



Understanding of Athletes' Nutritional Needs among Athletes, Coaches, and Athletic Trainers

Bethany Shifflett , Carl Timm & Leamor Kahanov

To cite this article: Bethany Shifflett , Carl Timm & Leamor Kahanov (2002) Understanding of Athletes' Nutritional Needs among Athletes, Coaches, and Athletic Trainers, Research Quarterly for Exercise and Sport, 73:3, 357-362, DOI: [10.1080/02701367.2002.10609032](https://doi.org/10.1080/02701367.2002.10609032)

To link to this article: <https://doi.org/10.1080/02701367.2002.10609032>



Published online: 26 Feb 2013.



Submit your article to this journal [↗](#)



Article views: 1482



View related articles [↗](#)



Citing articles: 7 View citing articles [↗](#)

Research Quarterly for Exercise and Sport
 ©2002 by the American Alliance for Health,
 Physical Education, Recreation and Dance
 Vol. 73, No. 3, pp. 357–362

Understanding of Athletes' Nutritional Needs Among Athletes, Coaches, and Athletic Trainers

Bethany Shifflett, Carl Timm, and Leamor Kahanov

Key words: nutrition, sport

Media sources, as well as educational programs and the medical community, have delivered the consistent and easily understood message that good nutrition is an important aspect of a healthy lifestyle. While poor nutrition can be the source of a number of health problems that develop over time (e.g., lowered resistance to infection, high cholesterol level), the effect among athletes training in a highly competitive environment may be both immediate and severe (e.g., impaired performance, heat exhaustion). Hydration, for example, is of particular importance to athletes (Clark, 1995). A few of the dangers of dehydration include impaired thermoregulation, reduced work capacity, a proportional rise in perceived exertion, and iso-osmotic hypovolemia, which reduces sweating and increases core temperature (Gisolfi, 1996). Increased demands on the body accompany training and competition, making it essential to match dietary intake with energy expenditure. It is, therefore, important to examine the extent to which those involved in athletics understand dietary needs and principles to avoid potential problems.

Typically, those who do not participate in athletics consider athletes, coaches, and athletic trainers to be knowledgeable about nutrition (President's Council on Physical Fitness and Sports Research Digest, 1998). However, studies conducted to assess the nutritional knowledge of those involved with the athletic commu-

nity report that athletes and coaches should be better informed (Corley, Demarest-Litchford, & Bazarre, 1990; Douglas & Douglas, 1984; Grandjean, Hursh, Majure, & Hanley, 1981). Some studies also include information about certified athletic trainers (ATCs). These studies (Graves, Farthing, Smith, & Turchi, 1991; Parr, Porter, & Hodgson, 1984) reported that ATCs were more knowledgeable and better prepared with respect to nutrition than coaches or noncertified athletic trainers. However, one group being more knowledgeable than another does not necessarily mean that the better performing group has a good understanding of nutrition. Graves et al. (1991), for example, in assessing nutrition knowledge reported both coaches and athletic trainers scoring poorly (59% and 64% correct, respectively).

The Athlete's Perspective

Those interested in assessing nutritional knowledge frequently ask athletes for their source of nutrition information. Athletes have identified parents as the primary source (Douglas & Douglas, 1984; Graves et al., 1991; Parr et al., 1984) and media as the secondary source (Parr et al., 1984; Short, 1994). A particular concern raised among researchers is the possibility that athletes might be receiving harmful information (Corley et al., 1990; Grandjean et al., 1981; Parr et al., 1984; Short, 1994). As one study (Grandjean et al., 1981) of collegiate athletes observed, 98% indicated that a high-protein diet improves performance, 80% believed that increased protein intake builds muscle mass, and 75% believed that athletes need more vitamins than nonathletes. These views were in direct conflict with a panel of experts identified by those conducting the study and research conducted by Singh, Moses, & Duester (1992). Additionally, research indicates that athletes do not possess an adequate

Submitted: August 17, 2000
 Accepted: October 24, 2001

Bethany Shifflett, Carl Timm, and Leamor Kahanov are with the Human Performance Department at San Jose State University.

understanding in fundamental areas of nutrition, including protein intake (Tufts University Diet and Nutrition Letter, 1987), vitamin and mineral supplementation (Armstrong & Maresh, 1996), and nutritional ergogenic aids (President's Council on Physical Fitness and Sports Research Digest, 1998).

Literature examining the differences in understanding among athletes, coaches, and athletic trainers is sparse. In addition, some of that work is dated and may no longer reflect current levels of familiarity with sport nutrition. This study is, therefore, a timely assessment and update on the differences among athletes, coaches, and athletic trainers with respect to understanding nutritional needs among athletes.

