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Knowledge and Usage of Performance-Enhancing Supplements among NCAA Division II Athletes

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KNOWLEDGE AND USAGE OF PERFORMANCE ENHANCING SUPPLEMENTS AMONG NCAA DIVISION II ATHLETES

BY

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To the Dean of the School of Human Performance and Leisure Sciences:

I am submitting herewith a thesis written by Elise Carlson entitled "Knowledge and Usage of Performance-Enhancing Supplements among NCAA Division II Athletes." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science with a major in Movement Science and Specialization in Athletic Training.

Dr. Sue Shapiro, Thesis Committee Chair

We, members of the thesis committee,
have examined this thesis
and recommend its acceptance:

Accepted:

Chair, Department of Sport and Exercise Sciences

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Dean, School of Human Performance and
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Abstract

The use of performance enhancing supplements among athletes has increased over time. The purpose of this study is to determine NCAA Division II athlete's frequency of usage and knowledge of performance enhancing drug. South Florida NCAA Division II schools were asked to participate, and five agreed to participate. Among those five schools, a total of seventy four student athletes participated in this study. Flyers were posted in the athletic training rooms for the student athletes to see and ask their athletic trainer to take the survey. Results show that 23% of the student athletes are currently taking performance enhancing supplements. A total at 33.8% of student athletes currently taking performance enhancing supplements have good knowledge of what they are taking. 43.75% of the student athletes that are taking performance enhancing supplement report they do not know if their supplement is banned by the NCAA, however 81.3% of these student athletes state they do know where to retrieve the information if their supplement is banned or not. No significant difference was found between expected and actual outcomes between age, gender and sport. In conclusion, this was a preliminary study done on division II student athletes that showed positive results in the areas of frequency of use, knowledge of supplements, as well as knowledge of where to retrieve information on banned substances.

Chapter I

Introduction

In recent years, literature has reported performance enhancing substance use by athletes of various ages. As the level of play increases, the competition increases among the athletes. Along with rigorous training, athletes believe the use of performance enhancing substances will improve their performance, assist them to train to their maximum potential, maximize recovery, make up for a poor diet, etc. [1,2,3,4,5] "Through previous investigations, athletes have reported that they believe a higher consumption of performance enhancers is required to manage high training loads, maximize recovery, improve training intensities and performance, and/or to avoid illness and maintain health."[4] However, most research shows a proper diet for the athlete is more than beneficial to aid in performance.[6, 7] Performance enhancing substances are considered anything from steroids, to nutritional supplements since athletes use them to enhance their performance in one way or another.

"Supplement use is widespread in sport, even though most supplements used are probably ineffective."[1] Due to lack of knowledge on proper nutrition for an athlete and ignorance to the potential risks of performance enhancers, athletes continue to take substances since they perceive it will pose a benefit. Education and/or nutritional services need to be available for the athlete in order to prevent common, poor nutritional choices. If such services cannot be provided, other potentially unreliable sources are utilized (i.e. family, friends, fellow athletes, coaches, etc[2, 8]). Most of these external influences have little or no previous education on performance enhancing substances and their effects on performance.

Performance enhancers pose health risks to an athlete, especially if used incorrectly. Possible adverse effects include affected organ function, dehydration, seizures, heart dysrhythmia's, etc. [1,5,9,14] Another risk athlete's face is testing positive on a drug test. Due to the insufficient enforcement of regulation by the Food and Drug Administration (FDA) of labeling all ingredients in a nutritional supplement, companies can add components such as steroids to their product without placing the ingredient on the label. Companies have also been found to state the incorrect dosage of an ingredient when in fact it is much higher ("about 150% more than the stated dosage"[10]). Athletes who do not conduct research or consult with a nutritionist/dietician about a nutritional supplement are taking a risk of testing positive on a drug test. Unfortunately, the NCAA does not excuse an athlete's ignorance for breaching a doping regulation. "Ergogenic aids are banned by the governing bodies of sport for one of two reasons: on the grounds that they pose threat to the health of the individual, or because they confer what is seen as an 'unfair' advantage."[1]

Statement the Problem

Athlete's use of performance enhancers has been on the rise over the past years and is still climbing. Scarcity of studies and education among athletes on these performance enhancers may put the athletes at risk of adverse effects, doping violations, etc. Proper guidance with regards to substance implantation (or use) will increase knowledge among athletes which will enhance their ability and confidence to make smart decisions regarding nutrition. Athletes need to recognize that research on the effects of performance enhancers is limited. The claims that performance enhancing companies make may turn out to be misleading since most declarations are not reinforced by scientific evidence. Studies have been conducted on NCAA Division I and elite athletes on their usage of performance enhancers, but there is not a significant amount of

data on NCAA Division II student athletes use and knowledge. Millman et al [5] report that younger athletes admire the physical condition of professional athletes which has been linked to steroid use and, unfortunately, professional athletes are often role models to these younger athletes. In a study conducted by Froiland et al [8] only eleven percent of athletes at a NCAA Division I university reported not currently or ever taking any form of a nutritional supplement. The high percentage of athletes using substances is due to the lack of appropriate knowledge and perception of information on these products. Athletes need to be cognizant of the products to which they are subjecting their bodies.

Purpose of Study

The purpose of this study is to determine Division II athlete's frequency of usage and knowledge of performance enhancing drug. Assessment amongst athletes will be based on answers to the survey and will determine whether athletes' usage is justified. The survey will also help determine whether athletes take performance enhancers at an expected rate, are educated on what substances they are currently taking, measure the knowledge of the substance or ingredients in the substance are banned by the NCAA and determine the level of knowledge as to where to get reliable information on substances.

Significance of Study

"Limited information is available on the extent of dietary supplement use among athletes."[1] Studies have been conducted on rate of usage, external influences, affected population, etc. Following the results of this study, recommendations can be made to the athlete, coaches, athletic trainers, and other athletic staff to make them aware that athletes do not know what they are taking. One main recommendation is to educate the athletes about performance

enhancers and their effects. This study will also increase the awareness that Division II athletes are taking performance enhancers and have no knowledge base on where to get reliable information.

Hypothesis

Research Hypothesis

1) 70% of student athletes are taking performance enhancing substance(s).
2) Less than 30% of student athletes will not have a good understanding or awareness of their performance enhancing substance(s).
3) A majority of student athletes do not know they are at risk of testing positive on a drug test.
4) There will be an expected difference between actual outcomes between the student athlete's age, gender, and sport.

Limitations

1) A number of participants may not respond to the survey.
2) Participants may answer incompletely due to lack of knowledge or desire.
3) Participants may acquire outside sources to answer the questions from the survey.
4) Participants will only be recruited from NCAA Division II institutions in South Florida.

5) The NCAA Division II South Florida institutions do not have a football team.

Delimitations

1) Survey questions will be analyzed in a pilot study to increase clarity of questions.

2) Instructions on how to complete the survey and anonymity of participants will be attached.

3) The focus of questions will be on knowledge and usage of performance enhancers.

Assumptions

1) All participants will fill out the survey to the best of their abilities.

2) All participants will adhere to instructions of the survey.

3) The head athletic trainers will state exactly what the script says to the student athletes to reduce coercion.

4) Participants will not seek outside references to answer survey questions.

5) Once the survey is complete, it will be placed back in the manila envelope and sealed to ensure anonymity.

6) Results will be correctly analyzed and will be interpreted by the head investigator.

Operational Definitions

1) Performance Enhancing Substance – a substance, supplement, drug, etc that is used to enhance performance for an athlete in a sport he/she is engaged in.

2) Nutritional/Dietary Supplement – "A product, other than tobacco, which is used in conjunction with a healthy diet and contains one or more of the following dietary ingredients: a vitamin, mineral, herb, or other botanical, an amino acid, a dietary substance for use by man to supplement the diet by increasing the total daily intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients."[3,11]

3) Dietary Supplement Health and Education Act of 1994 (DSHEA) –" passed by the US congress in 1994 states that performance enhancers that do not claim to diagnose, treat, prevent or cure disease are not subject to regulation by the Food and Drug Administration (FDA)."[1]

4) Food and Drug Administration (FDA) – "in the U.S., an official regulatory body for foods, drugs, cosmetics, and medical devices. It is part of the U.S. Department of Health and Human Services."[13]

5) National Collegiate Athletic Association (NCAA) –"a collegiate sports governing association with a purpose to govern competition in a fair, safe, equitable and sportsmanlike manner, and to integrate intercollegiate athletics into higher education so that the educational experience of the student-athlete is paramount."[12]

6) Student Athlete – as called by the NCAA, students that participate in a NCAA Division I, II or III sport.

7) Anabolic Agent – "testosterone, or a steroid hormone resembling testosterone, which stimulates growth or manufacturing of body tissues. Anabolic steroids have been used, sometimes in large doses, by male and female athletes to improve performance, esp. in events requiring strength. This issue has been judged to be illegal by various organizations that

supervise sports, including the International Olympic Committee and the US Olympic Committee. They are also used to treat patients with wasting illnesses."[13]

8) Ergogenic Aid – "in sports medicine, the questionable and often harmful use of various substances in an attempt to enhance performance."[13]

9) Androstenedione – "a precursor to testosterone used orally by some athletes to enhance performance or increase body bulk."[13]

10) Dehydroepiandrosterone (DHEA) – "an androgenic substance, $C_{21}H_{28}O_4$, present in urine. It has about one fifth potency of androsterone. The level of this hormone in plasma decreases with age. It is promotes as an antiaging, anticancer, and antiatherosclerosis agent by alternative medicine practitioners."[13]

11) Metabolite - "any product of metabolism."[13]

12) Leucine – "an essential amino acid, $C_6H_{13}NO_2$; it cannot be synthesized by the liver and must be present in the diet; required for protein synthesis. It is present in the body tissues and is essential for normal growth and metabolism."[13]

13) Adverse Effects – "harmful unintended reactions to a drug."[14]

14) Contamination – "exposure to environmental contaminants in doses sufficient to cause adverse health effects."[13]

15) Drug Test – "a test regulated by governing bodies (i.e. NCAA, IOC) by obtaining athletes urine to test for any banned substances in their system (see figure 1 for the banned substance list). So no one participant might have an artificially induced advantage, so that no one participant might be pressured to use chemical substances in order to remain competitive,

and to safe guard the health and safety of participants, this NCAA drug-testing program has been created."[12]

16) Banned Substance – a substance that is not permitted for use by student athletes which is regulated by the NCAA.

