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Development And Evaluation Of A Firefighter Physical Performance Program For Undergraduate Fire And Safety Students

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DEVELOPMENT AND EVALUATION OF A FIREFIGHTER PHYSICAL PERFOMANCE PROGRAM FOR UNDERGRADUATE FIRE AND SAFETY STUDENTS

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DEVELOPMENT AND EVALUATION OF A FIREFIGHTER PHYSICAL PERFOMANCE PROGRAM FOR UNDERGRADUATE FIRE AND SAFETY STUDENTS

BY

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DEDICATION

Major Malcolm Jenkins of the Fern Creek Fire Department in Louisville, KY died unexpectedly while on duty in October of 2014. He was a mentor and helped in training me to be the firefighter that I am today. This thesis is dedicated to him and all fire service personnel who have been taken too soon.

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ABSTRACT

The number one on-duty cause of death in the fire service is heart attacks. The International Association of Firefighters and the International Association of Fire Chiefs teamed up to create the Candidate Physical Ability Test (CPAT). Fire departments across the nation will have consistent physical performance tests to hire more physically capable candidates as part of the Wellness-Fitness Initiative (International Association of Fire Fighters, 2014).

Eastern Kentucky University is a nationally recognized school for its fire science program; however students are not required to take educational classes to better prepare them for physical performance tests. Students starting in a training habit at a younger age and preparing for physical performance tests would not only better prepare students for the real world, but also help in reducing the risk of heart related fire service deaths.

Students in this study participated in a physical performance test which involved firefighter job related tasks. Students in the training group participated in a prescribed training for six weeks and were then retested to determine if those that were under a specified training program would show improved physical performance.

Conclusively, while neither the control nor treatment groups were large enough to be representative of the population. It can be recommended to be a class on campus acting as an elective credit for students. Physical preparation will better prepare Eastern Kentucky University Fire Protection Administration students for a better career with the goal of creating the habit of health and wellness and reducing the risk of heart related deaths.

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CHAPTER I

Introduction

Firefighter deaths have slowly been on the decline over the past few years, however, the number one cause of firefighter deaths has not changed (Fahy, LeBlanc, & Molis, 2015). "As in most years, sudden cardiac death accounted for the largest share of the on-duty deaths (36 deaths, or 56 percent)" in 2014 (Fahy, LeBlanc, & Molis, 2015, p. 3). Firefighters are dying from something usually preventable through regular medical evaluations, along with diet and exercise. Our country's obesity levels are still on the rise with two out of three adults attributed to overweight or obese; fortunately fire departments are recognizing that overweight and obesity are on the rise (National Institute of Diabetes and Digestive and Kidney Diseases, 2012). In 2010, it was found that 40% of firefighters are overweight; higher than the national average (International Fire Service Training Association, 2013). There is a higher risk of coronary heart disease for those that are overweight or obese (International Fire Service Training Association, 2013).

Many career fire departments require those wanting to be firefighters to take physical ability tests as part of their hiring process (Thiel & Jennings, 2012). These tests were created to ensure the people applying for the job are capable of doing the work (Thiel & Jennings, 2012). Most physical ability tests are created with specific tasks in mind and having the candidate perform tasks they might possibly do on a job scene. The CPAT (Candidate Physical Ability Test) is becoming a common standardized test for many fire

departments. It is a way for fire departments to avoid hiring those unable to physically meet the job requirements (Thiel & Jennings, 2012).

Eastern Kentucky University offers a nationally recognized program in Fire Proetction Administration. Their program teaches the future leaders of the fire service, but it lacks in teaching the students how to meet the physical demands of firefighting (Eastern Kentucky University, 2011). With the rate of obesity going up and the risk of firefighter deaths due to heart related conditions on the rise, the Fire Protection Administration Education Department needs to evaluate the problem. Not all students wanting to become firefighters are ready to take on the physical challenges of being a firefighter.

Need for the Study

Students of the Fire Administration program of Eastern Kentucky University's Fire Protection Administration Degree Program are being educated to become leaders of the fire service. However, many are leaving with a Bachelor's degree, highly educated in the field, yet unable to get hired because they cannot meet the physical demands of the job. These students may not be aware if they are inadequate until after they graduate. Fire Protection Administration students need to be informed early about lifestyle and fitness changes to better prepare them specifically for the rigorous job of firefighter.

The Fire Protection Administration program at EKU should evaluate the need for a class to better prepare their students and evaluate the effectiveness of a program of this magnitude.

Statement of the Problem

The purpose of this study was to examine the effects, among fire science majors during a six week training course lasting four days a week versus those who continue their normal daily activities.

Additional Research Questions

1. Did fire science students at EKU show similar times when put through a physical performance test?
2. Did fire science students at EKU who participated in the training study show physical improvements versus fire science students at EKU who did not partake in the physical training program?

Assumptions

The following assumptions were made:

1. Subjects followed directions properly throughout the study.
2. Subjects answered the questionnaire truthfully regarding their personal exercise habits.
3. Dietary habits of all subjects did not change throughout the course of the study.
4. Subjects in the workout group maintained proper form and technique during the training program.
5. Subjects in the control group maintained their normal habits during the study.

Delimitations

Delimitations of the study were as follows:

1. Individual selection was delimited to 40 students who were registered or graduated within the last semester from the EKU fire science department bachelor degree program.
2. The training period was delimited to four days a week for six weeks.

Limitations

The following were limitations of the study:

1. Since the study was conducted by individuals who volunteered and not a random sampling, this may not be a true representation of the fire science population.
2. The efficiency and effort put forth by the subjects was an immeasurable variable.

Definition of Terms

Baseline Vital Signs – "The first measure of vital signs (e.g., pulse, blood pressure, respiration rate, temperature)… baseline vital signs refers to measurement of vital signs prior to the start of training. (CFBT-US LLC, 2013)"

BMI – Body Mass Index – "BMI is a measure of body fat based on height and weight that applies to adult men and women" (National Heart, Lung, and Blood Institute).

Body Fat Percentage – "Body fat percentage is simply the percentage of fat your body contains." A certain amount of fat is essential to bodily functions. Fat regulates body temperature, cushions and insulates organs and tissues and is the main form of the body's energy storage (Health Check Systems, 2012)."

Body Weight – "The weight of a person's body (Farlex, 2015)."

CPAT – Candidate Physical Ability Test – As part of the Fire Service Joint Labor Management Wellness/Fitness Initiative, a group of 10 of North America's leading fire departments came together along with the IAFF and IAFC to create the Candidate Physical Ability Test (CPAT) (International Association of Fire Fighters, 2014). Fire departments discovered people being hired were not physically capable of accomplishing the various tasks in the fire service (International Association of Fire Fighters, 2014). This team created the CPAT as a pre-employment test for those wanting to become firefighters (International Association of Fire Fighters, 2014). The goal of the CPAT test is it would be a consistent test and could not be deviated from ensuring the fire service would be hiring those individuals who are better physically fit for the job (International Association of Fire Fighters, 2014).

Exercise – "Activity requiring physical effort, carried out especially to sustain or improve health and fitness." (Oxford Dictionary, 2015)

Habit – "A usual way of behaving: something a person does often in a regular and repeated way." (Merriam-Webster Dictionary, 2014)

Heart Attack – A heart attack is, "…when a portion of the heart no longer receives oxygen-rich blood, usually due to total or near-total blockage of a coronary artery by a blood clot formed in an area already narrowed by plaque. The surrounding heart muscle dies and the heart stops working effectively." (Life Heart, 2004).

IAFC – International Association of Fire Chiefs – This organization was founded in 1873 and originally was the National Association of Fire Engineers (International Association of Fire Chiefs, 2012). In 1881, this organization pushed its members to create state chief

associations because of the increasing costs of railroad tickets, and this created a spokesman to represent each state at the national level (International Association of Fire Chiefs, 2012). The IAFC created the first Fire Chief's Handbook in 1932 (International Association of Fire Chiefs, 2012). It was one of the first fire service textbooks ever issued (International Association of Fire Chiefs, 2012). The IAFC pushed for better fire prevention and was a way for fire chiefs to connect and work on issues that were not only being seen in their area, but across the nation (International Association of Fire Chiefs, 2012). In 1996, the IAFC teamed up with the IAFF and worked together to create the CPAT (International Association of Fire Chiefs, 2012).

IAFF – International Association of Firefighters – The IAFF is a group who represents more than 300,000 full-time professional firefighters and paramedics (International Association of Fire Fighters, 2014). The organization was created in 1918 to bring together firefighters "for better wages, improved safety, and greater service for their communities" (International Association of Fire Fighters, 2014). The organization is based in Washington D.C. and "supports legislation on behalf of first responders" (International Association of Fire Fighters, 2014).

NFPA – National Fire Protection Association – Is a nonprofit organization established in 1896. Its goal is to reduce the burden of fires and other hazards through codes and standards, research, training, and education (National Fire Protection Association, 2014). "NFPA develops, publishes, and disseminates more than 300 consensus codes and standards to minimize the possibility and effects of fire and other risks" (National Fire Protection Association, 2014).

SCBA – Self-Contained Breathing Apparatus – "A respirator worn by the user that supplies a respirable atmosphere that is either carried in or generated by the apparatus and is independent of the ambient environment" (National Fire Protection Association, 2013).

Classifications of Firefighters –

Career – A paid structural firefighter. A structural firefighter's job can include fighting structure fires, grass fires, technical rescue such as trench rescue, auto-extrication and depending on the department sometimes serve as emergency medical technicians and paramedics.

Industrial – "An organization providing rescue, fire suppression, and related activities as well as emergency medical services, hazardous material operations, or other activities that occur at a single facility or facilities under the same management" (National Fire Protection Association, 2013).

Paid-On-Call – Firefighters who are paid on call are paid when they go onto a fire call or incident.

Structural – "The activities of rescue, fire suppression, and property conservation in buildings or other structures, vehicles, rail cars, marine vessels, aircraft, or like properties" (National Fire Protection Association, 2013).

Volunteer – Volunteer firefighters volunteer their time to fight fire. These firefighters are not paid by any means.

Wildland – "The activities of fire suppression and property conservation in woodlands, forests, grasslands, brush, prairies and other such vegetation, or any combination or

vegetation, that is involved in a fire situation but is not within buildings or structures" (National Fire Protection Association, 2013).

USFA – United States Fire Administration – The USFA is "an entity of the Department of Homeland Security's Federal Emergency Management Agency, the mission of the USFA is to provide national leadership to foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness, and response" (U.S. Fire Administration, 2013).

CHAPTER II

Related Literature

Introduction

Literature on the subject of firefighter health validates there is a problem in the fire service with firefighter deaths and the number one cause is heart related issues. Cardiovascular issues do not just affect career firefighters, but volunteer firefighters as well. According to the data from the United States Fire Administration (USFA), 62% of the heart attack deaths in the past decade were among volunteer firefighters, while 31% of the deaths were among career firefighters (U.S. Fire Administration, 2013). The other 7% were among a compilation of wildland, paid-on-call, industrial, and unknown firefighters (U.S. Fire Administration, 2013).

