

**Sports Nutrition Knowledge: Does Sex or Class Rank of  
Division II Athletes Make a Difference?  
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**Abstract**

**Aim:** Nutrition is an aspect of game and practice preparation that is commonly overlooked by many athletes, even those who are highly competitive. There were two primary purposes of this study. One, was to investigate the differences in nutrition knowledge between the sexes who play the same sport. Two, to identify if there is a difference in nutrition knowledge between upper and lowerclassmen.

**Methods:** The study included 145 athletes from six different sports that included both sexes. All participants completed a 16-question survey to determine their sports nutrition knowledge, with satisfactory knowledge at or greater than 75% correct. The overall mean sports nutrition knowledge for the athletes was 55.3%. Only 21 of the 145 athletes had satisfactory scores.

**Results:** Significant differences were found between the upper and lower classmen but no statistical differences between the sexes of the same sport, with the exception of one sport.

**Conclusion:** Possible reasons are offered as to why there were not more noticeable differences within these groups.

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## **INTRODUCTION**

Through a position statement, several notable organizations have reported that nutrition plays a role in an athlete's practices, game performance, and recovery (American College of Sports Medicine, American Dietetic Association, Dietitians of Canada, 2009). Studies such as the timing of protein intake to maximize muscle growth (Kafkas & Kafkas, 2019) and appropriate mineral and caloric intake prior to competition (Sonkeng Nzako, Fowe Djouhou, Saha Foudjo, Mafogang, & Fokou, 2022) are certain to be helpful to the athlete. However, the research has also 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).

While a focus of similar studies was to determine differences in nutrition knowledge between the sexes, we think this is the first study where one of the primary purposes was to specifically investigate differences in nutrition knowledge in the sexes who play the same sport. Further, a few studies on knowledge between the sexes have been conflicting. For instance, Whitcombe, Nethery, and Bergmann (1996) found that women scored higher in nutrition knowledge survey than men while other studies indicate there are no major differences between the knowledge of college men and women athletes (Andrews, Wojcik, Boyd, & Bowers, 2016; Rosenbloom, Jonnalagadda, & Skinner, 2002).

Improving the nutrition knowledge of 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; Rossi, Landreth, Beam, Jones, Norton, & Cholewa, 2017; Valliant, Emplincourt, Wenzel, & Garner, 2012). The two purposes of our study, using participants from a Division II university were as follows: (1) to investigate the differences in nutrition knowledge between the sexes who play the same sport; (2) to determine a difference in nutrition knowledge between upper and lowerclassmen.

We feel the two purposes of this article are important to investigate since there may be misconceptions about nutrition knowledge between the sexes. For example, some readers may feel that females have greater knowledge of sports nutrition, where others may think males would fair better, either which would be understandable for a variety of reasons such as previous experience with particular athletes, familiarity of studies that are similar in purpose, etc. In addition, there may be an assumption by many, coaches in particular, that as athletes age they naturally develop curiosity and as a result, increase in their understanding of nutrition,

especially how nutrition correlates to their sport. Thus, we anticipate that the findings reported here can be applied by any professional in their respective fields.

## **METHODS**

### ***Participants***

The participants were 145 NCAA Division II 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, six of which were female teams and six of which were male teams. The teams selected were paired by sport (note that women's softball and men's baseball were considered the same sport) to assess potential sex differences. 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).

To study class rank, the athletes were divided into two subgroups, lowerclassmen (freshmen and sophomores, n=78) and upperclassmen (juniors and seniors n=67). These groups were analyzed to observe if nutrition knowledge tended to increase as athletes matured and perhaps learned certain nutritional habits from coaches, trusted professionals and perhaps even upperclassmen while a lowerclassman.

### ***Instrument***

The sports nutrition knowledge questionnaire was the same instrument developed and validated by Torres-McGehee, Pritchett, Zippel, Minton, Cellamare, & Sibia (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.

### ***Data Collection***

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 athletes 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 Analysis***

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**

***Sex Differences – Overall and Within Same Sport***

Using a two-tail assessment, no significant difference was found in the nutrition knowledge scores of the two sexes (t-Stat=-1.29, P=0.20) (See Table 1).

**Table 1. Gender differences**

<b>Gender</b>	<b>X</b>	<b>%</b>	<b>t</b>	<b>p</b>
Male	9.05	56.50	-1.29	0.20
Female	8.53	53.34		

When completing a two-tail assessment, data analysis does not reveal a significant difference between male and female genders in nutritional knowledge (See Table 2). The average score of the male athletes was slightly higher at 56.5% to the female athletes at 53.3%, both below our standard of satisfactory knowledge of 75% or better. Another two-tail assessment was completed to analyze the statistical difference between the male and female athletes of the same sport (e.g. men’s golf to women’s golf). No team showed a significant difference between the sexes except for tennis where the men’s team scored 63.8% to the women’s 44.6% while also below the desired 75% (See table 2).

