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INFLUENCE OF CURRICULUM ON PHYSICAL ACTIVITY OF ATHLETIC TRAINING GRADUATE STUDENTS

A Dissertation

Presented to

The School of Graduate Studies

Department of Curriculum, Instruction, and Media Technology

Indiana State University

Terre Haute, Indiana

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

Melissa J. Reynolds

August 2007

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CERTIFICATE OF APPROVAL

DOCTORAL DISSERTATION

This is to certify that the Doctoral Dissertation of

Melissa J. Reynolds

entitled

Influence of Curriculum on Physical Activity of Athletic Training Graduate Students

has been approved by the Examining Committee for the dissertation requirement for the

Doctor of Philosophy degree

in Curriculum and Instruction (Teaching and Learning)

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ABSTRACT

The purpose of this study was: (a) to determine the level of physical activity of athletic training graduate students in a National Athletic Trainers' Association (NATA) accredited Post-Certificate Graduate Education Program; (b) identify the exercise stage of change of athletic training graduate students; and (c) to identify the impact curriculum had on physical activity behaviors. One hundred seventy-five students from 10 of the 11 Post-Certification Graduate Education Programs were invited to participate in an online survey, 87 subjects participated. A demographic survey, physical activity questions from the National College Health Risk Behavior Survey (NCHRBS), a Stages of Exercise Change Questionnaire, and a Qualitative Barriers Questionnaire were completed. SPSS software was used to analyze survey data. Results revealed 15.9% of the subjects were sedentary, 47.6% active, 4.9% moderate, and 31.7% were classified as vigorous during a seven-day period. Exercise stages of change found 53.7% of subjects in the contemplation or preparation stages and 46.3% in the action or maintenance stages. A multinomial logistic regression found no significant relationship between physical activity levels and curriculum. The qualitative data was coded and categorized by relevant themes. These themes revealed that the majority of students felt overwhelmed with long hours spent in clinical assignments and completing research, and 68.3% of subjects reported that curriculum decreased their physical activity behaviors.

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TABLE OF CONTENTS

Page

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Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

LIST OF TABLES AND FIGURES

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Figure Page

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Chapter 1

INTRODUCTION

Statement of the Problem

Chronic diseases such as coronary heart disease, stroke, type II diabetes mellitus, and obesity plague Americans and are linked with physical inactivity. More than 300,000 deaths per year in the United States are attributed to poor dietary intake and physical inactivity. The substantial benefits of regular physical activity and exercise have been reported to reduce the risk of these chronic diseases, yet more than 50% of Americans do not engage in enough physical activity to reap these benefits and more than 25% of Americans are sedentary (Centers for Disease Control and Prevention, 2005).

Educating people about the benefits of regular physical activity along with teaching them how to incorporate physical activity and exercise into their daily routine are important steps in reversing the chronic disease epidemic. The more knowledge individuals have about exercise, the more likely they will be to start an exercise regime and adhere to it (Buxton, Wyse, & Mercer, 1996). However, even allied health professionals, such as doctors, nurses, and athletic trainers do not comply with the Surgeon General, Centers for Disease Control and Prevention (CDC), and American College of Sports Medicine (ACSM) guidelines for moderate and vigorous physical

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activity. "Given the obvious benefits associated with health-related physical fitness, it is imperative that allied health professionals maintain a certain level of health-related physical fitness" (Miller & Berry, 2000, p. 306).

There has been anecdotal discussion by athletic training practitioners regarding obesity and a lack of physical activity and exercise among Certified Athletic Trainers (Athletic Trainer Certified-ATCs). Data elicited by Cuppett and Latin (2002) and Schulman (2003) revealed that ATCs do not typically engage in regular physical activity. A moderate amount of physical fitness is needed for various job related physical activities such as therapeutic rehabilitation, assistance with ambulation, carrying large water coolers, and demonstration of reconditioning, strength and agility movements. As health professionals it is imperative that athletic trainers, and others in the allied health field, model the healthy behaviors, such as engaging in regular moderate and vigorous physical activity, which they promote for their patients, athletes, and clients.

Throughout their program of study, athletic training graduate students gain knowledge of why and how to exercise. They are also surrounded by a physically active population for which they provide care. Therefore, it could by hypothesized that athletic training graduate students are engaging in positive health attributes such as regular physical activity and exercise at higher levels than the general population; however, due to the demands of their particular curriculum, time may be limited for physical activity. Course work, assistantship demands, clinical assignment, and scholarly research are among the possible barriers to physical activity in the graduate athletic training curriculum.

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Purpose of the Study

The purpose of this study was to determine if athletic training graduate students in a National Athletic Trainers' Association (NATA) accredited Post-Certificate Graduate Education Program engaged in regular physical activity and to identify the impact curriculum had on physical activity behaviors. Regular physical activity is not only important to the personal health and wellness of the student athletic trainer, but also to the profession of athletic training. It is important to identify if these students are engaging in physical activity and what type of impact, if any, the curriculum has on their physical activity behaviors. If students are not physically active and the curriculum is cited as the limiting factor, a change may be needed in the academic domain of athletic training.

To be successful in their careers, depending on the physical demands such as carrying, lifting, and demonstrating strength and conditioning exercises needed, athletic trainers should engage in a moderate amount of physical conditioning. It is also important that athletic trainers exhibit this behavior for their own personal health and wellness. Finally, the athletes and patients athletic trainers work with may respond better to an athletic trainer who models the behavior of a healthy, active person. Athletic trainers should personify the model they are trying to instill in their athletes, patients, and clients.

Need for the Study

Although there have been numerous studies on the health behaviors of nurses, doctors, and the students of these fields, much of this research is very dated. There is little recent data regarding physical activity and other health behaviors of allied health professionals. More significant to this study, there is no data on the topic of physical activity of athletic training students.

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Little focus has been given to the personal health and wellness of athletic trainers. Cuppett and Latin (2002) found that working athletic training professionals did not engage in levels of physical activity above the general population. This study is among the handful of studies completed regarding the physical activity of practicing certified athletic trainers, yet there is no research of physical activity levels during undergraduate or graduate school, prior to engaging in a career in athletic training. Likewise, there has been little research regarding physical activity of graduate students regardless of major and only moderate research of physical activity of undergraduates. Because moderate physical activity during an academic program may relate to continuance of an ingrained practice, understanding the influences that promote or inhibit such practices in an academic program is important.

According to the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM), adults should engage in moderate intensity physical activity more than five days a week for at least 30 minutes to reduce the risk of chronic disease or engage in vigorous intensity physical activity for at least 20 minutes more than three days a week for even more benefits (Pate et al., 1995). Over 16% of the ATC's in Cuppett and Latin's (2002) study were reported to be physically inactive or sedentary. It is not known what percentage of athletic training undergraduate or graduate students are sedentary or engage in moderate or vigorous physical activity.

Objectives of the Study

The objectives of this study were to classify physical activity behaviors of athletic training graduate students, and to identify the influence curriculum has on these physical

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activity behaviors. It was hypothesized that athletic training graduate students would not be physically active due to the intense curricular demands of their field.

Research Questions

The following were research questions for the study:

1. What percentage of athletic training graduate students are vigorously physically active, moderately physically active, active but not meeting CDC/ACSM guidelines, or sedentary?
2. Is the graduate athletic training curriculum a determinant of physical activity behaviors of athletic training graduate students?

Hypotheses

For the purpose of this study, the following hypotheses were created:

1. Less than 25% of athletic training graduate students were sedentary and in the pre-contemplation or contemplation stage.
2. Less than 50% of athletic training graduate students were active but not meeting the recommended amount of physical activity and were in the preparation or action stage.
3. Less than 15% of athletic training graduate students engaged in moderate physical activity and were in the action or maintenance stage.
4. Less than 10% of athletic training graduate students engaged in vigorous physical activity and were in the action or maintenance stage.
5. Age, gender, ethnicity, marital status, hours spent in class per week, clinical assignment, hours spent in clinical assignment per week, hours spent researching

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and studying per week, program length, program credit hours, or season status do not predict level of physical activity.

Percentages used in the preceding hypotheses were based on CDC data of national averages for physical activity (CDC, 2005).

Significance of the Study

This study will provide athletic training graduate students with information to aid them in becoming cognizant of the importance of their own physical activity. Even those aware of the importance of personal health and wellness may not be aware why they are unable to practice healthy behaviors. Knowing the specific influences inhibiting or promoting physical activity, such as program curriculum, research projects, or life outside academia, may help these students become aware of where and how to modify specific influences.

This research may also offer program directors of graduate athletic training programs insight as to what modifications may need to take place in the curriculum. The NATA has made an effort to address the importance of healthy lifestyle by deeming the slogan for the 2006 National Athletic Training Month as "Be Active, Stay Healthy" (NATA, 2006a). The organization will benefit from this study regardless of the outcome of the data because it will either reveal the athletic training curriculum to be adequate in instilling positive physical activity behaviors in students, or it may create need for further research into graduate and undergraduate athletic training curriculum.

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Definition of Terms

Action Stage of Change: Actively engaging in physical activity behavior.

Certified Athletic Trainers (ATCs): "unique health care providers who specialize in the prevention, assessment, treatment, and rehabilitation of injuries and illnesses" (NATA, 2007, ¶ 1).

Contemplation Stage of Change: Thinking about making a change in physical activity behavior.

Curriculum: All aspects of the graduate athletic training program including course work, graduate assistantship, clinical assignment, and scholarly research.

Exercise: A form of physical activity; planned and structured movement done to bring about improvements in physical fitness.

Maintenance Stage of Change: The final stage of behavioral change; occurs after six months of engaging in regular physical activity.

Moderate intensity physical activity: Movement activities that cause a slight increase in heart rate and breathing, such as a brisk walk, done for at least 30 minutes at least five days a week.

National Athletic Trainers' Association (NATA): The national governing body for athletic training.

Physical activity: Any bodily movement that occurs while engaging in athletic, recreational, or occupational activities; physical activity may include physical skills, speed, flexibility, muscular strength, muscular endurance, power, cardiovascular endurance, range of motion, and agility.

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Pre-contemplation Stage of Change: Not wanting to make a change in sedentary behavior.

Preparation Stage of Change: Getting ready to make a change or already making small changes for physical activity engagement.

Sedentary: Inactive; not engaging in any leisure time physical activity.

Vigorous intensity physical activity: Movement activities that greatly increase heart rate and breathing, such as running, done for more than 20 minutes at least three days a week.

Limitations

The following were limitations of the study:

1. Student responses were limited to athletic training graduate students in a post-certification athletic training graduate program during the time frame of this study.
2. The online format for the survey was subject to server failure.
3. Only 10 of the 11 programs were represented in the study.

Delimitations

There were no delimitations of this study.

Assumptions

It was assumed that the participants answered the questionnaire honestly and understood each question.

It was assumed that the athletic training graduate student will continue the behavior of physical activity/inactivity into their career after the completion of their degree.

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Organization of the Study

The study is divided into five chapters. The first chapter consists of the statement of the problem, purpose of the study, need for the study, objectives of the study, research questions, significance of the study, definitions of terms, limitations, delimitations, and assumptions. The second chapter is divided into four sections providing a thorough literature review including: the benefits of physical activity, research on physical activity of college students, research on physical activity of allied health professionals including athletic trainers, and curriculum aspects of athletic training programs.

The third chapter provides the methodology of the study. The fourth chapter provides the results of the study, while the fifth presents a discussion of the findings and suggestions for further research.

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Chapter 2

REVIEW OF THE LITERATURE

The purpose of the study was to establish if athletic training graduate students engaged in regular physical activity and determine to what extent, if any, the graduate athletic training curriculum plays in the role of physical activity behaviors. Although there have been numerous studies on the health behaviors, including physical activity, of nurses, doctors, and the students of these fields, much of this research is very dated. Few studies have been conducted on physical activity of graduate students, and there has been no research on physical activity of graduate athletic training students.

