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ORIGINAL RESEARCH

Frequency and Attributing Factors to Food Insecurity Experienced by Professional Athletic Training Students

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Context: Many college students struggle with food insecurity due to limited income and competing financial interests for tuition and housing. Students in health care professions may be at an even higher risk of food insecurity; for instance, researchers have indicated that over 50% of nursing students experience food insecurity. However, little is known about the frequency and attributing factors to food insecurity in professional athletic training students.

Objective: To investigate the frequency and attributing factors of food insecurity experienced by professional athletic training students.

Design: Cross-sectional study.

Patients or Other Participants: One hundred sixteen participants completed the survey (11.6% completion rate). Twenty-four were males, and 92 were females.

Main Outcome Measure(s): Participants received an e-mail with a link to the online survey by the National Athletic Trainers' Association Research Survey Services. Participants completed the US Household Food Security Survey Module: Six-Item Short Form to identify food insecurity frequency, along with demographic questions and questions about dietary habits, academic demands, and mental health to identify factors that may contribute to food insecurity. We used a series of χ^2 tests to determine if any significant group differences existed between food security groups and the personal and demographic questions.

Results: One hundred sixteen participants completed the survey; 35.3% reported having high or marginal food security, 37.1% reported low food security, and 27.6% reported very low food security. We found that participants with high to marginal food security were more likely to live with family or a spouse.

Conclusions: Over 60% of professional athletic training students reported low to very low food security. Professional athletic training programs should be aware of this risk and create policies to help ease the challenges to food security among their students.

Key Words: Access to healthy foods, demographics, food security, young adult

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Frequency and Attributing Factors to Food Insecurity Experienced by Professional Athletic Training Students

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KEY POINTS

- Over 60% of professional athletic training students reported experiencing low or very low food security, highlighting a significant concern within this population.
- Students with high or marginal food security were more likely to live with family or a spouse, suggesting that support networks may play a role in mitigating food insecurity.
- Given the high rates of food insecurity, professional athletic training programs should recognize this issue and implement policies to support students' access to food and overall well-being.

INTRODUCTION

Food insecurity, which affects 17.0 million or 12.8% of American households, refers to the limited availability of nutritious food or the limited ability to acquire said foods in a socially acceptable way.[1–3] This issue has been linked to adverse health outcomes such as increased risks for diabetes, obesity, mental health disorders, and other chronic diseases.[4–6] Notably, the prevalence of food insecurity among college students is significantly higher, with more than 32% of the student population affected.[7]

Several factors may explain the higher food insecurity rate among college students, such as the financial demands of tuition and housing.[8] While meal plans are an option for many undergraduate students, the substantial upfront cost may dissuade graduate students from choosing this option.[8] Additionally, college students often limit employment during their academic programs, which decreases their financial ability to stay food secure.[9] Broton and colleagues identified additional contributors to food insecurity, including students who are from food-insecure homes, identify as a racial or ethnic minority, live off campus, or attended college in an urban area. The authors also noted that increased levels of food insecurity were attributed to a lack of time to obtain and prepare food and a lack of money to secure food.[10]

In health care profession education, it has been shown that food insecurity is even higher than reported in the general college population. For example, Bydalek and colleagues found that 52% of nursing students displayed some form of food insecurity.[11] In medical education, it has been shown that approximately 30% of medical students experience food insecurity.[12] The discrepancy between nursing students and medical students may be explained by the willingness of students to take out student loans, a decision that is affected by future earning opportunities.[13] In the study on nursing students, it was noted that living off campus may have been a contributing factor to food insecurity, but the authors did not find any relationship between racial or ethnic minorities and food insecurity.[11] Additional differences may include the level of degree the individual is pursuing.

Nursing is an undergraduate program, yet many health professions require advanced degrees such as master's and doctoral degrees. The factors contributing to food insecurity among undergraduate students may not fully apply to graduate students. Graduate students tend to be older, have greater financial responsibilities, and may have less family support.[14] Additionally, they are more likely to live off campus and not participate in campus meal plans.[14] Authors of previous reports have indicated almost 40% of graduate students experience some level of food insecurity, which is higher than the rates published for student doctors[14] This again may be due to the willingness to take out student loans to complete an advanced medical degree.[13]

While food insecurity has been examined in graduate students and other health care profession education, the frequency and attributing factors to food insecurity among professional athletic training students have yet to be discovered. In addition to increased rates of adverse health consequences and decreases in quality of life, food insecurity has been associated with declines in academic performance in general college students.[15] Wolfson and colleagues found that food-insecure students were less likely to graduate with a bachelor's or graduate or professional degree than their food-secure counterparts.[16] Thus, the frequency and attributing factors to food insecurity among professional athletic training students should be identified to develop strategies and update policies to ensure the success of these students and the profession. In this study, we aimed to investigate the frequency and attributing factors to food insecurity experienced by professional athletic training students and explore socioeconomic factors that contribute to food insecurity.

METHODS

Participants

We recruited 1000 student members of the National Athletic Trainers' Association (NATA) enrolled in the Commission on Accreditation of Athletic Training Education (CAATE) graduate professional athletic training. To be eligible for the study, participants must have been currently enrolled in a master's professional athletic training program and be fluent in English.

