Effect of a work site exercise program on selected fitness and psychological parameters

Kristen Ann Christiansen
University of Nevada, Las Vegas

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EFFECT OF A WORK SITE EXERCISE PROGRAM ON SELECTED
FITNESS AND PSYCHOLOGICAL PARAMETERS

by

Kristen Ann Christiansen

Bachelor of Science
University of Nevada Reno
2007

A thesis submitted in partial fulfillment
of the requirements for the

Masters of Science in Exercise Physiology

Department of Kinesiology and Nutrition Sciences
School of Allied Health Sciences
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Kristen Christiansen

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Richard Tandy, Committee Chair
John Young, Committee Member
Laura Kruskall, Committee Member
Patricia Alpert, Graduate College Representative
Ronald Smith, Ph. D., Vice President for Research and Graduate Studies and Dean of the Graduate College

December 2011
ABSTRACT

Effect of a Work Site Exercise Program on Select Fitness and Psychological Parameters

by

Kristen Ann Christiansen

Dr. Richard Tandy, Examination Committee Chair
Associate Professor of Kinesiology
University of Nevada, Las Vegas

The increasing rates of obesity continue to threaten the vitality of our nation. Health care costs are soaring and chronic diseases are reaching even the youngest populations. Physical activity is an integral component in reversing the obesity epidemic and improving the health of today's workforce. The present study sought to determine the effect of a work site exercise program on select fitness and psychological parameters. Five female employees participated in a six-week exercise program utilizing HealthBeat™ outdoor exercise equipment in a circuit fashion for 30 minutes, 2 days per week. Eighty percent of participants were categorized as sedentary or low-active using the International Physical Activity Questionnaire (IPAQ). Weight, waist circumference, hip circumference, and body fat using the Omron and Lange calipers, was measured before and after the intervention to determine anthropometric changes. Participants performed a 3-minute step test, YMCA bench press, and YMCA sit up test to determine any changes in aerobic and/or muscular endurance. Positive and negative affect changes were determined using the Positive and Negative Affect
Scale - Expanded Edition (PANAS-X). Other self-reported questionnaires were used to determine changes in self-efficacy and physical activity habits.

After the intervention participants reduced their body fat percentage using Lange calipers ($p=0.049$) and the Omron ($p=0.020$). Participants were able to complete significantly more sit-ups ($p=0.016$) and bench press repetitions ($p=0.019$) after the intervention. Positive affect also increased significantly ($p=0.036$). Three out of five participants recorded starting additional physical activity after the intervention began. When asked how likely they are to continue being physically active in the next six months, participants scored an average of 7.4 on a scale of 10.
ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

Being physically active throughout life has numerous health benefits, from preventing chronic diseases like Type 2 diabetes, hypertension, and heart disease, as well as preventing obesity, improving mental health and increasing longevity in old age. Individuals who engage in a minimum of 2 to 2.5 hours of moderate physical activity per week see an overall decrease in all-cause mortality rates (PA Guidelines Advisory Committee Report, 2008). People who are active 7 hours per week have a 40 percent lower risk of premature death than those who are inactive, with even lower levels of moderate activity (1 hour and 30 minutes per week) showing a lower risk of mortality (Physical Activity Guidelines, 2008). Even though the overall percentage of deaths from heart disease has declined in recent years, it is still the leading cause of death for all ages in the United States (NCHS, 2009).

Obesity continues to be a growing concern for the United States and is associated with an increased risk of heart disease, stroke, diabetes, some cancers, hypertension, osteoarthritis, gallbladder disease, and disability (NCHS, 2009). A RAND study estimates by the year 2020, if we continue with an increasing trend, one-fifth of health care costs will be used primarily to treat the life-threatening consequences of obesity (Devol, 2007). The percentage of obese individuals continues to rise, with at least one out of every three adults having a Body Mass Index (BMI) greater than or equal to 30.
Reducing the rates of obesity is the single most effective way to reduce the burden of disease and cost on society as a whole. Out of all the major disease states, obesity reduction has the largest impact on the number of cases of hypertension, followed by heart disease and diabetes (Devol, 2007). An investment in preventative health is clearly an investment for the future.

Physical activity plays a significant role in energy balance, metabolism speed, and prevention of chronic diseases and weight gain over a lifetime. Energy expenditure through physical activity and caloric intake must be in balance like a pendulum based on an individual’s unique needs. As energy expenditure through movement and physical activity decreases and caloric intake increases, one experiences weight gain. Even something as subtle as an excess of 100 kilocalories per day beyond one’s needs can lead to weight gain. As one ages, the inevitability of weight gain grows, metabolism slows and other life circumstances and stresses emerge. Physical fitness levels of the population have declined considerably in the past years and during this time diabetes incidence has doubled. Those with a normal range BMI (18.5-24.9) have a low percentage rate of diabetes, but as one’s BMI increases the risk of developing diabetes and its complications also rise. For women with a BMI above 40, nearly one in five will have type 2 diabetes, while an optimal BMI range reduces the incidence to one in forty (Devol, 2007). Physical activity may seem to be a last priority for most, but it can be a substantial preventative investment in one’s health over a lifetime.
Aside from the physiological benefits of activity, psychological benefits also abound. People who are physically active have a lower incidence of depression and decline in cognitive function with aging, including Alzheimer’s disease and Parkinson’s disease (Deslandes, 2009). Those experiencing less depressive symptoms with exercise are more likely to continue being active (Conn, 2010), which reinforces the association of being physically active with a positive mood outcome. This reduction in depressive symptoms has been shown even in those without clinical depression in supervised or unsupervised physical activity interventions (Conn, 2010). Conn also found better mood outcomes and larger effect sizes when interventions focused not only on endurance exercise but also included resistance exercise and flexibility. Exercise itself can be a stressor on the body, but at moderate intensities, exercise can actually reduce effects of potentially harmful physiological stressors.

Being physically active can also help prevent increasing health care costs and medical bills related to chronic diseases and obesity. The most common chronic diseases are estimated to cost the economy $1 trillion annually, with projected increases to reach $6 trillion annually (Devol, 2007). Most of these expenses are avoidable by focusing on the prevention of chronic disease through lifestyle changes and physical activity, not just advancements in treatment once the disease has progressed. Even with vast improvements in medical technology contributing to decreased mortality rates, chronic disease rates continue to grow and threaten the vitality of the population and economic growth. It is estimated that 80% of heart disease, stroke, type 2 diabetes and 40% of cancers can be
prevented through cost-effective programs targeting preventable risk factors (World Health Organization/World Economic Forum, 2008).

Most individuals spend a considerable amount of their waking hours at work. It makes sense that the work setting would be the ideal location for targeted, preventative programs for improving overall health and behaviors. Corporations have discovered the value in the preventative nature of worksite wellness programs because they can reach a significant amount of their workforce. When employees with chronic illnesses have to take multiple sick days, there is a considerable reduction in a healthy workforce. When those who are sick do show up for work, there is a loss in performance, productivity, and quality of work which reflects on the company image as a whole.

Corporate wellness programs can be a great investment initially, but they prove to reduce overall spending in the long run. Devol, et al., predict lower obesity rates will reduce cases of chronic illness by 14.8 million in 2023, cutting the national treatment bill and improving GDP by $60 billion and $254 billion, respectively. In addition to an overall reduction in spending and health care costs, employees are happier, healthier, more productive, and have a positive outlook towards life. Workplace health promotion programs targeting physical activity see several beneficial outcomes including, increased physical activity levels, reduced body fat percentage, decreased musculoskeletal disorders and an improvement in cardiorespiratory fitness (World Health Organization/World Economic Forum, 2008). At a six to twelve month follow up of nine worksite health promotion programs, there was a net loss of 2.8 pounds (95% CI=-4.6, -
1.0) and about 1% overall decrease in skinfold thickness at 12 months (Anderson, 2009).

Even with all the numerous health benefits of being active, many individuals still fall short of meeting the recommended minimum of 150 minutes of physical activity each week. Giving employees the opportunity to become physically active at the worksite can be a great way to improve overall health and morale, in addition to helping them get more physical activity without additional travel time. A series of outdoor fitness equipment that can be utilized in this fashion is called HealthBeat™, which is designed as a great way to introduce physical activity for teens and adults of all fitness levels. The University of Nevada Cooperative Extension recently installed a circuit of this equipment in their Outdoor Learning Center behind the main employment building. A study was devised to determine if a work site setting exercise program utilizing the HealthBeat™ equipment could influence fitness, anthropometric and/or psychological parameters, and assess participants’ self-efficacy of participation in physical activity in the future.
Purpose of the Study

The purpose of this study is to determine if an exercise program in a work site setting will affect selected fitness, anthropometric and psychological parameters.

Research Questions

Question #1

What effects will a work site exercise program have on selected fitness and anthropometric parameters?

Question #2

What influence does an exercise program in a work site setting have on participant's mood and exercise self-efficacy?

Question #3

Do physical changes and/or mood influence self-efficacy of future participation in physical activity?