The review of the literature is divided into four parts: physical activity research including personal wellness issues; physical activity of college students; physical activity research of athletic trainers, physical therapists, physicians, physician assistants and nurses; and a curriculum overview of the graduate athletic training programs.

Physical Activity

Evidence is underscoring the importance of physical activity in reducing the risk of coronary heart disease, stroke, colon cancer, type two diabetes, high blood pressure, and other hypokinetic conditions (Pate et al., 1995). The CDC and ACSM study results suggest people of all ages can benefit from engaging in regular, moderate or vigorous

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physical activity. Moderate intensity activities cause a slight increase in heart rate and breathing, such as a brisk walk, for at least 30 minutes, should be completed at least five days a week. Vigorous intensity, which includes activities that greatly increase heart rate and breathing, such as running, for more than 20 minutes should be completed at least three days a week (CDC, 2006).

Although there are obvious health benefits, more than 50% of the United States' population, including children, does not get the recommended amount of physical activity, and only 15% of adults performed the recommended amount of physical activity in 1997. The target for Healthy People 2010 is to have at least 30% of adults physically active (U.S. Department of Health and Human Services, 2000). In 2005, 24% of adults were inactive or sedentary, engaging in less than 10 minutes per week of moderate or vigorous physical activity (CDC, 2005). There has been an ongoing quest to change this sedentary behavior of individuals. There is no quick or magical fix, but rather a long process of behavioral change. Understanding the transtheoretical model helps in identifying how change can occur.

The transtheoretical model is a comprehensive paradigm describing the process of behavior change. It can be applied specifically to exercise adoption and adherence through the stage of change model. Prochaska and DiClemente (1992) identified five stages people progress through while adopting a behavior change. Individuals in the precontemplation stage do not want to make a change. Individuals in the contemplation stage are thinking about making a change. Those in the preparation stage are getting ready to make a change or are making small changes. During the action stage individuals have been actively engaging in the new behavior. Individuals spiral through the stages,

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relapsing and progressing until they reach the final stage of maintenance, which occurs after six months of exercising regularly. Once in the maintenance phase, individuals are less likely to relapse (Buxton et al., 1996).

There are factors or determinants that affect adherence to physical activity and exercise for each stage of change. Determinants are various personal attributes, environmental issues, and aspects of exercise itself. Personal attributes appear to have the greatest impact on activity adherence. These factors may include demographics, education, behaviors, beliefs, and health. Low income, lower education, increasing age, smoking, ethnicity, and female gender are often correlated with physical inactivity (Buckworth & Dishman, 1999). Individuals with more education, higher income, non-Hispanic whites, married, and male are more likely to be physically active (Kaplan, Cohen, Lazarus, & Leu, 1991).

Environmental determinants such as social influences, weather, cost, and access to a facility can influence physical activity behavior; however, an individual with high self-motivation and value of fitness may not be affected by these determinants. Another environmental determinant, which is the most popular excuse for not being physically active, is lack of time. Again, individuals viewing activity as of high personal importance and enjoyment will be less affected by this excuse (Dishman & Buckworth, 1996).

Determinants can be identified throughout the stages of change as factors that either promote or deter an individual's engagement in physical activity. The success of changing a behavior, such as increasing physical activity, begins with identifying the determinants that influence physical activity behaviors (King et al., 1992; Sallis & Hovell, 1990).

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A personal factor that may contribute to adherence is education and knowledge of exercise. Individuals with little exercise knowledge are typically in the precontemplation stage; they are not even thinking about a change in their behavior (Buxton et al., 1996). It is often believed that the more knowledge individuals have of exercise, the more likely they will be to engage in exercise and be in the action or maintenance stages of the stages of change model. However, studies reveal knowledge does not directly translate to adherence (Young, 2005). Entering the action and maintenance phases requires more than just knowing the benefits of physical activity. Allied health professionals have exercise knowledge, yet do not adhere to physical activity behaviors. Other barriers or determinants must be identified to in order to effectively aid individuals in their quest for physical activity change and adherence. Affecting physical activity behavior with types of interventions requires identifying the individual's stage, health beliefs, and exercise barriers.

College Students and Physical Activity

There is a clear lack of research regarding college students' physical activity. The available research reveals a dramatic decrease in physical activity between 18 and 24 years of age, standard college ages (Stephens, Jacobs, & White, 1985 as cited by Dinger, 1999) regardless of prior athletic engagement during high school (Dishman, 1994). Of the research available, many indicate the lack of physical activity of college students (CDC, 1997; Dinger; Pinto & Marcus, 1995).

Keating, Guan, Pinero, and Bridges (2005) note the lack of research on college students' physical activity behaviors. The authors conducted a meta-analysis of the available research. Of the studies analyzed, very few used a multiple-level approach

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looking at psychosocial, personal, and environmental levels affecting college student physical activity. Their final conclusion indicated that current research used subjective and inconsistent measures of physical activity, making comparisons of literature difficult.

The typical college student fails to meet physical activity recommendations (Dinger, 1999). The 1997 National College Health Risk Behavior Survey (NCHRBS) indicated only 19.5% of college undergraduates engaged in moderate physical activity and only 37.6% engaged in vigorous physical activity. Thirty-six percent did not participate in adequate amounts of physical activity (CDC, 1997).

Wallace and Buckworth (2002) identified characteristics related to individuals meeting the recommended guidelines for physical activity. Six hundred-eighty college undergraduate students completed a seven-day recall of moderate and vigorous physical activity, comprised of select questions from the NCHRBS. More than half of the subjects did not satisfy the minimum guidelines set by the CDC and ACSM for both moderate and vigorous physical activity. Of the subjects, increasing age, non-Caucasian, and women were less likely to meet CDC/ACSM guidelines. Social support, gender, and perceived severity of inactivity were the primary characteristics associated with meeting the guidelines.

In a similar study, Wallace and Buckworth (2003) examined the relationship of self-efficacy, social support, and sedentary behavior and shifts in exercise stage of change for 161 college students at a large Midwestern university. The sample was overrepresented with females and Caucasians. Results of the study revealed students, male and female and all races, who relapsed or were not able to adhere to exercise had significant decreases in peer support and exercise self-efficacy. These and other

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determinants are important to identify in order to influence exercise adoption and adherence.

Leenders, Silver, White, Buckworth, and Sherman (2002) found similar results as earlier reports on college students' physical activity behaviors. They used a street-based survey with college students at a large Midwestern university. They recorded 925 student responses, which was a respectable 50% response rate. One-third of students responding did not participate in vigorous physical activity. Stages of change and exercise self-efficacy were also addressed in this study. Forty-one percent of women and 35% of men did not meet physical activity guidelines and were in the precontemplation or contemplation stages. Self-efficacy scores increased as the stages progressed from precontemplation to maintenance which indicates that students lacking confidence in their ability to exercise were more likely to be sedentary than students with greater self-efficacy. Again females and Caucasians appeared to be overrepresented; however, the study reflects similar results as prior research regarding college students' physical activity.

Even fewer studies have been conducted on physical activity of graduate students in college. This lack of literature may be due to the short term of most graduate students enrolled in a program. McWhorter, Wallmann, and Tandy (2002) evaluated physical fitness of three successive classes of graduate physical therapy students at the beginning and end of their programs to determine the effect of curriculum on physical fitness. Cardiorespiratory endurance, body composition, muscular strength, and muscular endurance was tested for 10 men and 27 women during the first two weeks of school and 27 months later in the two weeks of their final semester.

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Findings from McWhorter et al. (2002) reveal a significant increase in body fat for women and a decrease in isokinetic strength for men in the program. Fifty-one percent of the students engaged in moderate activity at the beginning of the program, yet only 38% were engaging in moderate activity at the end of the program, slightly above the 30% target goal of Healthy People 2010 but a dramatic decrease from entering the program. Five percent of the physical therapy students engaged in vigorous activity in the beginning of the programs compared with 8% at the end, well under the Healthy People 2010 goal of 30%. The study did not reveal a direct impact of curriculum to physical fitness and did not address other factors which may have influenced physical fitness. However, the authors note the need for future research in establishing appropriate levels of physical fitness for physical therapy graduate students.

Longfield, Romas, and Irwin (2006) conducted a qualitative study to identify graduate students' perspectives of how graduate school affected their self-worth and physical and social activities. Forty-seven graduate students at a large Canadian university participated in focus groups which were recorded and coded. Results of the physical activity discussions revealed students engaged in low levels of physical activity due to program of study priorities. Students felt guilty to take time to engage in physical activity because of their high workload in graduate school. Those that did participate were more likely to do so when they could combine their social activities with their physical activities. The authors cite the need for interventions in graduate school to address social and physical activity related challenges graduate students of all disciplines face.

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With regard to education and physical activity intervention of medical students, Levy, Goldberg, Rippe, and Love (1984) created a study to determine if an intervention during medical school could improve health related behaviors of medical students. The intervention consisted of instruction and encouragement to exercise regularly during a study period. The study revealed a positive influence of the intervention on the medical students to exercise. The research also found 78% of students not receiving intervention material and supervision actually reduced their amount of exercise during the nine week period.

Continuing the research on medical students, Buchman, Sallis, Criqui, Dimsdale, and Kaplan (1991) researched physical activity and fitness levels of 207 entering medical students. Their results indicated medical students had mean fitness levels of "very good" to "excellent" and reported a mean exercise frequency of four times a week. It is important to note that this data was taken the first week of classes with first year medical students. Transition and patterns had not developed yet. Students did not yet have curricular issues and time constraints interfering with their health status. Another limitation of the study is that almost 40 students chose not to participate in the research; the physical activity or physical fitness levels of these students is not known. They may have self-selected to opt out of the study due to poor fitness; however, the authors were more concerned with correlations between fitness and psychological characteristics.

Frank, Galuska, Elon, and Wright (2004) also studied first year medical students. Frank et al. sought to determine personal exercise habits and intended exercise counseling practices of 1,906 first year medical students in the U.S. Almost 100% of the subjects reported some form of exercise at least at a mild level intensity such as walking,

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golf, or yoga in a typical week. About 64% of medical students met the recommended guidelines of exercise, either 20 plus minutes of strenuous exercise, such as jogging, aerobics, or biking more than three days a week or 30 plus minutes of moderate intensity exercise, such as fast walking or easy swimming at least five days a week. Almost 80% of the medical students felt it was important in their future medical practice to educate patients about exercise.

While the findings of Frank et al. (2004) regarding entering medical students are encouraging and well above the national averages for the same age group, it must be noted that students were surveyed during their orientation for medical school before any classes or rotations had begun and were based solely on self-reports. The authors also note that "the time prior to orientation may have been especially exercise intensive" (p. 119).

Pitetti, Blessing, and Elizondo (1991) followed 23 physician assistant (PA) students through two semesters of PA training. The students' health promotion and disease prevention profiles were assessed at the start and end of their nine month training period. The results showed a trend toward weight gain and increased body fat for the majority of subjects. There were no significant changes in aerobic fitness even though 57% of the subjects reported exercising at levels high enough to improve aerobic fitness.

The discrepancy in subject reporting to measured data may be attributed to inaccurate reporting by subjects, subjects only exercising at intensities high enough to maintain fitness, or due to three subjects quitting their regular exercise routines. Also, the subjects who continued their exercise programs throughout the nine months stated that their exercise time was decreased or limited due to the intensive curriculum. Medical

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students, nursing students, and physician assistant students all cite the strenuous and time consuming curriculum as issues restricting time for exercise. It is theorized that athletic training students would have the same difficulties and comments as the other students in the allied health professions.

