Medical students, free clinics and nutrition counseling: A job well done?

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Abstract

Objectives: Low socioeconomic income has been associated with poor nutrition. Medical students often volunteer at clinics providing free or subsidized care to patients with low socioeconomic status. This study reports the results of a survey distributed to medical students volunteering at an academic medical center’s free clinic. The study aims to describe medical student attitudes towards nutrition as well as knowledge and awareness of nutritional resources available to patients with low socioeconomic status.

Methods: A 13-item online survey was distributed to all four-years of medical students in the Spring of 2018. The survey included questions to evaluate students’ knowledge of community resources and attitudes regarding nutrition counseling. Simple descriptive statistics were used to analyze the results.

Results: The survey had a 17.5% response rate. Only 20.5% of students recalled formal education throughout their medical school curriculum on nutrition counseling for patients with low socioeconomic status. Eighty-one percent were not confident in their ability to counsel patients on programs to assist maintaining a healthy diet. Fifty-nine percent were aware that low-income patients may be eligible for the Supplement Nutrition Assistance Program (SNAP), but only 36% knew the benefits of the programs and only 7% were aware of other nutrition programs in the community. Ninety-four percent of students felt that it would be helpful to receive further education in this area prior to working with this vulnerable patient population in clinic.

Conclusion: Medical students do not recall formally taught nutrition information and do not feel equipped to provide nutrition counseling to patients. This educational gap could result in many patients not receiving information regarding available nutrition related resources. Students welcome further nutrition education, which should be provided throughout the curriculum instead of at a single point in time.

Keywords: Nutrition, Low Socioeconomic Status; Food Desert; Medical Student; Medical Education; Medical
School; Supplemental Nutrition Assistance Program; SNAP

Introduction

Dietary differences amongst patients with different income levels has long been investigated with global dietary surveys reporting a significant dietary discrepancy between patients with low socioeconomic status and their higher socioeconomic status counterparts. (Darmon and Drewnowski, 2008) By the 1980s, obesity and overweight affected half of US adults and by 2013, the number of obesity and overweight increased to 70%. (Centers for Disease Control and Prevention, 2017) Being overweight and obesity are important risk factors for diabetes, cardiovascular disease, cancer and premature death. (Kelly et al., 2008) (Manson et al., 2004) Triggers for obesity and chronic illness are linked to poor diet. Low socioeconomic status patients consume less whole grains, fruits, vegetables, nuts and lean meats. (Darmon and Drewnowski, 2008) Additionally, patients with lower education levels and women who self report as being in food insufficient households have lower healthy eating index (HEI) scores. (Champagne et al., 2007) (Basiotis and Lino, 2003) Lack of supermarkets in low-income neighborhoods, inadequate transportation to areas with supermarkets, the number of fast food restaurants and the high cost of healthy foods in prominently African American neighborhoods compared to neighborhoods of other ethnicities are factors impacting the access families have to healthy diet choices. (Walker, Keane and Burke, 2010) Such areas where healthy and affordable foods are not readily available are known as food deserts. Food deserts have more access to foods with high sugar and fat content than fresh fruits and vegetables, which negatively impacts the diets of many low income families. (Gallagher, 2011)

In 2009, approximately 25% of medical schools in the United States required medical students to take a nutrition course and on average, students only received 19.6 hours of nutrition teaching over the course of their 4-year medical school education. (Adams, Kohlmeier and Zeisel, 2010) This is much lower than the 30% and 22.3 hours reported respectively in 2004. (Adams, Kohlmeier and Zeisel, 2010) The lack of education is despite the National Academy of Sciences suggesting that students should receive at least 25-30 hours of formal nutrition education during pre-clinical education, years one and two. (National Research Council, 1985) However, nutrition education continues to be inadequate and appears to have decreased over recent years.

The goal of this study was to study medical student attitude towards nutrition as well as knowledge and awareness of nutritional resources available to patients with low socioeconomic status.

