

Sports Nutrition Knowledge of Division II Student-Athletes and Their Coaches

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Abstract

Objectives: There were two primary purposes of this study. One was to determine the nutrition knowledge of NCAA Division II student-athletes and coaches. Two, to investigate the differences in nutrition knowledge between the sexes who play the same sport. Secondary objectives included finding a difference in nutrition knowledge between upper and lowerclassmen, and to determine the most common resources of nutrition knowledge. Methods: The study included 145 student-athletes and 21 coaches. All participants completed a 16-question survey to determine their sports nutrition knowledge, with satisfactory knowledge at or greater than 75% correct. Results: The overall mean sports nutrition knowledge for the student-athletes was 55.3% and the coaches was 67.9%. Only 21 student-athletes and 9 coaches had satisfactory scores. Two control groups (students majoring in athletic training and exercise science; and non-student-athletes) were used to make comparisons to the student-athletes and coaches. Conclusion: The results indicate that it would be valuable for coaches to communicate their knowledge to their athletes and for college athletic programs to spend time and effort in improving nutrition knowledge to optimize athletic performance.

Key words: Sports, Survey, Performance

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Note: This manuscript or any of its contents has not been published elsewhere and is not being considered for publication elsewhere.

Introduction

The American College of Sports Medicine (ACSM) and the American Dietetic Association (ADA) have reported that nutrition plays a significant role in an athlete's practices, game performance, and recovery (Torres-McGehee, Pritchett, Zippel, Minton, Cellamare, & Sibilgia, 2012). Research has shown that athletes generally fail to meet basic nutrition markers due to multiple factors such as lack of time to prepare meals, preferences of food, appetite, as well as misinformation regarding nutrition education (Trakman, Forsyth, Devlin, & Belski, 2016). Coaches, for a variety of reasons, often overlook adequate nutrition education as an integral part of the athletes' training regimen (Andrews, Wojcik, Boyd, & Bowers, 2016; Rossi, Landreth, Beam, Jones, Norton, & Cholewa, 2017). And unlike many matters of participating in athletics and student life, the NCAA does not require athletes to participate in any kind of nutrition education program (Fink & Mikesky, 2018; Rosenbloom, Jonnalagadda, & Skinner, 2002).

Athletes who do not consume the proper amount and type of macronutrients and micronutrients in their daily eating will likely compromise their performance. Specifically, athletes will not be able to maintain adequate energy levels, develop minimal lean tissue mass through resistance training, and the body will deplete its stored resources such as fat and glycogen, especially in endurance athletes, when caloric consumption is inadequate (Fink & Mikesky, 2018; Valliant, Emplaincourt, Wenzel, & Garner, 2012).

Previous research demonstrates that athletes have regular access to a sports medicine team, which may include a strength and conditioning specialist (SCS), athletic trainer (AT), and registered dietician (RD), all which are expected to have considerable knowledge in nutrition. (Torres-McGehee, et al., 2012, Trakman, et al., 2016, Valliant, et al., 2012). Due to the rigor and amount of material devoted to nutrition, it is reasonable to expect that the nutrition knowledge of the RD would be substantially higher than these other professions.

Despite having access to professionals with adequate nutrition knowledge, as well as their respective coaches, research demonstrates that athletes tend to be misinformed on many of nutrition-based basics such as proper caloric intake and meal-timing, as they are often exposed to multiple opinions and may succumb to unreliable sources such as another athlete, magazines, and the internet (Andrews, et al., 2016, Hornstrom, Friesen, Ellery, & Pike 2011). Torres-McGehee, et al., (2012) found that among 579 NCAA Division I, II and III athletes and staff, that the athletes tended to seek nutrition information from their athletic staff members, such as their coaches, SCSs and ATs rather than their registered dietitian; and not surprisingly, it was found that the coaches and athletes had lower average scores than the ATs and SCSs.