17) Nutritionist/Dietician – "an individual whose training and experience are in the area of nutrition and who has the ability to apply that information to the dietary needs of the healthy and the sick. *Registered* – a specialist in dietetics who has met the requirements for certification stipulated by the American Dietetic Association (ADA)."[13]

Chapter II

Literary Review

The use of performance enhancing supplements by athletes is a concept that dates back to when sports were initiated. "As early as BC 776, the Greek Olympians were reported to use substances such as dried figs, mushrooms and strychnine to perform better."[11] Since that time there have been advancements in substances. "In 1959, the first reported case of high school football players taking steroids surfaced."[11] Once steroids had surfaced, sporting government bodies (such as the International Olympic Committee) started to ban certain substances as well as implement drug testing policies. Soon after other sporting government bodies followed the banned substance and drug testing regimen (such as the NCAA in 1986[12]). Sport governing bodies enforce drug testing in order to keep the competition fair on the field. Upon violation of these rules, there are consequences for each individual association or committee, but the consequences are at minimum suspension from competition. Drug testing techniques are constantly being modified due to new "masking" techniques by athletes. Therefore, even though the by-laws are being enforced, it can be difficult to legally justify a positive drug test.

"The global market for supplements in 2001 was estimated at US $46 billion, with the US supplement market in 2000 being estimated at US $16.7 billion."[1] Dating back a few years earlier, sales in 1990 were $3.3 billion and increased in 1997 to $9 billion[2], and estimates sales in 1999 at US $12 billion.[15]

Performance enhancers can present in many forms. These substances can come in the form of a tablet, capsule, soft gels, liquids, powders, and bars.[16] The common justification for the use of these supplements is to improve athletic performance, decrease soreness (improve

recovery), prevent illness and injuries, etc. Even though some of the performance enhancing substances makes some of these claims, there is not enough scientific evidence to support their claims.

Many professional and elite athletes have been accused of utilizing performance enhancers and banned substances. Since sports are a continuing growing industry, many of the young athletes aspire to be like the professional athletes. Once the young athletes see that their role model has taken substance(s) to enhance performance, this influences the young athletes to experiment with the same substances. Athletes as young as middle school age have been reported to be taking substances.[9,11] Most athletes who use these enhancers do not have a nutritional background or predominantly seek information from people with little or no nutritional background. Often times, athletes taking performance enhancers do not complete the proper research on the products before consumption. Instead, these athletes blindly trust the manufacturer's claim(s) on the benefits of the particular substance.

For the purpose of this study, the focus of the survey will be student athletes in a Division II setting. This literary review will continue as follows: affected population, proper nutrition for athletes, common performance enhancers, athlete's usage of performance enhancers, national collegiate athletics association drug testing, and summary. Key words are performance enhancer, nutritional supplement, student athletes, nutrition, education of performance enhancers, contamination of performance enhancers, drug testing.

Affected Population

In society today, there is pressure of having the 'sex appeal' image for not only athletes, but also the general population. In a large percentage of ads presented on television and the

internet, most commercial actors have a slim and fit body image. With this image, the actors are paid to promote nutritional products such as Nutri System and Hydroxy Cut (two examples out of many). All these supplements have one goal in common, to lose weight fast. For sports such as gymnastics, swimming, wrestling, rowing, etc the fit image and idea of losing weight fast is important. "Not only athletes but many people in the general population use various pharmaceutical and technological means to increase physical as well as other types of performances."[17] In a study done by Breivik, Hanstad and Loland,[17] a survey was given to athletes and the general population about their attitudes towards performance enhancers. It was determined that both groups were willing to use performance enhancers rather than body modification techniques. "The body can be understood as a social symbol signaling who we are and what we can achieve."[17] Both the athletes and the general population want quick results, even though the body modification process is timely.

For athletes, they have the pressure of the body image as well as the pressure to perform at exceeding high levels. Athletes are always trying to improve their performance, better themselves and/or become the best (i.e. break records, be better, faster and stronger than other athletes). Some athletes will do whatever it takes to get there.

> "In 1994, an often-referenced survey was conducted by Goldman when aspiring Olympians were asked 2 simple questions. The first one was, 'If you were offered a banned performance-enhancing substance that guaranteed that you would win an Olympic medal and you could not be caught, would you take it?' Remarkably, 195 of 198 athletes said yes. The second was, 'Would you take a banned performance-enhancing drug with guarantee that you will not be caught, you will win every

competition for the next 5 years, but you will die from adverse effects from the substance?' Still, more than 50% of athletes answered yes."[11]

The above survey shows that athletes have an attitude that they will do whatever it takes to win.

Proper Nutrition for Athletes

Athletes are known to train/practice at least twice a day many days out of the week (especially during pre season). Collegiate athletics usually requires rigorous training such as the "two-a-days", and in addition athletes do extra individual workouts. Athletes are known to expend more energy as compared to the general population. Due to the higher energy expenditure, athlete's nutritional needs must be adapted to the physical demands. "What, when and how much an athlete eats and drinks can affect speed, strength, skill and overall performance."[7] The recommended caloric intake for the general population on average is 2000 calories per day, with percentage intake of carbohydrates to be between 45-65%, protein between 10-35% and fat between 20-35%.[6,7] An athlete needs an average 3000 calories per day, with percentage intake of carbohydrates between 60-65%, protein between 10-15%, and fat between 20-30%.[6,7] "Persistent fatigue, poor recovery, illness, unwanted weight loss are most common result of under nutrition or suboptimal eating habits."[6] Athletes need to ensure they receive their recommended daily intake of nutrients otherwise they could see a change in their performance. Athletes that are maintaining a well balanced diet and ingesting supplements are at risk of toxicity from supplementation (from ingesting more nutrients than the body requires). Again, if an athlete is maintaining a well balanced diet, there is no need for additional supplementation.

Carbohydrates

Carbohydrates are the primary source of fuel during physical activity. "It generates more energy for muscular work, provides energy more rapidly to working muscles than protein or fat, and it is the only fuel that can be used anaerobically."[7] The recommended daily intake is based upon the body mass of each individual athlete. "The daily recommendation of carbohydrate intake is six to ten grams per kilogram of body mass per day to maintain blood glucose levels and to replace muscle glycogen."[6] There are many sources of carbohydrate foods from which athletes can choose. "Sources of carbohydrates include pasta, fruits, vegetables, dried peas, beans, whole grain cereal, bread and potatoes."[7] Recommendation for a pre exercise meal is to eat 3-4 hours prior to activity containing carbohydrates with a low glycemic index (shown to have performance benefits).[7] Low glycemic index foods take longer to effect the blood sugar levels in the body compared to high glycemic index foods. These foods are high in carbohydrates and easily digested. The recommendations during exercise includes 30-60 grams per hour (a way to achieve this is to drink a well formulated sports drink and to drink in increments of 20 minutes[7]). Providing a source of carbohydrates during a long period of exercise has shown to be beneficial. "Eating during exercise has been proven to enhance performance, lower perception of effort, and delay fatigue."[7] The post exercise meal is the prime time for athletes to recover with muscle repair and to rebuild the muscle glycogen stores. "The recommendation for intake is 1.5 grams of carbohydrates per kilogram of body mass at 30 minutes, 2 hours, 4 hours and 6 hours post exercise."[7] "High glycemic index carbohydrates are recommended due to rapid glycogen resynthesis."[7] Examples of high glycemic index food are breads, breakfast cereals, potatoes and sports drinks.[7] "Ingestion of a complete meal (includes

carbohydrates, protein and fat) has been reported to be more effective in stimulating post exercise muscle protein synthesis when compared with eating only carbohydrates."[18]

Protein

For an athlete, protein is essential nutrient for building muscle. "Protein is the building block for making hormones, enzymes, blood cells, helps maintain a healthy immune system, and helps to build and repair body tissues including muscles."[7] The recommended protein intake is different for varying types of athletes. "Recommended protein intake for an endurance athlete is 1.2-1.4 grams per kilogram of body mass, while anaerobic athletes with high amounts of resistance training are recommended to ingest 1.6-1.7 grams per kilograms of body mass."[6] Example foods include eggs, beef, turkey, chicken, fish, cheese, milk, yogurt, soy and beans.[7] The common misconception among athletes is that ingesting more protein will assist in developing the muscle and make the athlete stronger (there has not been any scientific evidence to support this claim). Athletes tend to ingest excessive amounts of protein to get bigger and stronger which can have negative effects on the body. Excessive protein ingestion can lead to acid build up that can obstruct bone function, and athlete can be subject to osteoporosis (a disease that mostly affects women that result from reduced bone density).

Fat

Fat is one of the most misunderstood nutrients in today's society. People see fat and automatically think it is not needed to maintain a healthy diet. Fat is one of the vital nutrients that the body needs to function. "Fats form essential tissue building blocks and hormone-regulating substances."[7] " 20-25% of total energy consumed by fat provides essential fatty acids and fat soluble vitamins such as vitamin A, D, K, and E."[6] There are also a significant amount

of foods that are nourished with fat. Example foods include nuts, oil, seeds, cold water fish, olives and avocados.[7] One issue in today's society is the consumption of trans and saturated fat used by large amounts of fast food industries as well processed foods. "Large amounts of trans fat (food in hydrogenated and partially hydrogenated oils, packaged products) and saturated fat (found in animal products) have been found to have potential unfavorable health effects."[7] It is very important for athletes to distinguish the healthy fats the body needs from unhealthy fats in order to receive the appropriate amount of daily fat needed.