Methods

Setting and participants:
The University of Florida College of Medicine (UFCOM) is located in Gainesville Florida, with up to 550 medical students enrolled. (University of Florida Medical Admissions College of Medicine) The city of Gainesville is home to approximately 132,000 people. (United States Census Bureau) It is estimated that 66% of the population is white (10% identifying as Hispanic or Latino) and 22% is African American. Ninety one percent of the population has at minimum a high school level education, with the median household income is reported as only $32,716 with 35% of people living in poverty. (United States Census Bureau) Although the percentage of Gainesville’s population with a high school degree is higher than the national average (87%), Gainesville falls substantially lower than the national average median household income of $55,322 and the estimated 13% of our nation’s people living in poverty. (United States Census Bureau)

The United States Department of Agriculture (USDA) had determined certain areas in the city of Gainesville to be
food deserts. (United States Department of Agriculture Economic Research Service, 2015) Low income neighborhoods are defined by having a poverty rate greater than 20% or median family income less than 80% of the average for the metropolitan area or state. Low access areas are defined by having more than 500 people or 33% of the population living further than 1 mile in urban settings or 10 miles in rural settings from the nearest supermarket or grocery store. (United States Department of Agriculture Economic Research Service, 2015) Specifically, the northeast side of the city is recognized for having low-income neighborhoods with low access to healthy food, a food desert. (United States Department of Agriculture Economic Research Service, 2015)

UFCOM provides care to underserved areas of Gainesville through student run free clinics called the ‘Equal Access Clinic Network,’ founded in 1988. (Equal Access Clinic Network) Medical students as well as allied health professions students, are able to volunteer at the evening clinics which provide medical care to the under-insured and uninsured in our community. The Equal Access Clinic Network has four primary care clinic sites. (Equal Access Clinic Network) Each student is required to complete a small number of service hours (6 hours per semester) during years one and two of medical school. Many, if not the majority of students fulfill this hour requirement by volunteering within the Equal Access Clinic Network.

In addition to the health outreach that Equal Access Clinic Provides, the UF Institute of Food and Agricultural Sciences (IFAS) Extension Family and Nutrition Program (FNP) is a resource available to low socioeconomic families in combination with the government funded Food Assistance Program – Supplemental Nutrition Assistance Program (SNAP – formerly known as Food Stamps). (United States Agriculture Food and Nutrition Service) (UF/IFAS Extension Family Nutrition Program) IFAS/FNP is a very helpful resource for low income families as they offer free nutrition education throughout the community and encourage families to pursue an overall healthy lifestyle with the goal of decreasing the risk of chronic disease. (UF/IFAS Extension Family Nutrition Program)

Methods:
An anonymous survey was developed by the authors utilizing available literature regarding nutrition knowledge and attitudes of medical students. Information from IFAS and SNAP websites were also used to help construct questions. (United States Agriculture Food and Nutrition Service) (UF/IFAS Extension Family Nutrition Program) (Table 1) The survey questions assessed the students’ knowledge of nutritional resources available to low socioeconomic status patients. Additionally, information on hours spent in Equal Access Clinics, previous nutrition education, confidence in nutrition counseling and willingness to receive further education was gathered. The survey was utilized as an opportunity to disperse information about nutritional resources available to low socioeconomic status patients. After students answered Questions 1-4, which collected basic information about year of study, hours spend in clinic, exposure to nutrition education and confidence in nutrition counseling, they were provided with information about nutrition resources and asked about their awareness of this information, questions 5-10. Question 11 inquired about whether the students would have found it helpful to receive this information prior to working in clinic and Question 12 asked the students if they found the information dispersed as part of the survey useful. Question 13 allowed students to provide open ended responses about their experience with nutrition counseling in Equal Access Clinics and give suggestions regarding how to improve their ability to provide nutrition counseling to patients of low socioeconomic status.

The 13-item electronic survey was developed using the Qualtrics® web-based system. An invitation email including the link to the anonymous electronic survey was sent to all medical students at the UFCOM during the Spring semester of 2018. The study was granted an ‘exempt status’ by The University of Florida’s institutional review Board (IRB). The data gathered was analyzed using simple descriptive statistics.
## Results/Analysis

### Table 1: Survey Questions and Responses

| Question                                                                 | Response                          |
|--------------------------------------------------------------------------|-----------------------------------|
| 1. Enter your year of study                                              | MS*1 34.25% MS2 26.03% MS3 38.36% MS4 1.37% |
| 2. Approximately how many hours have you completed as a medical student volunteer at Equal Access Clinic? | Mean: 38 hours |
| 3. Since entering medical school, do you recall a formal session on nutrition counseling for patients of low socioeconomic status? If yes, please state in which year or on which rotation. | Yes: 20.55% No: 79.45% If yes, which year or on which rotation: • First Year: 80% • Nutrition Course: 33.33% • Population Health Course: 6.67% • Second Year: 6.67% • First or Second Year: 6.67% • Third Year: 6.67% • Fourth Year: 0% |
| 4. Do you feel equipped to counsel patients at Equal Access Clinic (or generally from a low socioeconomic status) about programs to assist them in eating a healthy diet? | Yes: 19.18% No: 80.82% |

