EFFECTIVENESS OF A WORKSITE HEALTH PROMOTION PROGRAM TO IMPROVE HEALTH-RELATED QUALITY OF LIFE INDICATORS

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by

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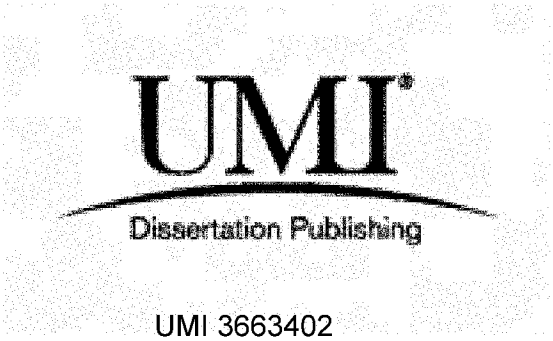

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Effectiveness of a Worksite Health Promotion Program to Improve Health-Related Quality of Life Indicators

Tara Casimano, Ph.D.

Trident University International, 2015

Health and wellness is essential to each individual's quality of life. The importance of health and wellness is not only of an individual concern but also a population-based societal concern. Currently there is growing epidemic of obesity as 65% of American adults are either overweight or obese. The work setting is an ideal location to foster healthy behaviors as most adults spend the majority of their day there. The need for health-related activities is supported in many different types of workplaces, especially in higher education settings. This study aimed to explore the relationship of a health promotion program using pedometers on the health-related indicators of the SF-36v2 and vital functioning of the participants in a college setting. The association of participant's health promotion level to changes in health-related indicators and vital functioning was also explored.

A pre-test post-test experimental design was conducted with a convenience sample of 29 participants. All 29 participants completed the pre-test, the 6 week health promotion program using pedometers, and the first post-test (post-test 1). Only 15 individuals completed the second post-test (post-test 2) which was administered six months after the completion of the health promotion program. Paired sample t tests analyzed the difference in scores of each participant from pre-test (baseline) to post-test 1. The paired sample t tests reported a significant improvement in the component summary and subtests of the SF 36v2 such as the mental health component summary ($p = .013$), physical functioning ($p = .015$), vitality ($p = .033$), and mental

health (p = .005). The linear regression analysis revealed mental health component summary scores were a highly significant predictor of vitality (β = 1.075, p = .001), accounting for 50.5% of the variance in vitality. Vitality is unique to each individual. This construct can affects one's ability to activity engage in their roles and occupations.

Health and wellness support role performance. The roles of most adults consist of worker, friend, and family member. Fulfillment of roles and meaningful activities supports balance and quality of life. Having the physical and mental capability to perform one's roles in a variety of contexts leads to engagement and satisfaction. Sustenance of a healthy lifestyle via physical activity is also an integral component of wellness. Utilizing technology and support within the social, virtual, and physical environments have all been shown by this study to improve quality of life indicators. Improvements were noted to statistically support the use of pedometers, points of decision prompts, and email correspondence to increase physical activity levels as well as stages of health promotion.

BIOGRAPHICAL SKETCH

Tara Casimano is an occupational therapist practicing for over 25 years. Her clinical area of expertise is in the area pediatrics. She holds the title of Assistant Professor and Associate Director at Touro College for the past 16 years. She enjoys teaching potential occupational therapists in the areas of pediatrics, clinical reasoning, and research. While balancing her professional career she also maintains her family business in her home state of Texas. She has pursued her doctoral degree in order to promote health and wellness in her community. Her personal and professional interests relate to improving the quality of life for individuals by balancing the physical, cognitive, emotional, social, and spiritual domains of one's self.

She is a loving wife and dedicated mother to her four beautiful children whom she hopes through her hard work and persistence to motivate to reach their full potential in life – whatever that may be. Tara is active in numerous community organizations, volunteering in her church, children's school, and other nonprofit organizations.

She is truly blessed.

This dissertation is dedicated to my wonderful family.

My husband Phil

My children Nicole, Thomas, Sarah, and Margaret.

Mom, Del, and Nana

May they always know how much I love them and am thankful for all their support and encouragement.

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Chapter One: Introduction

A new research agenda to curtail the obesity epidemic was launched in 2010. Many government agencies are working with the research community to invoke changes on a national level. Healthy People 2020 is a governmental program that was instituted in 1979 to monitor the nation's health in objective measurable goals and to set forth interventions to address problem areas. The establishment of Healthy People 2020, set forth by the United States Department of Health and Human Services (HHS) in 1980, strives to improve the health of all Americans by setting goals and objectives that are monitored over ten year increments (Fielding, 2009; Koh, 2010). For the first time in Healthy People history, the 2020 initiative was established in conjunction with an external advisory board of experts in the health field to help build on past objectives and establish new objectives along with a mission and overarching goals (Fielding, 2009).

In order to identify where the nation's health stands and how each successive Healthy People initiative must change, in order to meet criteria, studies on a variety of health issues must be conducted and analyzed. Reports indicate minimal progress toward meeting Healthy People 2010 criteria as only 19% of the target objectives were met (Koh, 2010). A significant component of the Healthy People 2020 initiative objectives targets worksites and employees. Studies are targeting health-related topics, particularly those involving health promotion programs such as nutrition, weight loss, and stress management. Theories to implement such health programs in the workplace are areas that deserve attention and can provide great insight into the health of the nation (Koh, 2010). The Affordable Care Act (ACA) of 2010 stresses the importance of initiating wellness and prevention programs as a top priority in health care delivery service. The ACA fully reflects the United States government's view from a disease-

specific model to what is now a national model focused on wellness. "Real health reform starts with prevention" (Anderko, 2012, p.4).

Occupational therapy, according to the American Occupational Therapy Association's Centennial Vision, is a health care profession that aims to promote health and wellness in order for each individual to perform their areas of occupation with success and satisfaction. Health is not only defined as the absence of disease; its definition is much broader and encompasses the ability to perform meaningful occupations to foster quality of life. Health includes both physical and mental well-being. The ability to be physically active within ones natural context is both the means and the ends toward successful and satisfactory engagement in one's daily occupations. Thus the incorporation of physical activity in health promotion programs is integral to Occupational Therapists and the clients to whom they provide services (AOTA, 2014).

This research study explores the effectiveness of a worksite health promotion program to improve health-related quality of life (HR QOL) indicators, including both physical and mental health and wellness. The association of the stages of the transtheoretical model (TTM) and change in HR QOL and SHC are also explored. The vision of Healthy People 2020 is to create a society in which all people live long, healthy lives, and it is the hope of the author to assist in this national agenda (Healthy People, 2020).

Study Rationale

Physical inactivity is considered to be a major public health problem in our society. The Center for Disease Control 2009) estimates that obesity is associated with 112,000 deaths each year. People who are overweight or obese are at increased risk of developing heart disease, diabetes, cancer, arthritis, respiratory problems, reproductive complications, and

depression. Poor diet and physical inactivity are the major causes of being overweight or obese. Currently 65% of adults are overweight or obese as compared to 47% of adults who were overweight or obese in 1980. Medical spending attributable to obesity is estimated to be $147 billion dollars. The Centers for Disease Control(CDC) and Prevention and the National Institutes of Health estimate the direct and indirect costs associated with obesity at $117 billion per year nationwide (CDC, 2009). This health promotion program was designed to improve physical activity levels in order to prevent disease and foster healthy behaviors.

Problem Statement

In the 33rd Annual Report of the Health Status of the Nation (2009), obesity rates among adults (20 to74 years of age) have doubled since 1976-1980. Over the past 30 years, the percentage of adults who were obese has also increased from 15% to 35%. Along with the increase in adults who are overweight and obese, the prevalence of chronic medical conditions has also increased. Such conditions include diabetes, hypertension, and other cardiovascular diseases. Musculoskeletal conditions and arthritis were reported to be the leading causes of activity restrictions in working age adults over the past decade (U.S. Department of Health and Human Services, 2009). Although strong consistent evidence supports the benefits of regular physical activity, most Americans continue to engage in a sedentary lifestyle and do not engage in health-enhancing activities. The U.S. Surgeon General estimates that only 45% of adults get the recommended amount of physical activity (U.S. Department of Health and Human Services, 2001).

Research Questions and Hypotheses

Research Question I: What is the effect of the worksite health promotion program on health-related quality of life indicators?

H_0: As a result of the worksite health promotion program, there is no significant effect on health-related quality of life indicators.

H_A: As a result of the worksite health promotion, there was a significant positive effect on health-related quality of life indicators.

Research Question II: What is the effect of the use of pedometers on health-related quality of life indicators?

H_0: As a result of a worksite health promotion, there is no significant association between participants' stage of change within the transtheoretical model and health-related quality of life indicators.

H_A: As a result of the worksite health promotion, there is a significant positive association between participants' stage of change within in the transtheoretical model and health-related quality of life indicators.

Research Question III: What is the association of participants' stage of change and health-related quality of life indicators?

H_0: As a result of the worksite health promotion, there is no significant difference in health-related quality of life indicators between the pedometer group and the non-pedometer control group.

H_A: As a result of the worksite health promotion, there is a significant difference in health-related quality of life indicators between the pedometer group and the non-pedometer control group, with the pedometer group having greater improvements in quality of life indicators.

Study Aims

To assess the effectiveness of the worksite health promotion program on health-related quality of life indicators in an academic setting.

To assess the effectiveness of the use of pedometers in a worksite health promotion program on health-related quality of life indicators in an academic setting.

To compare the participant's stage of change within in the transtheoretical model and change in health-related quality of life indicators in an academic setting.

Chapter Two: Literature Review

The literature was reviewed and critiqued to provide current information regarding health-related quality of life indicators specifically related to physical activity. ProQuest and Medline databases were searched utilizing the keywords health promotion, walking programs, worksite wellness, pedometers, governmental programs with the healthy people initiatives, transtheoretical models of stage of change, and health surveys. The articles were synthesized to provide support and guidance for the research study; as well significant gaps in the literature were identified.

Health Promotion Programs and Improvements in Daily Living

There are baseline/initial physical activities that are essential for daily living skills. Daily living skills are activities oriented toward taking care of one's body that are essential to living in a social world; they enable basic survival and well-being. Health enhancing health promotion goes beyond baseline health promotion and has been strongly associated with an individual's level of health and well-being. These activities may include walking, jogging, swimming, cycling, dancing, etc. A landmark document released in October 2008 by the U.S. Department of Health and Human Services (HHS), *Health Promotion Guidelines for Americans*, provides a robust examination of the scientific evidence regarding the health benefits of health promotion. The advisory committee of senior scientists conducted a systematic review of the literature dating back from 1996; key relevant summations from this report have been integrated into this literature review. Overall the evidence strongly supports a vast range of health and fitness outcomes when individuals are physically active. There is a clear inverse relationship between physical activity and all causes of mortality; a 30% risk reduction is consistently reported for both sexes and in different ethnic and racial groups.

Furthermore, there is a clear inverse relationship between health promotion and cardiopulmonary health. There is a 20% to 35% lower risk for stroke and cardiovascular disease for individuals who engage in physical activity. There is a clear inverse relationship between health promotion and metabolic health, such as the prevention of type 2 diabetes. There is a 30% to 40% lower risk for type 2 diabetes for those individuals who are moderately active as compared to those individuals with sedentary lifestyles. There is favorable and modestly consistent evidence that aerobic physical activities positively impacts the achievement of weight maintenance, although health promotion alone does not have an effect on achieving 5% of weight loss except at very large volumes. There is a 36% to 68% risk reduction of hip fracture at very high levels of physical activity (greater than 300 minutes per week). There is a 30% risk reduction for either the prevention or delay in functional role limitations with individuals engaged in physical activities. The greatest evidence of a dose-effect response is evident for walking activities, these type of activities should include periods of greater than 30 minutes of moderate intensity at least 3 days a week. There is a 30% decreased risk for colon cancer and a 20% lower risk for breast cancer in individuals who engage in health promotion as per the recommended governmental guidelines. There is a reported 20% to 30% lower risk for dementia, depression, and overall mental health distress.

There is strong scientific evidence based upon a vast array of well conducted studies that indicate that individuals who are physically active have a lower risk for developing a wide range of medical conditions as well as have higher levels of health-related fitness outcomes (U.S. Department of Health and Human Service, 2008). Howley (2008) summarized the practical considerations and applications based upon the 2008 Health Promotion Guidelines for Americans, and recommends for men and women between the ages 18 and 65 (with no

preexisting disabling medical conditions) that 150 minutes of moderate intensity exercise should be performed per week. These activities should be performed in at least 10 minute blocks and spread throughout the week. Intensity is defined as how hard or difficult the activity is to perform, as it relates to the amount of effort exerted by the individual. An example of a moderate intensity activity is brisk walking. The health benefits associated with health promotion are well supported in the scientific literature in relation to overall health and physical and mental functioning.

Health Promotion Programs in the Workplace

Hughes (2010) conducted a large cross-sectional study examining the prevalence of health behaviors of working insured adults. The study concluded that participants were not meeting the recommended guidelines; supporting the implementation and utilization of worksite health promotion programs. Wellness and preventative programs and policies are more widely evident and are encouraged by federal and local municipalities to curb the growing healthcare crisis. Linnan (2008) supports the need for health promotion programs in the worksite. Health promotion programs are becoming part of employer-based health benefits to improve work environments leading to a decrease in risk factors associated with chronic disease (Cassil, 2010).

Administrative barriers and benefits. There are benefits to both employers and employees such as a reduction in medical costs, increase in productivity, decrease in absenteeism, decrease in body fat, and increase in aerobic capacity that decreases the risk of chronic diseases. Current barriers to engagement in health promotion activities are primarily reported as lack of time and accessibility. Providing worksite health promotion programs is a well-recognized strategy to increase the frequency, duration, and intensity of health enhancing activities for adults. The workplace is an ideal environment to implement health promotion

programs. Since middle-aged adults spend the majority of their time at work it is suitable to attempt to integrate these programs into this type of setting. Mackey (2007) conducted a randomized control study that reports a greater need for health promotion programs for working adults over the age of 45. These older workers have a higher rate and cost of injury when compared to workers under the age of 45.

Additionally, DeJong (2003) found similar findings in which a sedentary workforce demonstrates an increased risk for future cardiovascular disease. Phipps (2010) discusses the workplace as an ideal environment to implement health promotion programs but stresses the need to identify the interest levels of the employees and assess potential barriers. Reidel (2001) states that worksites that implement and encourage health promotion programs may improve worker productivity, decrease absenteeism, and have many more benefits to both the workers and employers.

Employee incentives. Kruger (2007), based upon the 2004 Health Style Survey, assessed barriers and incentives towards worksite health promotion programs. The main incentives that attract employees were time to exercise at work and healthy food choices at worksite cafeterias. Consistently reported barriers were lack of time to exercise. The 2004 Health Styles Survey identified several areas that employees stated would make a worksite wellness program successful; 70% of participants identified the need for programs to be arranged at convenient times and convenient locations, 80.6% identified the need for a fitness center, 67.1% identified a need for weight loss programs, 80% identified a need for paid time to exercise during the day and healthy food selection on site. Kruger (2007) and Dishman (2009a) reported upon the efficacy of a health promotion program in the workplace in order to meet prior Healthy People 2010 health promotion recommendations. The purpose of the study was to assess the

workplace environment, employee motivation, and personal and team goal setting during a 12-week intervention to increase moderate-to-vigorous health promotion based on management theory. The study emphasized the importance of the environment and management support as a major influence in employee motivation and participation along with goal-setting in worksite health promotion programs.

Siegel et al. (2010) and Atlantis, Chow, Kirby, and Singh (2006) examined intervention programs that included the application of both physical activity and healthy dietary intake in the worksite. The study aim was to improve employee's physical and psychological health by promoting healthy exercise and dietary behavior. It was hypothesized that employees participating in the program would be significantly more likely to lose weight as well as change diet and physical activity behaviors. Siegel et al. (2010) found a reduction of body mass index among employees in intervention schools, while those in control schools increased in body mass index. No significant differences were found for waist-hip ratio, weekly physical activity, or fruit and vegetable consumption. This study was found to be an effective means for stimulating change. Atlantis et al. (2006) hypothesized that combined aerobic and weight-training exercise along with dietary/health education counseling in the worksite would improve employee's waist circumference and aerobic fitness. There were observed significant differences in waist circumference ($p = .01$) and aerobic fitness ($p < .001$) among the participants. Higher intervention compliance predicted greater improvements in physical fitness. No significant effects on body mass or body mass index were found.

Worksite interventions, particularly targeting visceral adiposity and physical activity, have the potential to minimize the increasing burden of being overweight and obesity. However, substantial barriers to adoption/adherence need to be overcome with greater feasibility and

impact on employee physical health. Lemon et al. (2009) aimed to examine the associations of individual perceptions of organizational commitment to employee health, coworker physical activity, and eating behaviors with body mass index, physical activity, and eating behaviors in employees. A growing number of population-based studies suggest that environmental factors influence obesity rates and associated physical activity and eating behaviors. This study was conducted to develop conceptually grounded intervention strategies, and a greater understanding of how employee obesity and associated behaviors are impacted by employees' perceptions of worksite environmental support. Lemon et al. (2009) found that greater perception of organizational commitment to employee health is associated with lower body mass index. In addition, greater perceptions of coworker healthy eating and physical activity behaviors are associated with fruit, vegetable, and saturated fat consumption and physical activity, respectively. By improving organizational commitment and facilitating supportive interpersonal environments, obesity rates among working populations may decrease.