Education of Athletes on Nutrition

Not every athlete has correct information when it comes to a balanced diet. As stated by Quatromoni regarding nutritional issues collegiate athletes face, it is a "span a spectrum from under nutrition (such as low energy intake) and compromised nutrition by status to high body fat percentage and overweight."[19] Student athletes are often limited to the food services offered on campus at a college or university, limited or no access to a fully supplied cooking area, and/or limited finances. Athletes believe that they can make up for their malnutrition by ingesting nutritional/performance enhancing supplements. However, it is believed once athletes acquire knowledge of proper nutrition; it prevents them from taking unnecessary nutritional/performance enhancing supplementation and allows them to implement a proper diet. In order for athletes to gain knowledge about nutrition, they need to be provided with the proper resources. In a study done by Quatromoni, [19] the study "demonstrated that if nutritional services are provided, athletes will participate". Also in an intervention study by Abood et al[20] "results show that the experimental group (the group with the nutritional intervention) displayed a significant increase in nutritional knowledge, specifically in the areas of energy intake, macronutrients, minerals as well as an increase in confidence in their ability to make the healthful food choices." Education

of nutrition to athletes is very important so they can learn how to use their resources around them properly to get the right amount of nutrients they need for optimal performance.

The impact of uneducated athletes on performance enhancers can lead to them influencing not only fellow athletes, but themselves, in taking substances. According to Dascombe et al [4] "while the majority of athletes reported that they had limited specific knowledge and desired more information on nutritional supplements, a considerable proportion of athletes (12/72; 17%) listed themselves as an influential figure in determining supplement usage." There are many other influential figures surrounding the athletes, but in the end it comes down to the individual in making the better choice. Athletes that are not being educated on this matter are at risk, and it is a situation that needs attention. Athletes need to understand the possible consequences of taking substances (i.e. adverse effects, doping violations), and understand the true effects. Education needs to be implemented in order to prevent any of the possible consequences.

Accessibility of Nutritional Services for Athletes

Not every athlete has access to a nutritionist or dietician to assess his or her diet. Colleges and universities have the option of providing nutritional interventions or hiring a nutritionist/dietician so the athletes can have access to proper nutritional guidance. Nutritionist/dieticians that are on staff at a college/university can mostly be found at a Division I school. "Roles for a sport nutritionist include nutrition and dietary assessments, evaluation of performance enhancers, fluid intake assessments, weight management, and counseling for energy and nutrient requirements for optimal choices."[21] Combining the expertise of the sports nutritionist/dietician and athletic trainer, a staff can provide complete nutritional services for the athletes. In a survey by Burns et al,[21] a dietician was available to student athletes to utilize, but

use of the service was limited. Student athletes went to the athletic trainers for nutritional guidance. Even though the use of the dietician services were limited by athletes, athletic trainers will use the services when they are unsure of a nutritional fact or question asked by an athlete. Athletic trainers can be the link between student athletes, coaches, etc and dieticians for access to correct information. Athletes may not go see the dietician; however their knowledge will still be accessed and not go unused.

Common Performance Enhancing Substances

There are numerous performance enhancers on the market today. "There are approximately 89 brands of supplements compromising more than 300 products that are sold over the counter."[5] Most claim to have a performance benefit, a weight loss benefit, etc. Most of these claims are not substantiated by scientific evidence. The uses of these substances are influenced by professional and elite athletes, as well as the advertisements on the television and the internet. It is all about image. There are many different brand names and types of performance enhancers available. For the purposes of this study, common performance enhancers and types shall be viewed. The following are common substances that are used by athletes:

Anabolic Androgen Steroids

Anabolic androgen steroids (AAS) are man-made derivatives of the hormone testosterone. "Testosterone is a sex hormone that is essential to maturation and sex differentiation."[5] The consensus today is that anabolic steroids do increase athletic measures with objective gains in strength and fat free mass with muscle hypertrophy due to retention of nitrogen within the muscle.[5,9,11] Olympic lifters started to use this substance in the 1950's and 1960's, which is when the use of anabolic steroids received its popularity, and since then has

become one of the most used supplement among athletes in power and strength sports. "Of all power lifters competing for a national championship in 1998, fifty five percent admitted to using steroids."[5] AAS can be either taken orally or by injection. "AAS in oral form is short-acting and is eliminated over days, whereas injectable steroids having longer lasting effects but risk positive drug testing up to months after use."[11] What is common with the use of AAS with younger athletes is the sharing of one needle, which can result in transferring diseases such as HIV, hepatitis A, B and C.[11] Other adverse effects of this supplement includes testicular atrophy with possible infertility, male gynecomastia, premature balding, virilizing and feminizing effects, acne, precocious puberty, affecting lipid profiles of the cardiovascular system, raising blood pressure, and left ventricle hypertrophy.[5,9,11] Also, the premature athlete may have premature physeal closure (therefore stunting growth).[9,11] Psychologically, the athlete can experience severe mood swings ranging from depression mania to aggression. [9,11] AAS is not only banned by sport government bodies, but also by the US government law.[11] The Anti Act in 1988 first prohibited the distribution of steroids for any purpose other than treatment of disease, then was followed by the Steroid Control Act of 1990 which placed steroids under Schedule III controlled substances.[11] An individual caught with possession of AAS, can be punished with one year in prison and/or a minimum of $1000 fine. An individual caught with intent on selling AAS, can be punished with 5 year prison sentence and/or a $250,000 fine.[11] AAS has been proven to have positive and negative effects to an individual, and is a dangerous supplement for one to take (hence it being illegal).

Human Growth Hormone (hGH)

"The human growth hormone is a natural hormone synthesized by the body, and it is released by the anterior pituitary gland."[9] "hGH is known to have metabolic functions that are generally anabolic, increase in amino acid uptake and protein synthesis as well as supporting other growth promoting bodily functions."[9] Studies of the use of this hormone are lacking, and this hormone is not illegal but only available by physician prescription. However, this hormone is banned by the NCAA. Use of hGH as a performance enhancer claims to increase muscle strength, increase lean body mass and improve performance.[9] The few studies that have been done do not support these stated claims.[9] Adverse effects of this hormone as a performance enhancer include water retention, carpal tunnel syndrome, and insulin resistance.[9]

Erythropoietin (EPO)

"Erythropoietin is a hormone naturally produced by the kidney that serves to stimulate an increase in hemoglobin" (which increases the oxygen carrying capacity of the blood).[9] The use of this hormone as a performance enhancer is mostly utilized by endurance athletes (i.e. cyclists). "The use of this hormone is an alternate to blood doping" (which mostly has similar effects as the use of EPO).[9] EPO is a banned substance by the NCAA, and is only available by physician prescription.[9] There have been reported deaths related to the use of EPO. Adverse effects of this hormone used as a performance enhancer include stroke, myocardial infarction, and pulmonary embolism.[9]

Prohormones

"Prohormone is defined as a precursor to a hormone."[13] Substances classified as prohormones are androstenedione (which is made in the adrenal glands and gonads[11]) and

dehydroepiandrosterone (also known as DHEA which is made in the adrenal cortex[11]). "These substances are available by prescription only."[1] Although prohormones are not illegal, but are banned by the NCAA. These substances are used as steroid precursers.[1] These prohormones claim to have the same effect as anabolic steroid (which increases testosterone levels[1, 9,11]). These testosterone precursors do not have enough scientific support to their claim in having any effects as stated above. However, androstenedione has been shown to significantly increase estrogen concentration in a study by Cogeni and Miller.[11] Adverse effects of prohormones include changes in lipid profiles, potential male gynecomastia, virilization of females, and down regulate testosterone overtime.[1,9,11]

Beta-Hydroxy-Beta-Methylbotyrate (HMB)

"HMB is a metabolite of leucine."[1,9] Mechanism of action is unknown[1,9], but Maughan et al[1] states that HMB can, "either acts by decreasing muscle proteolysis or by improving cell integrity by providing substrate for cholesterol synthesis."[1] In a study by Slater et al[9], the result was disproved when they found that "supplementation with HMB over two weeks resulted in no significant increase in the urinary testosterone-epitestosterone ratio, and they concluded that this supplement does not work through a testosterone-mediated pathway." However, findings on the effects of HMB are inconsistent. A study by Vukovich and Dreifort[9] noted that although "VO_2 peak was unaffected by HMB supplementation, the onset of blood lactate accumulation, a marker for anaerobic metabolism, was significantly increased in the HMB group compared to the control." HMB is marketed to "suppress protein breakdown during the recovery phase after a workout, thereby only burning carbohydrates and fat for energy and increase lean body mass",[9] and "reduce blood lactate accumulation during endurance exercise."[1] HMB is legal, and is not banned by the NCAA. HMB can be ingested in a healthy diet since leucine is an essential amino

acid (body cannot synthesize this amino acid). Adverse effects include "effects of the hematologic, hepatic and renal function."[1] A review of studies has also shown HMB use lowered total cholesterol, low density lipoprotein cholesterol and systolic blood pressure.[9]

Protein and Amino Acid Supplements

These types of nutritional supplements are one of the most popular on the market. This type of supplement is used by athletes that are mostly in strength and power sports, with the belief that these substances will make them better athletes. These supplements can give sufficient amount of protein requirements needed for a proper nutrition (that is if the athlete doesn't ingest adequate protein through their diet). "Athletes often insist that much higher amounts of protein is necessary to increase muscle mass, but the literature does not support this position."[1] In this case, more is not better. "The proposed mechanism of action includes a mass action effect on synthetic pathways by increasing amino acid availability and stimulation of hormone release or potentiating of hormone action and an increase in cell volume, or by acting to adaptation (i.e. promoting adaptation to training)."[1] Although protein and amino acids can be found in a healthy diet, however these supplements varies if are banned by the NCAA or not. Adverse effects of high protein intake are stated previously in the protein subsection of Proper Nutrition for Athletes.

