

Perceived Dietary Quality and Habits of Collegiate Student-Athletes

Original Research

Kyle Brauman,¹ Rebecca M. Achen, PhD,² Jennifer L. Barnes, PhD¹

¹ Department of Family and Consumer Sciences, College of Applied Sciences and Technology, Illinois State University, Normal, IL/United States

² School of Kinesiology and Recreation, College of Applied Science and Technology, Illinois State University, Normal, IL/United States

Abstract

Purpose: The purpose of this study was to investigate student-athletes' source of nutritional information, perceived quality of dietary intake, and body composition beliefs while exploring how these factors may affect dietary decisions.

Methods: Student-athletes at an NCAA division 1 university were invited to complete a survey. The survey was designed using the literature on nutrition habits and barriers to healthy eating in athletes and young adults. A professional review and pilot study were conducted before data collection commenced over a two-week period.

Results: A total of 169 student-athletes fully completed the survey. Responses indicate a sample that derives their nutritional information mostly from strength and conditioning coaches (SCC) (41%), family (16%), and social media (14%), did not indicate a desire to change body composition for health (76%) or sports performance motivations (65%), and overall felt positive about the quality of their dietary intake (94%). ANOVA and post-hoc Fisher's LSD revealed significant positive relationships between a 'Very Good' dietary intake rating and corresponding fruit ($p = .002$) and vegetable ($p < .001$) serving intake when compared to a 'Bad' dietary intake rating.

Conclusions: SCC's/Athletic trainers are commonly identified sources of nutritional information for student-athletes and present a potential point of intervention. Student-athletes may possess a disconnect between the perception of their dietary intake vs. the adequacy of their dietary intake, though further research is needed to confirm this. Future studies should examine body composition beliefs of student-athletes including physical appearance as a potential motivator.

Key Words: Nutritional Information Source; Sports Nutrition; Body Composition

Corresponding author: Jennifer Barnes, jlbarn2@ilstu.edu

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Introduction

The performance of an athlete is tied to their dietary intake in various ways. If the diet is not optimal, let alone adequate, performance, recovery, and adaptation may be impaired. For example, if carbohydrate stores are limited during training, intensity and duration can both be impaired, while performance improvements from the session can also be diminished.¹ Overall, the current literature on consuming an optimal diet and sports performance makes it apparent that low energy availability impedes athletic performance in both the short- and long-term.¹ With this in mind, knowledge of what affects the dietary intake of athletes would be useful in preventing such detrimental effects. However, information on factors affecting the dietary intake of collegiate student-athletes is rather scarce with four barriers being identified: lack of time,²⁻⁶ finances,^{2-4,7} travel schedule,^{2,3,5} and lack of knowledge.²⁻⁵ While peripheral to collegiate student-athletes, there is a large literature base in young adults examining barriers to healthy eating which provides additional insight.⁸⁻¹⁹ These barriers range from a few that were also apparent in student-athletes, like lack of time^{10,14,17,18} and finances,^{8,10,14,16} to those not observed in student-athletes, like lack of

motivation^{8,9,14,17} and alcohol-related eating.^{10,12,18} The current literature on barriers to healthy eating in young adults is summarized well in a scoping review by Munt et al.¹⁷