Zawila, Steib, & Hoogenboom (2003) reported that only 17% of 60 female cross country runners chose an AT for their sports nutrition knowledge, with common sources being magazines, parents, coaches and teammates. Hornstrom et al., (2011) found that softball players were likely to use a physician, an AT, college courses, before consulting with a RD. Since the athletes were more often exposed to the coach, ATs and SCSs, and thus looked to them as a resource, researchers have suggested that athletes would have benefit most if there had been educational interventions by the RD to provide accurate information regarding nutrition intake and consultation in order to further support continuity of training and rehabilitation of athletes (Andrews, et al., 2016; Heikkilä, Valve, Lehtovirta, & Fogelholm, 2017; Torres-McGehee, et al., 2012).

Improving the nutrition knowledge of student-athletes can be a difficult task since several factors need to be considered such as personal preferences and tolerance, training and game schedule, academic workload, and being sensitive to the amount of change they could endure. But it's clear that applying such knowledge would improve athletic performance (Fink & Mikesky, 2018; Valliant, et al., 2012). The purposes of our study, using participants from a Division II university, were to (1) determine overall nutrition knowledge; (2) to find differences, if any, between the nutrition knowledge of student-athletes and coaches; and (3) examine the most common resources of nutrition knowledge.

Methods

The participants were 145 NCAA Division II student-athletes from a university in the southeastern United States. Every athlete on each roster was sent a questionnaire via email. The overall response rate was 63.9%. Twelve sports teams from the university were represented in this sample, seven of which were female teams and seven of which were male teams. For continuity, the teams selected were paired by sport (note that women's softball and men's baseball were considered the same sport). The female sports included golf (n=7), tennis (n=7), swimming (n=10), basketball (n=6), lacrosse (n=9) and softball (n=9). The male sports included golf (n=6), tennis (n=5), swimming (n=9), basketball (n=8), lacrosse (n=26) and baseball (n=14).

Twenty-one coaches from these teams were also recruited to participate in this study. All of the head coaches and at least one assistant coach from each completed the questionnaire. In addition to the student-athletes and coaches, there were two control groups. Twenty-two student-athletes who were exercise science and athletic training majors were extracted from general student-athlete population to create Control #1. The second control

group consisted of 37 non-student athletes to create Control #2. Control #1 was primarily used to investigate if participation in a sports nutrition and related courses enhanced the athlete's knowledge in comparison to their peers who had not taken such courses. Control #2 was used to analyze differences between the nutrition knowledge of student-athletes and non-student-athletes.

The sports nutrition knowledge questionnaire was the same instrument developed and validated by Torres-McGehee, et al. (2012). Two sample questions from the 16 multiple choice items were "From a sports performance perspective, which is the most significant and/or detrimental dietary deficiency?" and "A megadose of which of the following vitamins is potentially very dangerous?". A score below 75% (less than 12 correct out of 16) was considered inadequate knowledge while a score 75% or better (12 or more correct) was considered adequate.

Permission to survey all parties was granted by the university's Research Review Board, the athletic director, and each of the head coaches. Although the coaches gave permission to be surveyed and to survey their athletes, the specific topic of the questionnaire was not shared to prevent any research on nutrition prior to receiving the questionnaire. The student-athletes, coaches, and control groups were sent the nutrition knowledge survey via email and it was attached as a Google form. In the email, potential subjects were notified that participation was voluntary and anonymous, and were asked to avoid any simultaneous research on the topic. To encourage participation, second and third (if needed) emails were sent to those who did not initially respond. Data were collected in the late spring/early summer of 2018 and lasted approximately 45 days. The data was analyzed via a Microsoft® Excel® 2016 MSO, 32-bit workbook. The data analysis software was provided within the add-in within excel: the analysis ToolPak.

Results

A major goal for this research was to investigate the relationship between coaches and their student-athletes, both in aggregate and on a team by team basis. The overall average for the student-athletes was 55.3%. The overall average for the coaches was 67.9%. Of the sample, 13.7% (n=20) student-athletes and 42.8% (n=9) of the coaches had satisfactory nutrition knowledge.

