

A COMPARISON OF NUTRITION HABITS AND KNOWLEDGE BETWEEN NCAA
DIVISION II ATHLETES AND NON-ATHLETES

A THESIS

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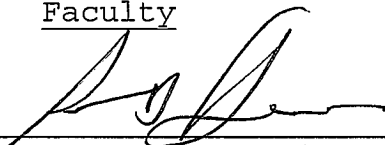
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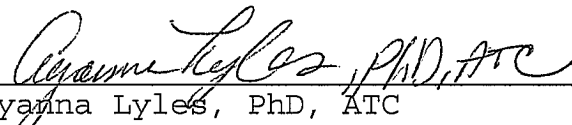
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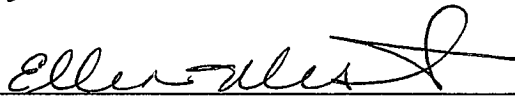
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INTRODUCTION

Nutrition is a key component to athletic performance and a healthy lifestyle. Good dietary habits are essential in order to maintain lean tissue mass, healthy immune and reproductive function, and best possible athletic performance.¹ For both athletes and non-athletes, leaving home for the first time poses new challenges when it comes to nutrition habits. Though nutrition information is readily available via the internet and peer health education (PHE) is widely used on college campuses across America, college students still seem to have less than optimal diets.² College students are typically shown to possess unhealthy dietary behaviors such as skipping meals, snacking frequently on energy-dense food, and taking part in unhealthy weight loss plans.³ College students also tend to have diets that are high in fat, saturated fat, cholesterol, and sodium, and are low in fiber, vitamins, and minerals.³

Planning for proper nutrition contributes to sustaining healthy living habits, motivation, and higher levels of productivity in the life of students.⁴ College

students are at an impressionable age in which lifestyle attitudes and behaviors are created and characterize a pattern for later years in life. For this reason, it is important to observe the trends in health behavior with this age group.⁴

Contributing factors to the less than satisfactory nutrition habits among college students include busy schedules and the college environment.^{5,6} For athletes, busy class and practice schedules may influence nutritional choices.⁶ Environmental factors include buffet style cafeterias and dormitory living. Having a buffet may increase the amount of food a student will eat and with the variety of choices available may deter them from choosing healthy whole grains, fruits, and vegetables.⁵ Dormitory living limits the facilities for food preparation and access to grocery stores.⁶ Students may not have the time or resources to cook whole meals and may opt for food that is fast, cheap, and unhealthy.⁶

In the college environment, group influences may also be a factor in dietary choices. Hausenblas et al⁷ examined group influences, both positive and negative, on male and female varsity athletes. Results showed that most athletes did not report a perceived group influence that dictated personal dietary habits, revealing that although other

research may support a negative influence of groups on individual dietary and eating behaviors, there are also positive influences. There are a variety of nutrition resources that may be available to the college student and athlete to assist them in making better dietary choices. These resources include but are not limited to the internet, peer health education, coaches and athletic trainers.

The internet is a quick, easy way to obtain information. Especially for college students who have access to and consistently use the internet to find information. The internet can be a great tool for exploring health information.⁸ However, according to a study by Cousineau et al⁸, the internet may have limited information that is specifically geared toward the nutritional needs of college students.

Peer health education is another way students in a college setting may obtain information about nutrition. Peer health education (PHE) is used on college campuses across the nation to encourage healthy behaviors among students.² The benefits of PHE as described in the literature include easy access to the students and positive effects.²

Another channel for nutrition information commonly comes from the coaches as they are viewed as the "central team member."⁹ As athletes interact closely with their coaches, the coach may often become a source of information to the athletes. In this case, coaches should be knowledgeable about nutrition so they can provide the best and most accurate advice to their athletes.⁹

It is very important that the sports medicine team including dietitians and certified athletic trainers be informed of current nutrition recommendations as they are also sources of information to the athlete.¹⁰ National Collegiate Athletic Association (NCAA) athletes often seek the certified athletic trainers for nutrition advice. It is the role and responsibility of the certified athletic trainer to be aware of the behavioral trends that dictate the nutritional choices of NCAA athletes so they are better able to understand the root of nutrition choices.^{10,11} The certified athletic trainer should have sports nutrition as an undergraduate course which must teach them nutrition knowledge and eating behavior. Once they understand where the cause of making poor nutrition decisions come from, they will be able to make better recommendations concerning nutrition advice or further counseling for their athletes.¹¹

Population groups differ in eating knowledge and habits concerning nutrition. Research has been conducted to observe trends among NCAA athletes and non-athletes which includes explaining dietary changes that occur for females during their freshman year of college, as well as dietary habits among male and female athletes. Butler et al¹² determined dietary, physical activity, and body weight parameter changes that occur among college freshman women during their first semester after leaving home. Results showed that the females did not meet the U.S. Department of Agriculture (USDA) recommendations for daily intake of vegetables, fruits, breads and pasta, and meats during the pre or post test. Results of a study by Hinton et al⁶ showed only 15% of Division I athletes had adequate carbohydrate intake and 26% for recommended daily allowances of protein. These results indicate that even Division I athletes that may have more exposure to good food and dieticians may not be eating optimal diets. Athletes are college students with a heavy exercise schedule, so the challenge to consume a well balanced, healthy diet is very important in maintaining energy levels and general health.

NCAA athletes and non-athletes need to be more knowledgeable about the importance of proper nutrition.

They need to be more conscientious because proper nutritional habits are necessary in order to maintain lean tissue mass, healthy immune and reproductive function, and best possible athletic performance.¹ Our study examined the nutrition knowledge and eating habits of NCAA Division II athletes and non-athletes.

METHODS

The purpose of this study was to examine similarities and/or differences between the nutrition knowledge and eating habits in NCAA Division II athletes and non-collegiate level varsity athletes. The following sections are discussed: (1) Research Design, (2) Subjects, (3) Instruments, (4), Procedures, (5)Hypothesis, and (6) Data Analysis.

Research Design

A descriptive research design was used for this study. Dependent variables were subjects' nutritional knowledge and eating habits. The independent variable was group (NCAA athletes/non-varsity athletes). Demographic information was collected at the beginning of the survey as the first sheet. These questions include academic year in college, gender, whether or not the subject is an NCAA athlete, living environment, and exposure to nutrition information in college. Nutritional knowledge and eating behavior scores were assessed using a 32 item

questionnaire, originally developed by Marino¹³ in 2001 (APPENDIX C1) and revised by Shepard¹⁴ in 2007 called the Revised Nutritional Knowledge and Eating Habits Questionnaire.¹⁴ Results are limited to Division II athletes and also non-athletes who attend California University of Pennsylvania.

Subjects

Male and female NCAA Division II athletes and non-athletes from California University of Pennsylvania were used for this study. For the purpose of this study, NCAA athletes (n = 54) were those who actively participate in a varsity sport. At California University of Pennsylvania there were 373 NCAA Division II athletes in the fall and 383 NCAA Division II athletes in the spring. Permission to access athletes during practice times were obtained from the California University of Pennsylvania's Athletic Director. The researcher then asked permission from California University of Pennsylvania's football, men's/women's soccer, track and field, men's and women's cross country, tennis, volleyball, baseball, softball, swimming, cheerleading, and men's/women's basketball coaches to have 15 minutes prior to or after practice to

talk with the athletes without the presence of the coach. There were no consequences or rewards for completing the survey. It was also explained that participation may be discontinued at any time without penalty and all data discarded, and informed consent was obtained. Students deemed as non-athletes were also solicited for the study (n = 232). The non-athlete population sample was also obtained through distributing the survey by hand. The researcher received permission from two faculty professors at California University of Pennsylvania in the Department of Health Science. Upon receiving permission from these professors, the researcher took the survey by hand to the classroom and distributed it to those willing to volunteer. Informed consent was obtained by the non-athlete volunteers prior to completing the survey.

Instruments

The instruments included in this study were a Demographic Sheet (APPENDIX C2) and the revised Nutritional Knowledge and Eating Habits Questionnaire (APPENDIX C3). A demographic sheet was completed by each subject, which included information on academic year in college, gender, NCAA athlete/non-athlete, and living situation (dormitory,

on, or off campus apartment, living in a house with relatives, or living in a house with non-relatives). There was also a section where the subjects were asked where their sources of nutrition information came from and to check all that apply. These sources of nutrition information include: academic class, guest lecture, peer health education (PHE), internet, peer influence, coaches, certified athletic trainer, sports nutritionist, strength and conditioning coach, and dietician.

Nutritional knowledge and eating habits were measured using a revised version of a two-part questionnaire (APPENDIX C1) developed by Marino¹³ for her study on female college gymnasts. The questionnaire was then used by Shepard¹⁴ for establishing Division II swimmers' nutrition profiles. Following the pilot research completed by Shepard,¹⁴ reliability coefficients of 0.88 and 0.81 were established for both sections on the revised Nutritional Knowledge and Eating Habits Questionnaire, respectively.

The first part of the questionnaire (22 questions) was designed to evaluate the level of nutritional knowledge of each subject. Using a four-point Likert-type scale, the subjects were asked to specify to what degree they agree with each statement. Answers range from strongly agree (4) to strongly disagree (1). Questions surveyed the subjects

on topics such as pre-event meals, breakfast habits, individual nutrient effect on performance, vitamin consumption, and food group choices consistent with USDA MyPyramid (www.mypyramid.gov) guidelines. Questions were scored to their value. For example, if the subject answered with a 4, they were given 4 points for that particular question. The scores in the first knowledge section ranged from 22-88 points. By dividing a subject's score by 88, a percentage was appointed. Nutritional knowledge was scored as follows: excellent (85-100%), good (70-84%), fair (55-69%), or poor (54% or below). Higher scores in this section indicate an individual subjects' increased nutrition knowledge.¹⁰

The second section of the questionnaire, comprised of 10 questions, tested the quality of the eating habits of individual subjects. Using a four-point Likert-type scale, subjects were asked to specify how frequently they consume certain foods or take part in particular eating habits. Answers included: Always (4), Often (3), Sometimes (2), and Never (1). Always (4) showed that a habit occurs 5-7 days per week, Often (3) 3-4 days per week, Sometimes (2) 1-2 days per week, and Never did not occur at all. Reverse scoring was used for questions numbered 2, 3, and 6. Reverse scoring means that when a question is answered as a

4, one point is given. The other questions excluding 2, 3, and 6 were scored according to their numerical value. If the subject answered with a 4, they were awarded 4 points. In this section, scores ranged from 10-40 points. After adding up each subject's score, the total was divided by 40. Scores were awarded as follows: Excellent (85-100%), Good (70-84%), Fair (55-69%), or Poor (54% or below). Subjects with high scores in this section reflect more positive eating habits.

Procedures

The researcher applied for and received approval from the IRB of California University of Pennsylvania to perform this study (APPENDIX C5).

