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CAN A POINT-OF-DECISION-PROMPT INTERVENTION INCREASE STAIR USE?

AN ANALYSIS OF A COMMUNITY INTERVENTION

A Chapter Style Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of Master of Public Health in Community Health Education

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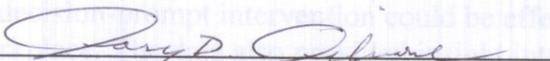
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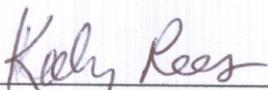
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ABSTRACT

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This study was part of a large initiative known as *Activate Fox Cities* being undertaken in the Fox Cities, in Eastern Wisconsin. The purpose of this study was to assess reported stair use, reaction to the point-of-decision-prompts, perceived barriers, and in addition would provide recommendations regarding stair use at five Fox Cities locations through a survey format. This study was of importance due to two significant problems. First, there is a growing overweight and obesity epidemic in the United States, and the need for effective solutions to reduce chronic, lifestyle related disease and to increase physical activity rates. Secondly, according to the United Way Fox Cities, the 2006 Fox Cities Behavioral Risk Factor Surveillance System (BRFSS) showed that chronic diseases are the leading causes of death in the Fox Cities. A descriptive study was conducted using a survey format to collect data. A pre-intervention (n=503) and post-intervention (n=304) survey was administered, with collected data being statistically analyzed using descriptive and inferential statistics. The findings from this study indicated that a point-of-decision-prompt intervention could be effective in increasing stair use in the workplace. The data also provided insight into barriers toward stair use, reaction to point-of-decision-prompts, and effects of prompts on overall health with some significant data results being found.

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CHAPTER I

INTRODUCTION

Background

This study was part of a large initiative known as *Activate Fox Cities* being undertaken in the Fox Cities, WI. The Fox Cities are a collection of villages, townships and cities in Northeast Wisconsin along the Wisconsin River and include the Cities of Appleton, Neenah, and Menasha among many others. In August 2007, a group of professionals from the Fox Cities traveled to Madison to take part in the Healthy Wisconsin Leadership Institute (HWLI), which, according to the Medical College of Wisconsin (MCW) web site (2008, na) is a, "...joint program of the Medical College of Wisconsin and the University of Wisconsin School of Medicine and Public Health." This group of professionals was chosen to be one of the four teams taking part in the Community Teams Program within the HWLI. As a chosen team, this group was required to take on a project that addressed a critical need in their community to improve health. The team received training and technical support from the HWLI and was required to design and implement a project meeting the specified need.

The Fox Cities Team sought to create a project that reduced barriers and increased support for healthy living. The team decided to call themselves the *Activate Fox Cities* Team (AFCT) because their project was part of a large initiative in the Fox Cities called *Activate Fox Cities* (AFC). According the AFC website (2008, na), AFC is, "...part of a national effort led by the YMCA of the U.S.A., known as *Activate America: Pioneering*

Healthy Communities, a project that engages key community stakeholders to develop strategies that reduce barriers and increase support for healthy living in the Fox Cities. [AFC's] plan is to educate, motivate, and facilitate long-term collaboration with business, government, schools, communities, neighborhoods, social service agencies and the media toward making the Fox Cities a healthier place to live, work and play.”

The project the AFCT chose was a walkability study where they used point-of-decision-prompts in an effort to improve cardiovascular health through increased stair use. This team decided to place point-of-decision-prompts at twelve locations within the Fox Cities to encourage people to use the stairs instead of the elevators. Different health promotion based signs (see Figure 1 Appendix C) were displayed at these locations with the intent on motivating people to make a healthier choice by using the stairs. These signs were designed by the AFCT members and were non-offensive to both employees and patrons. The signs were put in place and then left up indefinitely, with each location having the option to switch out the signs periodically by selecting one of the many sign options available to them through the AFCT and they had the option to create their own sign with their respective company label if desired.

The AFCT decided to take on this project because of a U.S. Department of Health and Human Services Centers for Disease Control and Prevention (CDC) study called *StairWELL to Better Health*. According to the CDC web site (2007) and Kerr, Yore, Ham and Dietz (2004), this study examined whether making physical changes to a stairwell (carpeting, paint, motivational signs, and music all at different intervals) increased stair use. It was found that each of these interventions increased stair use. Although the majority of research reviewed including articles by Kerr et al. (2004), Andersen,

Franckowiak, Snyder, Bartlett, and Fontaine (1998), Boutelle, Jeffery, Murray, and Schmitz (2001), Marshall, Bauman, Patch, Wilson, and Chen (2002), Blamey, Mutrie, and Aitchison (1995), Brownell, Stunkard, Albaum (1980), Russel, Dzewaltowski, and Ryan (1999), and Titze, Martin, Seiler, and Marti (2001), had used observational data collection both pre- and post- intervention to assess impact, to do so for this project was difficult. The main reason for the difficulty was simply the large number of locations being used. One goal of the AFCT and AFC was to implement large-scale health behavior change programs; therefore, the AFCT chose to use various locations within the Fox Cities. Due to the large number of locations, and the many different possible stair cases/elevators in each location, it was difficult to collect observational data due to time and resource constraints, but it was also hard to get an accurate count on stair use. Therefore, this study examined results pre- and post-intervention via a survey instead of via observational data.