Creatine

"Since 1992, creatine has been the most popular nutritional supplement on the market."[9] Creatine is one of the few supplements that are not banned by any US sport governing bodies, but it is illegal in Europe and banned by the International Olympic Committee. Creatine can be ingested in a proper diet for an athlete. Creatine is mainly found in meat and fish, with the daily

recommended intake being 2 grams per day.[1, 9, 11] Creatine is found in a healthy diet but is not banned by the NCAA. Using creatine as a supplement facilitates rapid regeneration of ATP within a cell metabolism, but a limited amount is available. "Performance effects from creatine supplements include increase strength and outcomes in short duration, anaerobic events, but not endurance events."[1] This supplement is mainly used by track and field athletes (i.e. sprinters). There have been studies that show creatine supplements do have positive performance effects on sprinters by increasing mean sprint times as much as two percent.[9] Two percent may not seem like a big improvement but, for a sprinter, every millisecond counts. However, these studies have been conducted on a short term basis. There is limited data on long term effects of creatine. Adverse effects include impaired renal function and water retention due to increase in muscle mass.[1, 9, 11] Creatine supplementation may also suppress the body producing its own creatine.

Ephedrine

Ephedrine is derived from the ma huang, which is an ephedra herb. "This is a stimulant with a chemical structure closely related to amphetamine."[11] This stimulant is used to aid in losing fat and to get quick energy. "Claims also state ephedrine boosts metabolism, burns fat and increases alertness."[9] "Ephedrine enhances the release of norepinephrine and it stimulates the central nervous system."[9] Adverse effects include anxiety, ventricular dysrhythmias, hypertension, hallucinations, insomnia, seizures, tremors, paranoid psychosis, cerebral vascular accident, myocardial infarction and death.[9,11] This supplement has been banned by the NCAA and taken off the market by the FDA in 2006. However, athletes can still obtain this supplement through the black market.

Vitamins, Minerals and Herbal Supplements

The main reason for use of this type of supplement is as a preventative measure (i.e. boost immune system). The most common vitamin and mineral to take is a multivitamin since it can give you your daily requirement at all vitamins and minerals in one pill. Another common vitamin is vitamin C since most people know that it helps strengthen your immune system. Once people start to notice they are getting sick, they start taking vitamin C supplements hoping they will not get worse. "Many herbal supplements claim to increase testosterone concentrations and hence have anabolic action but all claims are based on *in vitro* data."[1] Although these supplements are not banned by the NCAA, they can be found in a healthy diet.

Contamination of Nutritional/Dietary Supplements

> "The Dietary Supplement Health and Education Act (DSHEA) passed in 1994, reduced the regulation of dietary supplement and broadened the category to include new ingredients, such as herbal and botanical products. The DSHEA shifted responsibility from the manufacturer to the Food and Drug Administration to enforce guidelines for safety and claims, but the FDA is allowed to investigate a supplement only after a safety problem has been reported. Requirements for good manufacturing practice and accurate labeling are included in the DSHEA, but there has been little enforcement."[10]

The FDA regulations are not regulations at all; it's more of guidelines for the manufacturers. The manufacturers do not need to register with the FDA, or obtain approval for selling or producing their products. The manufacturers are responsible to ensure that the product or ingredient(s) in the product are safe before it is marketed, and the manufacturer's must ensure

that they are truthful with labeling their ingredients. Given these regulations, there is a lot of wiggle room for the manufacturers producing these products. However, the manufacturers do have to put FDA not approved on their products to let the public know that they do not test the supplements.

There have been numerous counts of positive drug testing where the athlete was unaware he/she was ingesting a banned substance. "Not a lot of athletes are aware that there are banned substances in the cold remedies, analgesics, hay fever medication, and herbal preparations."[22] Supplement regulation is different from country to country, but anyone can buy supplements over the internet from another country without difficulty. For example, an athlete in the US can buy a supplement from the UK, and they could possibly have less regulation of their supplements and labeling as compared to the US. Without the athlete knowing, they are taking the risk of ingesting a banned substance from this supplement bought over the internet from the UK. Contamination of nutritional substances is due to inadequate labeling of all ingredients in the supplement.[10,15,22,23,24,25] Due to this inadequacy, athletes may ingest a banned substance having no desire to cheat but are held accountable. "Unfortunately in the US, quality control of supplement manufacturing is trusted to the supplement companies."[10] With this control that the manufacturers have, the companies will do anything to get their product sold.

Many studies have been done to investigate what true ingredients are in the nutritional supplements. In one study by Thevis and Schanzer[20], "supplements were taken from 13 countries, and on each supplement they label that the ingredients do not include steroids. In 14.8% of all products tested, there was evidence of anabolic steroids in concentrations that can lead to a positive drug test result." Another study did an analysis of 10 commercial DHEA products and revealed that only "half the products contained the amount of DHEA stated on the

product label: containing 0-150% of the stated content."[10] Another study found that an "over the counter androstenedione was contaminated with 19- norandrostenedione which produces a positive urine test for nandrolone."[10] These are only to name a few studies to show that performance enhancers are contaminated.

Athletes not only need to be educated on proper nutrition, but how to protect themselves from ingesting banned substances. Athletes need to do their research if they decide to take performance enhancers. This research should include what ingredients are listed as a banned substance and the quantity allowed to be ingested. For example, the NCAA has caffeine as a banned substance if a student athlete has more than 15 micrograms/ml of caffeine present in their urine. They should refer to an athletic trainer, nutritionist or dietician for information on a specific product. Athletes also need to understand that there are not many supplements out there that have the proper labeling of ingredients, so the athletes do not truly know what they are ingesting.

Due to proof of contamination of supplements in many studies, "the Council of Europe and the World Anti Doping Agency also want governments to work for 'safe' supplements."[15] In regards to the US, the FDA needs to increase regulations of nutritional supplement labeling and conduct research on the supplement in order to state the actual effects. In the meantime, these present studies can make athletes aware of the possible contamination of supplements.

Athletes Usage of Performance Enhancing Substances

The use of performance enhancers by today's athletes is not uncommon. "The use of nutritional supplementation by athletes is increasing with time."[4] Athletes are known to be competitive and do what it takes to become the best. The starting age for use of performance

enhancers can start as young as middle school age athletes. "Worldwide supplement use among athletes on average range from 40-60%."[16] Unfortunately, lack of knowledge and/or misconceptions regarding supplements within the athlete's population have not been documented.[3,4] Related to athletes in particular, there is limited data on the habits and knowledge among this population. The cost for an athlete to use a supplement can be extensive due to the high money spent on these products (these products can be expensive). Also, the possible effects that these products can have on an individual can be detrimental and overall life threatening.

Also, the taking of performance enhancers can lead to a positive drug test either due to ingesting high amounts of the substance or improper labeling (as discussed in the previous section). Athlete's use of performance enhancers is usually influenced by other people who have little or no background in nutrition. One of the common influences is a fellow athlete stating "this substance worked for me, it should work for you as well." Along with common influence, society is a huge advocate. "The taking of a nutritional supplement is also of a societal issue: a lean muscular physique is highly prized and people will almost do anything to get one." [5] Another greater influence is the elite and professional athletes on younger athletes. Especially professional athletes, who are known to ingest performance enhancers along with banned substances. The younger generation sees that and asks, "Well if he can take that substance, why can't I?"

Reasons for Usage

Commonly cited reasons for performance enhancer use include: to compensate for inadequate diet, to meet abnormal demands of hard training or frequent competition, to benefit performance, to keep up with teammates and/or opponents, and recommended by coach, parent

or other influential individual.[1,2,3,4,5] Athletes would not have to compensate for inadequate diet if they were educated on what to eat, how much to eat and when to eat it. In order to meet demands of hard training and/or competition, the nutrition for an athlete is adjusted just for those purposes. The next time the athlete trains and they eat the correct amounts, their energy stores will properly be restored and muscles will be repaired. To benefit performance, again which comes from a proper diet, performance enhancers have little or no scientific evidence to support claims of performance benefits. In order to keep up with teammates and/or opponents, that is up to the individual athlete. Some athletes need more individual work than others. If athletes want to become the best they can be then they have to put the time into their training. Lastly, if a substance is recommended by family, friend, fellow athlete, coach, etc they may not have the proper nutritional background to recommend that supplement to the athlete.[2,8] The greatest influence came from an athletic trainer as compared to parents and coaches as found in a survey by Dunn[2]. Athletic trainers have more background regarding nutrition because it is part of their accredited curriculum.

Athletes need to be smart about their reasoning for taking performance enhancers. Education on supplement is a good preventative measure and should be offered to athletes and/ or have access to a nutritionist or dietician (as talked about in Accessibility to Nutritional Services).

National Collegiate Athletic Association Drug Testing

"Drug testing was approved in 1986 to be done at championship games hosted by the NCAA, then in 1990 it was approved to do year round drug testing on campuses for Divisions I and II (Division III is considering year round testing)."[12] The reason for drug testing is to preserve competition and ensure fairness for all athletes. One athlete having an advantage over

another due to taking a substance is not something the NCAA wants to allow. Each institution sets up their own drug testing procedures that needs to be approved by the NCAA. Drug testing policies by each individual institution should be used to educate student athletes and not used as a punitive. "The NCAA drug-testing program is overseen by a committee including members from all three divisions (the Committee on Competitive Safeguards and Medical Aspects of Sports) and by the national office health and safety staff."[12] Even though there are new advances for avoiding detection during a drug test, the NCAA are working together to try and keep up with the ways athletes can cheat on drug tests. Another reason why the NCAA does drug testing is to ensure the health and safety of the athletes. Again, as stated in the section Performance Enhancing Supplements, there is little support to claims of the supplements, and there are potential health risks as well. Drug testing does not only assess for performance enhancers, but for street drugs as well (cocaine, marijuana, etc). Testing is completed via urine test in which the student athlete submits a urine sample while being observed to ensure they do not submit false urine or someone else's. Once the sample is given, it is sent to Carbon Isotope Ratio testing, which is a UCLA laboratory. As shown in Appendix A, this lists all of the banned substances by the NCAA and proper warnings to the athlete (the list of banned substances changes from year to year, so the banned substance list is given to the student athletes yearly by their college/university compliance office).