This chapter will first cover research on heart attacks, stressors, and firefighter standards. The later section will specifically deal with college students' health and exercise habits.

Heart Attacks

A majority of the heart attacks among firefighters are a result of stress and overexertion (U.S. Fire Administration, 2013). But why are heart attacks the main cause of death for firefighters? During a fire scene firefighters are pushing their bodies to the limit. Once a firefighter is called to an incident, they must put on their structural fire gear within a very short period of time; one minute according to Fire Engineering's Skill Drills for Firefighter I & II (PennWell Corporation, 2009, p. 27). This does not include

donning a self-contained breathing apparatus (SCBA). A firefighter may not have to put on their SCBA before getting to the fire scene, depending on how the SCBA is in the apparatus and the department's policies and procedures. From this point the firefighters are on the apparatus in full gear travelling to the fire scene. Travel time can be anywhere from two to ten minutes depending on how close the call is to the station.

Once the apparatus gets to the scene, firefighters have to pull the fire hose toward the structure and attempt to extinguish the fire. Additional apparatus typically arrive on scene to accomplish other various tasks to add in extinguishing the fire. While one crew is working on fire attack (putting out the fire), another crew will be pulling a back-up line, one doing ventilation, another crew doing search and rescue, and one crew on the rapid intervention team. While all these different job tasks are going on, there is non-stop activity for the crews. There is no time to slow down until the main seat of the fire is knocked down and extinguished. "Fire fighters react to these emergency calls with an increase in their heart rates, probably due to a surge in sympathetic nervous system activity" (Department of Health and Human Services, 2007).

Firefighters put a tremendous amount of stress on their body. "They must climb stairs and ladders, carry and use heavy tools, often above their head or in awkward positions, and they may be called upon to perform difficult rescue operations" (Smith, 2011, p. 167). Firefighters can be under psychological stress from the job, on top of wearing personal protective equipment that can be a burden on the firefighter for its weight, and restrictiveness too (Smith, 2011). These stresses could lead to cardiovascular diseases, like heart attacks. The definition of a heart attack is, "…when a portion of the

heart no longer receives oxygen-rich blood, usually due to total or near-total blockage of a coronary artery by a blood clot formed in an area already narrowed by plaque. The surrounding heart muscle dies and the heart stops working effectively" (Life Heart, 2004).

Risk Factors for Coronary Artery Disease

People who suffer a heart attack usually have associated risks. Various risk factors exist making one more susceptible to suffering a heart attack. There are risk factors one can change (modifiable) and there are factors a person has no control over (non-modifiable). Factors a person has control over are: tobacco use, high blood cholesterol, high blood pressure, diabetes, overweight and obesity, metabolic syndrome, birth control pills, physical inactivity, unhealthy diet, stress or depression, anemia, and sleep apnea (National Heart, Lung, and Blood Institute, 2011). Most of these factors are able to be diagnosed with regular physicals.

However, there are factors that cannot be controlled and can contribute to heart problems, which are: older age and menopause, family history, and preeclampsia (National Heart, Lung, and Blood Institute, 2011). These factors cannot be controlled by a person. The older the person the greater the risk of a heart attack. If a family member has suffered a heart attack, it increases the likelihood of the person suffering a heart attack.

For firefighters, their job can add additional stress factors leading to cardiovascular disease. The Essentials of Firefighting lists four causes that can be attributed to cardiovascular diseases: "exposure to smoke and chemicals, heat stress from

fires and high temperatures, and long, irregular work hours (International Fire Service Training Association, 2013, p. 49)."

Baseline Vital Signs

Along with the associated risks, firefighters' baseline vital signs may not be up to par which could cause them to be at a higher risk to suffer a heart attack. Baseline vital signs include: blood pressure, breathing, pulse, and temperature. Normal is different for every person based on,"…age, sex, weight, exercise tolerance, and overall health." (Medline Plus, 2013). The average person should be close to 120/80 mm/HG in adults (EMT-Training.org, 2008). The respiratory rate should be between 12-18 breaths per minute with a pulse of 60-100 beats per minute (Medline Plus, 2013). The average person's temperature is around 98.6 degrees Fahrenheit, but it can vary from 97.8-99.1 degrees Fahrenheit (Medline Plus, 2013). These are basic baseline vital signs, however, there are other vital signs people can look at to see how healthy a person might be.

Body Mass Index

Body Mass Index (BMI) is another way to evaluate a person's health status. BMI is shown to correlate with a person's body fat (Centers for Disease Control and Prevention, 2015). A high BMI can be an indicator that an individual has high body fatness (Centers for Disease Control and Prevention, 2015). BMI is only a screening tool and does not diagnose a person with their body fat (Centers for Disease Control and Prevention, 2015). BMI is measured by different categories: underweight (less than 18.5), normal / healthy weight (18.5 – 24.9), overweight (25.0-29.9), and obese (30.0 or greater) (Centers for Disease Control and Prevention, 2015).

A study was done among firefighters looking at the "prevalence of overweight, obesity, and substandard fitness" (Poston, et al., 2011, p. 266). The study evaluated risk factors based on individuals baselines. Body composition involved individuals' weight, BMI, and body fat percentage (Poston, et al., 2011). The study found among the firefighters, 32.7% were classified as overweight based on BMI, and were considered obese based on their body fat percentage. It was found the BMI appeared to underestimate obesity (Poston, et al., 2011).

Body Fat

A certain amount of body fat is considered to be essential for a person to function. Body fat can be measured through several different methods, such as hydrostatic weighing, calipers, the bod pod, dual x-ray absorptiometry, and bioelectrical impedance.

Body fat levels have different categories versus just considering someone underweight, and overweight. The categories most commonly used are: essential fat, athletes, fitness, average, and obese. "Essential fat is the minimum amount of fat necessary for basic physical and physiological health (Perry, 2013)." For men 2-5% and for women 10-13% is what is considered essential (Perry, 2013). To be part of the athletic category, men will range from 6-13%, while women range from 14-20%. The fitness range consists of men with 14-17% body fat, and women ranging from 21-24% body fat. The average person's body fat range for men is 18-24% while women are 25-31% (Perry, 2013). Anything above these ranges is considered obese.

Firefighter Standards

NFPA

The National Fire Protection Association is a non-profit organization whose sole purpose is to eliminate "..death, injury, property, and economic loss due to fire, electrical, and related hazards (National Fire Protection Association, 2015). NFPAs' are standards but are only considered recommendations unless the jurisdiction adopts the standard. NFPA 1500 is the standard on Occupational Safety and Health Programs (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013). According to NFPA 1500, fire departments should adopt a policy regarding the department's occupational safety and health (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013). It should specify goals and objectives to reduce the risks of injuries, diseases, illnesses, and fatalities (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013). As part of the department standard, there should be a health and safety officer that ensures the health and wellbeing of the firefighters (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013). In addition, there should be "medical surveillance, wellness programs, physical fitness, nutrition, and injury and illness rehabilitation" as part of a health maintenance program (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013).

Chapter ten of NFPA 1500 describes the Medical and Physical Requirements, which is broken down into the medical requirements, physical performance requirements, health and fitness, confidential health data base, infection control, and fire department

physician (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013). For medical requirements, it is recommended for firefighters that perform fire suppression meet NFPA 1582 (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013). Under the physical performance requirements, candidates should meet NFPA 1583 (NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2013).

NFPA 1582 addresses the need for , "Comprehensive Occupational Medical Programs for Fire Departments" (NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2013). In chapter five of NFPA 1582, it goes over thirteen job specific tasks (NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2013). The fire department should evaluate the tasks to determine if their firefighters will encounter them on a day to day basis (NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2013). Chapter eight of this NFPA goes over the fitness evaluation of members. Once this information is evaluated, the fire department physician can determine the firefighter's medical performance (NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2013).

NFPA 1583 provides a standard on "Health-related fitness programs for fire department members." (NFPA 1583: Standard on Health-Related Fitness Programs for Fire Department Members, 2008). This standard discusses different assessment components that can be used when assessing ones' health. Some of the different components recommended are: aerobic capacity, body composition, muscular strength,

muscular endurance, and flexibility (NFPA 1583: Standard on Health-Related Fitness Programs for Fire Department Members, 2008). The standard goes over various components that should be part of a health and wellness program such as: educational (describing components and their benefits), individualized exercise programs based on assessments, warm-ups and cool-downs, aerobic program, muscular resistance (this includes strength and endurance), flexibility, healthy back, and safety & injury (NFPA 1583: Standard on Health-Related Fitness Programs for Fire Department Members, 2008). All these components can be intertwined to create a wellness program for a fire department.

CPAT

The Candidate Physical Ability Test (CPAT) is becoming one of the top physical ability tests for firefighters. It was introduced in 1999 and was created by ten cities, the International Association of Fire Fighters, and the International Association of Fire Chiefs Joint Labor Management Wellness-Fitness Initiative Task Force (International Association of Fire Fighters, 2014). The goal was to have a uniformly accepted test that was comprehensive, rigorous, and would adhere to high standards regardless of gender, age, or any other demographics. All those wanting to be firefighters would need to be able to pass the test. The test was designed around basic firefighter skills that one would need to be able to do on the job. It was intended to promote more properly trained and physically fit individuals to do the job safely.

The CPAT consists of eight tasks. Each task is job related. The individual performing the test must wear a 50 pound weighted vest throughout the whole test along

with long pants, gloves, and a helmet. The 50 pound vest is to be a simulation of the weight of fire gear, while the pants, gloves and helmet are meant for safety reasons. The individual must complete all the tasks in 10 minutes and 20 seconds. If they do not complete the test in the allotted time frame, it is considered a failed test. It is a pass/fail test, so whether the individual finishes in 8 minutes or in 10 minutes 19 seconds, the individual would be considered a passed test. Any time past 10 minutes and 20 seconds is a failed test.

The eight tasks that are done in the testing sequence are: a stair climb (with an additional 25 pounds to simulate a hose pack), a ladder raise and extension, a hose drag, an equipment carry, forcible entry (accomplished through simulation of penetrating through a door or breaching a wall), search (done by crawling through a dark tunnel), rescue drag (using a 180 pound rescue mannequin), and a ceiling push/pull (to simulate searching for fire extension). All of these tasks are commonly done on a fire scene. It is expected for firefighters to be able to accomplish these tasks on the fire scene, and the creation of the CPAT was to ensure that a firefighter candidate is physically ready to accomplish these tasks.

The State of Kentucky mandates that new fire department hires must pass the CPAT in KRS95A.040 (Kentucky Legislature, 2010). With so many fire departments making physical ability tests a requirement, students at EKU who are not prepared, fail to get hired.