Purpose of the Study

The purpose of this study was to assess reported stair use, reaction to the point-of-decision-prompts, perceived barriers, and in addition provided recommendations regarding stair use at five of the Fox Cities locations through a survey format. The five locations being surveyed were the 222 Building (ThedaCare and Affinity Health employees), the City Center (City of Appleton employees) (signs were placed in the three parking ramps used by City of Appleton employees and thus counted as three locations) and St. Elizabeth Hospital (Affinity Health employees). The locations that were not surveyed were M&I bank (could not get permission for electronic survey to be sent out), Appleton Medical Center and Theda Clark (these businesses were rolling out separate

point-of-decision-prompt interventions on a different timeline), the YMCA parking ramp (did not have point of decision prompts up at time of study), Alta Resources, Kimberly Clark and Plexus (did not have point-of-decision-prompts up at time of study). The pre-intervention survey was implemented before the intervention to gather baseline data. The intervention involved placing point-of-decision-prompts in locations where people had the option of using an elevator or taking the stairs. A follow-up survey was then sent out twelve weeks after the intervention to assess long-term trends in stair use when point-of-decision-prompts were in place. This study provided insight into the AFCT HWLI project and helped to not only assess the success of the intervention through data analysis but also helped the team recognize strengths and areas for improvement. This assessment was essential because of the fact that the point-of-decision-prompts were left up indefinitely and through this study AFCT were able to make any necessary adjustments to the project before it is handed over to each location respectively. To the researcher's knowledge, there were no studies to date that had examined the results of a point-of-decision-prompt intervention on stair use after a designated amount of time post-intervention when the point-of-decision-prompts were still displayed.

Obesity and other Chronic Diseases Due to Lifestyle Behaviors

This study was of importance due to two significant problems. First, there is a growing obesity epidemic in the United States, and the need for effective solutions to reduce chronic, lifestyle related disease and to increase physical activity rates. According to an article on the CDC web site titled *How much exercise do you need?* (March 24, 2008), adults should do at least 30 minutes of moderate-intensity activity on most, and ideally all, days of the week or a minimum of 20 minutes of vigorous-intensity activity

three days per week to achieve and maintain cardio-respiratory health. However, according to the *Morbidity and Mortality Weekly Report* (MMWR) by the CDC (November 23, 2007), in 2005, fewer than half of all adults in the U.S. met the recommended daily physical activity recommendations. Based on these data, the CDC recommends that evidence-based intervention strategies be used to encourage and increase daily physical activity, with one such intervention being point-of-decision-prompts.

Secondly, according to the United Way Fox Cities, the 2006 Fox Cities Behavioral Risk Factor Surveillance System (BRFSS) shows that chronic diseases are the leading causes of death in the Fox Cities. The causes behind many of these diseases are due to poor lifestyle habits including tobacco use and exposure, alcohol abuse, obesity and a sedentary lifestyle, and poor nutritional choices. In fact, the occurrence of these poor lifestyle behaviors is higher in the Fox Cities than state and national norms. These behaviors are practiced on a daily basis and there is a great need to take action to combat these poor choices in an effort to improve the health of the Fox Cities. Point-of-decision-prompts offer a great solution to physical inactivity and provide a way for people to accumulate minutes of physical activity throughout the day in a simple, low-cost, and safe manner.

Need for the Study

The incidence and prevalence of obesity and other chronic lifestyle diseases led to a need for interventions within the Fox Cities. This study provided a supplement to the point-of-decision-prompt project the HWLT was developing. The team stated that they wanted some sort of data collection that assessed stair use, input on point-of-decision-

prompts, and barriers to stair use. Based on the study by Kerr et al. (2004), the team knew that the point-of-decision-prompt project was evidence-based and found to be effective, but wanted to collect and analyze data from their own project to measure progress and assure that the needs of the citizens of the Fox Cities were being met. The AFCT HWLT had expressed a desire for this survey because of the difficulty in obtaining observational data that was valid. In addition, due to the timeline they had set forth to have the signs in place by November 17, 2008, the survey was the best measure to collect data, both pre- and post-intervention, in a timely and effective manner.

This assessment looked at the effects of point-of-decision-prompts prior to the intervention and then twelve weeks later. These data were quite valuable in guiding the AFCT in making their project stronger and more effective, as they planned on keeping the point-of-decision-prompts up indefinitely. Also, because the locations vary, the survey helped to clarify what locations were most likely to see changes from point-of-decision-prompts and what locations may have needed different types of stimuli to increase stair use.

In addition, there was a need for more research in the area of long-term effectiveness of point-of-decision-prompt interventions. One study reviewed used point-of-decision-prompts at points where people had a choice of taking the stairs or elevators and examined whether the prompts increased the frequency of stair use. Observations were made prior to the intervention, during the three-week intervention, two weeks immediately after the signs were removed, four weeks after the signs were removed, and again twelve weeks after the signs were removed (Blamey et al., 1995). Of the literature reviewed, this was the only study that looked at the long-term effects of an intervention,

and in this case the intervention was removed after three weeks. In the case of this study, the intervention was left up. It was critical to see what the outcome of this sustained intervention was and if it was at all comparable to the study by Blamey et al., 1995.

Finally, this assessment provided a personal insight into this project that otherwise was not available because no observational data were planned to be collected. The data collected from the survey may have also piloted other similar initiatives in the Fox Cities which benefited the community by helping to improve the population's health, which was one goal of *Activate Fox Cities*.

Research Questions

The research questions that were addressed in this study are listed below.

1. How would stair use frequency change from pre-intervention to post-intervention?
2. What barriers would be present that would discourage stair use?
3. How would the population react to the point-of-decision-prompts (e.g., would they notice the prompts, how would they react emotionally to the prompts, what were the likes and/or dislikes in regards to the signs)?
4. Would the point-of-decision-prompts cause a change in behavior that would affect overall physical health positively?

Assumptions

To conduct this study, a few key assumptions needed to be made. First, it needed to be assumed that access to stairways/elevators was equal among sites (i.e., at each site the opportunity to use the stairs instead of an elevator was equal). Second, it needed to be assumed that the population being studied was in the vicinity of the research sites for

equal amounts of time each day/week (i.e., each population at each site had an equal likelihood to use the stairs each day). It was assumed that each population was at the location for eight hours per day, Monday through Friday.

Delimitations

Specific delimitations were set for the purposes of this study.

1. Only sites within the Fox Cities, WI, were considered.
2. There was a specific time frame in which this study was to be conducted which was from November 10, 2008 to February 20, 2009.
3. At each of the five locations being surveyed, only employees of those locations were surveyed as they were the ones that occupied the building during the week and were the ones most frequently encountering the point-of-decision-prompts. Since this study aimed to look at change in stair use over time, employees of each location were the best populations to be studied.