Significance of the Study

While many behaviors can have an impact on our health, according to the Physical Activity Guidelines of 2008, being physically active is one of the most important steps to improving one’s health, yet only 18.2% of U.S. adults met both the aerobic and muscle strengthening recommendations (Carlson et al., 2010). We know the appropriate duration and intensity of physical activity for optimal physical health, but the difficult part lies in lifestyle adoption, behavior change, and ultimately exercise adherence. There has been a great push to encourage
individuals to adopt a physically active lifestyle, yet in the past ten years there has not been much progress made to achieve optimal activity levels, particularly in the inactive subgroups. Some demographic subgroups including women, older adults, non-Hispanic blacks, Hispanics, and adults with lower education still remain a challenge for community health promotion initiatives (Carlson, et al 2010).

There are many variables that can influence exercise behavior and participation, which include various barriers that can be physical and psychological in nature. Barriers like time, family, work, stress, disparities, the environment, as well as complex psychological concepts like self-efficacy, to name a few, can influence one’s ability and self-perception to be physical active. Even the nature of the exercise program, including volume, frequency, intensity, duration and mode have all been thought to influence behavioral adherence, but Rhodes, et al found no such significant connection. They concluded social cognitive, personality, and other factors must also be considered in exercise adherence (Rhodes, 2009). Confidence in one’s abilities to execute a particular behavior has been identified as an influential factor for many behavioral changes, including physical activity (World Health Organization/World Economic Forum, 2008). Enhancing one’s exercise self-efficacy through education, motivation and routine can help to establish an initial spark to continue being physically active.

Multiple barriers can unfortunately influence behavior changes in a negative manner. A very common reason for higher attrition rates for many participants is lack of time. In a national survey assessing American attitudes toward physical
activity, 43% of respondents identified a lack of time for physical activity and 15% claim family responsibilities as a barrier (Hart Research Associates, 1993).

What is the motivating factor that inspires individuals to adopt an active lifestyle? Why are some individuals regularly active, while a majority of others fall short? Adoption of a behavior begins with slow, progressive steps, and it can take several months before a behavior change is established. Even small behavior changes can have a powerful impact on future disease risk. Because a search for various short term work site exercise programs in relation to body composition, fitness testing and self-efficacy yielded no results, this study examined whether a short term work site exercise program could significantly impact participants’ body composition and fitness, in addition to increasing their overall mood and exercise self-efficacy.

Definition of Terms

The following definitions are given for the purpose of clarification:

1. **Body Mass Index (BMI)** is an index of health using weight in kilograms divided by height in meters squared. A BMI of <18.5 denotes underweight, 18.5 – 24.9 denotes a healthy range, 25 – 29.9 indicates overweight, and a BMI >30 classifies an individual as obese.

2. **Waist-to-hip ratio** is a measurement for assessing a person’s abdominal fat content as well as disease risk factors associated with obesity and mortality. The waist circumference measurement is divided by the hip circumference with higher risk seen for 0.94 and 0.82 in men and women,
respectively. Men with a waist circumference greater than 40 inches and women with a ratio greater than 35 inches are at higher relative risk for obesity-related factors.

3. Self-Efficacy is defined as one’s beliefs in their capabilities to organize and execute courses of action required to perform a specific situational task. There are many facets of self-efficacy in the literature and several are described below:

   a. Task Self-Efficacy pertains to the confidence one perceives in being able to accomplish a specific exercise component, such as walking for 30 minutes.

   b. Coping Self-Efficacy is the confidence in performing physical activity under challenging conditions, such as fatigue or limited time.

   c. Scheduling Self-Efficacy is the confidence in organizing and maintaining regular, consistent exercise and can be viewed as a subset of coping self-efficacy.

   d. Maintenance Self-Efficacy is the confidence in continuing to be regularly active over time.

4. Negative Affect is defined as “a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness . . .” (Watson & Clark, 1988).
5. Positive Affect ‘reflects the extent to which a person feels enthusiastic, active, and alert’ (Watson & Clark, 1988).
CHAPTER 2

REVIEW OF RELATED LITERATURE

Prevalence of Overweight and Obesity in Adults

and its Impact on Health and the Economy

The prevalence of adults who are classified as overweight or obese continues to rise in the United States. Obesity has doubled over the past three decades to approximately one out of every 3 adults having a BMI $\geq 30$ kg/m$^2$ (NCHS, 2009). Those who are overweight with a BMI of 25 to 29.9 kg/m$^2$ has remained at one-third since the 1960s, but is still a growing health concern with inactivity and weight gain over time. We know that excess body weight puts additional stress on the body and is associated with an increase in morbidity, mortality and various chronic diseases like heart disease, diabetes, stroke, hypertension, some cancers, osteoarthritis, gallbladder disease, and disability (NCHS, 2009). Mortality associated with obesity has been estimated to total 112,000 people in the United States each year (Center for Disease Control and Prevention, 2005), with more than half of all Americans afflicted with a chronic disease (Devol, 2007). The reasons behind the growing obesity epidemic are vast and complicated without a clear picture or easy answer to resolve. Various variables, including diet, caloric balance, physical inactivity, genetic factors, environmental influences, psychological factors and health conditions all play a role in the continued prevalence of excessive weight in the United States. Fifteen to eighteen percent of school-age children and adolescents were overweight in
2005-2006, continuing the cycle of generational obesity and increased chronic disease in the future. The number of overweight preschool-age children doubled from 5% in 1976-1980 to 11% in 2005-2006 (CDC, 2009). In general racial and ethnic groups and lower income populations have a higher prevalence of obesity, particularly in women. Fifty percent of non-Hispanic black women and 40% of Mexican American women are obese compared to 33% of non-Hispanic white women (CDC, 2009).

Not only does excessive weight gain have an impact on various health related problems and mortality, it is also a considerable burden on the economy and taxpayer health system to treat these chronic diseases related to obesity. Reducing obesity in the United States is the single most effective way to reduce medical care costs that have now grown to $1 trillion annually. Without preventative measures in place to reduce the health risks and chronic diseases associated with obesity, annual spending is projected to reach $6 trillion in the future. Expenditures for treating chronic diseases totaled $277 billion in 2003, with the highest spent for heart disease at $64.7 billion, followed by several types of cancers, mental disorders, pulmonary conditions, hypertension, diabetes and stroke (Devol, 2007). These costs do not even reflect the addition of comorbidities and secondary developments of other diseases attributable to the primary disease.

Medical technology advancements have proven to be effective for treatment outcomes and reducing mortality rates, but with chronic disease rates increasing and threatening these improvements, the key will be the investment in early
detection and preventative care. Treatment can only go so far before the health system and economic vitality are strained. Reducing obesity alone is predicted to cut $60 billion from the national treatment bill and reduce cases of illness by 14.8 million in 2020, which will in turn improve the GDP by $254 billion (Devol, 2007). With the profound health disparities and economic impact from excessive weight gain, along with all the immense budget cuts plaguing our society, preventing obesity has to be a top priority for our future health and economic growth.

Growth of Worksite Wellness Programs and their Impact on Employee Health

A large factor in the health of the economy is a healthy workforce. Obesity and chronic diseases can reduce employee work days and on the job productivity which also greatly impacts the business and overall economy. Employers have begun to realize the benefit of providing preventative wellness programs for their employees’ health and wellness needs. A healthy diet and adequate physical activity reduces chronic diseases and excessive health care costs for companies. The workplace is a great setting for health promotion. Most employees spend many of their waking hours at work with fairly sedentary office jobs and have access to less healthy convenience foods. Employers can reach a large proportion of their workforce by implementing programs at work. According to WHO, workplace health promotion (WHP) programs are effective in changing lifestyle behaviors, improving health outcomes, and facilitating organizational
changes like reduced absenteeism (World Health Organization/World Economic Forum, 2008). In particular, those programs focusing primarily on physical activity found beneficial outcomes, including increased physical activity levels, reduced body fat, a decrease in musculoskeletal disorders and an improvement in cardiorespiratory fitness. Corporate wellness programs may cost more in the beginning, but show a great return on investment for the future with an average 25-30% reduction in sick leave, medical costs, and costs associated with absenteeism (Chapman, 2005).

Many programs focus on the whole package to include interventions targeting nutrition and physical activity goals. Continuing physical activity throughout one’s lifetime can help with weight maintenance and prevention of excessive weight gain. In 2005-2008, only 30.8 percent of individuals over age 20 were at a healthy weight and Healthy People 2020 has a goal to increase that baseline by 10 percent by 2020 (US Department of Health and Human Services, 2010). Worksite wellness programs can be the key to improving and reaching this weight status target. Looking at the effectiveness of worksite nutrition and physical activity interventions for controlling employee overweight and obesity, Anderson et al., found several interesting results related to program effectiveness. Studies focusing primarily on weight outcomes saw an overall reduction in weight by three pounds at 6-12 months and found a greater benefit with structured programs versus self-directed (Anderson, et al, 2009). In the Move to Improve program to increase physical activity at the workplace, those that met the recommended level of regular physical activity increased from 31%
to 51% at the end of the intervention (Dishman, 2009). This program focused on personal and team goal setting, higher management endorsement and committees, small incentives, and environmental props such as encouraging signage to get participants motivated to be active. A complicated exercise program is not necessary to get worksite employees to become more active and motivated to be healthier. Even a small increase in physical activity can have a huge impact on one’s overall health. These types of programs have the potential to set foundational habits to be physically active for improved health and lasting relationships to maintain that motivation over time.