Firefighter Job Specific Testing

A study was done on firefighters to "investigate and compare undulation training (UT) vs. a standard training control (STCo)" in order "to assess the degree of transfer of training to job specific testing batteries" (Peterson, Dodd, Alvar, Rhea, & Favre, 2008, p. 1684). Peterson and his colleagues recruited fourteen firefighter academy attendees for the 12 week study. The attendees went through six job specific testing batteries. . This included: an equipment hoist, a hose pull, a Keiser sled and sledgehammer, a stairclimb, an attic crawl, and a simulated civilian carry/drag (Peterson, Dodd, Alvar, Rhea, & Favre, 2008). The UT group underwent multidimensional muscular fitness development (day 1 = upper body – endurance/hypertrophy and lower body – strength, day 2 = upper body – strength and lower body – power/speed, day 3 = upper body – power/speed and lower body – endurance/hypertrophy) (Peterson, Dodd, Alvar, Rhea, & Favre, 2008). The STCo group trained in a specified mesocycle (mesocycle 1 = endurance/hypertrophy, mesocycle 2 = strength, mesocycle 3 = power/speed). The UT improved over the STCo significantly ($fi<0.05$) in the job specific testing (Peterson, Dodd, Alvar, Rhea, & Favre, 2008). In other words, the UT group performed better than the STCo group in the job specific testing.

How to Physically Prepare Students for Firefighting

EKU Fire Protection Administration majors are not required to do any additional physical fitness than the required wellness class of all other Eastern students. The wellness requirement is only one semester and three credit hours. The purpose of this course is for students to evaluate their wellness and to be able to find ways to improve

their wellness (Dr. Jim Larkin, 2015). This class is a general class and does not focus on job specificity for the fire administration students. While students will learn about their wellness and how to maintain wellness, those that have no experience in the field may not know the best way to exercise and prepare their bodies for the CPAT or any other type of physical ability test that they might have to take for their career.

Exercise

Exercise comes in many forms. For students though, it can be hard to fit in the time to exercise. There is no one perfect way to exercise. "Firefighters perform strenuous work in hostile, chaotic, and unpredictable conditions" (Smith, 2011, p. 167). "Like soldiers and elite athletes, firefighters should be physically prepared to meet the unique physical challenges they face" (Smith, 2011, p. 170). Therefore, exercise has to become part of a normal regimen in order to remain physically fit and perform at optimum levels. As people get older, their bodies will naturally decline. Though difficult to be a successful, healthy firefighter, one must make exercise a habit (Sherek, 2009).

Habit

Habit is "a usual way of behaving or something that a person does often in a regular and repeated way" (Merriam-Webster Dictionary, 2014). In a study by Lally Phillippa, it was found that three particular themes reappeared for majority of the individuals when creating a habit (Lally, Wardle, & Gardner, 2011). The three themes are: "Strategies used to support initial engagement in a novel behaviour; development of behavioural automaticity; and selecting effective cues to support related behaviour"

(Lally, Wardle, & Gardner, 2011). The individuals in the study found that it took more effort to make a change in the beginning. Later on the change in their life was to the point of automatic in which people felt unusual if they did not do the task. Finally, it was found that with each person's changed behavior there was a specific cue that prompted them to do the task; for instance, one individual ate breakfast every morning once they arrived at work and that was the individual's cue to eat breakfast (Lally, Wardle, & Gardner, 2011). Students have to find new cues to trigger them each year to study and adjust to their schedule.

In an article by Oliver Burkeman, it discusses that for some individuals it can take as few as 18 days to make their new habit automatic, while for some it can take upwards of over 200 days (Burkeman, 2009). Each person is going to adjust differently, but if a student were to start making exercise a habit when they begin college, by the time they graduate exercise adherence will be improved. "Many adult behaviors are established during late adolescence and early adulthood…" (Buckworth & Nigg, 2004, p. 28). Getting students in the habit of physical exercise now could increase the chance of these students maintaining this habit throughout adulthood.

How to Maintain Physical Fitness

According to an article in the Journal of American College Health, "Fitness levels of young Americans are declining and failing to improve, and the most rapid reduction in physical activity levels occurs between the ages of 18 and 24 years" (TW, 1997). With college students' activity levels declining and this could make it more difficult for students to be prepared for physical performance tests similar to the CPAT.

Training

Everyone is different and cannot be expected to be at the same level as the person standing next to them. But whether a person is new at training or experienced, each individual will have to put forth a certain amount of effort to make improvements in their current condition. The key to keeping students interested in training will be to motivate the students in the study. Group exercise has been shown to offer a variety of benefits (Dolan, 2012). Benefits could include: "exposure to a social and fun environment, a safe and effectively designed workout, a consistent exercise schedule, and accountability factor for participating in exercise, and a workout that requires no prior knowledge or experience" (Dolan, 2012). Class benefits such as these could be motivators for students.

When college students were involved in a study about their physical activity motivators, it was found that there were different motivators among men and women (Kilpatrick, Herbert, & Bartholomew, 2005). Challenge, competition, social recognition and strength and endurance were the rated higher motivators for men versus women. While women had weight management ranked as a higher motivator than men did. Enjoyment and positive health benefits were motivators for physical activity engagement among the students (Kilpatrick, Herbert, & Bartholomew, 2005).

Summary

In conclusion, with the increased risk of death by heart related issues for firefighters, not only is there a need to focus on the overall physical improvement among students. This would not only prepare them for after they graduate, but it should hopefully reduce their risk of having heart disease later in life. By creating an exercise

routine that will teach them what exercises will benefit them and get them ready for passing firefighter physical ability tests, it will also help make exercise a habit in their daily lives. The sooner students' start creating this habit the easier it will be for them in the long run to maintain exercise adherence into the future. This should in turn, reduce their risk factors for heart related problems.

CHAPTER III

Method

Introduction

The purpose of this study was to compare fire science students' physical performance after attending a six week, 4 day per week training course (versus a control group who continue to perform their normal daily functions). All subjects completed a pretest and posttest which included measurements of their weight, height, body fat, and a firefighter specific physical ability test. This chapter gives information on the subject selection process, experimental procedures, and the statistical treatment of the data relating to the subjects' physical performance test results.

Subject Selection

To obtain participants, an advertisement was given to EKU fire science majors during their fire science classes at the Stratton Building & Ashland Building. Additional advertising was done on the internet closer to the start date. Additionally, professors teaching fire science classes announced the need for participants. Students were also personally contacted directly, and if the student was interested, they were given a packet about the study. Students had to be college aged, EKU fire science majors. It did not matter whether they were male or female.

Students who chose to sign-up were queried through a screening questionnaire that was in their study packet, and were then chosen to be part of the study only if they met certain criteria (see Appendix B).

Experimental Procedures

All subjects read and signed an informed consent form (see Appendix B) and paid a $20.00 deposit to be entered into the study. The money would be refunded to the student upon completion of the study. Students were informed when the study would start and when and where they would need to be to participate in the study.

Pre-Test/Post-Test Session

Pretesting lasted two days. Students were asked not to exercise 24 hours or eat 2-3 hours prior to testing. The students were informed to meet at the Moberly Building's Gym. The students' height was measured to the nearest half inch and their weight was measured to the nearest half pound. Students did not wear shoes during their height and weight measurements. Their waist circumference was measured to the nearest half inch, and their body fat was tested using bioelectrical impedance.

Students were then given the next day off to rest. Students participated in a physical performance test specific to fire fighting that they learned about through reading their consent forms. Students were told to report to the Richmond Fire Department Training Center at 8 a.m. to start their pre-testing. Prior to the students starting the test, they did a walk-through of the test so they would have a better understanding of what was expected of them and what they had to do. During this time, students were able to ask questions and all safety concerns were discussed.

Post-testing lasted the same length of time on the 8th week. It consisted of the same protocol as the pretesting.

Physical Performance Testing

The physical performance testing consisted of multiple stations assessing job-related firefighter skills. There was no pass/fail on this test. This test was a timed test meant to show physical improvement through improved times. Throughout the test each student wore a 50 pound short vest, helmet, and gloves, (which were provided for consistency). The students' were required to wear long pants, and closed toe shoes, preferably athletic shoes, to reduce the risk of injury.

In the first task, high rise climb, the student took a hose bundle consisting of: 100' of a 1 ¾" hoseline duct taped into position. The students would carry this bundle up five flights of stairs and back down. The student had to touch every step going up and down (for safety reasons). They were allowed to use the hand railings in the stairwell. If the student missed a step, they had to start the task over and time would have continued. This task was meant to simulate a firefighter going up a stairwell to a fire with some of the possible equipment needed to fight a fire. Once they had ascended and descended the stairs, they could move on to the next task.

For the second station, supply line drag, the student had to extend an uncharged 5" hoseline 100 feet. The student carried the hose over their shoulder and had to go around a barrel after they had pulled 50 feet of hose. This was a simulation of when a firefighter first gets on the scene of a structure fire and has to pull the supply line to have constant water flow from a fire hydrant to the fire engine. Once the student had pulled the hose past the 100 foot mark, they were able to move on to the next station.

In the third station, the fire line attack, the student dragged a charged 1 ¾" hoseline 100 feet. The hose was carried under their arm. Many fire trucks have pre-connected attack hoselines of this size ready for the firefighter to take directly into the fire to start extinguishment. Once the student dragged the hose line to this point the student moved forward to the next station.

The fourth station was the Keiser Force Machine. The student straddled the weight standing on the platform. The student was only allowed to move the weight by striking it with the sledgehammer. If the student was observed to push or pull the weight, they would have to start the station over. This station simulated the student cutting out the roof line as the student must strike the weight in a downward motion using an 8 pound sledgehammer. Once the student moved the weight on the Keiser from one end to the other, the student could move on to the next task.

For the fifth station, the ladder raise, the student had to raise a ladder. A 14' roof ladder was raised rung over rung until the ladder was vertical and resting on the wall. Once the ladder was fully against the wall the student would move on to the next task.

The sixth station, the ladder extension, consisted of the student extending a 24' extension ladder. The student had to show control and could not allow the rope of the extension ladder to slip at any point. If the student allowed the rope to slip they had to start the task over and the time did not stop. Once the student extended and lowered the ladder in a controlled manner, then they moved on to the next station.

The seventh station was the over and under. The student went over and under a prop or obstacle and repeated it. The obstacles were 36 inch high hurdles and spaced

eight feet apart. The first hurdle, the student went over, and the next hurdle the student went under. The student did this twice. This station was created to simulate the various obstacles a firefighter could come in contact with in a real fire scenario.

The final task, the rescue drag, consisted of a dummy drag. Using a hose manikin weighing 100 pounds, the student had to drag the object 100 feet. The student then had to use the rope harness on the manikin to drag the manikin. Once the student dragged the manikin past the 100' mark, the test was concluded and time stopped.

In between each obstacle the student walked 50', except between the Keiser and the 14' ladder raise. The area between those two tasks was a 100' walk for the students since this was the middle of the test and provided the students a bigger rest break. The students were given a small amount of recovery during each obstacle by having to walk in between the obstacles. The students were not allowed to run during this portion of the physical performance test.

Training

After pre-testing was complete, students were randomly assigned to either the control group or training group. Students in the control group were told to do no training during the study, however they were asked to continue their current everyday lifestyles during the duration of the study. This includes their normal activity level and food habits. Those in the training group were told to report to behind the Ashland Building on Monday morning at 7:00 a.m. for their first training.

Training was conducted four days a week: Monday, Tuesday, Thursday, and Friday. It lasted approximately one hour and consisted of the following: Warm-up and

stretch, workout, and cool-down and stretch. Their workouts were supervised and led by a certified personal trainer.

