

# Medical students' perceptions of nutrition in medical education and future practice

Peri Fenwick

Dalhousie University Faculty of Medicine

Alyson Colborne

Dalhousie University Faculty of Medicine

Olga Theou

Dalhousie University Faculty of Medicine

Leah Cahill ([✉ Leah.Cahill@Dal.Ca](mailto:Leah.Cahill@Dal.Ca))

Dalhousie University Faculty of Medicine <https://orcid.org/0000-0003-3584-2227>

---

## Research

**Keywords:** medical education, nutrition, medical students, physicians, undergraduate, lifestyle medicine

**Posted Date:** May 1st, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-25430/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

**Version of Record:** A version of this preprint was published at DALHOUSIE MEDICAL JOURNAL on January 11th, 2021. See the published version at <https://doi.org/10.15273/dmj.Vol47No1.10723>.

## Abstract

**Background:** Physicians are relied upon as knowledgeable sources of nutrition information; however, many report low nutrition knowledge.

**Objective:** The present study assessed first and second-year medical students' perceptions of nutrition education within the medical curriculum, in terms of their attitudes, learned body of knowledge, and satisfaction.

**Methods:** An online questionnaire was administered to Dalhousie University medical students completing their first or second years (N=125). Mann-Whitney U tests compared the responses of first-year to second-year students and those with and without previous nutrition education.

**Results:** 97.6% of respondents agreed that nutritional counselling can positively influence patient outcomes, with 91.2% agreeing that physicians play a key role in nutritional counselling. Compared to second-year students, first-year students had greater self-perceived knowledge of basic nutrition concepts ( $p<0.001$ ) and nutrition in the treatment of disease ( $p=0.005$ ), as did students with previous nutrition education compared to those without ( $p=0.019$  and 0.018 respectively). Satisfaction was <30% agreement, with first-year students more satisfied with their nutrition education than second-year students ( $p<0.05$ ).

**Conclusions:** First and second-year medical students regard nutrition as an important component of medical practice that can positively impact patient outcomes. However, low satisfaction with their nutrition education suggests that additional nutrition curriculum would better prepare them for future practice.

## Introduction

The importance of nutrition in achieving and maintaining good health is well recognized. A report by the WHO describes a global shift in dietary habits toward an increased intake of processed, low-quality foods, contributing to the development of chronic, non-communicable diseases (1). A recent study reported that diet is the top risk factor associated with death and the second highest risk factor associated with disability in Canada (2). As such, diet is an important modifiable lifestyle behaviour for the healthcare system, and those who provide primary care, to target.

Family physicians are relied upon as knowledgeable sources of nutrition information (3); however, evidence suggests that they do not provide this type of counselling to patients, due to reasons such as perceived lack of knowledge and access to resources (4–6). This may be attributed to a lack of nutrition education during medical school (7) and in residency training (8–10). Results from a pivotal survey of primary care physicians demonstrated that 67% of respondents reported a lack of training in nutrition counselling (5). The two existing surveys of Canadian medical students' perceptions of nutrition education reported high perceived importance of nutrition in medical practice alongside low satisfaction

with nutrition education (11,12). However, no studies to date have examined the individual early years of medical school's nutrition education to further elucidate its current state and potential avenues for improvement.

The primary purpose of this study was to determine first and second-year medical students' perceptions of nutrition education, in terms of their attitudes towards its use in general medical practice, their learned body of knowledge, and their satisfaction with how the medical school curriculum links nutrition content and its application to medical practice. Secondary goals of the current study were to determine if there are any differences according to year of study and previous nutrition educational experiences.

## Methods

### Subjects

Participants were first and second-year Dalhousie University medical students at the Halifax and New Brunswick campuses, after completion of their respective year of studies. Students were invited to participate through emails distributed by the Undergraduate Medical Education office and Dalhousie Medical Student Society, as well as through social media. This study was approved by the Dalhousie University Research Ethics Board. All participants provided informed consent prior to participating in this study.

### Survey

Because no standardized questionnaire existed that collected the data we required, the Nutrition and Physical Activity Education Questionnaire (NPAEQ, see Additional File 1) was developed for the present study to capture (1) attitudes towards nutrition in medical practice, (2) self-assessed knowledge of nutrition-related topics, (3) satisfaction with nutrition content within the medical curriculum, and (4) demographic information, including of year of study and previous nutrition education. Questions were based on the 5-point Likert scale method of measuring beliefs, attitudes and opinion (13). The NPAEQ contained similar questions pertaining to physical activity education, which were not included in the present study. The NPAEQ underwent a face-content validation and professional validation by graduate students and researchers in the fields of nutrition and physical activity which followed the recommended methods (14–16) of assessing six survey domains: visual appropriateness, language appropriateness, relevance, clarity, representativeness and ease of online survey tool. The questionnaire was distributed using the online survey tool Opinio (version 7.11) (17). The survey was open online between May 10<sup>th</sup> to June 18<sup>th</sup>, 2018.