Benefits of Physical Activity

In Health and Wellbeing

In addition to an overall healthy diet, being physically active helps to prevent numerous chronic diseases and plays a key role in the prevention of unwanted weight gain over a lifetime. Both men and women, young and old, across numerous countries, engaging in differing types of activity, have a 30% lower risk of mortality than inactive individuals (HHS, 2008). The minimum amount of physical activity shown to lower risk of all-cause mortality was found to be 2 to 2.5 hours per week at a moderate-intensity, which includes walking. Those individuals that are inactive are still encouraged to do any level of activity to see a reduction in mortality rates. An inverse relationship between physical activity and all-cause mortality rates was shown, even when controlling for behaviors based on an individual’s age, sex, race, education, smoking habits, BMI, alcohol
consumption, diet, and personal and family medical history. It appears there is a curvilinear relationship between the total volume of energy expended being active and the amount of health benefits. For example, engaging in 1.5 hours of activity per week is associated with a 20% risk reduction compared to no activity, while 5.5 hours of activity per week is associated with a 40% reduction in risk compared to no activity (HHS, 2008). There are additional benefits for increasing physical activity beyond the minimum, but on a smaller scale. Those who are physically active also have better overall cardiovascular health with lower incidences of cardiovascular disease, coronary heart disease, hypertension and stroke. Metabolic syndrome is another growing problem in the United States and it is estimated that approximately 47 million people have it (HHS, 2008). An individual has metabolic syndrome when they possess at least three of the following symptoms, including abnormal lipid levels (low high-density lipoproteins and high triglycerides), elevated blood glucose and insulin resistance, hypertension, and increased abdominal obesity or waist circumference. Metabolic syndrome, as well as type II diabetes, is strongly preventable through physical activity.

Physical activity also plays a large role in energy balance and weight loss. Physical activity alone can produce some benefits as far as weight loss, weight maintenance, and preventative health in general. In order to achieve a clinically significant weight loss of 5% or more, factoring in a dietary intervention would also be imperative. Weight maintenance has been defined as less than three percent of change in body weight. Three to five percent of change in body
weight is considered a small fluctuation. Being active is essential in preventing long-term weight gain. Endurance exercise appears to burn more calories overall with a greater reduction in weight compared to resistance exercise. Resistance exercise can help increase lean body mass and facilitate a more desirable body composition. A fairly large amount of activity is needed in order to prevent weight gain after a large amount of weight is lost. This can be a difficult habit to maintain and weight regain can be very common (Ewbank, 1995) when those that initially had the motivation to lose the weight, loosen the reigns after they reach their goal weight and discontinue or reduce their exercise regimen. Being active has to be an entire lifestyle change that one continues throughout the lifespan, not just an initial, short-term technique to get the weight off.  

Physical activity can influence mental well-being and reduce symptoms of mental health disorders. The annual prevalence of depression is 8% among women and 4% among men, with rates increasing over the past fifty years (HHS, 2008). The Advisory Committee Report of the Physical Activity Guidelines found active individuals had 45% less depressive symptoms than those that were inactive. Those that were active had lower rates of distress and higher rates of well-being and feelings of self-worth, with greater changes in self-esteem seen in those with lower initial levels. Even eight weeks of regular, 30-minute bouts of walking was shown to significantly enhance feelings of vigor and activity and reduced feelings of anxiety compared to those who participated in short-bout walking and no exercise at all (Osei-Tutu, 2004). Physical activity has also been shown to help maintain cognitive function in older adults and may be protective
from CNS diseases like Alzheimer’s and dementias, although the exact mechanism behind this finding is still not quite clear. It is evident that being physically active is really one of the most important steps one can take towards overall wellness and vitality for a longer life.

Physical Activity Guidelines 2008 and Adherence Rates

The U.S. Department of Health and Human Services (HHS) developed the Physical Activity Guidelines to assist policymakers and health professionals on the types and amounts of physical activity shown to provide the most substantial health benefits for the population. The Physical Activity Guidelines also provide useful and easy to understand information to the general public regarding physical activity and health. These Physical Activity Guidelines, along with the Dietary Guidelines for Americans developed by the Department of Agriculture (USDA), provide a concrete framework for combining the benefits of physical activity and a healthy diet in the prevention of chronic diseases.

Physical activity is referred to any bodily movement that enhances health in addition to baseline activity (Physical Activity Guidelines, 2008). Baseline activity is any type of movement of daily life, including walking, standing and light office work. Health enhancing benefits are seen when activities like brisk walking, lifting weights, bike riding and yoga are included in addition to one’s baseline activity.
There are four categories of activity as defined by the Physical Activity Guidelines, including inactive, low, medium and high. Most substantial health benefits are seen when individuals engage in at least 150 minutes to 300 minutes of moderate intensity physical activity (or 75 to 150 minutes of vigorous intensity activity) per week. Additional health benefits can be seen with a high level of physical activity, or more than 300 minutes of moderate intensity activity per week. Even engaging in lower levels of physical activity, with less substantial health benefits, is better than no activity.

Table 1 Classification of Total Weekly Amounts of Aerobic Physical Activity Into Four Categories

<table>
<thead>
<tr>
<th>Levels of Physical Activity</th>
<th>Moderate-Intensity Minutes a Week</th>
<th>Summary of Health Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactive</td>
<td>No activity beyond baseline</td>
<td>Being inactive is unhealthy</td>
</tr>
<tr>
<td>Low</td>
<td>Fewer than 150 min/week</td>
<td>Some</td>
</tr>
<tr>
<td>Medium</td>
<td>150-300 min/week</td>
<td>Substantial</td>
</tr>
<tr>
<td>High</td>
<td>More than 300 min/week</td>
<td>Additional</td>
</tr>
</tbody>
</table>

(Physical Activity Guidelines, 2008)

The Physical Activity Guidelines also recommended adults should participate in muscle-strengthening activities at least 2 or more days per week in order to increase muscle fitness and maintain a strong bone density. Previous guidelines by CDC/ACSM recommended a specific 30 minute accumulation of physical activity on most days of the week for a total of at least 150 minutes per week. These previous recommendations are very similar to the new guidelines and are still useful. The new Physical Activity Guidelines give people the flexibility to
accumulate their minutes in various ways based on their lifestyle and circumstances. There is not a minimum frequency or duration requirement, but activity must be measured at 10 minute increments. Moderate and vigorous intensity exercise can also be combined to add up to the total time. Whether it is 30 minutes 5 days per week, or 50 minutes 3 days per week, they are not limited by a specific number of time duration or days per week. It is recommended to engage in at least 150-300 minutes of aerobic activity per week based on scientific research showing significant beneficial health outcomes when those targets are met. It is important to remember a small amount of physical activity each week is still better than no activity.

Every day there are choices that need to be made, including what we may eat for breakfast, what errands need to be done and work tasks accomplished. Rarely does one think of preventative health as a choice. Even with all the information out there on the benefits of physical activity, many Americans still choose to remain inactive or do not make the time to move for better health. The evolution of technology has made our lives easier and reduces the amount of energy expenditure required for everyday tasks. Over time this lack of energy expenditure adds up, not only on waistlines, but also with an increase in chronic diseases and health care costs. Think how simple the prevention of obesity could be if individuals utilized that knowledge and were empowered to make the choice to be active. It seems so simple and yet 30% of Americans are obese and about 81.8% of adults do not meet the minimum recommended levels of aerobic and muscle-strengthening activities of the Physical Activity Guidelines
(Carlson, 2010). Using the Healthy People 2010 criteria for physical activity, 32.6% of adults are aerobically active during their leisure time, compared to 43.5% when the Physical Activity Guidelines 2008 are used. This difference is evident from the fact that the latter does not include a frequency requirement and allows a combination of moderate and vigorous activity minutes. Even though the percentage of active individuals can vary based on criteria used, the fact is many Americans are still not meeting these guidelines and jeopardizing their health outcomes. There is still much improvement needed in increasing the amount of Americans that meet the Physical Activity Guidelines.

Barriers to Physical Activity

There are a multitude of reasons why Americans remain inactive from life circumstances, demographics, lower education, lack of time, low levels of motivation and self-efficacy, as well as functional status. Actual behavior change remains to be the single most difficult challenge regarding physical activity and dietary patterns for health. It has been thought that lower intensity exercise and/or shorter bouts of exercise would have an impact on the adoption and adherence of sedentary individuals, as these prescription characteristics could be important to consider when looking at positive behavior change and physical activity. A study by Rhodes, et al looking at the characteristics of physical activity guidelines and their effect on adherence actually found that the duration, intensity, mode, type, and total volume of activity were all minimal in regards to determining exercise adherence outcomes. The authors suggest continued
research in these areas, especially with more well-controlled studies, but
recommend particular exercise prescription characteristics based on the fitness
and health goals of the individual client or needs of the particular population they
may be working with. We do know that exercise is extremely important for
health, and whether the intensity or duration makes a huge difference in
adherence for middle-aged adults still remains to be found. What may play a
bigger role in exercise adherence are those factors that are much harder to
measure and are unrelated to actual guideline characteristics, including those
related to social cognitive behavior theories, personality, self-efficacy, mood,
environmental influences, and social economic factors to name a few.