Method

Instrument Development

The Human Subjects Institutional Review Board at San Jose State University approved the pilot and main study prior to the collection of data. The original version of the survey contained three sets of items. The first ($n = 9$) solicited demographic information intended to provide a description of the sample and permit analyses by relevant subgroups. The second set of items ($n = 20$) comprised the knowledge component (multiple choice format) of the survey and included questions on carbohydrates, proteins, fats, vitamins, minerals, hydration, weight loss and gain, and rest and recovery. The final set of items ($n = 8$) requested information on perceived understanding of nutrition, factors that affect an athlete's ability to adhere to a healthy diet, sources of nutrition information, and quality of eating habits.

Prior to conducting the pilot study, the survey underwent two qualitative reviews. The first was by a nutrition professor and an exercise physiology professor who both teach sport and nutrition classes. The second was by a certified athletic trainer in a Division II intercollegiate athletic program. Following each review, revisions were made based on the recommendations received. A pilot study was then conducted to quantitatively assess, through item analysis, the quality of the nutrition knowledge items. Responses to the survey were solicited from athletes and coaches in a Division I intercollegiate athletic program. In addition, all athletic training master's students from the same institution were surveyed. A total of 123 (of 300) usable surveys were returned. An item analysis indicated that 7 of the 20 items were not functioning well, because discrimination indexes were poor and the pattern of choices among the distractors (incorrect options) indicated a need for revision. One item was completely replaced, and the distractors for the re-

maining weak items were modified. The athletic trainer and exercise physiologist then reviewed the entire survey again. Aside from grammatical or format suggestions, no other substantive changes were recommended. The revised survey¹ contained a knowledge component ($n = 20$), demographic and background items ($n = 10$), and items ($n = 4$) soliciting information on perceived understanding of athletes' nutritional needs, importance of athletes adhering to a healthy diet, quality of respondents' eating habits, and respondents' sources of nutrition information.

Participants, Data Collection, and Analysis

Following survey revisions based on the pilot data, a new sample of certified athletic trainers, athletes, and coaches in Division I, II, and III intercollegiate athletic programs was surveyed ($N = 900$). Athletic trainers ($n = 300$) were selected from the California Athletic Trainers Association listing of certified athletic trainers. Using the Blue Book of Senior, Junior, and Community College Athletics, coaches from selected sports at six universities (two in each Division) were asked to both complete the survey and administer the survey to their athletes ($n = 300$). An additional 270 surveys were mailed to randomly selected coaches at other Division I, II, and III institutions listed in the Blue Book.

Demographic information from returned surveys was summarized for the group as a whole and separately for athletes, coaches, and athletic trainers. Responses to items regarding information sources, perceived understanding of nutrition, importance of adhering to a healthy diet, and quality of eating habits were summarized for the group as a whole, by gender, and by participant type.

An item analysis of the survey's knowledge component was then conducted to identify weak items. Reliability (coefficient alpha) was also assessed. A nutrition score (number correct) was then obtained for each participant and summarized by gender and participant type. Additionally, the nutrition score was the dependent variable tested for a difference in means across athletes, coaches, and athletic trainers. Homogeneity of variance and normality assumptions were met and an analysis of variance procedure was used to test for a statistically significant difference in means. The Scheffe post hoc procedure was then used to determine which pairs of group means were significantly different from one another. Practical significance was assessed using η^2 .

Further analyses of the test score included correlations with age, years engaged in competitive sports, perceived understanding of nutrition, quality of eating habits, and number of nutrition and health courses taken. These correlations were calculated for the group as a whole and separately by gender and participant type.

Results

Sample Demographics

Responses ($N=231$) to the survey were obtained from 98 athletic trainers, 68 coaches, and 65 athletes. This represented a return rate of 26%. This sample comprised 108 (47%) male and 123 (54%) female respondents. The mean ages were 35 years for ATCs, 41 years for coaches, and 20 years for athletes. Coaches were fairly evenly divided across Division I (41%), Division II (31%), and Division III (29%), while most of the athletic trainers (57%) and athletes (52%) were from Division III (including National Association of Intercollegiate Athletics schools) institutions. Athletic trainers (63% head ATCs, 36% assistant ATCs) on the average had 11 years experience as certified athletic trainers, and coaches averaged 15 years of collegiate coaching experience. In addition, 54% of the athletes indicated they had coaching experience. A summary of descriptive information for the respondents is available in Table 1.

Athletic trainers most frequently reported completing nutrition coursework (see Table 2). In addition, 3%

of the ATCs reported taking no coursework in nutrition compared to 37% and 75% of the coaches and athletes, respectively. Similar patterns were observed among the number of health courses taken.