Instrumentation

Participants completed a 25-question online survey. The US Household Food Security Survey Module: Six-Item Short Form, a valid (sensitivity 92% and specificity 55%–65%) and reliable (Cronbach $\alpha = 0.74$–0.83) tool, was used to assess the level of food security.[17,18] Based on standard scoring criteria, participants were grouped as having (1) high or marginal food security, (2) low food security, or (3) very low food security. Participants completed a series of 5-point Likert-style and yes or no questions regarding their dietary habits, academic demands, mental health, and knowledge of their school's food resources. Finally, participants completed demographic questions, including gender

identity, ethnicity, housing situation, financial aid, employment, and grade point average. An expert reviewed these questions for clarity and readability.

Procedures

Potential participants received an e-mail from the NATA Research Survey Services containing a link to the Qualtrics online survey. Due to the nature of the survey distribution, all responses were kept confidential. Participants were provided information regarding the risks, benefits, scope, and time commitment of the survey in the e-mail and on the first page of the survey. Participants who continued after the first page consented to participate in the survey. Data were collected between March 28 and April 25, 2024. All procedures were approved by the university's institutional review board (HS24-0332).

Data Analysis

The survey data were cleaned and organized within SPSS (version 27; IBM). Scores of the US Household Food Security Survey Module: Six-Item Short Form were tabulated, and participants were then grouped based on the scores as high or marginal food security, low food security, and very low security. Low and very low security indicates greater food insecurity. Participants were considered to have *high or marginal food security* if they scored 0 to 1, *low food security* if they scored 2 to 4, and *very low food security* if they scored 5 to 6. A series of χ^2 tests with Bonferroni corrections were used to determine if any significant group differences existed between food security groups and the personal and demographic questions.

RESULTS

Of the 1000 participants recruited, 125 opened the survey link, leading to a 12.5% response rate. Of those, 116 participants completed the survey (11.6% completion rate). The Table contains the demographics of the participants. Of our sample, 35.3% reported having high or marginal food security, 37.1% reported low food security, and 27.6% reported very low food security. Low and very low security indicates greater food insecurity.

Of the questions regarding dietary habits, academic demands, mental health, knowledge of their school's food resources, gender identity, ethnicity, housing situation, financial aid, employment, and grade point average, only 3 had a significant χ^2 test, indicating significant food security group differences. Participants with high to marginal food security were more likely to live with parents, roommates, or spouses. Comparatively, participants with low food security were more likely to live alone or with roommates, and participants with very low food security were more likely to live with roommates (χ^2 [10, N = 116] = 20.738, P = .023). Next, when participants were asked if their "current school schedule allows me to dedicate enough time to enjoy 3 meals a day," participants with high or marginal food security were more likely to say always and sometimes. In contrast, participants with low food security and very low food security were more likely to say rarely (χ^2 [6, N = 116] = 12.652, P = .049). Finally, when participants were asked if their diet habits affected their ability to perform at their best in and out of the classroom and/or clinical rotation, participants with high to marginal food security were more likely to report rarely or never, whereas participants with low food security and very low food security were more likely to report always and sometimes (χ^2 [6, N = 116] = 20.339, P = .002). All other questions were insignificant, including financial aid received, hours employed per week, race or ethnicity, and grade point average.

Table. Demographics

Variable	No. (%)
Gender	
Male	24 (20.7%)
Female	92 (79.3%)
Ethnicity	
Caucasian	85 (73.3%)
Black	4 (3.4%)
Hispanic	12 (10.3%)
Other	15 (13.0%)
Year in professional program	
First year	24 (20.7%)
Second year	92 (79.3%)
Financial Aid?	
Yes	89 (76.7%)
No	27 (23.3%)
Employment hours per week	
40+ hours	1 (0.8%)
30–39 hours	3 (2.6%)
20–29 hours	15 (13.0%)
10–19 hours	18 (15.5%)
1–9 hours	26 (22.4%)
Unemployed	53 (45.7%)
Grade point average	
4.0	10 (8.6%)
3.5–3.9	77 (66.4%)
3.0–3.5	26 (22.4%)
Less than 3.0	3 (2.6%)

DISCUSSION

Food insecurity is a significant concern for US college students. In this study, we are among the first to identify the frequency and factors attributing to food insecurity among professional athletic training students. Our findings indicated that 64.7% of professional athletic training students experienced some level of food insecurity (low to very low food security), which is higher than that of the general population, general college population, and other students enrolled in professional health care education.[1,7,11] Previous researchers have indicated several factors may contribute to food insecurity.[10–12,14] We found that professional athletic training students who lived alone or with a roommate were more likely to experience food insecurity than those who lived with parents or a spouse. Additionally, we showed that food-insecure students were more likely to indicate that their athletic training program schedule affected their ability to secure 3 meals a day, which consequently might affect their ability to perform in the classroom and clinical setting.