Statistical Treatment of Data

Descriptive characteristics, including the means and standard deviations, were computed for all the variables tested. Change scores were calculated to analyze the changes from pre-testing to post-testing.

CHAPTER IV

Results

Introduction

The purpose of this chapter is to present fitness testing data that was collected before and after a six week training period. A total of 16 students participated in the study ranging from age 18 to 30. Among the students, thirteen participated in the pre-testing and only nine participants completed post-testing. Out of the nine, four of the students were in the workout group, while the other five were in the control group.

In addition to the means and standard deviations of the variables, change scores were calculated. In this chapter, the data collected are presented in the following order: subjects' physical characteristics; and physical performance testing.

Subjects Physical Characteristics

Data were obtained prior to physical performance pre-testing and physical performance post-testing. Students who participated in pre-testing ranged in age from 18 to 30 and descriptive data are displayed in Table 1. This table shows the training groups' and control groups' average age was about a year difference, there was 45 pound average weight difference and higher body fat average in the training group.

Students who completed the study ranged in age 18 to 30 and descriptive data are displayed in Table 2. Among students who completed the study, the training group had higher average age, higher body weight and higher body fat compared to the control group.

Table 4-1. Physical Characteristics of students who participated in pre-testing. N=13

Variable	Training (n=5) Mean (SD)	Control (n=8) Mean (SD)
Age (yr)	22.6 (2.9)	21.5 (3.7)
Weight (lbs.) Pre-	208.3 (44.4)	162.8 (29.6)
Body Fat (%) Pre-	20.9 (1.6)	16.4(6.6)

Table 4-2. Physical Characteristics of students who completed study. (N=9)

Variable	Training (n=4) Mean (SD)	Control (n=5) Mean (SD)
Age (yr)	23.5 (2.38)	21.6 (4.83)
Weight (lbs.) Pre- Post-	210.0 (51.1) 206.3 (51.9)	172.6 (22.2) 173.8 (24.7)
Body Fat (%) Pre- Post-	21.3 (1.5) 21.2 (2.4)	15.5 (6.7) 15.0 (5.1)

Physical Performance Testing

The physical performance testing was done eight weeks apart. During the six week period in between testing, the training group met at 7:00am, Monday, Tuesday, Thursday, and Friday for one-hour training sessions. The workouts consisted of circuits specific to the physical performance testing. Table 3 shows the results of the pre-testing of the physical performance test among the control group and training group in relation to the mean, and standard deviation. The training group had a lower average time versus the control group for students who initially participated in the pre-testing.

Table 4-3. Pre-testing means and standard deviations for all who participated in the physical performance pre-test. (N=13)

Group	Training (n=5) Mean (SD)	Control (n=8) Mean (SD)
Pre-test (Seconds)	566.4 (269.7)	574.3 (501.2)

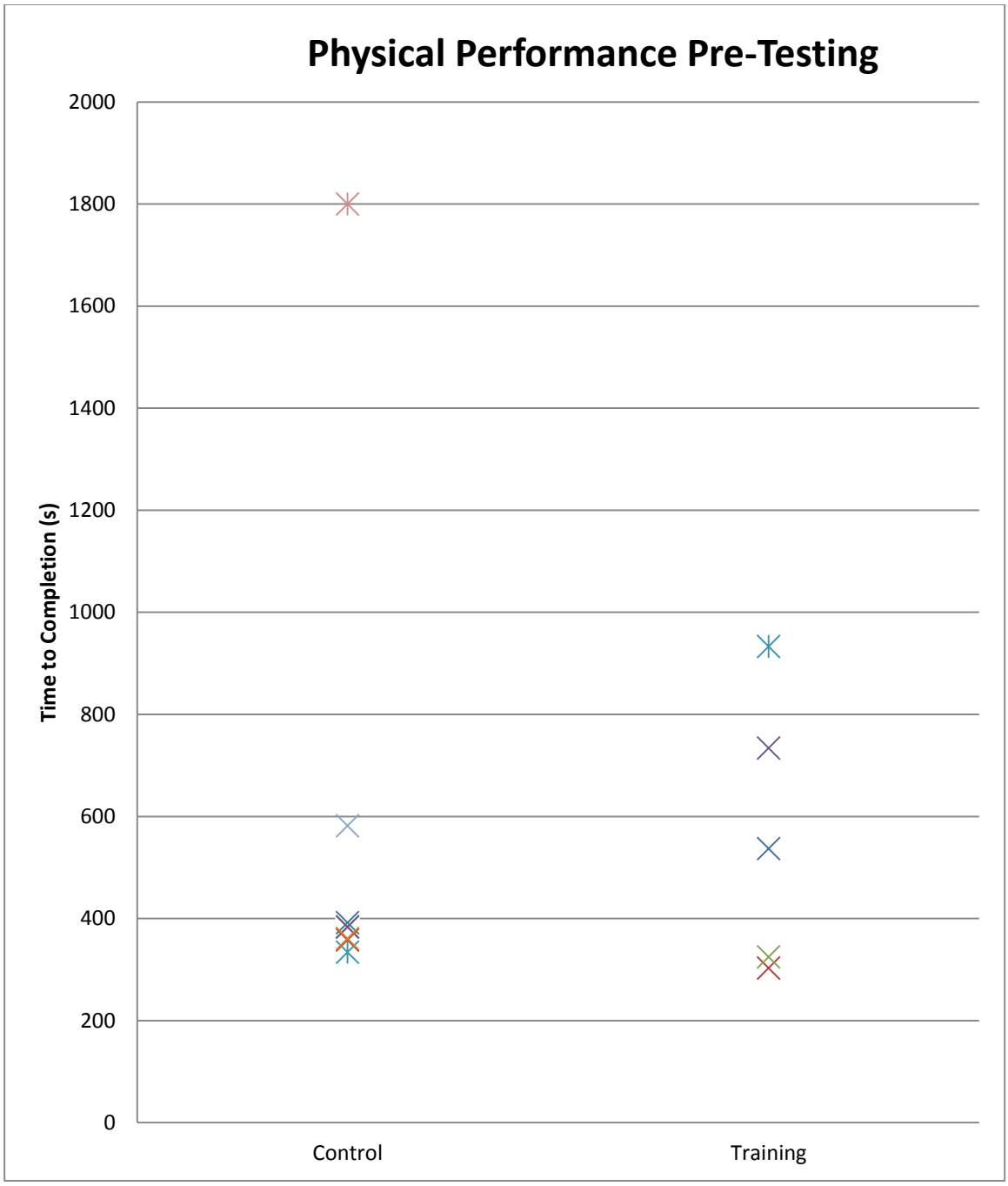
Pre- and post-testing of the physical performance test between the two groups in relation to the mean, standard deviation and percent change among the groups is shown in Table 4. The training group had a higher average time pre- and post-testing compared to those in the control group who finished the study. However, there was a 21% decrease in the training groups overall average time, versus only an 8.6% decrease in the control groups average time.

Table 4-4. Pre-Test and Post-Test means, standard deviations and percent change for Training and Controls. (N=9)

Group	Training (n=4) Mean (SD)	Control (n=5) Mean (SD)
Pre-test (Seconds)	632.3 (260.9)	413.6 (94.9)
Post-test (Seconds)	499.5 (133.8)	378.0 (62.0)
Percent Change	-21.0	-8.6

Figure 1 shows the pre-testing of the control and training group for each student that participated. The control group had two students who did not finish the physical performance test. Their times are noted by asterisks on the graph of when they chose to stop the test. One student from the training group did not finish the physical performance test.

Figure 2 shows the pre- and post-testing results of the physical performance test for each student. Along with this, linear lines were shown for each individual to show whether they increased or decreased their completion time.



X=Completed Test *=Incomplete Test

Figure 1. Pre-Testing Physical Performance Testing Comparison

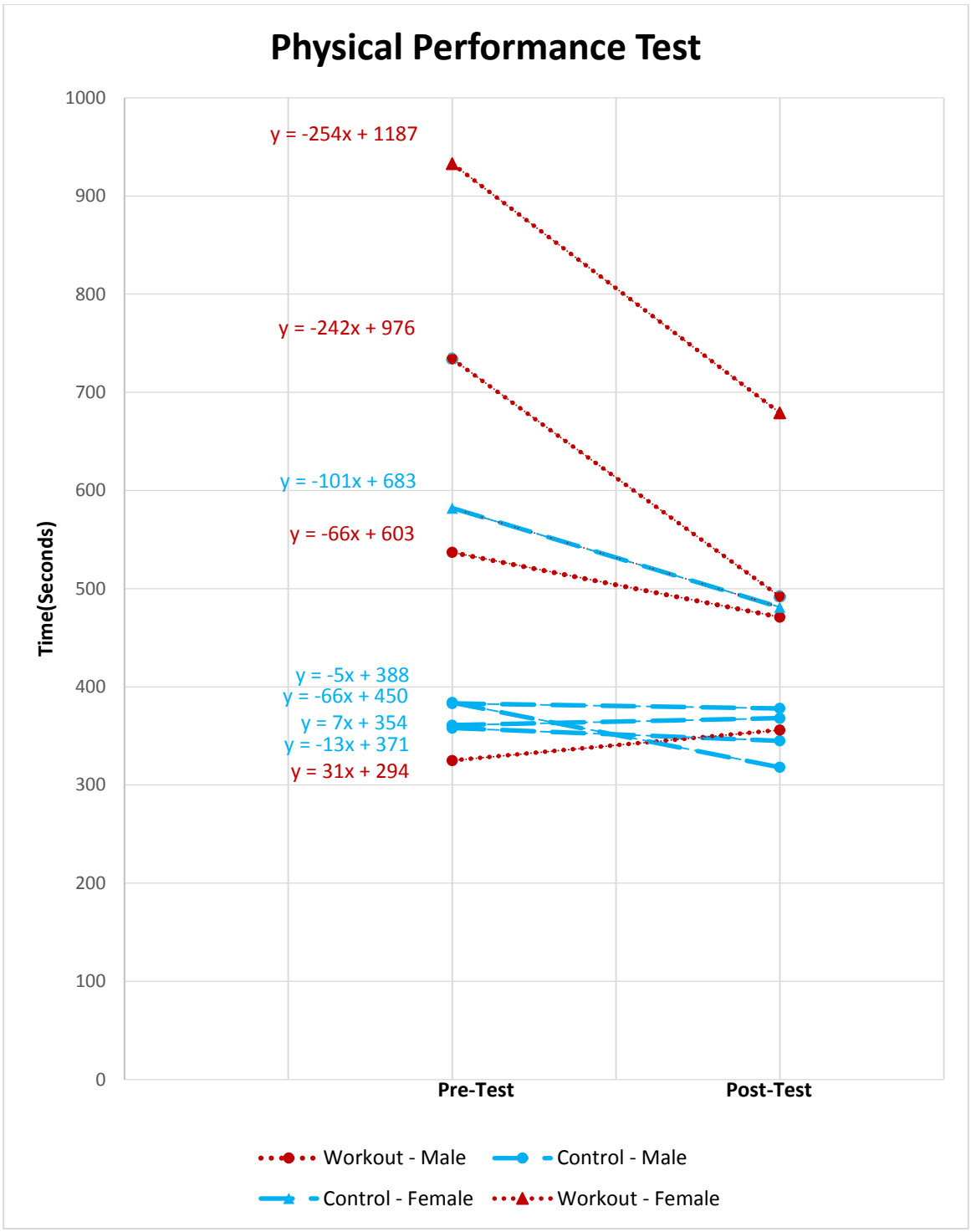


Figure 2. Physical Performance Pre-Test and Post-Test Results.