Allied Health Professionals and Physical Activity

Athletic Trainers

> ATCs are highly educated, multiskilled allied health-care professionals who work in a variety of settings such as rural and urban hospital emergency rooms; urgent- and ambulatory-care centers; military hospitals; sports-medicine clinics; high schools, colleges, and universities; commercial employers; professional sports teams; and performing-arts companies. (Halls, 2005, p. 65)

Athletic trainers work in similar situations as doctors and nurses. There has been interest in the health and wellness of these doctors and nurses, but little attention has been given to athletic trainers.

Little research has been done regarding fitness levels or physical activity of athletic training students or working certified athletic trainers. Cuppett and Latin (2002) sought to identify the activity levels of employed ATC's. This study was the first of its kind for the athletic training field. However, the study was limited to ATC's of the Mid-America Athletic Trainers' Association and did not include students. The Baecke Questionnaire of Habitual Physical Activity was distributed to the subjects. The researchers concluded from the self-reports of both leisure and work that ATC's did not engage in levels of physical activity above the general population even though they are knowledgeable of the benefits and means of physical activity. Over 16% of the ATC's in

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the study reported that they are physically inactive. Studies of physical inactivity for the general population reported that 9% to 27% were physically inactive. Although the study was not nationwide, "one would expect ATCs to have knowledge of the benefits of personal physical fitness and to lead by example" (Cuppett and Latin, 2002, p. 282). Cuppett and Latin offer a possible explanation for the lack of physical activity by certified athletic trainer:

> Certified athletic trainers tend to work extended hours and are often not in control of their time due to the schedule of games and practices. It may be difficult for many ATCs to find time to exercise routinely. Added responsibilities, such as team travel and home, family, and teaching responsibilities may make regular exercise habits difficult to maintain. (p. 282)

The study from Cuppett and Latin (2002) warrants areas for further investigation. It is important to identify when the lack of physical activity behavior begins. There must be research to identify physical activity levels of students in this field. It is important to acknowledge the factors that reinforce the inactivity and activity behaviors while the student is gaining knowledge in the field.

Oki (2006) also identified self-reported physical activities of ATCs at work and leisure. This study was comparable to the study from Cuppett and Latin (2002) and also used the Baecke Questionnaire of Habitual Physical Activity. Oki's subjects consisted of 239 ATCs employed in District 2 (Eastern Athletic Trainers' Association including New York, New Jersey, Pennsylvania, and Delaware). No significant differences in activity levels were found among ATCs regardless of gender, job title, or employment setting. However, Oki's results revealed that ATCs in District 2 had much higher total activity

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levels than the general population, yet the average BMI for District 2 was 25.8 (overweight). These results are limited to District 2 of the NATA which is a possible explanation for the discrepancy between the decrease in physical activity found in Cuppett and Latin's study which included Midwestern athletic trainers, not East coast.

Another study related to athletic training professionals and physical fitness was conducted by Schulman (2003). Schulman sought to identify job related perceived exertion rates and physical activities of ATCs as well as their participation in exercise when compared to the national population. Schulman also correlated the hours ATCs exercised with their reported working hours.

Schulman created the survey to identify perceived physical exertion levels of ATCs while engaging in job related tasks and leisure time exercise. Exercise participation and demographics were also obtained through the survey. Results from 76 participants randomly selected in the NATA's ten districts found no correlation between the hours worked per week and the hours ATCs spent exercising. However, the survey did not provide an option for participants to answer zero hours in response to hours spent exercising. This error in the survey may have led to the high response of exercise per week for ATCs. Schulman's study was limited to ATCs in the university setting and can truly only be generalized to that particular group.

The importance of including health-related physical fitness knowledge in curriculum has been noted by Miller and Berry (2000). Miller and Berry cite the value of including health-related physical fitness knowledge in the curriculum of athletic trainers, nurses, and physical therapists to better prepare these students as allied health professionals, but does not note the importance of the students actually engaging in these

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activities themselves. Miller and Berry's study compared the health-related fitness knowledge of athletic trainers, nurses, and physical therapists. The athletic training group scored significantly higher on the post-tests than nurses and physical therapists. The study concluded that education for allied health professions should emphasize physical fitness in their curriculum.

Physicians

There has been significant data reported on other allied health professionals and their personal health behaviors. The importance of the data notes the potential modeling behavior of the patients and the credibility the health care provider has with the patients. Doctors, nurses, and athletic trainers should be seen as exemplars of good health practices, not as representatives of the general population's ailing health.

Many previous studies have focused on the poor health and wellness of physicians by highlighting their lack of physical activity and their increasing obesity (Abramson, Stein, Schaufele, Frates, & Rogan, 2000; Chambers, 1992; Gaertner, Firor, & Edouard, 1991; Rogers et al., 2005).

Of the aforementioned studies, Gaertner et al. (1991) found 30% of the physicians in their study were in the active category compared to the national average of 39%. However, most of the physicians did report physical activity to be important for themselves and their patients. The authors deduced that their "findings reflect an unhealthy lifestyle imposed on medical students and postgraduate trainees" (p. 1256).

Nearly a decade after the Gaertner et al. study, Abramson et al. (2000) investigated physicians' personal exercise behaviors along with the counseling practices of those physicians regarding patient exercise. Two-hundred ninety-eight of 1200

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physicians in the United States returned a questionnaire regarding personal exercise behavior and counseling practices. Seventy-three percent of the physicians reported engaging in aerobic activity; however, only 25% of physicians responded to the survey which may suggest that only the more active physicians returned the survey.

Abramson et al. (2000) did not identify the intensity level of the aerobic exercise, yet the questionnaire provided categorized aerobic exercise in four levels. The physicians could have been engaging in regular aerobic activity at light intensity which includes walking at less than two miles per hour or golfing with an electric cart. Abramson et al. note a possible bias toward physically active physicians returning the surveys. The final conclusion from the study noted that physicians who exercise regularly are more apt to counsel their patients on exercise and healthy behaviors.

Continuing the research on physicians and health, Chambers (1992) sought to identify the general health of doctors and teachers in the United Kingdom. Of the 850 questionnaires sent to physicians, only 408 were returned. Results from the questionnaire found only 24% of physicians reported not exercising in the past month yet only 13% admitted to exercising more than two times during the week with walking and gardening being examples of modes of exercise.

Fifty subjects were then chosen from the pool for physical and mental screenings. Twenty-eight percent of the doctors could not complete the fitness testing for reasons not listed. Results from the testing revealed 30% of the physicians had body fat higher than 25%, and 38% were considered overweight according to BMI. Sixty-four percent of the subjects reported exercising zero to four times a month, 10% reported exercising five to eight times a month, 26% reported engaging in exercise more than eight times a month.

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The Chamber's (1992) study defined activity as exercise if the participant did "enough to get sweaty, or swum [sic], for at least 20 minutes" (p. 77). Final results for the study indicated that doctors exercised much less than teachers and admitted to exercising much less than they would advise their patients to exercise. Chambers described a similar flaw as Abramson et al. (2000) in the study regarding a low response rate of questionnaires from physicians, and acknowledged that results may have even been biased in favor of more health conscious respondents. Research investigating excuses for reduced energy expenditure includes Levy et al. (1984), who reported that many physicians blame their decreased physical activity and other poor health habits on the intense study and training they had to engage in during medical school.

Several studies have been focused on the perception of patients and the exercise counseling habits of physicians. Frank, Schelbert, and Elon (2003) along with Hash, Munna, and Vogel (2003) and Levy et al. (1984) note that physicians who are in better health and engage in physical fitness activities themselves will counsel patients to become physically active and are more likely to have patients with greater confidence in the physician.

Similar results were yielded from Rogers et al. (2005) along with Wells (1984) who noted physically active physicians are more likely to encourage patients to exercise. Unfortunately, the physical activity levels of physicians are no better than the physical activity levels of the general population. Rogers et al. sought to create interventions for resident physicians regarding personal exercise and attitudes toward the residents' personal fitness. Attitudes toward fitness were increased following the interventions although actual fitness values declined over time. Rogers et al. suggest a follow up study

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should include a longer fitness program for the participants to reach the maintenance stage of exercise.

The final result of the study from Rogers et al. (2005) concluded that resident physicians who participated in the interventions were more likely to counsel patients about physical activity. The investigators noted the restrictions on resident physician work hours which could allow for interventions and implementation of exercise programs. This idea should also be geared toward graduate athletic training students.

In similar findings, Frank, Breyan, and Elon (2000) note how physicians with healthy habits are more likely to motivate patients to adopt healthy habits. Part of the conclusion from this study notes the importance of educational institutions to encourage health professionals-in-training to develop and demonstrate their own healthy lifestyles as modeling behaviors for patients. Acta (2004) also identifies the value of including some form of physical education as an important subject included in the medical school curriculum.

Data also exists on female physicians as indicated by Frank et al. (2003), who surveyed 4,501 female physicians from 1993 to 1994. Ninety-six percent of the doctors reported exercising at least three hours per week with walking, gardening, and biking as the top modes of activity. Of those exercising at least 30 minutes three times a week, only 50% met this recommendation with only one-fifth actually engaging in vigorous exercise. Those who met the recommendations tended to counsel patients on exercise more consistently and with more confidence. Frank et al. noted that these physicians appear to be good role models yet could improve on their exercise habits.

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Physician Assistants and Nurses

Further research exists on other allied health professionals including nurses, physician assistants, and nurse practitioners. Most of the studies have reported meager health habits and poor role models for health promotion of many nurses (Blackwell, 2004; Callaghan, 1999; Haughey, Kuhn, Dittmar, & Wu, 1992). Blackwell notes the importance of nurses to be role models for patients and to help boost respect for the profession of nursing. Nurses, along with physicians and other health care provides, are not living up to the standards they request patients to live by; they are not practicing what they preach.

An exception to the negative literature regarding poor health of nurses is a study from Connolly, Gulanick, Keough, and Holm (1997). These researchers sought to discover the health behaviors of critical care nurses. Questionnaires were completed by 127 critical care nurses during a conference. Their results concluded more than 70% of nurses in the study engaged in exercise and said they would promote their lifestyle to their patients. Exercise was defined as any activity engaged in long enough to work up a sweat. There were no specific guidelines on duration, mode, or frequency; however, walking was the most frequently cited mode at 22%. This study appears to be an exception to all of the other literature regarding nurses and health behaviors. It is one of the few studies in which nurses appear to engage in physical activity. The discrepancy in the data could be due to the type of open-ended survey questions used and the format in which it was administered.

Continuing with the literature on nurses, Piazza, Conrad, and Wilbur (2001) investigated the exercise behavior of female occupational health nurses. Of the 300

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surveys mailed, 206 subjects returned questionnaires. Forty-two percent of the participants reported engaging in exercise more than four times a week, with walking being the preferred method of activity. The occupational nurses not engaging in exercise cited a lack of time for the behavior. Piazza et al. note that too many occupational health nurses do not engage in the recommended amount of exercise. "Occupational nurses serve as role models for health promotion at their places of employment" (p. 85).

Blackwell's (2004) study focused on nurse practitioners, "a registered nurse who has either completed a master's degree in nursing with a content-focus in becoming an NP or one who has a master's degree in nursing and has completed a post-graduate certificate NP program" (p. 81). Even with a higher education degree, nurses still need improvement in physical activity behaviors.

Nurses within the field have noted their own lack of physical activity and poor health habits. Jackson, Smith, Adams, Frank, and Mateo (1999) implore nurses to "adopt a national nursing agenda for healthy eating, exercise, and image" (p. 196). In a response to the Jackson et al. article, Amella (1999) notes that obese or inactive nurses are less likely to counsel patients about exercise and weight management or diabetes and hypertension risk when it is needed.

Physical activity research regarding health care professionals is not isolated to the United States. Hui (2002) indicated that this epidemic of physically inactive health care practitioners is a concern around the world. Hui's study of Hong Kong nursing students revealed poor physical activity habits along with other wellness issues. Hui expressed a need to change the curriculum to emphasize exercise for its students, and even revise the scheduling of classes and rotations to include an exercise program in the class day.