Given the transition of professional athletic training programs to the master's level, it is expected that graduate students are more likely to live off campus. Previous researchers have indicated that students who live off campus are more likely to be food insecure.[11] The change to graduate-level

education may create a barrier to food security that was not experienced when an athletic training degree was at the undergraduate level. Participants in our study did not indicate that living off campus was an attributing factor to food insecurity. Indeed, it is likely that it may not be living off campus that places professional athletic training students at risk of food insecurity but rather their circumstances residing off campus. Food-secure students were more likely to live with someone who could help support them financially (ie, parents or a spouse), whereas food-insecure students did not have that financial support (ie, living alone or with a roommate).

We did not find gender, race, or ethnicity as attributing factors to food insecurity for professional athletic training students. This finding is consistent with what was found among nursing students.[11] In this study, we had a small percentage (26.7%) of minority participants. However, the racial and ethnic demographics are consistent with those reported for professional athletic trainers and those enrolled in professional athletic training programs.[19,20] Previous researchers have shown that minority students are more likely to be food insecure.[10] The predominantly White, non-Hispanic participants may have limited our ability to identify how race and ethnicity affect food security for professional athletic training students.

It has been shown that students with food insecurity have lower grade point averages and may fail to progress satisfactorily toward their degrees.[16,21] While our data did not indicate that students with food insecurity had lower grade point averages than their food-secure counterparts, those with low to very low food security felt diet habits sometimes affected their performance in the classroom or clinical setting or both. To ensure the success of professional athletic training, students, programs, and faculty should be well positioned to recognize food insecurity, provide food resources to all students on campus, and educate students on the importance of obtaining 3 nutritious meals a day.[11]

Our findings revealed that the rigorous demands of the professional athletic training curriculum significantly affect students' ability to enjoy 3 balanced meals daily. Athletic training programs often emphasize clinical integration, in which didactic learning and hands-on clinical experiences occur concurrently.[22] For example, this concurrent schedule typically involves students attending didactic coursework in the morning and engaging in clinical experiences during the afternoon and evening. Students may be required to leave for clinical rotations immediately after morning classes, making it essential to prepare and pack all meals ahead of time. Failure to do so may leave them without access to proper nutrition until late evening, as clinical duties may extend into late hours. In research on student nutrition, authors have highlighted that irregular meal patterns, often seen in health care–related professional programs, can lead to adverse outcomes like fatigue, decreased cognitive function, and poor academic performance.[23] Furthermore, financial limitations and food availability near clinical sites may exacerbate these issues, making it even more challenging for athletic training students to prioritize and maintain adequate nutrition throughout their day. As programs evaluate their clinical hour requirements and their didactic and clinical schedules, it may be essential to consider how those hours compete with students' ability to ensure adequate nutrition throughout the day.

Based on the findings that over 60% of professional athletic training students have reported some level of food insecurity, program directors and faculty should implement several strategies to support student well-being and performance. First, adjusting class and clinical schedules to allow adequate meal breaks or offering staggered shifts can help students secure time for meals. Promoting access to campus food pantries and meal vouchers and hosting meal prep workshops can provide valuable resources for students facing food insecurity. Regularly surveying students on their food security status would enable early identification of those in need while educating faculty on how food insecurity affects performance and how to connect students with available resources. Nutritional support programs, such as meal subsidies for clinical hours and nutritionist access, would further ensure students can maintain proper nutrition despite their busy schedules. Additionally, financial solutions like targeted scholarships, increased financial aid, and emergency funds would help alleviate the financial pressures contributing to food insecurity. Implementing these recommendations could lead to significant improvements in both academic and clinical outcomes for athletic training students.

The current study is not without limitations. First, the nature of self-report surveys may result in response and nonresponse biases, which could skew the results.[24] The response bias may have led to an underreporting of food insecurity effects on mental health and an inflation of grade point average, leading to insignificant results. This may be why certain factors, such as the effects of food insecurity on mental health and grade point average, were insignificant; the 11.6% completion rate may exacerbate this. Second, the low response rate and the smaller sample size of ethnic minorities and a more significant portion of female participants may limit the generalizability; however, these demographics are consistent with what has been previously reported in professional athletic trainers and students enrolled in professional athletic training programs. While no researchers have indicated that gender is a factor to food insecurity, the lack of equal gender representation makes it difficult to identify the effect of gender on food insecurity in professional athletic training students. Future research in which authors target minority and male students in athletic training may be beneficial in seeing how food insecurity may affect these groups differently from the results found here. Future researchers should examine evidence-based strategies and policies that limit food insecurity among professional athletic training students and improve student success. Third, we did not capture information related to clinical immersion. Future researchers should explore the effect of clinical immersive experiences on food security. Finally, the survey was distributed to athletic training students who were members of the NATA. Although NATA student membership is relatively inexpensive, students with less financial means may choose against the additional cost if it is not mandated by the education program.

CONCLUSIONS

Our findings suggest a concerning level of food insecurity among professional athletic training students. Faculty, preceptors, and athletic training program administrators need to be aware of food insecurities among their students. Programs and national athletic training organizations should identify strategies to access and improve food security among athletic training students, such as creating student-centric didactic and clinical scheduling and providing nutritional support resources for students.

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