Figure 3 shows the change scores of each individual who completed the physical performance test. Changes scores were calculated by taking the students' post-test time minus their pre-test time on the physical performance test.

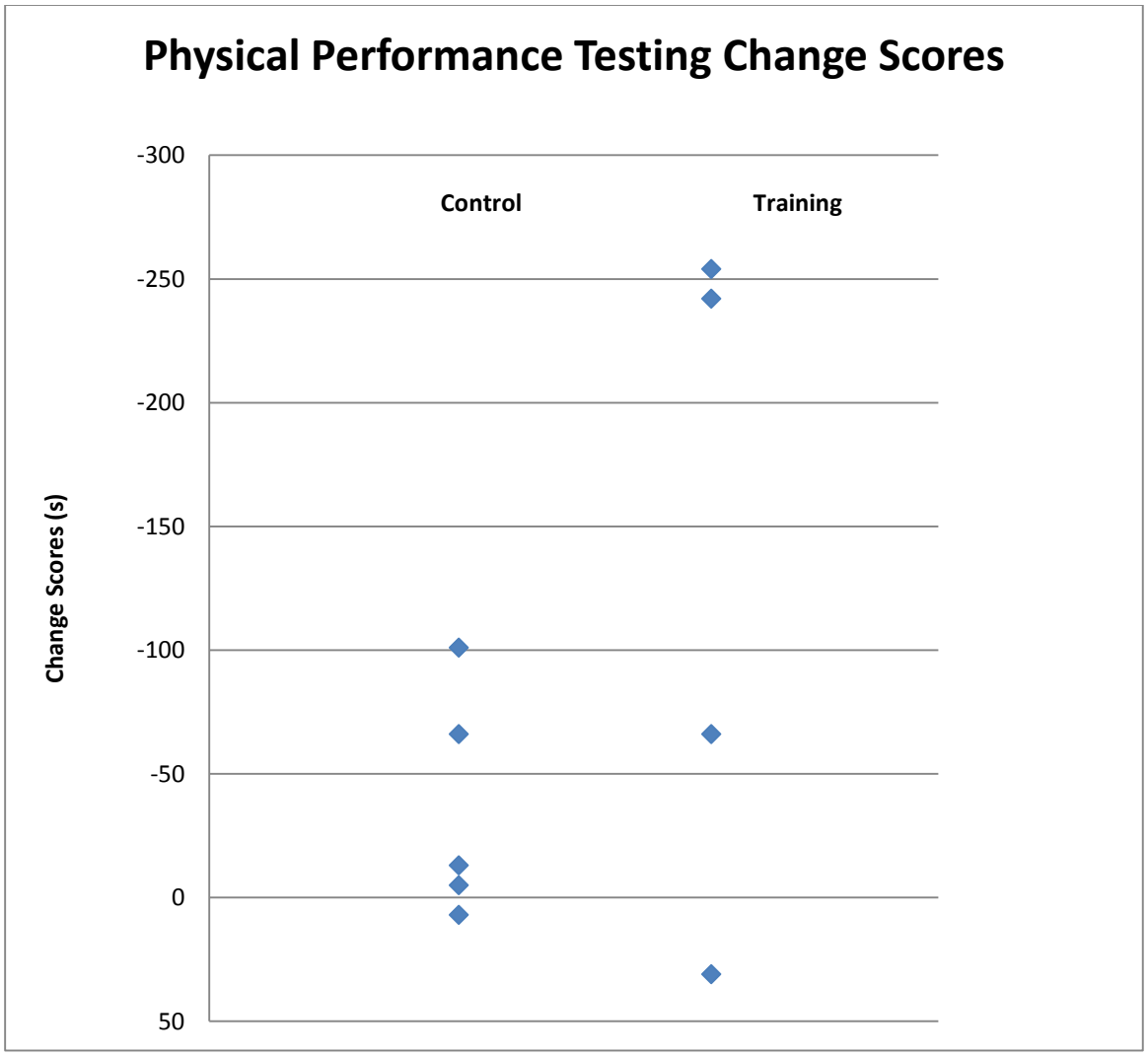


Figure 3. Physical Performance Testing Change Scores

Figure 4 shows the changes scores in relation to the attendance of the Training Group. The most days that the students could have attended were 24 days.

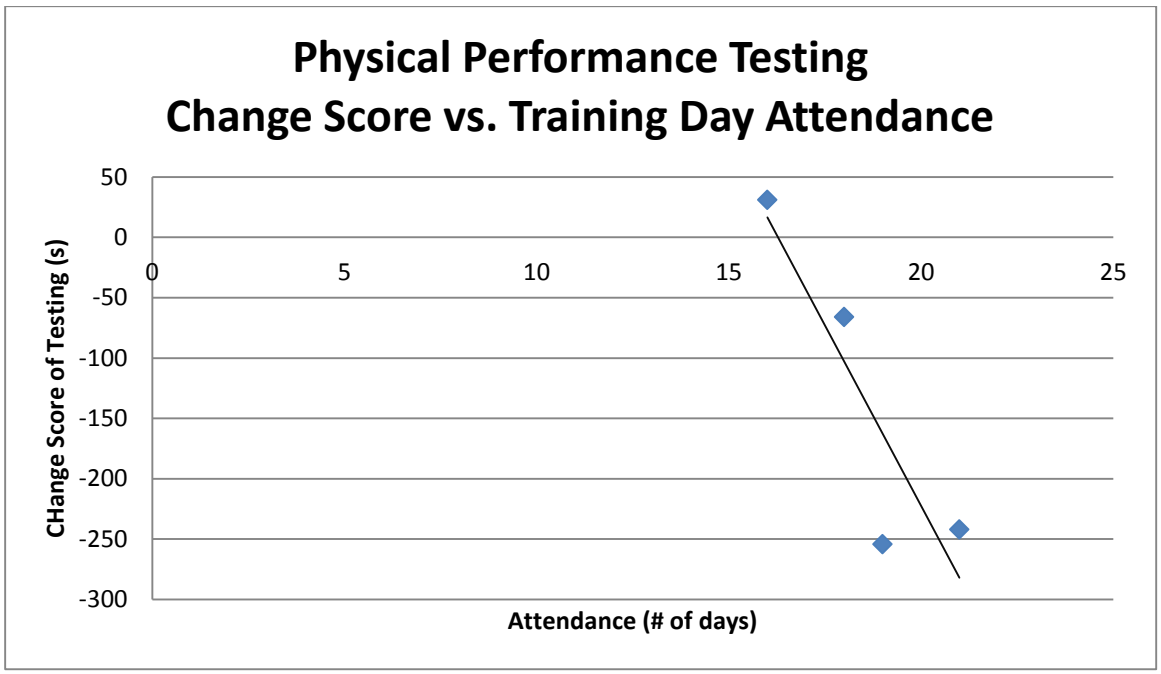


Figure 4. Training Group Physical Performance Testing

Post-Testing Surveys

Post-testing surveys were given to each student on the days of their final testing to find out their workout and nutritional habits during the past 6 weeks. This was done for both the training group and control group. Along with this students were asked in the post-testing surveys about whether or not they had taken the CPAT and passed and what could be done to improve the current program.

Summary

In summary, physical characteristics were compared for training and control groups of the students who participated in the pre-testing as well as those who completed

the study. A comparison of the control groups versus the training groups physical performance testing average times was evaluated based on the students who did the pre-testing and another evaluation of the students who completed the study. Data was graphed showing the students pre-testing time between the control group and the training group. Another graph was made to show the results of pre-testing and post-testing completion times for the control and training group. Change scores were graphed based on control group or training group to show the difference of the students' who completed the pre- and post-testing. Finally, there is a graph to show the change scores of the training group and their attendance throughout the study.

CHAPTER V

Discussion

Summary of Physical Characteristics

The physical characteristics among the students who participated in the pre-testing are close in average age with only an average of 1.1 years difference among the groups. This is similar to Peterson's study in which the subjects were 21.9 years + or – 1.8 years in their study on firefighter job performance fitness (Peterson, Dodd, Alvar, Rhea, & Favre, 2008). However, the training groups' average weight was heavier than the control group by 45 pounds and the body fat average was higher by almost 5%. This could conclude the training group started out more sedentary than the control group.

The physical characteristics of the students who completed the study showed the training groups' average age to be higher by 1.9 years. Along with these results, the training groups' average weight, pre- and post-testing was higher than the control group. Conversely, the training group had an average weight decrease of 3.7 pounds while the control groups average weight increased by 1.2 pounds. The body fat analysis was similar with the control group having a lower average percent body fat being 5.8% lower than the training group. On the contrary though, the control group ended the testing with a lower average body fat percentage compared to the training group. The control group decreased their average body fat percentage by 0.5% and the training group only decreased their average by 0.1%. In Poston's study, it was found that "rates of obesity also were high regardless of how obesity was defined" among the firefighters (Poston, et

al., 2011). So for students to be reducing their body fat they are not going to become part of Poston's findings.

Summary of Physical Performance Testing

The physical performance testing among the students who participated in the pre-testing showed only 7.9 seconds difference between the control group and the workout group. The workout groups' average time was lower. Two students in the control group did not finish the test and one student from the training group did not finish. One of these students was stopped for safety reasons, another student stopped due to light-headedness, and another stopped because the student did not feel they were capable of completing the test.

The pre-testing means changed when evaluated for only those who completed the study. The workout groups' average completion time of the pre-test was much higher than the control group by 218.7 seconds. The post-testing of the groups average completion times showed the workout group, while still longer than the control group, was only 121.5 seconds slower compared to the 218.7 seconds at pre-testing. The workout groups' average completion time had dropped 132.8 seconds in 8 weeks giving the workout group a 21% decrease in their average time. The control group, while still decreasing their average time at post-testing, only decreased their time by 35.6 seconds giving them an 8.6% decrease in their time.

The pre-testing results for the physical performance test showed the students in the training group were more spaced out compared to the control group. This could mean those who were randomly selected for the training group happened to be more sedentary

than the control group. However, the top individual of the control and training group did not finish the test, and the lowest individual time on the control group did not finish the test either.

Among those who completed the study, the majority of the training group showed an improvement in their completion time. Those in the control group did not appear to have as much improvement compared to those in the training group. This is similar to the study Peterson did in relation to his undulation training (UT) group performed better than the standard training control (STCo) group (Peterson, Dodd, Alvar, Rhea, & Favre, 2008). While both of Petersons groups showed improvement, the UT group showed significant improvement (Peterson, Dodd, Alvar, Rhea, & Favre, 2008).