A majority of Americans express a lack of time regarding physical activity. In
one worksite intervention, subjects were prescribed 20 minutes of moderate to
high intensity aerobic exercise at least three days each week, including additional
weight training for 30 minutes three days each week and dietary/health education
through group and individual counseling. While they found a significant
improvement in waist circumference and aerobic fitness, 42% of subjects
dropped out of the study. The reason most commonly cited for dropping out of
the treatment group was a lack of time (Atlantis, 2006). Another review looking
at the effectiveness of worksite interventions focusing on dietary habits, physical
activity, or both, found a median attrition rate of 17% (range: 0-82%) (Anderson,
2009). While worksite programs can be effective at improving employee health,
it is evident there are still barriers that have to be overcome in convincing
participants they have to make the time to be physically active. An interesting,
phone survey by the President’s Council on Physical Fitness and Sports, found
59% of ‘less actives’, those exercising less than 2 times per week, would like to
be more active, yet 64% claim they cannot find the time to exercise and only 25%
are confident they will increase their activity level in the future (Hart Research

The Influence of Self-Efficacy
on Exercise Adherence

Self-efficacy has been shown to be a strong predictor of human behavior. A
main component in the Social Cognitive Theory, self-efficacy was first introduced
by Bandura as a person’s belief in his or her capability to overcome certain
difficulties in accomplishing a situational task (Bandura, 1982). People will tend
to pursue tasks they are certain they can accomplish and avoid those they
perceive they are incapable of, meaning that self-efficacy ratings vary between
individuals and for different tasks, including exercise behaviors. Self-efficacy
also plays a role in a person’s persistence and dedication when adopting a new
behavior that may be challenging and can be dynamic over time. Abusabha
determined most studies see an increase in self-efficacy scores when
interventions focus on increasing knowledge, training, experience, and/or
familiarity with a particular task. An increase in self-efficacy is more likely to
shape future behavior (Abusabha, 1997). Perceived self-efficacy is a factor that
serves to bridge the gap between internal intention and actual behavior. Self-
efficacious people may be more likely to translate their plans into action and
maintain physical activity over time (Luszczynska, 2011). While self-efficacy is not the only determinant in behavior, it serves as a strong foundational base for exercise adherence, especially when an individual is faced with perceived barriers such as time, weather and mood.

Task self-efficacy relates to the confidence in completing a specific movement or action, such as walking for thirty minutes or performing three sets of squats. Coping self-efficacy reflects an individual’s ability to engage in physical activity when faced with barriers, such as limited time or psychological problems. Maintenance self-efficacy is one’s confidence to continue to be physically active over time and being able to schedule their physical activity time in a way that enhances overall health.

Internal self-efficacy serves to foster behavior, or lack thereof, and there is also a great influence from other individuals on one’s confidence in task accomplishment. Working in a group setting can have a large impact on one’s self-efficacy. In a study looking at interventions focusing on changing physical activity self-efficacy, it was found that those incorporating vicarious experience and providing feedback had larger effect sizes than those that did not (Ashford, 2010). It appears that subjects who are able to gain experience by watching another perform a skill or those that are able to compare their performance with their past or others’ performances had the greatest increase in physical activity self-efficacy.

Physical activity maintenance is influenced by a multitude of various factors. Crain and colleagues found true maintenance may be achieved when individuals
integrate the enjoyment of physical activity into their self-concept. The Keep Active Minnesota (KAM) physical activity maintenance intervention gave participants a mail and phone based physical activity support program over a two year time period (Crain, 2010). Several sessions also included coaching focused on cognitive, behavioral, and environmental strategies to enhance self-efficacy. Measurements were taken at 6, 12, and 24 months and a structural model was created to indicate the path mediators between KAM and physical activity. Over two years, this structural model indicated that KAM significantly increased self-efficacy. Self-efficacy was also shown to be positively related to physical activity enjoyment and self-concept, with a stronger self-concept as a physically active person predicting more physical activity participation (Crain, 2010). Perhaps those that meet the Physical Activity Guidelines and maintain their physical activity over time, have an inner perception of being a physically active person and truly enjoy the time spent being active. Physical activity no longer becomes a chore that can be easily influenced by extrinsic factors and barriers, but is an everyday way of life.

Measures

Measuring physical activity can be a challenge, especially outside of a laboratory setting without access to controlled methods. Being that this exercise intervention model could possibly be used in other work site settings, employment of techniques that could be utilized outside of the laboratory were used. Baseline physical activity characteristics were measured using the IPAQ
(International Physical Activity Questionnaire, 2005). The long-version, self-administered version of the IPAQ was found to be valid for assessing different levels, patterns, and intensities of physical activity in healthy adults (Haströmer, 2005). Participants’ positive and negative affect was measured with the PANAS (Positive and Negative Affect Scale, 1988). Participants were asked to rate a list of words using a Likert Scale from 1 (very slightly or not at all) to 5 (extremely) to show how each word described the way they felt over the past few weeks. Example words used to describe positive affect include enthusiastic and cheerful, while examples of negative affect included distressed and dissatisfied with self. Self-efficacy was measured using a Likert Scale question, which asked participants to rate their certainty in overcoming the following barriers to carry out their exercise intentions. Responses were rated from 1 (very uncertain) to 4 (very certain). Examples of the sentences include “I can manage to carry out my exercise intentions . . . even when I have worries and problems, even if I feel depressed, and even when I am busy.” Additional questions were asked at the end of the intervention to rate their confidence in continuing physical activity to assess perception of exercise adherence, as well as a set of questions to assess their attitude and self-concept towards physical activity.
CHAPTER 3

METHODS

Subject characteristics

Ten, healthy females between the ages of 18 and 65 years of age volunteered for this research study. Subjects were recruited at their place of employment at the University of Nevada Cooperative Extension through an introductory e-mail message detailing the study characteristics and expectations of them (see appendix I). All the participants had sedentary office jobs and did not participate in other organized physical activity. Organized exercise was described as participating in aerobic or strengthening activities for ≥ 30 minutes on three or more occasions per week, or approximately ≥ 90 minutes per week. Exclusion criteria included any health contraindications, including but not limited to heart disease, hypertension, diabetes and other medical conditions that would prevent or limit them from safely being physically active. Five participants discontinued the study due to time constraints and concern with the weather, sweating, and lack of showers to use after the session. The Human Ethics Committee of the University of Nevada, Las Vegas, as well as the Area Director of the University of Nevada Cooperative Extension, approved this research study.

Collection of Data

One week prior to the beginning of the exercise intervention, participants were scheduled to complete the pre assessments and asked to sign the informed
consent after an explanation of the procedures and risks (see appendix II). The PAR-Q survey was given before any assessments were conducted to assure participants’ safety to be physically active. Prior to using the HealthBeat™ outdoor exercise equipment, employees were required to sign a consent form separately through the University of Nevada Cooperative Extension explaining the safety implications and requiring the equipment be used outside of their work hours. Each data set was numerically coded for participants to remain anonymous.

Psychological, anthropometric and fitness testing was completed in a reserved room at the University of Nevada Cooperative Extension to ensure privacy. Participants were advised to come with comfortable clothing and shoes suitable for being active. Participants were also instructed to not eat anything within 1-2 hours of testing and to be euhydrated. Before the fitness and anthropometric assessments were completed, participants were instructed to complete the written surveys including the IPAQ, PANAS-X, and exercise self-efficacy in a separate corner of the room. Post-intervention assessments also included additional self-efficacy questions designed to determine their activity level since starting the program and their confidence in continuing to be physically active in the future (see appendix II). If the IPAQ questionnaire given at the initial assessment revealed that participants’ activity was greater than moderate, their data was excluded from the study.

For the anthropometric and fitness tests, subjects moved from station to station completing each assessment with CITI certified volunteers trained in the
assessment protocol. The order of assessment was as follows: height, weight, Omron/BMI, waist/hip circumference, skinfolds, 3-minute step test, bench press, and sit-ups. Subjects’ heights were measured to the nearest 0.25 in with a stadiometer (model SECA 214, Seca, Hamburg, Germany). Subjects were weighed to the nearest 0.5 pound wearing clothes but not shoes on an electronic scale (model SECA 884, Seca, Hamburg, Germany). Using standard procedures, bioelectrical impedance analysis from hand to hand was measured using the Omron HBF-306 (Omron Corp., Kyoto, Japan), which provides percentage body fat and body mass index. Waist and hip circumference was measured to determine body fat distribution. A flexible measuring tape was used to measure the maximal circumference of the hip/proximal thigh, just below the gluteal fold, and the circumference of the narrowest part of the torso above the umbilicus and below the xiphoid process. The waist to hip ratio was then calculated by taking the circumference of the waist and dividing by the circumference of the hips. Health risk increases for men and women, when values exceed 0.95 and 0.86, respectively (ACSM Guidelines for Exercise Testing and Prescription, 2010). Using a Lange skinfold caliper (Cambridge Scientific Industries, Inc., Cambridge, MD) and the procedures of the YMCA, the following skinfold thickness measurements were taken: abdomen, ilium, tricep and thigh. These were measured to the nearest mm, with the average of three measurements at each site being used for analysis. The Jackson-Pollock sum-of-four equation for females and males was used to determine estimated percent body fat (%BF). Jackson, Pollock and Ward derived prediction equations
differing in age based on body density from hydrostatic (underwater) weighing.