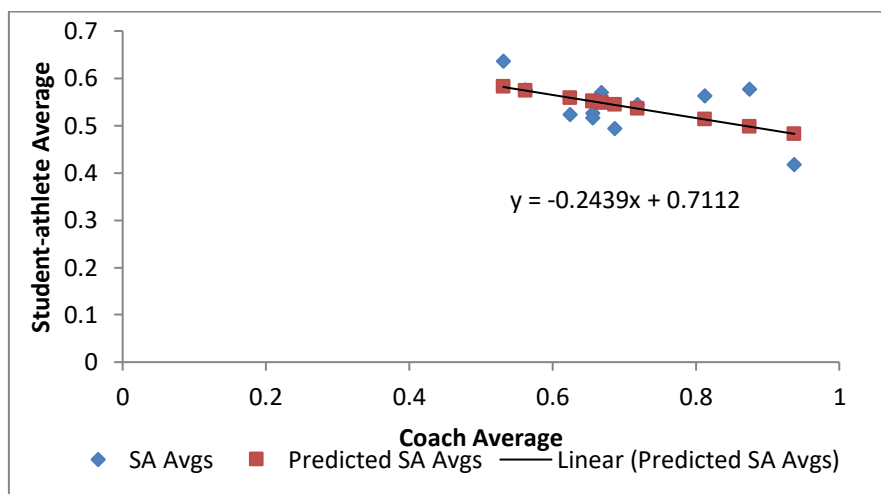
Table 1. Sports nutrition knowledge of the student-athletes and coaches in comparison to both control groups with independent t-tests

Name of Group (n)	t-Test with Control #1				t-Test with Control #2		
	Average	Average	t-Stat	P-Value	Average	t-Stat	P-Value
All Student-athletes (133)	0.553	0.642	2.64	0.00898	0.552	0.00805	0.994
Coaches (30)	0.679	0.642	-0.811	0.422	0.552	-3.0373	0.00181

Both of the control groups were analyzed to determine if there was a significant difference between the nutrition knowledge of the exercise science and athletic training majors (Control #1) in comparison to non-student-athletes (Control #2). When our sample of NCAA Division II athletes were compared to Control #1, the average of this control group was 64.2% (n=22) which was significantly higher than the overall of the student-athlete population participating (Table 1). When comparing the student-athletes to Control #2 (55.2%, n=37) there was no significant difference between the two groups as both groups showed unsatisfactory nutrition knowledge (Table 1).

A linear regression was completed on the average scores of the student-athletes from each team as well as the coaches, and surprisingly it determined that there is a negative correlation between the nutrition knowledge of the coach and the student-athletes (Figure 1). That is, as the nutrition knowledge score of the coach increased, the score of the student-athletes on that coach’s team tended to decrease.

Figure 1. Coach Average Line Fit Plot



An ANOVA test was completed to assess the significant differences between the primary sources of nutrition knowledge chosen by the student-athlete participants (n=131). There was nearly a significant difference between the primary source at which the subject used and the nutrition knowledge score ($F=2.19$, $p=0.0507$). The distribution of the sources that the student-athletes chose is displayed in Table 3. Due to the limited number of participants that chose nutrition courses, academic journals, coaches or team physicians as their primary source, these scores were collected and placed into the “other” category (Table 2). Although the data presented was nearing a significant difference, a larger population would need to be tested in order to confirm the changes in scores from primary resource to another.

Table 2. Primary sources of nutritional knowledge that the student-athletes selected with the designated average scores from each source

<i>Primary Source for Nutrition Knowledge</i>	<i>n</i>	<i>Percentage of total</i>	<i>Score (%)</i>
Athletic Trainer	20	14	45.6
Registered Dietician/ Nutritionist	14	13	65.9
Friends	14	9	61.1
Parents	17	14	55.8
Certified Strength and Conditioning Specialist (CSCS)	14	11	59.7
Internet	44	31	60.1
Other	8	10	56.3

Discussion

Most of the student-athletes and their coaches demonstrated unsatisfactory nutrition knowledge. Only 15% of the student-athletes and 30% of the coaches answered 75% or more of the 16 questions correctly, which is consistent with several other studies using the same or a similar instrument (Andrews, et al., 2016; Dunn, Turner, & Denny, 2007; Torres-McGehee, et al., 2012). The current study was conducted to investigate nutrition knowledge with a focus on student-athletes and their respective coaches. Data was also collected to determine sources of the student-athlete’s nutrition based information.