California University of Pennsylvania NCAA Division II and non-athletes were the desired subjects for this study. For the purpose of this study, NCAA athletes were defined as those who actively participate in a varsity sport. Permission to access athletes during practice times was obtained from the California University of Pennsylvania's Athletic Director. The researcher then asked permission from California University of Pennsylvania's football, men's/women's soccer, track, cross country, tennis,

volleyball, baseball, softball, swimming, cheerleading, and men's/women's basketball coaches to have 15 minutes prior or after practice to talk with the athletes without the presence of the coach. Upon the coach's permission, the researcher requested that the athletes take part in the survey; however there were no consequences or rewards for taking part in it. It was also explained that participation may be discontinued at any time without penalty and all data discarded. First, a consent form was distributed. After the researcher collected the consent forms, the surveys were distributed. After completion of the surveys, the subjects were instructed to turn them over so a blank sheet of paper faced up for the researcher to collect. The surveys were numbered for data collection/analysis. After collecting the surveys, the researcher placed them in a folder, which was stored in a locked file cabinet in a secure office in which only the researcher and the program director had a key.

Potential non-varsity athlete volunteers for this study were gathered through the Health Science Department. Two faculty professors were contacted via email to request permission to enter the classroom at two separate times, for two classes by each professor. The researcher entered the classroom and requested that student athletes (NCAA)

and/or non-athlete's take the survey. It was stressed that participation was strictly voluntary and that there were no rewards or consequences for taking, or not taking the survey. A consent form explaining the research project was distributed to the subjects to be reviewed and then signed before the surveys were distributed. Surveys were collected, coded, and stored in the same manner as those obtained at athletes' practices.

Hypothesis

The following hypothesis was based on previous research and the researcher's intuition.

NCAA athletes and non-athletes will not exhibit a significant difference in nutrition knowledge and eating habits.

Data Analysis

All data were analyzed by using SPSS version 17.0 for Windows at an alpha level of ≤ 0.05 . The research hypothesis was analyzed using a MANOVA for the dependent

variables (nutrition knowledge/eating behavior) by group
(NCAA athletes/non-athletes).

RESULTS

The purpose of this study was to examine similarities and/or differences between the knowledge and eating habits of nutrition among NCAA athletes and non-athletes. Subjects were tested by completing a 32 item questionnaire, originally developed by Marino¹³ (APPENDIX C1) and revised by Shepard called the Revised Nutritional Knowledge and Eating Habits Questionnaire.¹⁴

Demographic Information

A total of 286 subjects (54 NCAA athletes, 232 non-varsity athletes) completed the survey. All of the respondents were volunteers and were students at California University of Pennsylvania. Of these subjects, 129 were male and 157 were female. Academic year in college included 173 freshman (1 - 29 credits), 74 sophomores (30 - 59 credits), 21 juniors (60 - 89 credits), and 18 seniors (90 or more credits). When asked about type of housing, 159 subjects reported to living in a dorm room, 55 lived in an apartment, 54 resided in a home (with family or

relatives), and 18 subjects lived in a house (with no family or relatives).

The final portion of the demographic data included the subjects' exposure to nutrition information in college. In this section the subjects were instructed to check all of the sources that applied (Table 1).

Table 1. Exposure to Nutrition Information

Source	Athlete (N)	%	Non Athlete (N)	%
Academic	27	50.0	204	87.9
Guest*	10	18.5	119	51.3
Peer Health	7	13.0	44	19.0
Internet	24	44.4	114	49.1
Peer	22	40.7	78	33.6
Coaches	34	63.0	14	6.0
ATC	31	57.4	21	9.1
Sports	4	7.4	4	1.7
CSCS	43	79.6	18	7.8
Dietician	3	5.6	6	2.6

*Guest Lecture

Hypothesis Testing

Hypothesis testing was completed at an alpha level of ≤ 0.05 . Descriptive statistics for nutrition knowledge (KScore) and eating behavior (BScore) are shown in Table 2.

Table 2. Descriptive Statistics for Nutrition Knowledge and Eating Behavior Scores.

	NCAA	N	Mean	SD	Classification
KScore	Athlete	54	83.7332	7.12169	Good
	Non-	232	83.0182	8.51765	Good
	Total	286	83.1532	8.26525	Good
BScore	Athlete	54	72.5000	8.82214	Good
	Non-	232	69.3427	8.38560	Fair
	Total	286	69.9388	8.54404	Fair

Hypothesis: NCAA athletes and non-athletes will not exhibit a significant difference in nutrition knowledge and eating habits. A MANOVA was calculated examining differences between group (NCAA athletes and non-athletes) on nutrition knowledge and eating behavior. A significant effect was found ($\Lambda(2,283) = .979, P = 0.05$). Effect size for the MANOVA was also reported.

Table 3. Tests of Between-Subjects Effects for MANOVA

Source	Dependent Variable	F	Sig.
NCAA Athlete	Kscore	.327	.568
	Bscore	6.089	.014*

*P is significant at ≤ 0.05

Conclusion: Athletes exhibited significantly higher (better) eating behavior than non-athletes but the groups were not significantly different on knowledge of nutrition.

(Figure 1, Table 3). The partial Eta Squared for effect size was 0.001 (knowledge) and 0.021 (eating behavior) which represented no true effect due to different sample sizes.

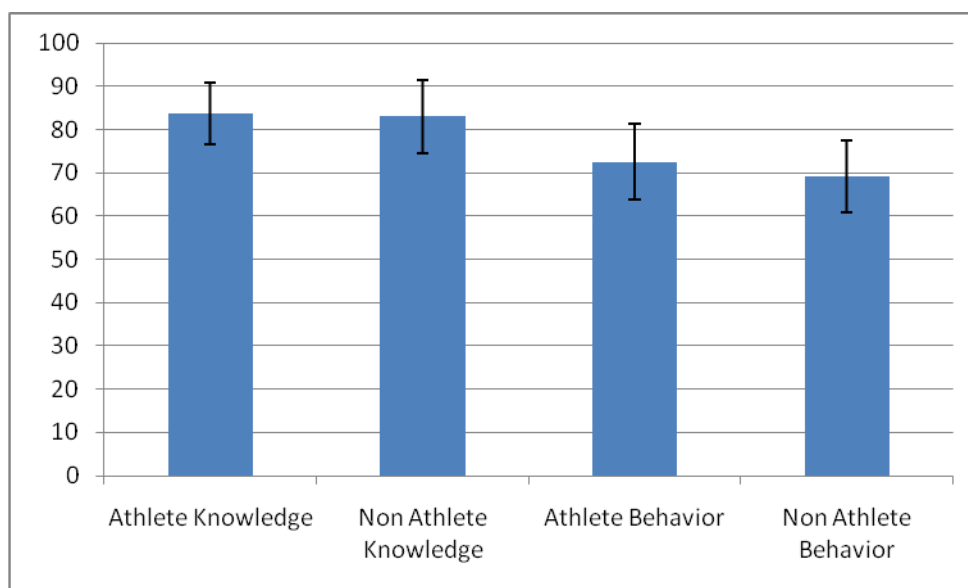


Figure 1. Nutrition Knowledge and Eating Behavior Score for Groups (NCAA Athlete and Non-Athlete).

Additional Findings

Differences due to type of housing, academic year in college, and gender on the main significant variable, eating behavior, were also analyzed using one-way ANOVAs. Type of housing included dorm room, apartment, home (with family and relatives), and house (no family or relatives).

No significance was found between nutrition behavior and type of housing. Academic year in college included freshman (1 - 29 credits), sophomore (30 - 59 credits), junior (60 - 89 credits), and senior (90 or more credits). No significance was found between academic year in college and nutrition behavior, as well as for gender and nutrition behavior. A Pearson Product Moment correlation between knowledge and behavior regardless of group revealed a low significant positive correlation ($P = .001$, $r = .202$). This means that 20% of the time, increased (better) nutritional knowledge scores will result in increased (better) eating behavior scores.

DISCUSSION

Discussion of Results

The main finding was that there was no difference in nutrition knowledge between NCAA athletes and non-athletes but with significant difference in eating behavior scores between the two groups. Statistics from this study showed that NCAA athletes scored better on eating behavior than did the non-athletes as well.

Cupisti et al¹⁵ evaluated nutritional knowledge and dietary composition among female athletes compared to non-athletes. Subjects were 60 athlete and 59 non-athlete Italian, adolescent females ages 14 - 18. Body weight and height were measured as well as energy requirements using the Harris - Benedict equation. Data were collected with a three day diary and a food knowledge questionnaire. Results showed that the females overall did not meet daily estimated energy requirements. Athletes showed a higher intake of energy during breakfast than non-athletes. The athletes also showed a higher intake of carbohydrates, fiber, and vitamin A and lower intake of lipids when

compared to the non-athletes. Neither group met daily requirements for calcium, iron, and zinc. On the nutritional knowledge questionnaire, the athletes scored slightly higher than the non-athletes, showing more nutritional knowledge although both groups exhibited some dietary misconceptions and nutritional deficiencies. Overall, the results of this study showed better nutritional concepts and practices among athletes when compared to the non-athletes, which support our findings. Athletes who have access to certified athletic trainers and strength and conditioning coaches, such as the NCAA Division II athletes in our study, might exhibit better behavior.

As for effects of year in school, Butler et al¹² determined dietary, physical activity, and body weight parameter changes that occur among college freshman women during their first semester after leaving home. Results showed that the freshman females did not meet the USDA recommendations for daily intake of vegetables, fruits, breads and pasta, and meats during the pre or post-test. The women did seem to have adequate daily intake of milk, however. Overall, body weight and fat mass increased after the five months of the study. Interestingly, dietary energy intake actually decreased. It is apparent that the

increase in body weight and mass in this group of individuals is due to inactivity. Our results found that there was a slightly lower but not significant difference between eating behavior and year in school. Though not significant, the eating behavior score mean slightly increased as year in school increased. Many students may take health and wellness class as a freshman or sophomore so it is possible that eating behavior scores increase after having formal classes that discuss nutrition concepts.

Hinton et al⁶ analyzed the dietary habits of male and female collegiate athletes. Subjects were 345 male and female Division I athletes from various sports. Results showed only 15% of athletes had an adequate intake of carbohydrates and 26% of the athletes reported recommended daily allowances of protein. Male athletes were more likely to consume higher than recommended amounts of fat, saturated fat, cholesterol, and sodium. Females showed a higher interest in losing five pounds and so less macronutrient and calories were consumed. These results indicate that even Division I athletes may not be eating optimal diets. Athletes are college students and so the challenge to consume a well balanced, healthy diet applies to them. Our findings showed that while there was a

significant difference between gender and nutrition knowledge, there was no difference between gender and eating behavior. Eating behavior may not be different due to both male and female NCAA Division II athletes receiving similar channels of nutrition information. As a result, the athletes as a group are probably offered similar food choices on campus and on the road.