Knowledge Component Results

Following an item analysis of the nutrition knowledge questions, one weak item (discrimination index = $-.08$, difficulty index = $.21$) was eliminated, leaving 19 items in the knowledge section of the survey. The item deleted read, "Regarding water intake before and during activity, athletes should drink..." then listed options with various amounts before and during activity. Internal consistency, estimated with coefficient alpha, was $.61$. Mean scores (see Table 3) for the groups were 14.02 (ATCs), 12.16 (coaches), and 10.52 (athletes). Expressed as a proportion, the ATCs averaged 74% correct responses, followed by coaches who, on average, responded correctly to 64% of the items, and athletes, with 55% correct responses. An analysis of variance, $F(2, 225) = 44.72$, $p < .01$, followed by Scheffe post hoc comparisons, revealed statistically significant differences in the means among

Table 1. Respondent's age, athletic participation, and education

	ATC				Coaches				Athletes			
	Male ($n = 58$)		Female ($n = 40$)		Male ($n = 39$)		Female ($n = 29$)		Male ($n = 11$)		Female ($n = 53$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	35.70	7.60	33.90	7.00	43.10	9.70	37.60	9.40	20.00	1.50	20.00	2.00
Years as an athlete	11.00	6.23	11.00	5.70	19.00	8.40	19.00	8.30	12.00	3.60	10.00	3.50
Years as collegiate athlete	1.00	1.50	1.50	1.60	3.40	1.20	3.80	0.61	1.90	0.99	2.00	0.98
Highest degree												
Bachelor's	11 (19%)		12 (30%)		15 (39%)		8 (28%)		—		—	
Master's	43 (74%)		27 (68%)		22 (56%)		21 (72%)		—		—	

Note. ATC = certified athletic trainers.

Table 2. Proportion of respondents completing nutrition and health coursework

	ATC		Coaches		Athletes	
	Male	Female	Male	Female	Male	Female
Nutrition courses	$n = 57$	$n = 39$	$n = 37$	$n = 28$	$n = 11$	$n = 54$
None	4%	3%	27%	54%	73%	76%
1-2	75%	87%	65%	39%	27%	24%
3 or more	21%	10%	8%	7%	—	—
Health courses	$n = 52$	$n = 36$	$n = 37$	$n = 28$	$n = 11$	$n = 54$
None	2%	5%	16%	29%	55%	61%
1-2	56%	56%	52%	46%	36%	28%
3 or more	42%	39%	32%	25%	9%	11%

Note. ATC = certified athletic trainers.

all groups. The proportion of the variability (η^2) in score attributable to group status was .28.

No obvious thread ran through the items missed, however, athletes were the predominantly weaker group on 26% of the items. The content of these items focused on the effects of dehydration: "If insufficient water is ingested during activity, which of the following potential health effects is the most serious?" weight gain principles: "When weight gain is desired, athletes should....;" fat consumption: "For athletes, calories from fats should be approximately what percent of their daily caloric intake?" and protein needs: "An athlete's protein needs are determined by...." With respect to dehydration, 83% of the athletes were not able to correctly identify

increased core body temperature as a serious health effect associated with ingesting insufficient water. Weight gain was another area with which athletes in particular (89% incorrect) and coaches as well (50% incorrect) had difficulty.

For the group as whole, performance was particularly weak on the item pertaining to protein needs and another item regarding the proportion of caloric intake that should come from fats. Across the three items related to the proportion of an athlete's daily caloric intake that should come from fats, carbohydrates, and protein, the group as a whole did well (74% correct) on the carbohydrate item, but less well on the protein item (41% correct), and poor (22% correct) on the fat item. Although performance on the knowledge component varied, all groups indicated they believed it was important ($M = 9$ on a scale of 1 to 10) for athletes to adhere to a healthy diet.

Next, relationships between nutrition score and participant characteristics were examined (see Table 4). For the group as a whole, analyses revealed weak relationships with years engaged in competitive sports ($r = -.08$), quality of eating habits ($r = .07$), and perceived understanding of nutrition ($r = .13$). An interesting observation was that participants' perception of their level of understanding of athletes' nutritional needs did not match their performance on the knowledge component of the survey. Athletes overestimated (on a scale of 1 to 10) their level of understanding, and coaches underestimated theirs. The mean response for athletes was 6.8 ($SD = 1.9$) followed by ATCs with a mean response of 6.7 ($SD = 1.5$), and coaches with mean response of 2.0 ($SD = 1.2$).