Limitations

Within this study, it was predicted that limitations would present themselves.

1. Among the employees at the three sites taking the survey, some may have left their jobs during the time of the study and therefore were not able to take part in the study after such point in time. If a survey respondent left his/her job after filling out the pre-intervention survey, data collection and interpretation were affected.
2. The data collected were more so subjective in nature because they were self-reported in survey format. Recall bias may have occurred when respondents reported their responses on the survey.

3. No observational data were collected. Without these data it is hard to determine if the self-reported data were close to what actually was occurring in the stairwells.
4. The Thanksgiving, Christmas and New Year's Holidays fell during this study period, thus skewing results because respondents may have been spending more or less time at work.
5. Those that use the stairs may have been more likely to take the pre- and post-interventions surveys compared to those that did not take the stairs.
6. The surveys were distributed to the employees via email. Emails may not reach every employee (e.g., custodial staff may not have a station with custodial capability).

Definitions of Terms

For further understanding of this study, a couple key terms needed to be defined.

1. BMI: "A measure of an adult's weight in relation to his or her height, specifically the adult's weight in kilograms divided by the square of his or her height in meters." (CDC, *Obesity Trends Among U.S. Adults*, n.d.)
2. Physical Activity: "Any bodily movement produced by skeletal muscles that results in energy expenditure" (Pate et al., 1995, p. 402).
3. Point-of-decision-prompt: A lifestyle intervention that is, "...designed to change the physical environment to influence individuals to make active rather than sedentary behavioral choices" ((Russel et al., 1999, p. 257). In the case of this study, point-of-decision-prompts were health promotion signs displayed at each location that would encourage stair use and the many benefits stair use could offer.

4. Walkability: “Walkability is a measurement of the transportation and recreation opportunities for pedestrians, and considers pedestrian safety, convenience, and route aesthetics” (CDC, May 22, 2007).

CHAPTER II

REVIEW OF THE LITERATURE

Obesity and Overweight Patterns in the United States

The prevalence of obesity (BMI \geq 30) and overweight (BMI between 25 and 29.9) individuals in the United States has increased markedly in the past 20 years and represents a critical public health concern. According to an article by the CDC titled *Obesity Trends Among U.S. Adults* (n.d.), data collected from the CDC BRFSS indicated that in 1990 no state (among those that had contributed data) had a prevalence of obesity over 15%. By 1998, no state had a prevalence of obesity below 10% and seven states had a prevalence of obesity between 20-24%. By 2007, only one state had a prevalence of obesity below 20% (Colorado), thirty states had a prevalence of obesity of at least 25% and three states had a prevalence of obesity above 30%. According to an article by the CDC titled *U.S. Obesity Trends: 1985-2007* (July 24, 2007), Wisconsin's state obesity rate in 2007 was 24.7%. While national data demonstrate the need for public health efforts to reduce the prevalence and incidence of obesity and overweight, local data from the Fox Cities are also indicative of a need for intervention. According to the Fox Cities BRFSS 2005 Key Findings Summary, the Fox Cities BRFSS surveyed was conducted in late 2005. A representative sample of 400 residents in Appleton, Neenah and Menasha, Wisconsin, were surveyed in an effort to collect data on health practices and health related behavioral risks in an effort to learn about the health needs of the residents in the

Fox Cities in Wisconsin. One key finding was that among those surveyed, 23% were obese and 38% were overweight.

According to an article on the CDC website titled *Obesity and Overweight: Introduction* (January 28, 2009), the prevalence of obesity among men and women in 2005-2006 was 33.3% and 35.3% respectively. In addition, being obese or overweight is not just a problem affecting adults in the United States. Data from 2003-2006 show that 16.3% of children and adolescents age 2-19 are obese. Obesity has many implications on a person's health and increases the risks for many chronic diseases and conditions including coronary heart disease, type 2 diabetes, breast, colon and endometrial cancers, high cholesterol, stroke and osteoarthritis among many others (CDC, January 28, 2009). In fact, according to Rosenberger, Sneh, Phipps and Gurvitch (2005), obesity is believed to lead to approximately 300,000 US adult deaths per year.

Obesity and overweight not only have physical implications but financial as well. The costs of obesity and overweight can be broken down into direct and indirect costs. Direct costs include preventive, diagnostic, and treatment services while indirect costs include lost wages due to inability to function properly and potential lost future earning due to death. With both these types of costs taken into consideration it is estimated that the total cost of obesity and overweight for the US was \$99 billion in 1995 and \$117 billion in 2000. Further, it is estimated that the excess medical care costs associated with increasing prevalence of obesity and overweight are comparable to the costs of smoking (Rosenberger et al., 2005).

Despite all the statistics, obesity and overweight are among the most preventable of chronic diseases. Being obese or overweight is a modifiable risk factor that can be helped largely by physical activity (Rosenberger et al., 2005).

A landmark study by Pate et al. (1995) issued a public health recommendation on the type and amount of physical activity adults in the United States should be getting on a weekly basis. This study was landmark it was the first to look at new scientific evidence linking regular physical activity to an assortment of physical and mental benefits and to use the evidence to issue public health recommendations on the types and amounts of physical activity needed on a daily basis to promote health and prevent disease. This recommendation was given by a panel of experts brought together by the CDC and American College of Sports Medicine (ACSM) after they reviewed and analyzed literature and research in the area of physical activity. The recommendation for physical activity that they presented was that, “Every US adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week” (p. 404). In addition, it was stated that the recommended 30 minutes of physical activity could be done all at once or in short bouts of time (no shorter than 8 minutes) during the day equaling up to 30 minutes. These recommendations still stand today. Most US adults are recommended to do a minimum of 30 minutes of moderate-intensity exercise on most days of the week or a minimum of 20 minutes of vigorous-intensity activity 3 days a week. However, many people in the United States are not meeting the requirements for physical activity (CDC, March 24, 2008).