Jelinic et al¹⁵ examined the dietary and physical activity behaviors of students who live in family environments as opposed to living alone or in student housing. Subjects were 496 students attending Medical School University of Zagreb, Croatia. The study showed that the group that lived in a family environment practiced better dietary and physical activity habits although it should be noted that both groups displayed less than desirable dietary and physical activity habits. Our findings showed no difference between housing and eating behavior score. The finding may be a result of busy practice and academic schedules where an NCAA athlete chooses to eat what is quick and available.

There are a variety of nutrition resources that may be available to the college student and athlete to assist them in making better dietary choices. These resources include but are not limited to the internet, peer health education,

and coaches. Cousineau et al⁸ looked at the availability of resources of nutrition to college students available online and the elements of nutrition that were deemed most important by students, educators, and counselors. Results revealed surprising information because of the lack of nutrition information that was available specifically for college students' nutritional needs. The results of our study showed that while the non-athletes gained most of their nutrition information from academic class, the internet was the second largest source of information. The goal of White et al² was to determine effects of peer health education on a college campus and the impact that it made on health behaviors. Subjects were 146 students at a University in California. The research instrument was a survey that evaluated impacts of peer health education on health behaviors. Data were collected over a three-year period. Regarding eating and nutrition habits, the study showed students to have engaged in unhealthy eating practices during the first year but the negative habits decreased by the third year. The results of their study emphasize the importance of PHE availability to college students. A similar study researching nutrition information for athletes sought to determine whether coaches give information on nutrition to their athletes and how

knowledgeable they are in nutrition topics⁹. Subjects were 168 male rugby coaches in New Zealand. The study was conducted using a survey tool. Results showed that most of the coaches do give nutritional advice to their athletes and of the nutrition topics tested, coaches were the least knowledgeable about supplements.

It is important that certified athletic trainers, strength and conditioning coaches, and team coaches be knowledgeable on evidence based research regarding nutrition information because it is apparent in our study that these are the primary sources for our NCAA Division II athletes. At the Division II level, dieticians may not be readily available so, accurate nutrition information should be available to them through the certified athletic trainers, strength and conditioning coaches, and coaches. Evidence based research will provide the appropriate personnel with the most accurate and current nutrition information. Our findings showed that the NCAA Division II athletes received most of their nutrition information from strength and conditioning coaches. Next to strength and conditioning coaches, NCAA Division II athletes received nutrition information from coaches, and then certified athletic trainers compared to non-athletes who mostly received nutrition information in academic classes.

Conclusions

While NCAA athletes and non-athletes do not differ in their knowledge about nutrition (both groups scored "good"), NCAA athletes reported better behavior regarding eating habits (NCAA athletes scored "good" as opposed to non-athletes who scored "fair"). Additionally, type of housing, academic year in college, nor gender affected the eating behavior score. This finding may be different from previous research due to differences in methods.

Recommendations

Our findings suggest that although NCAA athletes displayed better eating behavior, their knowledge base was the same as non-athletes. As the certified athletic trainer works with NCAA athletes closely and on a daily basis, they should serve as an active nutritional resource. Certified athletic trainers have a responsibility to be aware of the behavioral trends that dictate the nutritional choices of NCAA athletes. The certified athletic trainer can then understand why NCAA athletes make the nutrition choices that they make. While the certified athletic

trainer does not act as a counselor, they should be current on nutrition knowledge and serve as an educational resource to their athletes so that they may ultimately increase energy levels, performance, and overall well being.

Certified athletic trainers should also be knowledgeable on evidence-based research regarding nutrition, ensuring that they are familiar with the most current and accurate nutrition information. At the Division II or III levels, athletes may not have direct access to a dietician, so it is important then that certified athletic trainer is current on evidence based research to not only better educate athletes but also strength and conditioning coaches and coaches who also work directly with athletes and serve as a channel of nutrition information.

Future research may gain insight on eating behavior alone comparing Division I and Division II athletes as access to nutrition information may be different. Budgets between the two levels may also be different which may affect food choices when traveling. Eating habits and difference in sport were not considered in this study but may be researched for future studies. Regardless of Division I or II level, each sport at a specific institution may not have the same budget and so food choices while traveling may be different. Also, difference

in population should be considered, specifically between individual and group team sports.

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APPENDICES

APPENDIX A
Review of Literature

In order for athletes to perform their best, adequate nutrition is important. Though many Division I athletes may have access to nutritionists or dieticians, collegiate athletes are typically at liberty to make their own dietary decisions. Relocating from home to a college campus poses changes in both the social and physical environments of a college student.¹ These changes offer new experiences with dietary habits such as a buffet style cafeteria which may be a quick and easy meal method.^{2,3} It could also mean hours of sitting, whether in class or in front of a computer or television.^{2,3} These habits may lead to poor food choices or inadequate nutrition. Education is essential for this population of athletes who may not be as knowledgeable about proper nutrition. Certified athletic trainers and other members of the sports medicine team should be informed about nutrition, hydration, and supplements so they are best equipped to educate athletes about dietary habits. The review of the literature will be divided into two sections. The first section is the nutrition overview that will then discuss nutritional considerations, specific considerations for athletes, pre and post game meal, and supplement use. The second section is general perception

of dietary habits, which is divided into formation of dietary habits, environmental factors, and available nutrition resources.

Sports and General Nutrition Overview

Athletes require a proper nutritional regime in order to meet the demands their bodies require both on and off the field. Good dietary habits are essential in order to maintain lean tissue mass, healthy immune and reproductive function, and best possible athletic performance.⁴

Nutritional Considerations

Carbohydrates are important for the maintenance of blood glucose levels while exercising and replacing muscle glycogen. Daily requirements for athletes depend on the athlete's age, gender, total daily energy expenditure, and sport.⁵ For the general population, it is recommended that at least 3 ounces of whole grains be eaten on a daily basis.⁶

Protein should be consumed primarily from food sources. Caloric intake should be adequate to maintain body weight and to promote optimal protein usage in the body for optimal performance.⁵ The daily requirements for

meat and beans vary according to a person's age, gender, and physical activity level. Current recommended dietary allowance for protein is $0.8 \text{ g} \cdot \text{kg}^{-1}$.⁵

Fruits and vegetables are essential for optimal vitamin intake. A variety from each group is vital in order to consume an assortment of nutrients. For women ages 19 and older, a daily recommendation of $2 \frac{1}{2}$ cups of vegetables is suggested. For men ages 19 and older, 3 cups of vegetables is recommended for daily intake.⁶ Two cups of fruit is the daily requirement for both males and female's ages 19 and older.⁶

Though diets high in fat are not recommended for athletes, it is important that fat intake should be about 20-30% of total energy intake.⁵ Consuming the recommended amount of fat is essential for energy and fat is also necessary for a number of fat-soluble vitamins.⁵

It is the role and responsibility of the sports medicine professional to be educated on the current nutritional recommendations for athletes. Assessment and education of nutritional knowledge is imperative in providing the best nutritional advice to athletes.⁵

Specific Considerations for Athletes

Since athletes are typically more physically active than the general population and they require more energy, assessments are necessary in order to monitor their nutritional goals. Using an adequate nutritional assessment, the athletic trainer or other sports medicine team member can develop a plan of action suited for the individual athlete and target it to improve their nutritional status.⁷

First a diet history is taken, including taking a 24-hour recall of the athlete's diet, a food frequency checklist, food diary, and direct observation.⁷ A 24-hour recall is a record of the athlete's food intake for one day. It is quick and easy to acquire however, it is rarely a true representation of a person's actual diet.⁷ The food frequency checklist is a list in which the athlete would check off how often and in what quantity specific foods are consumed. The method is a better representation of one's diet, although several foods that are regularly consumed may be left out of the checklist.⁷ A food diary is typically a 7-day record of all foods and beverages consumed. If completed correctly, this is a more accurate representation of a person's diet. The method however is difficult to

obtain due to monotony and underreporting.⁷ Direct observation is actually seeing and recording what the athlete has eaten. Usually this is performed in a hospital or in-patient setting and is usually not possible in other settings.⁷

Depending on their sport, athletes need to maintain a specific body type. In certain activities, performance may be affected by being either overweight or underweight.⁷ To measure body weight, a calibrated scale should be used. However, while a football lineman may have a higher bodyweight than a ballerina, body composition might also vary. There are several ways to determine body composition. The use of body mass index (BMI) is used to determine a range of weight that is acceptable for a specific height.⁷ Though body mass index does not take into consideration the body's proportional composition or the fat distribution, it is a moderate association for body fat based on stature and mass.⁸ For this reason it may not be valid for most athletes but is commonly used.⁸ BMI is determined by taking a person's weight in kilograms and dividing it by the square of the person's height in meters.⁷ The measure is important due to its curvilinear relationship to mortality ratio, as BMI increases, so does the risk for hypertension, stroke, type 2 diabetes, and renal disease.⁸ Again, however,

these measures of height and bodyweight may not be valid measures in athletes with higher lean body mass.

Two practical and valid ways to assess body composition are the skin fold technique and bioelectrical impedance analysis.^{7,8} Skin fold measurements are taken in conjunction with a tool that measures subcutaneous fat at selected body sites; most commonly the triceps, subscapula, suprailium, abdomen, and thigh.⁸ Bioelectrical impedance is another common and practical method to determine body composition.⁷ The tool is based on Ohm's law which is that voltage is created as a result of the product of current and resistance.⁷ Athletes who take this test should be hydrated, as hydration changes that occur with exercise may influence the test and provide inaccurate values.⁸

An appropriate assessment of nutritional and weight management status can point an athlete in the direction that is most beneficial to their nutrition needs and that is sport specific. Determining an athlete's current dietary habits and body composition will allow the health care provider to better assist the athlete in determining what meal plan is best suited for them. Further, this will allow the athlete to perform their best at their sport. Not only will a dietary assessment aide the health care provider in providing optimal meal plan assistance but it

will also help them give the best advice regarding competition day meals.