Summary

In summary, performance enhancers are used by athletes of all ages as well as the general population. Due to the fact that athletes are always trying to improve, meet the demands of their sport and succeed at their sport, they are often exposed to nutritional/dietary supplements and their benefits, but the detriments are often overlooked. Some athletes will adjust their diet and

start using balanced meals to help meet the demands of their individual training. However, other athletes do not know what their diet should consist of to maintain adequate performance. Once athletes are educated about proper nutrition, they will make healthier food choices and have confidence in their decisions. If institutions do not provide athletes with educational sessions about nutrition, it would be beneficial for them to have access to a nutritionist or a dietary specialist with whom they can seek proper guidance. These specialists can go more in depth and assess each athlete's diet and individual needs to ensure they are receiving the appropriate information to maintain a proper diet. There is little scientific evidence to support the idea that the use of performance enhancers truly benefits athletes. Athletes need to be cautious about what they consume and be aware that the manufacturers of performance enhancers may be misleading in their labeling techniques. The FDA should act more strictly to enforce the policies/procedures regarding labeling of products to ensure the safety of the consumer. External influences (i.e. coaches, other athletes, etc) also persuade athletes to take supplements since they believe it will help the athlete's performance. Supplements are mainly used by athletes looking to improve their performance, which again is not widely supported by present research. To ensure fair play and the health and safety of the student athletes, the NCAA enforced a drug testing policy. Even though some student-athletes disregard these policies, the NCAA is currently working hard to put an end to drug use in collegiate athletics and keep student-athletes who are caught out of competition that are caught.

Chapter III

Methodology

The purpose of this study is to determine Division II athlete's frequency of usage and knowledge of performance enhancing drug. Assessment amongst athletes will be based on answers to the survey and will determine whether athletes' usage is justified. The survey will also help determine whether athletes take performance enhancers at an expected rate, are educated on what substances they are currently taking, measure the knowledge of the substance or ingredients in the substance are banned by the NCAA and determine the level of knowledge as to where to get reliable information on substances.

Participants and Recruitment

The sample group will consist of 75 NCAA Division II male and female athletes of various sports (i.e. baseball, basketball, soccer) from institutions located in Central and South Florida. Athletes who choose to participate in this study will take a survey and answer questions regarding their usage and knowledge of performance enhancing substance(s) they are currently taking (if taking any).

The survey will test knowledge and frequency of usage of performance enhancers. Participants will be asked to fill out a survey that will be handed out in a manila envelope by the university's head athletic trainer. Previous contact will be made to the head athletic trainers to ensure their cooperation and participation. Also if they agree to assist in this study, there will be a script for the head athletic trainer to say when asking a student athlete to participate.

Instrumentation

The survey that will be used was taken from a previous study done by Dascombe et al.[4] (see Appendix B) The survey has been modified by the primary investigator to suit the purpose of this study. Due to the modification, a pilot study was conducted to test for validity and reliability of questions. The pilot study was conducted at a National Association of Intercollegiate Athletics (NAIA) Division II school. Questions will be altered regarding to the NAIA instead of the NCAA. The analysis of the pilot study has shown to be confusing for the participants regarding the directions and order of the survey. With this analysis, the survey has been restructured to be more comprehendible with the directions and order of the survey.

The reconstructed survey contains a series of yes and no questions, multiple choice, and open ended questions. The modified survey was created based on research reviewed in Chapter II. The survey contains generic questions such as what school is the participant currently attending, class, age, sex, in season or out of season, and training hours on a weekly basis. The definition of a performance enhancer is provided to give clarity to the participant to what constitutes a performance enhancing substance. The next series consists of questions asking the participant's to rate their diet on a poor to excellent scale (more elaborative answers are provided for each category), if the participants are taking performance enhancers, if not taking performance enhancers to explain why, reason for taking performance enhancers. Based on the answers the participants give, the participant might continue on to the next series of questions if they are currently taking a performance enhancing substance(s). If they are not currently taking performance enhancing substance(s), then they have completed the survey and do not need to continue to the next series of questions. The next section of the survey is for participants that are currently taking performance enhancers. For the number of supplements participants are taking,

the section will be answered the same number of times for each individual supplement. This section consists of where the participant obtained information for the supplement, if it is effective and in what ways, if know that the supplement is banned by the NCAA and where they can find out if the supplement is or is not banned, to rate their knowledge on the supplement (more elaborative answers are provided next to possible answers), and finally if participant would recommend this supplement to other athletes and whether they have sought medical advice for taking this supplement.

Procedures

Head athletic trainers at South and Central Florida NCAA Division II institutions will be contacted to ask for their cooperation and assistance in this study. Once the head athletic trainer agrees to assist, they will post up a flyer created by the head investigator in the athletic training room which will ask student athletes for their participation in this study. If student athletes decide they would like to participate, they will ask the head athletic trainer for the survey. The head investigator will send the athletic trainers thirty surveys that will be placed in individual manila envelopes with a cover letter for each participant that the athletic trainer will not even see (athletic trainers will be instructed not to look at the survey). The head athletic trainers will be asked to hand out the envelopes to the student athletes only if they ask to participate. The student athlete will read the cover letter and participate by filling out the survey if they wish. By completing the survey, the student athletes have given consent to participate in this study as stated in the cover letter. Once the survey is filled out, the student athlete will place it back in another manila envelope, seal it and sign their initials on the back. If an athlete chooses not to participate at any time, he or she will place the unmarked survey in the manila envelope, seal it and initial it on the back. Once again, the athletic trainers will be instructed to not open the sealed manila envelopes that the student athletes hand

in. The sealed manila envelope will be placed it in a large envelope by the student athlete that will be located in the head athletic trainer's office. The head athletic trainer will place the large envelope in a secure location. The secure location will be located within the head athletic trainer's office. The head athletic trainers will be instructed to not sort through the sealed or unsealed manila envelopes at any time. After a period of time, the head athletic trainers will then send the large envelope containing the surveys to the head investigator.

Design and Analysis

The survey will provide the head investigator with descriptive data. A cross tabs analysis will be used to determine use and knowledge of performance enhancers. Also, the chi-square analysis will be used to test for the expected difference between actual outcomes between the student athlete's age, gender, and sport.

Chapter IV

Results

The purpose of this study is to determine Division II athlete's frequency of usage and knowledge of performance enhancing drug. Assessment amongst athletes was based on answers to the survey and will determine whether athletes' usage is justified. The survey also helped determine whether athletes take performance enhancers at an expected rate, are educated on what substances they are currently taking, measure the knowledge of the substance or ingredients in the substance are banned by the NCAA and determine the level of knowledge as to where to get reliable information on substances.

The total number of participants in this study was 74 student athletes. The total response rate to this survey is 49.3%. Results of the research hypothesis are as follows:

The first hypothesis states that 70% of student athletes are taking performance enhancing substances. The result of this survey analysis does not support this hypothesis. This was based on the answer to question 2. At first review, 16.2% of the participants checked yes, but still some indicated that they were taking performance enhancing substances by answering question number seven. A second review was done with an adjusted coding to the data where student athletes who listed specific performance enhancers in question 7 were recorded as 'yes' to question 2. The percentage increased from 16.2% to 23% of student athletes who are taking performance enhancing substances, still way below the percentage hypothesized. Figure 1 below shows descriptive statistics with the first coding, and figure 2 below shows the adjusted coding.

Figure 1, *First Analysis of Student Athletes Taking Performance Enhancing Supplements*

Q2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	62	83.8	83.8	83.8
	Yes	12	16.2	16.2	100.0
	Total	74	100.0	100.0	

Figure 2, *Second Analysis of Student Athletes Taking Performance Enhancing Supplements*

Q2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	57	77.0	77.0	77.0
	Yes	17	23.0	23.0	100.0
	Total	74	100.0	100.0	

Comparing genders and question two, only 9 males and 8 females are taking performance enhancing substances as shown by figure 3 cross tabulation analysis.

Figure 3, *Comparison of Male/Female Student Athletes Taking Performance Enhancing Supplements*

Crosstab

		Q2			% of Yes
		No	Yes	Total	
GENDER	Female	34	8	42	47%
	Male	23	9	32	53%
Total		57	17	74	100%

Comparing sport and question two, the sport of baseball had the highest number of participants, however only 18.18% of baseball players marked that they are taking performance

enhancing substances. The sport of rowing had only eleven participants, but 36.36% stated that they were taking performance enhancing substances. Figure 4 shows the cross tabulation of sport and question two.

Figure 4. *Comparison of Student Athletes of Various Sports That Are Taking Performance Enhancing Supplements*

Crosstab

		Q2		Total	% of Sport
		No	Yes		
SPORT	Rowing	7	4	11	36.36%
	Baseball	18	4	22	18.18%
	Basketball	4	1	5	20%
	Softball	8	2	10	20%
	Soccer	9	1	10	10%
	Cheerleading	1	0	1	0%
	Lacrosse	2	2	4	50%
	Tennis	1	0	1	0%
	Volleyball	5	0	5	0%
	Water Skiier	0	1	1	100%
	Swimming	0	1	1	100%
	Track	2	1	3	33.33%
Total		57	17	74	

Comparing age to question two, the oldest age that answered the survey was 23 years of age. The ages between 18 and 20 showed to have the highest number of student athletes that are taking performance enhancing substances. This age group mainly consists of freshman, sophomore and junior classes. Figure 5 shows the cross tabulation of age and question two.