### Statistical analysis

Results were analyzed using SPSS software version 19.0. Descriptive statistics were used to summarize survey responses and participant characteristics. Percentage agreement was analyzed according to the 5-point Likert scale (13), with a score of 4 (agree) or 5 (strongly agree) indicating agreement, a score of 3

indicating a neutral response, and a score of 1 (strongly disagree) or 2 (disagree) indicating disagreement. A Mann-Whitney U test was used to compare the percent agreement between the first-year students and second-year students, as well as those with and without nutrition education. The significance level was set at  $p<0.05$ .

## Results

### Respondent characteristics

Of 220 first and second-year students, 125 students completed the survey (response rate of 57%) (Table 1), with a higher proportion of responses from first-year students (60.8%). Overall, 66% of respondents were female and 27% reported previous nutrition experience.

**Table 1.** Participant demographics.

Participant Characteristics	N (%)
Gender	
Male	41 (32.8)
Female	83 (66.4)
Prefer to self-describe	1 (0.8)
Previous Nutrition Experience	
No	91 (72.8)
Yes*	34 (27.2)
Degree in nutrition	2 (1.6)
Nutrition research	3 (2.4)
Nutrition education (e.g. post-secondary courses, workshops)	24 (19.2)
Clinical nutrition experience	14 (11.2)
Other	10 (8.0)
Year of Medical Studies	
1 <sup>st</sup>	76 (60.8)
2 <sup>nd</sup>	49 (39.2)

\*Respondents could select more than one type of previous nutrition education.

## **Students' attitudes towards nutrition in medical practice**

In the first section of the survey, students were asked about their level of agreement with four statements related to their attitudes towards nutrition in medical practice. As shown in Figure 1, the percentage of students who agreed with statements about the importance of nutrition counselling and the role of physicians in the provision of such counselling ranged from 44 to 97.6%. Respondents reported higher levels of agreement with statements that focus on the importance of nutrition for health outcomes and the role of physicians in improving such outcomes, compared the statements addressing nutrition assessment and counselling.

## **Perceived knowledge of nutrition-related information**

Self-perceived knowledge of basic nutrition concepts was the highest (90.4% agreement), while the lowest percentage agreement was seen in the pathophysiology of specific diseases (56.8% agreement) (Figure 2). First-year students and students with previous nutrition education had significantly greater levels of self-perceived knowledge of basic nutrition concepts (1<sup>st</sup> year: 97.4% agreement vs. 2<sup>nd</sup> year: 79.6%,  $p<0.001$ ; previous nutrition education: 100% agreement vs. no previous education 86.8%,  $p=0.019$ ) and nutrition in the treatment of disease (1<sup>st</sup> year: 84.2% agreement vs. 2<sup>nd</sup> year: 63.3%,  $p=0.005$ ; previous education: 85.3% agreement vs. no previous education: 72.5%,  $p=0.018$ ). Students with previous nutrition education reported greater knowledge of how and where to access credible nutrition information compared to students without previous education (82.4% vs. 64.8% agreement, respectively;  $p=0.027$ ).

## **Satisfaction with nutrition education**

First-year students reported significantly higher agreement with all satisfaction-related questions, compared to second-year respondents (Figure 3). Previous nutrition education was associated with higher satisfaction with the amount of time dedicated to nutrition in the medical school curriculum (29.4% agreement among students with previous education vs. 18.7% among those without;  $p=0.051$ , data not shown), but was not associated with satisfaction with nutrition integration in the curriculum ( $p=0.272$ ), or preparedness for future medical practice ( $p=0.461$ ).

## **Discussion**

In this survey study of first and second-year medical students, we found that respondents not only perceived nutrition counselling as an important component of health, but also view physicians as an important player in providing nutrition counselling. Students at the end of their first-year reported significantly higher knowledge of basic nutrition concepts and the role of nutrition in the treatment of disease, compared to students finishing second-year. Furthermore, students with previous nutrition

experience had higher agreement with most knowledge-related questions compared to students without previous nutrition education. Students' overall satisfaction with the nutrition education they receive in medical school is low. Interestingly, first-year respondents reported higher agreement with all satisfaction-related questions compared to second-year students.