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Poland is another country not immune to health care practitioners forgetting to practice what they preach. Zysnarska, Maksymiuk, and Kalupa (2005) studied the health behavior patterns of pediatric nurses in Poland. The study of 91 pediatric nurses revealed nurses to devote very little time to active recreation. More than 61% of the nurses cited taking a stroll as their primary mode of physical activity. No data was given for frequency, intensity, or duration of the stroll. Most of the subjects reported a preference for watching television for leisure.

In analyzing the literature, it appears other allied health professionals do not engage in regular physical activity or regular exercise as defined by the CDC. Due to the dated nature of many of the aforementioned studies, updated research should be conducted to confirm if the data is still true.

Graduate Athletic Training Curriculum

Although graduate athletic training students are educated on the principles of physical fitness for inclusion into their professional lives, it is not known how well they are able to incorporate these principles into their personal behaviors. Classroom and clinical demands are similar to time expectations they will encounter in their future careers as athletic trainers. If students are not able to form daily physical activity habits during college, it is unlikely they will form them once they enter their careers (Keating et al., 2005; U.S. Department of Health and Human Services, 1991).

Athletic training is a rapidly growing profession. The athletic trainer has struggled to become a respected professional in the allied health field. In the past, the role of an athletic trainer had been to give rub downs, carry water jugs, and run on the field when the word "trainer" was bellowed. Athletic trainers were not regarded as serious medical

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liaisons; however, through education, research, and development athletic trainers have become valued and competent health professionals.

The history of athletic training can be traced back to ancient Greece and has changed dramatically throughout the years. Today certified athletic trainers (ATCs) are educated to understand the complexities of health and the human body. Throughout the years, the scope of athletic training has grown from providing care primarily for athletes to assisting physicians and physical therapists as well as using their expertise in other independent areas of health promotion and disease prevention. ATCs are responsible for providing prevention, assessment, treatment, and rehabilitation of injuries to athletes and other physically active populations. "Applying their education in nutrition and fitness, ATCs are key resources for individuals wanting a proactive approach to health care and obesity" (Halls, 2005, p. 65). Yet, do athletic trainers take a proactive approach in their own health care?

Undergraduate education for ATC's begins with attending an Athletic Training Education Program accredited by the Commission on Accreditation of Athletic Training Education (CAATE). The educational process uses both classroom and clinical settings based upon the medical school model of education. The hands on learning experience, especially during the graduate program, can be very demanding of students' time (Delforge & Behnke, 1999).

The National Athletic Trainers' Association Educational Competencies and the National Athletic Trainers' Association Board of Certification Role Delineation Study indicate that all entry-level ATCs should have knowledge of the benefits of physical activity and the design of regular exercise programs. However, Cuppett and Latin (2002)

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reveal that ATCs did not engage in greater amounts of activity than the US population, whom collectively have less knowledge of exercise than ATCs.

Athletic training students are educated in human anatomy, physiology, kinesiology, biomechanics, nutrition, care and prevention of injury and illness, strength and conditioning, and statistics and research. Students must also pass competencies based on knowledge, skill, professional behavior, and practice oriented outcomes (NATA, 2005).

The Role Delineation Study emphasizes the areas of curriculum for the degrees. Students are required to engage in hands-on experience, clinical training, in addition to their course work. A medical physical exam is also required for all athletic training students. "Sufficient postural and neuromuscular control, sensory function, and coordination to perform appropriate physical examinations using accepted techniques; and accurately, safely and efficiently use equipment and materials during the assessment and treatment of patients" is required of all students in the Athletic Training Educational Program (NATA, 2006b, Part 3).

In their quest to become knowledgeable of the field, 70% of student athletic trainers will opt to continue their education and obtain either a master's or doctoral degree. However, only 10% of these students pursue their degree in an Athletic Training major (Ingersoll & Gieck, 2005). It is through this educational process that students learn how to care for others in prevention, rehabilitation, and health promotion and further the discipline through research and development.

Graduate athletic training education programs were first developed in 1972 and implemented at Indiana State University and the University of Arizona. The curriculum

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has gone through several revisions and rigorous changes since its original development. It has flourished from being a combination of courses in other majors to becoming its own accredited major for both undergraduate and graduate education (Delforge & Behnke, 1999).

The undergraduate and graduate programs allow students to become eligible to take the entry-level athletic trainer certification exam administered by an independent Board of Certification. Advanced learning opportunities are encouraged through NATA accredited graduate programs. Research and scientific discovery are the distinguishing characteristics of this type graduate program (Delforge & Behnke, 1999).

Currently, there are 11 post-certification graduate athletic training education programs in the United States. In 2005, there were 125 graduates of 11 programs (one program has since decided to suspend their graduate curriculum) with a fairly equal male to female ratio, 51% male and 49% female. Forty-six percent of the students went on to become employed as ATCs in a college setting, 32% were employed in clinics, 16% as high school ATCs, 10% were involved in professional sports, and the remaining graduates went on to other post-graduate studies or other types of employment (NATA, 2006c).

The Graduate Education Committee of the NATA Education Council directs the guidelines for the graduate athletic training programs; therefore, the 11 NATA Accredited Post-Certification Graduate Athletic Training Education Programs vary only slightly in scope of curriculum (NATA, 2005). The mission of these schools is "to expand the depth and breadth of the applied, experiential, and propositional knowledge and skills of entry-level ATCs, expand the athletic training body of knowledge, and to

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disseminate new knowledge in the discipline" (Ingersoll & Gieck, 2005, Slide 16). Post-certification athletic training programs prepare students for research and scholarship to improve the quality of healthcare for the physically active.

The 11 graduate athletic training education programs accredited by the NATA are disbursed throughout the US. The institutions include Arizona School of Health Sciences, San Jose State University, Indiana University, Indiana State University, Western Michigan University, University of North Carolina, University of Oregon, California University of Pennsylvania, Temple University, Old Dominion University, and University of Virginia (NATA, 2005).

Most programs are two years in length and provide a master's degree in Athletic Training to students who already have or are eligible to obtain their athletic training certification through the Board of Certification from the NATA. Basic course work at each institution includes: anatomy, statistics, research methods, pathology and rehabilitation of athletic injuries, current topics in athletic training, advanced therapeutic modalities, orthopedic basis of athletic training, biomechanics, seminar, practicum, and a thesis.

A few schools such as Old Dominion University and California University of Pennsylvania offer either an advanced strength and conditioning course or a performance enhancement specialist design course. These courses are typically directed toward the athletic trainer's knowledge of correct form to prevent or rehabilitate injuries of an athlete and client.

Major differences in programs are identified by Table 2.1 and include length of program, credit hours for graduation, title of master's degree, number of students in the

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major, and average hours worked per week by graduate assistants. Indiana State University, California University of Pennsylvania, and University of Virginia all have one year programs but still require more than 30 credit hours to graduate. (No further information was obtained for University of Virginia; therefore, it was not listed in Table 2.1) Arizona School of Health Sciences, Indiana University, and University of Oregon require more than 45 credit hours to graduate. All athletic training graduate students in these programs are graduate assistants and work in several settings such as high school or college athletics and teaching assistantships. Most of the programs average 20-hour work weeks for graduate assistants, less hours when out-of-season, more when in-season.

Summary

Research regarding athletic training students' physical activity appears to be exempt from any published literature. However, research on other health care providers indicates that although these professionals have knowledge of proper physical activity behaviors, they seldom practice positive health behaviors and tend to be physically inactive. The literature indicates a need to include physical activity engagement in curriculum of health care provider students to increase their participation in physical activity. It could be hypothesized that athletic training students, being in the health care field, would be no different than nurses, doctors, and other health professionals with regards to physical inactivity and curriculum needs.

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Table 2.1

Program Analysis

Program	Years	Credits	Degree	*N*=	Hours
Arizona School of Health Sciences	2	88	MS Athletic Training	27	20-30
San Jose State University	2	39	MA Kinesiology	30	20
Indiana University	2	51	MS Kinesiology (Athletic Training)	11	16-18
Indiana State University	1	33	MS Athletic Training	12	20
Western Michigan University	2	36	MA Physical Education (Athletic Training)	18	28
University of North Carolina	2	31	MA Exercise & Sport Science	18	20
University of Oregon	2	45	MS Human Physiology (Athletic Training)	13	20
California University of Pennsylvania	1	36	MS Athletic Training	18	30
Temple University	2	37	MEd Kinesiology (Athletic Training)	8	15-20
Old Dominion University	2	39	MS Education (Athletic Training)	24	20-25

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Chapter 3

METHODOLOGY

Introduction

The review of the literature notes a distinct void of information regarding physical activity of Certified Athletic Trainers (ATCs) and particularly of graduate student athletic trainers. The purpose of this study was to identify if athletic training graduate students are physically active according to the Centers for Disease Control and Prevention (CDC) and American College of Sports Medicine (ACSM) guidelines, and to identify the influence of curriculum on physical activity behavior of these students.

Design

This study was comprised of mixed methods using both quantitative data from a descriptive survey, and qualitative data from open-ended questions respondents answered regarding their physical activity behaviors.

The following items were identified for each subject through the survey: current college/university; age; gender; Body Mass Index (BMI); ethnicity (White-not Hispanic/Black-not Hispanic/Hispanic or Latino/Asian or Pacific Islander/American Indian or Alaskan Native/Other); marital status; curriculum as defined by clinical assignment; in-season or out-of-season status; hours spent in class per week; hours spent

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in clinical assignment, studying, or working on research per week; and program (college, program length, and program credit hours).

The two dependent variables identified through the survey were physical activity level (sedentary, active but not meeting guidelines, moderately physically active, vigorously physically active) and exercise stage as defined by the Stages of Change Model (precontemplation, contemplation, preparation, action, maintenance) for each participant.

Participants

The entire population of athletic training graduate students enrolled in NATA Accredited Post-Certification Athletic Training Education Programs for a master's degree was recruited to participate and included approximately 195 students. One school was unable to allow recruitment of subjects due to Institutional Review Board guidelines at that particular institution; therefore, the sample invited for participation consisted of 175 students. The number of respondents from the survey consisted of 87, for a return rate of 49.7%.

Instrumentation

An online survey consisting of demographic data (Appendix A) and specific questions from several reliable surveys was developed using Web Forms, and the survey was placed on a secured server. Demographic data included: gender, age, height, weight, marital status, ethnicity, international student status, program of current enrollment, clinical assignment, hours in class, hours spent studying and researching, hours spent in clinical assignment/graduate assistantship, and in-season or out-of-season status.

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Physical activity questions from The National College Health Risk Behavior Survey's (NCHRBS) (Appendix B) were used to collect the physical activity data. Participants were asked to recall physical activities from the past seven days. This survey was designed to measure college students' health risk behaviors, including physical activity (CDC, 1997; Douglas et al., 1997). The NCHRBS was developed by researchers at the CDC and was based on questions from the Youth Risk Behavior Survey (YRBS). Measures from the YRBS were used to gauge reliability due to the similar format, structure, and content of these two surveys; although, the YRBS was designed to measure health risk behaviors of high school students. Reliability for the physical activity portion of the YRBS was substantial or higher (0.61-1.00) and the mean kappa statistic was 0.74 (Silver, 1998).

A Stages of Exercise Change Questionnaire (Appendix C) was used to identify the stage each participant identified with most. Reed, Velicer, Prochaska, Rossi, and Marcus (1997) identified the Stages of Exercise Change Questionnaire (SECQ) as the most reliable and valid staging method. Buckworth and Wallace (2002) utilized a similar questionnaire; however, they used a true/false response instead of a likert scale, and found a Kappa index of 0.81 (n=48). Concurrent validity with a 7-Day Physical Activity Recall Instrument self-report was demonstrated by Marcus and Simkin (1993).