The equations for women follow:

$$\text{Women } \%\text{BF} = 0.29669 \times (\text{abdomen + ilium + tricep + thigh}) - (0.00043 \times (\text{abdomen + ilium + tricep + thigh})^2) + 0.02963 \times (\text{AGE}) + 1.4072, R = 0.846; SE = 3.89\% \text{ fat}$$

Overall fitness was measured using several YMCA-based fitness testing protocols, including a three minute step test to measure cardiorespiratory endurance, a timed bench press to measure muscular endurance, and timed sit-ups to also measure muscular endurance (Golding, 2000).

The exercise intervention was completed outdoors in Las Vegas, Nevada on various HealthBeat™ exercise equipment, tailored to be user-friendly and accessible to the average individual, across a wide span of ages from young to old. The exercise circuit was located behind the UNCE building and within the Outdoor Learning Center. Each circuit station was evenly spaced by approximately 0.05 miles, and arranged in a circular fashion with a cushioned walking track in between. This track was used for warm-up, cool down, and active recovery between stations and sets. The five pieces of exercise equipment that were used include: Cardio Stepper, Ab Crunch and Leg Lift, Squat Press, Pull-up and Dips, and Assisted Row and Push-up.

At the beginning of each exercise session, participants were issued and signed in the date on their individual number coded tracking sheet (see Appendix III). Each participant was given a blank tracking sheet for each session. The tracking sheets were given to the student investigator after each session. The student investigator led each exercise session. The student investigator
reminded participants when to change stations, monitored for proper form and time progression with a stop watch, gave encouragement, and answered any questions. Participants began the 5-minute warm up walk after receiving their tracking sheet. After the warm-up they proceeded to a nearby station. The student investigator started with the participant at the nearest station, while the others walked to find another open station. Once the first participant was finished, the student investigator and participant then walked to the next station in a counterclockwise fashion and ‘tagged’ the next participant to move to the next station. This ensured proper timing without the need for an audible notification. Participants rotated counterclockwise to the next open station after each station was completed, with the number of sets and repetitions recorded on their tracking sheet. Participants were instructed to complete 2-3 sets of 8-10 repetitions of each exercise, with active recovery walking or marching in place on the track between sets. Each station was timed for a 3--minute duration with a 1-minute transition between stations. A 5--minute brisk walk was completed for warm-up and cool-down.

The supervisor to subject ratio ranged from 1:1 to a max of 1:5 during the intervention. Each session lasted approximately 30 minutes, 2 times per week, for 5-6 weeks. There were two time options for participants, including one at 7:00am, and another session at 7:35am. After the cool down, participants signed out, noting the time of duration and relative intensity. Ratings of perceived exertion (RPE) were noted according to the Borg Scale for the entire exercise session (Centers for Disease Control and Prevention, 2011). Participants had to
note their intensity during the session as easy, medium, or hard, as well as pick a number from 6-20 on the RPE scale. An RPE scale with descriptions was shown on their tracking sheet for visual reference. Participants were not told what exact intensity to aim for and were given the encouragement to work hard, but at their own individual sense of fitness.

Data Analysis Methods

Descriptive statistics were used to obtain information on the characteristics of the sample. Data entry was completed using an Excel spreadsheet which was formatted to automatically calculate the desired data. Paired sample \( t \)-tests were used to examine the mean difference between pre and post exercise program data, including anthropometric measurements and fitness testing. Subjective data was interpreted and described from each participant response. A significance level of .05 was used for all tests.
CHAPTER 4

RESULTS

Sample Characteristics

Participation in this study was open to all employees at the University of Nevada Cooperative Extension between the ages of 18 and 65, without any medical contraindications to physical activity. The mean age was 41.4 ± 13.4 and all participants were female. Mean BMI was 34.6 ± 8.6, with classification as follows: 0 unhealthy low (<18.5), 0 healthy (18.5-24.9), 3 overweight (25-29.9) and 2 obese (>30). The 2 participants in the obese category, were also in the class III obesity category with a BMI > 40. Demographic characteristics of the participants are listed in Table 2.

Table 2 Characteristics of the Participants

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 5 females)</td>
</tr>
<tr>
<td>Age</td>
<td>41.4 ± 13.4</td>
</tr>
<tr>
<td>Height (inches)</td>
<td>64.6 ± 2.5</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>205.7 ± 52.1</td>
</tr>
<tr>
<td>Body Mass Index (BMI)</td>
<td>34.6 ± 8.6</td>
</tr>
<tr>
<td>Body Fat Percentage</td>
<td>36.0 ± 7.0</td>
</tr>
<tr>
<td>Waist circumference (inches)</td>
<td>39.5 ± 5.3</td>
</tr>
<tr>
<td>Hip circumference (inches)</td>
<td>46.5 ± 6.4</td>
</tr>
</tbody>
</table>

Values are means ± standard deviation
Physical Activity Level

Data from the IPAQ was reduced according to the Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ, 2005). Survey responses relating to time spent in any physical activity were converted to minutes, and any values less than 10 minutes were recoded as zero. Three main categories of METs were used for this study: walking (3.3 METs), moderate intensity (3-6 METs) and vigorous intensity (8 METs). For this study, leisure time physical activity, or physical activity outside the activities of daily living, was the predominant focus. According to the physical activity guidelines the majority of participants spent less than 150 minutes in leisure time physical activity, which categorizes them into the low level category (see Table 1 and 3).

<table>
<thead>
<tr>
<th>Participant</th>
<th>Minutes spent in PA each week</th>
<th>MET-min spent in PA each week</th>
<th>Physical Activity Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60</td>
<td>198</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>49.5</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>Inactive</td>
</tr>
<tr>
<td>4</td>
<td>180</td>
<td>1314</td>
<td>Moderate/Medium</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>198</td>
<td>Low</td>
</tr>
</tbody>
</table>

While the recommended time spent in physical activity for optimal health is 150-300 minutes each week, only one participant reported spending 180 minutes in leisure time physical activity.
Changes in Anthropometric and Fitness Measurements

While the majority of measurements changed slightly towards favorable results, four measurements reached statistical significance. Change in fat percentage using Lange skinfold calipers was significant $t_4 = 2.14, p=0.049$ and body fat measurements using the Omron decreased significantly $t_4 = 2.98, p=0.020$. Participants were able to complete significantly more sit-ups, $t_4 = -3.24, p=0.016$ and were able to complete significantly more bench presses, $t_4 = -3.54, p=0.019$, after the intervention.

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Fat % (Lange Calipers)</td>
<td>36.0 ± 7.0</td>
<td>34.8 ± 6.3</td>
</tr>
<tr>
<td>Body Fat % (Omron)</td>
<td>40.3 ± 6.4</td>
<td>39.6 ± 6.0</td>
</tr>
<tr>
<td>Sit Up</td>
<td>27.2 ± 11.5</td>
<td>35.8 ± 12.4</td>
</tr>
<tr>
<td>Bench Press</td>
<td>22.0 ± 10.7</td>
<td>24.3 ± 9.4</td>
</tr>
</tbody>
</table>

Values are means ± standard deviation

Psychological Changes and New Activities

Using the PANAS-X assessment for mood and psychological changes, participants significantly increased their positive affect after the intervention $t_4 = -2.44, p=0.036$. Four out of five participants described feeling a change in attitude towards physical activity, with more motivation to continue. Self-efficacy scores
did not change significantly. Participants rated their confidence to continue being physically active within the next six months as an average score of 7.4 on a scale of 10.

Three out of five participants increased additional physical activity outside of the intervention, while two participants' physical activity habits remained the same. Participant responses for additional exercise included cardio and strength training, using the gazelle again and rejoined Las Vegas Athletic Club, and started zumba classes at the gym. One participant whose physical activity habits remained the same explained she has been motivated to begin thinking about how to be more physically active.

Participants were also asked various questions regarding their self-concept in relation to physical activity on a scale of 1 to 10. A rating of 10 indicated a high score of self-concept. One question asked how closely they identified and defined themselves with being a physically active individual after the intervention. One participant scored herself a six, while all other participants resoundingly scored as a one.
Table 5  Physical Activity Self Concept - Post Intervention

<table>
<thead>
<tr>
<th>Question</th>
<th>Average Score (1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being physically active each week is a top priority</td>
<td>6.4 ± 3.1</td>
</tr>
<tr>
<td>I perceive myself as a physically active individual</td>
<td>4.6 ± 1.7</td>
</tr>
<tr>
<td>I would like to be more physically active but don’t have time</td>
<td>4.8 ± 3.0</td>
</tr>
<tr>
<td>Physical activity is enjoyable</td>
<td>6.2 ± 1.3</td>
</tr>
<tr>
<td>Being active is a part of life &amp; I don’t think much to do it</td>
<td>3.4 ± 2.1</td>
</tr>
<tr>
<td>Physical activity is difficult for me</td>
<td>4.6 ± 2.1</td>
</tr>
<tr>
<td>Being physically active defines who I am</td>
<td>2 ± 2.2</td>
</tr>
<tr>
<td>Physical activity is more of a burden but I do it</td>
<td>4.8 ± 2.2</td>
</tr>
<tr>
<td>People see me as an active individual</td>
<td>2.6 ± 2.5</td>
</tr>
</tbody>
</table>

Values are means ± standard deviation

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Discussion of Results

The purpose of this study was to determine if an outdoor exercise program in a work site setting would affect selected fitness, anthropometric and psychological parameters. Pre-test and post-test results of various anthropometric and fitness assessments and affect by the PANAS-X were compared. Data analysis revealed statistically significant improvements in body fat percentage, bench press, and sit ups. Participants were able to complete significantly more bench presses and sit ups after the intervention. Aerobic endurance, utilizing the step test, did not change significantly. While the exercise circuit did include brisk walking and an increase in heart rate to complete the
stations, it must not have been enough stress on the cardiovascular system to have an effect on aerobic endurance improvement.

