Spring 5-5-2016

Nutritional and physical activity behaviors of certified athletic trainers in the collegiate setting

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Nutritional and Physical Activity Behaviors of Certified Athletic Trainers in the Collegiate Setting

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A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Science in Health Sciences

Nutrition and Physical Activity

May 2016

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Dedication

I'm dedicating my master's thesis to my amazing grandmother. Without her constant support and prayers, I would not be where I am today. She saw strength and determination in me, that I did not see myself, which has allowed me to be the first person in my family to achieve a master's degree. To the person that has made the trip from Boston to Virginia, more than anyone else in my family, I love and thank you.

Acknowledgements

First I would like to thank my advisor, Dr. Michelle Hesse. Without you constant support and guidance over the past two years, I'm not sure I would get through this research process. Thank you for everything that you have done, and I'm proud to say I was your first graduate thesis student.

Second, I would like to thank Dr. Hasan Hamdan. Thank you for taking time of your busy schedule to meet with me and help me with my statistical analysis. You helped me form a story out of a bunch of numbers, and it did not go unappreciated.

Third, I would like to thank my thesis committee. Thank you for agreeing to me on my committee, and taking time out of your day to offer your input and feedback throughout my research process.

Finally, I would like to thank my sports medicine family here at James Madison University. You have been my family away from home the past two years. You put up with me when I stress out about school and finding a job, and are the first ones there to congratulate me after a test or job interview. There are not enough words to explain how grateful I am.

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Abstract

Objective: To determine if collegiate athletic trainers meet the current national recommendations for a healthy weight, diet and physical activity.
Design: The research was a cross-sectional design consisting of a self-constructed survey formulated using the 2010 Dietary Guidelines and 2009 Academy of Sports Medicine Physical Activity Recommendations.
Subjects: One- thousand randomly selected athletic trainers were contacted to participate. One-hundred and five participants (10.5% return rate) completed the survey. All were District 3 members of the National Athletic Trainers Association.
Measurements: Body mass index (BMI) was calculated using participant self-reported height and weight data. Means and frequencies were computed for BMI, dietary intake of nutrients, and physical activity length and duration. Frequencies were calculated for age, years of experience, and collegiate division. One-sample t-test compared mean BMI, mean dietary intake and physical activity compared to national recommendations. One-way analysis of variance (ANOVA) and Fisher's Least Significant Differences (LSD) post-hoc tests examined differences in BMI among years of experience and collegiate division. One- way ANOVA and LSD post-hoc tests examined differences of nutritional outcomes and physical activity levels across collegiate divisions. A p-value of $p=0.05$ was set as the level of statistical significance.
Results: On average, athletic trainers s were identified as overweight according to BMI (27.4 kg/m^2 , 0.45 SD). Athletic trainers in Division II setting had significantly higher BMI scores compared to those working at Division I or Division III collegiate settings ($p= .015$). Significant differences between athletic trainers' consumption and national recommendations was found ($p=.0001$), with athletic trainers consuming less fruits and vegetables, dairy and water than recommended. Division II athletic trainers were found to eat at fast food restaurants more frequently than Division I or Division III ($p= .029$) The average frequency of weekly physical activity was 3.7 days, with only 36% ($n=38$) meeting recommendations of 5 days or more ($p=.001$).
Conclusion: Athletic trainers, on average are overweight and do not meet nutrition and physical activity recommendations of the Dietary Guidelines and Academy of Sports Medicine. There appears to be differences between Collegiate Division, higher BMI and certain dietary outcomes.

Keywords: athletic trainer, nutritional guidelines, physical activity, overweight

Chapter 1: Introduction and Literature Review

Introduction

Medical professionals get involved in their line of work to care for the health and well-being of their patients. They may follow different practice guidelines or cater to specific populations, but the overall goal is to promote a healthy way of living to those they are treating. Medical professionals have the knowledge to lead by example when it comes to their health behaviors, but research has supported that this is not the case for doctors, nurses, and physical therapists.[1-4] Currently in the United State, 69% of Americans are considered overweight or obese.[5] Medical professionals are not exempt from the general population statistic. In competitive collegiate sports, the medical professionals who are regularly sought out for diet and exercise guidance are athletic trainers. To date, there is limited research to support that athletic trainers follow the National Guidelines for nutrition and physical activity.