### **Comparison to previous findings**

The present study observed that first and second year medical students believe nutrition is an important topic in medicine while feeling low satisfaction with their nutrition education, findings that are in line with previous research. Previous research in the U.S. demonstrated that insufficient time spent on nutrition education (18) as well as other barriers, including lack of time and compensation, as contributing factors in physicians' reporting of a lack of preparedness to help their patients adapt healthier eating habits (4,5). Canadian research has demonstrated similar results (11). Among the 933 medical students from all years of study who completed their survey, Gramlich *et al.* demonstrated that knowledge of basic nutrition concepts was higher than perceived preparedness to provide nutrition counselling. Hanninen and Rashid (12) found that upwards of 95% of students agreed on the importance of nutrition in disease prevention and treatment, as well as the role of physicians as role models for positive nutrition behaviours; however, satisfaction with their nutrition education was low with 30.3% of respondents dissatisfied or strongly dissatisfied with the nutrition curriculum and 78.6% in agreement that more nutrition education should be provided.

### **Potential explanations for findings**

In today's society where there are varying opinions about which diet is optimal for health (19), students may not know how to appraise this information while simultaneously participating in a demanding medical curriculum. A need for increasing multidisciplinary care may also contribute to current issues surrounding the integration of nutrition into patient care (20). Cambridge University identified a collaborative approach among doctors, dietitians, nutritionists and nurses as a key factor in the success of their nutrition education initiative (21).

Our finding of differences in knowledge and satisfaction based on year of study may be a result of the structure of the Dalhousie University medical school curriculum. At Dalhousie, the majority of structured nutrition education is delivered during students' first-year, which may have influenced our survey as a result of the proximity between when the first-year students learned the nutrition content of the curriculum and the time of survey distribution. Alternatively, perhaps the higher perception of nutrition knowledge in first-year versus second-year students is an expression of Albert Einstein's adage '*the more I learn, the more I realize how much I don't know.*' Previous research found that students earlier on have more positive perceptions of nutrition counselling by physicians (11,22,23). This may be related to a cognitive bias known as the Dunning-Kreuger effect, in which those who are less skilled in a given area often rate their knowledge as greater than those who are more experienced in the same discipline (24–26).

### **Strengths and limitations**

This study is based on self-report and does not include objective measurements of nutrition knowledge; however, previous research has reported that perceived quality of nutrition training in medical school is positively correlated with proficiency scores, providing evidence that self-perceived knowledge may serve as a reliable proxy for clinical proficiency (27). The findings of the current research were strengthened by a response rate of 57%, which is higher than similar previous studies (11,12,28).

### **Implications and future directions**

The current study indicates that the first couple of years of medical school could be an appropriate time to incorporate additional nutrition education to increase physician competency in nutrition counseling. The NPAEQ may be used in future research to explore similar questions among different cohorts, such as family medicine residents who are at the front-line of primary care, an area where nutrition counselling can be used as a form of preventative medicine to reduce the prevalence of lifestyle-associated diseases.

This research adds to the growing body of evidence supporting improved nutrition in medical education (10,11,29). A number of American medical schools have implemented culinary medicine electives, in which students receive cooking instruction and review principles of dietary counselling (30,31). The University of Toronto recently began teaching undergraduate medical students how to prepare affordable, healthy food, and ways to help support patients to do the same (32). Future research could evaluate education changes like these on the improvement of physician comfort and competence in providing dietary advice to patients.

## **Conclusion**

This cross-sectional survey of first and second-year medical students found that attitudes towards nutrition in medical practice were positive; however, perceived knowledge of nutrition information and satisfaction with nutritional education was low. These findings contribute to our understanding of the status of nutrition education in the undergraduate curriculum of Canadian medical schools.

## **Declarations**

**Ethics approval and consent to participate:** This study was approved by the Dalhousie University Research Ethics Board. All participants provided informed consent prior to participating in this study.

**Consent for publication:** Not applicable.

**Availability of data and materials:** The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests:** The authors have no conflicts of interest to disclose.

**Funding:** This study was funded by a Faculty of Medicine Ross Stuart Smith RIM Summer Studentship to Peri Fenwick and a University Internal Medicine Research Foundation RIM Summer Studentship to Alyson

Colborne.