Thus, while little is known about the issues affecting the dietary intake of student-athletes, these two bodies of literature illuminate a few variables of interest due to their potential relationships with dietary intake: source of nutritional information, perceived quality of dietary intake, and body composition. Regarding source of nutritional information, the literature relating to student-athletes reveals strength and conditioning coaches (SCC), athletic trainers (AT), and family to be common sources of nutritional information for the student-athlete.^{4,6,20} This begs the question of the accuracy and legitimacy of these sources and the potential negative effects on the dietary intake of athletes. Regarding perceived quality of dietary intake, in a study by Valliant et al.,⁶ the authors noted that the majority (54.5%) of student athletes rated their eating habits positively. However, in the same study, the authors also collected dietary intake data showing inadequacies in total energy intake as well as in all macronutrient needs. This data questions the accuracy of student-athletes' subjective feelings regarding their dietary intake, compared to the objective composition of their dietary intake. This information potentially also highlights a noteworthy misconception student-athletes possess regarding the adequacy of their dietary intake; if student-athletes feel their dietary intake is adequate when it is not, this may contribute to the under-consumption of calories, macronutrients, micronutrients and subsequent negative effects. The purpose of the present study is to further investigate these variables in collegiate student-athletes and explore the factors dictating dietary decisions. It is hypothesized that non-registered dietitians will be common sources of nutrition information and student athletes will have an altered perception of their overall diet quality.

Methods

Participants

Participants totaled 418 student-athletes, across seventeen different sports teams, at an NCAA Division 1 university in the Midwestern United States. All were invited to complete the survey given they met the criteria of being a current student-athlete and at least eighteen years of age.

Instruments

To the knowledge of the authors, no existing, validated survey was available for use that would have met the data collection goals for the present study. Thus, the available literature was reviewed and survey questions were created utilizing knowledge of known barriers as well as questions from similar studies to compile survey sections regarding participant demographics, information on the participants' sports, living arrangements, nutritional beliefs and dietary intake and potential barriers to healthy eating.²⁻¹⁹ Students were asked multiple choice questions about their demographics, sport information, living situation, nutritional beliefs, and barriers to eating healthy. Slider-format questions were used to evaluate approximate number of servings per day from each food group including fruit, vegetables, dairy, and proteins on a scale from 0 – 20 to allow student-athletes ample room, due to increased energy requirements from physical activity¹ and subsequent increases in food group consumption, to select their corresponding number of food group servings. Grains were also measured using slider-format questions, though featured a 0 – 30 scale as grains are the primary carbohydrate source and could exceed 20 servings per day. Matrix-style question formats were utilized when asking about access to the dining hall and quantity of access (none/limited/unlimited access). Rank-order question formats were utilized to sort the selected barriers by significance. In addition, for the purposes of this study, an operational definition of 'healthy diet' was provided in all questions to ensure a uniform interpretation. This was defined as, "A balanced diet that meets the needs of day-to-day life in addition to the needs from added physical activity related to sports." After creation, the survey was tested for face validity via a professional review by five individuals working in collegiate sports nutrition. Additionally, a pilot survey was conducted using 20% (n=84) of the student-athlete population in order to establish validity and reliability. This was accomplished using an Excel function to randomly assign numbers, sort the list from smallest to largest, and select the top 84 student-athletes for participation. Included in the pilot-survey was an open-ended response question regarding the participants' thoughts on the definition of a healthy diet, which was used to assess consistency between students' interpretation and the operational definition. Participants were also given the opportunity to comment on the clarity of the survey and make any suggestions for changes. The student-athletes had a week to complete the pilot survey, followed by an analysis of the responses. Responses did not indicate any areas of misunderstanding or necessary changes of wording.

Protocol

An email was sent by the researchers containing a link to the survey, supplied to the Director of Sports Nutrition at the university, and sent to the school email of each student-athlete. The link directed the participants to the survey, which included informed consent. Participants had two weeks to complete the survey with a reminder email sent on the eight day as well as reminders from SCC's via prepared scripts given to the staff to read to each individual team after the teams' next session during the first and second week of data collection. All procedures were approved by the Illinois State University Institutional Review Board.

Statistical Analysis

Categorical data were assessed for homogeneity, goodness of fit, and independence using Pearson's Chi-Square test, and post-hoc Z-test to determine the location of differences in significant results. Group means were measured for independence utilizing an ANOVA test, and post-hoc Fisher's LSD to determine where differences occurred in significant results. Statistical significance was set at ≤ 0.05 . Analyses were performed with the use of SPSS (version 25).