Participants were asked to respond to eight additional questions (Appendix D) that were used to identify if curriculum was a barrier to their physical activity behaviors. The open-ended questions were provided to prompt participants in identifying other possible barriers to physical activity.

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Procedures

Once approval by the Institutional Research Board (IRB) at Indiana State University was received, the graduate program director at each institution was contacted via an electronically mailed personalized invitation letter (Appendix E). The program directors responded with approval by sending the e-mail addresses of graduate athletic training students in their programs or by agreeing to forward a message from the investigator. The students were then sent an email informing them of the study and the link to the survey. The survey, cover letter, and informed consent (Appendix F) were all accessible via the emailed link. The survey was available for completion for two weeks after the initial email was sent to the participants. A reminder email was sent after one week. A final reminder email was issued to participants one day prior to the last day of availability. (Web Forms experienced data problems on the day the first reminder email was sent to subjects that necessitated the system to be shut down. Web Forms data was restored the following day and all but three surveys were recovered.)

Data Analysis

Research Questions

The following were research questions for the study:

1. What percentage of athletic training graduate students are vigorously physically active, moderately physically active, active but not meeting CDC/ACSM guidelines, or sedentary?
2. Is the graduate athletic training curriculum a determinant of physical activity behaviors of athletic training graduate students?

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Hypotheses

For the purpose of this study, the following hypotheses were created:

1. Less than 25% of athletic training graduate students were sedentary and in the pre-contemplation or contemplation stage.
2. Less than 50% of athletic training graduate students were active but not meeting the recommended amount of physical activity and were in the preparation or action stage.
3. Less than 15% of athletic training graduate students engaged in moderate physical activity and were in the action or maintenance stage.
4. Less than 10% of athletic training graduate students engaged in vigorous physical activity and were in the action or maintenance stage.
5. Age, gender, ethnicity, marital status, hours spent in class per week, clinical assignment, hours spent in clinical assignment per week, hours spent researching and studying per week, program length, program credit hours, and season status do not predict level of physical activity.

Percentages used in the preceding hypotheses were based on CDC data of national averages for physical activity (CDC, 2005).

An analysis of descriptive statistics (mean and standard deviation) identified participants of the study. Descriptive statistics (frequency and percentage) were also used to identify exercise level and stage of change of participants.

A multinomial logistic regression analysis was conducted to predict level of physical activity based on age, gender, ethnicity, marital status, hours spent in class per week, clinical assignment, hours spent in clinical assignment per week, hours spent

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researching and studying per week, program length, program credit hours, and season status. The analysis identified the relative importance of curriculum and demographic variables that were predictive of physical activity level.

The dependent variable, physical activity, was categorized into four levels (sedentary, active but not meeting recommended guidelines, moderate, vigorous). The independent, or predictor variables, were demographic data and curriculum information. Demographic data included: age (22-24 years=Low, 25-35 years=High), gender (male, female), ethnicity (White, Not White), and marital status (never been married, married). The curriculum independent variables included: hours spent in class per week (0-6 hours=low, 7-20 hours=high), clinical assignment (intercollegiate, high school, other), average hours spent in clinical assignment (1-24 hours=low, 13-40 hours=high), hours spent researching and studying per week (1-12 hours=low, 13-40=high), program length (1 year, 2 year), program credit hours (31-38 credit hours=low, 39-88 credit hours=high), and season status (in-season or out-of-season).

A stepwise regression could not be conducted for this method; independent variables were entered simultaneously in a multinomial logistic regression. Upon final analysis, regression coefficients, model coefficients, predicted values, goodness-of-fit measure, with test statistics, probabilities, and confidence intervals, and classification table were obtained. Statistical significance was set at the .05 level.

The Qualitative Barriers Questionnaire was examined by calculating frequencies of the responses in the specific categories (yes, no, increased, decreased, not affected). The qualitative follow up responses were identified, coded, and categorized by relevant themes.

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Summary

Both quantitative and qualitative measures were used to determine if athletic training graduate students engage in regular physical activity and to discover the influence of curriculum on physical activity level.

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Chapter 4

RESULTS

The potential population was 175 subjects; a total of 87 surveys were retrieved, providing an overall response rate of 49.7%. All incomplete surveys were eliminated from final analysis, leaving the total number of usable surveys at 82. The Statistical Package for the Social Sciences (SPSS) PC software was used for data analysis.

Results for the study are divided into four parts. The first section provides demographic characteristics of the respondents. The second section yields data classifying athletic training graduate students into physical activity levels (sedentary, active but not meeting guidelines, moderately physically active, vigorously physically active) and Stages of Change categories (precontemplation, contemplation, preparation, action, maintenance). The third section provides results for the multinomial logistic regression analysis using the independent variables (age, gender, ethnicity, marital status, hours spent in class per week, clinical assignment, hours spent in clinical assignment per week, hours spent researching and studying per week, program length, program credit hours, and season status) to predict level of physical activity. The fourth section of results identifies the results from the qualitative data.

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Demographic Characteristics

Eighty-two athletic training graduate students participated in the study, 53 females (64.6%) and 29 males (35.4%). Participants' age ranged from 22 to 35 years of age (23.88 ± 1.82). The subjects' height in inches (67.5 ± 3.93), weight in pounds (169.94 ± 39.21) and BMI (26.14 ± 4.91) were obtained from the data. Demographic characteristics of the participants are represented in Table 4.1.

Table 4.1

Demographic Characteristics

Demographic	*Mean*	*SD*
Age	23.88	1.82
Height (inches)	67.50	3.93
Weight (pounds)	169.94	39.21
BMI	26.14	4.91

Several demographic and curriculum data were categorized for the multinomial analysis. The categories created are represented in Table 4.2, Table 4.3, and Table 4.4. All categories were dichotomous and grouped as high or low except clinical assignment, which was separated into three levels (intercollegiate, high school, and other).

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Table 4.2

Descriptive Statistics of Demographic Categories

Variable	Frequency	Percent
Age		
22-24 years	62	75.6
25-35 years	20	24.4
Gender		
Female	53	64.6
Male	29	35.4
Marital Status		
Never Been Married	78	95.1
Married	4	4.9
Ethnicity		
White	67	81.7
Non-White	15	18.3
Nationality		
American	78	95.1
International	4	4.9

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Table 4.3

Descriptive Statistics of Curriculum Data

Variable	Frequency	Percent
Program length		
1 Year	24	29.3
2 Year	58	70.7
Season Status		
In-Season	69	84.1
Out-of-Season	13	15.9
Clinical Assignment		
Intercollegiate	42	51.2
High School	34	41.5
Other	6	7.3

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Table 4.4

Descriptive Statistics of Curriculum Data Categories

Variables	*Mean*	*SD*	Low category *n*=	High category *n*=
Classroom Hours per week	6.94	3.26	43(52.4%)	39(47.6%)
Study/Research Hours per week	13.33	7.27	44(53.7%)	38(46.3%)
Assignment Hours In-Season per week	31.99	12.97	32(39.0%)	50(61.0%)
Assignment Hours Off-Season per week	19.32	14.24	32(39.0%)	50(61.0%)
Average Hours in Assignment per week	25.65	12.44	36(43.9%)	46(56.1%)
Program Credits	42.04	14.78	44(53.7%)	38(46.3%)

Physical Activity Level and Stages of Change

Physical activity was divided into four levels: sedentary, active but not meeting recommended guidelines, moderately physically active, and vigorously physically active. Frequencies and percentages for physical activity levels are reported in Table 4.5. Frequencies and percentages for the seven-day recall of vigorous activity, flexibility, strength, and moderate activity are reported in Appendix G. A comparison of subjects' physical activity levels to the hypotheses data, which were based on CDC data of national averages for physical activity (CDC, 2005), is shown in Figure 1.

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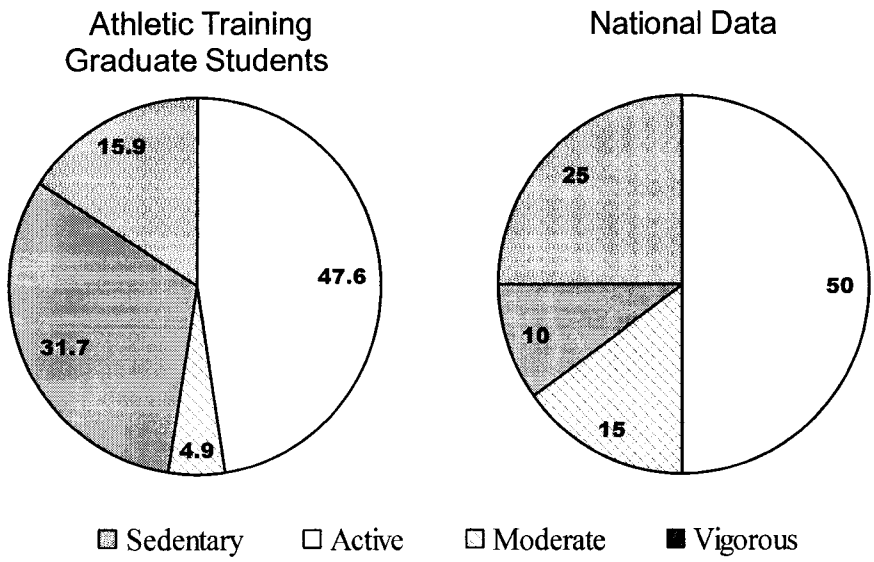

Figure 1. Comparison results for physical activity levels.

There were 15.9% (n=13) of the subjects categorized as sedentary. Sedentary was described as inactive or not engaging in any physical activity. For a seven-day recall, these subjects reported engaging in physical activity zero days for flexibility, strength, moderate physical activity, and vigorous physical activity.

The physical activity level, active but not meeting the recommended amount of physical activity, included 47.6% (n=39) of subjects. This level included subjects who reported at least one day of physical activity in any category (flexibility, strength, moderate, or vigorous) in the past seven days, yet did not meet the requirements for classification in the moderate or vigorous levels. Only 4.9% (n=4) of subjects were classified as moderately physically active. Participants in this category engaged in movement activities, such as walking or bicycling five days a week for at least 30 minutes at a time, which caused a slight increase in heart rate and breathing.

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There were 31.7% (n=26) of subjects categorized as engaging in vigorous physical activity. These subjects engaged in exercise or participated in aerobic activities three days a week for at least 20 consecutive minutes that caused sweating and labored breathing, such as basketball, jogging, swimming laps, tennis, fast bicycling, or similar aerobic activities. Subjects meeting criteria of both moderate and vigorous levels were coded as vigorous.

Table 4.5

Physical Activity Levels

Level	Frequency	Percent
Sedentary	13	15.9
Active	39	47.6
Moderate	4	4.9
Vigorous	26	31.7

Exercise stages of change frequencies and percentages are reported in Table 4.6. Exercise stage of change revealed no subjects in the precontemplation stage. This stage included participants who identified with the statement "I currently do NOT exercise, and do NOT intend to start exercising in the next six months." The contemplation stage contained 17.1% (n=14) of the subjects. Participants in this stage identified with the statement "I currently do NOT exercise, but I am thinking about starting to exercise in the next six months." The preparation stage of change included 36.6% (n=30) of the subjects. These participants agreed with the statement "I currently exercise some, but not regularly (three times a week for more than 20 consecutive minutes)."

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The action stage of change included 20.7% (n=17) of the participants. The subjects in this stage identified with the statement "I currently exercise regularly (three times a week for more than 20 consecutive minutes), but I have only begun doing so within the last six months."

There were 25.6% (n=21) of subjects in the maintenance stage. This stage of change included participants who agreed with the statement "I currently exercise regularly (three times a week for more than 20 consecutive minutes), and I have done so for longer than six months."