Physical activity provides many health benefits both physical and mental. According to an article by the CDC titled *Physical Activity and Health* (2008), the

benefits of physical activity include weight control, reduced risk of cardiovascular disease, reduced risk of type 2 diabetes and metabolic syndrome, reduced risk of some cancers, strengthening of muscles and bones, improved mental health and overall mood, improved ability to do daily activities and prevent falls (among older adults), increased chances of living longer. More specifically, taking the stairs as part of one's daily 30 minutes of recommended exercise can provide benefits. According to an article on the Public Health Agency of Canada titled *Stairway to Health* (2007), taking the stairs burns twice as many calories as walking. According to Bassett et al. (1997), the average caloric cost of stair climbing is 0.15 kcal-step. In addition, those that take the stairs regularly have greater leg strength and aerobic capacity than those that do not take the stairs. And uniquely, taking the stairs is often faster than taking the elevator for the same distance (Public Health Agency of Canada, 2007).

One reason for the increased prevalence of obesity and overweight individuals is because of a lack of physical activity. According to CDC MMWR (April 15, 2003), data from the 2000-2001 BRFSS showed that the majority of adults in the United States were not physically active enough to gain health benefits. Data from the 2005 BRFSS showed that the prevalence of physical activity increased 8.6% among women (43% to 46.7%) and 3.5% among men (48% to 49.7%). Although these trends show an increase in physical activity, the national average is still below 50% and racial and ethnic disparities are evident (CDC MMWR, November 23, 2007). Based primarily on these data, national goals and objectives have been set to promote physical activity and reduce the prevalence of obesity and overweight.

Healthy People 2010 is a set of national health objectives set forth by the U.S. Department of Health and Human Services, the *Healthy People Consortium* and hundreds of private, public and non-profit organization according to an article titled *Leading Health Indicators: Priorities for Action* (n.d.). This effort's two main goals are increasing the quality and years of healthy life and eliminating health disparities. Among the 467 objectives listed in this initiative, a smaller set of ten Leading Health Indicators is listed. These ten indicators represent the major public health concerns and are used to measure the health of the nation from 2000-2010. According to an article titled *What Are the Leading Health Indicators?* (n.d.) on www.healthypeople.gov, among the ten indicators listed, physical activity and obesity and overweight are the top two.

Results from Community Point-of-Decision-Prompt Interventions

Several studies examined the effectiveness of point-of-decision-prompt interventions in various community settings using a variety of methods with the majority of research finding that point-of-decision-prompts were inexpensive and effective in increasing stair use.

A landmark study by Brownell, Stunkard and Albaum (1980) was the first to use point-of-decision-prompts to examine physical activity in the natural environment. The reason this study was important was because it was the first to show that a simple sign increased the use of stairs and that this increase was prolonged. This research consisted of two separate studies conducted in a shopping mall with the first study examining intermittent use of the intervention and the second study examining long-term effects on behavior change. What this study sought to do was see if placing a sign encouraging stair use next to an escalator that was adjacent to stairs resulted in more people taking the

stairs instead of the escalator. The researchers chose this type of intervention and environment as a good place to study physical activity in the natural environment because they proposed that using the stairs or escalators were common activities to many and also because large numbers of people could be studied in a non-invasive way allowing for comparisons. During the 8-week study, researchers collected baseline observational data for the first two weeks to count the number of people taking the stairs and the number of people taking the escalator. In addition, these observational data were used to break people into subgroups such as age, gender, race and weight (obese or non-obese). For the weeks 3 and 4, the sign was put up and observational data were collected again to count the number of people taking the stairs and the number of people taking the escalator. During weeks 5 and 6, the sign was removed and observational data were collected to again count the number of people taking the stairs or escalator. Finally, during weeks 7 and 8, the sign was put up again and the observational data were collected to count the number of people taking the stairs or escalator.

The second study was similar to the first, but it had a different intervention schedule and was designed to examine the longer-term effects of a point-of-decision-prompt. During the study, baseline observational data were collected for 5 days to count the number of people taking the stairs or escalator. Following the baseline, the sign was displayed for 15 days during which observational data were collected to count the number of people taking the stairs or escalator. Following the intervention, the sign was taken down for 10 days. Two 1-week follow up data collection phases were conducted during which the sign was not displayed. The first occurred 1 month after the last day of

intervention and the second occurred 3 months after the last day of intervention (Brownell et al., 1980).

Several important data points emerged. First, the initial baseline phases showed that there was a high level of physical inactivity. Only 6.3% and 11.6% of people took the stairs during the baseline phases in Study 1 and Study 2 respectively. Second, it was found that a simple intervention (e.g., approx. 3 feet by 3 feet sign with a health message on it) significantly increased the use of stairs. In study one, stair use nearly doubled during the intervention phases among both obese and non-obese populations. In study two, stair use was increased during the intervention phase. One month after the intervention phase when the sign was removed, stair use decreased some but still remained significantly higher than baseline. Stair use finally returned to baseline levels 3 months after the intervention. This study led to many other similar studies looking to examine physical activity in the natural environment because it showed that stair use or escalator use was a common activity, large numbers of people could have been studied and easily broken into subgroups, long-term behaviors could possibly have possibly been studied, the behavior was sensitive to changes in the environment, and the behavior could have been observed in its natural setting (Brownell et al., 1980).

A similar study was conducted by Blamey, Mutrie and Aitchison (1995) in an underground station (similar to a subway) for 16 weeks. Data were collected during the baseline first week, for 3 weeks when the sign encouraging stair use was displayed, 2 weeks immediately following the intervention, 4 weeks after the intervention and 12 weeks after the intervention. What was found was that stair use increased significantly during the intervention phase, decreased after the intervention but still remained

significantly higher than baseline even 12 weeks after the intervention. Studies by Andersen et al. (1998), Boutelle et al. (2001), Northwest Public Health (2006), Kerr, Eves and Carroll (2000), Andersen (2006), Russell et al. (1999), Kerr et al. (2004) and Titze et al. (2001) all found similar results. Among these studies, the locations, time schedule, populations and types of data collection methods varied, however, despite the differences, they all found that a simple point-of-decision-prompt could increase stair use. In addition, many showed that these prompts had the ability to increase long-term stair use.