Pre and Post Game Meal

Nutrition during the day of competition is a vital component to the athlete's energy and performance needs.⁹ The meal prior to competition should supply enough carbohydrate energy and guarantee optimal hydration.^{5,8} Fasting before competition will negatively effect the athlete's performance due to the rapid depletion of liver and muscle glycogen.⁸ Foods that should be consumed during the day of competition should be somewhat low in fat and fiber to accommodate gastric emptying and decrease gastrointestinal discomfort, high in carbohydrates in order to sustain blood glucose levels and maximize glycogen stores, moderate in protein, and familiar to the athlete.⁵ Carbohydrates not only restore liver and muscle glycogen depletion but they are also more quickly digested and absorbed than proteins and lipids. They will ultimately supply energy more quickly and will reduce the "feeling of fullness" after a meal.⁸ Meals high in protein will elevate the body's resting metabolism, causing a greater energy requirement for digestion, absorption, and assimilation. The heat created by this process will in turn put a strain

on the body's heating mechanisms and will impair its performance in hot weather.⁸

Timing of the meals is an important factor for competition day. Athlete preference will vary, but most athletes do not like to perform on a full stomach.⁵ Smaller meals may be eaten throughout the day to allow for gastric emptying, or a considerable meal may be eaten 2-4 hours before competition. Other athletes may rely on liquid meals that close to competition.⁵ For meals 3-4 hours prior to exercise, it has been shown that carbohydrates in the amount of 200 to 300 g is beneficial to exercise.⁵ Though the above recommendations are effective in competition day performance, athletes should use practice days to try new foods and beverages to evaluate what works best for them.⁵

The post game meal consumption and timing depend on the length and intensity of the exercise session and whether or not glycogen depletion occurred. It also depends on if and when the next exercise session will occur.⁵ Glycogen stores begin to deplete after 90 minutes of high intensity training.⁵ When sufficient carbohydrate intake has taken place, glycogen stores will restore at about 5 -7% per hour.⁸ When an exercise session has caused glycogen depletion, it will take about 20 hours for glycogen stores to return.⁸ Some foods to avoid when

restoring glycogen reserves include legumes, fructose, and milk products due to their slower re absorption rates.⁸ Incorporating protein into the post exercise meal will assist in re-instituting the necessary amino acids for muscle protein restoration and will support a more anabolic hormonal profile.⁵

Supplement Use

Supplement use is a common activity among athletes. Though a proper diet is recommended for adequate nutrition it is inevitable that a portion of athletes will look for dietary supplements in order to enhance performance, assist in injury recovery, or supplement a diet in which they may be lacking nutrients.¹⁰ With the internet now a primary source of information and distribution, it is important for the sports medicine professional to be updated on the current knowledge and concerns regarding over the counter supplements.

Froiland et al¹¹ concluded that 89% of the subjects who were all Division I athletes had used supplements. It also showed that males were significantly more likely to use energy and protein supplements and females were more likely to use vitamins and minerals. Most of the athletes reported that they obtained supplement information from

family, fellow athletes, their strength and conditioning coach, athletic trainer, registered dietician, friend, and coach. Males took supplements with the goals to improve speed and agility, strength and power, or for weight and/or muscle gain. Females took supplements due to a sub optimal diet or for overall health.

Malinauskas et al¹² sought to identify the incidence of sports injury in college athletes, to identify three categories of supplement interest among athletes including those supplements marketed to improve circulation, promote joint and soft tissue repair, and reduce inflammation. The survey was also designed to determine whether there was a sex difference for supplements of interest and to learn the primary sources of supplement information as used by athletes. Subjects were collegiate athletes. Results showed that 91% of the athletes had experienced sport related injury. In the three categories, 34% of the athletes showed an interest in supplements used for joint and soft tissue repair. Twenty two percent were interested in reducing inflammation and 17% were interested in improving circulation with the use of supplements. No significant gender difference in the three categories was found. Most athletes used athletic trainers, physicians, and coaches as the primary source of information regarding

supplements. Other popular sources included the internet, magazines, and television. Females were more likely to refer to textbooks for information whereas males would rely on strength coaches.

Injury is a common occurrence in athletics. If athletes are interested in supplement use to promote healing it is important that the sports medicine team be knowledgeable on the various supplements and their role in speedy recovery. They should also be able to educate athletes about legal supplements that may assist with healing.

Perception of Diet

There are several reasons why NCAA athletes and non-athletes eat the way they do. The formation of their dietary habits, environmental factors, and available resources are all factors that affect the nutritional choices of this population. Understanding these trends and patterns will assist the certified athletic trainer and health care professional in providing adequate care for this population.

Formation of Dietary Habits

College students away from home for the first time tend to develop poor eating and physical activity habits. More time is spent sitting in front of a computer or television and less time participating in sports or physical activity.¹³ Even for those who are participating in organized sports, it may be the first time they have had to make their own eating choices as the college campus may have buffet and fast food type establishments to choose from. Students may not have the time or resources to cook whole meals and may opt for food that is fast and cheap.¹⁴

The transition from home life to college hosts a variety of changes that may occur in one's dietary habits. Jelinic et al¹⁵ examined the dietary and physical activity behaviors of students who live in family environments as opposed to living alone or in student housing. Subjects were 496 students attending Medical School University of Zagreb, Croatia. The study showed that the group that lived in a family environment practiced better dietary and physical activity habits although it should be noted that both groups displayed less than desirable dietary and physical activity habits. Lifestyle behaviors and attitudes about health care are learned early in life and will influence decisions made later on in life.

College students have the chance to make their own decisions about eating once they have left home. Whether they are eating at campus provided buffets or fast food establishments, or doing their own grocery shopping for the first time the choices are vast. Butler et al¹ determined dietary, physical activity, and body weight parameter changes that occur among college freshman women during their first semester after leaving home. Results showed that the females did not meet the USDA recommendations for daily intake of vegetables, fruits, breads and pasta, and meats during the pre or post test. The women did seem to have adequate daily intake of milk, however. Overall, body weight and fat mass increased after the five months of the study. Interestingly, dietary energy intake actually decreased, showing that the increase in body weight and mass in this group of individuals is due to inactivity.

When considering collegiate athlete nutrition habits, it must be noted that they are college students and so their eating habits may mirror those of a general college student. This is apparent according to Hinton et al¹⁴ where dietary habits of male and female collegiate athletes were analyzed. Subjects were 345 male and female Division I athletes from various sports. Data were collected using surveys to determine dietary behaviors of the athletes. A

food frequency questionnaire and Dietary Reference Intakes, Dietary Guidelines, and Recommended Dietary Allowances were used to assess nutrient intakes. Results showed only 15% of athletes had an adequate intake of carbohydrates and 26% of the athletes reported recommended daily allowances of protein. Male athletes were more likely to consume higher than recommended amounts of fat, saturated fat, cholesterol, and sodium. Females showed a higher interest in losing five pounds and so less macronutrient and calories were consumed.

These results indicate that even Division I athletes may not be eating optimal diets. Athletes are college students and so the challenge to consume a well balanced, healthy diet applies to them.

Environmental Factors

There are several environmental factors that may apply to college students, particularly athletes. For college students in general these factors may include increased time spent sitting in class or in front of a computer or television. Other factors include available food choices such as fast food or buffet style cafeteria food.¹³ For athletes in particular, environmental factors that may

influence the way an athlete eats include group influences and sport.

Hausenblas et al¹⁶ examined group influences, both positive and negative, on male and female varsity athletes. Subjects were 131 volunteer male and female collegiate athletes. Data were collected using an open-ended questionnaire. Results showed that most athletes did not report a perceived group influence that dictated personal dietary habits. Overall, the group seemed to have a greater influence on eating behaviors (quality and quantity of food) than on dieting practices (weight and body shape). About 30% of the athletes reported a positive influence on eating and dietary behavior while about 10% reported a negative influence on eating and dietary behavior. Although other research may support a negative influence of groups on individual dietary and eating behaviors, these results show that there are also positive influences.

Athletes on a team spend a considerable amount of time together. This may cause them to begin to influence each other's eating and dietary behavior.¹⁶ It is important to encourage healthy eating behaviors and dietary practices both at the individual level and also as a group. Depending on the sport, they may also have pressure concerning weight and body type.

Schwarz et al³ wanted to determine the differences in eating attitudes, body dissatisfaction, and perfectionism among female collegiate athletes as compared to female non-athletes. Subjects were 103 female, undergraduate students. Data were collected using a survey, which measured eating attitudes, perfectionism, and demographics. Body mass index was measured using self reported height and weight. Results did not indicate that athletes showed a higher incidence of eating disorder symptoms. The only difference between the athletes and non-athletes in this study was found in body dissatisfaction. Though body sizes were rather similar in both groups, non-athletes displayed a higher dissatisfaction with their bodies. The athletes also exhibited a higher score of perfectionism as compared with the non-athletes. This may be especially true for those athletes who may make dietary choices to account for body appearance including dancers, gymnasts, and figure skaters.¹⁷

Available Nutrition Resources

There are a variety of nutrition resources that may be available to the college student and athlete to assist them in making better dietary choices. These resources include

but are not limited to the internet, peer health education, and coaches.

The internet is a quick, easy way to obtain information. Especially for college students, who have access to the internet and who consistently use the internet to find information the internet seems like a great tool for exploring health information.¹⁸ Cousineau et al¹⁸ looked at the availability of resources of nutrition to college students available online and the elements of nutrition that were deemed most important by students, educators, and counselors. The first part of the study was completed by conducting research on nutrition specific to college students by using popular search engines such as Google, yahoo, and lycos. They also searched specific sites such as www.colleges.com and www.dietician.com. The results of this part of the study revealed surprising information to the authors because of the lack of nutrition information that was tailored for college students. The finding suggests that the need for nutritional information specific to college students should become available on the internet.¹⁸

Peer health education is another way students in a college setting may obtain information on nutrition. Peer health education is used on college campuses across the

nation to encourage healthy behaviors among students.¹⁹ The benefits of PHE as described in the literature include easy access to the students and positive effects.¹⁹ The goal of White et al¹⁹ was to determine effects of PHE on a college campus and the impact that it made on health behaviors. Subjects were 146 students at a University in California. The research instrument was a survey that evaluated impacts of peer health education on health behaviors. Data were collected over a three-year period. Regarding eating and nutrition habits, the study showed students to have engaged in unhealthy eating practices during the first year but the negative habits decreased by the third year. The results of this study emphasize the importance of PHE availability to college students.

Another channel of nutrition information is commonly the coaches as they are the central team member.²⁰ Athletes interact closely with their coaches and so the coach may often become a source of information to the athletes. Zinn et al²⁰ sought to determine whether coaches give information on nutrition to their athletes and how knowledgeable they are in nutrition topics. Subjects were 168 male rugby coaches in New Zealand. Their study was conducted using a survey tool. Results showed that most of the coaches do give nutritional advice to their athletes and of the

nutrition topics tested, coaches were the least knowledgeable about supplements. Most of the coaches had never had formal nutrition education. These results indicate that coaches may benefit from some form of nutrition education. Athletes will often turn to a coach for advice in nutrition and so coaches should be more knowledgeable in nutrition so they can provide the best and most accurate advice to athletes.²¹

At the high school, collegiate, and professional level certified athletic trainers are often the first person an athlete may turn to for medical advice.²² Therefore, an athlete may look to the certified athletic trainer for advice about nutrition. Descriptive research conducted by Burns et al²³ showed that even though dietitians were available in half of the athletic departments studied, the certified athletic trainers were the primary information source regarding nutritional concerns and students perceived the athletic trainers as good resources in terms of knowledge of nutrition. In order to provide better nutrition services to athletes, dietitians and certified athletic trainers should join their nutritional expertise.²³

Summary

Leaving home for the first time poses new challenges when it comes to nutrition habits for college students whether they are athletes or non-athletes. Though nutrition information may be available through the internet, PHE, coaches, and certified athletic trainers, college students still seem to have less than optimal diets.¹⁹ College students are typically shown to possess unhealthy dietary behaviors such as skipping meals, snacking frequently on energy-dense food, and taking part in unhealthy weight loss plans.²⁴ Contributing factors to the less than satisfactory nutrition habits among college students include busy schedules and the college environment.^{13,14} For athletes, busy class and practice schedules may influence nutritional choices.¹⁴ Environmental factors include buffet style cafeteria's and dormitory living, which may hinder facilities for food preparation or the opportunity and funds to go grocery shopping.¹⁴

College students are at an impressionable age in which lifestyle attitudes and behaviors are created and characterize a pattern for later years in life. For this

reason, it is important to observe the trends in health behavior with this age group.¹⁵ Understanding these trends and patterns will assist the certified athletic trainer and health care professional in providing adequate care for this population. The certified athletic trainer should become familiar with evidence based research regarding nutrition so that they are not only able to educate the athletes, but so that they are also able to educate coaches and strength and conditioning coaches when necessary.