Figure 5. *Comparison of Student Athletes Ages That Are Taking Performance Enhancing Supplements*

Crosstab

		Q2		Total	% of Yes
		No	Yes		
AGE	18	7	4	11	23.5%
	19	13	2	15	11.8%
	20	12	5	17	29.5%
	21	13	3	16	17.6%
	22	10	3	13	17.6%
	23	2	0	2	0%
Total		57	17	74	100%

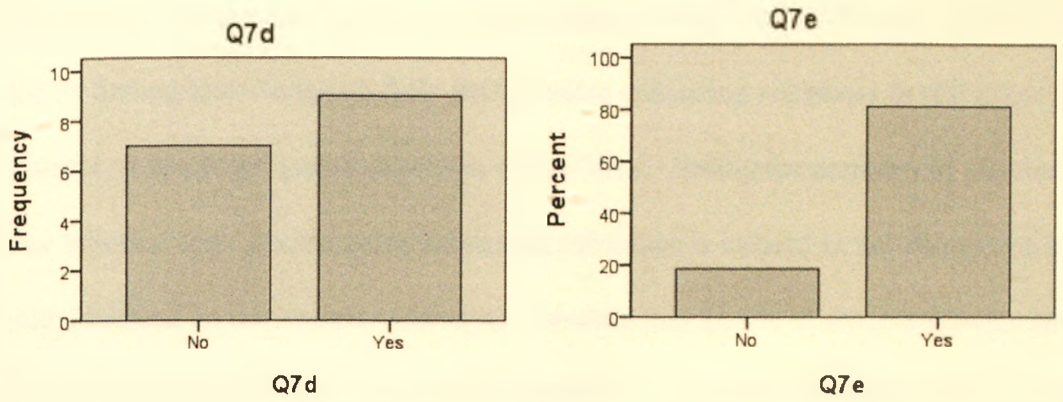
The second hypothesis states that less than 30% of the student athletes have good knowledge of performance enhancing substances. The result of this survey analysis does not support this hypothesis. The analysis shows that more than 30% of student athletes (33.8% total) have good knowledge of performance enhancing substances. This was analyzed by looking at the answers to questions 4a, 4c, 4d and 4e. The number of student athletes that answered these questions were graded and had to score 75%. Figure 6 shows the frequency of the scoring rubric.

Figure 6. *Percentage of Scores for Knowledge of Performance Enhancing Supplements*

Score1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.4	2.6	2.6
	1.00	4	5.4	10.3	12.8
	2.00	9	12.2	23.1	35.9
	3.00	11	14.9	28.2	64.1
	4.00	14	18.9	35.9	100.0
	Total	39	52.7	100.0	
Missing	System	35	47.3		
Total		74	100.0		

The third hypothesis states that the majority of student athletes do not know they are at risk of testing positive on a drug test. The result of this survey analysis does not support this hypothesis. Analyzing the answers from question 7d, only 43.75% of student athletes documented that they do not know the performance enhancing substance they are taking is banned by the NCAA. However, analyzing question 7e, 81.3% of students athlete state they know where to find information if their substance is banned or not. Figure 7 compares the 7d and 7e frequencies. These percentages indicate that the student athletes know where to retrieve information but have not done the research on their performance enhancing substance.

Figure 7. *Student Athletes Knowledge about NCAA Banned Substances*



The results of the descriptive data are as follows. Results of question one that asks the student athletes to rate their diet show that 81% of the 74 student athletes claim to at least have a "good diet". However, only 11% of those student athletes claim to have an "excellent diet". A total of 60 student athletes answered this question. Results of question three shows reasons why the student athletes do not take performance enhancing supplements because 20% believe performance enhancing supplements are illegal, 6.7% listed that it is against NCAA to take performance enhancing supplements, 15% depend on natural athletic ability and hard work to enhance performance, 13.3% believe they do not need them, and 10% believe that performance enhancing supplements are harmful/not good for the body. The other 35% listed various results of why they do not take performance enhancing supplements (i.e. don't believe in them, do not know side effects, too expensive, do not want to, etc). The student athletes have listed multiple influential figures that influenced them to take their performance enhancing supplement. 29.4% of the student athletes that are currently taking performance enhancing supplements have multiple influences surrounding them (most common listed were friends/family, coach and fellow athlete).

In conclusion, the results of the survey analysis show that the four hypotheses stated in the introduction are not supported. The first hypothesis was on the higher end of the percentage

range, but results show that not many student athletes are taking performance enhancing substances. The second hypothesis wasn't upheld, but by only a little bit. 33.8% of student athletes having knowledge on their performance enhancing substance is still a low percentage. However, it is a better percentage than below 30%. Seeing the majority of the student athletes know whether their performance enhancing substance is banned or not shows that the athletes are being educated on this matter. However, showing that 81.3% of student athletes know where to retrieve information if their substance is banned or not shows the student athletes need to utilize their education and find out of their substance is banned or not. Having no significant difference amongst the student athlete's age, gender and sport on this matter shows that not one age group, gender or sport is using more performance enhancing substances over other groups. The descriptive data shows that 81% of the student athletes claim to at least have a good diet. Out of 60 student athletes that answered question three, 20% claim they do not take performance enhancing supplements because they are illegal. Out of the 17 athletes that are currently taking performance enhancing supplements, 29.4% have multiple influential figures that most commonly include friends/family, coaches and fellow athletes. This will be discussed further in chapter five.

Chapter V

Discussion

The purpose of this study is to determine Division II athlete's frequency of usage and knowledge of performance enhancing drug. Assessment amongst athletes was based on answers to the survey and will determine whether athletes' usage is justified. The survey also helped determine whether athletes take performance enhancers at an expected rate, are educated on what substances they are currently taking, measure the knowledge of the substance or ingredients in the substance are banned by the NCAA and determine the level of knowledge as to where to get reliable information on substances.

Student athletes need to have a well balanced diet in order for the body to fully recover form training and aide to increase performance. Overall, most of the student athletes in this study claim to have a "good" diet (which was elaborated as, "well balanced diet most days"). Supplementation along with a well balanced diet can cause toxicity due to ingestion of excess nutrients that the body requires. Water soluble vitamins (vitamin B complex and vitamin C) for example will excrete via urination when there is a surplus. However, fat soluble vitamins (vitamin A, D, E, and K) are stored in the body when not used (these vitamins do not emit as easily as water soluble vitamins). Common performance enhancing substances that were listed in this study were multi-vitamins, and protein shakes. Student athletes need to keep track of their diet and supplementation to make certain they do not reach toxic levels.

Collegiate athletes are limited to what foods they can eat. Unless the athletes have access to a full kitchen and can afford groceries, they are limited only to what their dining hall can offer. Quatromoni[19] stated on the nutritional issues collegiate athletes face, "span a spectrum of under nutrition (such as low energy intake) and compromised nutrition by status of high body fat

percent and overweight". Proper education/intervention is a tool to help student athletes make the right choices regarding diet and refraining from ingesting performance enhancing supplements (as soon by Abood et al[20]). However, this study shows that the students are receiving education on nutrition and performance enhancing substances but they have not utilized what they have learned. Again, most student athletes state they have a well balanced diet most days, but 23% are still ingesting performance enhancing substances. These student athletes should know that with an adequate diet, additional supplementation is not necessary. Also, student athletes indicated they do not know if their substance is banned by the NCAA, but they do know where to find out this information. This shows that the education for student athletes on this matter is being taught, but is not being implemented. It is a possibility that the student athletes are linking illegal supplements with banned substances. This possibility could mean that student athletes believe if a supplement is not banned by law, then they might assume the supplement is not banned by the NCAA. With that said, this can also lead to the possibility that the student athletes do not feel the need to look up the supplement they are taking. Although the student athlete can be over confident that they won't get drug tested and/or won't get caught with a banned supplement, the student athlete does not feel the need to retrieve the banned supplement information.

Athletes have many influential figures surrounding them every day. An influential figure can be a coach, fellow athlete, strength trainer, etc. Any of the people listed can influence an athlete to take a performance enhancing supplement, but ultimately it is up to the individual to decide if he/she is going to or not. In a study by Dascombe et al[4], "17% of athletes listed themselves as an influential figure in determining supplement usage". In this study, common influential figures that were listed were coaches, fellow athletes, and even a store representative

(such as the GNC store). Listing a store representative is interesting because these sales representatives make their paycheck by commission. Of course the sales representative is going to try to sell as many products as they can to whoever walks into the store. Also, these representatives are talking about the product based on what the label says, not by scientific evidence (since there is not much evidence out there to support most of these performance enhancing substances). Influential figures that need to be listed are people with a nutritional background (such as a nutritionist or dietician). Nutritionist/dieticians can justify if one needs to take a performance enhancing supplement or not. Unfortunately, coaches, fellow athletes and store representatives do not have an extensive nutritional background and aren't qualified to recommend a performance enhancing supplement to an athlete.

"Worldwide supplement use among athletes on average range from 40-60%"[16]. Out of 74 division II student athletes in this study, only 17 stated they are taking performance enhancing supplements. However, this low percentage can be due to athletes associating performance enhancing supplements with illegal drugs. Some student athletes that listed they do not take performance enhancing supplements explained they do not because performance enhancing supplements are illegal. Student athletes can be confusing the terms performance enhancing supplements with nutritional supplements. Realistically, both of these categories are supplements that claim to have a positive effect on performance (whether it is reduce fatigue, increase strength, reduce body fat, etc). In the survey, there was a basic definition of performance enhancing supplements that clarify it as, "supplement, drug, etc that is used to enhance performance for an athlete in a sport he/she is engaged in". This misunderstanding can be explained by the student athlete not thoroughly reading the survey and just answering the questions.

Drug testing was put into action by the NCAA in 1986. This was put into practice to ensure fair competition for all athletes in the NCAA. The NCAA banned substance list is updated annually. Student athletes have full access to the banned substance list online at ncaa.org. Also, this list is given to them at the beginning of every school year by the school's compliance coordinator. There is another option to see if a drug or supplement is banned by the NCAA, the website is drugfreesport.com. Again, the student athletes are educated on what is banned by the NCAA and where they can look up what supplements are banned as well. According to the findings of this study, student athletes do not know if their supplement is banned by the NCAA, but they state they do know where to retrieve the information if their supplement is banned or not. Again as stated in the beginning of this section, student athletes need to utilize their education. Student athletes that do not find out if their supplement is banned are at risk of doping violations.