Table 3. Summary of group scores on nutrition component of survey

	<i>N</i>	<i>M</i>	<i>SD</i>	95% CI
Athletic trainers	97	14.02	1.95	13.63–14.41
Male	58	13.91	2.02	
Female	39	14.18	1.86	
Coaches	68	12.16	2.62	11.53–12.80
Male	39	12.13	2.59	
Female	29	12.21	2.72	
Athletes	63	10.52	2.46	9.90–11.14
Male	11	10.45	1.75	
Female	52	10.54	2.60	

Note. *M* = mean; *SD* = standard deviation; CI = confidence interval.

Table 4. Correlations between participant characteristics and their nutrition test score

	Age (<i>n</i>) r_{xy}	Years athletic experience (<i>n</i>) r_{xy}	Understand nutrition (<i>n</i>) r_{xy}	# Health courses (<i>n</i>) r_{xy}	# Nutrition courses (<i>n</i>) r_{xy}	Quality of eating (<i>n</i>) r_{xy}
ATC						
Male	(58) .04	(58) -.14	(58) .32*	(52) .02	(57) .13	(57) .10
Female	(39) -.04	(39) -.12	(38) .04	(35) .05	(38) .10	(39) -.22
Coaches						
Male	(39) -.12	(35) -.09	(39) .20	(37) -.03	(37) .11	(38) -.10
Female	(29) .36	(29) .09	(29) .36	(28) -.16	(28) -.18	(28) .26
Athletes						
Male	(11) -.26	(11) -.61*	(11) -.38	(11) -.09	(11) -.17	(11) -.67*
Female	(51) .22	(50) .14	(52) .09	(52) .20	(52) .17	(52) .29
Whole group	(227) .28**	(222) -.08	(227) .13*	(215) .20**	(223) .31**	(225) .07

Note. Understand nutrition = participants' rating of their perception of their level of understanding regarding the nutritional needs of athletes; quality of eating = participants' rating of the quality of their eating habits.

* $p < .05$.

** $p < .01$.

Variables found to have a statistically significant relationship with the nutrition score for the group as a whole were "number of health courses taken" ($r = .20, p < .01$), "age" ($r = .28, p < .001$), and "number of nutrition courses taken" ($r = .31, p < .001$). Statistically significant relationships were also observed for male athletes, when the nutrition score was correlated with "quality of eating habits" ($r = -.67, p < .05$) and "years engaged in competitive sports" ($r = -.61, p < .05$). The results for the male athletes should be considered in light of the fact that they are based on a small sample ($n = 11$). It is not possible to generalize these findings; however, they are interesting enough to warrant follow up. They suggest that male athletes perceive they have good eating habits yet score poorly on a set of items regarding nutrition. The second correlation ($r = -.61$) suggests that among male athletes, those with more competitive experience score lower on items regarding nutrition than those with less experience.

Nutrition Information Sources

An examination of respondents' sources of nutrition information (see Table 5) revealed that, among athletic trainers, the source selected most frequently (35%) as first choice was academic journals followed by nutrition faculty (22%). The sources selected most frequently (19%) as first choice among coaches were ATCs and nutrition faculty. Athletes (28%) selected parents followed by coaches (17%) most frequently as their first choice.

High Performing Group Profile

A profile of the respondents who scored well (80% correct or greater) was examined. A total of 32 participants (24 ATCs, 8 coaches) scored in this range. Their mean age was 37 years ($SD = 9$). Fifty-three percent were men, 78% had a master's degree, 41% selected academic

journals as their first choice for information on nutrition, and 66% listed academic journals as a first, second, or third choice. The next most frequently cited nutrition information sources for those scoring well were nutrition faculty (44%) and college health and nutrition courses (34%). Sixteen percent had taken three or more nutrition courses, and 26% had taken three or more health courses. In addition, there was a moderately strong relationship ($r = .41, p < .05$) between quality of eating habits and score on the nutrition items.

Discussion

This study, like others, (Graves et al., 1991; Parr et al., 1984) found that athletic trainers scored better than other groups on items related to nutrition. Mean performance, expressed as a proportion, for this sample was 74% correct responses for the athletic trainers, followed by 64% correct responses among the coaches, and 55% correct responses for the athletes. This study observed that athletes were likely to turn to parents or coaches for nutrition information, as has been reported by others (Douglas & Douglas, 1984; Graves et al., 1991; Parr et al., 1984). A potentially serious ripple effect, in need of study, is that because more than half the athletes in this study had coaching experience, the nutritional information they transmit to their athletes may not be accurate. This study observed that the athletes surveyed believed they understood nutritional needs among athletes, yet as a group they had the poorest overall scores. Further study of collegiate athletes engaged in coaching could provide valuable information regarding their impact on young athletes in a variety of areas, including nutrition.