Although the coaching staff earned higher mean scores than the student-athletes, we observed through the linear regression that there was a negative correlation between the knowledge of the coaches to the athletes. That is, while nutrition knowledge for most coaches

and their respective athletes were similar, coaches who scored the highest had teams with the lowest mean averages. For instance, the average score of one women's team was 41.7%, (the lowest mean score of any team in our study) while the coach of that team earned a 93% (the highest score of any coach). Despite a display of better understanding of basic nutrition principles by the coaches than their athletes, the reason for this disparity are not fully understood. It could be that coaches simply lack confidence in their nutrition knowledge and thus hesitate to share that knowledge. It's also possible that the coaches may not see teaching nutrition as their responsibility, or they simply want to devote all of their time to recruiting and better practice and game strategy.

When comparing the student-athletes and coaches to the control groups, the student-athletes, without a formal nutrition background, were comparable to the knowledge of the non-student-athletes. This finding was a surprise since it is reasonable to expect for athletes to seek information, at least casually, from valid sources to assist in performance as well as to justify their scholarships, which most have earned at this institution. Upon reflection of the overall results, we were not surprised to find that Control #1 (student-athletes who were Athletic Training and Exercise Science majors) had significantly higher scores than the student-athletes, since subjects in these areas of study are regularly participating in lectures and being tested on nutrition in several courses.

While not the primary focus of the present study, we expected to find that the primary source of the student-athletes nutrition knowledge was their coach, instead we found that the favored choices included the internet, athletic trainers (AT) and strength and conditioning specialists (SCS). However, it was not a surprise to find that student-athletes who utilized a registered dietitian (RD) as their primary source were found to have a significantly higher score (66.1%) than those who selected an athletic trainer as the main source (51.6%). Other studies have also demonstrated a strong association between using a RD and better overall scores (Burkhart & Pelly, 2014; Rossi, et al, 2017; Valliant, et al., 2012). Further, those that used an AT as a primary source have the lowest score among all choices, even below the "other" category, which included academic journals, coaches, nutrition courses, and the team physician (56.3%). Since many schools do not employ a RD (or do so part time as is the case in the present study) it may be valuable for student-athletes, coaches, as well as the sports medicine team to enroll in nutrition education courses or attend sessions provided by professional that address the basics of sports nutrition. Having the coach and student-athlete attend nutrition seminars/courses can improve the confidence of knowledge for both groups and might open the communication between the two groups. Note that the total number of responses on this portion

of the data is lower since some student-athletes checked at least two primary choices where one was requested.

Conclusions

Since the current findings are consistent with several similar studies using college athletes and coaches, we agree with previous conclusions that some intervention should be attempted to improve nutrition knowledge. In particular, coaches should consider using a registered dietitian, athletic trainer, or exercise science faculty to present basic sports nutrition to the team - one session per season or even a series of presentations throughout the academic year. Further, it would be helpful if the professional would curtail the discussion to the athletes they are addressing and their particular needs.

There were some limitations in our study. The sample was not random. Those used in the data were athletes, coaches and non-athletes who volunteered to complete the survey. Regarding different-sex but same sport analysis, a larger sample size would have strengthened the conclusions reached. This study was conducted at one NCAA Division II university in the southeastern United States, and if the sample were to include other institutions, the results might vary depending on the level of NCAA competition and the region. It would be interesting to complete another study on a larger scale to analyze the relationship between the athlete and coach as well as the relationship between males and females of similar sports, such as within an entire athletic conference or including NCAA Division I and III institutions.

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