Knowledge Base of Athletic Trainers

An athletic trainer is defined as a "health care professional who collaborates with physicians to provide preventative services, emergency care, clinical diagnosis, therapeutic intervention and rehabilitation of injuries and medical conditions".[6] Athletic trainers can provide preventative nutritional guidance , ensuring their patients are adequately nourished, properly hydrated, and recognize nutritional behavioral risks, which are considered the first lines of defense in preventing injury and illness.[7] Athletic trainers obtain both nutrition and exercise prescription knowledge through educational competencies taught within their professional education. Subsequently, they are tested on these competencies during their national certification exam. After certification is

complete, they may continue gaining education in these content areas through continued education requirements necessary to maintain their board certification. These skills are taught so athletic trainers are prepared to assist patients with nutrition and fluid intake guidelines, exercise prescription, education and referral to other professionals, if necessary.[7]

Role of Athletic Trainers as part of the Support Staff

Athletic Trainers' nutritional knowledge positions them as the first member of the athletic support staff to be sought out by athletes for guidance. In a cross-sectional study conducted by Torres-McGehee[8], over 500 participants, consisting of coaches, athletes, athletic trainers, and strength and conditioning specialists (SCSs) from all three divisions of the National Collegiate Athletic Association (NCAA), completed a survey on sport nutrition knowledge.[8] The survey consisted of questions from four domains of sports nutrition that were deemed relevant to athletes' health and performance: micronutrients and macronutrients, supplements and performance, weight management and eating disorders, and hydration. Torres-McGehee[8] reported that athletic trainers scored about 75% in all four domains, making them "adequate in sports nutrition knowledge," along with having one of the highest nutrition scores compared to other athletic support staff participants.[8] The authors concluded that athletic trainers were the primary source of nutrition information for athletes and was most likely due to the relationship developed through everyday contact and support. [8]

Other research studies support prior findings. Burns et al[9] sent a survey to student athletes from the Big Ten Conference that consisted of questions assessing their primary source of nutrition information, along with rating their athletic trainers on how strongly

they perceived their nutritional knowledge.[9] Results showed that about 40% of all student athletes reported their primary source of nutritional information was from their athletic trainers. Athletes also ranked an average score of 3.8 out of 5 point scale as to how strongly they perceived their athletic trainers' knowledge of nutrition, with only 8% of the student athletes giving a score less than 3.[9] These findings support the claim that athletic trainers have the nutrition knowledge base to care for their athletes, but also that their athletes trust what they are being told.

These conclusions from Torres-McGehee[8] and Burns et al[9] continue to confirm evidence from years prior. Findings from Jacobson[10] and Smith-Rockwell[11] indicate that athletic trainers are the athletic support staff's most knowledgeable resource on nutrition and are the first to be sought out by their athletes for advice and support on nutrition and physical activity decisions.[10,11] These earlier studies do have some limitations due to their small and specific sample size, but their conclusions continue to support the findings of the larger samples of athletes and universities of more recent research.[10,11] Overall, research spanning more than ten years suggest athletic trainers are knowledgeable in the sports nutrition recommendations they are providing their patients, and their patients also trust their opinions due to their close, everyday contact seen in the collegiate setting.

Nutritional Guidelines Followed by Athletic Trainers

Athletic training is a medical profession that is a firm proponent of evidence - based practice. The use of recent evidence in addition to individual clinical experience guide athletic trainers in providing the most up-to-date care.[12] For this reason, athletic trainers follow nutritional guidelines published by the United States Department of Agriculture (USDA), the American College of Sports Medicine (ACSM), and NATA.[13-15]

These governing bodies synthesize the current nutrition and activity research and set evidence based recommendations including diet quality, energy and fluid requirements for competitive activity and recognition of unhealthy dietary behaviors, among others.[13-18]

Association Guidelines

The USDA publishes its nutritional recommendations in the form of Dietary Guidelines for Americans,[13] which are updated every five years to reflect emerging nutrition science. These guidelines generalized for individuals aged 2 and up. The scope of the Guidelines focuses on making dietary recommendations that are consistent with promoting optimal health outcomes.[13] The Dietary Guidelines for Americans include recommendations for dietary patterning, diet quality, physical activity recommendations, and weight management strategies.[13] Athletic trainers' primary concern is the health and well-being of their patients. By using these guidelines, athletic trainers can provide general nutrition and health education for their athletes. The more specific and prescriptive athletic performance benefits from nutrition come second to an overall healthy lifestyle.

The ACSM is an association that evaluates the role of nutrition in athletic performance and recovery. Nutrition recommendations from ACSM are based on optimal nutrition for athletic performance and are targeted to specific populations.[14] These recommendations build on the recommendations of the Dietary Guidelines for Americans and assume that athletes are meeting general nutrition targets. The ASCM specifies amounts and timing of macronutrients depending on body weight and sport, along with fluid replenishment and slightly varying recommendations for food groups,

due to the metabolic demands of athletic performance.[14] Athletic trainers' clinical judgment, along with the patients' needs for overall health and performance, dictate the combination of these guidelines used and that the combination will vary with each individual.

The National Athletic Trainers' Association (NATA), publishes position statements specifically for the athletic training profession. These position statements target areas that athletic trainers encounter on a regular basis and focus on techniques and responsibilities specific to their scope of practice.[6] Position statements that have been published related to nutrition include dietary supplements, fluid replacements, weight loss and maintenance, and the detection and management of eating disorders. [15-18] All three sets of organizational guidelines can be used in combination by athletic trainers to ensure that their patients are meeting general dietary recommendations, while optimizing nutrition for performance and recovery.