**Authors' contributions:** PF and LC conceived the study idea and design in discussions with OT and AC. PF performed the statistical analyses and drafted the manuscript under the supervision of OT and LC. All authors contributed to additional drafts of the manuscript and approved the submitted version, and each author satisfies the authorship criteria of the International Committee of Medical Journal Editors. All authors agree to be accountable for all aspects of the work.

**Acknowledgements:** This project was completed as part of Dalhousie Medical School's "Research in Medicine" program, through the support of the Faculty of Medicine Ross Stuart Smith RIM Summer Studentship. We sincerely thank the participants for completing our survey.

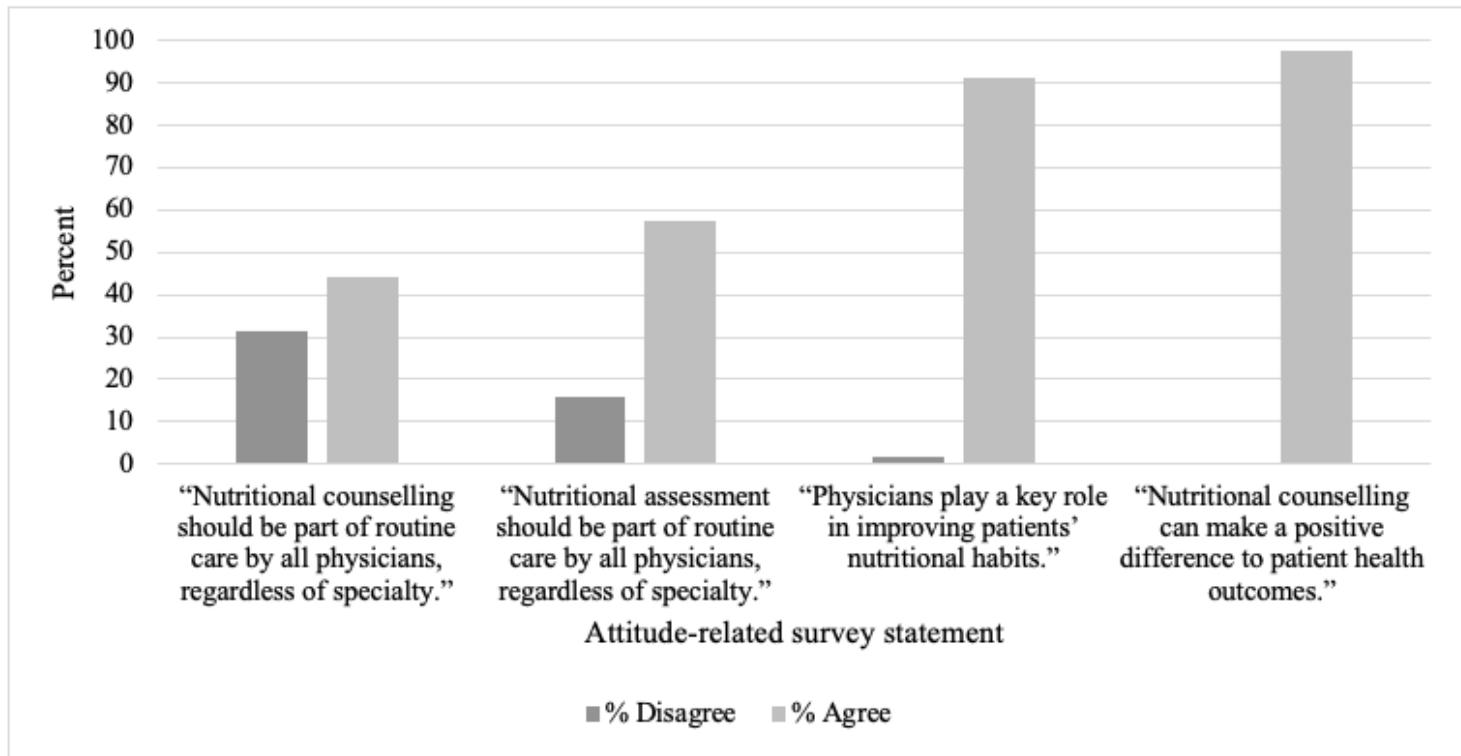
## References

1. Global Strategy on Diet, Physical Activity and Health. World Heal Organ [Internet]. 2004 [cited 2018 Jan 20]; Available from:  
[http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy\\_english\\_web.pdf](http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf)
2. Alam S, Lang JJ, Drucker AM, Gotay C, Kozloff N, Mate K, et al. Assessment of the burden of diseases and injuries attributable to risk factors in Canada from 1990 to 2016: an analysis of the Global Burden of Disease Study. *C Open* [Internet]. 2019 Feb 28 [cited 2019 Jul 24];7(1):E140–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/30819694>
3. Association AD. American Dietetic Association. Summary of findings: American Dietetic Association's public opinion survey Nutrition and You: Trends 2008. 2008.
4. Kolasa KM, Rickett K. Barriers to Providing Nutrition Counseling Cited by Physicians. *Nutr Clin Pract* [Internet]. 2010 Oct 20 [cited 2018 Jan 20];25(5):502–9. Available from:  
<http://doi.wiley.com/10.1177/0884533610380057>
5. Kushner RF. Barriers to Providing Nutrition Counseling by Physicians: A Survey of Primary Care Practitioners. *Prev Med (Baltim)* [Internet]. 1995 Nov [cited 2018 Jan 21];24(6):546–52. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/8610076>
6. Glanz K. Review of nutritional attitudes and counseling practices of primary care physicians. *Am J Clin Nutr* [Internet]. 1997 Jun 1 [cited 2019 Jun 15];65(6):2016S-2019S. Available from:  
<http://www.ncbi.nlm.nih.gov/pubmed/9174514>
7. Adams KM, Lindell KC, Kohlmeier M, Zeisel SH. Status of nutrition education in medical schools. *Am J Clin Nutr* [Internet]. 2006 Jun 1 [cited 2019 Jun 15];83(4):941S-944S. Available from:  
<https://academic.oup.com/ajcn/article/83/4/941S/4649273>
8. Devries S, Agatston A, Aggarwal M, Aspry KE, Esselstyn CB, Kris-Etherton P, et al. A Deficiency of Nutrition Education and Practice in Cardiology. *Am J Med* [Internet]. 2017 Nov [cited 2019 Jun 15];130(11):1298–305. Available from:  
<https://linkinghub.elsevier.com/retrieve/pii/S0002934317305272>