Participants significantly increased their general positive affect. From the results of the PANAS-X, participants had an increased positive outlook which could further propel them to maintain physical activity in the future. This sense of positivity in their actions could have motivated the majority of participants to begin additional activities outside of the program as well as explain the 7.4 rating in confidence to continue physical activity within the next six months. Many times inactivity fosters inactivity, which perpetuates a viscous cycle that is harder to break. Providing the equipment, education, and encouragement that sedentary individuals need can help initiate a new cycle of activity. Having someone demonstrate how to use what may seem like foreign equipment can also help to boost mood. Seeing positive results can help to continue the cycle towards even longer term maintenance of physical activity where it becomes integrated into the self-concept.

While participants experienced an increase in mood, there was not a change in their self-efficacy or confidence in completing exercise in the face of certain barriers, including worries, feeling depressed, tense, tired, or too busy. For some this research study was perhaps too short for them to realize individual barriers and there was no change in self-efficacy. Others may have realized the barriers they will face and scored lower after the intervention. Perhaps they are still not confident enough to maintain physical activity on their own, but need additional assistance and motivation. It would be recommended to utilize a more in-depth,
easier to understand, self-efficacy tool with a larger scale system, starting with ‘very certain’ rather than ‘very uncertain’.

Even a short term, six week work-site program, encompassing a circuit of 30 minutes 2 times per week can have an impact on body fat, aspects of muscular endurance, and positive affect. As the *Physical Activity Guidelines 2008* emphasize, any activity is better than no activity at all.

Conclusions and Recommendations

For Further Study

While the six-week time frame of this study is on the shorter end of most studies similar in nature, it was used to determine if there was a minimum time period that could be used to produce significant results. Producing a larger effect on body composition and aerobic endurance will of course need much longer time. Even some results and a positive affect can serve to improve the likelihood of physical activity participation in the future. With a longer time frame, additional studies should focus on assessments which look at participants’ engagement in physical activity several months after the completion of the intervention to determine maintenance.

This study did not have the number of participants needed to show statistical power. This study also did not provide any incentives to its participants besides the benefit of getting healthier. Most, if not all programs need some kind of non-food incentive to motivate participants in a healthy way. Most participants are not
motivated by their health alone and need to see some kind of value for their time and effort.

It will also be imperative to monitor weather conditions carefully if the exercise program is located outside. If the conditions are not exactly perfect, participants are very likely to decline. Having a shower or lockers available is important to determine if participants will be able to clean up after their session if it is before work. Individuals new to starting a physical activity regimen are very sensitive to various extraneous factors that will exert a stronger influence than the desire to get healthier and physically fit.

While the time frame of this exercise intervention produced some significant anthropometric, fitness, and psychological results, it was not long enough for participants to intrinsically identify themselves as being physically active. It is true those individuals who have been active most of their lives continue the path towards being active because they self-identify themselves as an active person. Engaging in physical activity on a consistent basis helps to facilitate thinking of physical activity simply as a behavior that is influenced by extrinsic factors, to actually enjoying the activity and incorporating that into the essence of who they are. Future studies should focus on what time frame is needed for physical activity to become a component of one’s self concept, in addition to the psychological facets behind this change.

Society as a whole needs to re-think physical activity when it comes to the order we place certain priorities. For most individuals physical activity is not a top priority because life lends itself to so many other things that need to be done.
In order to reverse the obesity epidemic and all the chronic comorbidities and health care costs that come along with it, we have to place a higher priority on physical activity as a whole. Employers and upper management have a large role to play in this, from providing wellness programs, allowing additional time at lunch for a workout, installing easily accessible walking paths, showers and company workout facilities, providing desirable incentives for those that invest in their health, and most importantly by setting a good example. It is evident that even a short term worksite exercise program can provide significant changes in body fat, muscular endurance, and positive affect. The investment in these types programs are well worth the long-term improvements in health and wellness. The incredible costs of obesity can be reversed, but it is going to take a new way of thinking, one day and one step at a time.
Hello!

You are receiving this e-mail because you expressed interest in participating in an exercise program for a research study utilizing the Outdoor Learning Center HealthBeat™ equipment. I wanted to touch base with you, give some details about the research study, and determine some times that would work best if you are still interested in participating.

If you agree to participate in this research study, you will be guided through an exercise session twice a week for approximately two months on the outdoor HealthBeat™ equipment. Each 30-minute exercise session will be in a small group of 5-10 and scheduled outside of your work time based on availability. Organized exercise, aside from physical activities of daily living, will not be permitted outside the scheduled program. Guidelines for each activity will be based on the beginner with emphasis on paying attention to personal physiological signals of discomfort and discontinuation if necessary. It is important that participants do not engage in organized activity outside of the program for the time of the study only because it may influence the results. Prior to the start of the exercise program, we will also be scheduling a time to conduct several anthropometric measurements, fitness tests and surveys to complete.

If you are interested in participating in this study, we will move forward with signing an informed consent, scheduling an introductory meeting on how to use the equipment properly, and showing how the exercise circuit will proceed.

Please let me know your time of availability during the week outside of work and feel free to ask any questions you may have.

Thank you!

Kristen

Kristen Christiansen
(702) 291-8551

Dr. Richard Tandy (Principal Investigator)
(702) 895-5080
APPENDIX II

Assessment Materials

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

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 in the box 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 you are 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: check YES or NO.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>1.</td>
<td>□</td>
</tr>
<tr>
<td>Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2.</td>
<td>□</td>
</tr>
<tr>
<td>Do you feel pain in your chest when you do physical activity?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
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<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3.</td>
<td>□</td>
</tr>
<tr>
<td>In the past month, have you had chest pain when you were not doing physical activity?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4.</td>
<td>□</td>
</tr>
<tr>
<td>Do you lose your balance because of dizziness or do you ever lose consciousness?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5.</td>
<td>□</td>
</tr>
<tr>
<td>Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>6.</td>
<td>□</td>
</tr>
<tr>
<td>Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7.</td>
<td>□</td>
</tr>
<tr>
<td>Do you know of any other reason why you should not do physical activity?</td>
<td></td>
</tr>
</tbody>
</table>

If you answered YES to one or more questions, talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out what community programs are safe and helpful for you.

If you answered NO to all questions:

- Start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- 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. It is also highly recommended that you have your blood pressure measured. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

Please Note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional, ask whether you should change your physical activity plan.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

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

Signature of participant

Date

Signature of parent or guardian (if participant under the age of majority)

Date

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.
PANAS-X

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now. Use the following scale to record your answers:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very slightly or not at all</td>
<td>a little</td>
<td>moderately</td>
<td>quite a bit</td>
<td>extremely</td>
</tr>
</tbody>
</table>

______ cheerful  ______ sad  ______ active  ______ angry at self
______ disgusted  ______ calm  ______ guilty  ______ enthusiastic
______ attentive  ______ afraid  ______ joyful  ______ downhearted
______ bashful  ______ tired  ______ nervous  ______ sheepish
______ sluggish  ______ amazed  ______ lonely  ______ distressed
______ daring  ______ shaky  ______ sleepy  ______ blameworthy
______ surprised  ______ happy  ______ excited  ______ determined
______ strong  ______ timid  ______ hostile  ______ frightened
______ scornful  ______ alone  ______ proud  ______ astonished
______ relaxed  ______ alert  ______ jittery  ______ interested
______ irritable  ______ upset  ______ lively  ______ loathing
______ delighted  ______ angry  ______ ashamed  ______ confident
______ inspired  ______ bold  ______ at ease  ______ energetic
______ fearless  ______ blue  ______ scared  ______ concentrating
______ disgusted with self  ______ shy  ______ drowsy  ______ dissatisfied with self
INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE  
(October 2002)  

LONG LAST 7 DAYS SELF-ADMINISTERED FORMAT  

FOR USE WITH YOUNG AND MIDDLE-AGED ADULTS (15-69 years)  

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) and short (4 generic items) versions for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity.  

Background on IPAQ  
The development of an international measure for physical activity commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries (14 sites) during 2000. The final results suggest that these measures have acceptable measurement properties for use in many settings and in different languages, and are suitable for national population-based prevalence studies of participation in physical activity.  

Using IPAQ  
Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.  

Translation from English and Cultural Adaptation  
Translation from English is encouraged to facilitate worldwide use of IPAQ. Information on the availability of IPAQ in different languages can be obtained at www.ipaq.ki.se. If a new translation is undertaken we highly recommend using the prescribed back translation methods available on the IPAQ website. If possible please consider making your translated version of IPAQ available to others by contributing it to the IPAQ website. Further details on translation and cultural adaptation can be downloaded from the website.  