**Table 2. Sports nutrition knowledge between male and female teams of similar sports**

<b>Sport</b>	<b>Male (n)</b>	<b>X</b>	<b>Female (n)</b>	<b>X</b>	<b>t</b>	<b>P</b>
Golf	6	0.563	7	0.545	0.286	0.780
Swimming	9	0.660	10	0.613	0.708	0.489
Tennis	5	0.638	7	0.446	2.392	0.0379
Basketball	8	0.516	6	0.417	1.116	0.286
Lacrosse	26	0.570	9	0.493	1.375	0.178
Baseball/ Softball	14	0.522	9	0.576	-0.859	0.400
Soccer	19	0.550	10	0.575	-0.474	0.639

***Sports nutrition Knowledge between Upper and Lowerclassmen***

When completing a two-tail assessment, data analysis reveals a significant difference between upper and lowerclassmen nutritional knowledge scores (t-Stat=-1.96, P=0.05) (See Table 3). The average score of the lowerclassmen athletes was lower at 53.2%, which was

nearly significant to the 57.9% shown from the scores of the upperclassmen and yet again, both lower and upperclassmen failed to score at or above the satisfactory threshold.

**Table 3. Class rank differences**

<b>Class</b>	<b>X</b>	<b>%</b>	<b>t</b>	<b>p</b>
Lower	8.51	53.21	-1.96	0.05
Upper	9.27	57.93		

## **DISCUSSION**

Most of the athletes demonstrated unsatisfactory nutrition knowledge. Only 15% (n=21) of the athletes 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; Valliant, et al., 2012). Of particular interest of this study was to investigate any differences between the male and female groups, with an expectation of females having the better scores since women having overall greater concern for their weight, body image, and health which would translate to greater nutrition knowledge. With the exception of tennis, there was no such statistical difference found between the two groups, as was consistent with at least two other studies (Andrews, et al., 2016; Torres-McGehee, et al., 2012), but conflicts with another (Dunn, et al., 2007). It's particularly interesting to see a difference in the sexes of tennis athletes since they had the same coach, as did swimming, which saw no such differences. While other studies have included collegiate tennis as part of their data collection, we could not find any studies for comparison that analyzed the differences between the sexes in tennis as did our study.

The reasons for conflicting findings regarding sex are not quite understood and are sure to be complex since it would likely involve an investigation of the athlete's psychological and social profile. However, a simple explanation is that both men and women athletes are susceptible to social media and the "quick fix" regarding important information such as nutrition, and may never absorb vital nutrition material unless they take a college-level course in the subject or commit to self-learning. Note that students' data who were majoring in athletic training and exercise science were excluded from the final results reported in this study.

The upperclassmen (juniors and seniors) scored higher on the survey than underclassmen (freshmen and sophomores). These data are similar to the findings of some research (Whitcombe, et al., 1996) but conflicts with the results found in softball players (Hornstrom Friesen, Ellery, & Pike, 2011) as well with a variety of college sports (Andrews, et al., 2016), although it should be noted that sample size and the nutrition instrument were different than the present study. An observation of knowledge improving through the college

years is not surprising since it can be assumed that the athletes' interest and effort to improve in their sport would likely increase with time rather than decline or remain neutral. We can offer two possible reasons for better scores with the upperclassmen. One, with college being formative years it can be assumed that interest in dietary habits increase with age. That is, it is natural for students of this age to be naturally inquisitive, and it's likely that nutrition would not be an exception to this theory. Two, scholarship athletes, especially those at Division II, note upon arrival to college that their coaches and strength and conditioning personnel generally do not offer such information, and many schools at this level do not imply a full-time dietitian. As a result, the competitive athlete would then be required to seek out nutrition-based information on their own.

## **CONCLUSIONS**

Although there were no statistical differences between the sexes who play the same sport and subtle differences were found between classmen, the overriding point is that the current findings are consistent with several studies using college athletes that demonstrates that overall knowledge in sports nutrition needs to improve (Andrews et al, 2016; Dunn et al., 2007; Rosenbloom, et al., 2002). Therefore, we agree with previous conclusions that some intervention should be attempted to improve nutrition knowledge. In particular, coaches should consider using a registered dietitian – at least part time, or recruit athletic trainers or exercise science faculty to discuss basic sports nutrition to each team - one session per season or a series of presentations throughout the academic year. Moreover, it would be helpful if the professional would curtail the discussion to the sports they are addressing and the athlete's particular needs.

### **Applications in Sport**

The reported methods and results can assist and in particular motivate coaches, athletic trainers, and dietitians to improve the nutrition knowledge of college athletes. It has been reported that athletes of either sex, any level and in every sport can optimize performance if the basics of nutrition are understood and applied.

### **Limitations**

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. Regarding class rank, we may have found more distinct differences if we studied the four traditional classifications of class rank. The data was collected at one NCAA Division II institution in the

southeastern United States, and if the sample were to include other institutions of various NCAA divisions in different regions, our findings might be different.

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