In addition to community interventions, two studies examined clinical experiments to increase stair use. These two studies added to the body of knowledge supporting the effectiveness of point-of-decision-prompts in increasing stair use. A study by Raynor, Coleman and Epstein (1998), examined how proximity to physical activity or sedentary options influenced exercise behavior. Participants (34 males) were randomly assigned to one of four conditions: (1) both the exercise alternative and the sedentary alternative were near, (2) the exercise alternative was near and the sedentary alternative was a 5-minute walk away, (3) the exercise alternative was a 5-minute walk away and the sedentary alternative was near, or (4) both the exercise and sedentary alternatives were a 5-minute walk away. What was found was that the participants engaged in physical activity when it was made more convenient (near) than the sedentary alternative. Even when the physical activity was inconvenient, if the sedentary alternative was even less convenient (e.g., further away than the physical activity alternative) the participants took part in the physical activity. However, if sedentary alternatives were just as easy to access as physical activity, participants took part in the sedentary alternative. Overall, what this

study showed was that by reducing access to sedentary alternatives that may compete with more physically active options, one increased physical activity.

Another clinical study by Boreham, Wallace and Nevill (2000), found physical benefits of stair use. In this study, 22 sedentary female students took part in a 7-week stair climb program. The participants were randomly assigned to the control group or stair-climbing group. The control group was instructed to simply maintain their normal lifestyle. The stair-climbing group was instructed to ascend stairs (199 steps) once per day in week one with a gradual increase to six ascents in weeks 6 and 7. For both groups baseline data were collected including anthropometric, fitness and blood tests. These tests were also conducted after the 7-week program for both groups. What was found was that among the stair-climbing participants, cardiorespiratory fitness improved and these changes resulted from relatively little exercise each day. In addition, this study showed that short bursts of physical activity provided health and fitness benefits if done over a period of time.

Recommended Next Steps

Various task forces and coalitions have examined techniques used to increase population physical activity levels in an effort to prevent cardiovascular disease. Among the various techniques examined, policy and community/environmental interventions have been shown to be effective for a number of important reasons. An article by King et al. (1995) indicated that policy and community/environmental approaches to promoting physical activity may have a greater impact than other types of interventions because they have the capability of reaching large populations and promoting cultural changes. In addition, these interventions are often less expensive and sustainable. It is argued that

interventions that are passive in nature (i.e., do not require active decision making), such as policy and community/environmental interventions, are often more successful.

Policy interventions are one way to increase physical activity, especially in the workplace. In particular, in the workplace, the easiest and most effective means of increasing physical activity is by policies that promote facilities-free physical activities such as walking and stair use. Research has consistently shown that worksite physical activity interventions are both cost-effective and successful in increasing physical activity levels among the employees that work there. An article by Brown and Kraft (2008) also discusses the importance of policy interventions. While public health interventions are important, Brown and Kraft (2008) feel that policies need to be developed that would require building in activities for active living directly into the built environment. By having this type of policy in place, public health interventions would essentially not be needed because options for safe and effective physical activity opportunities would already be present in the environment.

While policy interventions are effective and important, community/environmental approaches continue to be found highly successful and cost-effective. In particular, point-of-decision-prompts are consistently proven to be effective. A CDC MMWR article by Kahn, Ramsey, Heath and Howze (October 26, 2001) reviewed various efforts from around the United States designed to increase physical activity. After reviewing 94 articles discussing such efforts, the Task Force on Community Preventive Services recommended six interventions to increase physical activity and among them was the use of point-of-decision-prompts (the other 5 were community-wide campaigns, school-based physical education, social support interventions in community settings, individually

designed health behavior change and allocation of places for physical activity, as well as informational outreach programs). The Task Force felt that by incorporating the six interventions into a community, the goals of *Healthy People 2010* could be reached.

An article by Dunn, Andersen and Jakicic (1998) discussed a review of literature relating to lifestyle physical activity interventions and also indicated the importance of community interventions, such as point-of-decision-prompts, to increase physical activity. Lifestyle physical activity is the accumulation of the recommended daily 30 minutes of moderate-intensity exercise through leisure, occupational or household activities that are part of daily life. What was found was the environmental/community approaches such as point-of-decision-prompts were both cost-effective and reached a large number of people, especially those that were sedentary and/or unfit.

A study conducted by the Minnesota Department of Health (2004) also found that point-of-decision-prompts were effective. A survey was sent out to 1,150 representative businesses in Minnesota with 10 or more employees. The survey was designed to learn about various worksite health promotion activities, health issues that were important to employees and barriers employees faced related to health issues. What was found was that educational and environmental approaches were the best at getting people more physically active at work, including point-of-decision-prompts.

What these studies indicate is that while a variety of interventions are available to increase physical activity in an effort to prevent cardiovascular disease, policy and community/environmental approaches continue to be proven successful and cost-effective. More specifically, however, the community/environmental approaches are quickly becoming the method of choice in worksites and throughout the built

environment, with point-of-decision-prompts proving to be successful and cost-effective in a variety of environments.

CHAPTER III

METHODS AND PROCEDURES

Introduction

A descriptive study was conducted using a survey format to collect data. Upon collection, the data were analyzed and conclusions were made. Each phase of the research will be described in detail below.

Respondent Selection

At four of the five locations being studied, all employees with email access at that location were sent the survey electronically via employee email (St. Elizabeth Hospital and the City Center comprised of the three parking ramps). In the 222 Building, only ThedaCare and Affinity Health employees were surveyed. The survey was sent out in electronic form using the Select Survey program offered through the University of Wisconsin La Crosse. All employees were sent the pre-intervention survey as well as the post-intervention survey. The reasoning for this was to track data over time from the initial population. Only respondents that worked at each of the locations being studied were eligible. Patrons of the various locations were not chosen as they were not at the location on a regular, daily basis and thus might have skewed the data collection and interpretation.