9. Devries S, Willett W, Bonow RO. Nutrition Education in Medical School, Residency Training, and Practice. *JAMA* [Internet]. 2019 Apr 9 [cited 2019 Jun 15];321(14):1351. Available from: <http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2019.1581>
10. Vetter ML, Herring SJ, Sood M, Shah NR, Kalet AL. What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. *J Am Coll Nutr* [Internet]. 2008 Apr [cited 2019 Jun 15];27(2):287–98. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18689561>
11. Gramlich LM, Olstad DL, Nasser R, Goonewardene L, Raman M, Innis S, et al. Medical students' perceptions of nutrition education in Canadian universities. *Appl Physiol Nutr Metab* [Internet]. 2010 Jun [cited 2018 Jan 21];35(3):336–43. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20555378>
12. Hanninen S, Rashid M. Assessment of Students' Perception of the Nutrition Curriculum in a Canadian Undergraduate Medical Education Program. *J Can Assoc Gastroenterol* [Internet]. 2019 Jul 10 [cited 2019 Jul 26];2(3):141–7. Available from: <https://academic.oup.com/jcag/article/2/3/141/5063812>
13. Likert RA. A Technique for Measurement of Attitudes. Vol. 22, *Archives of Psychology*. 1932. 1 p.
14. Artino AR, La Rochelle JS, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No. 87. *Med Teach*. 2014;36(6):463–74.
15. Muhammad NA, Shamsuddin K, Mohd Amin R, Omar K, Thurasamy R. Questionnaire development and validity to measure sexual intention among youth in Malaysia. *BMC Public Health* [Internet]. 2017 Feb 2 [cited 2020 Mar 9];17(1):157. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28152993>
16. Devon HA, Block ME, Moyle-Wright P, Ernst DM, Hayden SJ, Lazzara DJ, et al. A psychometric toolbox for testing validity and reliability. *J Nurs Scholarsh*. 2007 Jun;39(2):155–64.
17. Opinio [Internet]. Oslo: Object Planet Inc.; 2019. Available from: <http://www.objectplanet.com/>
18. Adams KM, Kohlmeier M, Zeisel SH. Nutrition education in U.S. medical schools: latest update of a national survey. *Acad Med* [Internet]. 2010 Sep [cited 2019 Jun 15];85(9):1537–42. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20736683>
19. Mozaffarian D, Rosenberg I, Uauy R. Science and Politics of Nutrition: History of modern nutrition science—implications for current research, dietary guidelines, and food policy. *BMJ* [Internet]. 2018 [cited 2019 Jul 31];361:k2392. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/29899124>
20. Kris-Etherton PM, Akabas SR, Bales CW, Bistrian B, Braun L, Edwards MS, et al. The need to advance nutrition education in the training of health care professionals and recommended research to evaluate implementation and effectiveness. *Am J Clin Nutr* [Internet]. 2014 May [cited 2019 Jul 30];99(5 Suppl):1153S-66S. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24717343>
21. Ball L, Crowley J, Laur C, Rajput-Ray M, Gillam S, Ray S. Nutrition in medical education: reflections from an initiative at the University of Cambridge. *J Multidiscip Healthc* [Internet]. 2014 [cited 2019 Jul 30];7:209. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24899813>