APPENDIX B

The Problem

THE PROBLEM

Leaving home for the first time poses new challenges when it comes to nutrition habits for college students whether they are athletes or non-athletes. Though nutrition information may be available, college students still seem to have less than optimal diets.¹⁹ For this reason, it is important to observe the trends in health behavior with this age group.¹⁵ At the high school, collegiate, and professional level certified athletic trainers are often the first person an athlete may turn to for medical advice.²² Therefore, an athlete may look to the certified athletic trainer for advice about nutrition. Descriptive research conducted by Burns et al²³ showed that even though dietitians were available in half of the athletic departments studied, the certified athletic trainers were the primary information source regarding nutritional concerns and students perceived the athletic trainers as good resources in terms of knowledge of nutrition. In order to provide better nutrition services to athletes, dietitians and certified athletic trainers should join their nutritional expertise.²³ The purpose of this study was to examine similarities and/or differences

between the nutrition knowledge and eating behavior among NCAA Division II athletes and non-athletes.

Definition of Terms

The following terms were integrated throughout this study and so are defined as they relate to this research:

- 1) Kilocalorie (kcal) - a measurement of food energy. One calorie expresses the amount of heat that is required to elevate the temperature of 1 kg of water 1 degrees Celsius (more specifically from 14.5 to 15.5 degrees Celsius).⁸
- 2) NCAA Athlete - for the purpose of this study, someone who participates in a sport that is a part of the National Collegiate Athletics Association.
- 3) Non-Athlete - for the purpose of this study, someone who does not participate in a sport that is part of the National Collegiate Athletics Association.
- 4) Nutritional Habits - a number that is reported as percentage score which is used to evaluate the apparent quality of eating habits adopted by each subject (APPENDIX C3).²⁵
- 5) Glycogen - a polysaccharide that is found in the liver and muscle of humans and animals.⁸

- 6) Nutritional Knowledge - a number that is reported as a percentage score which is used to evaluate the apparent knowledge of each subject in the nutrition field (APPENDIX C3).²⁵

Basic Assumptions

The following assumptions may be made about this study:

- 1) All subjects participated voluntarily.
- 2) All subjects answered honestly and to the best of their ability.
- 3) All instruments are valid and reliable assessments of nutritional knowledge and eating habits.

Limitations of the Study

The following are possible limitations of the study:

- 1) Results were limited to a subject sample of NCAA Division II athletes at one university.
- 2) Results were limited to a subject sample of general college students at one university.

Significance of the Study

The college environment may be a challenge for students who are trying to make good nutritional choices.

Though nutrition information is readily available via the internet and peer health education is widely used on college campuses across America, college students still seem to have less than optimal diets.¹⁹ Relocation from home life to a college situation poses changes in both the social and physical environments of a college student - whether they are an athlete or not.¹

The study was a comparison between NCAA Division II athletes and non-athletes and their nutrition knowledge and eating behavior. Since research already shows that college students have less than optimal diets, this study is important in that it revealed various knowledge and behaviors that are apparent in college students and athletes. The more obvious that the knowledge and habits are among this population, the better equipped sports medicine professionals will be in order to decide what strategies are best in making improvements. Since certified athletic trainers are often the first medical professional with whom the athlete will seek out, they should especially be able to answer questions and provide knowledgeable advice regarding nutritional decisions that will assist the athlete in athletic performance.²² Certified athletic trainers should be knowledgeable on evidence based

research so that they are better educating athletes and other appropriate personnel when necessary.

APPENDIX C
Additional Methods

APPENDIX C1

Original Nutritional Knowledge and Eating Habits

Questionnaire

Original Nutritional Knowledge and Eating Habits Questionnaire

SECTION 1: Please circle the number for each statement indicating to what extent you agree or disagree with each of the following statements.

- 4 - Strongly Agree
 3 - Agree Somewhat
 2 - Disagree Somewhat
 1 - Strongly Disagree

Athlete # _____

1. Skipping breakfast can negatively affect athletic performance.
 4 3 2 1
2. Proteins are the best and most efficient source of energy.
 4 3 2 1
3. Nutrition affects mental performance.
 4 3 2 1
4. The pre-event meal should be eaten 3-4 hours prior to competition.
 4 3 2 1
5. Calcium excretion from the body increases with alcohol consumption.
 4 3 2 1
6. According to mypyramid.gov, it is recommended that females, age 18-25, who engage in more than 60 min. of exercise per day, should consume 8 daily ounce equivalents from the grains group.
 4 3 2 1
7. According to mypyramid.gov, it is recommended that females, age 18-25, who engage in more than 60 min. of exercise per day, should consume 2 cups of fruit daily.
 4 3 2 1
8. According to mypyramid.gov, it is recommended that females, age 18-25, who engage in more than 60 min. of exercise per day, should consume 3 servings from the dairy group daily.
 4 3 2 1
9. According to mypyramid.gov, it is recommended that females, age 18-25, who engage in more than 60 min. of exercise per day, should consume 6.5 ounce equivalents from the meat/bean group every day.
 4 3 2 1
10. Eating breakfast can improve concentration.
 4 3 2 1
11. Carbohydrates are less fattening than fatty foods.
 4 3 2 1
12. At least 60% of total calories should come from carbohydrates.
 4 3 2 1

13. Carbohydrates are easier to digest than fats or proteins.
4 3 2 1
14. Excess vitamin consumption can be toxic.
4 3 2 1
15. Anemia is a deficiency of iron.
4 3 2 1
16. Average percentage of body fat in females is 20-25%.
4 3 2 1
17. Cereal, bread, bagels, and pasta are good sources of carbohydrates.
4 3 2 1
18. Tofu, nuts, and beans are good sources of proteins.
4 3 2 1
19. Athletes tend to consume twice as much protein as recommended.
4 3 2 1
20. Over-consumption of protein is beneficial for athletes.
4 3 2 1
21. The best sources of iron come from animal products and fish.
4 3 2 1
22. Eating cereals or breads enriched with iron should be eaten with a source of vitamin C to enhance the absorption of iron.
4 3 2 1
23. Proteins act to repair and build muscle tissue and make hormones to boost the immune system.
4 3 2 1
24. Fats are essential in all diets.
4 3 2 1
25. If a diet is lacking in carbohydrates, proteins are then used for energy.
4 3 2 1
26. Oatmeal, legumes, and fruits are sources of soluble fiber.
4 3 2 1
27. The recommended amount of iron for females is 18-23 milligrams per day.
4 3 2 1
28. Vitamin C is also known as ascorbic acid.
4 3 2 1
29. If you are not thirsty, then you must not be dehydrated.
4 3 2 1

SECTION 2: Please circle the number that applies to the following questions. Refer to the scale below to determine the number of days

per week defined in each rating. **All of the results will be strictly confidential.** Thank you for your cooperation.

4 - Always: Occurs 5-7 days per week.

3 - Often: Occurs 3-4 days per week.

2 - Sometimes: Occurs 1-2 days per week.

1 - Never: Does not occur at all.

1. How often do you eat breakfast in the morning?
4 3 2 1
2. Based on three meals per day, how often do you skip at least one meal per day?
4 3 2 1
3. How often do you take vitamin supplements?
4 3 2 1
4. How often do you take mineral supplements?
4 3 2 1
5. How often do you eat three meals per day?
4 3 2 1
6. How often do you record what you eat?
4 3 2 1
7. How often do you drink water?
4 3 2 1
8. How often do you drink carbonated beverages?
4 3 2 1
9. How often are you on a "diet"?
4 3 2 1
10. How often do you eat breads, cereals, pasta, potatoes or rice?
4 3 2 1
11. How often do you eat fruits, such as apples, bananas, or oranges?
4 3 2 1
12. How often do you eat vegetables, such as broccoli, carrots, or salad?
4 3 2 1
13. How often do you eat dairy products such as milk, yogurt or cheese?
4 3 2 1
14. How often do you eat berry jams, cookies, candies, or other sweets?
4 3 2 1
15. How often do you snack on foods like potato chips, cakes, candies, donuts, or soda?
4 3 2 1
16. How often do you snack on foods like bagels, yogurt, popcorn, pretzels, or fruits?

4 3 2 1

17. How often do you eat fast foods?

4 3 2 1

18. How often do you seek out nutritional information?

4 3 2 1

APPENDIX C2
Revised Nutritional Knowledge and Eating Habits
Questionnaire

Revised Nutritional Knowledge and Eating Habits Questionnaire

Section 1: Please circle the number for each statement indicating to what extent you agree or disagree with each of the following statements.