Table 4.6

Exercise Stages of Change

Stage	Frequency	Percent
Precontemplation	0	0
Contemplation	14	17.1
Preparation	30	36.6
Action	17	20.7
Maintenance	21	25.6

Prediction of Physical Activity Level

A multinomial logistic regression was conducted to determine which independent variables, demographics (age, gender, ethnicity, marital status) and curriculum factors (hours spent in class per week, clinical assignment, hours spent in clinical assignment per week, hours spent researching and studying per week, program length, program credit hours, and season status), were predictors of physical activity level (sedentary, active but

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not meeting recommended guidelines, moderately physically active, vigorously physically active). The correlation coefficients between the predictor variables and the descriptive statistics are shown on Table 4.7.

Table 4.7

Mean, Standard Deviation, and Correlation for Predictor Variables

	Agecode	Avhrscode	Classcode	Studycode	Lengthcode	Creditscode
Agecode		.045	-.029	-.015	.134	.186
Avhrscode			.104	-.016	-.025	-.083
Classcode				.045	-.183	-.290**
Studycode					.155	.030
Lengthcode						.598
Creditscode						
Mean	.76	.44	.52	.54	1.71	1.46
SD	.43	.50	.50	.50	.46	.50

** p=0.01

An alpha level of .05 was used for the multinomial logistic regression statistical tests. The generated model was not statistically significant, with χ^2 (36) = 33.391, p = .593. According to the Cox and Snell Psuedo R-Square measure, the proportion of variance in physical activity level accounted for by the linear combination of the predictor variables was 33.4% (Nagelkerke R^2 =.371). Table 4.8 shows that while 82.1% of cases were correctly classified as active but not meeting recommended guidelines, only 42.3% of the cases were correctly classified as vigorously physically active.

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Moreover, only 25% of the cases were classified as moderately physically active and 15.4% as sedentary. Overall, the model correctly classified 56.1% of the cases.

Table 4.8

Classification Table for Observed vs. Predicted

	Predicted				
Observed	Sedentary	Active NMR	Moderate	Vigorous	Percent Correct
Sedentary	2	10	0	1	15.4%
ActiveNMR	1	32	1	5	82.1%
Moderate	0	3	1	0	25.0%
Vigorous	0	15	0	11	42.3%
Overall					56.1%

The independent variables for only the demographic information of subjects were entered into the multinomial logistic regression analysis. The model was not statistically significant, with $\chi^2(12) = 4.373, p = .976$. According to the Cox and Snell Psuedo R-Square measure, the proportion of variance in physical activity level accounted for by the linear combination of the predictor variables, demographic data, was 4.9% (Nagelkerke $R^2 = .054$). Table 4.9 shows that while 90.2% of cases were correctly classified as active but not meeting recommended guidelines, only 21.4% of the cases were correctly classified as vigorously physically active. No cases were correctly classified as sedentary or moderately physically active. Overall, the model correctly classified 49.4% of the cases.

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Table 4.9

Classification Table for Observed vs. Predicted Using Demographics

	Predicted				
Observed	Sedentary	Active NMR	Moderate	Vigorous	Percent Correct
Sedentary	0	13	0	1	0.0%
ActiveNMR	0	37	0	4	90.2%
Moderate	0	2	0	2	0.0%
Vigorous	0	22	0	6	21.4%
Overall					49.4%

The third analysis entered only the independent variables for curriculum into the multinomial logistic regression analysis. The model was not statistically significant, with $\chi^2(24) = 23.325, p = .501$. According to the Psuedo R-Square measure, Cox and Snell, the proportion of variance in physical activity accounted for by linear combination of curriculum variables was 24.8% (Nagelkerke $R^2 = .275$). Table 4.10 shows that while 89.7% of the cases were correctly classified as active but not meeting recommended guidelines, only 42.3% were correctly classified as vigorous, 25% as moderately physically active, and 7.7% as sedentary.

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Table 4.10

Classification Table for Observed vs. Predicted Using Curriculum

	Predicted				
Observed	Sedentary	Active NMR	Moderate	Vigorous	Percent Correct
Sedentary	1	9	0	3	7.7%
ActiveNMR	1	35	0	3	89.7%
Moderate	0	3	1	0	25.0%
Vigorous	0	15	0	11	42.3%
Overall					58.5%

Qualitative Questionnaire Results

Subjects were asked to answer eight questions; the last four of which were open-ended as part of the qualitative analysis. The non open-ended questions are represented in Table 4.11. Of the respondents, 98.8% answered "yes" to the first question "Do you feel it is important for you to engage in regular physical activity?" In response to the question "Do you feel your current curriculum (courses, study time, research, graduate assistantship/clinical assignment) has increased, decreased, or not affected your physical activity behaviors?", 8.5% said it increased, 68.3% decreased, and 23.2% stated curriculum had no effect on their physical activity behaviors. Of the respondents, 54.9% reported to be more physically active when their clinical assignment is out-of-season. When asked if the past seven days have been typical of this semester, 60% responded "yes."

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Table 4.11

Preface Questions of Qualitative Data (n = 82)

Questions	Yes	No
Do you feel it is important for you to engage in regular physical activity?	98.8%	1.2%
Are you more physically active when your clinical assignment is out of season?	54.9%	45.1%
Have the past 7 days been typical of this semester?	60.0%	40.0%

	Increased	Decreased	Not Affected
Do you feel your current curriculum has increased, decreased, or not affected your physical activity behaviors?	8.5%	68.3%	23.2%

The first open-ended question asked "How have each of the following influenced your physical activity behaviors: Courses, Study time, Research, Graduate assistantship/Clinical assignment?" The general response for this question was lack of time for physical activity caused by the curriculum components; however, 12.2% (n = 82) described why they felt that their physical activity was not affected by curriculum. One respondent in this category stated:

> My physical activity behaviors haven't really changed all that much with any of the above activities. I've been active and competitive my entire life, so not

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> exercising is out of the question. The only difference that I've noticed is that sometimes I have to cut my workouts a little bit shorter so that I can get everything done. But, exercising is a huge priority for me, so I do what I can to get it done, even if it means that I get a little less sleep.

Of the respondents, 79.3% stated that some form of curriculum, which included courses, study time, research, or clinical assignment, had influenced their physical activity. Of the 79.3%, only 12.3% identified how curriculum actually increased their physical activity. One subject stated, "Courses have allowed me to increase physical activity because it is a class with a lab component that consists of some very vigorous workouts."

Many subjects identified multiple curricular factors as being influential to reducing their physical activity. Out of the total responses, clinical assignment (assistantship) was referenced by 68.3% of the subjects as a deterrent for physical activity, while research was cited by 45.1% of the subjects. Courses (35.3%) and study time (30.5%) were also accounted for as deterrents of physical activity.

The second qualitative question asked students to identify factors that influenced their decisions to engage in physical activity, not necessarily pertaining to curriculum. An overall lack of time was cited as a negative influence to engaging in physical activity by 49.4% ($n = 81$) of the subjects. One example of time as a negative factor is described by a subject:

> Time is really my only problem. I have been running/biking/weight training for about 10 years on and off. For the past 2 or 3 years I have been on a great

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exercise/diet regimen. Since Grad school started, I probably haven't worked out 3 days in a given week but I manage to play basketball about once per week.

Most subjects listed multiple factors influencing physical activity decisions outside of curriculum. Another common factor that influenced subjects' decisions to engage in physical activity was health (49.4%). The reported responses containing health varied from wanting to feel better to disease prevention, "My family has many health related issues, so exercise to me is important."

Another factor influencing participants' physical activity decisions was enjoyment (14.8%). "Physical activity has always been a major part of my daily life. I do it because its part of who I am and I enjoy it" was a common response from subjects. Location or access (19.8%) was another deterrent subjects had to contend with when making the decision to be physically active, "If I had easier access to a gym close to home or at-home exercise equipment, I would be more likely to exercise."

The third qualitative question asked the respondents to explain why they answered yes or no to the question "Do you feel it is important for you to engage in regular physical activity?" Only one participant answered "no" and explained his/her position, "Because my job is already physically active. I might not be doing a regular cardio workout but I do a lot of hands on activities with my athletes and I'm constantly participating in their rehab by doing some of their exercises with them."

The other 98% (n = 82) of the respondents cited multiple factors such as health (86.9%), professional responsibility (29.8%), or enjoyment (16.7%) as reasons why it is important for them to engage in regular physical activity. Professional responsibility and health are noted in this subject's response, "Because of the profession I am in I believe it

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is important to be active and take care of yourself. I cant work with athletes and try to help them make smart decisions about their body when I'm not doing it."

The final qualitative question asked the respondents "How could your Athletic Training Graduate Program change to help you become more physically active?" Of the respondents, 38.6% (n = 82) remarked that it was not the role of the program to enhance or encourage physical activity and there should not be a change made in the program. The following response is an example of the remarks provided by this group:

> I'm not sure our program should change. I came here for a Master's degree and will leave here in two months having gained significant knowledge and experience. If PA was more important to me, I could put down the books for a while or cut out some social activities. But I have a good enough balance between in season and out of season work to allow me times to work out. I just don't have that time right now. I plan on getting back into a regular routine after graduation.

Changes in course work and scheduling of assistantship hours were recommended by 24.1% of the subjects. Such changes varied but primarily included moving class times to later in the morning and reducing the amount of busy work in classes. Including exercise into the curriculum was recommended by 15.7% of the subjects. Respondents stated this could be accomplished by requiring students to register for an activity class each semester, block time for recreational opportunity, or "Possibly a hands on rehab class instead of just lecture? Or more labs."

Fifteen percent of the respondents remarked that the program should help promote students' physical activity in other ways such as a 24-hour access free gym membership

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or "high stipends so we don't have to work additional jobs, which would leave more time for physical activity."

Only 7.2% felt that their program did not need to change because it already encourages physical activity through various means such as, "My program has a major influence on my physical activity since we have a class based on Performance Enhancement and I love using exercise techniques I learn in class." Two of the schools included this certification as a part of the degree requirement.

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Chapter 5

DISCUSSION

Eighty-seven athletic training graduate students completed questionnaires for the study, representing 44.6% of the population (N=195) of students in a post certification athletic training graduate program. There was a 49.7% response rate from the subjects invited to participate (N=175). This is considered a high response rate. After elimination of incomplete questionnaires, there were 82 usable surveys. The majority of the students classified themselves as Non-International students (95.1%), White-not Hispanic (81.7%), traditional graduate student age of 22-24 years of age (75.6%), and have never been married (95.1%). This created a somewhat homogenous sample; however, it is reflective of the population.

Physical Activity Level and Stages of Change

The first hypothesis stated that less than 25% of athletic training graduate students were sedentary and in the pre-contemplation or preparation stage. The criteria for this hypothesis was met. Only 15.9% were categorized at sedentary and 17.1% were in the pre-contemplation/contemplation stages. Twenty-five percent of the nation is considered sedentary, but less than 16% of athletic training graduate students in a post certification

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program are in the sedentary category. This result is similar to Cuppett and Latin's (2002) findings that 16% of working ATCs were sedentary.

Eighty-five percent of the participants' excuses in the sedentary category revealed a lack of time, due to research, classes, or assistantship hours. Irregular schedules were identified by two subjects in this category. Of the subjects whose data from the seven-day recall listed them as sedentary, 38% of them were in the action stage of change. A possible explanation for these subjects is reported in the qualitative data, "The inconsistency in my schedule with my clinical assignment does not allow me to get on a regular exercise schedule."

The second hypothesis indicated that less than 50% of athletic training graduate students were active but not meeting the recommended amount of physical activity and were in the preparation or action stage. Of the subjects, 47.6% were active, which met the criteria of the hypothesis; however, the preparation and action stages combined contained 57.3% of the subjects. The discrepancy may be due to the seven-day recall questionnaire. A subject may have engaged in more (or perhaps less) activity than usual the week of the questionnaire, but still identifies with the preparation or action stage. Those in the preparation and action phases are thinking about engaging in physical activity or engaging in activity, but not regularly. Many athletic training students may be active sporadically during the season and consider carrying coolers, performing rehabilitation on athletes, and other work activities as exercise, which would explain the high percentages in the action category. Another explanation is offered by a subject, "I'm a weekend warrior. Work and school makes it hard to do anything during the week." Other

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excuses indicate time, in general, as a problem, "It is all based on time. Some weeks are better than others."