There appears to be the possibility of a plateau for individuals who participated in the physical performance test. Students who completed the pre-test in the 300-400 second range, as well completed their post-testing in the same range. It did not matter whether the student was in the control group or the training group; however, if the student was in the workout group, it could be assumed they might maintain that level of performance, but without further testing this cannot be determined at this time.

The change scores of the students who completed the study showed the biggest change score in the control group was around the 100 second decrease, while the training group had their biggest change score being around a 250 second decrease. Those in the training group appeared to have a larger difference in their pre- and post- workout times in comparison to the control group. Three out of five (60%) of the control groups'

change scores were a 13 second decrease or less, while three out of four (75%) of the training groups' change scores were a 66 second decrease or more.

Students' in the training groups' change scores were evaluated based on their attendance. Students had the opportunity to come to 24 supervised one hour trainings. By having the students working out four times a week, it gave the opportunity to create a habit for the student to continue working out even after the study would be complete, similar to Lally's study on habit formation (Lally, Wardle, & Gardner, 2011). In her study, people found it odd after an eight week period to not continue or do their new habit (Lally, Wardle, & Gardner, 2011). The training group only met for six weeks, but it might have been a long enough period to create a habit.

Out of the 24 days, the highest attendance of any of the students was 21 with the fewest days attended being 16 among those who completed the study. According to the graph, the students in the group who attended 18 or more trainings decreased their overall physical performance test completion time. Peterson's study had the subjects meeting three times a week for about 1-1.5 hours, for 9 weeks of training (12 weeks total including testing) (Peterson, Dodd, Alvar, Rhea, & Favre, 2008). While this study did not last as long as Peterson's, no subjects were excluded from the study as a result of their absences. Peterson's study excluded subjects that missed more than two workouts during the study (Peterson, Dodd, Alvar, Rhea, & Favre, 2008).

Summary of Post-Testing Surveys

The five students who were in the control group claimed they did not change their eating habits; however, four (80%) students in the group continued to do some type of

exercise during the study. Among the control group, two (40%) students had taken the CPAT and passed. The other three (60%) had not at the time attempted to take the CPAT. All five showed interest in taking this as a class if it were to become offered. When asked why the students would want to take this as a class they expressed the concern that the exercises would better prepare them for their career and how physical fitness is essential while being a firefighter. Kilpatrick found in his study that subjects, male or female, "were more motivated to engage in physical activity as a means for enjoyment and to achieve positive health benefits" (Kilpatrick, Herbert, & Bartholomew, 2005). Some students expressed that a class of this nature would give them more motivation to exercise, and would give the students more real-life situations versus the general physical education requirement. It would be geared toward the fire science student.

Out of the four in the workout group, one (25%) student changed their eating habits and two (50%) of the students did additional training on their own in addition to the group training. The CPAT had been attempted by three (75%) students in the workout group; however, only one student had passed the CPAT. The consensus of the group was they would be interested in an exercise program as a class, and went on to explain not only were the workouts geared to what they would be expected to do on a performance test, but for some the workouts and testing gave them more confidence in themselves. The workout group was also asked how this could be made better and among the responses, students would like to see a diet plan involved and more times available to train.

Conclusions

According to the data of this study, the following conclusions were made:

1. Average pre-test times between the control group and the training group did not have much difference showing each of the groups were close to being equal.
2. Those who chose not to complete the study caused the average pre-testing time to increase in the training group and decrease in the control group, making the control group appear to be better at the physical performance pre-testing.
3. However, this caused the training group to have a larger decrease in time by 21% versus the control group only having an 8.6% decrease in their time.
4. Evaluation of the change scores between the control group and the training group, shows the training group had bigger change scores compared to the control group.
5. Among the students who completed testing in the training group, those who attended more training sessions, proved to do better on the physical performance test.

Recommendations

Future Studies

Due to the fact the training group did not show a difference compared to the control group, research should be done with a larger group of participants.

1. Due to the lack of student participation, giving students' college credit for the study could result with more student participation. Setting the study up to count as an elective class for Fire Protection Administration students could give the students more incentive to volunteer to be part of the study.

2. A similar study should be performed for a longer duration. This may better show how a student's body can change over the course of a semester.
3. Heart rate monitors could be worn by the students in order to measure the intensity of the student and their performance.
4. Offering the program again, but with more flexible workout times and testing times.
5. Nutrition could be incorporated to show the effects of how it directly correlates to weight loss and body fat reduction.
6. Having additional groups could look at different types of workouts and what type of training works best for physical performance testing.

Practical Application

Creating healthy habits should be a result of this program. It could potentially start the habit of a healthier lifestyle for the Fire Protection Administration students and could make it easier for students to maintain upon graduating. Students were taught different ways to workout with equipment that is easily accessible and available at fire stations. In turn this will hopefully start to reduce the amount of firefighter deaths as a result of heart related problems and could create an atmosphere in the fire service getting more fire service personnel to maintain a certain level of health and fitness in their daily lives.

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Appendix A

Consent

Consent to Participate in a Research Study

Firefighter Physical Performance Testing

Why am I being asked to participate in this research?

You are being invited to take part in a research study about Firefighter Physical Performance Testing. You are being invited to participate in this research study because you fit the profile needed for this study by being a student seeking a fire science degree. If you take part in this study, you will be one of about 40 people to do so.

Who is doing the study?

The person in charge of this study is Jessica Moody at EKU. She is being guided in this research by Professor Paul Grant. There may be other people on the research team assisting at different times during the study.

What is the purpose of the study?

By doing this study, we hope to show the need for a class to help students get in better shape prior to graduation to increase their chances of getting a firefighter job. Also, to start a habit among those in the study to change their lifestyle and making working out a regular habit.

Where is the study going to take place and how long will it last?

The research procedures will be conducted at EKU. You will need to come to 4 times a week for 8 weeks during the study. Each of those visits will take about 60 minutes. The total amount of time you will be asked to volunteer for this study is 4 hours a week over the next 8 weeks.

What will I be asked to do?

Pre-test/Post-test Session

Pre-testing will last approximately 2 days. The first day will consist of measuring the student's height, weight, body fat, waist circumference, aerobic test, flexibility test, and endurance test. The individual's height will be measured to the nearest quarter inch and their weight will be measured to the nearest quarter pound. The aerobic test will consist of a timed 1-mile run. The flexibility test is the sit and reach, in which students will sit on the floor with their legs straight out in front of them and reach for their toes. The muscular endurance test which will consist of push-ups, and sit-ups, doing as many as possible until 1 minute has passed. The muscular endurance test will also include a flexed arm hang, where students would hang in a pull-up position for as long as possible. Students will then be given a day off to rest. On the third day students will participate in a physical performance test that they will have learned about during the informational meeting. Students will take the test in 10-15 minute intervals.

Post-testing will last the same length of time on the 8th week.

Physical Performance Testing

The physical performance testing will consist of multiple stations that will be used to assess job-related firefighter skills in a fitness test. There is no pass/fail on this test. It is a timed test that is meant to show physical improvement through better times. Throughout the test each student must wear a 50lbs. short vest, a helmet, and gloves, which will be provided. The student will also be required to wear long pants, and closed toe shoes, preferably athletic shoes, to reduce the risk of injury.

The first task is the high rise climb. The student will take a hose bundle that will consist of 50' of 3" line with a curved appliance attached to the line and a gated wye attached to the line with 2 small spanner wrenches, and carry this bundle up 5 flights of stairs and back down. The student must touch every step going up and down for safety reasons. They will be allowed to use the railings. If the student misses a step, they must start the task over and time will continue. This task is meant to simulate a firefighter going up a stairwell to a fire with some of the possible equipment needed to fight a fire. Once they have ascended and descended the stairs, they will move on to the next task.

The second station is the supply line drag. The student will extend an uncharged 5" line 100 feet. The student must carry the hose over the shoulder. This will be a simulation of when a firefighter first gets on the scene of a structure fire and has to pull the supply line to have constant water flow from a fire hydrant to the fire engine. Once the student has pulled the hose past the 100 foot mark, they will be able to move on to the next station.

The third station is the fire line attack. The student will drag a charged 1 ¾" line 100 feet. The hose must be carried under the arm. Many fire trucks have pre-connected attack hose of this size ready for the firefighter to take directly into the fire to start extinguishment. Once the student has drug the hose line to this point the student will move forward to the next station.

The fourth station is the Kaiser machine. The student will straddle the weight standing on the platform. The student will only be able to move the weight by striking

it with the hammer. If the student is caught pushing or pulling the weight, they will have to start the station over. This station simulated the student cutting out the roof line as the student must strike the weight in a downward motion using an 8 pound sledgehammer. Once the student has moved the weight on the Kaiser from one end to the other, then the student can move on to the next task.

The fifth station is the ladder raise. The student will raise a 14' ladder rung over rung until the ladder is parallel and resting on the wall. Once the ladder is fully against the wall the student can move on to the next task.

The sixth station is the ladder extension. The student will extend a 24' extension ladder. The student must show control and cannot allow the rope of the extension ladder to slip at any point. If the student allows the rope to slip they must start the task over and time will not stop. Once the candidate extends and lowers the ladder in a controlled manner, then they can move on to the next station.

The seventh station is the over and under. The student will be going over and under 32 inch high hurdles that will be spaced 8 feet apart. The first hurdle, the student will go over, and the next the student will go under. This will simulate the various obstacles and needed agility a firefighter could come in contact with in a real scenario.

The final task is the rescue drag. The student will drag a hose manikin weighing 180 pounds dead-weight, the student is to drag the object 100 feet. The student must use the harness on the manikin to drag the manikin. Once the student drags the manikin past the 100' mark, the test will be concluded and time will stop.

In between each obstacle the student will walk 50' to each obstacle. This will give the student a small amount of time to recover during each obstacle. The student will not be allowed to run during this portion of the physical performance test.

6 Week Physical Training

The next week students that are part of the experimental group will start Monday for their first workout. It will last approximately 1 hour and will consist of: 10 minute warm-up, 40 minute workout, and 10 minute cool-down. The students will workout on Mondays, Tuesdays, Thursdays, and Fridays. Each student will be doing similar workouts but not exactly the same as the person standing next to them based on fitness level variations. Some students will be stronger than others and therefore will need to be pushed differently to get a workout that will be effective.

Are there reasons why I should not take part in this study?

Students must be 18 years of age to participate in the study. If you have some form of physical injury that a doctor has specified that you should not workout, then you should not participate in this study.

What are the possible risks and discomforts?

To the best of our knowledge, the things you will be doing have no more risk of harm than what you would experience while training to pass any other physical performance test for firefighting.

Please remember that by working out at this level you might be sore from the workout until your body becomes used to the movement and the muscles are trained.

Will I benefit from taking part in this study?

There is no guarantee that you will get any benefit from taking part in this study. We cannot and do not guarantee that you will receive any benefits from this study.

Do I have to take part in this study?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering.

If I don't take part in this study, are there other choices?

If you do not want to be in the study, there are no other choices except to not take part in the study.

What will it cost me to participate?

There will be a $20.00 deposit that you will get back at the conclusion of the study. If you fail to complete the study the money will be donated to a charity related to the fire service.

Will I receive any payment or rewards for taking part in the study?