- 4 - Strongly Agree
- 3 - Agree Somewhat
- 2 - Disagree Somewhat
- 1 - Strongly Disagree

1. Skipping breakfast can negatively affect athletic performance.
4 3 2 1
2. Nutrition can affect mental performance.
4 3 2 1
3. Calcium excretion from the body increases with alcohol consumption.
4 3 2 1
4. According to mypyramid.gov, it is recommended that females, age 18-25, who engage in more than 60 minutes of exercise per day, should consume 8 daily ounce equivalents from the grains group.
4 3 2 1
5. According to mypyramid.gov, females age 18-25, who engage in more than 60 minutes of exercise per day, should consume 2 cups of fruit daily.
4 3 2 1
6. According to mypyramid.gov, females age 18-25, who engage in more than 60 minutes of exercise per day, should consume 3 servings from the dairy group per day.
4 3 2 1
7. According to mypyramid.gov, females ages 18-25, who engage in more than 60 minutes of exercise per day, should consume 6.5 ounce equivalents from the meat/bean group every day.
4 3 2 1
8. Eating breakfast can improve concentration.
4 3 2 1
9. Excess vitamin consumption can be toxic.
4 3 2 1
10. Anemia is a deficiency of iron.
4 3 2 1
11. Average percent of body fat in females is 20-25%.
4 3 2 1
12. Cereal, bread, bagels, and pasta are good sources of carbohydrates.
4 3 2 1
13. Tofu, nuts, and beans are good sources of protein.
4 3 2 1

14. Athletes tend to consume twice as much protein as recommended.
4 3 2 1
15. The best sources of iron come from animal products and fish.
4 3 2 1
16. Eating cereals or breads enriched with iron should be eaten with a source of vitamin C to enhance absorption of iron.
4 3 2 1
17. Proteins act to repair and build muscle tissue and make hormones to boost the immune system.
4 3 2 1
18. Fats are essential in all diets.
4 3 2 1
19. If a diet is lacking in carbohydrates, proteins are then used for energy.
4 3 2 1
20. Oatmeal, legumes, and fruits are sources of soluble fiber.
4 3 2 1
21. The recommended amount of iron for females is 18-32 milligrams per day.
4 3 2 1
22. Vitamin C is also known as ascorbic acid.
4 3 2 1

Section 2: Please circle the number that applied to each of the following questions. Refer to the scale below to determine the number of days per week defined in each rating. **All of the results will be kept strictly confidential.** Thank you for your cooperation.

- 4 - Always: Occurs 5-7 days per week
3 - Often: Occurs 3-4 days per week
2 - Sometimes: Occurs 1-2 days per week
1 - Never: Does not occur at all

1. How often do you eat breakfast in the morning?
4 3 2 1
2. How often do you take vitamin supplements?
4 3 2 1
3. How often do you take mineral supplements?
4 3 2 1
4. How often do you eat three base meals per day?
4 3 2 1
5. How often do you record what you eat?
4 3 2 1
6. How often are you on a "diet"?

4 3 2 1

7. How often do you eat fruits, such as apples, bananas, or oranges?

4 3 2 1

8. How often do you eat vegetables, such as broccoli, carrots or salad?

4 3 2 1

9. How often do you consume dairy products such as milk, yogurt or cheese?

4 3 2 1

10. How often do you seek out nutritional information?

4 3 2 1

Appendix C3
Consent Form



California University of Pennsylvania

Informed Consent Form

1. Sarah Seabrook, who is a Graduate Athletic Training Student at California University of Pennsylvania, has requested my participation in a research study at California University of Pennsylvania. The title of the research is *A Comparison of Nutrition Habits and Knowledge Between NCAA Division II Athletes and Non-Athletes*.

2. I have been informed that the purpose of this study is to study the similarities and/or differences in nutrition habits and knowledge between NCAA Division II athletes and non-athletes. I understand that I must be 18 years of age or older to participate. I understand that I have been asked to participate along with other individuals who are not NCAA Division II athletes .

3. I have been invited to participate in this research project. My participation is voluntary and I can choose to discontinue my participation at any time without penalty or loss of benefits. My participation will involve demographic information and completing a nutritional knowledge and eating habits questionnaire.

4. There are no foreseeable risks associated with this study .

5. There are no feasible alternative procedures available for this study.

6. I understand that the possible benefits of my participation in the research is sports medicine professionals will be able to better understand the trends associated with eating knowledge and behavior among NCAA Division II athletes. This will allow them to provide better nutritional advice to this population.

7. I understand that the results of the research study may be published but my name or identity will not be revealed. Only aggregate data will be reported. In order to maintain confidentiality of my records, Sarah Seabrook will maintain all documents in a secure location on campus and password protect all electronic files so that only the student researcher and research advisor can access the data. Each subject will be given a specific subject number to represent his or her name so as to protect the anonymity of each subject.

8. I have been informed that I will not be compensated for my participation.

9. I have been informed that any questions I have concerning the research study or my participation in it, before or after my consent, will be answered by:

Sarah Seabrook, ATC
STUDENT/PRIMARY RESEARCHER
SEA4160@cup.edu
609-602-7618

Rebecca Hess, PhD
RESEARCH ADVISOR
hess ra@calu.edu
724/938-4359

10. I understand that written responses may be used in quotations for publication but my identity will remain anonymous.

11. I have read the above information and am electing to participate in this study. The nature, demands, risks, and benefits of the project have been explained to me. I knowingly assume the risks involved, and understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. In signing this consent form, I am not waiving any legal claims, rights, or remedies. A copy of this consent form will be given to me upon request.

12. This study has been approved by the California University of Pennsylvania Institutional Review Board.

13. The IRB approval dates for this project are from: 03/05/10 to 03/05/11 .

Subject's signature: _____ Date: _____

Witness signature: _____ Date: _____

Appendix C4
Demographics

Demographic Information

Please **DO NOT** write your name anywhere on this sheet. Answer the following questions honestly and to the best of your ability. All responses to the following survey will be kept confidential and used only for data analysis by the researcher. Thank you.

1. Gender Male Female
2. Academic year in college
 Freshman (1-29 credits)
 Sophomore (30-59 credits)
 Junior (60-89 credits)
 Senior (90 or more credits)
3. Are you an NCAA athlete at California University of Pennsylvania?
 Yes No
4. What type of housing do you live in?
 Dorm room Apartment (on or off campus)
 Home (with family or relatives) House (no family or relatives)
5. What is your exposure to nutrition information in college? (check all that apply)
 Academic Class Guest Lecture
 Peer Health Education Internet
 Peer Influence Coaches
 Certified Athletic Trainer
 Sports Nutritionist
 Strength and Conditioning Coach
 Dietician

Appendix C5

Scoring Key: Revised Nutritional Knowledge and Eating
Habits Questionnaire

Revised Nutritional Knowledge and Eating Habits Questionnaire

Section 1: Please circle the number for each statement indicating to what extent you agree or disagree with each of the following statements.

- 4 - Strongly Agree
- 3 - Agree Somewhat
- 2 - Disagree Somewhat
- 1 - Strongly Disagree

1. Skipping breakfast can negatively affect athletic performance. 4
2. Nutrition can affect mental performance. 4
3. Calcium excretion from the body increases with alcohol consumption. 4
4. According to mypyramid.gov, it is recommended that females, age 18-25, who engage in more than 60 minutes of exercise per day, should consume 8 daily ounce equivalents from the grains group. 4
5. According to mypyramid.gov, females age 18-25, who engage in more than 60 minutes of exercise per day, should consume 2 cups of fruit daily. 4
6. According to mypyramid.gov, females age 18-25, who engage in more than 60 minutes of exercise per day, should consume 3 servings from the dairy group per day. 4
7. According to mypyramid.gov, females ages 18-25, who engage in more than 60 minutes of exercise per day, should consume 6.5 ounce equivalents from the meat/bean group every day. 4
8. Eating breakfast can improve concentration. 4
9. Excess vitamin consumption can be toxic. 4
10. Anemia is a deficiency of iron. 4
11. Average percent of body fat in females is 20-25%. 4
12. Cereal, bread, bagels, and pasta are good sources of carbohydrates. 4
13. Tofu, nuts, and beans are good sources of protein. 4
14. Athletes tend to consume twice as much protein as recommended. 4
15. The best sources of iron come from animal products and fish. 4
16. Eating cereals or breads enriched with iron should be eaten with a source of vitamin C to enhance absorption of iron. 4
17. Proteins act to repair and build muscle tissue and make hormones to boost the immune system. 4

18. Fats are essential in all diets. 4
19. If a diet is lacking in carbohydrates, proteins are then used for energy. 4
20. Oatmeal, legumes, and fruits are sources of soluble fiber. 4
21. The recommended amount of iron for females is 18-32 milligrams per day. 4
22. Vitamin C is also known as ascorbic acid. 4

RANGE OF SCORES: 22-88

Section 2: Please circle the number that applied to each of the following questions. Refer to the scale below to determine the number of days per week defined in each rating. **All of the results will be kept strictly confidential.** Thank you for your cooperation.

- 4 - Always: Occurs 5-7 days per week
- 3 - Often: Occurs 3-4 days per week
- 2 - Sometimes: Occurs 1-2 days per week
- 1 - Never: Does not occur at all

1. How often do you eat breakfast in the morning? 4
2. How often do you take vitamin supplements? 1
3. How often do you take mineral supplements? 1
4. How often do you eat three base meals per day? 4
5. How often do you record what you eat? 4
6. How often are you on a "diet"? 1
7. How often do you eat fruits, such as apples, bananas, or oranges? 4
8. How often do you eat vegetables, such as broccoli, carrots or salad? 4
9. How often do you consume dairy products such as milk, yogurt or cheese? 4
10. How often do you seek out nutritional information? 4

RANGE OF SCORES: 10-40

CLASSIFICATIONS:

- Excellent = 85-100%
- Good = 70-85%
- Fair = 55-69%
- Poor = 54% or below

Appendix C6

Institutional Review Board

Proposal Number
Date Received



California University of Pennsylvania

PROTOCOL for Research
Involving Human Subjects

Institutional Review Board (IRB) approval is required before
beginning any research and/or data collection involving human subjects

(Reference IRB Policies and Procedures for clarification)

Project Title A Comparison of Nutrition Habits and Knowledge Between NCAA Division II Athletes and Non-Athletes

Phone # 609-602-7618 **E-mail Address** SEA4160@calu.edu

Faculty Sponsor (if required) Dr. Rebecca Hess

Department Health Science

Project Dates January 2010 to May 2010

Sponsoring Agent (if applicable) _____

Project to be Conducted at Hamer Hall, California University of Pennsylvania

Project Purpose: Thesis Research Class Project Other

Keep a copy of this form for your records.