The 'time' problem for athletic trainers does not get better once they are out of school. Cupett and Latin (2002) found that once employed, ATCs typically work long hours and have an irregular schedule due to games and practices. It will be just as difficult to find time to exercise routinely after the thesis is completed and the clinical assignment is finished. Now, while in school, is the time for these students to develop good habits of implementing regular physical activity. It is important for students to adopt positive physical activity habits during college, because it is unlikely that they will form them once they enter the workforce (Keating et al., 2005; U.S. Department of Health and Human Services, 1991), especially considering the demands of the job will be similar to the demands of the clinical assignment and time allotted for classes, studying, and research.

These findings are similar to Wallace and Buckworth's (2002) results. Wallace and Buckworth found more than 50% of undergraduate students were not meeting guidelines for moderate or vigorous physical activity. Leenders et al. (2002) found 41% of female and 35% of male undergraduates were not meeting physical activity guidelines for moderate and vigorous activity. Almost 64% of athletic training graduate students not meeting the guidelines, more research needs to be conducted to identify how athletic training graduate students compare to other graduate students and undergraduate students with a similar allied health major.

The third hypothesis stated that less than 15% of athletic training students engaged in moderate physical activity and were in the action or maintenance stage. There

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were only 4.9% of subjects classified as moderately physically active, yet 46.3% identified with the action or maintenance stage. The criterion for this hypothesis was not met. Subjects meeting the requirements for both moderate and vigorous were coded only as vigorous. This coding modification would account for the low number of subjects categorized as moderate. The high number classified as being in the action or maintenance stage exceeds the hypothesis. Subjects in this category are regularly physically active. These subjects did cite curricular constraints as limiting their time, but they did not allow it to affect their engagement in physical activity. Students in this stage identify self-efficacy and motivation as reasons they continue their exercise routines, "With other obligations and an erratic schedule with work, it is difficult to keep a set workout schedule. Motivation becomes a big factor after working long hours and studying/researching for school." As Dishman and Buckworth (1996) suggest, an individual with high self-motivation and value of fitness may not be affected by these determinants.

The fourth hypothesis indicated that less than 10% of athletic training graduate students engaged in vigorous physical activity and were in the action or maintenance stage. There were 31.7% of subjects categorized as engaging in vigorous physical activity and 46.3% in the action or maintenance stage. Fortunately, the criterion for this hypothesis was not met. Athletic training graduate students exceeded the national data for this category. When asked how curriculum affects physical activity, this group responded with, "They have not influenced my behaviors as my typical workout time is at 6:00 AM before I start class/work." Other comments from this group suggest, "It is often difficult to find the spare time or energy to dedicate to personal exercise. Although, there are

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times when despite the lack of energy, exercise is the most beneficial way of relieving stress" and "I find that when I am busier I am more disciplined with working out. When I have more free time I am less likely to go to the gym."

Prediction of Physical Activity Level

The independent variables for subjects' demographic information and curriculum data were entered into a multinomial logistic regression. The probability of the Model Chi-Square (33.391) was 0.539, greater than the level of significance of 0.05. The model is not statistically significant evidence of the presence of a relationship between the levels of the dependent variable physical activity (sedentary, active but not meeting recommended guidelines, moderately physically active, vigorously physically active), and the combination of independent variables (age, gender, ethnicity, marital status, hours spent in class per week, clinical assignment, hours spent in clinical assignment per week, hours spent researching and studying per week, program length, program credit hours, season status).

The Psuedo R-Square measure, Cox and Snell, was 0.334. The closer this measure is to 1.0, the stronger the estimate of the model. The model only accounted for 33.4% of the cases, confirming it was not a good fit. However, the classification accuracy rate was 56.1%, which was higher than the 44.25% proportional by chance accuracy criteria. No further interpretation of the independent variables relationship to the dependent variable is needed for this analysis because the model is not significant.

Results from the analysis revealed a failure to reject the null hypothesis, which stated that age, gender, ethnicity, marital status, hours spent in class per week, clinical

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assignment, hours spent researching and studying per week, program length, program credit hours, and season status do not predict level of physical activity.

A limiting factor in this analysis is the small number of cases per independent variable in certain categories. The minimum number of cases per independent variable is 10. If a cell has very few cases (a small cell) or is left empty, the model may become unstable or it might not run at all. This may have been the reason for the failure to reject the hypothesis; therefore, the analysis was ran again using only the demographic data for only four independent variables and again with the curriculum data for only six independent variables to improve the strength of the model for prediction.

The independent variables for the demographic information of subjects were entered into the multinomial logistic regression analysis. The probability of the Model Chi-Square (4.373) was 0.976, greater than the level of significance of 0.05. The model was not statistically significant evidence of a presence of a relationship between demographic data and physical activity levels. The Psuedo R-Square measure, Cox and Snell, was 0.049. The model only accounted for 4.9% of the cases, confirming it was not a good fit. The classification accuracy rate was 44.2%, which was only slightly higher than the 49.4% proportional by chance accuracy criteria indicating that the model predicts almost as well as by chance. Due to the homogeneity of the subjects, this analysis did not reveal a prediction between demographics and physical activity level.

The third analysis entered only the independent variables for curriculum into the multinomial logistic regression analysis. The probability of the Model Chi-Square (23.325) was 0.501, greater than the level of significance of 0.05. The model was not statistically significant evidence of a presence of a relationship between curriculum

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assessment and physical activity levels. The Psuedo R-Square measure, Cox and Snell, was 0.248. The model only accounted for 24.8% of the cases, confirming it was not a good fit. The classification accuracy rate was 44.3%, which was higher than the 58.5% proportional by chance accuracy criteria indicating that the model predicts physical activity level slightly better than chance.

The quantitative analysis did not reveal a prediction between curriculum and physical activity level; however, this may be a result of an error with the statistical design due to a small number of subjects in comparison to the large number of independent variables and multicollinearity among several of the independent variables. A thorough analysis of the qualitative data now becomes even more important in understanding if, or how, curriculum affects physical activity behaviors of the athletic training graduate students.

Qualitative Analysis

The first four questions of the Qualitative Questionnaire were posed to understand more about the participants. Forty percent of the subjects indicated that the past seven days had not been typical of their semester, which could be a possible explanation for the discrepancies between participants' reports of physical activity level and stages of change identification. Some subjects identified with the action or maintenance stage, yet they did not meet the criteria for the moderate or vigorous group according to the seven-day activity recall. An explanation is given by a subject listed as active but not meeting recommended guidelines and in the action stage of change, "It is all based on time. Some weeks are better than others." A subject in the sedentary category but identifying with the

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action stage states, "I will get into a routine and work out regularly for a few weeks and then my schedule will change and I'll stop."

Fifty-five percent of subjects reported being more physically active when their sport is out-of-season, and 84.15% of the subjects were in-season when they completed the survey. Results may be different if this study were to be conducted at a different point in the semester, which was a noted limitation of the study.

All but one subject indicated that it is important for them to engage in regular physical activity, yet less than 40% actually do engage in regular physical activity. Athletic trainers have knowledge of the benefits of regular physical activity, and 50% indicated the importance of including physical activity for optimal health. Yet, as Young (2005) indicated, actually engaging in the activity takes more than just knowledge. According to the subjects of this study, it takes motivation, discipline, and enjoyment of activity to become regularly physically active.

When asked if curriculum increased, decreased, or did not affect their physical activity, 68.3% of subject indicated that it decreased their physical activity. Subjects were then asked to describe specifically how their courses, study time, research, and clinical assignment influenced their physical activity behaviors. Time required for each of these components was noted as a deterrent to physical activity for almost 70% of the subjects.

> The amount of time I spend in the training room and studying has greatly decreased my physical activity. It has been hard to me to create a regular schedule for working out. All of the factors listed have caused me to abandon my workout routine.

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The primary excuse most individuals give for not engaging in physical activity is a lack of time (Dishman & Buckworth, 1996). Some students indicate they have limited free hours, but make time for physical activity; others admit to just being too tired at the end of the day to exert the effort, "I either do not have the time I would like to dedicate to exercise or I do not have the energy at the end of the day."

These findings are similar to study results from Longfield et al. (2006) who found that students engaged in low levels of physical activity due to the time constraints of their graduate program. Longfield et al. indicated a need to address these challenges and create interventions for physical activity. One such intervention suggested combining social activities with physical activities, which was also suggested by several subjects in the question regarding program changes. Two students share how social activities should be incorporated: "Do some recreational sports together!!!! Fun!!Is key" and "We could even have a class where the students were required to take turns teaching a physical activity of some sort, and other classmates participated. This would give everyone the opportunity to be physically active, and the teaching experience would contribute to our education." Both are interesting ideas with positive side effects for students academically and socially.

Although an overwhelming percentage of subjects reported curriculum as a deterrent to physical activity, 12% indicated a positive relationship between physical activity and curriculum. Upon further investigation of these responses, it was noted that one program had similar student comments about the positive relationship. These students indicated that their curriculum requirement, becoming a Performance Enhancement Specialist, allowed them to become more interested in their personal

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performance and increased their physical activity through coursework. These subjects suggested all schools should incorporate this requirement into their program.

Another similarity among students in an individual program is reflected in classification and stage of change. Fifty-seven percent of the subjects in one program were classified as vigorous and in the action or maintenance stages. A student from this program explained why he/she is able to be so active, "Courses have allowed me to increase physical activity because it is a class with a lab component that consists of some very vigorous workouts." No other relevant themes were noticed in individual programs regarding an influence of curriculum on physical activity which suggests that the decision to engage in physical activity may be more of an individual decision.

Students were asked to identify determinants of physical activity outside of curriculum. Again, lack of time was noted; however, motivation, self-efficacy, age, location, access, health, enjoyment, and money were all identified by students as determinants of physical activity. A subject identifies several of his/her determinants:

> Self-efficacy: I want to feel good about myself, feel fit and healthy; Time: When I don't have time exercise is one of the first things I drop; Friends: a few of us have decided to run a half marathon, so that has definitely influenced my physical activity; HS athletes: comments they make about athletic trainers health... makes me feel like a role model and that I need to be a positive example."

The final comment made by this subject indicates an understanding of the professional obligation some athletic trainers experience. Thirty percent of the subjects in this study understand this obligation and indicate it, professionalism, as a motive for them to be physically active. Another student states:

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I think that as a health professional, I should practice what I preach to my athletes. I also think that there are many, many short-term and long-term benefits of cardiovascular exercises, and stretching and weight training. I don't get sick as often, have more energy, and generally feel better about myself when I do.

One of the Healthy People 2010 objectives is to have at least 30% of adults physically active; athletic training graduate students have exceeded this objective by obtaining almost 37% of subjects in moderate or vigorous categories. Although the percentage of subjects in the vigorous category exceeds the national data, more than 60 % of the subjects were not meeting the CDC and ACSM recommended guidelines for physical activity.

When subjects were asked how to change the curriculum to encourage more physical activity, several suggestions consisted of including physical activity into curriculum, increasing assistantship stipend to reduce outside work hours, providing free gym memberships, and reducing class busy work. One subject suggested, "Arrange the schedule to give time in the mornings to work out or such that we have days off where we can work out before going to our clinical assignments."

Only 2% of the subjects suggested reducing hours of the assistantship even though 68.3% of subjects indicated the assistantship as the biggest deterrent of physical activity. Program directors stated that students work an average of 20 hours a week for their assistantship. Students reported the average workweek while in-season was 32 hours, 20 hours out-of-season, and 25 hours for an average year workweek.