Foster et al. (2006) and Culson et al. (2008) supported an increase in productivity, a decrease in stress levels, and a decrease in the cost in health insurance resulted when using physical activity as an intervention in a health promotion program. An assumption by Fong (2008) stated a strong correlation that employees with high BMI levels would show a decrease in job stability. The researcher's assumption underlying this hypothesis is due to the belief that increased BMI levels result in an increase of health care cost and high absentee rate due to greater health risks and illness. However, this study showed that with an increased BMI, the levels of stability and productivity levels increased. Most similar studies showed a relationship between increases in BMI and negative productivity levels at work. Researchers assume that employees with increased levels of BMI know they are at high health risks, and therefore, they

want to ensure they still receive health insurance thus increasing their productivity level in their workplace.

Health promotion programs have been conducted in a variety of worksites. Consistent results support the beneficial outcomes toward health and wellness. Tucker (2011) conducted a quasi-experimental design with an intervention group and a comparison group following a 10-week worksite physical activity program. This study followed 30 nurses and reported that the intervention group differed significantly in fat index ($p < .27$), fat mass ($p < .035$), and percentage of fat mass ($p < .035$). Participant feedback regarding the program stressed the importance of reminders to remain active within their work day as well as suggested a longer intervention program to facilitate the desired health benefits (Tucker, 2011).

Dishman (2009a) found an increase in health promotion in participants in the intervention group with an increase in the number of people meeting the recommended levels of health promotion as per Healthy People 2010. Measures of health promotion remained the same as baseline measures for the control group. Renaud et al. (2008) examined the implementation of a comprehensive worksite health promotion program, aiming to provide employees with information and support for risk factor reduction, using a personalized approach and involving the organization's management as both program participants and promoters. This study hypothesized that programs that incorporate environmental modifications, longer-terms, and comprehensive interventions are more effective. Results from this study indicated that the assessment of health profile changes showed a significant increase in the Global Health Score. Participants were significantly more likely to report more frequent health promotion and better nutritional practices. The proportion of smokers among participants was also significantly reduced (p .0147). Stress signs and feelings of depression within the workplace and in the

community were significantly reduced as well. During the same period, absenteeism in the organization declined significantly (28%). The organization's administration viewed the program as a success secondary to a decrease in absenteeism and turnover (54%). This study concluded that worksite health promotion will be most effective when it promotes overall organizational health.

Thogersen-Ntoumani (2010) conducted a feasibility study aimed to increase walking during a lunchtime health promotion intervention program. The first phase of the study consisted of group-supported walking led by a facilitator, then the participants were asked to walk independently, and finally the participants were encouraged to organize group walks with their co-workers. Results indicate a range of positive physical and psychological health-related benefits of the lunchtime walking program. These findings are clinically significant as office employees are relatively less physically active while at work, and much of the day is spent at a workstation or accessing clients via computer programs and emails. Thorgersen-Ntoumani (2014) and Sternfeld (2009) utilized booster strategies to improve the physical activity levels of sedentary employees. An increase in walking followed emailed messages that provided information and motivation to improve activity levels to participants.. An increase in walking immediately following such booster strategies was found, although may not yield habit-forming lifestyle changes.

Linde (2012) labeled the workplaces of the majority of Americans as "obesogenic" environments in which healthy behaviors are not fostered. Approximately 60% of adults work in a full-time capacity, and thus the workplace is a prime context to incorporate healthy behaviors to help curtail the current obesity epidemic. Although a high attrition rate (15%) was reported, the Health Works program attempted to provide a multidimensional program to improve physical

activity levels. This longitudinal study utilized a stair use initiative, pedometers, and health media to increase the participant's motivation and behavioral measures supporting physical activity. The findings stated that the intervention was not strong enough to produce statistically significant results and suggested that physical activity programs need to include a social ecological framework including the participation of administrators, stakeholders, and the participant's family members to yield the desired health benefits. There was no statistically significant difference (p = .36) in weight gain between the intervention and the control group over the 2-year study period.

Higher education worksites have also conducted studies addressing physical activity and health promotion. Recently Ainsworth (2012) addressed the worksite in a University setting. The study was conducted in Sweden and the United States and paired faculty, staff, and graduate students together to assess the increase of walking via a group-based physical activity program. The target population of this study consisted of "sedentary" adults with the objective to reach the governmental standard of 10,000 steps per day. Office based-employees are relatively inactive and are estimated to take only half the amount of steps per day as healthy adults. This supports the research premise of incorporating health promotion programs in the worksite as the work environment has not historically facilitated physical activity and is now considered a targeted environment to encourage health promotion of employees. To this end, both employers and employees will benefit.

Administrative Support of Health Promotion Programs. Napolitano et al. (2006) reported a trend toward increasing walking activity from baseline, midway through the campaign, and following the administrative health promotion campaign (p = .075). This study shows initial promise in a theoretically-based communications intervention that focused on

increased knowledge of health promotion and promoted walking. Additionally, this study highlighted the need for experimental studies to examine overall health and well-being as outcomes of a worksite health promotion program. There needs to be equal collaboration between staff and employers to make the worksite health promotion program beneficial for every stakeholder. Hawkins (2009) discussed the need for a unique partnership between governmental agencies and employers to meet the objectives set forth in Healthy People 2010 as well as the anticipated objectives of 2020. The U.S. government has set forth guidelines for health promotion and enhancing accessibility to health promotion for all Americans in various environments. Research indicates that these programs must be truly collaborative in order to be successful and beneficial for everyone.

Walking Programs

Walking has been linked to both primary and secondary prevention of cardiovascular disease. Walking is a type of exercise that has beneficial outcomes for both men and women with minimal risk of injury. Walking is also a type of exercise that is readily accessible, requires minimal resources and no equipment. Chyou (2006), based upon a prospective observational study, reported a statistically significant increase in participants' health promotion level ($p < .0001$) as well as a decrease in mean body mass index (BMI) ($p = .02$) as a result of a worksite walking program. There was no evidence to support a decrease in participant blood pressure. Schwartz (2009) conducted a cross-sectional study examining environmental and worksite policies based upon a self-reported survey. It was concluded that worksites that implemented walking programs significantly influenced employee walking ($p = .05$). Prospective designs with large diverse samples may further explore this association. A systematic review of the effect of worksite programs on health outcomes measured in weight loss

and body mass index (BMI) was conducted by Anderson (2009), which calculated the positive effect of worksite programs on weight loss (95% CI = -0.8, -0.2) and BMI (95% CI = -4.6, -1.0) for both male and female participants. Most of the programs reviewed in this systematic review included both informational and behavioral strategies.

Another systematic review from the Cochrane Database from 2007- 2008 reported strong, consistent evidence that exercise prevented musculoskeletal (back) problems in working adults. Bigos (2009) reported that based upon the systematic review of 20 articles there was an effect size of 0.39 to less than 0.69 in the prevention of musculoskeletal problems. Tveito (2008) reported statistically significant differences between the control and intervention group. The intervention group had fewer neck complaints, less stress, improved physical fitness, and overall improved health and well-being. There was no statistical difference in sick time between the groups. Tveito (2008) also reported that there are improvements in the subjective effects of health and well-being for the participants in a health promotion program. In their randomized control pilot, the dependent variables under investigation were the subjective health complaints inventory and the generic health status inventory SF-36. Conn (2009) reported a modest association of increased health promotion based upon worksite health promotion programs. The mean effect was reported at 0.21 based upon 26 worksite studies integrated into the meta-analysis. A similar effect size (r = 0.11, d = 0.22) was reported by Dishman (1998). Improvements in fitness were greater with a reported effect size of 0.57. Improved job satisfaction and decreased stress levels were also positive outcomes. Conn (2009) suggested a need for continued research to objectively define and measure health promotion programs.

Walking, whether for leisure, transportation, or exercise, remains a healthy type of physical activity and plays both a primary and secondary role in the prevention of cardiovascular

disease. Zheng (2009) reported a 19% reduction in risk of cardiovascular disease when incorporating the practice in one's daily routine for 30 minutes per day, five days a week. There also appears to be a dose-dependent reduction of cardiovascular disease risk with increasing walking levels.

Haines et al. (2007), Faghri et al. (2008), and Napolitano, Lerch, Papandonatos, and Marcus (2006) examined intervention programs that set out to solely promote and increase the level of health promotion in the workplace. These studies hypothesized that a walking program in the worksite would show positive effects on employees' health status, decreased health care visits, and work absenteeism. They support that walking is an inexpensive, easy, and convenient form of health promotion for many adults, and therefore, implementation of this type of workplace program with the important element of increasing individual's awareness of risks, can be an effective approach to reducing cardiovascular risk factors, as well as a way to manage overweight and obesity in sedentary adults. Murtagh (2010) discusses the benefits of a walking program as a health promotion program to improve health and fitness. All studies reviewed found walking to improve fitness levels in their participants.

Pedometer-Based Walking Programs. The use of pedometers in walking programs has provided motivation toward one's physical activity goals. The use of these motivational tools has steadily increased over the past decade as evident in the amount of research published. In a mixed-method design, Gardener (2011) suggested the use of pedometers can provide important environmental cues that motivate participants to join physical activities. Pedometers can assist as a motivational tool to change behavior. Tudor-Locke (2009) concurred based upon the findings of a meta-analysis conducted that demonstrated that pedometer-based physical activity programs are effective. The programs showed increases in participant physical activity and

decreases in both blood pressure and weight. As well, focus groups revealed pedometers were well accepted and viewed as helpful to increase physical activity level. Focus group members also commented that the immediate visual feedback pedometers provide increased personal awareness. A four-week pedometer-based walking program in a worksite environment found an increase in 70% of the participant's level of walking (Thomas, 2006). This study also revealed a gap in the literature as most studies reviewed also discussed the short-term benefits of a health promotion program (less than 6 months).

A similar study using pedometers in a worksite walking program was conducted by Lauzon (2008) in which the use of pedometers was viewed as useful to increase awareness of participant physical activity levels. Lauzon also recommended the incorporation of group-based components to improve social support and encouragement through the program. Both Haines et al. (2007) and Faghri et al. (2008) observed differences between baseline and follow-up through the use of a pedometer walking program. Haines et al. (2007) observed differences in body mass index (p .024), blood glucose (p = .06), and total cholesterol (p = .09). Faghri et al. (2008) reported significant improvements in the number of steps per week, level of health promotion, movement through stage of change, and other health-related indicators ($p < .05$). Both studies concluded that a worksite pedometer walking program and e-technology is an effective intervention to improve the health and wellness of its employees and simultaneously reducing health-care costs.

Bravata (2007) evaluated the association of pedometer use with health outcomes (including physical activity) with a healthy adult population. This systematic review identified 8 randomized control trials (RCT) and 18 observational studies. In the RCT studies, the step count was significantly increased between the control and pedometer group, $p < .001$. All 26 studies

analyzed body mass index and reported a significant decrease by 0.38, 95% CI 0.05 – 0.72, p = .03. Bravata (2007) found that an important predictor for increasing physical activity was for the participants in the studies to have a step goal, p = .001. Richardson (2008) examined the effects of pedometer-based walking programs on weight loss. Weight change was reported as significant, p = .05 comparing pre- and post-intervention weight. A strong linear association between duration of the intervention program and the magnitude of weight change was concluded, p = .003, with the longer programs associated with greater weight change. The median length of pedometer-based walking programs was 16 weeks, with a range from 4 to 52 weeks in duration.

Aittasalo (2012) conducted a randomized study comparing a pedometer STEP group to a control group over a 12 month period. Participants were recruited from various health care centers. Results support pedometers as a valid and reliable tool to increase physical activity. They are easy to use and unobtrusive to wear. They provide immediate understandable feedback that can increase awareness, which may increase physical activity level. Pedometers are a well-accepted tool in health promotion programs for participant goal achievement (Gardener, 2011). The previously reviewed meta-analyses and systematic literature reviews report consistent, well-supported findings that pedometer-based walking programs assist to change behavior and increase physical activity levels to improve health-related quality of life indicators. However, the literature does not assess mental health quality of life indicators as outcomes from the use of pedometers or any type of walking program. This is a notable gap in the literature and was addressed in the research study.

Point-of-Decision Prompts

Changing the environment can lead to change in an individual's behavior. Motivation and peer support can encourage lifestyle changes as well as influence the longevity of that change to behavioral habits. Utilizing informational, behavioral, social, and environmental approaches to improve one's physical activity level encompasses a dynamic approach. In 2000, the *Guide to Community Preventive Services* completed a systematic review of such approaches to determine the effectives of increasing physical activity levels with adults (Task Force on Community Preventive Services, 2002). A community-based approach towward improvements is recommended to enhance physical activity. Findings from this task force suggested making conceptually integrated interventions focusing on informational approaches to provide knowledge to community dwellers regarding the benefits and opportunities of physical activity within their community; environmental and policy approaches to provide convenient, safe, and attractive places to engage in physical activity within the community; and behavioral and social approaches to facilitate behavioral change toward physical activity for both a short-term and long-term basis.

Soler (2010) conducted a systematic review of the literature from 2005 to 2010 regarding the use of Points-of-Decision Prompts (PODP) to increase stair use. A total of 11 studies were incorporated in this review, and the studies were conducted within the natural context of the community such as in shopping malls, train and bus stations, healthcare facilities, office buildings, and university settings. The subjects in this study were middle-aged individuals from a diverse ethnic background. All the studies yielded a significant increase in stair use from baseline although the majority of studies did report a low level baseline stair use. The median relative improvement of the reviewed studies in observed stair use was 50%. Although there was

no significant relationship reported between stair use and PODP, rho (10) = - 0.39, p = .77. The Task Force on Community Preventive Services (2010) reported findings based upon the use of PODP to increase health promotion within the worksite. PODP are motivational signs placed on or near stairwells or at the base of elevators and escalators to encourage individuals to increase stair use. These signs inform individuals about a health or weight-loss benefit from taking the stairs and remind individuals already predisposed to becoming more active.

The Task Force on Community Preventive Services (2010) identified 13 studies qualifying for the primary review of PODP. The Task Force recommends the use of PODP on the basis of strong evidence of its effectiveness in moderately increasing levels of health promotion, as measured by an increase in the percentage of people choosing to take the stairs rather than an elevator or escalator. Soler (2010) provided strong evidence of the effectiveness of PODP intervention in increasing the use of stairs. On average, these improvements represent a modest improvement in stair use. PODP may represent a simple, lower-cost option to increase health promotion in some settings. There was insufficient evidence to draw a conclusion regarding the effectiveness of stair or stairwell enhancements when used with PODP. Despite the inclusion of additional studies, there remain important gaps in understanding the effectiveness of these interventions in some settings (such as worksites), and the contribution of these interventions to overall health promotion and physical fitness.

Soler (2010a, b) supports the use the use of PODP to support physical activity programs as a motivational strategy. Modest improvements in stair use and activity levels have been reported. Continued use of this motivational and informational tools can booster a physical activity intervention program. Motivation can be facilitated through knowledge and social

participation. Autonomous motivation may not be present initially in sedentary adults although through the use of motivational tools such as PODPs. it can be fostered.

Transtheoretical Model Stages of Change

The TTM proposes that people use both behavioral and cognitive processes to progress through the stages of change ofvarious health behaviors. Individuals change their own behaviors to modify their health. The theoretical constructs describe behavior as changing dynamically over time. The TTM is considered to be cyclic as it proposes that people move back and forth through the stages of change. Furthermore people move through the stages of change by using various cognitive and behavior strategies. (Linke. 2013)

The processes of change are consciousness raising in which an individual is provided with increasing information about the problem at hand or themselves. self-reevaluation that entails assessing how feels about themselves and the problem. self-liberation which entail an individual committing to change their behavior. counterconditioning as an individual substitutes alternative behaviors for the problem behaviors. stimulus control occurs when an individual avoids the stimulus that triggers the problem behavior. reinforcement management occurs when reinforces are provided by oneself or others for performing the health behaviors. helping relationships occurs when an individual is able to be open and trusting about the problem behavior to others who show support. dramatic relief is a strategy that encompasses one's ability to express their feelings regarding their behaviors and possible solutions. environmental reevaluation occurs as an individual assess how the problem behavior affects their physical environment. and lastly social liberation as there are increases in alternative strategies for changes in the behavior available in society. (Linke. 2013)

Through the application of the aforementioned processes of change individuals are able to move through stages of change according to the TTM. These stages of changes are: precontemplation, contemplation, preparation, action 1, action 2, maintenance, and termination. The precontemplation stage is described as when an individual does not anticipate performing the behavior in the next 6 months. The contemplation stage is when an individual intends to change and perform the behavior within the next 6 months, the preparation phase is described as when the behavioral change is imminent and the individual has a plan of action and intends to perform the behavior usually within the next month. Action stage 1 is described as when the individual has begun the behavior and incorporated the change into their lifestyle; this is a recent change. Action stage 2 is described as a consistent incorporation of the behavior into the individual's lifestyle over a 6 month span of time. The maintenance stage of change is when the individual has maintained the behavior consistently in their lifestyle for more than a 6 month time period. The termination stage is described as a relevant change ridding oneself of unhealthy behaviors. This stage is achieved when the individual is no longer tempted to perform the unhealthy behavior. In the area of exercise, this stage is less relevant than it might be, for example, if the individual had quit smoking and in this stage no longer experienced cravings for nicotine; however, it is during this stage the individual discoveries new supportive strategies to continue with their new healthy lifestyle. Exercise, more specifically, regular walking or stair climbing remains in the maintenance stage (Hegamin, 2009).

Stage-matched interventions such as TTM were compared against a social-cognitive approach in the implementation of a health promotion program at a worksite setting. The stage-matched intervention (TTM) was equally effective in the assessment of the participants moving to a higher level within the model for determining change in health behaviors. A limitation in

the study is noted with a lack of homogeneity of group size as there was an unequal representation of participants in the earliest stage (precontemplation) (Griffin-Blake, 2006). This is a consistent finding throughout the literature as individuals not yet thinking of changing their behavior are not as accessible as study participants. However, Dishman (2009) supports the use of stage matched theories in assessing health behaviors.