Other Medical Professions and Their Health Behaviors

Other health care professions may not recommend to their patients the exact same nutritional and physical activity guidelines as athletic trainers, given the unique needs of the population they care for, but all professionals can promote guidelines for a healthy lifestyle. Yet, the question becomes, do health care professionals personally practice what they preach? Several studies conducted among other medical professions have used the USDA guidelines for nutrition and the ACSM guidelines for physical activity.[1-4] There are contradicting results among professions with regard to meeting physical activity recommendations, and a constant trend of varying health professionals being overweight and not individually meeting nutrition guidelines.[1-4]

Nurses

A cross sectional study conducted by Zapka[1] surveyed nurses from six different hospitals across the state of Massachusetts.[1] The survey consisted of demographic information, along with a food frequency questionnaire to quantify servings of fruits and vegetables, along with saturated fat consumption. Results showed that 28 % of nurses were obese and 37% were overweight.[1] Following the USDA Dietary Guidelines, the nurses' average serving of fruits and vegetables were lower than recommended, along with saturated fat intake being higher than the guidelines.[1]

These finding are similar to a recent study that found 45% of nurses were overweight and 79% were not consuming the USDA guidelines for at least 5 servings of fruits and vegetables daily.[2] Additionally 30% of nurses were not meeting the recommendation of at least 150 minutes of moderate intensity exercise per week as recommended by the Daily Guidelines for Americans.[2] Thus, although guidelines are continuously changing due to the continued research, a large number of medical professionals are not changing their behaviors to live a healthy lifestyle.

The issue of living a healthy lifestyle does not seem to be isolated to when nurses are practicing professionally, but also when they are going through the educational process. A study surveying nursing students found that 24% were either overweight or obese before they began their career. Additionally 47 % of the nursing students did not meet the recommendations for 30 minutes a day or 150 minutes of weekly physical activity. [3]

Physicians

Nursing is not the only health profession that struggles with weight issues. A study conducted out of the Palo Alto Medical Center, examined physicians with the majority being male, and found 44% to be overweight,[4] this is despite 93% of the physicians reported to exercising regularly. "Regularly" was not clearly defined based on recommendations by the USDA or ACSM, therefore there is a limitation to the actual amount of physical activity performed.[4] Overall, the nutrition and physical activity behaviors of other medical professionals do not correspond with the guidelines they are recommending to their patients, along with setting an example for them to follow.

Current Research on Athletic Trainers

Although there is a wide variety of literature on medical professions, such as nursing and medicine, research is limited on the health behaviors of athletic trainers. One study conducted at the University of Nebraska investigated the physical activity levels of athletic trainers in the Mid-America Region of the NATA, which spans seven states.[19] Results showed that 16% of athletic trainers were not physical active, according to ACSM Recommendations. The investigators concluded that their findings are just the beginning of the investigation into the health behaviors of athletic trainers and there is a need for more research to be done before generalized conclusions can be formed.[19]

Conclusion

Currently there is limited research on the weight status and the nutrition and physical activity behaviors of athletic trainers. It is known that athletic trainers have a strong nutrition background through their training and education, and tend to be the resource athletes use for dietary and physical guidance. Given the nutrition and physical

activity influence athletic trainers have on their athletes, it would be important to know whether athletic trainers utilize this information in their daily lives to maintain a healthy weight and meet the national guidelines for nutrition and physical activity. It is clear from studies on nurses and physicians that their health behaviors do not guidelines and recommendations they promote to their patients. Together these findings support the need for further research to test the hypothesis that athletic trainers' weight status and nutrition and physical activity behaviors do not follow national guidelines.

Chapter 2: Methodology

Research Design

The purpose of this study was to investigate the weight status and nutritional and physical activity behaviors of athletic trainers in the collegiate setting and to support the hypothesis that collegiate athletic trainers do not follow current national recommendations for dietary intake and physical activity. A cross sectional research design, using an electronic anonymous survey, was selected to capture nutrition and physical activity data on the target population.

Survey Development

The instrument developed was a self-constructed survey using Qualtrics, an online survey formulation and distribution software provided by James Madison University. The first section of the survey consisted of demographic questions, focused on retrieving information about gender, age, height, weight, collegiate setting, years of experience, and sports assignment (Appendix A).