Required IRB Training

The training requirement can be satisfied by completing the online training session at <http://cme.nci.nih.gov/>. A copy of your certification of training must be attached to this IRB Protocol. If you have completed the training at an earlier date and have already provided documentation to the California University of Pennsylvania Grants Office, please provide the following:

Previous Project Title _____

Date of Previous IRB Protocol _____

Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. *Provide an overview of your project-proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(es) or research questions that might be involved and explain how the information you gather will be analyzed. For a complete list of what should be included in your summary, please refer to Appendix B of the IRB Policies and Procedures Manual*

The purpose of this study is to examine similarities and/or differences between the knowledge and habits of nutrition among NCAA athletes and non-athletes. A descriptive research design will be used for this study. Dependent variables are subjects' nutritional knowledge and eating habits. The independent variable is group (NCAA athletes/non-athletes). Male and female National Collegiate Athletic Association (NCAA) Division II athletes (N ~ 50) from California University of Pennsylvania are desired for this study. For the purpose of this study, NCAA athletes are defined as those who actively participate in a varsity sport. NCAA non-athletes, those not participating in an NCAA sport, who attend California University of Pennsylvania are also desired for the study (N ~ 50). All participation is voluntary for NCAA athletes and non-athletes. The subjects will remain anonymous but will complete a consent form to participate in the study (Appendix C4). The instruments included in this study are a Demographic Sheet (Appendix C1) and the revised Nutritional Knowledge and Eating Habits Questionnaire (Appendix C2). A demographic sheet will be completed by each subject, which includes information on academic year in college, gender, whether they are an NCAA athlete, and living situation (dormitory, on or off campus apartment, living in a house with relatives, or living in a house with non-relatives). The first part of the questionnaire (22 questions) is designed to evaluate the level of nutritional knowledge of each subject. Using a four-point Likert-type scale, the subjects will be asked to specify to what degree they agree with each statement. Answers range from strongly agree (4) to strongly disagree (1). Questions surveyed the subjects on topics such as pre-event meals, breakfast habits, individual nutrient effect on performance, vitamin consumption, and food group choices consistent with www.mypyramid.gov. Questions will be scored to their value using the specified key (Appendix C3). For example, if the subject answers with a 4, they will be given 4 points for that particular question. The scores in the first knowledge section range from 22-88 points. By dividing a subject's score by 88, a percentage will be appointed. Nutritional knowledge will be scored as follows: excellent (85-100%), good (70-84%), fair (55-69%), or poor (54% or below). The second section of the questionnaire, comprised of 10 questions, is anticipated to test the quality of the eating habits of individual subjects. Using a four-point Likert-type scale, subjects will be asked to specify how frequently they consume certain foods or take part in particular eating habits. Answers will include: Always (4), Often (3), Sometimes (2), and Never (1). Always (4) shows that a habit occurs 5-7 days per week, Often (3) shows that a habit occurs 3-4 days per week, Sometimes (2) shows that a habit occurs 1-2 days per weeks, and Never shows a habit that does not occur at all. Reverse scoring will be used for questions numbered 2, 3, and 6. Reverse scoring means that when a question is answered as a 4, one point is given. The other questions excluding 2, 3, and 6 will be scored according to their numerical value – if the subject answers with a 4, they were awarded 4 points. In this section, scores range from 10-40 points. After adding up each subject's

score, the total will be divided by 40. Scores will be awarded as follows: Excellent (85-100%), Good (70-84%), Fair (55-69%), or Poor (54% or below). Permission to access athletes during practice times will be obtained from the California University of Pennsylvania's Athletic Director. The researcher will then ask permission from California University of Pennsylvania's football, men's/women's soccer, track, cross country, tennis, volleyball, baseball, softball, swimming, cheerleading, and men's/women's basketball to have 15 minutes prior to or after practice in which the survey may be taken by volunteer NCAA athletes without the presence of the coach. There will be no consequences or rewards for taking part in this survey and the survey may be discontinued at any time. The coaches' role in this study is simply to obtain permission to access athletes for 15 minutes prior to or after practice. They will not be present while the survey is handed out and completed. The researcher will distribute the surveys by hand. Potential non-athlete volunteers for this study will be gathered through the Health Science Department. Two faculty professors will be contacted via email to request permission to enter the classroom at two separate times; two classes for each professor. These classes are general education classes comprised of the general student population. The researcher will request for volunteers in the classrooms; student athletes (NCAA) and/or non-athletes may take the survey. It will be stressed that participation is strictly voluntary and there are no rewards or consequences for taking the survey. The role of the two professors is simply to obtain permission to enter the classroom for 15 minutes prior to or after class. The professor's will not be present during that time. The researcher will distribute the survey's by hand. It will also be explained that participation may be discontinued at any time without penalty and all data discarded. A consent form explaining the research project will be distributed to the subjects to be reviewed and then signed before the surveys are handed out. After reading, understanding, and signing the consent forms, the researcher will collect them and will keep them in a secured location. Following collection of the consent form, each survey will be distributed to the subjects. The survey is a typed questionnaire that will be distributed and collected by hand by the researcher. After completion of the surveys, the subjects will be instructed to turn them over so a blank sheet of paper will be faced up for the researcher to collect. The surveys will only be numbered for data collection/analysis. The numbers will not link the subject to his/her survey. After collecting the surveys, the researcher will place them in a folder, which will be stored in a locked file cabinet in a secure office in which only the researcher and the program director will have a key. The following hypothesis was based on previous research and the researcher's intuition based on a review of the literature. NCAA athletes and non-athletes will not exhibit a significant difference in nutrition knowledge and eating habits. All data will be analyzed by SPSS version 17.0 for windows at an alpha level of ≤ 0.05 . The hypothesis will be tested by using a MANOVA in order to compare the two dependent variables (nutrition knowledge and eating habits) between the groups (NCAA athletes and non-athletes).

- 2. Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.*

- a. *How will you insure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.*

There is no physical risk and minimal emotional risk possibilities for this study as subjects are serving as volunteers and may terminate the survey at any time without penalty. All subject's answers will be kept confidential and no research will be carried out until approved by IRB.

- b. *How will you insure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.*

No subject will be forced or coerced into this study by anyone at anytime. Subjects will be informed that they can withdraw from the study at any time without the possibility of penalty or personal self loss.

- c. *How will you obtain informed consent from each participant or the subject's legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.*

Informed consent forms will be read and completed by each potential volunteer prior to this study.

- d. *Show that the research plan makes provisions to monitor the data collected to insure the safety of all subjects. This includes the privacy of subjects' responses and provisions for maintaining the security and confidentiality of the data.*

The researcher will administer forms and surveys either by hand or electronically for the safety of all subjects and privacy of all responses. All forms will be kept in a secure location on University premises – Hamer Hall 235 in which only the researcher, Sarah Seabrook, and program director, Thomas West, can access information. The results of this study may be published, but subjects' identity will not be revealed.

3. *Check the appropriate box(es) that describe the subjects you plan to use.*

<input type="checkbox"/> <i>Adult volunteers</i>	<input type="checkbox"/> <i>Mentally Disabled People</i>
<input checked="" type="checkbox"/> <i>CAL University Students</i>	<input type="checkbox"/> <i>Economically Disadvantaged People</i>
<input type="checkbox"/> <i>Other Students</i>	<input type="checkbox"/> <i>Educationally Disadvantaged People</i>
<input type="checkbox"/> <i>Prisoners</i>	<input type="checkbox"/> <i>Fetuses or fetal material</i>
<input type="checkbox"/> <i>Pregnant Women</i>	<input type="checkbox"/> <i>Children Under 18</i>
<input type="checkbox"/> <i>Physically Handicapped People</i>	<input type="checkbox"/> <i>Neonates</i>

4. Is remuneration involved in your project? Yes or No. If yes, Explain here.
5. Is this project part of a grant? Yes or No If yes, provide the following information:
Title of the Grant Proposal _____
Name of the Funding Agency _____
Dates of the Project Period _____
6. Does your project involve the debriefing of those who participated? Yes or No
If Yes, explain the debriefing process here.
7. If your project involves a questionnaire interview, ensure that it meets the requirements of Appendix __ in the Policies and Procedures Manual.

California University of Pennsylvania Institutional Review Board
Survey/Interview/Questionnaire Consent Checklist (v021209)

This form **MUST** accompany all IRB review requests

Does your research involve **ONLY** a survey, interview or questionnaire?

YES—Complete this form

NO—You **MUST** complete the “Informed Consent Checklist”—skip the remainder of this form

Does your survey/interview/questionnaire cover letter or explanatory statement include:

[YES] (1) Statement about the general nature of the survey and how the data will be used?

[YES] (2) Statement as to who the primary researcher is, including name, phone, and email address?

[YES] (3) **FOR ALL STUDENTS**: Is the faculty advisor’s name and contact information provided?

[YES] (4) Statement that participation is voluntary?

[YES] (5) Statement that participation may be discontinued at any time without penalty and all data discarded?

[YES] (6) Statement that the results are confidential?

[YES] (7) Statement that results are anonymous?

[YES] (8) Statement as to level of risk anticipated or that minimal risk is anticipated? (NOTE: If more than minimal risk is anticipated, a full consent form is required—and the Informed Consent Checklist must be completed)

[YES] (9) Statement that returning the survey is an indication of consent to use the data?

[YES] (10) Who to contact regarding the project and how to contact this person?

[YES] (11) Statement as to where the results will be housed and how maintained? (unless otherwise approved by the IRB, must be a secure location on University premises)

[YES] (12) Is there text equivalent to: “Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm”? (the actual dates will be specified in the approval notice from the IRB)?

(13) FOR ELECTRONIC/WEBSITE SURVEYS: Does the text of the cover letter or explanatory statement appear before any data is requested from the participant?

(14) FOR ELECTRONIC/WEBSITE SURVEYS: Can the participant discontinue participation at any point in the process and all data is immediately discarded?

**California University of Pennsylvania Institutional Review Board
Informed Consent Checklist (v021209)**

This form **MUST** accompany all IRB review requests

Does your research involve **ONLY** a survey, interview, or questionnaire?

YES—DO NOT complete this form. You **MUST** complete the “Survey/Interview/Questionnaire Consent Checklist” instead.

NO—Complete the remainder of this form.

1. Introduction (check each)

- (1.1) Is there a statement that the study involves research?
- (1.2) Is there an explanation of the purpose of the research?

2. Is the participant. (check each)

- (2.1) Given an invitation to participate?
- (2.2) Told why he/she was selected.
- (2.3) Told the expected duration of the participation.
- (2.4) Informed that participation is voluntary?
- (2.5) Informed that all records are confidential?
- (2.6) Told that he/she may withdraw from the research at any time without penalty or loss of benefits?
- (2.7) 18 years of age or older? (if not, see Section #9, Special Considerations below)

3. Procedures (check each).

- (3.1) Are the procedures identified and explained?
- (3.2) Are the procedures that are being investigated clearly identified?
- (3.3) Are treatment conditions identified?

4. Risks and discomforts. (check each)

- (4.1) Are foreseeable risks or discomforts identified?
- (4.2) Is the likelihood of any risks or discomforts identified?
- (4.3) Is there a description of the steps that will be taken to minimize any risks or discomforts?
- (4.4) Is there an acknowledgement of potentially unforeseeable risks?
- (4.5) Is the participant informed about what treatment or follow up courses of action are available should there be some physical, emotional, or psychological harm?
- (4.6) Is there a description of the benefits, if any, to the participant or to others that may be reasonably expected from the research and an estimate of the likelihood of these benefits?
- (4.7) Is there a disclosure of any appropriate alternative procedures or courses of treatment that might be advantageous to the participant?

5. Records and documentation. (check each)

- (5.1) Is there a statement describing how records will be kept confidential?
- (5.2) Is there a statement as to where the records will be kept and that this is a secure location?
- (5.3) Is there a statement as to who will have access to the records?

6. For research involving more than minimal risk (check each),

- (6.1) Is there an explanation and description of any compensation and other medical or counseling treatments that are available if the participants are injured through participation?
- (6.2) Is there a statement where further information can be obtained regarding the treatments?
- (6.3) Is there information regarding who to contact in the event of research-related injury?