Transtheoretical Model Stages of Change and Health Promotion. Marshall (2001) conducted a meta-analysis of 71 published reports in which TTM's theoretical framework was applied to exercise and health promotion programs. The major findings were that it cannot be confirmed if changes in health promotion behavior occur along a series of set stages. Secondly, the incorporation of TTM concepts are a result of the need for empirical data to be collected with valid and reliable measurement methods. And lastly, higher levels are not as evident in the change of health promotion when compared to lower levels. This meta-analysis supports future studies in which the concepts of stage transition within the TTM should be investigated.

Spencer (2006) performed a comprehensive literature review in which 151 studies indicated the TTM measurement tools are a valid and reliable assessment of stage-matched interventions. A large prospective nonrandomized study assessing the effectiveness of the *Choose to Move* program reported increased health promotion levels as well as improved nutritional factors. Koffman (2001) concluded that this self-monitored mail mediated program incorporated the TTM concepts to motivate participants in the lower levels of health promotion to move to the higher levels. This study utilized the transtheoretical stages of change as an outcome measure. It is also indicated that further research is needed to identify transitions from the early stages of health behavior (precontemplation) to the active and maintenance stages. Prochaska (1997) outlines these stages of change as well as a method for gathering this data in a

reliable and valid manner. TTM, as supported in the literature review for this proposal, has demonstrated strong theoretical reliability and validity. More recently Tuah (2014) found the applying the TTM stages of change led to improvements in physical activity and dietary habits for overweight and obese adults. The sustainability of these changes in healthy behaviors was inadequate secondary to post-intervention assessments.

Longitudinal studies are limited in determining the lasting effects of changes in health behaviors in order to determine if the transitions between the stages of the TTM are maintained. As discussed by Linke (2014) to determine the length of follow-up may vary as individuals vary in the amount of time before the amount of time the adopted healthy behavior becomes a habit. Dishman et al. (2009) utilized TTM to assess past health promotion recommendations; however, this study did not focus on worksites. The researchers conducted this study to determine "the positive predictive value of the post-action stages of the Transtheoretical Model for classifying whether people met the U.S. Healthy People 2010 guideline for regular participation in either moderate or vigorous health promotion" (p. 281). This study was also used to determine if it was possible to predict the ability of individuals to meet the 2010 physical activity guidelines based upon their current stage of change. Dishman et al. (2009) found that stages according to TTM cannot be used to accurately determine if people are meeting health promotion recommendations as per Healthy People 2010.

Worksite settings. Utilizing the "stages of change" construct, Phipp (2010) conducted focus groups and a survey to identify employee interest in worksite health promotion programs. Three groups were identified as exercisers, intenders, and non-intenders. Intenders were significantly more interested in programs as compared to the other two groups, $p < .05$. Intenders also reported barriers to participation, primarily citing personal safety and lack of time

to exercise. These potential barriers along with employee attitude and motivation must be considered in all health promotion programs. Faghri et al. (2008) did not find a significant difference in the number of steps taken by participants according to differences in their stage level measured at pre-test as per the TTM. Results did indicate an increase in the number of steps taken, self-reported activity, the number of participants meeting the level of health promotion recommended by the American College of Sports Medicine, and the movement in stage change for health promotion, dietary habits, and stress management regardless of pre-test stage level.

This study is similar to the results indicated by Dishman et al. (2009) in which stages also could not predict health promotion level. Berry et al. (2007) found mixed results with little evidence to support the validity of the organizational stages of change construct. Their study indicated that individual stage-matched interventions within an organization would be more useful as there is a great deal of variability among individuals. The findings from Papandonatos (2013) confirm the importance of behavioral processes of change, but report that they also may vary depending upon the amount of time it takes for habits of behaviors to be formed. According to Linke (2014), "the TTM has been a highly influential theoretical framework composed of a number of useful organizing constructs that have been shown to be meaningfully related in empirical data and psychometric studies" (p. 9).

Summary

The physical and mental benefits of health promotion are well documented although the majority of American adults do not meet the recommended guidelines for health promotion. There is an obesity epidemic in the United States secondary to poor nutritional consumption and inactivity. A sedentary lifestyle has been consistently linked to numerous debilitating conditions.

U.S. healthcare policy advises all Americans to increase their quality of life by enhancing health promotion participation. The use of TTM to assess stages of change in health behaviors such as health promotion is also well supported in the literature. Many of the studies reviewed were prospective observational studies, cross-sectional, and few were experimental designs with randomization. Follow-up of outcome measures were not assessed past 6 months of program completion. Many of the studies focused on the physical benefits of the activity program such as musculoskeletal ailments, weight loss, and reductions in BMI classifications while few addressed the mental health benefits of the health promotion program. Walking is well documented as a safe, easy, healthy behavior that can be recorded using a pedometer. Using pedometers as a motivational tool has been studied with consistent evidence that they increase walking behaviors and activity levels. Additionally, PODP are supported as environmental tools to motivate individuals as well as educate them towards making behavioral changes. Work environments - specifically higher education settings - have limited literature regarding health promotion programs incorporating walking. The literature reviewed supported this research study; *The Effectiveness Of A Worksite Health Promotion Program To Improve Health-Related Quality Of Life Indicators.*

Conceptual Model

A conceptual model proposes a process in which outcomes are affected by an intervention. In this study, the intervention/independent variable is a worksite health promotion program and the outcomes/dependent variables are the health-related quality of life indicators, vital functioning measures, and the stages of change from the TTM. The outcomes measures are affected by three core components (cognitive/behavioral, physiological, and environmental) and their concepts. Change regarding healthy behavior practice is not a singular event but rather a

process in which multiple components work together to cause a specific outcome. The TTM presents a theoretical model to promote health behavior change. The model involves an emotional, behavioral, and cognitive process to facilitate intentional change. The worksite health promotion program also facilitates physiological and environmental changes that are supported by an ecological systems perspective. This model integrates the individual factors within a social environment. The contextual component fosters change in which establishing new routines occurs within a healthier workplace. Thus the three components are supported within an ecological and transtheoretical approach to produce positive changes with regard to health-related quality of life indicators, subjective health complaints, and progression through the stages of change with the TTM (Plotnikoff, 2001; Thompson-Robinson, 2006).

Within the cognitive/behavioral component of the model, the participants will increase awareness and knowledge of the recommended guidelines for health promotion, increase awareness and knowledge of health promotion strategies and regimens, provide companionship during health promotion activities, increase self-efficacy for habit restructuring and lifestyle changes, increase self-reevaluation to explore self-image toward unhealthy habits (lack of exercise), and pursue the substitution of healthy behaviors towards health promotion.

Within the physiological component of the model, the participants will decrease body mass index score, improve blood pressure, improve vital functioning, improve cardiopulmonary functioning, and improve overall fitness.

Within the environmental component of the model, the participants will be exposed to an environment in which there is time and the opportunity to exercise, administrative support of the

worksite health promotion program, social support from colleagues, and environmental stimulus to promote health promotion such as inspirational messages.

The conceptual model exemplifies a holistic process integrating ecological systems theory and the transtheoretical model of change based upon the effect of a worksite health promotion program. The cognitive/behavioral, physiological, and environmental components lead to positive outcomes in health-related quality of life indicators and stage of change of the participants.

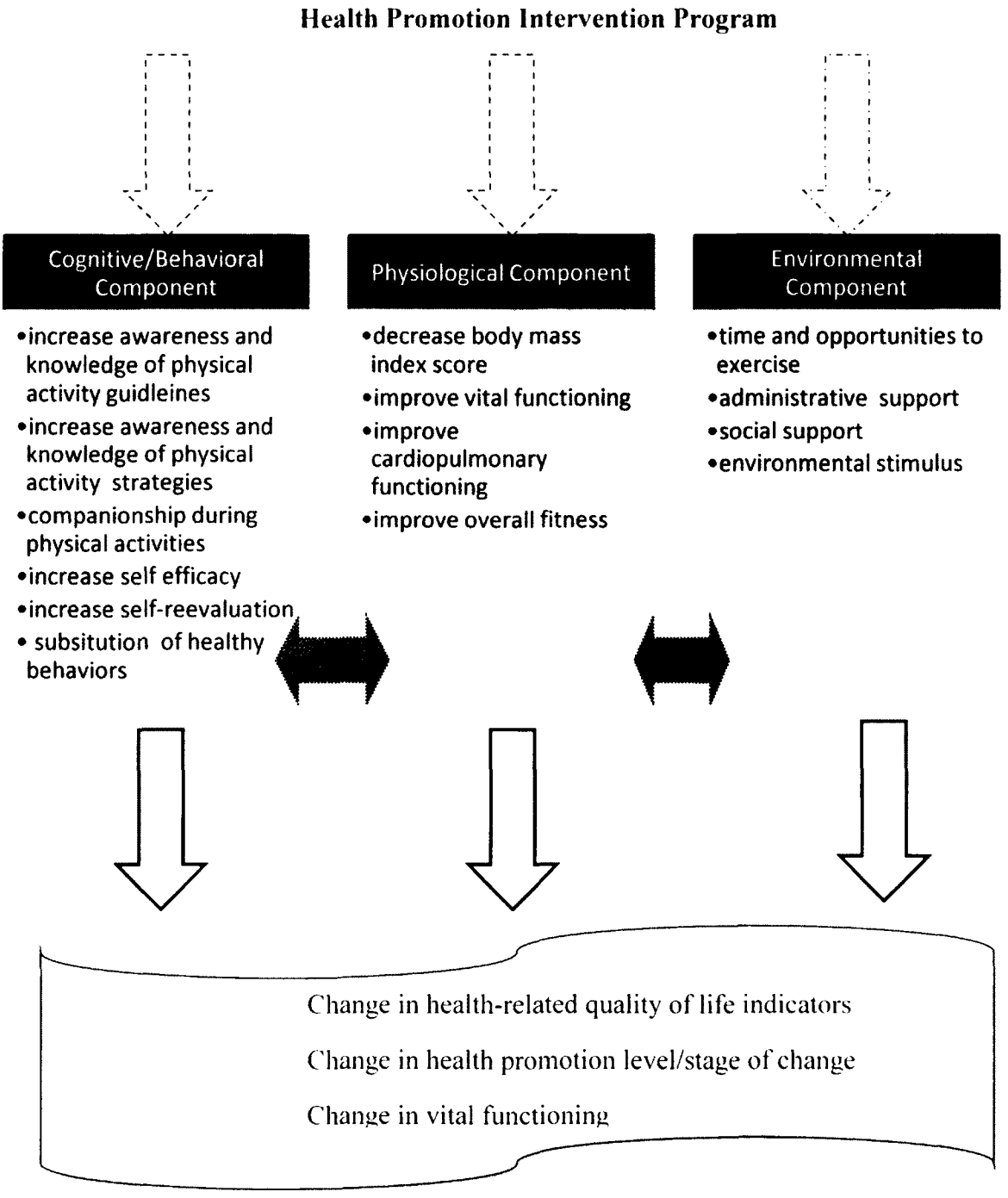

Figure 1. Conceptual model facilitating change from the health promotion program.

Chapter Three: Research Methodology

Study Design

The methodological design was geared to collect and analyze data accurately in order to answer the research hypothesis and research questions. The study design was a group pre-test post-test design, with 3 time points. Participation in the worksite health promotion program was to improve the outcome measures: health-related quality of life indicators, vital functioning measures relating to physical functioning, and the health promotion level/stages of changes of the participants. The length of the study was a collegiate academic year running from September 2011 to May 2012. The study began with the pre-assessments and then followed with the 6-week health promotion/pedometer program. After the 6-week health promotion/pedometer program, the participants were administered the post-test. A 6-month follow-up test after the health promotion/pedometer program was also incorporated into the study to determine the long-term effects of the pedometers on the outcome measures. The outcome measures consisted of standardized assessments, questionnaires, and vital functioning measurements administered at three times to one cohort of participants. The study timeline was 8 months, from enrollment and the pre-test assessments, inclusive of the 6-week worksite health promotion, and concluding after the administration of the two post-tests.

The worksite health promotion program aimed to improve the participants' health-related quality of life indicators as well as to increase their health promotion level, and to improve vital functioning measurements that are also related to improve physical functioning. The program ran for 6 weeks in which the participants were strongly encouraged to wear the provided pedometers during all waking hours and submit weekly reports via the pedometer computer software that recorded the amount of activity on a daily and weekly basis as well as the individual's daily and

weekly step count. During the 6 week health promotion program, the participants received weekly emails containing educational information to improve their health promotion level as well as practical strategies to improve physical activity. Points of decision prompts (Appendix A) were placed throughout the worksite setting. Common places were targeted, including by elevators, stairwells, bathrooms, entrance and exit doors from the campus building, and on the walls near the classrooms. The verbiage of the prompts was obtained from the Centers for Disease Control and Prevention's website to motivate the participants toward changes in exercise (CDC, 2008).

Recruitment. The sampling frame of the study included specific inclusion and exclusion criteria to enhance the homogeneity of the sample. The recruitment procedure began in the summer prior to September 2011 and consisted of email blasts to all staff and faculty in the School of Health Science in a private Northeastern college. Additionally, recruitment flyers (Appendix B) were hung throughout the college buildings. The flyers and email blasts summarized the study outlining the health promotion program, the requirements to participate, and the approved IRB number (Appendix C) for the research study. Also listed on the flyers and email blasts were the primary investigator's contact information if individuals would like more information or would like to enroll in the study.

Study population. The study population consisted of faculty and staff from a private college in the Northeastern United States. A convenience sampling plan was utilized in which all volunteers that met the stated inclusion criteria were eligible to participate. The inclusion criteria consisted of the following:

1) Full-time employees of the college between 18 and 67 years of age.

2) Those individuals with a self-reported chronic disease currently impacting upon role performance or health promotion were to be excluded from the health promotion program

All individual that agreed to participate in the study met the inclusion criteria. A non-probability convenience sampling method was used because all volunteers that met the inclusion criteria were enrolled in the study. All participants signed an informed consent form (Appendix D) and were assigned a research identification code number. Participants were then offered an appointment to participate the pre-test assessments.

Sample Size and Power Analysis

A sample size was determined for this study setting alpha at 0.05, power at 0.8, and an anticipated effect size of .25, with 2 predictors. A minimal sample size of 42 participants was determined via the PASS 2008 program. Thus a projected sample of 60 participants was attempted to account for attrition (PASS 2008). Every attempt was made to procure a large sample via the methods of advertising discussed above. A total of 31 participants were enrolled in the study although 2 dropped out of the study immediately after the pre-testing. The sample size that completed the 6-week health promotion program was N = 29. Only 15 participants completed all 3 time points of the study, and there were a significant number of participants who did not participate in the second post-test. Every effort was made to continue their participation in the 6-month follow-up after the worksite health promotion program had concluded. Thus, again the sample size of the cohort that completed the pre-test, worksite health promotion program, and the first post-test was N = 29; the cohort that completed all 3 time points of measurement were N = 15.

Data Collection Tools

All testing was performed in a private room in the workplace setting of the participant. Data was collected pre and post the worksite health promotion program. The instruments utilized to collect data relating to the aims of this study include the following: self-generated questionnaires specific to each phase of the study (pre-test, post-test 1, and post-test 2) (Appendix E, F, G), the SF-36v2 (Appendix H), and vital functioning measurements of height, weight, heart rate, and blood pressure. The questionnaires and SF-36v2 were completed by self-report with the assumption that each participant was honest and forthright with their responses. The primary investigator was present with each participant during all phases of data collection if further clarification was needed. Each of the data collection tools were coded with the participant ID to ensure confidentiality.

Needs Assessment. A needs assessment was conducted at the location of the study in the fall of 2010. A short electronic survey was emailed to 97 employees who met the inclusion criteria previously outlined. A 50% response rate of 49 individuals indicated there is a need for a health promotion program at the location. All departments were represented in the survey; the majority of respondents were female with a 3:1 ratio of women to men. The gender and age of the respondents appears to accurately reflect the staff and faculty of the School of Health Science. The results of the survey indicated a need for the program (Table 1). The results also indicated employee motivation toward participation, with 78% indicating a willingness to participate (Table 2). The preferred day and times indicated by respondents on the survey were considered when the program was scheduled in 2011.

Table 1

Health promotion programs based upon needs assessment

Type of Program	Response Percent	Response Count
Stress Management	61.5%	24
Nutrition	51.3%	20
Exercise	**66.7%**	**26**
Weight Loss	51.3%	20
Smoking Cessation	23.1%	9
Health Screenings	28.2%	11
None	7.7%	3

Table 2

Willingness of staff to participate in health promotion program based upon needs assessment

Willingness to participate	Response Percent	Response Count
Yes, all of the time	21.1%	8
Yes, some of the time	55.3%	21
Not sure	15.8%	6
No thanks	7.9%	3

Pre-test. The pre-testing phase of the study consisted of collecting information regarding each participant with regards to their current health promotion level, demographic information, health-related quality of life indicators, and vital functioning measurements. The pre-test questionnaire collected data such as their name, date of birth, marital status, current job title, and department within the college in which they worked. The demographic questionnaire was generated for the purpose of the study.

The information from the questionnaire also categorized each participant's current health promotion level. The participant was asked to select their health promotion level based upon statements that reflected the appropriate level according to the transtheoretical model (TTM). The lowest level, termed precontemplation, states: "I do not exercise or walk regularly now, and I do not intend to start in the near future". The highest health promotion level states: "I have been doing moderate or vigorous exercise more than 5 times a week or greater than 2.5 hours a week for more than 6 months". Descriptions of the 6 stages of change from the TTM were provided for the participant to choose which best represents their current health promotion level. The stages of change based on the TTM was assigned based upon the participant's dichotomous responses to a question on the demographic questionnaire. Each participant was placed into 1 of 6 categories of stages of change (precontemplation, contemplation, preparation for action 1, action 2, and maintenance). Prochaska (1997) outlines these stages of change as well as a method for gathering this data in a reliable and valid manner. The TTM as supported in the literature review for this proposal has demonstrated strong theoretical reliability and validity.