The 2010 Dietary Guidelines[13] were used as guidance for the development of questions aimed at dietary intake and were particularly focused on intake of fruits and vegetables, dairy consumption and quality, beverage quality and consumption of meals outside the home. Formulation of these questions were modified from the 2010 Healthy Eating Index.[20] For fruits and vegetables, the specific question asked participants to categorize their average daily intake as zero to two servings a day, three to five servings, six to eight servings, and greater than eight servings. The original intention was for the question to be categorical, but how the question was formatted in Qualtrics, gave a continuous response when outputted to SPSS 23. Supplemental questions go on to ask about the sources of these servings, such as frozen, fresh, juice, etc. Other dietary

questions were continuous in nature, asking participants to state the average daily amount of servings of dairy and water consumption. Supplemental questions were asked about dairy consumption to determine if participants were following the recommendations to consume low-fat and/or fat free versions, along with three servings per day. Supplemental questions were asked about water to investigate fluid consumption, and if recommendations were being followed to limit the amount of high calorie and high sugar beverages. Questions about consumption of meals away from home, particularly at fast food restaurants were also asked. The Dietary Guidelines for Americans[13] currently do not have any recommendations on dining away from home, but questions on this topic are important to include as behavior may be more frequent due to the nature of athletic trainers' schedules and work demands.[21] The third and final section utilized the 2009 ACSM Guidelines for Physical Activity[14] comprise of questions about physical activity level and tailored to the current physical activity recommendations for the adult population. Questions were formulated to be similar to Cuppets [19,] to make for easier comparison of results. Questions asked about weekly averages of physical activity, along with duration and intensity.

Recruitment and Administration of Survey

Approval was received from James Madison University Institutional Review Board before participant recruitment. An e-mail invitation, cover letter of consent, and an anonymous on-line survey link was sent to 1,000 randomly selected collegiate athletic trainers in District 3 over the NATA listserv. The listserv is able to specifically target athletic trainers based on criteria provided to the Research Survey Service provided by the NATA. District 3 is made up of 5 states and 1 district; Maryland, North Carolina,

South Carolina, Virginia, West Virginia, and DC. Participants' consent was obtained by take the survey, which was explained in the cover letter sent to them. The on-line survey remained open for completion of a total of six weeks, with the listserv sending an automatic reminder e-mail half way through, at the three week mark.

Data Analysis

Data analysis was conducted by first exporting results from Qualtrics software to SPSS 23, a statistical analysis software supplied by James Madison University. Participants with missing demographic data were excluded from further analysis, due to the inability to use their information to compare between groups. BMI was manually calculated as recommend by the Centers of Disease Control and Prevention[5], used self-reported height and weight data. Descriptive statistics were computed for BMI, dietary intake of nutrients, and physical activity length and duration. Frequencies were also performed for age categories, years of experience, and collegiate division. One-sample t-tests were used to compare the mean BMI to current BMI recommendations. One-sample t-tests were also used to compare mean nutrient intake servings and mean physical activity of ATs to national recommendations. Independent sample t-tests were used to compare differences of BMI by gender. One-way analysis of variance (ANOVA) was used examine differences of BMI between years of experience and collegiate division. Post-hoc analysis using Fisher's Least Significant (LSD) test is used to further examine the difference in BMI that were previously analyzed using one-way ANOVA. One- way ANOVA was also used to examine differences between nutrient servings and physical activity frequencies between collegiate division. Post-hoc analysis using Fisher's LDS test was then used to examine differences in dietary intake and physical activity

frequency that was previously analyzed using one-way ANOVA. A p-value of $p=0.05$ was set as the level of statistical significance.

Chapter 3: Manuscript

INTRODUCTION

Currently in the United State, 69% of Americans are considered overweight or obese[5] and medical professionals are not exempt from the general population statistic. Medical professionals get involved in their line of work to care for the health and well-being of their patients. They may follow different practice guidelines or cater to specific populations, but the overall goal is to promote a healthy way of living to those they are treating. Medical professionals have the resources and knowledge to lead by example when it comes to their health behaviors, but research has proven that this is not the case for doctors, nurses, and physical therapists.[1-4] In competitive collegiate sports, the medical professionals who are regularly sought out for diet and exercise guidance are Athletic Trainers. To date, there is limited research to support that athletic trainers follow the national guidelines for healthy weight, nutrition and physical activity. The purpose of this study is to determine if weight status, nutrition and physical activity behaviors of collegiate athletic trainers follow national guidelines.

METHODS

Survey Development

The instrument developed was a self-constructed online survey using Qualtrics, a survey formulation and distribution software provided at James Madison University. The first section consisted of demographic questions, focused on retrieving information about gender, age, height, weight, collegiate setting, years of experience, and sports assignment.

The second section of the survey used the 2010 Dietary Guidelines[13] to formulate questions aimed at dietary intake. For this study, dietary intake was particularly focused on fruit and vegetable consumption, dairy consumption, beverage quality and consumption of meals outside the home given the emphasis of these dietary behaviors in the 2010 Guidelines.[13] One question targeted fruit/vegetable intake due to the guidelines recommending an increase in servings per day. The specific question asked participants to categorize their average daily intake as zero to two servings a day, three to five servings, six to eight servings, and greater than eight servings. Supplemental questions go on to ask about the sources of these servings, such as frozen, fresh, juice, etc. Other dietary questions were continuous in nature, asking participants to state the average daily amount of servings of dairy and water consumption. Supplemental questions were asked about dairy to see if participants were following the recommendation of low-fat and fat free source, along with three servings. Supplemental questions were asked about water to investigate fluid consumption, and if recommendations were being followed of limiting high calorie and high sugar beverages. A question was also included about weekly fast food meals, not to compare to a current recommendation, but to investigate its relationships with other nutritional components and the ability to compare among groups.