7. Contacts.(check each)

- (7.1) Is the participant given a list of contacts for answers to questions about the research and the participant's rights?
- (7.2) Is the principal researcher identified with name and phone number and email address?
- (7.3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

8. General Considerations (check each)

- (8.1) Is there a statement indicating that the participant is making a decision whether or not to participate, and that his/her signature indicates that he/she has decided to participate having read and discussed the information in the informed consent?
- (8.2) Are all technical terms fully explained to the participant?
- (8.3) Is the informed consent written at a level that the participant can understand?
- (8.4) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)

9. Specific Considerations (check as appropriate)

- (9.1) If the participant is or may become pregnant is there a statement that the particular treatment or procedure may involve risks, foreseeable or currently unforeseeable, to the participant or to the embryo or fetus?
- (9.2) Is there a statement specifying the circumstances in which the participation may be terminated by the investigator without the participant's consent?
- (9.3) Are any costs to the participant clearly spelled out?
- (9.4) If the participant desires to withdraw from the research, are procedures for orderly termination spelled out?

(9.5) Is there a statement that the Principal Investigator will inform the participant or any significant new findings developed during the research that may affect them and influence their willingness to continue participation?

(9.6) Is the participant is less than 18 years of age? If so, a parent or guardian must sign the consent form and assent must be obtained from the child

Is the consent form written in such a manner that it is clear that the parent/guardian is giving permission for their child to participate?

Is a child assent form being used?

Does the assent form (if used) clearly indicate that the child can freely refuse to participate or discontinue participation at any time without penalty or coercion?

(9.7) Are all consent and assent forms written at a level that the intended participant can understand? (generally, 8th grade level for adults, age-appropriate for children)

California University of Pennsylvania Institutional Review Board
Review Request Checklist (v021209)

This form **MUST** accompany all IRB review requests.
 Unless otherwise specified, **ALL** items must be present in your review request.

Have you:

[YES] (1.0) FOR ALL STUDIES: Completed ALL items on the Review Request Form?

Pay particular attention to:

[YES] (1.1) Names and email addresses of all investigators

[YES] (1.1.1) FOR ALL STUDENTS: use only your CalU email address)

[YES] (1.1.2) FOR ALL STUDENTS: Name and email address of your faculty research advisor

[YES] (1.2) Project dates (must be in the future—no studies will be approved which have already begun or scheduled to begin before final IRB approval—**NO EXCEPTIONS**)

[YES] (1.3) Answered completely and in detail, the questions in items 2a through 2d?

[YES] 2a: NOTE: No studies can have zero risk, the lowest risk is “minimal risk”. If more than minimal risk is involved you **MUST**:

[YES] i. Delineate all anticipated risks in detail;

[YES] ii. Explain in detail how these risks will be minimized;

[YES] iii. Detail the procedures for dealing with adverse outcomes due to these risks.

[] iv. Cite peer reviewed references in support of your explanation.

[YES] 2b. Complete all items.

[YES] 2c. Describe informed consent procedures in detail.

[YES] 2d. NOTE: to maintain security and confidentiality of data, all study records must be housed in a secure (locked) location **ON UNIVERSITY PREMISES**. The actual location (department, office, etc.) must be specified in your explanation and be listed on any consent forms or cover letters.

[YES] (1.4) Checked all appropriate boxes in Section 3? If participants under the age of 18 years are to be included (regardless of what the study involves) you **MUST**:

[] (1.4.1) Obtain informed consent from the parent or guardian—consent forms must be written so that it is clear that the parent/guardian is giving permission for their child to participate.

[] (1.4.2) Document how you will obtain assent from the child—This must be done in an age-appropriate manner. Regardless of whether the parent/guardian has given permission, a child is completely free to refuse to participate, so the investigator must

document how the child indicated agreement to participate (“assent”).

[YES] (1.5) Included all grant information in section 5?

[YES] (1.6) Included ALL signatures?

(2.0) FOR STUDIES INVOLVING MORE THAN JUST SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

(2.1) Attached a copy of all consent form(s)?

(2.2) FOR STUDIES INVOLVING INDIVIDUALS LESS THAN 18 YEARS OF AGE: attached a copy of all assent forms (if such a form is used)?

(2.3) Completed and attached a copy of the Consent Form Checklist? (as appropriate—see that checklist for instructions)

(3.0) FOR STUDIES INVOLVING ONLY SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

[YES] (3.1) Attached a copy of the cover letter/information sheet?

(3.2) Completed and attached a copy of the Survey/Interview/Questionnaire Consent Checklist? (see that checklist for instructions)

(3.3) Attached a copy of the actual survey, interview, or questionnaire questions in their final form?

[YES] (4.0) FOR ALL STUDENTS: Has your faculty research advisor:

[YES] (4.1) Thoroughly reviewed and approved your study?

[YES] (4.2) Thoroughly reviewed and approved your IRB paperwork? including:

[YES] (4.2.1) Review request form,

[YES] (4.2.2) All consent forms, (if used)

[YES] (4.2.3) All assent forms (if used)

[YES] (4.2.4) All Survey/Interview/Questionnaire cover letters (if used)

[YES] (4.2.5) All checklists

[YES] (4.3) IMPORTANT NOTE: Your advisor’s signature on the review request form indicates that they have thoroughly reviewed your proposal and verified that it meets all IRB and University requirements.

[YES] (5.0) Have you retained a copy of all submitted documentation for your records?

Project Director's Certification
 Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

 Project Director's Signature

 Department Chairperson's Signature

Student or Class Research

 Student Researcher's Signature

 Supervising Faculty Member's
 Signature if required

 Department Chairperson's Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

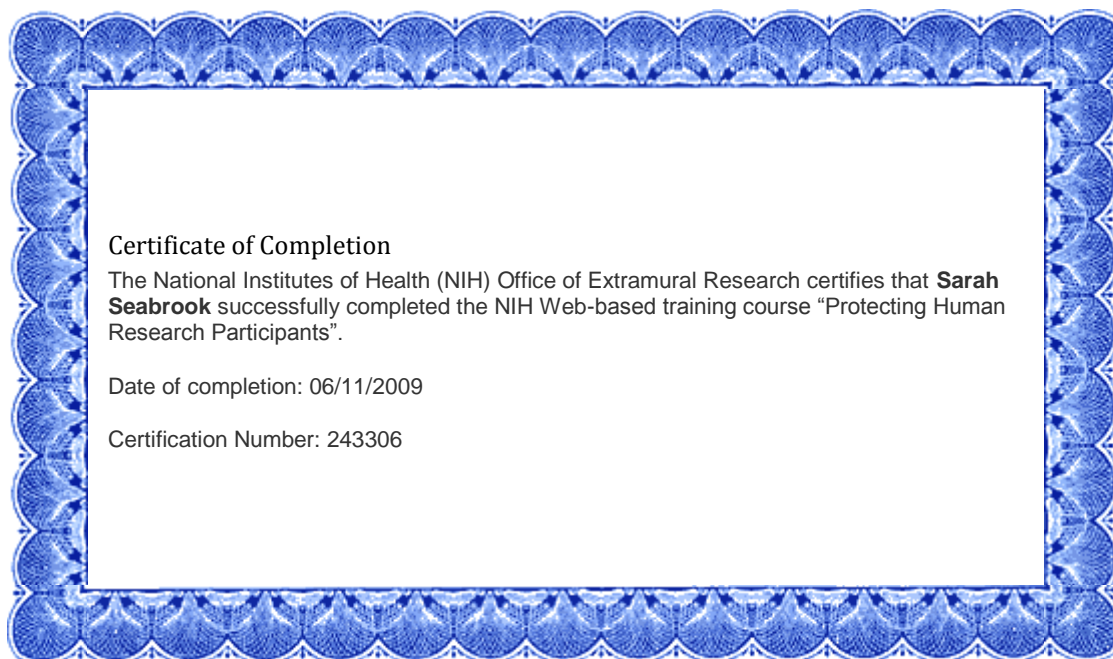
1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

Approved [_____]

Disapproved

Chairperson, Institutional Review Board

Date



**Institutional Review Board
California University of Pennsylvania
Psychology Department LRC, Room 310
250 University Avenue
California, PA 15419
instreviewboard@cup.edu
instreviewboard@calu.edu
Robert Skwarecki, Ph.D., CCC-SLP, Chair**

Sarah Seabrook,

Please consider this email as official notification that your proposal titled “A Comparison of Nutrition Habits Between NCAA Division II Athletes” (Proposal #09-035) has been approved by the California University of Pennsylvania Institutional Review Board as amended.

The effective date of the approval is 3-05-2010 and the expiration date is 3-05-2011. These dates must appear on the consent form .

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

- (1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)**
- (2) Any events that affect the safety or well-being of subjects**
- (3) Any modifications of your study or other responses that are necessitated by any events reported in (2).**
- (4) To continue your research beyond the approval expiration date of 3-05-2011 you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu**

Please notify the Board when data collection is complete.

Regards,

**Robert Skwarecki, Ph.D., CCC-SLP
Chair, Institutional Review Board**

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ABSTRACT

TITLE: A COMPARISON OF NUTRITION HABITS AND KNOWLEDGE BETWEEN NCAA DIVISION II ATHLETES AND NON-ATHLETES

Researcher: Sarah Nicole Seabrook

Advisor: Dr. Rebecca Hess

Date: April 2010

Research Type: Master's Thesis

Context: Current research indicates that athletes exhibit slightly more knowledge and better eating behavior practices than do non-athletes. However, previous studies have not examined a comparison of nutrition knowledge and eating behavior between NCAA Division II athletes and non-athletes.

Objective: The purpose of this study was to examine similarities and/or differences between NCAA athletes and non-athletes on the nutrition knowledge and eating behavior.

Design: Descriptive research using a reliable survey.

Setting: California University of Pennsylvania's NCAA Division II athletes were recruited prior to practice times. Non-athletes and some Division II athletes completed the study prior to anatomy or health class.

Participants: A total of 286 subjects (54 NCAA athletes, 232 non athletes) completed the survey. All of the respondents were volunteers and students at California University of Pennsylvania.

Interventions: The researcher distributed surveys to NCAA Division II athletes and non-athletes either prior to sports practice or anatomy or health class. It was clearly explained to the participants that participation was

strictly voluntary and there would be no rewards or consequences for taking part in the study. Informed consent was read and signed prior to completion of the survey.

Main Outcome

Measures:

Nutrition knowledge and eating behavior scores were obtained through a two part survey called the Revised Nutritional Knowledge and Eating Habits Questionnaire.

Results:

Athletes exhibited significantly higher (better) eating behavior than non-athletes but the groups were not significantly different on knowledge of nutrition.

Conclusion:

While NCAA athletes and non-athletes do not differ in their knowledge about nutrition, the NCAA athletes have better eating habits. Other behaviors, such as gender, or year in school are not associated with either variable.

Word count:

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