SF-36v2. Each participant completed the SF-36v2. The SF-36v2 is a standardized health survey consisting of 11 Likert scale questions. The participant was asked to complete the SF-

36v2 survey completely. For example, the first question asked the participant to rank their health as one of the following: excellent, very good, good, fair, or poor. Another question asked the participant to recall over the past 4 weeks how much their pain interfered with the normal work, which included both the workplace and at home. Likert scaled choices include: not at all, a little bit, moderately, quite a bit, and extremely. The health survey SF-36v2 assesses physical health and emotional health and social participation. One of the questions asked for participants to assess (over the previous 4 weeks) how much time physical or emotional health interfered with their social activities, such as visiting family and friends. Again, a ranking of choices is provided that includes: all of the time, most of the time, some of the time, a little of the time, or none of the time, which are listed for each individual to select the choice that best describes their answer. The survey questions were practical and written in layman's terms to assess eight quality of life of concepts, which are: limitations in physical activities secondary to health problems, limitations in social activities secondary to emotional or physical problems, limitations in standard role activities secondary to physical problems, bodily pain, general mental health functioning, limitations in standard role activities secondary to emotional problems, vitality, and general health perceptions. This standardized survey was selected because it addressed both the physical and emotional factors that are integral concepts when assessing quality of life. The scores within each of the eight domains of the SF-36v2 are the health-related quality of life factors for this research study. This survey has demonstrated rigorous criteria for internal consistency and validity (Garratt, 1993) and a reliability coefficient of greater than 0.75 for all dimensions except for social functioning (Brazier, 1992).

The SF-36v2 was received from Quality Metric Instruments. A grant from Quality Metric was received in which the health survey was administered free of charge. The Health and Well-

being survey (SF -36v2) along with the scoring software was provided by Quality Metric. The software was downloaded onto the primary investigator's computer and each participant was assigned their own file within the program.

The final component of the pre-testing phase consisted of vital functioning measurements of each participant's height, weight, blood pressure, and heart rate. These measurements were taken by a trained health professional. Height was assessed via a tape measure secured on the wall; weight from a calibrated scale; and an electronic sphygmomanometer was used to gather blood pressure and heart rate. The same measures and instruments were used for each participant at each time point. During the pre-testing phase, once all information was collected, each subject was provided with a Data Tracker USB Pedometer. An educational training session was conducted at that time in which each participant received a pedometer and was trained in its use. Verbal and written instructions were provided to each participant describing the requirements of their involvement in the study.

Pedometer. The pedometer provided was able to record steps taken by the participant. The pedometer was recommended to be placed either in a pocket, secured around the wrist, placed around the neck, or tied onto a belt loop. The pedometer was able to record activity time per day that was the amount of time the pedometer recorded steps counts each day. Other options were also available through the pedometer software program such as distance and caloric output if the individual chose to input specific bodily parameters. The pedometer had a USB output that was inserted into the participant's computer Participants were able to see their daily recordings, save the information, and set personal goals. Each participant was asked to send in the pedometer readings weekly during the 6-week worksite health promotion program. This

information was then converted to an Excel worksheet for each of the participants' daily steps and activity time for the 6-week worksite health promotion program.

Post-Test 1. Upon completion of the 6-week worksite health promotion program each participant completed the first post-test. Participants were emailed to set up an appointment for the post-test assessment. Convenient times were offered to ensure that all 29 subjects who completed the worksite health promotion program completed the first post-test. The SF-36v2 was administered again as well as the vital functioning measurements of weight, blood pressure, and heart rate. The post-test 1 questionnaire was administered asking each participant to disclose if there were any changes in marital status, department, or job title. Furthermore, the same criteria were used to assess the individual's health promotion level as in the pre-test questionnaire. Additional questions were included that asked the participant if they felt the use of the pedometer had increased their physical activity level. Similarly, they were asked if they felt their physical activity level increased secondary to the posted points of decision prompts messages throughout the institution or secondary to the email blasts regarding strategies to increase physical activity levels and the benefits of doing so. After completion of post-test 1, each participant was able to keep the pedometers for their continued personal use. They were no longer required to submit weekly pedometer reports as the worksite health promotion program was completed. All 29 participants completed the program; at this time point, there was 0% attrition rate.

Post-Test 2. Approximately 6 months after the worksite health promotion program concluded, email requests were sent to all 29 participants to complete the last set of post-tests. Only 15 of the initial 29 participants completed the 6-month follow-up; a 48% attrition rate. Post-test 2 consisted of the SF-36v2, vital functioning measurements, and a questionnaire

specifically designed for post-test 2. The post-test 2 questionnaire inquired if there were any changes in marital status, department, and job title. Likewise the questionnaire had the participants identify their current health promotion level as previously collected in the pre-test and post-test 1. Other questions also explored if the participants felt that they had increased their physical activity level, how often they used the pedometer over the past 6 months, as well as how often they anticipated using the pedometer in the future.

The worksite health promotion program lasted for 6 weeks. A social and supportive atmosphere was provided to improve compliance for program completion. The personnel responsible for data collection was the study's principal investigator, Tara Casimano MHS, OT/L.

Variable Description

The research design is reflected as Y_1 T Y2 Y3 in which the first variable (Y_1) is the pre-test assessments, Y_2 is the same post-test assessments, and T represents the intervention–the health promotion program. Y3 is the 6-month follow-up (the post-test 2 assessment). Data was collected at all three time points of the study. Table 3 identifies the concepts investigated within the research questions of the study and the instruments used to collect data as well as the statistical analysis conducted to answer the research questions of the study.

Table 3

Instrumentation to collect data based on variable description

Instrument	Concepts	Level of Measurement	Research Question	Variables	Statistical Analysis
Demographic Questionnaire	Age, weight, height, BMI, blood pressure, heart rate, Race, gender Job position	Scaled Dichotomous Categorical	What is the relationship of the worksite health promotion on health-related quality of life indicators?	Age, weight, height, BMI, blood pressure, heart rate	Descriptive analysis Correlation coefficients Paired sample t tests
			What is the effect of the use of pedometers on health-related quality of life indicators?	Pedometer output	Linear and Logistic regression
SF-36v2	Health-related quality of life (physical functioning, role limitations, bodily pain, social functioning, mental health, and general health perceptions).	Scaled, use of total scores from assessment.	What is the relationship of the worksite health promotion on health-related quality of life indicators?	SF-36v2 scores	Descriptive analysis Correlation coefficients Paired sample t tests
			What is the effect of the use of pedometers on health-related quality of life indicators?	SF-36v2 scores, Pedometer output	Linear and Logistic regression
TTM stages	2 levels ranging from lower health promotion levels (pre-contemplation, contemplation, preparation.) and higher health promotion levels (action 1, action 2, maintenance.	Categorical	What is the effect of participants' stage of change and health-related quality of life indicators?	TTM stage of change level/health promotion level	Descriptive analysis Correlation coefficients Paired sample t tests Linear and Logistic regression

Statistical Analysis

The specific statistical analyses are based upon the types of variables (independent and dependent variables) and their levels of measurement. Codebooks were formed for all 75 variables collected throughout the study and were maintained for each participant. The IBM SPSS Statistics Program v19 – v23 was used to formulate the database for all 75 variables, to manage the data collected, and perform the statistical analysis.

Descriptive statistics were gathered all on all the collected variables to describe the sample parameters. Inferential statistics were conducted to answer the posed research questions. Bivariate and multivariate analysis was conducted to assess the effectiveness of the health promotion program on the desired outcome measures. The paired sample t-test was used to determine if measures changed significantly from the initial baseline measure to the first time point after the health promotion program as well as from the initial time point to the final post-test, 6 months after the health promotion study. Pearson correlations were used to determine the relationship between variables within the study at the assigned time points of the study. Linear and logistic regressions were used to determine which correlated variables were significant predictors for the outcome measures.

Chapter Four: Data Analysis and Presentation of Results

Descriptive Analysis

Data was collected for 75 variables throughout the 8 month research study. The variables consisted on demographic information, vital functioning variables; participant's self-reported health promotion level/stage of change, SF-36v2component summary and its corresponding sub scores at pre-test, post-test 1 and post-test 2. Also collected were data on steps and activity time measured via the participant's pedometer for the 6 week health promotion program as well as participants ratings of the motivational emails blasts and posted educational material throughout the 6 week program.

There were 29 subjects that completed the Pre-Test and Post-Test 1. Only 15 participants of the 29 subjects that began the study completed the 6-month follow-up, Post-Test 2.

Demographic results. Percentages and frequency counts were conducted on all the variables collected from the pretest questionnaire.

Gender, Age and Ethnicity.

There were 26 female participants and 3 male participants ranging in age from 24 to 67 years of age (M =45 years, SD = 12 years. Twenty-five (25) of the participants were White and two (2) subjects were African American. Two subjects did not report their race.

Marital status.

Twenty-two (75.9 %) of the subjects were married or had a domestic partner. The seven (7, 24.1%) remaining subjects were either single or divorced. None of the participants identified

themselves as wither separated or widowed. The marital status classifications are identified in Figure 2.

Table 4:

Marital status pretest descriptive results

Marital Status	Frequency	Percent	Cumulative Percent
Married/domestic partner	22	75.9	75.9
Single/separated/divorced/ widowed	7	24.1	100.0
Total	29	100.0	

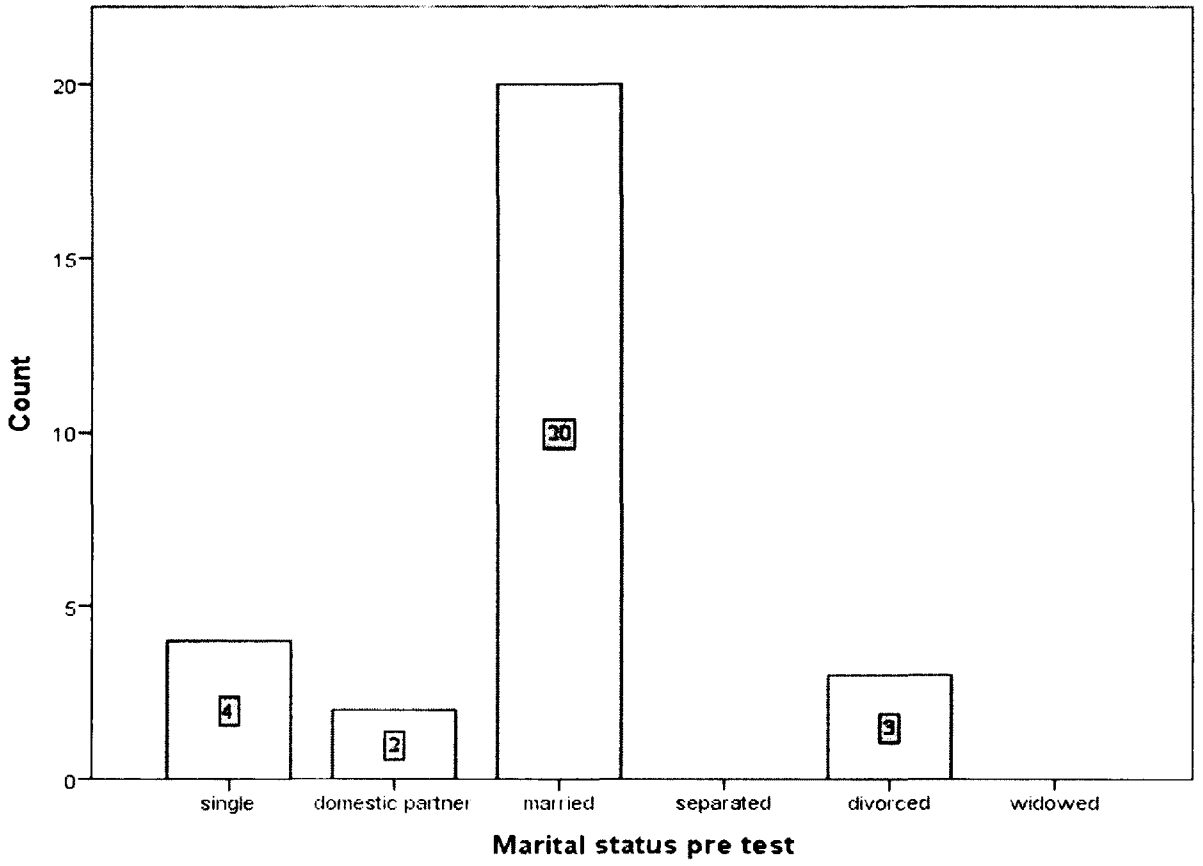

Figure 2. Marital Status of Participants. Approximately 75% of the sample were either married or with a domestic partner. None of the study subjects were separated or widowed.

Department and job title.

The various departments of the college in which the study took place were able to participate in the health promotion physical activity program. The participants were either from the college's administrative offices (21%), the professional programs that included the physical therapy department, the occupational therapy department, and the physician assistant program (52%) and finally the undergraduate program (27%). The sample was equally distributed between clinical instructors and academic faculty.

Vital functioning results. Vital functioning measurements included body mass index, systolic and diastolic blood pressure, and heart rate via the radial pulse. Body mass index is a calculation based upon height and weight to determine body fat percentage. The body mass index (BMI) for the study subjects ranged from 20-41, M =28.6, SD = 5.6. (Table 5)

Table 5

Body Mass index pre-test descriptive analysis

	N	Minimum	Maximum	M	SD
Body mass index pre test	29	20.00	41.00	28.6034	5.65430

Note: An average body mass index (BMI) for adults ranges between 18.5 and 25. The BMI calculation is based upon height, weight, and gender. The BMI standard range is 12-42.

Figure 3, below, depicts the distribution of the subjects by classifying the subject's BMI by the related health category. While 38% of the subjects were classified as healthy based on their BMI, 62% of the subjects were either overweight (28%) or were classified as moderately obese (17%), severely obese (14%), or very severely obese (3%).

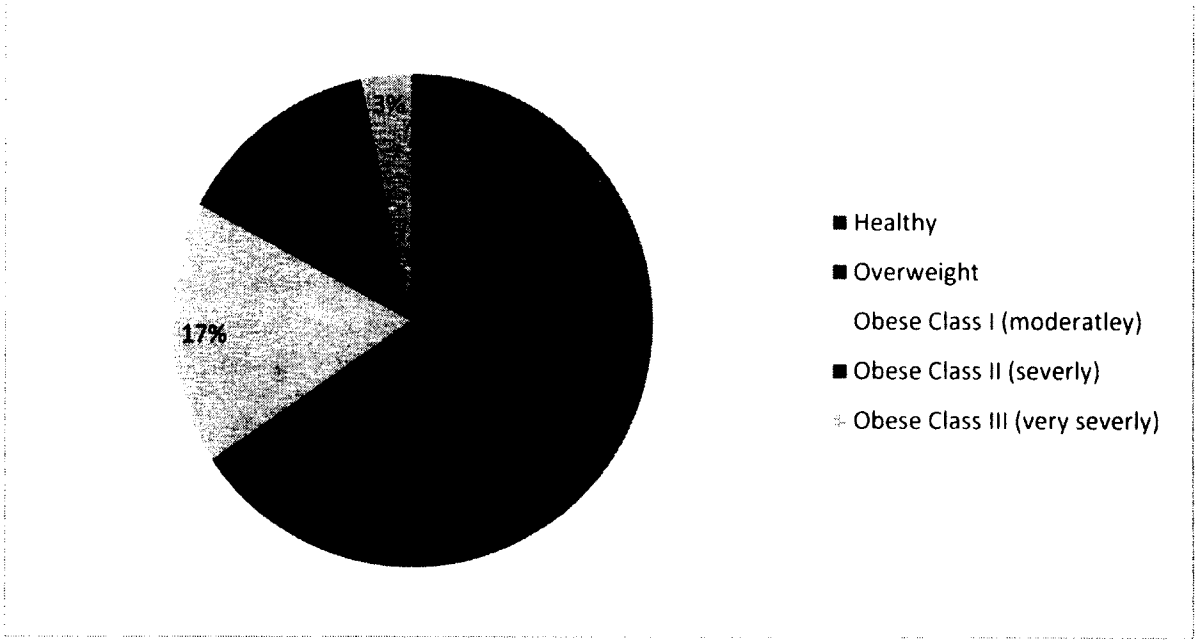

Figure 3. Pre-Test Body Mass Index pie chart showing the body mass index distribution of the sample at the pre-test. N= 29. Only a third of the sample recorded a BMI within the healthy range.

Other measures of vital functioning were collected and include blood pressure and heart rate. Pre-test measurements fell within normal limits for the following measurements of vital functioning: heart rate (M = 70, SD = 8.7), diastolic blood pressure (M = 80, SD = 9.3), and systolic blood pressure (M = 122, SD = 17.7).

Health promotion level results. Health promotion level was assessed by participant report via the questionnaire. The TTM suggests 6 levels of health promotion: precontemplation, contemplation, preparation, action phase 1, action phase 2, and maintenance. The precontemplation, contemplation, and preparation health promotion levels were merged into a lower health promotion level group while action phase 1 and 2 and maintenance levels were merged to a higher health promotion level group. This re-categorization was conducted secondary to the small amounts of participants in each of the 6 groups. Regrouping of the health

promotion levels was performed from 6 levels to 2. The lower health promotion levels consisted of those individuals who reported themselves as not currently engaged in physical activity as part of their daily routine and those individuals who reported themselves in the higher health promotion levels currently engaged in physical activity on a consistent basis. Self-reported health promotion levels were recorded at Pre-Test, Post-Test 1, and Post-Test 2. As noted in Figure 4 more individuals reported a higher health promotion level at the Post-Test2 time point.