In place of selecting a sample, an email was sent out to all employees that contained a brief introduction to the study, as well as including the link to the survey. This method was chosen because of the difficulty in randomly selecting respondents and

electronically sending the survey out to those selected. The researcher found that it was too difficult for the Internet technology personnel at each location to send out the survey to only a select few due to the time constraints. It was easier for those personnel to use the general listserv of all employees and send the survey out to everyone.

Instrument Development

It was determined that a survey format yielded the most appropriate information for this study not only because of the need to collect data from a large amount of people in a fairly quick manner, but also because no observational data were planned to be collected. The reason that no observational data were planned to be collected was due to the lack of time and staff to collect the data. No complete pre-existing survey was available, thus necessitating its development. A select number of questions were taken from Paffenbarger, Blair, Lee, and Hyde (1993), University of Michigan Health Management Research Center (2008) and from *Take Action!* National Coalition for Promoting Physical Health (n.d.). Numerous studies of point-of-decision-prompt intervention had used the survey format, to include Marshall et al. (2002), Northwest Public Health (n.d.), Paffenbarger, Blair, Lee, and Hyde (1993), Kerr, Eves, and Carroll (2000), and the National Coalition for Promoting Physical Activity (n.d.). Based on specific components of the surveys in these studies in conjunction with questions generated by the researcher, a brief survey was developed in order to assess reported stair use, reaction to point-of-decision-prompts, perceived barriers, and also to provide recommendations regarding stair use once the data had been analyzed (see Appendices A and B for pre- and post-intervention surveys).

Methods and Procedures

The HWLI planned on having the point-of-decision-prompts at each location (222 building, St. Elizabeth Hospital, 3 city-owned parking ramps providing access for City of Appleton employees into the City Center) and displayed by November 17, 2008. Prior to the point-of-decision-prompts being displayed, a pre-intervention survey was sent out to all employees at each location electronically during the week of November 10, 2008, to assess baseline data. The post-intervention survey was sent out to all employees at each location electronically the week of February 16, 2009. Specifically, instead of pooling all respondents from each location into a total database, each location was treated as a separate population. This allowed for overall analysis of the intervention at the sites, while at the same time allowing for an analysis of each site separately, thus providing a more in-depth analysis. In addition, respondents had the option of being entered into a drawing for a recognition gift after each survey. If the respondent was interested in being entered into a drawing, they simply clicked a link at the end of the survey that would then send an email to the researcher. The researcher then randomly chose three winners from each employer from the email responses received.

Statistical Treatment

All data collected were statistically analyzed using descriptive and inferential statistics. The descriptive statistics included frequencies, percentages, measures of central tendency and cross tabulations. The researcher determined that the Mann-Whitney U was a more appropriate statistical test to run because of the ordinal level of data and the non-matched pre and post collection of data. Also, there was no assumption of a normal

distribution. Nonparametric statistics were used to determine if the data collected were statistically significant at the $p \geq .05$ level and were used to answer the research questions.

CHAPTER IV

RESULTS

Respondents

For the purpose of this study all employees with email access at each location were sent the pre- and post-survey via email. Specifically, all employees at St. Elizabeth Hospital, all Affinity Health and ThedaCare employees that worked in the 222 Building, and all City of Appleton employees in the City Center were sent the surveys. The technology personnel for Affinity Health, City of Appleton and ThedaCare employees at each site used the employee listserv and sent the surveys out to everyone working for the respective business at that time. Along with the link for the survey, an email message explaining AFC and this study was included. Respondents were notified in that message that the survey was optional. Only data from respondents that answered “yes” to question 6 in the post-intervention survey (see Appendix B) were analyzed in an attempt to capture responses from those that took both surveys.

Affinity Health

A total of 384 Affinity Health employees participated in the pre-intervention survey. Of those respondents 357 (93%) were female and 27 (7%) were male. The average age of the respondents was approximately 46 years of age. The majority of the respondents were Caucasian (see Table 1). Of the two locations Affinity Health employees could have worked at, 111 (29%) respondents worked at the 222 Building and 268 (71%) worked at St. Elizabeth Hospital. Education level varied, with the largest

percent of respondent's reported having a Bachelor's Degree (see Table 2). When asked to describe health status, almost half indicated they had good health (see Table 3).

A total of 237 Affinity Health employees participated in the post-intervention survey that had also participated in the pre-intervention survey. Of those respondents 219 (92%) were female and 18 (8%) were male. The average age of the respondents was approximately 45 years of age. The majority of the respondents were Caucasian (see Table 1). Of the two locations Affinity Health employees could have worked at, 68 (29%) respondents worked at the 222 Building and 167 (71%) worked at St. Elizabeth Hospital. Education level varied among respondents with the largest percentages of respondents indicating they had a Bachelor's Degree (see Table 2). When asked to describe health status, almost half indicated they had good health (see Table 3).

Table 1. Race/Origin of Affinity Health Respondents: Pre- and Post-Intervention Survey

Race/Origin	% of Respondents Pre-Intervention	% of Respondents Post-Intervention
Caucasian	99	99
Hispanic	<1	
Asian or Pacific Islander	<1	
American Indian/Alaskan Native	<1	
Biracial		1

Note. Blank cells indicate no respondent selected that race/origin. % = percent.

Table 2. Education level of Affinity Health Respondents: Pre- and Post-Intervention Survey

Education Level	% of Respondents Pre-Intervention	% of Respondents Post-Intervention
Some High School	1	
High School Degree	18	16
Some College Education	24	22
Associate's Degree	20	17
Bachelor's Degree	27	32
Master's Degree	7	8
Professional Degree	3	1
Doctorate Degree	1	2

Note. Blank cells indicate no respondent selected that education level. % = percent.