You will not receive any payment or reward for taking part in this study.

Who will see the information I give?

Your information will be combined with information from other people taking part in the study. When we write up the study to share it with other researchers, we will write about this combined information. You will not be identified in these written materials.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from the information you give, and these two things will be stored in different places under lock and key.

However, there are some circumstances in which we may have to show your information to other people. For example, the law may require us to show your information to a court. Also, we may be required to show information that identifies you to people who need to be sure we have done the research correctly; these would be people from such organizations as Eastern Kentucky University.

Can my taking part in the study end early?

If you decide to take part in the study, you still have the right to decide at any time that you no longer want to participate. You will not be treated differently if you decide to stop taking part in the study.

The individuals conducting the study may need to end your participation in the study. They may do this if you are not able to follow the directions they give you, if they find that your being in the study is more risk than benefit to you, or if the agency funding the study decides to stop the study early for a variety of scientific reasons.

What happens if I get hurt or sick during the study?

If you believe you are hurt or if you get sick because of something that is done during the study, you should call Jessica Moody at 502-494-2677 immediately. It is important for you to understand that Eastern Kentucky University will not pay for the cost of any care or treatment that might be necessary because you get hurt or sick while taking part in this

study. That cost will be your responsibility. Also, Eastern Kentucky University will not pay for any wages you may lose if you are harmed by this study.

Usually, medical costs that result from research-related harm cannot be included as regular medical costs. Therefore, the costs related to your care and treatment because of something that is done during the study will be your responsibility. You should ask your insurer if you have any questions about your insurer's willingness to pay under these circumstances.

What if I have questions?

Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Jessica Moody at 502-494-2677. If you have any questions about your rights as a research volunteer, contact the staff in the Division of Sponsored Programs at Eastern Kentucky University at 859-622-3636. We will give you a copy of this consent form to take with you.

What else do I need to know?

You will be told if any new information is learned which may affect your condition or influence your willingness to continue taking part in this study.

I have thoroughly read this document, understand its contents, have been given an opportunity to have my questions answered, and agree to participate in this research project.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person taking part in the study

_____

Name of person providing information to subject

Appendix B

Student Questionnaires

Questionnaire for Study

Name_____ Date_____

Richmond Address_____

Home Address_____

Phone Number_____ Birthday_____ Sex: Male / Female

E-Mail_____

Are you available for Pre-test, Post-test, and Practice August – October 2015? Yes / No

Are you willing to train Monday, Tuesday, Thursday, and Friday each week during the study at 7:00 AM? All trainings will be supervised and have specified workouts each day. Yes / No

Will you agree to participate regardless of whether you are in the control group or the study group? Yes / No

Do you consider yourself to be an inactive person? Yes / No If yes, why?_____

_____

Will you agree not to engage in additional exercise during the course of this study? (i.e. – if you get the control group, abstain from additional exercise that you are not already doing, or if in the study group only do the specified training.) Yes / No

Will you agree not to change your normal diet or go on a restricted calorie diet during the study? Yes / No

Please be aware that numerous technicians, equipment, etc., are required to administer the tests outlined above. In order to demonstrate your commitment to the above study, a fully refundable $20.00 deposit will be required prior to any testing occurring. This deposit will be totally refunded upon completion of the post-test.

Note: Your deposit will be refunded if any medical situation results in your inability to physically complete the study.

Amount:_____ Date:_____

Received By:_____

PAR-Q & YOU

Physical Activity Readiness Questionnaire

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age and not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly.

YES NO 1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?

YES NO 2. Do you feel pain in your chest when you do physical activity?

YES NO 3. In the past month, have you had chest pain when you were not doing physical activity?

YES NO 4. Do you lose your balance because of dizziness or do you ever lose consciousness?

YES NO 5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?

YES NO 6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?

YES NO 7. Do you know of any other reason why you should not do physical activity?

If you answered YES to one or more questions, talk with your doctor before you start becoming much more physically active.

If you answered NO to all questions, you can be reasonably sure that you can:

- Start becoming much more physically active—begin slowly and build up gradually.
- Take part in a fitness appraisal—this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction.

NAME_____DATE_____

SIGNATURE_____WITNESS_____

SIGNATURE OF PARENT OR GUARDIAN _____

(for participants under the age of majority)

PHOTO AUTHORIZATION PERMISSION STATEMENT

I, _____, do hereby assign all rights, privileges, and materials for reproduction to Jessica Moody, and Kristen LeBrun, for their studies, for any and all photographs taken during the study.

Name_____ Signature_____

(Printed)

Date_____ Witness_____

Appendix C

Testing Schedules

Pre-testing Schedule

Mile Run: Thursday, August 27th 7am EKU Track

Height, Weight, Body Fat, Sit & Reach (Flexibility), Push-ups, Sit-ups, Flex Arm Hang:

Thursday, August 27th 7:30am – 1:30pm Moberly Gym

Physical Performance:

Saturday, August 29th @ 8 am Richmond Fire Training Center

Memo:

Please do not exercise 24 hours or eat 2-3 hours prior to your scheduled test time. Please make sure that you do eat something though the day of the testing.

At the above time, please show up at the listed location. Be dressed in comfortable exercise clothes (i.e. – exercise shoes, t-shirt, shorts/pants). In addition, for the physical performance test you must wear closed toe shoes, and pants, no shorts. If you are unable to make the above listed time please contact 502-494-2677 as soon as possible so you can be rescheduled. Thank you.

Post-testing Schedule

Mile Run: Thursday, October 15th 7am EKU Track

Height, Weight, Body Fat, Sit & Reach (Flexibility), Push-ups, Sit-ups, Flex Arm Hang:

Thursday, October 15th 7:30am – 1:30pm Moberly Gym

Physical Performance:

Saturday, October 17th @ 8 am Richmond Fire Training Center

Memo:

Please do not exercise 24 hours or eat 2-3 hours prior to your scheduled test time. Please make sure that you do eat something though the day of the testing.

At the above time, please show up at the listed location. Be dressed in comfortable exercise clothes (i.e. – exercise shoes, t-shirt, shorts/pants). In addition, for the physical performance test you must wear closed toe shoes, and pants, no shorts. If you are unable to make the above listed time please contact 502-494-2677 as soon as possible so you can be rescheduled. Thank you.

Appendix D

Pre-Testing and Post-Testing Results

Pre-Test 8/27/15

Mile Run _____

Time_____ ampm

Height_____Feet__Inches

Weight _____lbs.

Body Fat _____%

Waist Circumference___

_____Inches

Hips Circumference____

_____Inches

Sit & Reach _____ + -

1 Minute Sit-ups_____

1 Minute Push-ups_____

Modified yes no

Flex Arm Hang_____

Grip Strength_____

Post-Test 10/15/15

Mile Run _____

Time_____ ampm

Height_____Feet__Inches

Weight _____lbs.

Body Fat _____%

Waist Circumference___

_____Inches

Hips Circumference____

_____Inches

Sit & Reach _____ + -

1 Minute Sit-ups_____

1 Minute Push-ups_____

Modified yes no

Flex Arm Hang_____

Grip Strength_____

Physical Performance Testing

8/29/15

Time_____ ampm

Stair Climb _____

5” Pull _____

1 ¾” Pull _____

Keiser Sled _____

Ladder Raise_____

Extension Ladder_____

Over / Under_____

Dummy Drag_____

Total Time _____

Physical Performance Testing

10/17/15

Time_____ ampm

Stair Climb _____

5” Pull _____

1 ¾” Pull _____

Keiser Sled _____

Ladder Raise_____

Extension Ladder_____

Over / Under_____

Dummy Drag_____

Total Time _____

Appendix E

Physical Performance Testing Statement

Physical Performance Statement

The physical performance testing will consist of multiple stations that will assess job-related firefighter skills in a fitness test. There is no pass/fail on this test. It is a timed test that is meant to show physical improvement through better times. Throughout the test you must wear a 50lbs. short vest, a helmet, and gloves, which will be provided to you. You must wear long pants, and closed toe shoes, preferably athletic shoes, to reduce your risk of injury. During this test, **you are not allowed to run in between obstacles for safety reasons**. If at any time you feel you are unable to finish the performance test, you can stop the test. It will be noted where you stopped and what your time is, to use to compare to the post-test 8 weeks from now.

When you are ready we can start. You will start with the high-rise pack on the ground. You will lift it out of the area and place it on your shoulder. You will carry the high-rise pack up 3 flights of stairs and touch the sign. You will come down 2 flights of stairs and touch the sign. You will then, go back up the 2 flights of stairs touch the sign and finally come all the way down. You must touch every step on the way up and down or you will be warned once and on the second warning you will have to start the task over and time does not stop. Once you get to the bottom of the stairwell, you will place the high-rise pack back in the square on the ground where you first picked up the high-rise pack.

You will now follow the _____ line for 50' to the next station.

At this station you will drag a 5" supply line for 100' going around the barrel. It is uncharged and you must carry the line over your shoulder. Once the hose has been

pulled past the 100' mark I will inform you that you have completed the task and we will move on to the next task.

Follow the _____ line for 50' to the next station.

At this station you will advance an attack line 100'. The hose line is to be carried under your arm and is to remain in the off position. Once you have dragged the line past the 100' mark I will inform you that you have completed the task and we will move on.

Follow the _____ line 50' to the next task.

You are now onto the Kaiser Machine. You will straddle the machine standing on the top side. You will take the hammer and strike the weight until you have moved it from one end to the other. I will inform you when you have striked the object enough times to move the weight past the mark. You are to strike the object and not push the object with the hammer. If at any time you are observed to push the weight with the hammer you will be warned, a second warning will cause this station to be started over.

Next, follow the _____ line 100' to the next station.

You are now on to the ladder station. You will raise a 14' ladder rung over rung until it is leaned up against the building. Once it is against the building, you can move on to the next station.

Follow the _____ line 50' to the next station.

This ladder is to be raised by the rope in front of you. You are not to wrap the rope at any time around your hand. If you lose control of the ladder and the rope slips, you will be told to restart the task. You are not to let the rope slide at any point during

this exercise. Once you have raised the ladder to full extension and back down in a controlled manner, you can move on to the next station.

Follow the _____ line 50' to the next station.

On this station you will be going over and under the following obstacles. You must be low enough to not bump the under obstacles or you will be told to repeat the entire obstacle. Once you have completed this task you will move on.

Follow the _____ line to the final task.

You will lift the manikin using the harness on the manikin. You must drag the manikin 100' facing the manikin. Once the entire manikin is past the 100' mark, you will be told to stop and the performance test will be complete.

Appendix F

Study Participation

Thank you so much for participating in this study. By random selection, you are going to be in the control group. By being in the control group, you will not be involved anymore in the study, until the post-testing that will take place on October 15th and October 17th. It will be the same set up as the pre-testing. We will plan to meet at 7am October 15th at the EKU Track to do the timed mile-run again and will proceed on from there.

While you are in the control group, you may continue your current lifestyle. If you have a specific workout regiment or eat a particular way, we want to encourage you to continue to do so. Please do not feel you are not allowed to workout; however please do not change your workout style as a result of this study.