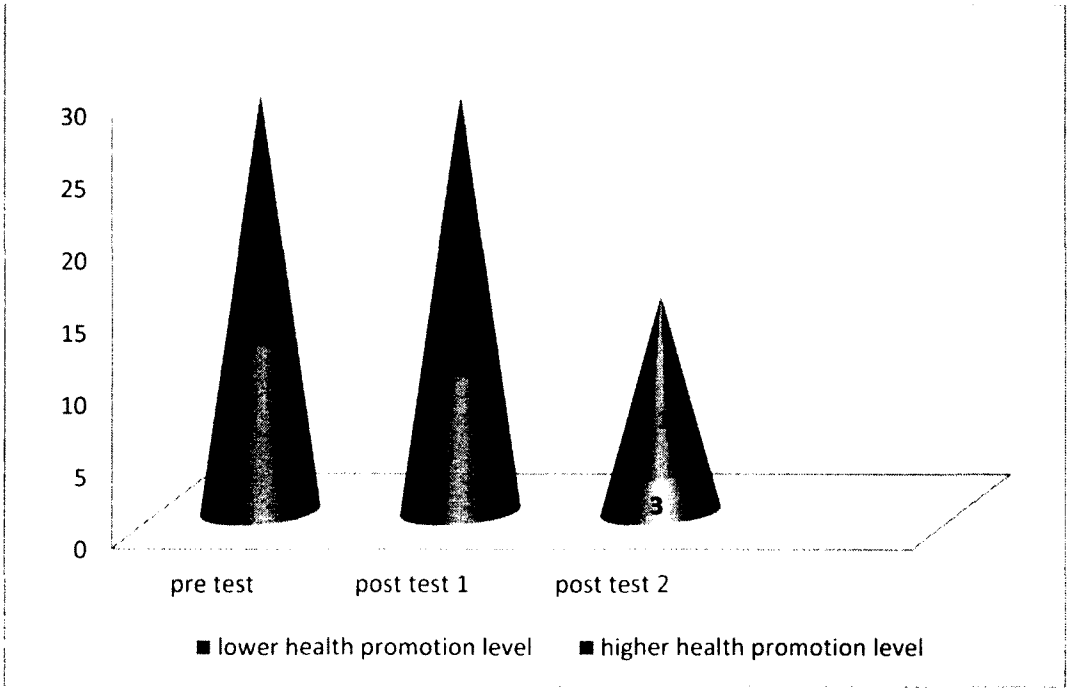

Figure 4. Health Promotion Levels at all three time points. Participant-reported health promotion levels at all 3 time points. Lower health promotion levels included the precontemplation stage, contemplation stage, and the preparation stage. The higher health promotion levels included the active stages and the maintenance stage. N = 29 for Pre-Test and Post-Test 1; N = 15 for post-test 2.

Pedometer Step and Activity Time results. Each participant sent weekly pedometer data consisting of steps and activity time per day and steps and activity time per week for the entire 6 weeks of the program. There was no significant difference in the weeks of the program

in relation to steps/week or activity time. The average steps for the cohort of participants varied as evident by the large standard deviation noted in Table 6.

Table 6:

Participant steps and activity time during health promotion program

PA program	Steps per Week	Activity time/minutes
Week 1	M = 41,691.93	M = 283.06
	SD = 16,522.93	SD = 125.48
Week 2	M = 43,754.10	M = 300
	SD = 19,991.62	SD = 128.55
Week 3	M = 39,396.24	M = 266.68
	SD = 19,349.24	SD = 128.55
Week 4	M = 34,483.44	M = 252.48
	SD = 13,829.59	SD = 96.33
Week 5	M = 40,103.03	M = 270.20
	SD = 13,829.59	SD = 116.60
Week 6	M = 38,981.44	M = 257.00
	SD = 17,068.00	SD = 118.08

Note: Participant steps and activity time per 6 week health promotion intervention program as recorded by their pedometer software program. The suggested steps per day to maintain a healthy lifestyle is 10,000 steps per day for at least 5 days per week (50,000/week). The suggested activity level is at least 30 minutes of moderate activity at least 5 days per week (150 minutes/week). N =29.

Participant pedometer usage and PODP toward increasing physical activity level.

The post– test 1 and post–test 2 questionnaires asked Likert scaled questions regarding the participant's opinions if the pedometer, points of decision prompts, and emailed educational information increased their physical activity. These questions addressed the social and environmental components of the health promotion program.

Post-Test 1.

Upon completion of the 6 week health promotion program using pedometers the subjects completed Post-Test 1. Ninety-three percent (93%) of the participants reported that they either somewhat agreed (n =18) or strongly agreed (n = 9) that the use of the pedometers increased their individual physical activity level. Only 2 participants (6.9%) stated that they "somewhat disagreed that the pedometer use increased their physical activity level". In regards to the Point of Decision Prompts (PODP), nearly 90% of the participants responded that the posted motivational messages throughout the workplace also increased their physical activity level. Fourteen (14) individuals responded that they "somewhat agreed that the PODP increased their physical activity level" while 12 participants strongly agreed with that statement in the Post-Test 1. Only three of the participants disagreed that the PODP increased their physical activity level. Similarly, 86% of the participants agreed that the emailed motivational and education messages somewhat (n = 11) or strongly (n =14) increased their physical activity level. Only three of the participants disagreed that the emailed messages had increased their physical activity level. Overall, the majority of the participants agreed that all of the components of the health promotion program increased their physical activity level: Pedometers (93%), PODP (90%), and emailed messages (86%).

Post-Test 2.

The Post-Test 2 questionnaire explored pedometer usage 6 months after the intervention was completed. Only 15 participants completed the post-test 2 assessment. Although numerous attempts were made to persuade participants to return for the 6-month follow-up assessment, only 52% of the sample completed post-test 2. With regard to participant use of the pedometer over the 6 months following the physical activity intervention, the responses ranged from "not at all" to "daily usage." Nearly half of the 15 participants stated they did not use the pedometer after the intervention program; this corresponds to the 40% who also reported that they did not feel that the pedometer had increased their physical activity level. This was a marked increase as 6.9% of the participants (N = 29) had stated at Post-Test 1 that the pedometer had not increased their physical activity levels.

When questioned about the future use of the pedometer after study completion, 26.7% of the participants stated they planned to use the pedometer a few times a week and 20% stated they planned to use it daily. Again, nearly half of the participants reported they did not have any specific planned use for the pedometer in their physical activity routine, Figure 5. Possibly those participants did not feel that the pedometer was required any longer as a motivational tool to increase and or maintain their current physical activity level.

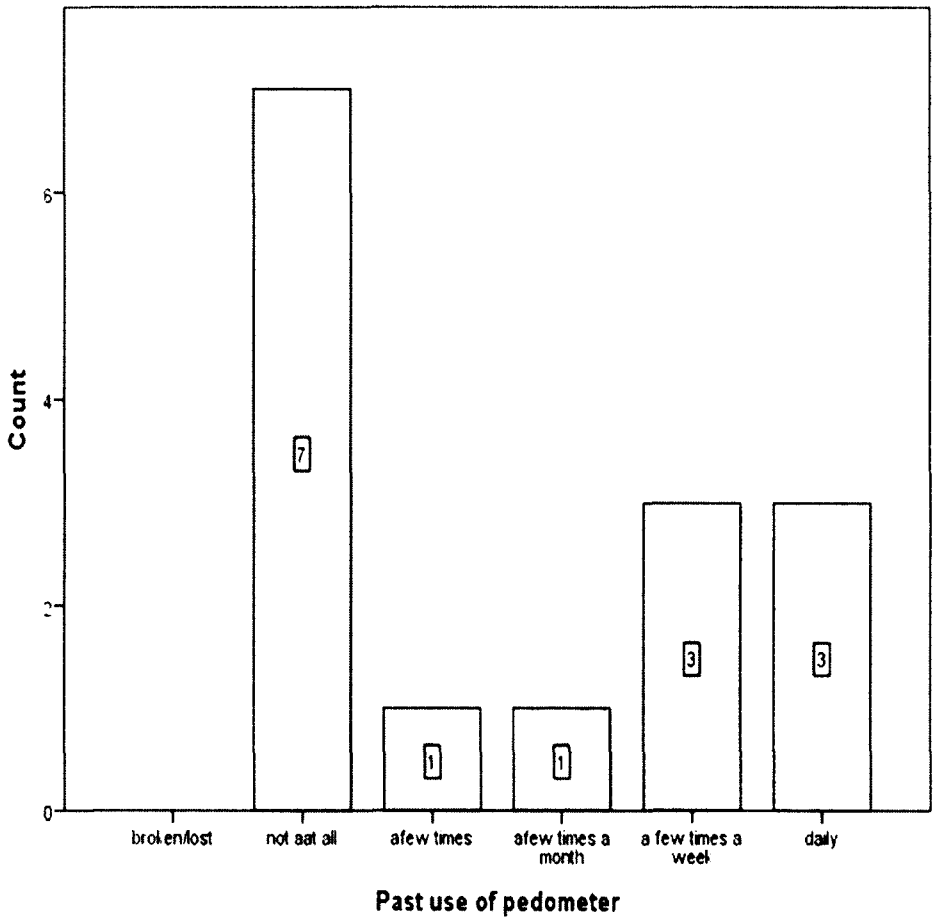

Figure 5. Participant pedometer usage at post-test 2. Participants at post-test 2 reported use of the provided pedometer usage over the 6 month period after the completion of the health promotion program; only 3 participants reported using the pedometer on a daily basis. N = 15.

Bivariate Analysis

Marital status (pre-test) and health promotion level pre-test.

Marital Status Pre-Test was independent of the subject's Pre-Test Health Promotion Level, χ^2 (1, N = 29) = 1.514, p = .219.

Marital status (pre-test) and body mass index (BMI) pre-test.

There was no significant difference between the subject's BMI pre-test and marital status, t (27) = -.475, p = .639; Levene's = .187.

Systolic blood pressure and diastolic blood pressure by age pre-test.

There was a significant correlation between the subject's age and systolic blood pressure r(28) = .413, p = .026. There was no significant relationship between the subject's BMI pre-test, age, diastolic blood pressure or heart rate at the baseline pretest time point. Correlation of vital functioning and age is displayed in Table 7.

Table 7.

Correlation results of age and vital functioning at baseline.

		Age	Body mass index pre test	Systolic bp pre test	Diastolic bp pre test	Heart rate radial pre test
Age	Pearson Correlation	1	.314	.413*	.193	.049
	Sig. (2-tailed)		.097	.026	.316	.800
	N	29	29	29	29	29
Body mass index pre test	Pearson Correlation	.314	1	.363	.254	.125
	Sig. (2-tailed)	.097		.053	.184	.518
	N	29	29	29	29	29
Systolic bp pre test	Pearson Correlation	.413*	.363	1	.797**	.005
	Sig. (2-tailed)	.026	.053		.000	.979
	N	29	29	29	29	29
Diastolic bp pre test	Pearson Correlation	.193	.254	.797**	1	.214
	Sig. (2-tailed)	.316	.184	.000		.264
	N	29	29	29	29	29

Body mass index (pre –test) and vitality (post – test 1).

There was a significant correlation between the subject's body mass index at baseline and vitality post-test 1 scores $r(28) = .484$, $p = .008$.

Mental health component summary scores (pre-test) and vitality (post-test 1).

There was a significant correlation between the subject's mental health component summary scores at baseline and vitality post-test 1 scores $r(28) = .453$, $p = .014$.

Body mass index and vitality at post – test 1.

There was a significant correlation between the subject's body mass index and vitality post- test 1 scores $r(28) = .497$, $p = .006$.

Mental health component summary and vitality at post-test 1.

There was a significant correlation between the subject's mental health component summary scores and vitality post-test 1 scores $r(28) = .679$, $p < .01$.

General health and vitality at post-test 1.

There was a significant correlation between the subject's general health scores and vitality post-test 1 scores $r(28) = .665$, $p < .01$.

Mental health and vitality at post –test 1.

There was a significant correlation between the subject's mental health scores and vitality post-test 1 scores $r(28) = .567$, $p = .001$

Paired t-test results from pre-test to post-test 1. The paired t- test was used to determine if study measures changed significantly from the initial baseline measure to the first time point after the worksite health promotion program. The following study measures differed significantly from baseline (pre-test) to the first post-test: mental health component summary, physical functioning, vitality, and mental health scores from the SF-36v2. There were 29 participants who took part in the worksite health promotion study from Pre-Test to Post-Test 1.

Mental Health Component Summary. The participants had an average difference from Pre-Test to Post-Test 1, with mental health component summary scores of 2.63 (SD = 5.36), indicating that the worksite health promotion program resulted in a highly significant increase in mental health component summary scores t (28) = 2.63, p = .013, d = 0.365.

Physical functioning. The participants had an average difference from pre-test to post-test physical functioning scores of 5.19 (SD = 10.73), indicating that the worksite health promotion program resulted in a highly significant increase in physical functioning scores t (28) = 2.603, p = .015, d = 0.68.

Vitality. The participants had an average difference from pre-test to post-test vitality scores of 6.57 (SD = 15.81), indicating that the worksite health promotion program resulted in a highly significant increase in vitality t (28) = 2.23, p = .033, d = 1.012.

Mental health. The participants had an average difference from pre-test to post-test mental health scores of 6.42 (SD = 11.23), indicating that the worksite health promotion program resulted in a highly significant increase in mean health scores t (28) = 3.078, p = .005, d = 0.129.

Paired t-test results from post-test 1 to post-test 2. There were 15 participants who completed the post-test 2 which was administered 6 months following the completion of the worksite health promotion program. There was no intervention during this time the post-test 2 measures were collected to determine the lasting effects of the worksite health promotion program to possible lifestyle changes. There were two measures that differed significantly from post-test 1 to post-test 2.

Body Mass index. The participants had an average difference from post-test 1 to post-test 2 in body mass index of .633 (SD= 1.10), indicating that the participants increase in body mass following the worksite health promotion program t (14) = 2.21, p =.044.

Vitality. The second measure, vitality, differed significantly from post-test 1 to post-test 2 with an average increase of 13.40 (SD = 13.19), indicating that the vitality measure continued to increase after the conclusion of the worksite health promotion program t (14) = 3.93, p =.001.

Multivariate analysis

A linear regression was conducted based upon the significant correlations between vitality and body mass index and the mental health component summary scores at the post-test1 time point. Only two variables were entered into the linear regression model secondary to the small sample size, N = 29. The linear regression analysis revealed mental health component summary scores was a highly significant predictor of vitality (β = 1.075, p = .001), accounting for 50.5% of the variance in vitality. Results of the ANOVA demonstrate the model presented in the regression was a strong fit for the data. The ANOVA indicated that less than .01% chance that the null hypothesis was true. A linear regression to determine predictors for outcome measures based on post- test 2 was not considered valid secondary to attribution of subjects, N = 15 at post –test 2 time point.

Table 8

Linear Regression of BMI and Mental health component summary on vitality.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-7.487	14.574		-.514	.612
	Body mass index post test1	.620	.407	.236	1.525	.139
	Mental component summary post- test 1	1.075	.292	.571	3.684	.001

Note: Dependent Variable: Vitality post - test 1

Chapter 5: Discussion and Implications of the Research

Discussion

The worksite health promotion program yielded significant results. The health promotion program improved the participants' quality of life indicators as measured by the SF-36v2. Significant improvements from pre-test to post-test 1 were found in regards to mental health subscales and overall mental health component summary scores. Although vital functioning did not significantly improve after the health promotion program, it is apparent that the participants' mental health did improve. Participants overall felt happy and more satisfied with their abilities. The mental health subscales looks at the participants' levels of nervousness, sadness, happiness, depression, and anxiety. Significant findings suggest that based upon the intervention, the participants' feelings about themselves were positive and healthy. Additionally, the mental health component summary score significantly improved as a result of the worksite health promotion program. This area increased and indicates that participants' improved in their positive feelings as well as their feelings relating to their roles. Participants demonstrated significant improvement in their feelings of accomplishment and efficiency as related to the meaning of the roles in their lives.

Physical changes were also improved as a result of the health promotion intervention. The subscale physical function also showed noteworthy improvements. Physical functioning related to basic daily living activities as well as vigorous activities was increased. Participants found their daily activities physically easier to perform and complete; participants were able to walk further and climb more flights of stairs with greater ease. Overall physical improvements were reported as a result of the worksite health promotion program. The participants were able

to complete basic physical skills with less discomfort and greater ease secondary to the health promotion intervention program. Although physical vital functioning did not yield significant results, physical functioning from pre-test to post-test 1 did support significant results.

And lastly, according to the SF-36v2 from pre-test to post-test 1, the measure of vitality among the participants greatly improved. Vitality is considered a subscale within the mental health component summary and is related to how an individual feels in regards to his or her energy level. Vitality relates to how full of life one feels or how fatigue interferes with daily functioning and role performance. The vitality scale was the only measure on the SF-36v2 that increased at all 3 time points of the study. Vitality is an integral component contributing to an improved outlook on life, motivation to engage in activities, and the incentive to attempt new activities. Improvements in vitality can lead to changes in observable behaviors—both physical and mental functioning. Although significant changes in vitality are reported there were no significant changes in regards to health promotion level from pre – test to post-test1. It may be inferred that overtime with the positive changes reported may lead to changes as well in health promotion levels. It is notable to mention that improvements in vitality may eventually lead to lifelong habitual changes in physical activity.

