56.3%)
Healthier	40 (56.3%)
Higher protein	27 (38.0%)
More wholesome ingredients (i.e., less processed)	26 (36.6%)
Free of allergens	7 (9.9%)
Options with nutrition labels so I can better assess their nutrition values	6 (8.5%)
Lower calorie	6 (8.5%)
Lower carbohydrate content	1 (1.4%)
I have no preferences	4 (5.6%)
I am happy with the current choices	1 (1.4%)

N/A=Not applicable, SEM=Standard error of the mean

Academic stress, leading to a reduction in adherence to a healthy diet, was another barrier identified in both studies. Interviews on medical students' well-being conducted from 2018 through 2019 in the Southwestern U.S. revealed that while academics were crucial to students' identity and wellness, they were also the largest barrier to maintaining well-being.^[16] A cross-sectional, survey-based study conducted across 100 healthcare institutions in China published in 2023 showed that poor lifestyle behaviors among healthcare workers emerged from persistently high stress levels.^[17] The physiological and social causes for the effects of stress on the development of obesity were described in a literature review published in 2022, covering articles from 2000 to December 2020.^[18] These data are in support of the conclusions from a 2023 systematic review of the associations between diet quality and mental health in university students, which hypothesized that efforts to enhance students' stress management could improve their dietary habits and adherence to nutritional goals.^[19]

Nutritional education is not adequately prioritized by medical schools in the U.S. A survey conducted among accredited U.S. medical schools in 2010 found that only 27 (28/105) provided students with the minimum of 25 nutrition education hours recommended by

the National Academy of Sciences.^[20] More recently, Crowley *et al.* conducted a systematic review of the literature published from 2012 to 2018 about nutrition education provided to medical students.^[21] The analysis included 24 studies, 11 of which were conducted in the U.S., and concluded that despite nutrition being at the crux of a healthy lifestyle, medical students were not adequately supported in providing high-quality, effective nutrition care to patients. Crowley *et al.* suggested that medical education can be enhanced by an institutional commitment to establishing nutrition competencies that provide benchmarks for nutrition knowledge and skills in the curricula.^[21] Therefore, a lack of knowledge on how to define or meet nutritional ideals is another potential barrier that students face. Our data support this suggestion, as 12.7% (9/71) of participants said that learning more about dietary recommendations in medical school led them to form healthier eating habits. Nonetheless, most participants' dietary choices were still limited by time and financial constraints. The authors of the present study suggest that increasing the availability of healthy, affordable options for students would support an increase in knowledge of the importance of dietary choices for health promotion.

Further study is needed to understand why medical schools do not offer more healthy alternatives. The authors of the

present study have identified that fresh items such as fruit and salads are priced higher than processed foods such as baked goods, candy, and sodas at our institution, as in most grocery stores or restaurants. Fresh items often perish more quickly than processed foods and are more expensive for the in-house food merchant to restock. This explanation could contribute to the reason why fresh and less processed items are stocked far less frequently than processed items, which are made perpetually available for purchase. The food items' names and frequencies at which they were sold by the school's in-house food purveyor, to both medical students and staff, in the 12-month period preceding this survey are presented in Supplemental Table 1.

Over 70% of the study's participants only bought food from the in-house food merchant a few times per month or very rarely, and 56.3% wanted it to be healthier or cheaper. If students preferred to buy fresh fruit and vegetable dishes often, that would require them to seek food purveyors outside of the immediate medical school environment. Since convenience and cost were some of the predominant factors affecting medical students' dietary choices, it is probably less likely that students would spend extra time or money obtaining healthier food. In addition to initiating individualized conversations about dietary goals in the primary care setting, system-level decisions that reduce students' exposure to nourishing and affordable food options should be evaluated, especially as fostering a culture that promotes well-being is of great value to both healthcare and education.

Future research directions

The data in this study reflect an opportunity to help medical students meet their health-focused dietary goals. Intervention studies and randomized controlled trials are required to further investigate these implications. This analysis should be replicated at other health professional schools, including physician assistant, dental, and nutrition-focused programs, for increased generalizability. Primary care providers associated with teaching institutions could be involved in creating interventions that increase the healthy and convenient dietary options available to medical students. Future studies should also assess whether annual primary care visits addressing medical students' lifestyle behaviors, including stress management and nutritional goals, improve their dietary habits.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Supplemental Table 1: In-house food and beverage items purchase frequency in 12 months

Item	n
Coffee without creamer	2819
Coffee with creamer	1046
Soda	2178
Cookie	1303
Candy	1098
Breakfast sandwich	944
Chips	923
Energy drink	912
Muffin	757
Granola bar	745
Vitamin Water	686
Sandwich	675
Bottled water	553
Crackers	522
Quesadilla	330
Unsweetened tea	302
Salad	261
Bagel	207
Protein bar	183
Protein drink	148
Wrap	146
Popcorn	114
Sweetened tea	93
Soup	87
Fruit juice	74
Gum or mints	51
Fresh fruit	44
Unsweetened nuts	43
Yogurt	40
Pizza	38
Smoothie	30
Cake	29
Powerade	20
Waffle	9
Oatmeal	7
Sweetened nuts	7