Results*Sample Characteristics*

Of the 418 student-athletes who were sent the final survey, a total of 169 student-athletes fully completed the survey (40%). Of these were 47 males (28%) and 122 females (72%). Additionally, the majority ($n = 147$) were White/Caucasian (87%). Freshmen comprised (27%) of the sample, sophomores (20%), juniors (28%), seniors (23%) and graduate students (2%). The living arrangements for the 169 respondents were somewhat evenly distributed between living off-campus and on-campus as 92 student-athletes responded living off-campus (54%) and 77 on-campus (46%). When asked about their access to the dining hall during the school year the distribution was relatively even between the three groups as 56 participants (33%) stated that they had access to the dining hall but with a limited number of swipes, 60 participants (36%) had unlimited access to the dining hall, and 53 participants (31%) had no access to the dining hall. During the summer the distribution shifted for dining hall access with 15 individuals (9%) stating they had limited access to the dining hall, 14 (8%) stating unlimited access, and 139 (82%) without access to the dining hall.

Source of Nutritional Information and Body Composition Beliefs

When asked about their primary source of nutritional information, responses varied (Table 1). The most selected source with 70 participants (41%) was a SCC. The second-most selected source with 27 participants (16%) was family and rounding out the top three with 23 participants (14%) was various social media platforms. Participants were also questioned regarding their body composition goals and most indicated no desire to gain or lose weight for better health or sports performance (Table 2).

Table 1: Primary Source of Nutritional Information

Source	<i>n</i>	Percent (%)
Friends	8	4.7
Family	27	16.0
Teammates	10	5.9
A Registered Dietitian	16	9.5
Strength and Conditioning Coaches	70	41.4
Team Coaches	3	1.8
Athletic Trainers	2	1.2
Social Media	23	13.6
Other	10	5.9

Table 2: Body Composition Beliefs

Idea	Belief	<i>n</i>	Percent (%)
Lose Weight for Better Health	Yes	50	29.6
	No	110	65.1
	Unsure	9	5.3
Lose Weight for Increased Sports Performance	Yes	55	32.5
	No	102	60.4
	Unsure	12	7.1
Gain Weight for Better Health	Yes	7	4.1
	No	148	87.6
	Unsure	14	8.3
Gain Weight for Increased Sports Performance	Yes	43	25.4
	No	116	68.6
	Unsure	10	5.9

Dietary Intake

Participants answered several questions directly regarding their dietary intake. When asked about how they would rate their typical dietary intake most felt positive as 159 respondents (94%) said it was average or better (Table 3). Participants were also asked to state the number of servings of each food group they consume on a typical day (Table 4). On average, participants consumed 2.6 servings of fruit, 2.6 servings of vegetables, 3.2 servings of dairy, 5.8 servings of protein, and 8.3 servings of grains. Moreover, significant associations were observed between participants' rating of their dietary intake and the quantity of fruit and vegetable servings (Table 5) consumed. Overall, the better individuals rated their dietary intake the higher their average fruit and vegetable serving consumption. These associations between rating of dietary intake and food group intake were only observed with vegetables and fruit servings, not dairy, grains, or proteins.

Table 3: Rating of Dietary Intake

Rating	<i>n</i>	Percent (%)
Very Good	16	9.5
Good	83	49.1
Average	60	35.5
Bad	9	5.3
Very Bad	1	.6

Table 4: Food Group Servings

	Food Group				
	Fruit	Vegetable	Dairy	Protein	Grains
Mean	2.6	2.6	3.2	5.8	8.3
Median	2.0	2.0	3.0	5.0	6.0
Standard Deviation	1.7	1.9	2.4	3.2	5.3