As mentioned previously health has many indices that may include not only the absence of disease but also improvements in mental health, which may lead to overall improvements in quality of life relating to health and wellness. Vitality is unique to each individual, as well as unique to how it affects one's lifestyle. Significant improvements in this scale indicate that the health promotion program was able to tap into each participant's individualized constructs of vitality and that via this program's social, physical, and environmental components, vitality significantly improved.

The effects of the worksite health promotion program—including the pedometers—resulted in significant improvements in the mental health scale, physical functioning scale, and measures of vitality. These areas are components of health-related quality of life that were significantly increased as a result of the worksite health promotion program. These factors support and answer the first and second research question of the study. With regard to the third research question: *What is the association of the participants' stage of change and health-related quality of life indicators?* There were no significant results indicating stages of change of health promotion levels to lead to changes in health related quality of life indicators. There was no significant change in health promotion levels from pre-test to post – test 1. The post-test 2 sample was small and groups were unequal in regards to health promotion levels. More individuals with the higher health promotion level completed the post- test 2 at the 6 month follow up. Those individuals reported to not use the pedometer as tool to maintain their current physical activity level.

Assumptions, Limitations, Delimitations, and Significance

Assumptions. A needs assessment was conducted to determine the demand for a physical activity health promotion program at the facility. The staff's needs and motivation for such a program was evaluated via a survey. The results of the needs assessment as discussed supported the introduction of a health promotion program. Another assumption of the study was that the participants who volunteered and met the inclusion criteria were a representative sample of the population from the study environment. This assumption is supported based upon the demographics reported. Although only a small percentage of males participated in the study, there only is a small percentage of male faculty and clinical staff within the School of Health Sciences. Furthermore, the participants were informed of the procedures to protect their identity.

Anonymity and confidential measures were strictly preserved in all stages of data collection and management by coding procedures. As well, each participant was fully aware that they were free to withdraw at any time in the study with no ramifications. Since the SF-36v2 was intended to assess each participant's quality of life in regards to physical and mental functioning, it is assumed that the participants who volunteered for the study would want an accurate report on such factors and thus answer the questions truthfully. Thus it is supported that the participant's answers to both the demographic questionnaire and SF-36v2 are honest and reliable. The pedometer data that was collected was directly downloaded from the participant's pedometer, and thus is assumed to be valid and reliable. Numerous assumptions have been presented with justifications regarding how they were managed.

As discussed, the assumptions were well justified via maintaining the anonymity and confidentiality of all the participants. The use of standardized testing and the pedometer computer software were also significant components to ensure that the results of this study are reliable and accurate from the sample.

Limitations. There were a few limitations to this study. The main limitation was the sample size. Although creative recruitment strategies and incentives were conducted, only 29 individuals volunteered to participate in the study. Additionally only 15 out of the 29 participants completed the 6-month post-test 2 component of the study. Another limitation was that there was no control or comparison group: thus, to account for this limitation, each participant acted as their own control over numerous data points as a 3 point time series was conducted within the research design. And finally, another limitation was that the study was only conducted at one site. This was based upon administrative support to conduct the study, IRB criteria, and the need to follow-up where the needs assessment was conducted.

The major limitation of this study was the differential loss of subjects, in which those participants who found exercise to be most difficult stopped participating in the study. Another factor that may have lead to attrition is participant change in employment status. This limitation was anticipated and attempted to be minimized via the health promotion intervention program. The health promotion program motivated participants to exercise as best they could. Additionally, PODP and weekly emailed messages were incorporated to foster positive social peer influences and minimize the mortality threat. There was no attrition rate from the pre-test to post-test1, although there was a large attrition rate to the follow-up post-test 2 time point.

Another inherent threat to this study is the threat of regression to the means because the sample is not randomized. This limitation was strongly considered and if there had been more than 100 participants, a control group would have been incorporated into the research design. Although the study used standardized instruments with strong validity and reliability, it did rely on self-reported information that also presents as an inherent threat of instrumentation. These threats were disclosed and were controlled through strict adherence to the intervention protocol.

Delimitations. The delimitations of the study were geared to narrow the scope of the study in order to improve the generalizability of the findings. The philosophical framework of the research study guided the scope and provided boundaries that were implemented to assess if health promotion levels improved as a result of the use of pedometers and the health promotion program. The TTM was applied to select health promotion levels and operationally define those levels as applicable to the participants. Health promotion levels were assessed at each of the 3 time points within the study. One of the specific aims was to assess if health promotion levels increased secondary to pedometer use. Thus, one could argue that using the theoretical perspective provided by the TTM was a delimitation of the study. Another delimitation was the study design, a longitudinal Pre-Test Post-Test Design with 3 time points to reliably measure if the health promotion intervention program was effective in improving health-related quality of life indicators, vital functioning measures, and health promotion levels of the cohort. A standardized evaluation with good validity and reliability was administered to measure health-related quality of life. In addition, the pedometer used also came with computer software that provided an accurate count for pedometer steps and activity time. The research study took place in the worksite of the participants. This environment was selected based upon the results of the needs assessment conducted prior to the health promotion intervention program. The administration was supportive of the objectives of the physical activity program and encouraged faculty and staff to participate.

The sample of the study only included full-time faculty and staff from a private Northeastern college. Students were excluded from this study as the purpose of the study is to explore a worksite health promotion program and not students within an educational setting. Part-time faculty and staff are also excluded as their participation with program activities may

have been compromised based upon their time on campus. The age range selected is from 18 to 67 years and is deemed appropriate for the study purpose; individuals older than the maximum age have different governmental recommended guidelines for health promotion and thus were excluded from the study. Also, those participants with self-reported ailments affecting their health promotion participation were excluded. The setting of the intervention was the worksite environment for the participants as this was a key element of the study. The instrumentation selected was based upon the current literature as a general survey to assess health-related quality of life; a basic demographic questionnaire generated for the study was also implemented to gain participant information. Any further assessments were not needed to answer the research questions and would be only time consuming and meaningless for the investigator and participants.

Significance. The study has several interrelated conceptions in which significance is supported. First, the study advanced knowledge in the field of health promotion in a worksite setting by incorporating a 6-month follow-up to determine if gains made in health-related quality of life are maintained for participants. Second, the results contributed to a great societal need to improve an individual's amount and degree of health promotion to improve health and wellness. This study strongly correlates with the Healthy People 2010 objectives. And lastly, the intervention protocol implemented incorporated several concepts of visual stimulus to increase health promotion, social and peer influences, as well as the health promotion program that is a novel approach to a worksite program. The findings of this study meet those needs within this field of study and provide valuable and meaningful support of the benefits of health promotion in this setting by exploring both the physical and mental health measures.

The limitations and delimitations were carefully considered in the intervention protocol and methodology of the study. Careful consideration was given to the sampling frame and the setting of this study to minimize any internal and external threats toward validity. The methodology was directed by the previously reviewed literature that in turn formulated the hypothesis and research questions for this study. All the elements for a defensible research study were identified and addressed in a comprehensive and succinct manner prior to embarking on this project.

Conclusion

Health and wellness support role performance. The roles of most adults consist of worker, friend, and family member. Fulfillment of roles and meaningful activities supports balance and quality of life. Having the physical and mental capability to perform roles in a variety of contexts leads to engagement and satisfaction. Sustenance of a healthy lifestyle via physical activity is also an integral component of wellness. Utilizing technology and support within the social, virtual, and physical environments have all been shown by this study to improve health related quality of life indicators. Improvements were noted to statistically support the use of pedometers, points of decision prompts, and email correspondence to increase physical activity levels as well as stages of health promotion. Physical and mental components also improved via the research variables introduced during the health promotion program. This research study supports the necessity for a multi-dimensional and multi-contextual approach towards improving physical activity and eventual overall health and wellness.

Additional Findings. A trend toward increasing physical activity levels was noticed by informal participant comments in the worksite to the primary investigator after the study concluded. Examples of these spontaneous unsolicited comments included the following: "thank

you for getting me started" , " this was fun", " and I downloaded an app on my phone that counts my steps now". The feelings of satisfaction and pleasure that emerged from the study participants supports the significant findings of improvements in mental health functioning leading to habit formation towards a healthier lifestyle.

Clinical Applications. The Occupational Therapy profession focuses on restoring and maintaining functional independence for disabled and well populations. Promoting health-related quality of life indicators and wellness to all populations is a central objective of the profession. According to the Centennial Vision of the American Occupational Therapy Association, wellness is identified as a key societal need Corcoran (2007). Both physical and mental well-being directly influences an individual's state of wellness, and specifically with regard to this study, health promotion behaviors related to physical activity. Some of the emerging areas of practice for Occupational Therapists are obesity prevention, providing education to communities regarding wellness strategies, and enabling employers to provide their staff with a balance of work, leisure, and family involvement. The role of the Occupational Therapy practitioner is dedicated to facilitating an individual's maximal performance and function in order to live their life to the fullest.

Future Research Directions

The benefits of health not only include the absence of disease but most importantly the ability to achieve the highest quality within one's life. To be healthy embraces the essence of engagement and meaningful activities in one's life. Physical activity improves both one's physical and mental capabilities, it enables one to perform essential roles in their daily lives, and to contribute to one's community. Future directions for research regarding how physical activity can improve quality of life health-related factors, vital functioning, and a healthier lifestyle

should be broadened to include a variety of worksites. Change in worksite programs must be based upon the current needs of the employees thus knowledge of the job requirements and barriers to activity should be assessed. Similarly, different work environments may have different socioeconomic factors, age ranges, and thus the health promotion program needs to be appropriate to facilitate improvement in overall health and wellness.

The research study conducted herein only addressed physical activity in a health promotion program via the use of pedometers, points of decision prompts, and educational messages. Incorporating other components into an intervention program may yield beneficial results. Such factors include nutrition, smoking cessation, vaccinations and immunizations, and making healthy lifestyle choices. Including such components in a health promotion program may yield favorable results; again, it should be based upon the potential participant's needs and interests. If the health promotion intervention program should include such components, thoughtful consideration for valid and reliable measurements would also be required. The pedometer used for this study, although convenient, was an additional item that could be forgotten while the participant was active, could be lost, misplaced, and require batteries. These were concerns that may affect the accuracy of future studies. Therefore, having mobile applications such as on one's phone or utilizing a bracelet that records activity level and step count may be viewed as more attractive or convenient for future participants. Future studies also should attempt to recruit a larger sample size and possibly to randomize the participants into cohorts to measure the effects of the intervention being tested.

This research study outlined the necessary components of a worksite health promotion program to improve health promotion levels, vital functioning, and health related quality of life indicators. For the future success of worksite programs, an overall wellness view should be

considered. Future programs should also incorporate nutritional components, smoking cessation, and a balance of rest, leisure and work. Opportunities to be physically active within the work day should be encouraged from administration with possible incentives and rewards. The Centers for Disease Control (2012) encourages employers to provide environmental supports for their employees for physical activity as well as to provide both individual and group programs. These programs can include walking, stretching, and group exercise programs. This worksite health promotion initiative did improve participants health and wellness.

One's health is an essential component to perform life roles. These roles for most adults are as a worker, friend, and family member. A healthy lifestyle should be initiated from within each individual and supported at the workplace and within their community. Physical activity is only one piece of the healthy lifestyle puzzle. As identified in this research study, health is a very important foundation to life, and ways to improve it should continue to be explored and initiated in the workplace.

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Appendix A

Points of Decision Prompts

Change happens one step at a time.

The victory is not always to the swift, but to those who keep moving.

Physical activity will add years to your life, and life to your years.

The first wealth is health. (Ralph Waldo Emerson)

In one minute, a 150 pound person burns approximately 10 calories walking up stairs and only 1.5 calories riding an elevator.

Walking up stairs burns almost 5 times more calories than riding an elevator.

There are 1440 minutes in every day...schedule 30 of them for physical activity.

Raise your fitness level, one step at a time.

Step up to a healthier lifestyle.

One step farther each day. You can do it!

Burn calories. Stress less. Get healthy.

No waiting by the nearest stairwell.

Add years to your life and life to your years.

Small steps make a big difference.

Appendix B

Recruitment Flyer

Volunteers Needed

FOR A RESEARCH STUDY RIGHT

HERE AT WORK !!!!

Participate in a health promotion program right here at work.

All full time faculty and staff eager to improve their health and wellness call Tara Casimano at the number noted below for more information.

It's free, fun, and good for you.

Effectiveness of a worksite health promotion program to improve health-related quality of life indicators.

IRB #

Tara Casimano MHS, OT/L extension 6247

Appendix C

Touro College IRB Approval

Touro College Health Sciences Institutional Review Board

1700 Union Boulevard • Bay Shore, New York, 11706 • 631-665-1600 x 6219 • email: touroirb@gmail.com Joseph Indelicato, Ph.D. Chair, Robin Zeller, Ph.D. Assit. Chair Evadne Hodge, MPS, Secretary.

Date Submitted to IRB: 9-27-2011 Approved October 7, 2011	Campus Brooklyn Manhattan X Bay Shore Other
Principal Investigator: Tara Casimano, MHS, OT/L	Research Advisor: Tara Casimano, MHS, OT/L
Proposal Title Effectiveness of pedometers to improve health-related indicators for faculty and staff in an academic setting	

Number of Subjects			Age Range	
Total	Male	Female	From	To
50	15	35	18	65

Investigator Information

	Name	Department
Principal Investigator	Tara Casimano, MHS, OT/L	OT
Co-Investigator	Marianne DePace, OTS	OT
Co-Investigator	William Law, OTS	OT
Co-Investigator	Chevie Liss, OTS	OT
Co-Investigator	Goldie Markowitz, OTS	OT
Co-Investigator		

Chair, The Health Science Institutional Review Board of Touro College

Re: Project IRB Approval (IRB 1152)
I am pleased to inform you that Touro College's School of Health Science IRB has decided that your project is acceptable. Please feel free to start your study at any time. Reapplication is not required in a year if the study is still being conducted. Please send the committee a copy of

any article, paper, or presentation that may result from this study. You can begin your project at any time.

Best wishes and good luck.

Joseph Goldstein, M.Phil., M.S.

Appendix D

Informed Consent Form

CONSENT TO PARTICIPATE IN RESEARCH

Title: Effectiveness of a worksite health promotion program to improve health-related quality of life indicators.

You are asked to participate in a research study conducted by Tara Casimano MHS, OT/L a doctoral candidate from the Health Science Department at Touro University International. The results of this study will contribute to the fulfillment of a doctoral dissertation. You were selected as a possible participant in this study since you are either a full time faculty or staff at Touro College and you did not report of any chronic disease currently impacting upon your role performance or health promotion level. Eligible participants must be between 18-65 years of age.

PURPOSE OF THE STUDY

This study aims to assess the effectiveness of the worksite health promotion program on health-related quality of life indicators in an academic setting and to compare the participant's stage of change within in the transtheoretical model and change in health-related quality of life indicators in an academic setting.

PROCEDURES

If you volunteer to participate in this study you will be asked to complete the entire project which will run from September 2011 to May 2012. There are three phases of participation which are outlined for you :

1. Pre-test Assessment: You will complete 2 short questionnaires; the first one will ask for demographic information such as age, ethnicity, job title, marital status, and frequency of current health promotion. The second questionnaire asks for information regarding your current health status and health promotion. You will also have your height, weight, blood pressure, and heart rate taken by a trained and licensed health professional.
2. Health promotion Program: You will need to participate in the walking program 3 times per week for duration of 30 minutes each time and the educational peer support meeting 1 time per week for duration of 30 minutes. The health promotion program will begin in October 2011 and run for 6 weeks. You may be selected to wear a pedometer all waking hours during the of the 6 week program. During this time you will be asked to record your daily step count in the record log provided.

After the program(May 2012) the pedometer will be yours to keep. The walking program and educational sessions will be held during lunch time and has been approved by administration.

3. Post-Test Assessment: You will need to again complete the same 2 questionnaires as you did during the pre-test assessment phase along with height, weight, blood pressure, and heart rate measurements. The post-test assessments will be administered immediately

following the health promotion program in November 2011 and 6 months following the program completion in May 2012.

The entire study will be conducted in the work environment where you are currently employed.

POTENTIAL RISKS AND DISCOMFORTS

There are minimal foreseeable risks for participation in this study. The assessments, measurements, and health promotion program will be administered by trained health professionals. Each participant should participate at their own comfort level.

The health promotion program will be held during the lunchtime hour 4/5 working days which may pose as an inconvenience.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Walking programs such as this study have been proven to improve the overall health and fitness of both men and women as well as reduce the risk of cardiopulmonary disease and obesity. The United States government has instilled a new health agenda in Healthy People 2020 in which communities and work environments are urged to encourage people to be more active. All participants will be given the Radio Shack pedometer no. 63-618 for their personal use after the study is complete in May 2012 as both an incentive to complete the study as well as a motivational tool to improve their health and wellness.

PAYMENT FOR PARTICIPATION

There is no payment for participation in this research study.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. Participation or non-participation will not affect your employment status or any other personal consideration or right you usually expect. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Tara Casimano MHS, OT/L extension 6247.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Institutional Review Board for the Protection of Human Subjects at Touro University

International, 5665 Plaza Drive, Third Floor, Cypress, California 90630; Telephone: (714) 226-9840 extension 2004 or email to fgomez@tuiu.edu.

SIGNATURE OF RESEARCH SUBJECT (AND) OR LEGAL REPRESENTATIVE

I understand the procedures and conditions of my participation described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Name of Subject

_____

Name of Legal Representative (if applicable)

_____ _____

Signature of Subject or Legal Representative Date

STATEMENT and SIGNATURE OF INVESTIGATOR

In my judgment the subject is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent to participate in this research study.

_____ _____

Signature of Investigator Date

Appendix E

Pre-Test Demographic Questionnaire

All questions contained in this questionnaire are strictly confidential and will become part of your record.