The following statements were followed by a yes or no question inquiring as to whether or not the student was previously aware of the fact provided:

| Question                                                                 | Response                          |
|--------------------------------------------------------------------------|-----------------------------------|
| 5. Families with a gross annual income less than 130% of the Federal Poverty Level (approximately $31,980 for a family of 4) may be eligible for the Food Assistance Program – Supplemental Nutrition Assistance Program (SNAP – formerly known as Food Stamps). | Aware: 59.15% Unaware: 40.85% |
| 6. People who are convicted of drug trafficking, have an active felony warrant, intentionally break Food Assistance Program rules, are non-citizens without a qualified status, and some students in colleges or universities are not eligible for food assistance benefits. | Aware: 18.57% Unaware: 81.43% |
| 7. Qualified families will receive a monthly allotment (maximum $640/month for a family of 4) on an Electronic Bank Transfer (EBT) card to be used to purchase healthy foods such as breads, cereals, fruits, vegetables, meats, and dairy products at grocery stores, ethnic markets, dollar stores, wholesale clubs, retail supercenters and farmers’ markets. | Aware: 35.71% Unaware: 64.29% |
8. People who are eligible for SNAP benefits may enroll in the UF Institute of Food and Agricultural Sciences (IFAS) Extension Family and Nutrition Program (FNP) at the outreach clinic. This program provides assistance in learning how to shop at the grocery store for healthy foods on a budget and provides free cooking classes once a week for 6 weeks.  

| Aware: 7.14% | Unaware: 92.86% |

9. UF Institute of Food and Agricultural Sciences (IFAS) Extension Family and Nutrition Program (FNP) can provide a cooking class demonstrating low income, easy and tasty meals inside a medical facility.  

| Aware: 10.14% | Unaware: 89.86% |

10. UF Institute of Food and Agricultural Sciences (IFAS) Extension Family and Nutrition Program (FNP) has a website that provides patients with access to information on healthy meals for kids, teens and adults. Information on appropriate portions, saving money at the grocery store, and eating out at restaurants while keeping a healthy diet is available for free online.  

| Aware: 8.70% | Unaware: 91.30% |

**Concluding Questions:**

11. Would it be helpful for medical students to receive information and education about nutritional resources available to patients and families of low socioeconomic status prior to working at Equal Access Clinic?  

| Yes: 94.20% | No: 5.80% |

12. Did you find the information provided in this survey useful?  

| Yes: 98.55% | No: 1.45% |
13. Please enter any comments you would like to share with the research team about your experience with Nutrition counseling at Equal Access Clinics and any suggestions you may have to improve the ability of students to provide nutritional counseling to patients with low socioeconomic status:

| Free Response |
|----------------|
| • I think it would be best for medical students to be made aware of where to find this information (ex: location of brochure at EAC) but I don't think it would necessarily be helpful to have this information in a lecture. It is best to have the resources nearby when relevant, because there is just so much information coming at us during our curriculum that it's easy to forget about helpful resources like those mentioned in this survey. Handouts are very helpful for both the patient and the provider. |
| • We should have contact information for IFAS and possibly a handout of meals that could be easily put together with EBT groceries |
| • I think instead of expecting medical students to memorize this information (we may have heard about it and I forgot), we should be aware that there is a brochure with this information available at EAC so we can refer to it when the need presents itself. |
| • Please create a flyer or compile a powerpoint of this information and send it to the Directors of the EACN for distribution! |
| • As med students, we already have so much to remember that I think having handouts/literature at the Equal Access sites would be more beneficial because most students (non-officers) will not be there consistently enough to retain this info. But helping patients with nutrition would be great (and linking people to resources would be better than us just saying to eat more vegetables). |
| • I think that nutritional education is severely lacking in this respect, especially considering that a lot of what we counsel on at EAC is lifestyle modification. We should have more curriculum covering nutritional topics, other than just relying on our nutrition week. |
| • Perhaps adding a lecture or activity about this during our nutrition week (Fall M1) would be helpful |
| • Please send links to fliers for the UF Institute Food program and the food stamps program! |
| • could we get a copy of all the information you shared in this survey? I would love to have this information to share with patients at EAC |
| • Please send this out to all EAC officers so that they are aware and can relay this information on to the social workers at their various sites |
| • having a flyer with info & sign-up details about these resources available to give to patients at EAC would be helpful |
| • I think nutrition counseling resource knowledge should be given to all officers (HOQI, medical student, pharmacy, etc) rather than to every student volunteering individually. These officers could then mention the available information at the beginning of each clinic night so students are aware further information can be provided if they perceive a need from their patient |
| • This information is sorely needed as a part of our medical education! I knew very little of this information and it would be extremely helpful. Even providing this information in a small card or something that could be carried around regularly would be great I think. Nutrition is extremely important to the health of our patients. |
| • Thank you!!! |