Table 3. Health Status of Affinity Health Respondents: Pre- and Post-Intervention Survey

Health Status	% of Population Pre-Intervention	% of Population Post-Intervention
Poor-Good	4	4
Good	47	48
Good-Excellent	36	41
Excellent	12	7

Note. % = percent.

City of Appleton

A total of 38 City of Appleton employees participated in the pre-intervention survey. Of those respondents 24 (63%) were female and 14 (37%) were male. The average age of the respondents was approximately 43 years of age. The race of the respondents was Caucasian (100%). All City of Appleton employees being sent the survey worked at the City Center. Education level varied among respondents with the majority of respondents indicating they had a Bachelor's Degree (see Table 4). When asked to describe health status, almost half of the respondents indicated they had good health (see Table 5).

A total of 24 City of Appleton employees participated in the post-intervention survey that had also participated in the pre-intervention survey. Of those respondents 16 (67%) were female and 8 (33%) were male. The average age of the respondents was approximately 45 years of age. The race of the respondents was Caucasian (100%). All City of Appleton employees being sent the survey worked at the City Center. Education level varied among respondents with the largest percentage of respondents indicating they had a Bachelor's Degree (see Table 4). When asked to describe health status, almost half of the respondents indicated they had good health (see Table 5).

Table 4. Education level of City of Appleton Respondents: Pre- and Post-Intervention Survey

Education Level	% of Population Pre-Intervention	% of Population Post-Intervention
High School Degree	5	4
Some College	24	29
Associate's Degree	16	17
Bachelor's Degree	37	38
Master's Degree	13	8
Professional Degree	5	4

Note. % = Percent.

Table 5. Health Status of City of Appleton Respondents: Pre- and Post-Intervention Survey

Health Status	% of Population Pre-Intervention	% of Population Post-Intervention
Poor-Good	3	
Good	47	29
Good-Excellent	32	46
Excellent	18	25

Note. Blank cells indicate no respondents selected that health status. % = percent.

ThedaCare

A total of 81 ThedaCare employees participated in the pre-intervention survey. Of those respondents 68 (84%) were female and 13 (16%) were male. The average age of the respondents was approximately 46 years of age. The majority of the respondents were Caucasian (see Table 6). Of the two locations ThedaCare employees could have worked at, 78 (96%) respondents worked at the City Center and 3 (4%) worked at the 222

Building. Education level varied among respondents with the largest percentage of respondents indicating they had a Bachelor’s Degree (see Table 7). When asked to describe health status, almost half of the respondents indicated they had good health (see Table 8).

A total of 43 ThedaCare employees participated in the post-intervention survey that had also participated in the pre-intervention survey. Of those respondents 41 (95%) were female and 2 (5%) were male. The average age of the respondents was approximately 45 years of age. The majority of the respondents were Caucasian (see Table 6). Of the two locations ThedaCare employees could have worked at, 39 (95%) respondents worked at the City Center and 2 (5%) worked at the 222 Building. Education level varied among respondents with the largest percentage of respondents having a Bachelor’s Degree (see Table 7). When asked to describe health status, almost half of the respondents indicated they had good health (see Table 8).

Table 6. Race/Origin of ThedaCare Respondents: Pre- and Post-Intervention

Race/Origin	% of Population Pre-Intervention	% of Population Post-Intervention
Caucasian	99	98
Hispanic	1	2

Note. % = percent.

Table 7. Education Level of ThedaCare Respondents: Pre- and Post-Intervention

Education Level	% of Population Pre-Intervention	% of Population Post-Intervention
High School Degree	17	16
Some College	19	21
Associate's Degree	12	12
Bachelor's Degree	35	40
Master's Degree	17	9
Professional Degree		2

Note. Blank cells indicate that no respondents selected that education level. % = percent.

Table 8. Health Status of ThedaCare Respondents: Pre- and Post-Intervention Survey

Health Status	% of Population Pre-Intervention	% of Population Post-Intervention
Poor	1	5
Poor-Good	2	7
Good	43	42
Good-Excellent	42	44
Excellent	11	2

Note. % = percent.

Findings

Combined Data

One of the main purposes of the study was to analyze how stair use frequency changed in response to the point-of-decision-prompts. For research question 1, in addition to each population being analyzed separately, all respondents from the three populations were analyzed as a whole group to get a better sense of the overall change in stair use frequency. Based on data collected from the two surveys, there was a significant difference ($p=0.004$) in stair use between the pre- and post-intervention survey among the three populations. These data need to be carefully, however. Each population surveyed has a different number of respondents and therefore the data may not be truly representative of each population individually. Each population individually showed increases; however, not all the increases were statistically significant. Each population's findings will be described individually below, with each research question being addressed.

Affinity Health

The first research question asked, "How would stair use frequency change from pre-intervention to post-intervention?" Based on the data collected from the two surveys, there was a significant difference ($p = 0.009$) in stair use between the first and second survey (see Figure 1). In the pre-intervention survey, 97 people (25%) indicated they took less than 2 flights of stairs per day, 104 (27%) took 2-4 flights of stairs per day, 72 (19%) took 5-6 flights of stairs per day, 53 (14%) took 7-8 flights of stairs per day and 58 (15%) took 9 or more flights of stairs per day. In the post-intervention survey, 48 (20%) respondents took less than 2 flights of stairs per day, 57 (24%) took 2-4 flights of stairs

per day, 39 (16%) took 5-6 flights of stairs per day, 37 (16%) took 7-8 flights of stairs per day and 56 (24%) took 9 or more flights of stairs per day.