The first hypothesis states that 70% of student athletes are taking performance enhancing substances. This hypothesis is not supported by the results of the survey analysis. The results show that only 23% of student athletes are currently taking performance enhancing supplements. A study conducted in 2004 at a division I university, the results reported that 89% of student athletes had taken or are currently taking performance enhancing supplements.[23] In a study by Dascombe et al[21], the results showed that 87.5% of elite athletes reported taking performance enhancing supplements. Compared to other studies, the results are varied. Varied results comparing Division I and Division II student athletes can be due to the different level of competition between the two divisions, different levels of pressure to win and succeed on the athletes as well as different expectations from the coaches. The Division I athletes may be more driven to take performance enhancing supplements as compared to Division II athletes. Another

possibility explaining these results is that student athlete may not know they are ingesting a performance enhancing supplement. The definition of a performance enhancing supplement was on the first page of the survey to decrease the confusion. Perhaps student athletes do not relate nutritional supplement and performance enhancing supplement. Student athletes relate performance enhancing supplements with illegal drugs which is true for some supplements but not all.

The second hypothesis states that less than 30% of the student athletes have good knowledge of performance enhancing substances. The results from this survey analysis show that 33.8% of student athletes that are taking performance enhancing supplements have good knowledge, which does not support this hypothesis. The student athletes were graded based on answers to question 4a, 4c, 4d, and 4e. The students must score at least a 75% to state they have knowledge of performance enhancing supplements. This finding shows that student athletes are being educated on performance enhancing supplements. 33.8% of student athletes are aware of what they are ingesting and of possible risks and side effects of performance enhancing supplements. In comparison, the Dascombe et al[21] study found that 61.9% of athletes did not know the active ingredient in their supplement. Also, 57.1% did not know the side effects and 54% did not know the mechanism of action.

The third hypothesis states that the majority of student athletes do not know they are at risk of testing positive on a drug test. Results show that 43.75% of student athletes do not know if their supplement is banned or not by the NCAA, but 81.3% do know where to look up the information to find out if it is or not. This shows that student athletes need to utilize their sources of information so they can know if the supplement they are taking puts them at risk of testing positive on a drug test. As stated before, athletes need to utilize their education. There is

limited data to compare this hypothesis due to results of other studies such as Somerville et al.[22] made assumptions whether the athletes know or not they are at risk of a doping violation. Somerville found that education was being given to the athletes, but some claim they forget what supplements are banned and need a reminder every now and again.

There was no significant difference between age, gender and sport due to the small number of student athletes that stated they are taking performance enhancing supplements. Out of the 17 student athletes who state they do take performance enhancing supplements, eight of them are female and nine are male. Stated in previous studies, female athletes take vitamin/mineral supplements mainly to prevent illness, and male athletes take protein supplements, creatine, etc to increase muscle mass and become stronger.[22] In another study, multivitamin and creatine were the most frequent supplement used among college athletes as well.[8] This study found that females mainly listed their performance enhancing supplements are multivitamin tablet, and protein shakes. The males in this study mainly listed their performance enhancing supplements are protein shakes, creatine and energy drinks. The difference in what categories of performance enhancing supplements among the gender is what the student athletes wish to gain out of their supplement. The sports of rowing and baseball have the highest number of student athletes that state they do take performance enhancing supplements. Finding that baseball is one of the sports that had the second highest number of student athletes taking performance enhancing supplements is not uncommon. The age range of 18-20 has shown to have the highest rate of student athletes taking performance enhancing supplements. This study consisted of a collegiate age group between the ages of 18-23 years of age.

Major limitation to this study was the possible misunderstanding of what qualifies as a performance enhancing supplement. If both the definition of a nutritional supplement and

performance enhancing supplement was in the survey, it may have reduced the confusion. Also, there was a short time frame for the student athletes to ask the athletic trainer for the survey. An extended time frame possibly could have meant a larger sample size, where at least 300 survey returns can validate these findings. Also to enlarge the sample size, recruiting more DII schools in the southeast region to participate in this study again to enhance the chances of a higher response rate. Future research is suggested with a larger sample size to receive a better idea of the knowledge and usage of performance enhancing supplements among DII athletes. The findings will be interesting to compare to other divisions due to the differences in educational resources and budgets.

In conclusion, DII athletes in the South Florida region have an overall good knowledge of performance enhancing supplements, but a low percentage of South Florida DII athletes use performance enhancing supplements. This low number can be due to the confusion as to what a performance enhancing supplement is. The student athletes are educated on performance enhancing supplements, but do not utilize it to look up if their supplement is banned by the NCAA. The student athletes know where to acquire the information, but do not actually retrieve it. With that said, that puts them at risk for doping violations if they do not research through specific resources. This was a preliminary study done on division II student athletes that showed positive results in the areas of frequency of use, knowledge of supplements, as well as knowledge of where to retrieve information on banned substances.

Appendix A

2010-11 NCAA Banned Drugs

The NCAA bans the following classes of drugs:

a. Stimulants
b. Anabolic Agents
c. Alcohol and Beta Blockers (banned for rifle only)
d. Diuretics and Other Masking Agents
e. Street Drugs
f. Peptide Hormones and Analogues
g. Anti-estrogens
h. Beta-2 Agonists

Note: Any substance chemically related to these classes is also banned.
The institution and the student-athlete shall be held accountable for all drugs within the banned drug class regardless of whether they have been specifically identified.

Drugs and Procedures Subject to Restrictions:

a. Blood Doping.
b. Local Anesthetics (under some conditions).
c. Manipulation of Urine Samples.
d. Beta-2 Agonists permitted only by prescription and inhalation.
e. Caffeine if concentrations in urine exceed 15 micrograms/ml.

NCAA Nutritional/Dietary Supplements Warning:

Before consuming any nutritional/dietary supplement product, review the product with your athletics department staff!

- Dietary supplements are not well regulated and may cause a positive drug test result.
- Student-athletes have tested positive and lost their eligibility using dietary supplements.
- Many dietary supplements are contaminated with banned drugs not listed on the label.
- **Any product containing a dietary supplement ingredient is taken at your own risk.**

It is your responsibility to check with the appropriate athletics staff before using any substance.

Some Examples of NCAA Banned Substances in Each Drug Class

NOTE: **There is no complete list of banned drug examples!!**
Check with your athletics department staff before you consume any medication or supplement.

Stimulants:
amphetamine (Adderall); caffeine (guarana); cocaine; ephedrine; fenfluramine (Fen); methamphetamine; methylphenidate (Ritalin); phentermine (Phen); synephrine (bitter orange); etc.
exceptions: phenylephrine and pseudoephedrine are not banned.

Anabolic Agents – (sometimes listed as a chemical formula, such as 3,6,17-androstenetrione)
boldenone; clenbuterol; DHEA; nandrolone; stanozolol; testosterone; methasterone; androstenedione; norandrostenedione; methandienone; etiocholanolone; trenbolone; etc.

Alcohol and Beta Blockers (banned for rifle only):
alcohol; atenolol; metoprolol; nadolol; pindolol; propranolol; timolol; etc.

Diuretics (water pills) and Other Masking Agents:
bumetanide; chlorothiazide; furosemide; hydrochlorothiazide; probenecid; spironolactone (canrenone); triameterene; trichlormethiazide; etc.

Street Drugs:
heroin; marijuana; tetrahydrocannabinol (THC) – no other substances are classified as NCAA street drugs.

Peptide Hormones and Analogues:
growth hormone(hGH); human chorionic gonadotropin (hCG); erythropoietin (EPO); etc.

Anti-Estrogens :
anastrozole; tamoxifen; formestane; 3,17-dioxo-etiochol-1,4,6-triene(ATD), etc.

Beta-2 Agonists:
bambuterol; formoterol; salbutamol; salmeterol; etc.

Any substance that is chemically related to the class of banned drugs is also banned! (unless otherwise noted)

NOTE: Information about ingredients in medications and nutritional/dietary supplements can be obtained by **contacting the Resource Exchange Center, REC, 877-202-0769 or www.drugfreesport.com/rec password ncaa1, ncaa2 or ncaa3.**

It is your responsibility to check with the appropriate athletics staff before using any substance.

Appendix B

Nutritional Supplementation Questionnaire

Age: _____ yr

Gender: _____

Sport: _____

Training hours: _____ /week

Do you currently use performance enhancers? YES/NO

Do you agree with the following perceptions regarding performance enhancers?

- Supplements are associated with health risks YES/NO
- Supplements enhance performance YES/NO
- Exercise increases the need for supplements YES/NO
- Supplements can cause positive doping results YES/NO
- Supplements are not needed with a balanced diet YES/NO
- More information should be provided on supplements YES/NO

If you don't use performance enhancers, list why you don't below:

If you use performance enhancers, how many supplements do you use: _____

List the supplements that you use below:

Why do you take performance enhancers?

- Maintain health
- Dietary routine
- Boost immunity
- Recommendations from other athletes
- Improves energy
- Improves performance
- Reduce fatigue
- Improves strength
- Sponsorship arrangements
- Travel assistance
- Other reasons (please list below)

Rate your knowledge on the supplements that you use, do you have:

- No knowledge
- Knowledge of active ingredient (what is actually in the supplement)
- Specific knowledge
- Extensive knowledge
- Complete knowledge (how it works and studies showing its effects)

Who are the main influences in deciding which performance enhancers to use (can list more than one):

Coach

Doctor

Self

Other athletes

Family and friends

Other allied health professionals and support staff

Would you recommend other athletes take performance enhancers: YES/NO

Do you get medical advice before starting a nutritional supplement: YES/NO

Do you continue to use supplements when you are not training: YES/NO

THANK YOU

Appendix C

Performance Enhancing Substance Questionnaire

School: _____

Class: Freshman Sophomore Junior Senior Graduate Student

Age: _____ yr

Gender: _____

Sport: _____

Check One: In Season: _____ Out of Season: _____

Training hours: _____ /week

A performance enhancing substance is defined as a substance, supplement, drug, etc that is used to enhance performance for an athlete in a sport he/she is engaged in.