Name ☐ M ☐ F DOB: **AGE:**

(Last,First)

Marital status: ☐ Single ☐ Partnered ☐ Married ☐ Separated ☐ Divorced ☐ Widowed

Current job title: Department:

1. What is your racial background?

   ☐ Caucasian

   ☐ Mongoloid

   ☐ Negroid

2. What is your health promotion level based on the following choices:

   ☐ I do not exercise or walk regularly now, and I do not intend to start in the near future.

   ☐ I do not exercise or walk regularly, but I have been thinking of starting in the next 6 months.

- ☐ I am getting ready to start to an exercise or walking program in the next 30 days, or I exercise or walk infrequently now.
- ☐ I am doing moderate exercise less than 5 times a week or vigorous exercise less than 3 times a week.
- ☐ I have been doing moderate exercise more than 5 times a week or more than 2.5 hours a week for the past 1 to 6 months.
- ☐ I have been doing moderate or vigorous exercise more than 5 times a week or greater than 2.5 hours a week for more than 6 months.

This part will be completed by a health professional. Thank you.

1. Height (inches)
2. Weight (pounds)
3. Body Mass Index
4. Blood pressure
5. Heart rate (radial wrist)

Other:

Completed by:

Date:

Appendix F

Post-Test 1 Demographic Questionnaire

All questions contained in this questionnaire are strictly confidential

and will become part of your record.

Please complete table below if there have been any changes.

Marital

status: ☐ Single ☐ Domestic Partner ☐ Married ☐ Separated ☐ Divorced ☐ Widowed

Current job title: Department:

Please complete the following questions

1. What is your health promotion level based on the following choices:

☐ I do not exercise or walk regularly now, and I do not intend to start in the near future.

☐ I do not exercise or walk regularly, but I have been thinking of starting in the next 6 months.

☐ I am getting ready to start to an exercise or walking program in the next 30 days, or I exercise or walk infrequently now.

☐ I am doing moderate exercise less than 5 times a week or vigorous exercise less than 3 times a week.

☐ I have been doing moderate exercise more than 5 times a week or more than 2.5 hours a week for the past 1 to 6 months.

☐ I have been doing moderate or vigorous exercise more than 5 times a week or greater than 2.5 hours a week for more than 6 months.

2. Do you feel the use of the provided pedometer increased your physical activity level?

☐ Strongly disagree

☐ Somewhat disagree

☐ Somewhat agree

☐ Strongly agree

3. Do you feel the posted educational messages motivated you to increase your physical activity level?

☐ Strongly disagree

☐ Somewhat disagree

☐ Somewhat agree

☐ Strongly agree

4. Do you feel the emailed educational messages motivated you to increase your physical activity level?

☐ Strongly disagree

☐ Somewhat disagree

☐ Somewhat agree

☐ Strongly agree

This part will be completed by a health professional. Thank you.

6. Weight (pounds)
7. Body Mass Index
8. Blood pressure
9. Heart rate (radial wrist)

Other:

Completed by:

Date:

Appendix G

Post-Test 2 Demographic Questionnaire

All questions contained in this questionnaire are strictly confidential

and will become part of your record.

Please complete table below if there have been any changes.

Marital

status: ☐ Single ☐ Domestic Partner ☐ Married ☐ Separated ☐ Divorced ☐ Widowed

Current job title: Department:

Please complete the following questions

1. What is your health promotion level based on the following choices:
   - ☐ I do not exercise or walk regularly now, and I do not intend to start in the near future.
   - ☐ I do not exercise or walk regularly, but I have been thinking of starting in the next 6 months.
   - ☐ I am getting ready to start to an exercise or walking program in the next 30 days, or I exercise or walk infrequently now.
   - ☐ I am doing moderate exercise less than 5 times a week or vigorous exercise less than 3 times a week.
   - ☐ I have been doing moderate exercise more than 5 times a week or more than 2.5 hours a week for the past 1 to 6 months.
   - ☐ I have been doing moderate or vigorous exercise more than 5 times a week or greater than 2.5 hours a week for more than 6 months.

2. Do you feel the use of the provided pedometer increased your physical activity level?

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Somewhat agree
- ☐ Strongly agree

3. In the past 6 months how often did you use the provided pedometer?

- ☐ Not at all
- ☐ Only a few times
- ☐ A few times a month
- ☐ A few times a week
- ☐ Daily

4. In the future, how often do you anticipate using the pedometer?

- ☐ Not at all
- ☐ Only a few times
- ☐ A few times a month
- ☐ A few times a week
- ☐ Daily

This part will be completed by a health professional. Thank you.

1. Weight(pounds)
2. Body Mass Index
3. Blood pressure
4. Heart rate(radial wrist)

Other:

Completed by:

Date:

Appendix H

Health and Well-Being Survey (SF-36v2)

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. ***Thank you for completing this survey!***

For each of the following questions, please mark an ☒ in the one box that best describes your answer.

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. <u>Compared to one year ago</u>, how would you rate your health in general <u>now</u>?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

3. The following questions are about activities you might do during a typical day. Does <u>your health now limit you</u> in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	☐ 1	☐ 2	☐ 3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐ 1	☐ 2	☐ 3
c. Lifting or carrying groceries	☐ 1	☐ 2	☐ 3
d. Climbing several flights of stairs	☐ 1	☐ 2	☐ 3
e. Climbing one flight of stairs	☐ 1	☐ 2	☐ 3
f. Bending, kneeling, or stooping	☐ 1	☐ 2	☐ 3
g. Walking more than a mile	☐ 1	☐ 2	☐ 3
h. Walking several hundred yards	☐ 1	☐ 2	☐ 3
i. Walking one hundred yards	☐ 1	☐ 2	☐ 3
j. Bathing or dressing yourself	☐ 1	☐ 2	☐ 3

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Cut down on the amount of time you spent on work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Accomplished less than you would like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Were limited in the kind of work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d Had difficulty performing the work or other activities (for example, it took extra effort)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Cut down on the amount of time you spent on work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Accomplished less than you would like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Did work or other activities less carefully than usual	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

6. **During the <u>past 4 weeks</u>, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?**

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

7. **How much <u>bodily</u> pain have you had during the <u>past 4 weeks</u>?**

None	Very mild	Mild	Moderate	Severe	Very severe
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

8. **During the <u>past 4 weeks</u>, how much did <u>pain</u> interfere with your normal work (including both work outside the home and housework)?**

Not at all	A little bit	Moderately	Quite a bit	Extremely
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Did you feel full of life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. Have you been very nervous?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. Have you felt so down in the dumps that nothing could cheer you up?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. Have you felt calm and peaceful?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e. Did you have a lot of energy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f. Have you felt downhearted and depressed?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g. Did you feel worn out?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h. Have you been happy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i. Did you feel tired?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11. How TRUE or FALSE is <u>each</u> of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a. I seem to get sick a little easier than other people	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. I am as healthy as anybody I know	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. I expect my health to get worse	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. My health is excellent	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Thank you for completing these questions!

Appendix I

Touro College IRB Request

TOURO COLLEGE
SCHOOL OF HEALTH SCIENCES

DATE: September 27, 2011
TO: Members of the Institutional Review Board for the Protection of Human Subjects

SUBJECT: APPROVAL OF RESEARCH PROPOSAL INVOLVING HUMAN SUBJECTS
PRINCIPAL INVESTIGATOR: Tara Casimano MHS, OT/L

PROJECT TITLE: Effectiveness of pedometers to improve health-related indicators for faculty and staff in an academic setting

The subject application is attached for your review. Please indicate your action thereon by signing in one of the spaces below.

1. CERTIFICATION
I hereby certify that in my judgment the proposal complies with Touro College policy on the Protection of Human Subjects.

Committee Member Date

2. CLARIFICATION
Further information or clarification is requested as follows:

Committee Member Date

3. DISAPPROVAL
In my judgment, the proposal does **NOT** meet the appropriate standards because:

Committee Member Date

The attached material is submitted for review and approval to the Touro College Institutional Review Board for the Protection of Human Subjects.

Tara Casimano — 9-27-11

Signature of Principal Investigator — Date

Signature of Advisor — Date

Appendix J

Institutional Review Board for the Protection of Human Subjects (IRB)

School of Health Sciences
Touro College

REQUEST FOR IRB REVIEW

This form must be submitted with proof of completion of the National Institute of Health course on working with human subjects. The course is free and takes about two hours. It can be found at
http://phrp.nihtraining.com/users/login.php

Protocol and Study Information	
Date Submitted to IRB: 9-27-2011	Campus ☐ Brooklyn ☐ Manhattan X Bay Shore Other
Principal Investigator: Tara Casimano, MHS, OT/L	Research Advisor: Tara Casimano, MHS, OT/L
Proposal Title Effectiveness of pedometers to improve health-related indicators for faculty and staff in an academic setting	

Number of Subjects			Age Range	
Total	Male	Female	From	To
50	15	35	18	65

Investigator Information		
	Name	Department
Principal Investigator	Tara Casimano, MHS, OT/L	OT
Co-Investigator	Marianne DePace, OTS	OT
Co-Investigator	William Law, OTS	OT
Co-Investigator	Chevie Liss, OTS	OT
Co-Investigator	Goldie Markowitz, OTS	OT
Co-Investigator		

IRB applications should be sent to the IRB committee via email, to the current chair of the committee, Dr. Joe Indelicato – josephi@touro.edu.

If email is impractical, the forms should be sent in triplicate by snail mail or in-house interoffice mail to the IRB office, located at Touro College, School of Health Sciences, 1700 Union Blvd., Bay Shore, NY 11701.

For questions and additional information, please call 631- 665-1600 ext. 6219.

Part A:

Application Status

The final determination of application status will be made by the IRB committee.

Full Review
(Project involves invasive procedures or other medical or therapeutic interventions)

XX Expedite Review
(Project does not involve invasive procedures or other medical or therapeutic interventions. Generally include interviews, review of existing data such as chart reviews or data collected in previous studies, or passive observations)

Full or Expedite Reviews require annual recertification.

Exempt
(Project fits the Federal criteria outline in the IRB instructions, or surveys)
Exempt status can only be determined by the IRB committee. Exempt studies do not require annual recertification, unless changes are made to the research methods.

Concise Statement of Research with Details of Human Subjects Use Aspect

Describe within the space below, **in layman's terms**, what is to be done so that a realistic estimate of the risks to the subjects and the benefits of the project can be assessed. If, in addition to this concise statement, an extensive description of the project has been drafted, please attach.

The inclusion of females and members of minority groups and their sub-populations must be addressed in the development of the research design appropriate to the scientific objectives of the study. The research plan should describe the composition of the study population in terms of gender and racial/ethnic group. Provide a rationale for each selection of such subjects. Your proposal should contain a description of the outreach programs for recruiting females and minorities as participants.

Approximately 35 females and 15 males are expected to participate in this study. Of the expected participants, approximately 10 are expected to be of minority status. Selection of participants is based on those who choose to volunteer for the program. All recruitment will be conducted through emails to staff and faculty and flyers posted around Touro College.

If you volunteer to participate in this study you will be asked to complete the entire project which will run from September 2011 to May 2012. There are three phases of participation which are outlined for you:

1. Pre-test Assessment: You will complete 2 short questionnaires; the first one will ask for demographic information such as age, ethnicity, job title, marital status, and frequency of current health promotion. The second questionnaire is the SF-36v2 which asks for information regarding your current health status and health promotion. You will also have your height, weight, blood pressure, and heart rate taken by a trained and licensed health professional.
2. Intervention Program: Pedometers will be provided to all participants. You are asked to wear the pedometer for the 6 week intervention stage during all waking hours. The program will begin in October 2011 and run until December 2011. During this time you will be asked to record the data from the pedometer on a weekly basis via the software provided. After the program (May 2012) the pedometer will be yours to keep.
3. Post Test Assessment: You will need to again complete the same 2 questionnaires as you did during the pre-test assessment phase along with height, weight, blood pressure, and heart rate measurements. The post-test assessments will be administered immediately following the health promotion program in November 2011 and 6 months following the program completion in May 2012.

   The entire study will be conducted in the work environment where you are currently employed.

Part B:

Answer the following questions:

1. Are human subjects involved in the proposed study? X Yes No
   If yes:

   a. Are the human subjects healthy volunteers? X Yes No

   b. Are the subjects under medical or therapeutic treatment? X Yes No

   c. What is the age range of the subjects? From: 18 To: 65

   d. How many subjects will be studied at this site? 50
   (approximate estimate if definite number is not known)

   e. Of the subjects studied, how many will be females? 35

   f. Of the subjects studied, how many will be from minority groups? 10

g. Are the subjects capable of understanding the nature of the study — X Yes No

h. What is the population source of the subjects to be studied?
A convenience sample of employee volunteers from Touro College School of Health Science at Bay Shore

i. Are the subjects inpatients? Yes X No

j. Are you the subjects attending physician and/or therapist? Yes X No

k. How long will each subject be in the study? 8 month's

If more than a year, study will have to be recertified in one year.

l. At what intervals will each subject be seen? Subjects will be seen for pre-test assessment, post-test assessment after 6 weeks of using the pedometer, and 6-month post –test assessment.(October 2011, December 2011 and May 2012).

2. Will any of the following classes of subjects be involved in the proposed study?

Minors (if yes assent form may be required)	Yes X No
Incompetents	Yes X No
Compromised Mental Status	Yes X No
Females	XYes No
Pregnant Women	Yes X No
Fetuses	Yes X No
Fetal Tissue	Yes X No
Minorities	X Yes No
Prisoners	Yes X No

3. Are human tissues, biological fluids or products (feces, mucus, etc.) involved in the study? Yes X No

If yes,

a. What tissues, fluids or products are involved?

b. Are the tissues, fluids or products being collected solely for the purpose of the study? Yes No

c. Are extra quantities (more than needed for routine tests) of the above being collected? Yes No

d. Are the above to be removed from a cadaver? Yes No

e. Are the above to be removed during a surgical Yes No procedure?

f. Are the above to be obtained during routine non-operative procedures? Yes No

4. Does the study involve a drug? *If yes: Yes X No

a. Is this a marketed drug? Yes No

If yes, is the study being initiated by a physician or a drug company?

b. Is this an investigational drug or is the study intended to support an application for marketing permit? Yes No

c. In what phase of the study is the drug?

d. What is the dose range of the drug to be used?

e. Have there been untoward reactions to the drug? Yes No

What tissues or organ systems were involved in these reactions?

---

*If study involves an investigational drug/agent, the sponsor's investigator drug brochure must accompany this form.

f. Will a placebo be used in this study? Yes No

g. Is this a double blind study? Yes No

h. Will the subject be denied other drugs customarily employed for this disease? Yes No

i. I am familiar with the "Formulary and Regulations Governing Drugs" at the Division at which the study is being conducted. Yes No

5. Does the study involve a device? Yes X No

a. Is the device FDA approved? Yes No

b. If yes, please provide documentation.

c. If no, is this a significant risk device? Yes No

d. If yes, please provide IDE # _____ _____.

or

Has the 30-day waiting period expired? Yes No

or

Has the FDA waived requirement for an IDE? Yes No

If either Numbers 4 or 5 have been answered yes, then the investigator must attach a specific list of parameters to be monitored and the frequency of monitoring. This may be a copy of a list supplied by the sponsor.

The Investigator must also report any untoward reaction to the IRB or its Officers after its occurrence within two working days.

6. Does the study involve a diagnostic or therapeutic procedure? If yes: X Yes No

   a. Is the procedure entirely new, new to this institution, or routine? X Yes No

   b. Have there been untoward reactions to this procedure? Yes X No

      What tissues or organ systems were involved in these reactions? _____

   c. Will placebo procedures be used in the study? Yes X No

   d. Will routine procedures customarily employed for this disease be denied the subject? Yes X No

All applicants must answer the following questions:

7. Will the subjects personally benefit from the study? X Yes No

   a. May the study contribute directly to the subject's health or welfare? X Yes No

   b. May the study provide health benefits for mankind? X Yes No

c. Are the subjects paid for entering the study? Yes X No

What is the amount and source of the funds? $_____ Source _____

d. Are other inducements going to be made to recruit subjects? Yes X No

If yes. explain:

8. Are all parties in the project protected? X Yes No

a. Are consent forms to be used? X Yes No
b. Does the investigator have the needed insurance coverage? X Yes No

c. Is Touro College covered by its Insurance under the conditions of the project? X Yes No

d. Have provisions been made for the subject's care in case of an untoward reaction? XYes No

****

****IMPORTANT****

Protocols will be delayed if the following items are not submitted along with this form:

Attachments:
1. Consent Form
2. IND Form – If applicable
3. Indemnification Letter – If Drug Company sponsored protocol
4. Contractual Agreement – If Protocol is sponsored by an external source

9. **FINANCIAL COMPENSATION FOR SERVICES**

a. Are the services and/or tests associated with this study billable to the patient or third party payers? Yes X No

If no. please describe below how these costs will be recovered.

Costs will be recovered by the Occupational Therapy department scholarship funds and out of pocket expenses by primary investigator.

Part C:
All applicants must answer the following eight questions.

Please address the following questions regarding your project. Answer as briefly as possible, but in detail. Refer to the IRB Instructions for further detail.
Remember that some reviewers are not specialists in your field. Word your answer so that an educated layperson will be able to understand your study. Use a separate page(s) for each question.

1. Who will the subjects be and how will they be selected. Include copies of all recruitment material such as flyers. All recruitment material must include the College's name, the purpose of the study, and contact information for the IRB office.