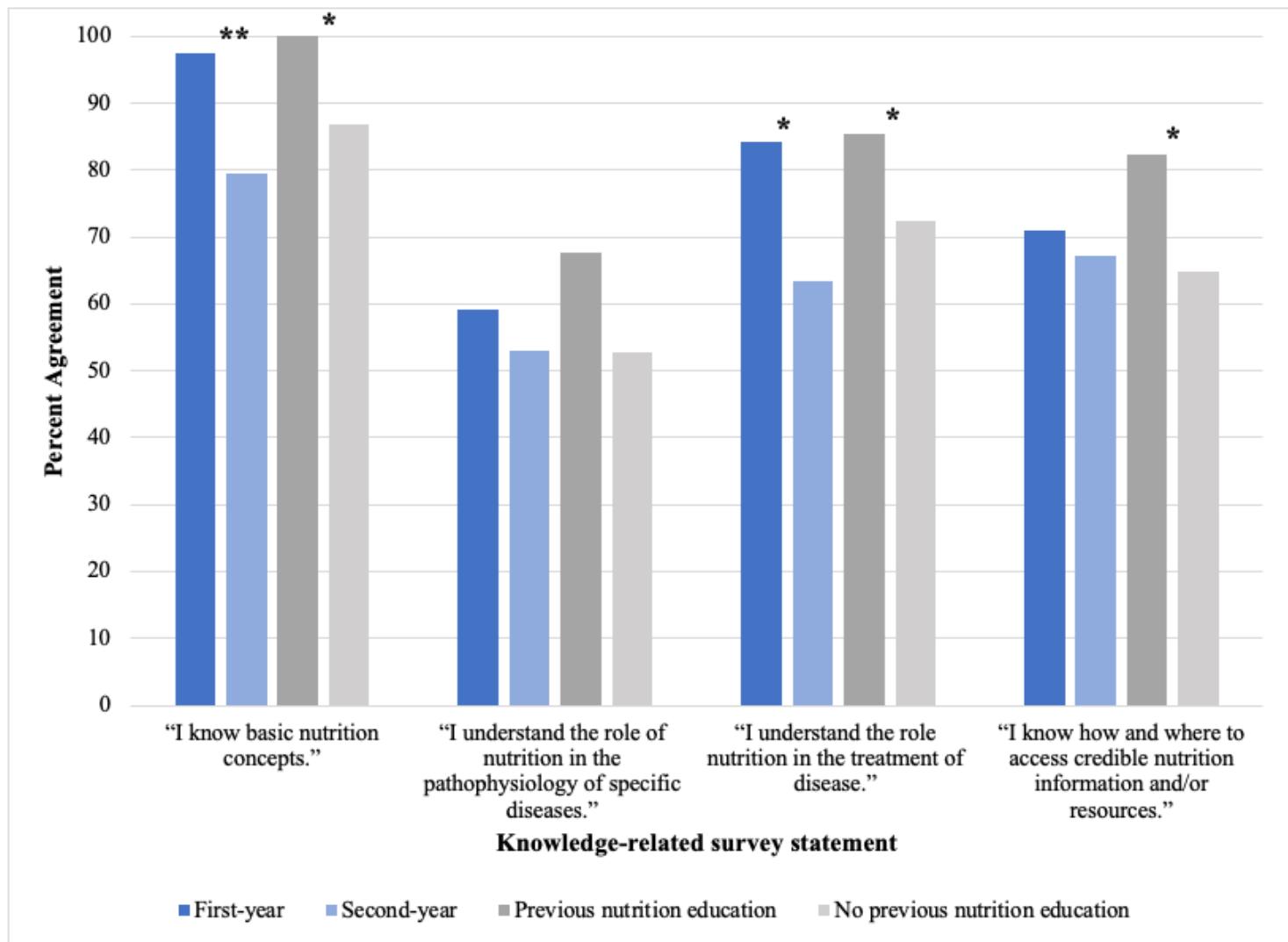
22. Spencer EH, Frank E, Elon LK, Hertzberg VS, Serdula MK, Galuska DA. Predictors of nutrition counseling behaviors and attitudes in US medical students. *Am J Clin Nutr* [Internet]. 2006 Dec 1 [cited 2018 Aug 10];84(3):655–62. Available from: <https://academic.oup.com/ajcn/article/84/3/655/4648783>
23. Foster KY, Diehl NS, Shaw D, Rogers RL, Egan B, Carek P, et al. Medical students' readiness to provide lifestyle counseling for overweight patients. *Eat Behav* [Internet]. 2002 [cited 2019 Jul 29];3(1):1–13. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15001017>
24. Pennycook G, Ross RM, Koehler DJ, Fugelsang JA. Dunning–Kruger effects in reasoning: Theoretical implications of the failure to recognize incompetence. *Psychon Bull Rev*. 2017 Dec 1;24(6):1774–84.
25. Motta M, Callaghan T, Sylvester S. Knowing less but presuming more: Dunning-Kruger effects and the endorsement of anti-vaccine policy attitudes. *Soc Sci Med* [Internet]. 2018 Aug [cited 2020 Jan 1];211:274–81. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S027795361830340X>
26. Zawadka M, Graczyńska A, Janiszewska A, Ostrowski A, Michałowski M, Rykowski M, et al. Lessons learned from a study of the integration of a point-of-care ultrasound course into the undergraduate medical school curriculum. *Med Sci Monit*. 2019;25:4104–9.
27. Mihalynuk T V, Scott CS, Coombs JB. Self-reported nutrition proficiency is positively correlated with the perceived quality of nutrition training of family physicians in Washington State. *Am J Clin Nutr* [Internet]. 2003 May 1 [cited 2019 Jun 15];77(5):1330–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12716690>