Table 5: ANOVA and Fisher's LSD for Fruit and Vegetable Servings

Food Group	Healthy Diet Rating 1	Healthy Diet Rating 2	Servings Mean Difference (1-2)	Significance
Fruit	Very Good	Good	0.7	.115
		Average	1.0	.040*
		Bad [^]	2.1	.002*
	Good	Very Good	-0.7	.115
		Average	0.3	.379
		Bad [^]	1.4	.017*
	Average	Very Good	-1.0	.040
		Good	-0.3	.379
		Bad [^]	1.1	.056
	Bad [^]	Very Good	-2.1	.002
		Good	-1.4	.017
		Average	-1.1	.056
Vegetables	Very Good	Good	1.3	.010*
		Average	1.5	.004*
		Bad [^]	2.8	.000*
	Good	Very Good	-1.3	.010
		Average	0.2	.508
		Bad [^]	1.5	.013*
	Average	Very Good	-1.5	.004
		Good	-0.2	.508
		Bad [^]	1.3	.034*
	Bad [^]	Very Good	-2.8	.000
		Good	-1.5	.013
		Average	-1.3	.034

[^] “Very Bad” and “Bad” were combined for statistical analysis and listed under “Bad”.

* Indicates level of statistical significance ($p < 0.05$)

Discussion

Source of Nutritional Information

Regarding source of nutritional information, student-athletes from the present study seemed to follow trends shown in other studies. The most common source was a SCC followed by family and social media platforms. Several studies have demonstrated SCC's, AT's, and family to be common sources of nutritional information for the student-athlete.^{4,6,20} For those in the nutrition field, at face value, this seems to present an issue regarding valid and reliable sourcing. However, in a survey by Torres-McGehee et al.,²⁰ most AT's (71.4%) and SCC's (83.1%) had adequate nutrition knowledge to communicate information to athletes, thus subsiding worries over valid and reliable sourcing and their effects on the dietary intake of athletes. This presents a unique opportunity for future interventions seeking to improve the dietary intake of athletes. Instead of going directly to the athletes, RDs could focus on improving the nutritional knowledge and capabilities of SCC's/AT's. Given that, on average, there are 450 student-athletes at a NCAA member-school,²¹ it may be a much more effective and efficient intervention for programs to focus on the staff given the population difference and that they are already the primary source.^{4,6,20}

Dietary Rating and Food Group Intake

The results of the present study potentially demonstrate a similar phenomenon as observed in Valliant et al.⁶ in casting doubt on the accuracy of student-athletes' feelings when compared to the objective composition of their diet. While food-group servings are not the preferred method for determining diet composition,¹ in the present study, inferences from food-group intake regarding diet composition seem more reliable. This is due to the striking similarity between mean food group intake data for the present study and outside literature,^{9,12,22,23} two studies of which gathered both food-group intake information and energy/macronutrient information.^{22,23} These two studies observed inadequate energy/macronutrient intake, and thus, given the similar food-group intake information between the

present study and the outside literature, this would point towards potential inadequate energy/macronutrient intakes in the present study as well. However, this is a weak association at best. Subar et al.²⁴ addresses the drawbacks of self-reported dietary data, though notes that the data can still be rich in information, under certain contexts. Nonetheless, given this information and that participants in the present study rated their dietary intake positively, this seems to show a similar disconnect between perception of intake versus adequacy of intake as shown in Valliant et al.⁶ Future studies should seek to confirm or deny this. If this is found to be a recurring theme in samples of collegiate athletes, the cause will need to be elucidated by further research as, if student-athletes feel their dietary intake is adequate when it is not, this may contribute to the under-consumption of calories, macronutrients, micronutrients and subsequent negative effects.