1. Rate your diet:

   Excellent (Well balanced) | Good (Well balanced most days) | Fair (Well balanced less days) | Poor (Not well balanced)

2. Do you currently use performance enhancers? YES/NO

   ***If answered yes to question #2, please skip to question #4.**

   ***If answered no to question #2, please answer question #3 and this will complete your survey.**

3. If you do not use performance enhancers, explain why you don't below:

4. Do you agree with the following perceptions regarding performance enhancers?
    a. Supplements are associated with health risks YES/NO
    b. Supplements enhance performance YES/NO
    c. Exercise increases the need for supplements YES/NO
    d. Supplements can cause positive doping results YES/NO
    e. Supplements are not needed with a balanced diet YES/NO
    f. More information should be provided on supplements YES/NO

5. Why do you take performance enhancers? Circle all that apply.

    Maintain health

    Dietary routine

    Boost immunity

    Recommendations from other athletes

    Improves energy

    Improves performance

    Reduce fatigue

    Improves strength

    Sponsorship arrangements

    Travel assistance

    Other reasons (please list below)

6. List other types of liquid you drink other than water during your sport participation (practice, competition, etc):

If you are taking performance enhancers, please complete the following section where you will be asked to list supplements you are currently taking and answer questions about them.

Below, list the nutritional supplement(s) individually and answer the following questions:

7. Supplement #1: _____

   a. Regarding supplement #1, where did you obtain information on this supplement?

   b. For supplement #1, who were the main influences in deciding to use this supplement? Circle all that apply.

Coach	Other athletes
Doctor	Family and friends
Self	Other allied health professionals and support staff

   c. Do you think this nutritional supplement is effective? In what ways is it effective? How would you validate this positive effect?

   d. Do you know if the substance(s) in your nutritional supplement is a banned substance by the NCAA? YES/NO

   e. Would you know where to go to find out if this specific supplement is on the banned substance list by the NCAA? YES/NO

   f. Rate your knowledge of this supplement. Please circle the closest match to your level of knowledge:

      No knowledge (know only what is on label/know what advertisement states about supplement)

      Knowledge of active ingredient (what is actually in the supplement)

      Specific knowledge (know how the active ingredient(s) work in the body)

      Complete knowledge (how it works and studies showing its effects)

g. Would you recommend other athletes take this supplement? YES/NO

h. Did you receive medical advice before taking this supplement? YES/NO

8. Supplement #2: _____

a. Regarding supplement #2, where did you obtain information on this supplement?

b. For supplement #2, who were the main influences in deciding to use this supplement? Circle all that apply.

Coach	Other athletes
Doctor	Family and friends
Self	Other allied health professionals and support staff

c. Do you think this nutritional supplement is effective? In what ways is it effective? How would you validate this positive effect?

d. Do you know if the substance(s) in your nutritional supplement is a banned substance by the NCAA? YES/NO

e. Would you know where to go to find out if this specific supplement is on the banned substance list by the NCAA? YES/NO

f. Rate your knowledge of this supplement. Please circle the closest match to your level of knowledge:

No knowledge (know only what is on label/know what advertisement states about supplement)

Knowledge of active ingredient (what is actually in the supplement)

Specific knowledge (know how the active ingredient(s) work in the body)

Complete knowledge (how it works and studies showing its effects)

g. Would you recommend other athletes take this supplement? YES/NO

h. Did you receive medical advice before taking this supplement? YES/NO

9. Supplement #3: _____

a. Regarding supplement #3, where did you obtain information on this supplement?

b. For supplement #3, who were the main influences in deciding to use this supplement? Circle all that apply.

Coach	Other athletes
Doctor	Family and friends
Self	Other allied health professionals and support staff

c. Do you think this nutritional supplement is effective? In what ways is it effective? How would you validate this positive effect?

d. Do you know if the substance(s) in your nutritional supplement is a banned substance by the NCAA? YES/NO

e. Would you know where to go to find out if this specific supplement is on the banned substance list by the NCAA? YES/NO

f. Rate your knowledge of this supplement. Please circle the closest match to your level of knowledge:

No knowledge (know only what is on label/know what advertisement states about supplement)

Knowledge of active ingredient (what is actually in the supplement)

Specific knowledge (know how the active ingredient(s) work in the body)

Complete knowledge (how it works and studies showing its effects)

g. Would you recommend other athletes take this supplement? YES/NO

h. Did you receive medical advice before taking this supplement? YES/NO

10. Supplement #4: _____

a. Where did you obtain information on this supplement?

b. Who were the main influences in deciding to use this supplement? Circle all that apply.

Coach	Other athletes
Doctor	Family and friends
Self	Other allied health professionals and support staff

c. Do you think this nutritional supplement is effective? In what ways is it effective? How would you validate this positive effect?

d. Do you know if the substance(s) in your nutritional supplement is a banned substance by the NCAA? YES/NO

e. Would you know where to go to find out if this specific supplement is on the banned substance list by the NCAA? YES/NO

f. Rate your knowledge of this supplement. Please circle the closest match to your level of knowledge:

No knowledge (know only what is on label/know what advertisement states about supplement)

Knowledge of active ingredient (what is actually in the supplement)

Specific knowledge (know how the active ingredient(s) work in the body)

Complete knowledge (how it works and studies showing its effects)

g. Would you recommend other athletes take this supplement? YES/NO

h. Did you receive medical advice before taking this supplement? YES/NO

THANK YOU

Appendix D

Barry University
Cover Letter

Dear Research Participant:

Your participation in a research project is requested. The title of the study is "Knowledge and Usage of Performance enhancers by NCAA Division II Athletes". The research is being conducted by Elise Corinne Carlson, a student in the athletic training department at Barry University, and is seeking information that will be useful in the field of performance enhancers. The aims of the research are to find out the knowledge and rate of usage of performance enhancers among student athletes. In accordance with these aims, the following procedures will be used: a survey instrument referenced and modified by the primary investigator. We anticipate the number of participants to be 75.

If you decide to participate in this research, you will be asked to do the following: complete the survey to the best of your ability, which should take approximately twenty minutes.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse effects on your current reputation.

There are no known risks to you for participating in this survey. Although there are no direct benefits to you, your participation in this study may help our understanding of student athlete knowledge and rate of usage of performance enhancers.

As a research participant, information you provide will be kept anonymous, that is, no names or other identifiers will be collected on any of the instruments used. Data will be kept in a secure file in your head athletic trainer's office. By completing and returning this survey you have shown your agreement to participate in the study.

The data that will be submitted will be kept for 3 years in a locked cabinet in Dr. Shapiro's office at Barry University by the primary investigator.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, Elise Carlson, at (914) 980-2027, my supervisor, Dr. Shapiro, at (305) 899-3574, or the Institutional Review Board point of contact, Barbara Cook, at (305) 899-3020.

Thank you for your participation.

Sincerely,

Elise Carlson, ATC/LAT

Appendix E

Seeking Assistance from Head Athletic Trainers in Central and South Florida NCAA DII Institutions

Asking for assistance in a study of knowledge and usage of performance enhancing substances among NCAA division II athletes. The assistance includes handing out surveys to your student athletes during you operating hours. What will be asked of volunteers:

1) Put up a flyer in the athletic training room for all student athletes to see
2) If student athletes volunteer to participate, hand the survey to them in the manila envelope
3) Student athletes will hand back the survey in the manila envelope sealed and to please place it in a secure location in your office
4) After a certain period of time, all sealed envelopes to be sent back to primary investigator

If any questions or concerns, please contact the primary investigator:

Elise Carlson, ATC/LAT

(914) 980-2027

Elise.Carlson@mymail.barry.edu

Appendix F

Now Seeking 30 Student Athletes to Participate in Research Study

This study will investigate the knowledge and usage of performance enhancing substances of NCAA Division II student athletes

Student athletes who are interested in taking the survey please see your Head Athletic Trainer and ask for the performance enhancing substance survey. The completion of this survey should take approximately 20 minutes.

Thank You,

Elise Carlson, ATC/LAT (primary investigator)

(914) 980-2027

Elise.Carlson@mymail.barry.edu

Appendix G

BARRY UNIVERSITY

11300 NE Second Avenue
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OFFICE OF THE PROVOST
INSTITUTIONAL REVIEW BOARD

Research with Human Subjects
Protocol Review

Date:	February 21, 2011
Protocol Number:	110104
Title:	Knowledge & Usage of Performance & Leisure Sciences
Approval Date:	2/21/11
Name:	Elise Carlson
Address:	931 NE 107th Street Miami, FL 33161
Sponsor:	Dr. Sue Shapiro.
School:	Sports & Exercise Science

Dear Ms. Carlson:

On behalf of the Barry University Institutional Review Board (IRB), I have verified that the specific changes requested by the IRB have been made. Therefore, I have granted final approval for this study as exempt from further review.

As principal investigator of this protocol, it is your responsibility to make sure that this study is conducted as approved by the IRB. Any modifications to the protocol or consent form, initiated by you or by the sponsor, will require prior approval, which you may request by completing a protocol modification form.

It is a condition of this approval that you report promptly to the IRB any serious, unanticipated adverse events experienced by participants in the course of this research, whether or not they are directly related to the study protocol. These adverse events include, but may not be limited to, any experience that is fatal or immediately life-threatening, is permanently disabling, requires (or prolongs) inpatient hospitalization, or is a congenital anomaly cancer or overdose.

The approval granted expires on February 1, 2012. Should you wish to maintain this protocol in an active status beyond that date, you will need to provide the IRB with and IRB Application for Continuing Review (Progress Report) summarizing study results to date.

If you have questions about these procedures, or need any additional assistance from the IRB, please call the IRB point of contact, Mrs. Barbara Cook at (305)899-3020 or send an e-mail to

dparkhurst@mail.barry.edu . Finally, please review your professional liability insurance to make sure your coverage includes the activities in this study.

Sincerely,

Doreen C. Parkhurst, M.D., FACEP
Chair Institutional Review Board
Associate Dean, SGMS &
Program Director, PA Program
Barry University
Box SGMS
11300 NE 2nd Avenue
Miami Shores, FL 33161

Cc: Dr. Sue Shapiro

Note: The investigator will be solely responsible and strictly accountable for any deviation from or failure to follow the research protocol as approved and will hold Barry University harmless from all claims against it arising from said deviation or failure.

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