28. Connor R, Cialdella-Kam L, Harris SR. A Survey of Medical Students' Use of Nutrition Resources and Perceived Competency in Providing Basic Nutrition Education. *J Biomed Educ* [Internet]. 2015 Aug 6 [cited 2019 Jul 31];2015:1–7. Available from: <https://www.hindawi.com/archive/2015/181502/>
29. Aspry KE, Van Horn L, Carson JAS, Wylie-Rosett J, Kushner RF, Lichtenstein AH, et al. Medical Nutrition Education, Training, and Competencies to Advance Guideline-Based Diet Counseling by Physicians: A Science Advisory From the American Heart Association. *Circulation* [Internet]. 2018 Jun 5 [cited 2019 Jun 17];137(23). Available from: <https://www.ahajournals.org/doi/10.1161/CIR.0000000000000563>
30. Hauser ME. A Novel Culinary Medicine Course for Undergraduate Medical Education. *Am J Lifestyle Med* [Internet]. 2019 May 24 [cited 2019 Jun 17];13(3):262–4. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/31105488>
31. Jaroudi SS, Sessions WS, Wang VS, Shriver JL, Helekar AS, Santucci M, et al. Impact of culinary medicine elective on medical students' culinary knowledge and skills. *Proc (Bayl Univ Med Cent)* [Internet]. 2018 Oct [cited 2019 Jun 17];31(4):439–42. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/30948975>
32. Oldfield J. Food Basics for Future Doctors: 'Culinary Medicine' at U of T | Faculty of Medicine [Internet]. 2017 [cited 2019 Jun 17]. Available from: <https://medicine.utoronto.ca/news/food-basics-future-doctors-culinary-medicine-u-t>