*Medical Student*
Results:
Seventy-three of 416 enrolled medical students responded to the survey (N=73/416), resulting in a response rate of 17.5%. The distribution of participants is as follows: 25 first-year students (34%), 19 second-year students (26%), 28 third-year students (38%) and one student who just completed fourth-year. Only 59% of the students were aware that many of the patients they see in clinic may be eligible for the Supplement Nutrition Assistance Program (SNAP) and only 36% of students were aware of the benefits of enrolling in this program. 19% were aware of patient exclusion criteria to receive SNAP benefits. 93% were not aware of IFAS/FNP or its benefits, specifically 90% did not know of the programs ability to provide cooking classes demonstrating healthy foods inside a medical facility. Finally, 91% were unaware of the IFAS/FNP free website which provides information on healthy cooking, saving money while grocery shopping and maintaining a healthy diet while eating at restaurants. (Table 1).

Overall, students completed an average of approximately 38 hours in Equal Access Clinics, ranging from 0-300 hours. Results showed only 21 % of the medical students surveyed recalled a formal session on nutrition counseling for patients with low socioeconomic status and the 81% did not feel equipped to counsel patients about programs to assist them in eating a healthy diet. Although the UFCOM has a required formal nutrition course, the students who were able to recall a formal teaching session had a varying responses as to when this session occurred. The majority quoted some time during the first year of medical school and 33% referenced the specific nutrition course taught during year one of medical education.

Ninety-four percent of medical student respondents felt like it would it be helpful to receive information and education about nutritional resources available to patients and families of low socioeconomic status prior to working at Equal Access Clinic. 100% of first year students responding to the question desired further education in comparison to 89% and 93% of second and third year students respectively. Overall, 99% of respondents found the facts provided throughout the survey useful. In the free response area, multiple students described their interest in learning more and requested handouts for providers and patients or having brochures available at Equal Access Clinics to distribute the information in the survey to their patients. Students provided additional comments in question 13 about their experience with nutrition counseling in Equal Access Clinics and suggestions for improving their ability to provide nutrition counseling to patients of low socioeconomic status. Consistent themes amongst comments included requests for flyers about SNAP and IFAS which students could distribute at the clinic and increased nutrition education in the curriculum. Some exemplar comments are provided below:

"Please create a flyer or compile a PowerPoint of this information and send it to the Directors of the EACN for distribution!" Participant (P) 1

"I think that nutritional education is severely lacking in this respect, especially considering that a lot of what we counsel on at EAC is lifestyle modification. We should have more curriculum covering nutritional topics, other than just relying on our nutrition week." P2

"Having a flyer with info & sign-up details about these resources available to give to patients at EAC would be helpful." P3

"This information is sorely needed as a part of our medical education! I knew very little of this information and it would be extremely helpful. Even providing this information in a small card or something that could be carried around regularly would be great I think. Nutrition is extremely important to the health of our patients." P4
Discussion

The main finding of our study is that medical students volunteering to provide care to patients of low socioeconomic status, who are in particular need for nutritional counseling, are ill equipped to provide such counseling to patients. A lack of awareness of nutrition assistance programs like SNAP and IFAS prevented them from guiding patients. Students in our study welcomed information and education about nutritional resources, requesting handouts/brochures for providers and patients at the clinic sites to help guide the discussions.

The UFCOM has implemented a weeklong nutrition intensive course, which is mandatory for all first-year medical students, yet the majority of students did not recall a formal session on nutrition counseling for patients of low socioeconomic status. Although disappointing, this is not surprising as previous research has shown similar results. A national survey of nutrition education in U.S. medical schools documented that students received less than 20 contact hours of nutrition instruction during their medical school career, and notably, this represented a 12% decline when compared to survey results four years earlier.(Adams, Kohlmeier and Zeisel, 2010) In 2009, the average student received 19.6 hours of nutrition teaching throughout medical school. Previous studies show that early medical students find nutrition counseling more relevant than students who were further along in their medical education.(Spencer et al., 2006) Less than half of senior medical students found nutrition counseling to be highly relevant to their future practice particularly those students who anticipated going into subspecialties compared to students intending to practice primary care.(Spencer et al., 2006) We found that all students who participated in the study were interested in more information, however we did not specifically ask them if they were considering subspecialties or primary care. The gap in nutrition education goes beyond medical school curriculum and the ramifications are felt by physicians as well.(Adams, Kohlmeier and Zeisel, 2010)(Aggarwal et al., 2018) According to Aggerwal et al, 58% of doctors describe having no or minimal education on nutrition during medical school and 73% had no or minimal education in nutrition during their residency program.(Aggarwal et al., 2018) When asked a majority of internal medicine interns felt that most physicians were not trained to provide nutrition counseling to patients.(Spencer et al., 2006)(Vetter et al., 2008)