Body Composition Beliefs

In a position statement released in 2016 on Nutrition and Athletic Performance, the group highlights the importance of body composition for success in various sports and notes that body composition is often a variable of interest to athletes due to its ability to be manipulated.¹ The available literature in athletes supports this proposition, though from a slightly different angle.^{2,3,6,7} Two studies observed that athletes expressed a desire to change their body composition in the form of weight loss, though with the specific intent of altering physical appearance, rather than achieving better health or sports performance.^{3,7} The results of the present study do not seem to reflect this as the majority indicated they did not believe they needed to change their body composition. Although, when comparing how athletes expressed their intent to change their body composition in the available literature, it was specifically in relation to a desire for a different physical appearance,^{3,7} rather than to enhance sports performance or health. Thus, given the present study posed the questions surrounding body composition beliefs with a specific intent relating to performance and health, it is possible this may not truly reflect the body composition beliefs of the sample. Therefore, athletes may still seek to alter dietary intake based on body composition goals, though related to physical appearance, rather than sports performance or health. Future studies should address this by also including desire to change body composition for physical appearance as an intent, rather than just for health or sports performance motivations.

Limitations

There were several limitations readers should be aware of in the present study. First, given that the body of literature relating to sports nutrition is minimal, this inhibits the ability to make strong comparisons and associations between the present study and outside literature. In addition, data were self-reported rather than observed behaviors and are thus susceptible to social-desirability bias. Also, the survey did not ask participants whether they were following any altered dietary patterns, such as a vegan or vegetarian diet. This is a confounding variable to the mean food group intake information as someone following this dietary pattern would likely have had abnormally high intakes of fruits/vegetables, pushing the group means up altogether. As well, data were collected from a sample of student-athletes at one midwestern university and thus may or may not apply to student-athlete samples at universities elsewhere.

Conclusion

The performance of an athlete is tied to their dietary intake in various ways. Unfortunately, the body of literature looking at what affects the dietary intake of student-athletes is relatively scarce, but does illuminate several other variables of interest due to potential relationships with dietary intake: source of nutritional information, rating of dietary intake, alcohol intake, and body composition beliefs. The results of the present study demonstrate that student-athletes source their nutritional information from SCC's, AT's, and family which presents an efficient point of intervention for nutrition education by focusing on staff in addition to student-athletes. As well, the present study shows a noteworthy association, though weak, between student-athletes feeling positive about the quality of their dietary intake despite under-consuming energy/macronutrients, which could be a contributing factor to inadequate dietary intake.

Media-Friendly Summary

The present study sought to investigate several variables in student-athletes, specifically, source of nutritional information, perception of the quality of their diet, and body composition beliefs, and how they may affect the dietary decisions student-athletes make. The results of the present study show that this population often receives their nutritional information from sports performance staff, which may prove to be a more efficient route of channeling nutrition knowledge to student-athletes. Further, the

results demonstrate a disconnect between how student-athletes feel about the quality of their dietary intake vs. the objective composition of their dietary intake, revealing one potential mechanism which may be contributing to student-athletes under-consuming nutrients. Lastly, the results show a sample in which most student-athletes did not desire to change body composition status for health or sports performance motivations, though future research will need to examine this by including physical appearance as a potential motivation as well.