Further Developments of IPAQ  
International collaboration on IPAQ is on-going and an International Physical Activity Prevalence Study is in progress. For further information see the IPAQ website.  

More Information  

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.
INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous and moderate activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?
   - [ ] Yes
   - [ ] No  
     Skip to PART 2: TRANSPORTATION

The next questions are about all the physical activity you did in the last 7 days as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs as part of your work? Think about only those physical activities that you did for at least 10 minutes at a time.
   - [ ] ○ days per week
   - [ ] ○ No vigorous job-related physical activity  
     Skip to question 4

3. How much time did you usually spend on one of those days doing vigorous physical activities as part of your work?
   - [ ] ○ hours per day
   - [ ] ○ minutes per day

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads as part of your work? Please do not include walking.
   - [ ] ○ days per week
   - [ ] ○ No moderate job-related physical activity  
     Skip to question 6

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.
5. How much time did you usually spend on one of those days doing moderate physical activities as part of your work?

_____ hours per day
_____ minutes per day

6. During the last 7 days, on how many days did you walk for at least 10 minutes at a time as part of your work? Please do not count any walking you did to travel to or from work.

_____ days per week
☐ No job-related walking → Skip to PART 2: TRANSPORTATION

7. How much time did you usually spend on one of those days walking as part of your work?

_____ hours per day
_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the last 7 days, on how many days did you travel in a motor vehicle like a train, bus, car, or tram?

_____ days per week
☐ No traveling in a motor vehicle → Skip to question 10

9. How much time did you usually spend on one of those days traveling in a train, bus, car, tram, or other kind of motor vehicle?

_____ hours per day
_____ minutes per day

Now think only about the bicycling and walking you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the last 7 days, on how many days did you bicycle for at least 10 minutes at a time to go from place to place?

_____ days per week
☐ No bicycling from place to place → Skip to question 12

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.
11. How much time did you usually spend on one of those days to bicycle from place to place?
   _____ hours per day
   _____ minutes per day

12. During the last 7 days, on how many days did you walk for at least 10 minutes at a time to go from place to place?
   _____ days per week
   □ No walking from place to place  →  Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

13. How much time did you usually spend on one of those days walking from place to place?
   _____ hours per day
   _____ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, chopping wood, shoveling snow, or digging in the garden or yard?
   _____ days per week
   □ No vigorous activity in garden or yard  →  Skip to question 16

15. How much time did you usually spend on one of those days doing vigorous physical activities in the garden or yard?
   _____ hours per day
   _____ minutes per day

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard?
   _____ days per week
   □ No moderate activity in garden or yard  →  Skip to question 18

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.
17. How much time did you usually spend on one of those days doing moderate physical activities in the garden or yard?

____ hours per day

____ minutes per day

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, washing windows, scrubbing floors and sweeping inside your home?

____ days per week

☐ No moderate activity inside home  

Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY

19. How much time did you usually spend on one of those days doing moderate physical activities inside your home?

____ hours per day

____ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the last 7 days, on how many days did you walk for at least 10 minutes at a time in your leisure time?

____ days per week

☐ No walking in leisure time  

Skip to question 22

21. How much time did you usually spend on one of those days walking in your leisure time?

____ hours per day

____ minutes per day

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

____ days per week

☐ No vigorous activity in leisure time  

Skip to question 24

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.
23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

______ hours per day
______ minutes per day

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

______ days per week

☐ No moderate activity in leisure time → **Skip to PART 5: TIME SPENT SITTING**

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

______ hours per day
______ minutes per day

**PART 5: TIME SPENT SITTING**

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

______ hours per day
______ minutes per day

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

______ hours per day
______ minutes per day

This is the end of the questionnaire, thank you for participating.
Self-Efficacy Survey

“How certain are you that you could overcome the following barriers?”

Rate your certainty for question #1 below with the following scale: 
Response format is (1) very uncertain, (2) rather uncertain, (3) rather certain, and (4) very certain

1. I can manage to carry out my exercise intentions ...

...even when I have worries and problems. ___
...even if I feel depressed. ___
...even when I feel tense. ___
...even when I am tired. ___
...even when I am busy. ___
...even when the weather is bad. ___

Included in post assessment:

2. On a scale of 0 to 10, with 10 being you are 100% certain, how likely are you to continue being physically active each week in the next six months? _______

3. How many days/minutes each week do you intend to engage in moderate, leisure-time physical activity for the next . . .
   four weeks? ___ day(s) ___ minutes
   three months? ___ day(s) ___ minutes
   Year? ___ day(s) ___ minutes

4. Has the worksite exercise program using the HealthBeat equipment changed your frequency of other physical activity? (please explain in detail)

   ___Increase  ___Decrease  ___Same
   
   If increase or decrease, why and how?

   If increase, what new activities did you start during the program?

   If decrease, what would best help you in starting?

   If same, what activities have you maintained in addition to the program?

5. Has your attitude towards physical activity changed? Explain
Physical Activity Self Concept:

Answer the questions below in regards to leisure-time physical activity on a scale from 1 to 10:
1 = strongly disagree 10 = strongly agree

a. Being physically active each week is a top priority for me. ___
b. I perceive myself as a physically active individual. ___
c. I would like to be more physically active, but I do not have time. ___
d. Physical activity is enjoyable for me. ___
e. Being physically active is a part of life and I do not think much to do it. ___
f. Physical activity is difficult for me. ___
g. Being physically active defines who I am. ___
h. Physical activity is more of a burden, but I do it. ___
i. People see me as a physically active individual. ___

Any additional comments?
Pre and Post Score Sheet

1. ID# ________________________
2. DOB _______________________
3. Age _______ Gender _________
4. Test Date ___________________
5. Test Limitations_______________
6. Ht(in) _________ Wt (lb)_______
7. Waist cm_____ Hip cm______
8. Waist to Hip Ratio _________
9. AB ____IL ___ TR ____TH _____
10. Omron _________BMI___
11. StepHR _______ Time ______
12. Sit-ups _________________
13. Bench Press _____
## APPENDIX III

### Intervention Materials

### Exercise Tracking Sheet

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Day One Date:</th>
<th>Day Two Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 min warm-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardio Step</td>
<td>time:</td>
<td>time:</td>
</tr>
<tr>
<td>Ab Crunch/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leg lift</td>
<td>Rep:</td>
<td>Rep:</td>
</tr>
<tr>
<td>Squat Press</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Res: Set:</td>
<td>Res: Set:</td>
</tr>
<tr>
<td>Pull Up/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dip</td>
<td>Rep:</td>
<td>Rep:</td>
</tr>
<tr>
<td>Assisted Row/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push Up</td>
<td>Rep:</td>
<td>Rep:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 min cool dwn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Intensity</td>
<td>RPE (6-20)</td>
<td>RPE (6-20)</td>
</tr>
</tbody>
</table>

| Time = 30min             |               |
| Each station is 3 min    |               |
| with a 1 min transition  |               |
| Aim to complete 2-3 sets |               |
| of 8-10 repetitions       |               |
| and note it on the sheet. Total |               |

The Borg Perceived Exertion Scale gives you an idea of how hard your exercise feels. If it feels light (less than 12), you should increase the intensity of your exercise. If the exercise feels hard (14 or greater), you need to ease up. Exercise should feel somewhat hard (12-13).
**Step 1:**
Warm-Up

When you are ready to begin your workout, warming up is very important. It prepares your body for exercise and gradually revs up your cardiovascular system, increases blood flow to your muscles and raises your body temperature.

**Step 2:**
Cardio Stepper

This provides a cardio or aerobic workout using your own body weight. You can change the resistance, using the dial on the cylinder, to allow you to target specific heart-rate training zones. One is the least resistance, six is the greatest.

**Step 3:**
Ab Crunch/Leg Lift

The core is not just your abdominal muscles. The core is the foundation of your body and also includes lower back muscles—it’s the beginning point for all movement. Core exercises are an important part of overall fitness training that, except for the occasional sit-up or crunch, are often neglected.

**Step 4:**
Squat Press

The Squat Press builds leg and hip muscle endurance. Beginners should start with the resistance dial set at one, and do fewer repetitions. For advanced users, increase resistance by adjusting the dial on the cylinder to a higher number. One is the least resistance, six is the greatest.

**Step 5:**
Pull-Up/Dip

The pull up/dips are highly effective muscle strengthening exercises. These tend to be challenging so listen to your body and go at your own pace.

**Step 6:**
Assisted Row/Push-up

Beginners can safely strengthen muscles with the Assisted Row/Push-Up by starting with feet closer to the bar. More advanced users can utilize the middle bar, having feet further from bar at start and performing more repetitions.
**Directions:**

1. Adjust the dial to find a comfortable resistance (one to six)
2. Step quickly and smoothly
3. Swing your arms freely or hold the handles
4. Stand up straight with good posture & look straight ahead

*Note:* This equipment uses adaptive resistance which automatically adjusts resistance to match your level of effort. Speeding up the exercise increases and slowing down decreases resistance.