An analysis of missed items suggested that basic principles were not well understood, because many of

Table 5. Percentage of participants using various nutrition information sources

Source	ATC (%)		Coach (%)		Athletes (%)	
	First choice	Selected	First choice	Selected	First choice	Selected
Academic journals	35	69	10	31	2	18
Athletic trainer	5	42	19	53	12	28
Coach	—	2	—	15	17	49
Magazines	7	21	16	54	14	46
Nutrition faculty	22	42	19	37	—	—
Nutrition/health courses	10	40	3	25	14	23
Parents	—	1	—	—	28	58
Physician	6	43	9	19	—	—

Note. ATC = certified athletic trainers; selected = respondents who identified the source as a first, second, or third choice.

the participants in this study missed, for example, items regarding appropriate proportions for caloric intake from fats and protein. Other areas in which athletes in particular had difficulty included hydration and weight gain. In response to the item on weight gain, many athletes and coaches selected the incorrect choice of "weight train and increase protein in diet" to gain weight.

In summary, statistically significant differences were observed in the mean level of understanding in sport nutrition among athletes, coaches, and athletic trainers. In addition, athletic trainers were more familiar with sport nutrition issues than coaches or athletes, and athletes tended to overestimate their level of understanding of nutrition.

To extend the work in this study, future research could first identify the potentially serious problems and consequences associated with poor nutrition among athletes and establish the benefits to be derived from sound nutritional practices. Subsequent work might then focus on identifying the factors that most influence nutrition knowledge. If, for example, background or training emerged as a salient factor, then those responsible for the training and hiring of both coaches and athletic trainers might consider re-examining their expectations of new hires in the area of sport nutrition. Nutrition does fall in one of the domains (injury prevention) identified as important by the National Athletic Trainers Association and is likely covered in most coaching preparation programs. However, subsequent findings indicating the need for greater understanding of sport nutrition might signal the need for more extensive requirements in this area and greater emphasis on certification exams. Continuing education focused on sport nutrition may also be called for. With influential factors identified, efforts might then be directed toward improving the level of understanding of nutrition principles in the athletic community and identifying ways to encourage athletes to adopt and adhere to good nutritional practices.

References

- Armstrong, L. E., & Maresh, C. M. (1996). Vitamin and mineral supplements as nutritional aids to exercise performance and health. *Nutrition Reviews*, 54(4), S149-S158.
- Clark, N. (1995). Water: The ultimate nutrient. *The Physician and Sports Medicine*, 23(5), 32g-32L.
- Corley, G., Demarest-Litchford, M., & Bazarre, T. L. (1990). Nutrition knowledge and dietary practices of college coaches. *Journal of the American Dietetic Association*, 90, 705-709.
- Douglas, P. D., & Douglas, J. G. (1984). Nutrition knowledge and food practices of high school athletes. *Journal of the American Dietetic Association*, 84, 1198-1202.
- Gisolfi, C. V. (1996). Fluid balance for optimal performance. *Nutrition Reviews*, 54(4), S159-S168.
- Grandjean, A. C., Hursh, L. M., Majure, W. C., & Hanley, D. F. (1981). Nutrition knowledge and practices of college athletes. *Medicine and Science in Sports and Exercise*, 13, 82.
- Graves, K. L., Farthing, M. C., Smith, S. S., & Turchi, J. M. (1991). Nutrition training, attitudes, knowledge, recommendations, responsibility, and resource utilization of high school coaches and trainers. *Journal of the American Dietetic Association*, 91, 321-324.
- Parr, R. B., Porter, M. A., & Hodgson, S. C. (1984). Nutrition knowledge and practice of coaches, trainers, and athletes. *The Physician and Sportsmedicine*, 12, 127-138.
- President's Council on Physical Fitness and Sports Research Digest (1998). *Nutritional Ergogenics and Sports Performance*, 3(2).
- Short, S. H. (1994). Heathquakery: Our roles as professionals. *Journal of the American Dietetic Association*, 94, 607-611.
- Singh, A., Moses, F. M., & Duester, P. A. (1992). Chronic multivitamin-mineral supplementation does not enhance physical performance. *Medicine and Science in Sport and Exercise*, 24, 726-732.
- Tufts University Diet and Nutrition Letter (1987). *How much protein do athletes really need?* 5(8).

Note

1. Survey available from authors.

Authors' Note

Please address all correspondence concerning this article to Bethany Shifflett, Human Performance Department, San Jose State University, San Jose, CA 95192-0054.

E-mail: bshifflett@geolog.com