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References

1. Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine. Nutrition and athletic performance. *J Acad Nutr Diet*. 2016;116(3).
2. Burke L. Practical issues in nutrition for athletes. *J Sports Sci*. 1995;13(S1):S83-S90.
3. Heaney S, O'Connor H, Naughton G, Gifford J. Towards an understanding of the barriers to good nutrition for elite athletes. *Int J Sports Sci Coach*. 2008;3(3).
4. Karpinski CA, Milliner K. Assessing intentions to eat a healthful diet among national collegiate athletic association division II collegiate athletes. *J Athl Train*. 2016;51(1):89-96.
5. Malinauskas BM, Overton RF, Cucchiara AJ, Carpenter AB, Corbett AB. Summer league college baseball players: Do dietary intake and barriers to healthy eating differ between game and non-game days? *Sports Manage Relat Top J*. 2007;3(2).
6. Valliant MW, Emplainscourt HP, Wenzel RK, Garner BH. Nutrition education by a registered dietitian improves dietary intake and nutrition knowledge of a NCAA female volleyball team. *Nutrients*. 2012;4(6):506-516.
7. Smart LR, Bisogni CA. Personal food systems of male college hockey players. *Appetite*. 2001;37(1):57-70.
8. Ashton LM, Hutchesson MJ, Rollo ME, Morgan PJ, Thompson DI, Collins CE. Young adult males' motivators and perceived barriers towards eating healthily and being active: A qualitative study. *Int J Behav Nutr Phys Act*. 2015;12(93).
9. Ashton LM, Hutchesson MJ, Rollo ME, Morgan PJ, Thompson DI, Collins CE. Motivators and barriers to engaging in healthy eating and physical activity: A cross-sectional survey in young adult men. *Am J Men's Health*. 2017;11(2):30-343.
10. Deliens T, Clarys P, De Bourdeaudhuij I, Deforche B. Determinants of eating behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*. 2014;14(53).
11. Gough B, Conner MT. Barriers to healthy eating amongst men: A qualitative analysis. *Soc Sci Med*. 2006;62:387-395.
12. Greaney ML, Less FD, White AA, et al. College students' barriers and enablers for healthful weight management: A qualitative study. *J Nutr Educ Behav*. 2009;41(4).
13. Hebden L, Chan HN, Louie JC, Rangan A, Allman-Farinelli M. You are what you choose to eat: Factors influencing young adults' food selection behavior. *J Hum Nutr Diet*. 2015;28:401-408.
14. Hilger J, Loerbroks A, Diehl K. Eating behaviour of university students in Germany: Dietary intake, barriers to healthy eating and changes in eating behaviour since the time of matriculation. *Appetite*. 2017;109:100-107.
15. Holley TJ, Collins CE, Morgan PJ, Callister R, Hutchesson MJ. Weight expectations, motivations for weight change and perceived factors influencing weight management in young Australian women: A cross-sectional study. *Public Health Nutr*. 2015;19(2):275-286.
16. Howse E, Hankey C, Allman-Farinelli M, Bauman A, Freeman B. 'Buying salad is a lot more expensive than going to McDonalds': Young adults' views about what influences their food choices. *Nutrients*. 2018;10.
17. Munt AE, Partridge SR, Allman-Farinelli M. The barriers enablers of healthy eating among young adults: A missing piece of the obesity puzzle: A scoping review. *Obes Rev*. 2016;18(1):1-17.

18. Nelson MC, Kocos R, Lytle LA, Perry CL. Understanding the perceived determinants of weight-related behaviors in late adolescence: A qualitative analysis among college youth. *J Nutr Educ Behav.* 2009;41(4):287-292.
19. Stok FM, Renner B, Clarys P, Lien N, Lakerveld J, Deliens T. Understanding eating behavior during the transition from adolescence to young adulthood: A literature review and perspective on future research directions. *Nutrients.* 2018;10.
20. Torres-McGehee TM, Pritchett KL, Zippel D, Minton DM, Cellamare A, Sibilila M. Sports nutrition knowledge among collegiate athletes, coaches, athletic trainers, and strength and conditioning specialists. *J Athl Train.* 2012;47(2):205-211.
21. Probability of Competing Beyond High School. National Collegiate Athletic Association. <http://www.ncaa.org/about/resources/research/probability-competing-beyond-high-school>. Published n.d. Accessed January 24, 2020.
22. Abbey EL, Wright CJ, Kirkpatrick CM. Nutrition practices and knowledge among NCAA division III football players. *J Int Soc Sports Nutr.* 2017;14(13).
23. Cole CR, Salvaterra GF, Davis JE Jr, et al. Evaluation of dietary practices of national collegiate athletic association division 1 football players. *J Strength Cond Res.* 2005;19(3):490-494.
24. Subar AF, Freedman LS, Tooze JA, et al. Addressing current criticism regarding the value of self-report dietary data. *J Nutr.* 2015;145(12):2639-2645.

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