The third and final section used the 2009 ACSM Guidelines for Physical Activity[14] to formulate questions about physical activity level and tailored to the current physical activity recommendations for the adult population. Included questions were about weekly averages of physical activity, along with duration and intensity.

Recruitment and Administration of Survey

Approval was received from James Madison University Institutional Review Board before participant recruitment. An e-mail invitation, cover letter of consent, and an anonymous on-line survey link was sent to 1,000 randomly selected collegiate athletic trainers in District 3 over the NATA list serv. The listserv is able to specifically target athletic trainers based on criteria provided to the Research Survey Service provided by the NATA. District 3 is made up of 5 states and 1 district; Maryland, North Carolina, South Carolina, Virginia, West Virginia, and DC. Participants' consent was obtained by them choosing to take the survey, which was explained in the cover letter. The online survey remained open for completion of a total of six weeks, with the listserv sending an automatic reminder e-mail half way through, at the three week mark.

Data Analysis

Data analysis was conducted by first exporting results from Qualtrics software to SPSS 23, a statistical analysis software supplied by James Madison University. Participants with missing demographic data were excluded from further analysis, due to the inability to use their information to compare between groups. BMI was manually calculated as recommend by the Centers of Disease Control and Prevention[5] using self-reported height and weight data. Descriptive statistics were computed for BMI, dietary intake of nutrients, and physical activity length and duration. Frequencies were also performed for age categories, years of experience, and collegiate division. One-sample t-tests were used to compare the mean BMI to current BMI recommendations. One-sample t-tests were also used to compare mean nutrient intake servings and mean physical activity of ATs to national recommendations. Independent sample t-tests were used to

compare differences of BMI by gender. One-way analysis of variance (ANOVA) was used examine differences of BMI between years of experience and collegiate division. Post-hoc analysis using Fisher's Least Significant (LSD) test is used to further examine the difference in BMI that were previously analyzed using one-way ANOVA. One- way ANOVA was also used to examine differences between nutrient servings and physical activity frequencies between collegiate division. Post-hoc analysis using Fisher's LDS test was then used to examine differences in nutrient intake and physical activity frequency that was previously analyzed using one-way ANOVA. A p-value of p=0.05 was set as the level of statistical significance.

RESULTS

Demographics

Data was received from 115 participants however, only data from 105 participants were analyzed due to missing demographic data from 10. From the 105 participants, 55% were female athletic trainers (n=58) and 45% were male (n=47). Years of experience ranged from less than 5 years to over 20 years, with about 50% of athletic trainers having less than 10 years of work experience. Participating athletic trainers also reported their current collegiate work setting, with a majority (60%) working in Division I Athletics (Table 1).

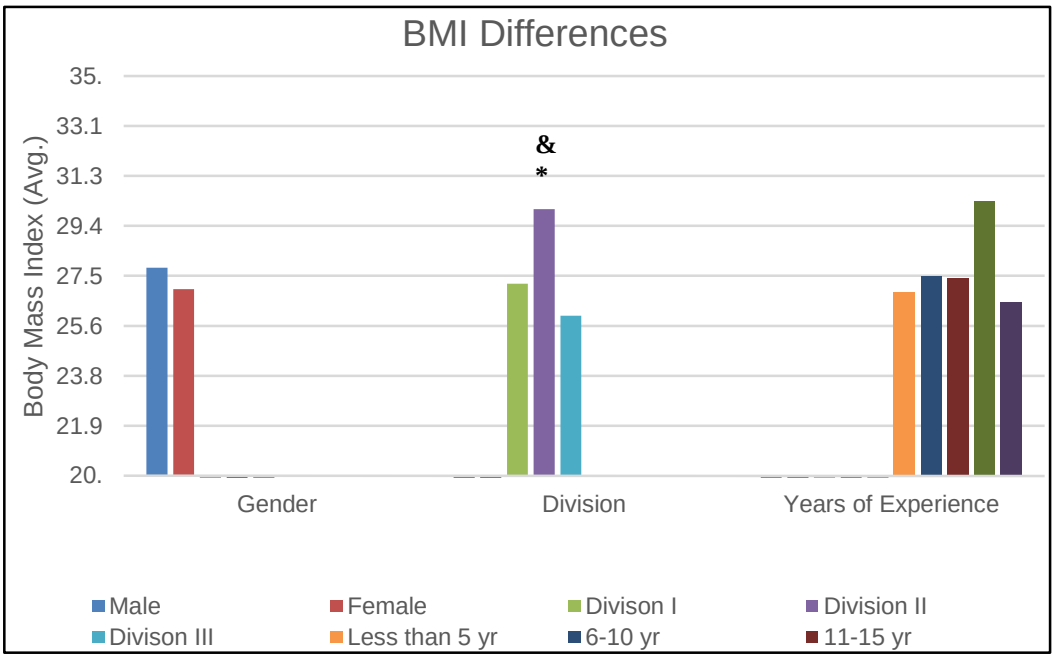
Table 1. Study Demographics among Collegiate Athletic Trainers by Division