Subjects will be volunteers of staff and faculty employed at Touro College School of Health Sciences located at the Bay Shore Campus. Recruitment will be done through emails and flyers. Touro College School of Health Sciences will provide the pool. Access to the pool will be done via postings of flyers and emails. Interested individuals may contact the principal investigator by visiting her office or calling her work extension number. Criteria for selection include all individuals between the ages of 18-65. Criteria for exclusion include those with any severe medical disorders, those that do not fit within the above age range, and those that are not employed in Touro College School of Health Sciences at Bay Shore Campus. Potential participants will need to fill out a consent form before entering the study, ensuring that they fit the inclusion criteria. The sample will include 50 participants; 35 females and 15 males.

2. Where will the research be performed? Who will be your approved supervisor?

Research will be performed at Touro College Bay Shore campus under the supervision of primary investigator Tara Casimano, MHS, OT/L. Subjects will provide their own transportation to and from their home to Touro College. The study will take place Monday through Thursday during standard working hours in an unoccupied classroom.

3. What precisely will be done with the subjects? Describe in reasonable detail. If a questionnaire will be used, please enclose a copy.

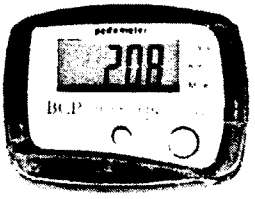
PROCEDURES
If you volunteer to participate in this study you will be asked to complete the entire project which will run from September 2011 to May 2012. There are three phases of participation which are outlined for you :

5. Pre-test Assessment: You will complete 2 short questionnaires: the first one will ask for demographic information such as age, ethnicity, job title, marital status, and frequency of

current health promotion. The second questionnaire asks for information regarding your current health status and health promotion. You will also have your height, weight, blood pressure, and heart rate taken by a trained and licensed health professional.

6. Intervention Program: Pedometers will be provided to all participants. You are asked to wear the pedometer for the 6 week intervention stage during all waking hours. The program will begin in October 2011 and run until December 2011. During this time you will be asked to record the data from the pedometer on a weekly basis via the software provided. After the program (May 2012) the pedometer will be yours to keep.
7. Post Test Assessment: You will need to again complete the same 2 questionnaires as you did during the pre-test assessment phase along with height, weight, blood pressure, and heart rate measurements. The post-test assessments will be administered immediately following the health promotion program in November 2011 and 6 months following the program completion in May 2012.

The entire study will be conducted in the work environment where you are currently employed.



Pedometer

4. How will subject anonymity and confidentiality be guaranteed?

All questionnaire and assessment results will be stored in a locked cabinet in the primary investigator's office. Only the principal investigator will hold the key to this cabinet, however the co-investigators will have access to this data for study purposes only. Questionnaires and assessments will be performed in a private area to ensure confidentiality. Any information entered into a computer will omit the names of the participants and will be used for statistical purposes and to draw conclusions of the study only.

All written information and study materials will be kept for at least three years after completing the study in May 2012. After this time, the materials will be discarded using a shredder.

5. Will the project require subjects to be uninformed, misled or misinformed in any way (e.g. sham treatment, placebo effects).

No, the subjects will not be uniformed, misled or misinformed in any way. Full disclosure will be given to subjects at time of completing the consent form.

6. In your judgment, will the project involve discomfort, stress or risk to the subject?

There are minimal foreseeable risks for participation in this study. The assessments, measurements, and health promotion program will be administered by trained health professionals. Each participant should participate at their own comfort level.

7. If a written consent form will be obtained from the subjects, please attach a copy. If your project is a survey, please attach the cover letter and questionnaire. Generally, surveys will not require a separate consent form.

All consent forms are required to include the name and address of the **Institutional Review Board, Touro College School of Health Science, 1700 Union Blvd., Bay Shore, NY 11706. tel. 631 665 1600 ext. 6219.**

See Attached

8. What benefits may there be to the subject(s) and/or society? If there are risks involved do the benefits outweigh the risks? Please explain.

Walking programs such as this study have been proven to improve the overall health and fitness of both men and women as well as reduce the risk of cardiopulmonary disease and obesity. The United States government has instilled a new health agenda in Healthy People 2020 in which communities and work environments are urged to encourage people to be more active. All participants will be given the Data Tracker USB pedometer from pedometers usa.com for their personal use and after the study is complete in May 2012 as both an incentive to complete the study as well as a motivational tool to improve their health and wellness.

Appendix K

Letter of request for approval to use SF-36 questionnaire

Submitted 9/11/10

ORDER SPEC FORM –

Our surveys have been used in ongoing outcomes, pre- and post-surgical outcomes, as well as research studies. Please fill out this form to receive a detailed quote specific to your needs.

Name (Who will appear as "Licensee"): Tara Casimano

Are you a CRO/Commercial Organization? ☐ Yes

X No

Address to appear on your license agreement:
82 McCord Avenue Merrick< New York 11566

Name/Address of person to receive prepay invoice (if different from "Licensee" listed)

Full Study Title: Title: Effectiveness of a worksite health promotion program to improve health-related quality of life indicators.

CT # from subject line of email: OP # (if available):

If this is a renewal, what is your existing license #: NO

II. Project funding:

A. Do you have or are you applying for grant funding?

- If so what organization(s): no
- Please provide your grant's ID#: (If you have your award letter, please share via email to: pbartley@qualitymetric.com or direct fax to: 401-642-9341.

o Is this a competitive grant?:
("competitive grant" means there was a submission process followed by an award announcement.)

B. Do you plan to use our survey(s) to obtain data for unfunded thesis or dissertation research?
YES

C. Do you plan to use our survey(s) to obtain data for unfunded university research based at a university and not related to a thesis or dissertation? no

D. Do you plan to use our survey(s) to obtain data for research based at a hospital or university hospital and funded/supported through the hospital? no

E. Who will own/have access to your data? Tara Casimano

F. Who will be invoiced for charges incurred? Tara Casimano

If none of the above, if you could please explain how you plan to use our surveys and where the funding will be coming from (internal, grant, commercial sponsor, etc.).

III. Type of form needed:

Which survey(s) are you interested in (e.g. SF-8, SF-12, SF-36)? SF-36

X☐ Self Report Form ☐ Interviewer Form†

a. What language(s) do you need each survey in? ENGLISH

Survey Languages Chart

b. What recall do you need (i.e. In the past 1 week have you felt tired?)?

X☐ Standard (4 weeks)
☐ Acute (1 week)
☐ 24 hour (Available for the SF-8 only)

†Please note that there are special scoring considerations that you need to be aware of when you are using the interview script for the SF-36v1 or v2 only. This information will be conveyed to you when your order is released.

IV. How will you administer the survey?

PAPER ADMINSTRATION

☐ **Scoring Software for Paper/Pencil:** Paper administration scored using our desktop Scoring Software.

X **Smart Measurement System – Fax:** Allows you to take completed paper/pencil surveys and fax them to a 1-866 number. You can then log into our amihealthy.com website to review each survey and access reports and scores.

WEB BASED APPLICATION

☐ **Scoring Web Service**: Integrated solution that allows QualityMetric's partners to administer surveys via partner applications and pass individual survey responses over the Internet (via a web service) to QualityMetric for scoring and reporting. Utilizes SOAP Protocol. *Development staff needed.*
or
☐ **Scoring API**: Integrated solution that allows QualityMetric's partners to administer surveys via partner applications and pass responses to an application program interface (API) installed locally on the same system. *Development staff needed with Microsoft .net expertise. Reports are* ***not*** *available with this option.*
or
☐ **Smart Measurement System**: An all-in-one portal hosted by QualityMetric for administration and scoring of QM's survey tools. as well as reporting and interpretation of the survey results. *A good option if using only QM surveys.*

V. Expected administrations/credits

a. How many study participants will you have? 60

b. How many times will each participant receive the survey? 3

VI. Time frame of data collection period

Note: QM only licenses in yearly increments so if you have a 1.5 year study we will license you for 2 years

☐1 X☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

What date do you plan to begin your data collection: September 2011

Thank you for providing this information. Please expect a customized quote within two business days.

NON-COMMERCIAL LICENSE AGREEMENT

Office of Grants and Scholarly Research (OGSR)

License Number: QM009844

Effective Date: September 12, 2011

Licensee Name: **Tara Casimano**

Licensee Address: 82 McCord Avenue Merrick, NY 11566

Approved Purpose: Non-commercial academic research – Unfunded Student

Effectiveness of pedometers to improve health related indicators for faculty and staff in an academic setting
Study Name:
Study Type:

Therapeutic Area: Wellness & Lifestyle

Royalty Fee: None, because this License is granted in support of the non-commercial Approved Use below

Other Definitions: As indicated on Appendix B "License Agreement – Details", including without limitation: Licensed Surveys, Modes, Fees, Administrations, Services, Approved Languages and (if applicable) License Term

Licensee accepts and agrees to the terms of this Non-Commercial License Agreement (the "Agreement") from the Office of Scholarly Grants and Research (OGSR) of QualityMetric Incorporated ("QM") as of the Effective Date.

Subject to the terms of this Agreement, including the QualityMetric Non-Commercial License Terms and Conditions attached as Appendix A: (a) QM grants to Licensee, and Licensee accepts, a non-exclusive, non-transferable, non-assignable, non-sublicensable worldwide license to use, solely for the Approved Use and during the License Term, the Licensed Surveys in the authorized Modes and Approved Languages indicated on Appendix B and to administer the Licensed Surveys only up to the Approved Administrations (and to make up to such number of exact reproductions of the Licensed Surveys necessary to support such administrations) in any combination of the specific Licensed Surveys and Approved Languages and Modes and to use any related software provided by QM and (b) Licensee agrees to pay the Fee and other applicable charges in accordance with the attached invoice.

Capitalized terms used in this Agreement and not otherwise defined herein shall have the meanings assigned to them in Appendix A. The appendices attached hereto are incorporated into and made a part of this Agreement for all purposes.

EXECUTED, as of the Effective Date, by the duly authorized representatives as set forth below.

QualityMetric Incorporated	**Tara Casimano**
[QM]	[Licensee]
Signature:	Signature: Tara Casimano
Name: Martha Bayliss	Name: Tara Casimano
Title: VP Operations	Title: Primary Investigator.
Date: 13 September 2011	Date: 9.12.11

Appendix L

Variable Codebook

VARIABLE NAME	VARIABLE LABEL as per spss	Participant Data
1) **Participant code number**	CODE/Participants 1-50, continuous	
2) **Gender**	GENDER/Male 1, Female2, nominal	
3) **Age**	AGE/Age 18-65, continuous	
4) **Marital status Pre-test**	MS0/Nominal single 1, domestic partner 2, married 3, separated 4, divorced 5, widowed 6	
5) **Job title**	JOBT/ Nominal l adminstrative1, clinical staff 2, faculty 3	
6) **Department Pre-test**	DEPT0/Nominal l/ Deans office1, OT 2, PT 3, PA 4, Undergrad 5, Student Services6,	
7) **Race**	RACE/Nominal white 1, American Indian 2, Asian 3, black 4, native Hawaiian 5, and Puerto Rican 6.	
8) **Health promotion level Pre-test**	HPL0/Nominal/Precontemplation1, contemplation2, preparation3, actionpart1 =4, action part2 =5, maintenance6	
9) **Body mass index Pre Test**	BMI0/Continuous	
10) **Systolic BP Pre-test**	SYS0/Continuous	
11) **Diastolic BP Pre-test**	DIA0/Continuous	
12) **Heart rate – radial pulse Pre-test**	HRT0/Continuous	
13) **Physical health component summary Pre-test**	PCS0/Continuous	

14) Mental health component summary Pre-test	MCS0/ Continuous
15) Physical functioning Pre-test	PF0/Continuous
16) Role Performance Pre-test	RP0/continuous
17) Bodily Pain Pre-test	BP0/continuous
18) General health Pre-test	GH0/continuous
19) Vitality Pre-test	VT0/continuous
20) Social functioning Pre-test	SF0/continuous
21) Role expectation Pre-test	RE0/continuous
22) Mental health Pre-test	MH0/ continuous
23) Pedometer steps week 1	PS1/continuous
24) Pedometer steps week 2	PS2/continuous
25) Pedometer steps week 3	PS3/continuous
26) Pedometer steps week 4	PS4/continuous
27) Pedometer steps week 5	PS5/continuous
28) Pedometer steps week 6	PS6/continuous
29) Pedometer activity time week 1	PA1/continuous
30) Pedometer activity time week 2	PA2/continuous

31) Pedometer activity time week 3	PA3/continuous
32) Pedometer activity time week 4	PA4/continuous
33) Pedometer activity time week 5	PA5/continuous
34) Pedometer activity time week 6	PA6/continuous
35) Marital status Post-test 1	MS1/Nominal single 1, domestic partner 2, married 3, separated 4, divorced 5, widowed 6
36) Department Post-test 1	DEPT1/Nominal l/ Deans office1, OT 2, PT 3, PA 4, Undergrad 5, Student Services6,
37) Health promotion level Post-test 1	HPL1/Nominal/ Precontemplation1, contemplation2, preparation3, actionpart1 =4, action part2 =5, maintenance6
38) Body mass index Post-test 1	BMI1/Continuous
39) Pedometer increase in PA level 1	PePAL1/ Interval : Strongly disagree 1, somewhat disagree 2, somewhat agree 3, strongly agree 4
40) Posted messages increase in PA level	PaPAL/ Interval : Strongly disagree 1, somewhat disagree 2, somewhat agree 3, strongly agree 4
41) Emailed messages increase in PA level	EmPAL/ Interval : Strongly disagree 1, somewhat disagree 2, somewhat agree 3, strongly agree 4
42) Systolic BP Post Test1	SYS1/Continuous
43) Diastolic BP Post-test 1	DIA1/Continuous

44) Heart rate – radial pulse Post-test 1	HRT1/Continuous
45) Physical health component summary Post-test 1	PCS1/Continuous
46) Mental health component summary Post-test 1	MCS1/ Continuous
47) Physical functioning Post-test 1	PF1/Continuous
48) Role Performance Post-test 1	RP1/continuous
49) Bodily Pain Post-test 1	BP1/continuous
50) General health Post/pre-test 1	GH1/continuous
51) Vitality Post-test 1	VT1/continuous
52) Social functioning Post-test 1	SF1/continuous
53) Role expectation Post-test 1	RE1/continuous
54) Mental health Post-test 1	MH1/ continuous
55) Marital status Post-test 2	MS2/Nominal single 1, domestic partner 2, married 3, separated 4, divorced 5, widowed 6
56) Department Post-test 2	DEPT2/Nominal I Deans office1, OT 2, PT 3, PA 4, Undergrad 5, Student Services6,

57) Health promotion level Post-test 2	HPL2/Nominal/ Precontemplation1, contemplation2, preparation3, actionpart1 =4, action part2 =5, maintenance6
58) Pedometer increase in PA level 2	PePAL2/ Interval : Strongly disagree 1, somewhat disagree 2, somewhat agree 3, strongly agree 4
59) Past use of pedometer	Pastuseped/ Nominal: not at all1, a few times 2, a few times a month 3, a few times a week 4, daily 5.
60) Future use of pedometer	Futureuseped/ Nominal: not at all1, a few times 2, a few times a month 3, a few times a week 4, daily 5.
61) Body mass index Post-test 2	BMI2/Continuous
62) Systolic BP Post-test 2	SYS2/Continuous
63) Diastolic BP Post-test 2	DIA2/Continuous
64) Heart rate – radial pulse Post-test 2	HRT2/Continuous
65) Physical health component summary Post-test 2	PCS2/Continuous
66) Mental health component summary Post-test 2	MCS2/ Continuous
67) Physical functioning Post - test 2	PF2/Continuous
68) Role Performance Post-test 2	RP2/continuous
69) Bodily Pain	BP 2/continuous

Post-test 2	
70) General health Post/Pre-test 2	GH 2/continuous
71) Vitality Post-test 2	VT2/continuous
72) Social functioning Post-test 2	SF2/continuous
73) Role expectation Post-test2	RE2/continuous
74) Mental health Post-test2	MH2/ continuous
75) Change in health status from post-test 1 to post-test 2	CHANGE/nominal :1 yes , 2 no

Appendix M

Paired Samples T-Test Results of vital functioning and SF-36v2 pre-test to post-test 1.

	t		degrees of freedom	Significance
Pair 1	bmi0 Body mass index pre test - bmi1 Body mass index post test1	-0.111	28	0.913
Pair 2	sys0 Systolic bp pre test - sys1 Systolic bp post test 1	-0.877	28	0.388
Pair 3	dia0 Diastolic bp pre test - dia1 Dialostic bp post test 1	0.454	28	0.654
Pair 4	hrt0 Heart rate radial pre test - hrt1 Heart rate post test 1	-0.418	28	0.679
Pair 5	pcs0 Physical component health summary pre test - pcs1 Physical health component summary post test 1	-1.568	28	0.128
Pair 6	mhcs0 Mental health component summary pre test - mcs1 Mental component summary post test 1	-2.638	28	0.013*
Pair 7	pf0 Physical functioning pre test - pf1 Physical functioning post test 1	-2.603	28	0.015*
Pair 8	rp0 Role performance pretest - rp1 Role performance post test 1	-1.467	28	0.154
Pair 9	bp0 Bodily pain pre test - bp1 Bodily pain post test 1	-0.828	28	0.415
Pair 10	gh0 General health pre test - gh1 General health posttest 1	-1.768	28	0.088
Pair 11	vt0 Vitality pretest - vt1 Vitality post test 1	-2.239	28	0.033*
Pair 12	sf0 Social functioning pretest - sf1 Social functioning post test 1	-0.591	28	0.559
Pair 13	re0 Role expectation pre test - re1 Role expectation post test 1	-1.447	28	0.159
Pair 14	mh0 Mental health pre test - mh1 Mental health post test 1	-3.078	28	0.005*

Note: Pair 6,7,11 and 14 are noted significant.