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Less than half of the subjects remarked that the program should not have to change. Many did not feel it was the responsibility of the program to encourage physical activity. The following quote is from a subject in this category:

> If I had more free time, it would be easier to fit exercise into my schedule. I don't expect my graduate program to cut any requirements that it has now though to accommodate that... I knew what I was getting into when I applied.

The majority of students with suggestions to change the program to help encourage physical activity did not suggest cutting requirements, rather enhancing the program by either adding a physical activity requirement or altering the timing of classes.

Recommendations and Future Research

The overall findings from this study reveal that the decision to engage in physical activity is a personal decision based on more than the excuse "lack of time." Most athletic training graduate students will find themselves with very little free time. Those that have incorporated physical activity into their lifestyle will continue to engage in that behavior regardless of curricular constraints. Unfortunately, more than 60% of the students are not engaging in regular physical activity. As students in the allied health field, athletic training graduate students should be regularly physically active now and when they become ATCs in their career.

Athletic training graduate students have the knowledge for engaging in physical activity, yet knowledge does not directly translate to adherence of physical activity. It is an individual decision to engage in physical activity. By identifying particular barriers to activity, health beliefs, and stage of change, interventions can take place. Most of the

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graduate athletic training students identified time as a barrier and health benefits as an important reason to engage in physical activity.

Increasing time available for physical activity for subjects with knowledge of health benefits, and a stage of change classification other than precontemplation, is the first step in changing physical activity level. No subjects were in the precontemplation stage and an overwhelming percentage (86.9%) cited the importance of health benefits as a reason to engage in physical activity; therefore, simply introducing specific blocked time for physical activity is a small intervention that may increase physical activity level without compromising the integrity of the athletic training graduate program. Levy et al. (1984) used a similar successful intervention with medical students.

To be a successful in their career, ATCs need to possess a moderate amount of physical conditioning. ATCs should also represent the profession of athletic training in a healthy manner. During the undergraduate and graduate educational experience, athletic training students learn the necessary academic material to pass the certification exam, obtain an entry-level position, and add to the knowledge base of their field. One area lacking representation in the curriculum is reinforcement of personal physical activity behaviors. It is unknown if students are receiving instruction on modeling the persona they instill in their patients, athletes, and clients. It is also unknown if the directors or professors in their programs are engaging in regular physical activity. Conducting further research in this area will help identify how to incorporate a successful intervention.

Interventions or modifications to programs should not deter from the academic learning experiences required of an optimal program, but rather enhance the strength of the program as well as the students within the program. Incorporating more hands-on

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therapeutic and rehabilitation laboratory courses, blocking time for social physical activity, or altering the class time schedule are examples of plausible suggestions made by subjects in this study.

More research needs to be conducted in this area to fully understand the need for and devise proper planning of an intervention in the curriculum of Post-Certification Athletic Training Programs. It would also be of interest to identify physical activity levels of undergraduate students in athletic training programs and students in entry-level athletic training graduate programs from a curriculum aspect. This area appears to be an untapped source of information begging research.

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APPENDIXES

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APPENDIX A

Demographic Survey

1. Select the institution in which you are enrolled:
Arizona School of Health Sciences
San Jose State University
Indiana University
Indiana State University
Western Michigan University
University of North Carolina
University of Oregon
California University of Pennsylvania
Temple University
Old Dominion University
University of Virginia

2. Gender:
Male
Female

3. Age:

4. Height (feet & inches):

5. Weight (pounds):

6. How do you describe yourself?
White-not Hispanic
Black-not Hispanic
Hispanic or Latino
Asian or Pacific Islander
American Indian or Alaskan Native
Other

7. Marital Status:
Never been married
Married
Separated
Divorced
Widowed

8. Are you an international student?
Yes
No

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9. If you answered yes to question #8, what is your native country?

10. How many hours do you spend in classes during a typical week this semester?

11. How many hours do you spend studying (include time for research) during a typical week this semester?

12. What is your clinical assignment/graduate assistantship this semester?

13. If your assignment is an athletic team, are you currently:
In season
Out of season

14. How many hours do you spend in your clinical assignment/graduate assistantship per week this semester in season?

15. How many hours do you spend in your clinical assignment/graduate assistantship per week this semester out of season?

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APPENDIX B

National College Health Risk Behavior Survey (NCHRBS)

1. On how many of the past 7 days did you exercise or participate in aerobic activities for at least 20 consecutive minutes that made you sweat and breathe hard, such as basketball, jogging, swimming laps, tennis, fast bicycling, or similar aerobic activities?
0 -- 1 -- 2 -- 3 -- 4 -- 5 -- 6 -- 7

2. On how many of the past 7 days did you do stretching exercises, such as toe touching, knee bending, or leg stretching?
0 -- 1 -- 2 -- 3 -- 4 -- 5 -- 6 -- 7

3. On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?
0 -- 1 -- 2 -- 3 -- 4 -- 5 -- 6 -- 7

4. On how many of the past 7 days did you engage in movement activities such as walking or bicycling for at least 30 minutes at a time that caused a slight increase in heart rate and breathing?
0 -- 1 -- 2 -- 3 -- 4 -- 5 -- 6 -- 7

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APPENDIX C

Stages of Exercise Change Questionnaire

Please read the following statements and choose Yes or No to all five items. (Answer Yes to only one statement.)

1. I currently do NOT exercise, and do NOT intend to start exercising in the next 6 months.
Yes
No

2. I currently do NOT exercise, but I am thinking about starting to exercise in the next 6 months.
Yes
No

3. I currently exercise some, but not regularly*.
Yes
No

4. I currently exercise regularly*, but I have only begun doing so within the last 6 months.
Yes
No

5. I currently exercise regularly*, and I have done so for longer than 6 months.
Yes
No

*Regular exercise: 3 times per week for 20 minutes or longer.

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APPENDIX D

Qualitative Barriers Questionnaire

Please answer the following:

1. Have the past 7 days been typical of your semester regarding your physical activity behavior?
Yes
No

2. Are you more physically active when your clinical assignment is out of season?
Yes
No

3. Do you feel your current curriculum (courses, study time, research, graduate assistantship/clinical assignment) has increased, decreased, or not affected your physical activity behaviors?
Increased
Decreased
Not affected

4. How have each of the following influenced your physical activity behaviors? Courses, Study time, Research, Graduate assistantship/Clinical assignment

5. What factors influence your decision to engage in physical activity? (e.g. family, self-efficacy, money, time, significant other, health, age, location) Please explain how they influence your physical activity.

6. Do you feel it is important for you to engage in regular physical activity?
Yes
No

7. Why did you respond yes or no to question #30?

8. How could your Athletic Training Graduate Program change to help you become more physically active?

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APPENDIX E

Letter to Program Director

Dear [program director]
Your graduate students are being invited to participate in a research study about the influence of curriculum and other factors on their physical activity behaviors. This study is being conducted by Melissa Reynolds MS, ATC, LAT (principal investigator) and Dr. Susan Kiger (faculty sponsor), from the Department of Curriculum, Instruction, and Media Technology at Indiana State University. This study is being conducted as part of a dissertation. Your students were selected as possible participants in this study because they are in a Post-Certification Graduate Athletic Training Master's Program.

I am requesting the email addresses of all of the students enrolled in your Athletic Training Post-Certification Program in order to send them the appropriate material for the survey. There are no known risks to your students if they decide to participate in this research study. There are no costs to you or them for participating in the study. The information they provide will be used to determine what factors influence physical activity levels of graduate athletic training students in post-certification graduate programs. The questionnaire they will answer will take approximately fifteen minutes to complete. The information collected may not benefit them directly, but the information compiled in this study may provide future benefits to students and faculty in Athletic Training.

The survey is anonymous. They will not write their name on the survey. Although absolute anonymity cannot be guaranteed using the internet, I will not collect IP addresses or make any effort to identify your students as a participants. No one will be able to identify the students or their answers, and no one will know whether or not they participated in the study. Should the data be published, no individual information will be disclosed, and only the Institutional Review Board may inspect these records.

Your students' participation in this study is voluntary. By completing and submitting the survey, they are voluntarily agreeing to participate. They are free to decline to answer any particular question they do not wish to answer for any reason.

Again, I am requesting the email addresses of all of the students enrolled in your Athletic Training Post-Certification Program in order to send them the link for the questionnaire. If you have any questions about the study, please contact Melissa Reynolds, 4610 South Lost Street, Terre Haute, Indiana, 47802, 812-237-4046, mreynolds@isugw.indstate.edu or Dr. Susan Kiger, 812-237-2956, skiger@isugw.indstate.edu.

If you have any questions about your rights, or your students' rights as research subjects or if you feel you've been placed at risk, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of

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Sponsored Programs, Terre Haute, IN, 47809, by phone at (812) 237-8217, or by e-mail at irb@indstate.edu.

IRB Number: 7146
Approval: 3/31/07
Expiration Date: Exempt

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APPENDIX F

Informed Consent

March 31, 2007

Influence of Curriculum on Physical Activity of Graduate Athletic Training Students

You are being invited to participate in a research study about the influence of curriculum and other factors on your physical activity behaviors. This study is being conducted by Melissa Reynolds MS, ATC, LAT (principal investigator) and Dr. Susan Kiger (faculty sponsor), from the Department of Curriculum, Instruction, and Media Technology at Indiana State University. This study is being conducted as part of a dissertation. You were selected as a possible participant in this study because you are a student in a Post-Certification Graduate Athletic Training Master's Program.

There are no known risks if you decide to participate in this research study. There are no costs to you for participating in the study. The information you provide will be used to determine what factors influence physical activity levels of graduate athletic training students in post-certification graduate programs. The questionnaire will take about fifteen minutes to complete. The information collected may not benefit you directly, but the information learned in this study should provide more general benefits to students and faculty in athletic training as well as the National Athletic Trainer's Association.

Your name and email address will not be identified on the survey. Absolute anonymity cannot be guaranteed using the internet; however, I will not collect IP addresses or make any effort to identify you as a participant. I am sending the survey to students enrolled in all 11 post-certification athletic training programs. I am asking for extensive demographic information from you and given the small population involved, your identity might accidentally be revealed to me, the researcher. If this concerns you, please consider leaving blank one or more of the demographic questions. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Your answers will be encrypted and stored in SQL Server 2000. Web Forms application will be used and does not know the physical identity of the user. Should the data be published, no individual information will be disclosed, and only the Institutional Review Board may inspect these records.

Your participation in this study is voluntary. By selecting "I AGREE", completing, and submitting the survey, you are voluntarily agreeing to participate. You are free to decline to answer any particular question you do not wish to answer for any reason.

If you have any questions about the study, please contact Melissa Reynolds, 4610 South Lost Street, Terre Haute, Indiana, 47802, 812-237-4046, mreynolds@isugw.indstate.edu or Dr. Susan Kiger, 812-237-2956, skiger@isugw.indstate.edu.

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If you have any questions about your rights as a research subject or if you feel you've been placed at risk, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of Sponsored Programs, Terre Haute, IN, 47809, by phone at (812) 237-8217, or by e-mail at irb@indstate.edu.

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APPENDIX G

Additional Tables

Table G.1

Vigorous Activity Days

Days	Frequency	Percent
0	29	35.4
1	10	12.2
2	17	20.7
3	11	13.4
4	8	9.8
5	6	7.3
6	1	1.2
7	0	0

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Table G.2

Flexibility Days

Days	Frequency	Percent
0	23	28.0
1	10	12.2
2	16	19.5
3	10	12.2
4	8	9.8
5	9	11.0
6	3	3.7
7	3	3.7

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Table G.3

Strength Days

Days	Frequency	Percent
0	33	40.2
1	13	15.9
2	13	15.9
3	12	14.6
4	7	8.5
5	4	4.9
6	0	0
7	0	0

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