	Division I, n	Division II, n	Division III, n	All, n
Age				
Under the Age of 25	2	0	2	4
25-30	20	6	10	36
31-35	16	2	3	21
36-40	7	2	2	11
41-45	7	1	3	11
46-50	*2*	4	0	6
Over the Age of 50	*9*	2	5	16
Total	**63**	**17**	**25**	**105**
Years of Experience				
Less than 5	12	1	7	20
6-10	17	5	6	28
11-15	13	3	4	20
16-20	6	2	2	10
Greater than 20	15	6	6	27
Total	**63**	**17**	**25**	**105**
Gender				
Male	32	9	6	47
Female	31	8	19	58
Total	63	17	25	105

BMI Differences

On average, athletic trainers had BMI that were categorized as overweight (27.4 kg/m^2, 0.45 SD) . Of the 105 participants, 45% of athletic trainers were identified as overweight, and another 24% obese. An independent sample t-test showed no significant BMI differences of gender (p=0.357) and years of experience (p=0.234, Figure 1). One-way ANOVA showed significant BMI differences among athletic trainers' collegiate work setting (p= 0.015, Figure 1). Follow-up Fisher's Least Significant Difference (LSD) tests, revealed that athletic trainers in Division II settings have significantly higher BMIs compared to athletic trainers working at Division I or Division III collegiate settings (p <.05). There were no significant BMI differences between Division I and Division III (Figure 1).

Figure 1. BMI Differences among Demographic Categories



Independent sample t-tests were used to compare differences of BMI by gender. One-way analysis of variance (ANOVA) was used examine differences of BMI between years of experience and collegiate division. Post-hoc analysis using Fisher's Least Significant (LSD) test is used to further examine the difference in BMI that were previously analyzed using one-way ANOVA.
*= Division II BMI is significantly larger than Division I at p≤0.05
&= Division II BMI is significantly larger than Division III at p≤0.05

Meeting National Recommandations

Further analysis of the diet and activity of athletic trainers was conducted to compare dietary intake and national recommendations among divisions (Table 2). The proportion of athletic trainers consuming less than the recommended five or more servings of fruits and vegetables a day was significantly different (p=.01). Fifteen percent (n=16) actually met daily fruit and vegetable recommendations of five or more servings a day. Forty-one percent (n=43) reported consuming two or less servings a day. Similarly, average dairy consumption was significantly lower than recommended dairy intakes (p=.01). Mean dairy consumption of athletic trainers was 2 servings a day, compared to the current dairy recommendation of 3 or more servings per day. Only 30 % (n=31) of athletic trainers reported meeting 3 or more servings of dairy per day.

According to current national recommendations, daily water consumption should be eight, 8 fl oz glasses. Athletic trainers' consumption of water significantly fell short of this recommendation (p=.01). Athletic trainers reported a daily mean of about 6, 8 fl oz glasses. Only 20% of athletic trainers met daily recommendations for water consumption.

Although currently no recommendation for the consumption of weekly fast food/take- out meals exists, on average athletic trainers report consuming 2 meals per week away from home.

National recommendations for physical activity suggest at least 30 minutes of moderate intensity exercise, 5 days a week. On average, athletic trainers report exercising 3.7 days a week. This is significantly different from national recommendations (p=.01). Only 36% of athletic trainers met recommendations.

A post-hoc analysis of collegiate division, BMI and dietary intake indicated that weekly fast food consumption was significantly different between groups ($p=0.029$, Figure 2). Similar to BMI differences, Division II was significantly different than Division I and III, as Division II athletic trainers on average consumed more fast food. No significant difference between Division I and Division III were found. Significant differences also existed between water consumption and Division II and Division III ($p=.003$) with Division II athletic trainers consuming less water than Division III athletic trainers.

Table 2. National Guideline Compliance among Collegiate Athletic Trainers

National Recommendations	Weight, Dietary and Physical Activity Outcomes				
	Division I	*Division II*	*Division III*	*Total*	*P-value*
Body Mass Index: ≤ 24.9 kg/m^2 %	27.2	30.0	26.0	27.4	0.01*
Water: 8, 8 fl oz glasses/day%	5.87	5.12	7	5.99	0.01*
Fruits/Veg.: >5 servings/day‡%	16%‡	6%‡	17%‡	15%‡	0.01*
Dairy: 3 servings/day%	2.22	2.13	1.86	2.11	0.01*
Physical Activity: 30 min, 5day/week#	3.9	3.1	3.6	3.6	0.01*
Meals consumed (per day) at fast food style restaurants	1.89	2.88	1.61	2.02	0.01*