*Time for Completion:*
3 minutes (45 sec step, 15 sec rest)

---

**Directions:**

1. Place feet in front of body as shown, shoulder width apart
2. Head, shoulders, hips must be aligned at start, and throughout exercise
3. Keep feet flat on ground
4. Knees should be aligned with toes & look straight ahead

*Note:* This equipment uses Bilateral, Adaptive Resistance which works two muscle groups with each push/pull movement, and automatically adjusts resistance to match your level of effort. Speeding up the exercise increases resistance. Slowing down decreases resistance.

*Time for Completion:*
2-3 sets of 8-10 reps (15 sec rest in between each set)
3 minutes

---

**Directions:**

- **Ab Crunch:**
  1. Lie down on bench with knees bent at 90 degrees
  2. Place feet either on top (more difficult) or under the footrest bar (less difficult)
  3. Place hands over ears (more difficult) or on chest (less difficult)
  4. Raise upper body off bench to a 45-degree angle, lower slowly

- **Leg Lift:**
  1. Beginners should lie down on the Ab Crunch/Leg Lift bench and reach for the handlebar
  2. Hold the bar and lift legs straight out. Raise one leg at a time to a 45-degree angle. Repeat.
  3. Lower legs slowly. Repeat.

*Time for Completion:*
2-3 sets of 8-10 reps (15 sec rest in between each set)
3 minutes

---

**Directions:**

- **Assisted Row:**
  1. Grab bar as shown, keeping body straight
  2. Pull your chest up to the bar
  3. Lower slowly, keeping body aligned throughout the exercise

- **Push-Up:**
  1. Follow the same principles as assisted row
  2. Utilize chest to bar motion

*Time for Completion:*
2-3 sets of 8-10 reps (15 sec rest in between each set)
3 minutes

---

**Directions:**

- **Pull-Up:**
  1. Bring chin to bar at the stop point
  2. Keep body "calm," no swinging
  3. GO SLOWLY
  4. Repeat

- **Dip:**
  1. Do NOT lean forward—look straight ahead
  2. Arms parallel with ground at stop point
  3. GO SLOWLY
  4. Repeat

*Time for Completion:*
2-3 sets of 8-10 reps (15 sec rest in between each set)
3 minutes
APPENDIX IV
IRB Approvals

INFORMED CONSENT
Department of Kinesiology & Nutritional Sciences

TITLE OF STUDY: Effect of a Work Site Exercise Program on Selected Fitness and Psychological Parameters

INVESTIGATOR(S): Dr. Richard Tandy (Principal Investigator), Kristen Christiansen

CONTACT PHONE NUMBER: Kristen Christiansen (702) 291-8551 Dr. Richard Tandy (702) 895-5080

Purpose of the Study
You are invited to participate in a research study. The purpose of this study is to determine if an exercise program in a work site setting will have any effects on selected fitness-related and psychological parameters after approximately two months.

Participants
You are being asked to participate in the study because you are a healthy adult, aged 18-65 years old, with no other medical contraindications to engage in physical activity.

Procedures
If you volunteer to participate in this study, you will first be asked to complete a health and fitness pre-participation screening questionnaire to assure it is safe for you to be physically active. If you do not know your blood pressure value, an exercise physiologist will conduct the screening. Several fitness tests will also be conducted. The purpose of the fitness testing is to evaluate your cardiorespiratory fitness, body composition, flexibility, and muscular strength and endurance. A 3-minute step test will evaluate cardiorespiratory fitness. Body composition is measured by taking several skinfold measures to calculate body fat percentage. A sit-and-reach test will determine your flexibility, muscular strength is measured using a timed bench press test, and muscular endurance is evaluated using a 1-minute sit-up test. The tests will be conducted by myself and trained volunteers and will take approximately 20-30 minutes of your time. You will be asked to fill out a short physical activity questionnaire, a psychological survey, and an exercise self-efficacy questionnaire. Once the pre-assessment procedures have been completed, you will be asked to participate in an outdoor exercise program using the new Outdoor Learning Center at the University of Nevada Cooperative Extension.

If you agree to participate in this study, you will be guided through an exercise session twice a week for approximately two months on the outdoor HealthBeat equipment. Each 30-minute exercise session will be in a small group and scheduled outside of your work time based on availability. Organized exercise, aside from physical activities of daily living, will not be permitted outside the scheduled time of the program. Guidelines for each activity will be based on the beginner with

Participant Initials: ___

Approved by the UNLV IRB. Protocol #1102-3703M
Received: 05-12-11 Approved: 05-12-11 Expiration: 04-04-12
emphasize on paying attention to personal physiological signals of discomfort and discontinuation if necessary. Each participant will be required to write down their completion of each exercise session on a provided exercise tracking sheet.

Once the exercise program is complete, you will be asked to complete the same fitness tests you completed at the beginning of the program, in addition to the surveys.

Benefits of Participation
Benefits of this study far outweigh the risks. Participants will gain knowledge of using exercise equipment at their work site and will gain confidence in possibly adopting a long-term exercise program in the future. Physical benefits may be seen as well, including but not limited to, increased endurance, flexibility and cardiovascular fitness, reduced body weight and body fat, and an increased positive outlook towards themselves and being physically active. Because a majority of the population does not meet the Physical Activity Guidelines, this study will set the foundation for adopting a healthy, active lifestyle. An active population is critical in the prevention of weight gain which is a growing concern in the United States.

Risks of Participation
There are risks involved in all research studies. This study may include only minimal risks. With the beginning of any exercise program, participants will have a risk of muscle soreness, discomfort, and increase in cardiovascular system recruitment which will be minimized over time as your body adapts.

Cost / Compensation
There will not be a financial cost to you to participate in this study. The study will take 30 minutes, 2 times per week, for 2 months of your time outside of work. You will be asked to bring a comfortable pair of shoes and clothes that you can move around in. You will not be compensated for your time.

Contact Information
If you have any questions or concerns about the study, you may contact Kristen Christiansen at 702-291-8551 or Dr. Richard Tandy at 702-895-5080. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office of Research Integrity - Human Subjects at 702-895-2794 or toll free at 877-895-2794 or via email at IRB@unlv.edu.

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Initials _____

Approved by the UNLV IRB. Protocol #1102-3793M
Received: 05-12-11 Approved: 05-12-11 Expiration: 04-04-12
TITLE OF STUDY: Effect of a Work Site Exercise Program on Selected Fitness and Psychological Parameters

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for 3 years after completion of the study. After the storage time the information gathered will be shredded.

Participant Consent:
I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

________________________________________________________________________
Signature of Participant Date

Participant Name (Please Print)

________________________________________________________________________

Participant Initials

Approved by the UNLV IRB. Protocol #1102-3703M
Received: 05-12-11 Approved: 05-12-11 Expiration: 04-04-12
Biomedical IRB – Expedited Review
Modification Approved

NOTICE TO ALL RESEARCHERS:
Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation, suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: May 12, 2011
TO: Dr. Richard Tandy, Kinesiology
FROM: Office of Research Integrity – Human Subjects
RE: Notification of IRB Action by /Charles Rasmussen/ Dr. Charles Rasmussen, Co-Chair
Protocol Title: Effect of a Work Site Exercise Program on Selected Fitness and Psychological Parameters
Protocol #: 1102-3703M
Expiration Date: April 4, 2012

The modification of the protocol named above has been reviewed and approved.

Modifications reviewed for this action include:
- Addition of the AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire with blood pressure screening for those that do not know their blood pressure.
- Addition of a sign-in sheet for participants to keep track of their completed repetitions/sets/exercise intensity after each guided session.

This IRB action will not reset your expiration date for this protocol. The current expiration date for this protocol is April 4, 2012.

PLEASE NOTE:
Upon approval, the research team is responsible for conducting the research as stated in the protocol most recently reviewed and approved by the IRB, which shall include using the most recently submitted Informed Consent/Assent forms and recruitment materials. The official versions of these forms are indicated by footer which contains approval and expiration dates.

Should there be any change to the protocol, it will be necessary to submit a Modification Form through ORI - Human Subjects. No changes may be made to the existing protocol until modifications have been approved by the IRB. Modified versions of protocol materials must be used upon review and approval. Unanticipated problems, deviations to protocols, and adverse events must be reported to the ORI – HSS within 10 days of occurrence.

Should the use of human subjects described in this protocol continue beyond April 4, 2012, it would be necessary to submit a Continuing Review Request Form 30 days before the expiration date.

If you have questions or require any assistance, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 895-2794.

Office of Research Integrity – Human Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0803
REFERENCES


The International Physical Activity Questionnaire. (2005). Available at http://www.ipaq.ki.se/


VITA

Graduate College
University of Nevada, Las Vegas

Kristen Christiansen

Degrees:
  Bachelor of Science, Nutrition (dietetics), 2007
  University of Nevada, Reno

Special Honors and Awards:
  CABNR Outstanding Senior Award, 2007

Thesis Title: Effect of a Work Site Exercise Program on Selected Fitness and Psychological Parameters

Thesis Examination Committee:
  Chair, Dr. Richard Tandy, Ph.D.
  Committee Member, Dr. John Young, Ph.D.
  Committee Member, Dr. Laura Kruskall, Ph.D.
  Graduate College Representative, Dr. Patricia Alpert, Ph.D.