Thank you for your participation and you will be contacted closer to the post-testing as a reminder.

If you have any further questions, you may contact me at 502-494-2677 or at jessica_wood25@mymail.eku.edu

Jessica Moody

Thank you so much for participating in this study. By random selection, you are going to be in the workout group. For the next 6 weeks, we will be meeting behind the Ashland building doing outdoor workouts. Workouts will be on Mondays, Tuesdays, Thursdays, and Fridays at 7am. Please dress accordingly to the weather and be sure to bring water with you. If you are unsure, due to weather, that we would workout, you can contact me, or Kristen. We also have a facebook page, EKU Firefighter Physical Performance Testing Study that we will update if the weather is not in our favor, at which time we might workout elsewhere.

If you have any further questions, you may contact me at 502-494-2677 or jessica_wood25@mymail.eku.edu

Jessica Moody

Appendix G

6 Weeks of Workouts

Table A-1. Workout Week 1

Source: Kristen LeBrun

Week 1			**Aug. 31 - Sept. 4th**		
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Warm Up	**Jog 200 M 20 Jumping Jacks 20 Mountain Climbers Jump Rope 1 Min**	**Jog 400 M + dynamic stretches**	**jog on own- recommended**	**Jog 200 M 20 Jumping Jacks 20 Mountain Climbers**	**Jog 200 M 20 M High Knees 20 M Butt Kicks 20 M Side Lunge Right Side 20 M Side Lunge Left Side Jump Rope 1 Min**
Met-Con	**CIRCUIT 3 Rounds + 2 Hill sprints between each; rest 1 min. ; 30 sec-15 sec 1) body wt. squats 2) plank shoulder taps 3) walking lunges 4) jumping jacks**	**15 Min. AMRAP 10 burpees 12step-ups w/ wt OH 14 sit-ups 100m weighted carry TABATA -side step ups -side plank hugs -up downs -hop scotch**		**CIRCUIT 3 rounds + 10 jumping jacks btw. Each exercise 1)squat jumps 2)tire drag- line to line 3) plank rows 4) goblet squats wt 5) push press w/ wt**	**BURN BABY 4x *0.5 mi. RUN *10 push-ups *10 DL's *10 dead bugs …10,12,14,16 increase each round**
Cool down	30 seconds of each -crunches w/wt -russian twists w/wt - toes to sky -flutter kicks -bridge static stretch	Stretch		30 seconds of each -crunches w/wt -russian twists w/wt - toes to sky -flutter kicks -bridge static stretch	

Table A-2. Workout Week 2

Source: Kristen LeBrun

Week 2			**Sept. 7 - Sept. 11**		
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Warm Up	**Jog 200 M 20 Jumping Jacks 20 Mountain Climbers Jump Rope 1 Min**	**Jog 200 M 20 M High Knees 20 M Butt Kicks 20 M Side Lunge Right Side 20 M Side Lunge Left Side Jump Rope 1 Min**		**Jog 200 M 20 Jumping Jacks 20 Mountain Climbers**	**Jog 400 M 15 Air Squats Jog 200 M**
Met-Con	**3 mile buddy run**	**Tabata 20:10sec * lunges w/ wt twist * box jumps * v-incline superhero push ups * line sprints * tire flips * tricep dips * G2OH presses w/ box * football quick feet 10minute run in between tabatas (26 min total)**		**400m BUY IN 21-15-9-5 1) woodchops w/ wt 2) walk the plank push ups 3) sit up get ups w/ wt 400m buy out**	**14 minute Even min : 10 deadlifts odd min : 3 crawl up hill; walk backwards down 12 minute Indian Run**
Cool down	5 min cool down stretch 3 rounds ABS 50 crunches 50 leg lifts 50 supermans			* plank hold 45 sec * side planks 30 sec/each * plank claps w/ partner 20x * single arm and leg hold plank for 20 sec and switch	

Table A-3. Workout Week 3

Source: Kristen LeBrun

Week 3			**Sept. 14-Sept. 18**		
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Warm Up	**Jog 200 M 20 Step Ups Jog 200 M Jog200 M 10 Star Jumps**	**Jog 200 M 10 plank jacks Jog 200 M 10 plank jacks Jump Rope 1 Min 10 plank jacks**		**Jog 200 M 20 M High Knees 20 M Butt Kicks 20 M Side Lunge Right Side 20 M Side Lunge Left Side Jump Rope 1 Min**	**Jog 200 M 10 Turkish Get-Ups (R) 10 Turkish Get-Ups (L) Jump Rope 1 Min**
Met-Con	**2 Rounds For Time - Run 1 Mile - 50 Box jumps - 30 burpees -20 plank up downs**	**Circuit 45sec;15 sec 3 rounds -tire drags - hose carry - push presses - squats * at least 1 round with wtd. Vest**		**Circuit 45sec;15 sec 3 rounds - tire flips -5" battling ropes - hammer hits - tire drag - farmer carry w/ box - burpee tire stepovers - RUN 100m**	**MOD: (M/G) For Time: 18,15,12,9,6,3 -bent Rows -decline Push Ups -hill sprint 400m**
Cool down	5 min cool down stretch 3 rounds ABS 50 crunches 50 leg lifts 50 supermans			* plank hold 45 sec * side planks 30 sec/each * plank claps w/ partner 20x * single arm and leg hold plank for 20 sec and switch	

Table A-4. Workout Week 4

Source: Kristen LeBrun

Week 4			**Sept. 21- Sept. 23**		
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Warm Up	**Jog 200 M 20 Step Ups Jog 200 M Jog200 M 10 Star Jumps**	**Jog 200 M 10 plank jacks Jog 200 M 10 plank jacks Jump Rope 1 Min 10 plank jacks**		**Jog 200 M 20 M High Knees 20 M Butt Kicks 20 M Side Lunge Right Side 20 M Side Lunge Left Side Jump Rope 1 Min**	**Jog 200 M 10 Turkish Get-Ups (R) 10 Turkish Get-Ups (L) Jump Rope 1 Min**
Met-Con	**SIZZLE 3 groups 10min. Stair stepper at level 7 5x5 deadlifts @ 65% 3 sets of 20x each - plank rows - wted OH lunges - sit ups**	**20 Min AMRAP 200 M Run 6,7,9,12,16,21,27 - tire flips - push ups - Russian DB swings or sledge hammer**		**5 Rounds; 45 sec. work; 15 sec break - tire side step ups - drag and flip tire from cone to cone - crawl on ground from cone to cone - rope pulls around the hydrant - both ways - clean and presses**	**3 minute steps w/wt vest + box carry up the hill Rest of group : jogging on mulch track + 10 tire flips 20minutes of running/ stepping total**
Cool down	5 min cool down stretch 3 rounds ABS 25 decline sit ups 25 leg lifts 15 back extensions	**Note: perform 6 of each exercise, then run 200m, then 7 of each and so forth…**		3x 30 sec. plank hold 15 sec side plank each side 20x supermans	

Table A-5. Workout Week 5

Source: Kristen LeBrun

Week 5			**Sept. 28-Oct. 2**		
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Warm Up	**3x {zig zag run … 15 jumping jacks} 'Bring Sally Up'- song with body weight squats**	**jog 5 minutes + dynamic stretches**		**4x's 10 walking lunges 3 up downs 1 box jog**	**Jog 200 M 10 Push Ups 15 Air Squats 20 Sit Ups Jump Rope 1 Min**
Met-Con	**REC CENTER * 5x5 Deadlifts @65% +10lbs * 5x5 Back squats - 3 sets : Row 10cal + 15 KB swings + - Stairstepper 10 min w/5-10 lbs**	**Circuit 1minute work 30 sec rest 4 x *sledge hammer hits *tire drags *battling ropes *box jumps *sprint cone to cone with high pack * sit up get ups w/ wt**		**20 MIN AMRAP 800m wted run 20 sledge hammers 10 air squats 5 burpees with weight and press 3/3 single leg dips**	**Circuit 1minute work 30 sec rest 4 rounds * box jumps * tricep dips w/ wt * tire drag * farmer carry *OH lunges 1 burpee between each exercise**
Cool down	5 min cool down stretch 3 rounds ABS 25 decline sit ups 25 leg lifts 15 back extensions			4x 30 sec. plank hold 15 sec side plank each side 20x supermans	

Table A-6. Workout Week 6

Source: Kristen LeBrun

Week 6			**Oct. 5th-Oct. 9th**		
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Warm Up	**3x {zig zag run … 15 jumping jacks} 'Bring Sally Up'- song withbody weight squats**	**jog 5 minutes + dynamic stretches**		**4x's 10 walking lunges 3 up downs 1 box jog**	**Jog 200 M 10 Push Ups 15 Air Squats 20 Sit Ups Jump Rope 1 Min**
Met-Con	**EMOM 12min; 5x -back squats -deadlifts 3 rounds -15 KB swings - 12 lunges w/ KB - 12 push ups Stairmaster 10min -level 7**	**Circuit 1min. work 30 sec rest for 4x *sledge hammer hits *tire drags *hose carry with tire *box jumps + burpees *push presses 2 rounds with wt. vest 30lbs**		**Circuit 1min. work 30 sec rest for 4x * plank row + push ups * tire flips * battling ropes * DB deadlifts * box jump ladder**	**25 minute CAP to complete 5 rounds + 12 step ups w/ wts + 12walking OH lunges + 12 bent rows + 200m run + 12 chest press**
Cool down	5 min cool down stretch 3 rounds ABS 25 decline sit ups 25 leg lifts 15 back extensions	**5 min cool down jog**		5 min cool down stretch 3 rounds ABS 25 decline sit ups 25 leg lifts 15 back extensions	**cool down jog 1 mile**

Appendix H

Post-Testing Surveys

Name_____ Date_____

Physical Performance Test

Post-test Survey for Control Group

Did you change your lifestyle during the past 8 weeks? Yes No

If yes, please explain._____

_____

Did you engage in exercise? Yes No

If yes:

How many times a week on average did you workout?_____

How long on average was each workout?_____

What was your typical workout? (Please explain in detail)_____

_____

Did you change your eating habits? Yes No

If yes, please explain._____

_____

Have you ever taken the CPAT? Yes No

If yes, when?(Please list all times you have attempted.)_____

Did you pass? Yes No

If this was offered as a class would you be interested in it? Yes No

Please explain why?_____

_____

_____

Name_____ Date_____

Physical Performance Test

Post-test Survey for Workout Group

Did you change your lifestyle during the past 8 weeks? Yes No

If yes, please explain._____

_____

Did you engage in exercise in addition to the workouts provided? Yes No

If yes:

How many times a week on average did you workout additionally?_____

How long on average was each additional workout?_____

What was your typical additional workout? (Please explain in detail)_____

_____

_____

Did you change your eating habits? Yes No

If yes, please explain._____

_____

Have you ever taken the CPAT? Yes No

If yes, when?(Please list all times you have attempted.)_____

Did you pass? Yes No

Do you think after following the 6 week workout period that you would be better prepared to take the CPAT or something similar to it? (Please explain.)_____

_____

If this was offered as a class would you be interested in it? Yes No

Please explain why?

How do you think this could be better?