	Division I	*Division II*	*Division III*	P-value
Body Mass Index: ≤ 24.9 kg/m^2 %	27.2^a	30.0^b	26.0^c	0.015*
Water: 8, 8 fl oz glasses/day%	5.87	5.12^a	7^b	0.085
Dairy: 3 servings/day%	2.22	2.13	1.86	0.314
Physical Activity: 30 min, 5day/week#	3.9	3.1	3.6	0.334
Meals consumed (per day) at fast food style restaurants	1.89^a	2.88^b	1.61^c	0.029*

One-way ANOVA for continuous variables. Superscript lowercase letters followed by different lowercase letters in a row indicate statistical significance ($p<0.05$)
‡ proportion of athletic trainers who reported consuming 5 or more servings of fruits and vegetables per day
*= significance at the $p \leq 0.05$ level
%= recommendation from the 2010 Dietary Guidelines for Americans
#= recommendation from the 2009 ACSM Physical Activity Guidelines
&= guidelines of the Center of Disease Control and Prevention

Dietary Intake Sources

Choices made within dietary categories were also investigated through open ended response. Water was the most frequent choice listed by athletic trainers followed by regular soda and diet soda. The number one choice among fruits and vegetables were frozen followed by fresh produce and juices. Dairy consumption for the majority was in

the form of reduced- fat dairy products, low- fat options listed second, and whole-fat options third. Athletic trainers reported grilled chicken and fish options as their top choice when consuming fast food meals. This was followed by red meat options (#2) and deep fried options (#3).

Table 3. Popular Sources of Nutrient Consumption

Nutrient Choices	Fluids	Fruits/Veg.	Dairy	Take-out
#1 Choice	Water	Frozen	Reduced fat	Grilled chicken/fish
#2 Choice	Regular Soda	Fresh	Low fat	Red Meat
#3 Choice	Diet Soda	Juices	Whole fat	Deep Fried Options

DISCUSSION

Obesity affects about one-third of Americans.[5] It is a health issue which not only has infiltrated the general population, but also is prevalent across health professions as well[1-4]. Based on the current survey of athletic trainers from the Mid-Atlantic region, 45% are overweight, and 24% are considered obese using self- reported height and weight. These data are consistent with previous research conducted on nurses and physicians. A study conducted by Zapka looked at female nurses in hospitals across the state of Massachusetts who were found to be 37% overweight and 28% obese.[1] A similar study done is a different area reported a group of nurses to be 45% overweight[2]. Research on male physicians conducted by Bortz indicated that 44% are overweight[4].

Athletic Trainers' nutrient intake and physical activity volume appeared to be far below the national recommendations. Only 15% of athletic trainers reported intakes that met dietary recommendations for fruit and vegetable servings. Previous research supports

these findings as 79% of nurses did not meet nutrient intake recommendations for all food groups.[1-2] dietary guidelines for nutrient intake for all food groups and. The minimum physical activity recommendation from ACSM encourages 30 minutes of moderate intensity physical activity, 5 days a week. This recommendation was not met by athletic trainers in this study who reported participating in activity on average three days a week. Reported activity level in other studies have been mixed. In studies on nurses, 30-47% do not meet physical activity recommendations[1-2] On the other hand, 97% of physicians met recommandations[4.]

Collegiate division of employment showed significant differences in BMI, with athletic trainers at the Division II setting having larger average BMI, placing them in the obese category. Average BMI's in Division I and Division III placed athletic trainers in the overweight category. After finding significant BMI differences, particularly Division II, further investigation into dietary intake and physical activity frequency may indicate reasons why BMI differences may exist. Athletic trainers in Division II athletics also consumed fast foods at increased frequency compared to Division I and Division III. Water consumption was consumed significantly less among Division II athletic trainers compared to Division I and Division III athletic trainers. Current literature is limited to help explain these findings, however collegiate divisional differences in work-life balance may play a role.

Division II is known to be a collegiate division that strives for athletic excellence, similar to Division I, yet Division II does not have the same amount of funding and man power.[22-25] This includes athletic trainers, who typically work with multiple different sports teams, unlike Division I, while still having the same travel time with all the teams

they work with, like Division I. Work-life balance issues have been proven to exist among collegiate athletic trainers, however collegiate divisions have not been compared.[21] Yet the work environments of Division II athletic trainers come with long hours, abnormal work schedules, and little time to reflect on personal health status. This setting may lead to increased work-life balance issues, one of them being obesity. Stress, sleep deprivation, and eating behaviors have been linked as causes of obesity.[26-27] While this study did not specifically look at factors such as stress and hours of sleep, results did show dietary behaviors, particularly frequency of fast food meal intake and water consumption do not meet national recommandations. Further research needs to be conducted to investigate why dietary and physical activity compliance differs among collegiate settings. With further investigation into collegiate setting differences and as more answers can be formed, solutions can be developed and implemented to address the issues that currently exist.