## Figures



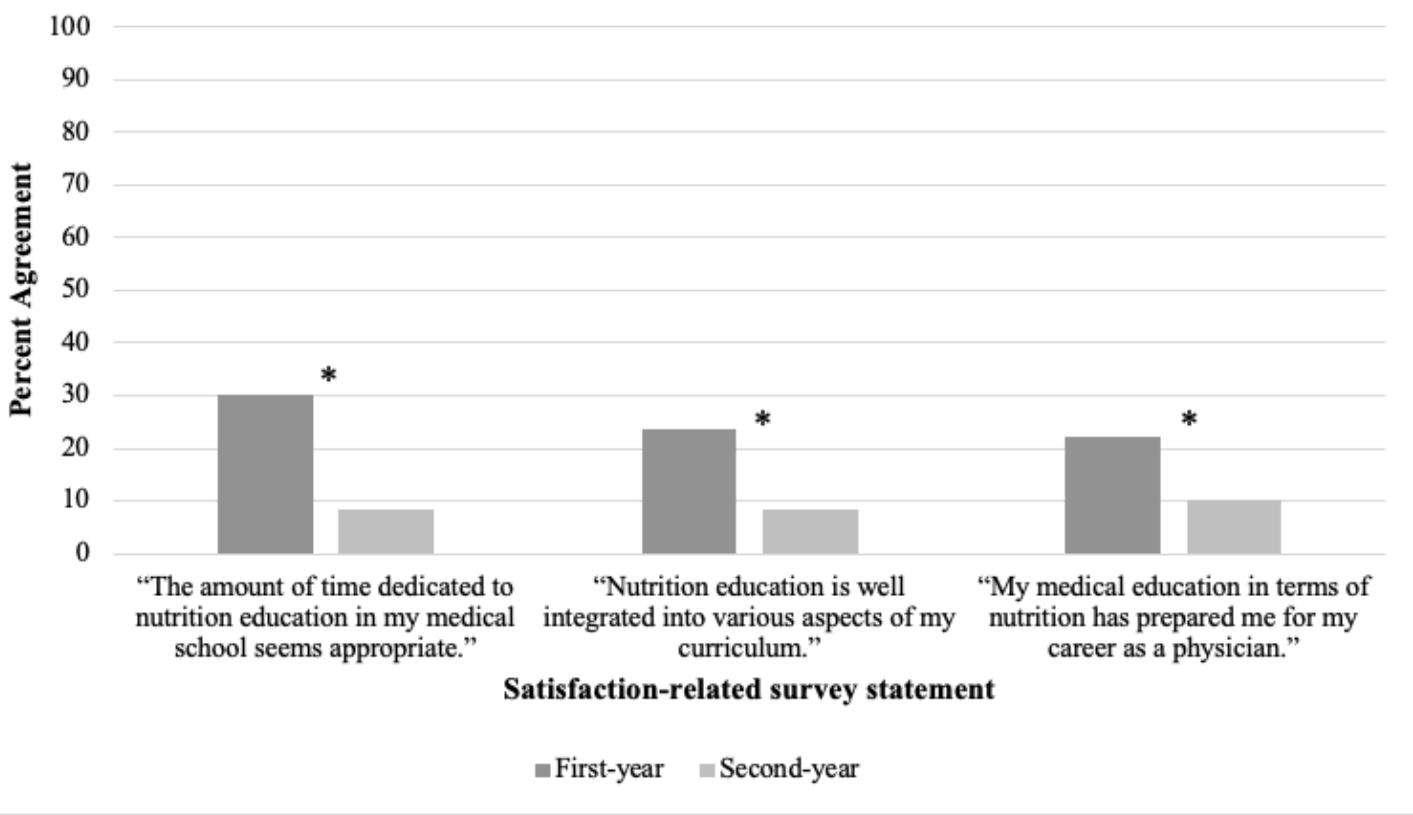
**Figure 1**

First and second-year students' attitudes towards nutrition in medical education and practice. Note: There were no significant differences in % agreement for attitude-related statements between first and second-year students or between those with or without previous nutrition education ( $p>0.05$  for all statements). Percentage agreement was analyzed using a Mann-Whitney U test according to the 5-point Likert scale, with a score of 4 (agree) or 5 (strongly agree) indicating agreement and 1 (strongly disagree) or 2 (disagree) indicating disagreement.



**Figure 2**

Self-perceived knowledge of nutrition-related subjects according to year of study and previous education. Note: There were significant differences in % agreement between first-year and second-year students, and between students with previous nutrition education and those without previous nutrition education (\* $p<0.05$ , \*\* $p<0.001$ ). Percentage agreement was analyzed using a Mann-Whitney U test according to the 5-point Likert scale, with a score of 4 (agree) or 5 (strongly agree) indicating agreement.



**Figure 3**

Satisfaction with nutrition education (% agreement) among first-year medical students compared to second-year medical students. Note: There were significant differences in % agreement between first-year and second-year students ( $*p<0.05$ ) for all satisfaction-related questions. Percentage agreement was analyzed using a Mann-Whitney U test according to the 5-point Likert scale, with a score of 4 (agree) or 5 (strongly agree) indicating agreement.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [NutritionAdditionalFile1.docx](#)