Our study shows that student knowledge of nutrition resources in our local community is lacking and they do not feel equipped to counsel patients from a low socioeconomic status about programs to assist them in eating a healthy diet. Many students were unaware that the SNAP exists, and fewer knew the benefits to our patients. Knowledge of community resources outside of SNAP such as UF IFAS/FNP’s program was also poor. Our results are similar to that of Smith et al. who surveyed faculty, family medicine residents and medical student involved in a student run clinic project similar to UF’s Equal Access Clinic.(Smith et al., 2017) Prior to any intervention, more than three quarters of study participants had never or rarely referred a patient to the government SNAP program.(Smith et al., 2017) Our study demonstrates one possible cause for the lack of patient referral to food assistance programs is a lack of provider knowledge that such programs exist. With so many barriers prohibiting patients of low socioeconomic status access to healthy foods such as lack of access to supermarkets, transportation and the cost of healthy food, it is imperative that lack of provider knowledge of assistance programs not be an additional barrier for these families to overcome.(Walker, Keane and Burke, 2010)

Improving nutrition counseling by physicians can affect the lifestyle of patients and result in prevention or delaying of progression of chronic diseases.(Eckel et al., 2014)(Kris-Etherton et al., 2014)(Wynn et al., 2010)(Mogre et al., 2018) Therefore, counseling by physicians should be considered the first line of defense to preventing obesity and improving health outcomes. Despite the wealth of knowledge regarding the lack of training for nutrition counseling, the topic continues to receive little attention in education at all levels of medical training. The impact of this education gap on physicians’ ability to counsel patients on nutrition is one of grave concern. Despite the designated
nutrition course, students did not recall information taught and felt unprepared. Additionally, since the course is not connected directly with the Equal Access Clinic, students may not connect the dots.

We recommend that medical schools consider vertical integration of nutrition education into both preclinical and clinical years. (Kushner et al., 2014) It is important to educate students and health care providers serving at the front line about community resources available. Such educational interventions must be threaded through the curriculum, so that the topic is revisited throughout medical education. Improving physicians’ nutrition and exercise knowledge and counseling skills requires a comprehensive approach, including sufficient nutrition and physical activity curriculum in undergraduate, graduate, and continuing medical education, as well as effective and practical tools to support counseling in clinical settings. (Berge et al., 2017)

**Strengths and Limitations:**

We acknowledge that our survey has a low response rate. However, as the responses clearly show the lack of preparedness throughout the medical school spectrum, we feel they likely depict a complete picture of the state of nutrition education.

A ripple effect of our study was that at the request of the students surveyed, our research team worked with the Equal Access Clinic Network to create a program that would ensure eligible patients are made aware of these valuable community resources. Beginning in fall of 2018, all patients attending clinics will be screened for income level and each qualified patient will be provided information on how to obtain assistance from programs like SNAP and UF IFAS/FNP.

**Conclusion**

Medical students are largely unaware of nutritional resources available to patients of low socioeconomic status. Our results reinforce the need for more nutritional education in medical schools as it directly applies to their patients. Medical students do not recall formal education on important nutrition topics which points to the need for curricular change to reinforce nutrition counseling throughout the curriculum.

**Take Home Messages**

- Students, residents and attending physicians do not recall important nutrition topics and feel unequipped to provide nutrition counseling to patients.
- Patients are not referred to government funded nutrition assistance programs potentially due to lack of provider knowledge that these programs exist or of their benefits.
- Further research is needed to determine the extent that medical school curriculum impacts students’ opinion on this topic.
- Medical students are willing to receive further nutrition education.
- Applicable nutrition topics should be included in courses teaching allopathic medical management of chronic diseases.
Notes On Contributors

Brianna Bielski is a fourth year medical student at the University of Florida College of Medicine. She will be pursuing an Internal Medicine residency and desires a career in academic medicine. Her interests include working with underserved communities and medical education.

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**Appendices**

None.

**Declarations**

The author has declared that there are no conflicts of interest.

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**Ethics Statement**

This study was approved as exempt by The University of Florida’s institutional review board (IRB). Approval was granted on 5/9/2018 by IRB-02. IRB#: IRB201800768.

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