CONCLUSION

The first purpose of the study was to examine the health status, dietary intake and physical activity patterns of athletic trainers, and compare them to current national recommendations. In support of the hypothesis, athletic trainers, on average, do not meet nutrition and physical activity recommendations. Athletic trainers also do not differ from other health care professionals, along with the general population, when it comes to overweight and obesity prevalence, supported by almost half (45%) of our participants being overweight based on BMI. Athletic trainers also do not stray far from the general population and other medical professionals when it comes to dietary intake, as only 16% of athletic trainers consumed recommended daily servings of fruits and vegetables, 15%

consumed adequate dairy 20% met recommendations for water consumption and only 36% received the recommended physical activity.

The second and overall purpose of our study was to lay a framework for further investigation of collegiate athletic trainers' nutritional behaviors that currently exist among this population. Significant differences were found among athletic trainers in different collegiate settings, but not among athletic trainers with different years of experience. Limited research exists to compare this study's outcomes too, which makes it hard to make generalizations about collegiate athletic trainers. Further investigation needs to occur, evaluating overall work-life balance differences among collegiate divisions which will lead to a better understanding of stress, sleep, and dietary differences that may exist within different collegiate work settings.

Limitations

One limitation of the study is that BMI was calculated using reported height and weight. Research has shown that people tend to over report their height and under report their weight, making their BMI lower than it actually is.[28]

Another limitation is the study's design. The cross-sectional design does not allow for causation inferences to be made based on the results. The small sample size hinders generalizations to be made about the athletic training population. The survey was self-constructed and not previously validated. Thus, there is a chance that differences in answers could be due to difference in interpretation of questions. Responses as intended may not have been received due to this limitation.

Strengths

All though the current study has limitations, it also has several strengths that can be built upon with further research. The cross-sectional design allowed for a large amount of data to be collected on a specific population. This study is the first of its kind to look at an athletic training population in the Mid-Atlantic region and evaluate their weight status and dietary and physical activity behaviors. Significant results were also found, which indicates a need for further investigation into why these results occurred, and the causes of these significances.

Appendix A: Survey Questions

1. Age:
    under the age of 25, 25-30 years old, 31-35 years old, 36-40 years old, 41-45 years old, 46-50 years old, over the age of 50

2. Gender:
    Male, Female

3. Height (in feet and inches): fill in the blank

4. Weight (in lbs): fill in the blank

5. Totals Years of Experience as a Certified Athletic Trainer:
    less than 5 years, 6-10 years, 11-15 years, 16-20 years, greater than 20 years

6. Current Employment Setting:
    Division I, Division II, Division III

7. Primary Sport Assignment(s): fill in the blank

8. Within the past year, have you been told by a physician that you needed to lose weight?
    yes, no

9. Have you been told by a physician that you have a health condition that would improve with increased physical activity and/or improved diet? (i.e. Type II Diabetes, high blood pressure, high cholesterol, etc.)
    yes, no

10. List health condition(s): fill in the blank

11. On average, how many servings of fruits/vegetables do you consume daily? (ex: 1 cup uncooked or raw vegetables, 2 cups raw salad, 1 medium apple/banana/orange, 1 cup of 100% fruit juice)
    0-2 servings, 3-5 servings, 6-7 servings, 8-9 servings, more than 9 servings

12. What are the sources of those servings?
    fresh fruit/vegetables, canned fruit/vegetables, frozen fruits/vegetables, fried fruits, juices
        - choose always, sometimes, or never

13. On average, how many servings of dairy do you consume daily? (ex: 1 cup of milk, 1 ounce of cheese (equivalent to 4 dice stacked together) , 3/4 a cup of yogurt)
    0, 1, 2, 3, more than 3 servings

14. What are the sources of those servings?
whole milk/full fat cheeses, reduced fat (2%) milk/cheeses, low fat (1%) milk/cheeses, fat free (skim) milk/cheeses, lactaid products, diary substitutes
-chooses always, sometimes, never

15. In an average week, how many meals are from a Fast Food Style Restaurant?
0, 1, 2, 3, 4, 5, more than 5 meals

16. Check your regular meal choices at these restaurants:
burgers/red meat options, deep fried options, grilled chicken or fish, salad with high/full fat dressing, salad with low fat dressing, regular soda or sugar added beverages, diet soda or sugar free beverages, water, milkshake or other high fat drinks, desserts

17. On an average daily basis, how many servings (8 fl oz) do you consume of the following?
Non-sport drink, high sugar beverages (sodas, juices), Regular Sports Drinks (Gatorade, PowerAde) **whole bottle is about 2 servings**, Low- Sugar Sports Drinks (G2, PowerAde Zero), Energy Drinks (Red Bull, Monster), Vitamin Enhanced Beverages (Vitamin Water), Water (8 fl oz), Diet Soda, sugar free beverages

18. On average, how many days a week do you engage in moderate to vigorous physical activity? (ex: jogging, biking, walking briskly, fitness class)
fill in the blank

19. On average, how long do you engage in this moderate to vigorous physical activity?
less than 30 minutes, 30-60 minutes, 1-2 hours, more than 2 hours

20. Is this physical activity done during your leisure time or while you are at work?
leisure time, at work, both

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