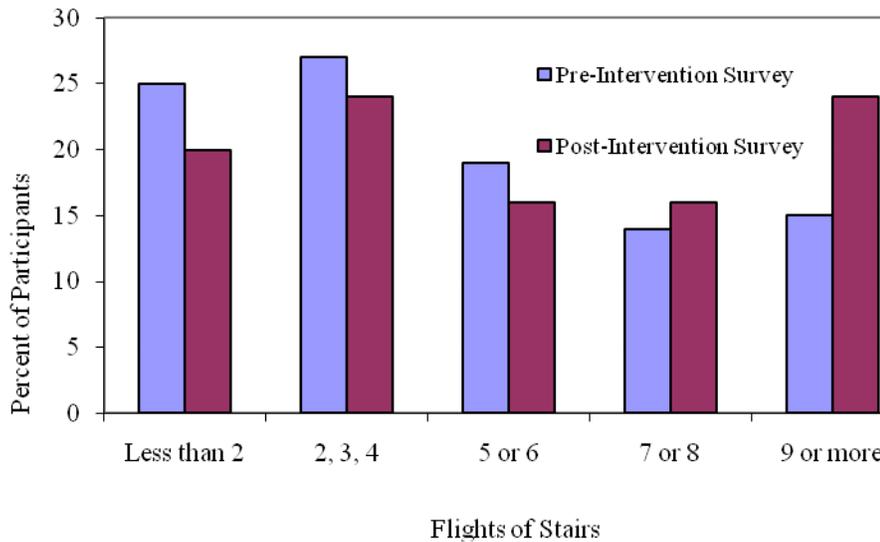


Figure 1. Change in Frequency of Daily Stair Use Among Affinity Health Respondents

The second research question asked, “What barriers would be present that would discourage stair use?” Respondents were asked to select all barriers that pertained from a list of choices (see question 10 in the pre-intervention survey and question 14 in the post-intervention survey in Appendices A and B). Data from the pre-intervention survey indicated that 134 (33%) of the respondents stated they lacked self-motivation, 51 (12%) had a physical injury, 37 (9%) had a health problem or condition, 129 (32%) had a busy work schedule/lack of time, 51 (12%) stated the stairwell was not easily accessible and 6 (1%) indicated the stairwell was not well-lit. In the post-intervention survey, 61 (25%) of the respondents stated they lacked self-motivation, 41 (17%) had a physical injury, 29 (12%) had a health problem or condition, 70 (29%) had a busy work schedule/lack of

time, 40 (16%) stated the stairwell was not easily accessible and 2 (1%) indicated the stairwell was not well-lit (see Figure 2).

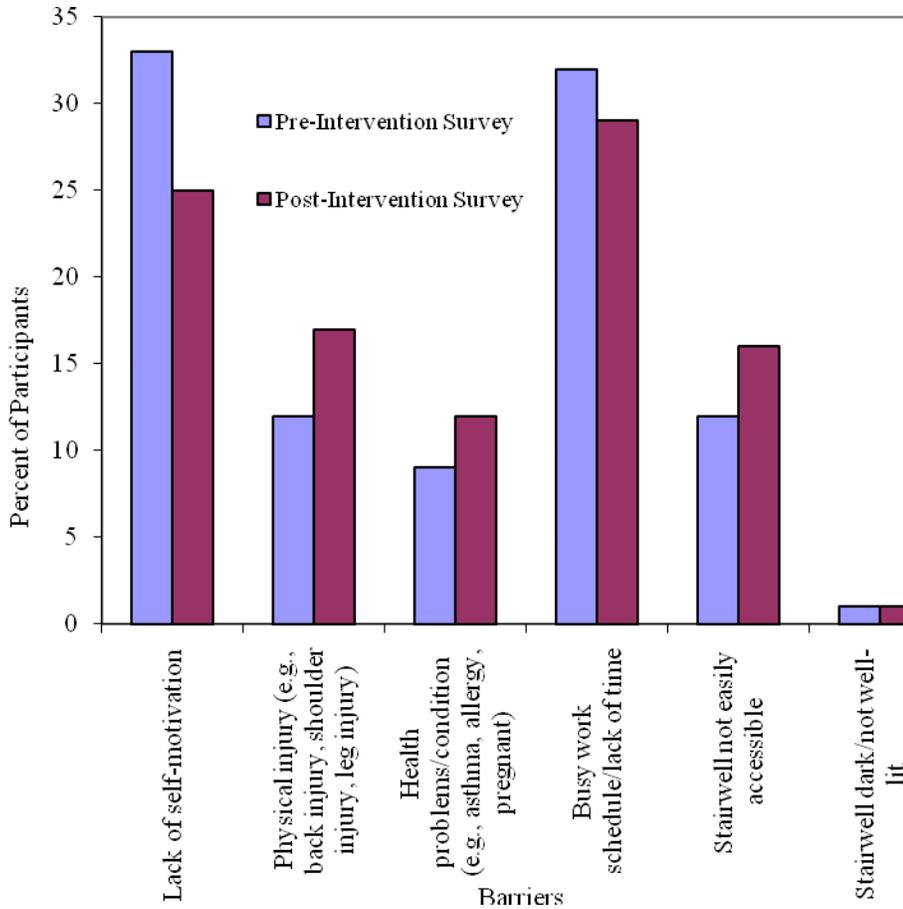


Figure 2. Barriers Toward Stair Use Among Affinity Health Respondents

In addition to physical barriers, a question was asked to assess a perceived barrier. In the pre-intervention survey, 339 (89%) of respondents felt they could definitely do something to prevent ill health, 39 (10%) felt they could perhaps do something to prevent ill health and 4 (1%) felt preventing ill health was largely a matter of chance. In the post-intervention survey, 213 (90%) of respondents felt they could definitely do something to prevent ill health, 21 (9%) felt they could perhaps do

something to prevent ill health and 3 (1%) felt preventing ill health was largely a matter of chance.

The third research question asked, “How would the population react to the point-of-decision-prompts (e.g., would they notice the prompts, how would they react emotionally to the prompts, what were the likes and/or dislikes in regards to the signs)?” Data from the post-intervention survey indicated that significantly more people ($p = 0.000$) increased their stair use (19%) after the point-of-decision-prompts were in place compared to those that decreased their stair use (4%). In regards to respondent awareness to the point-of-decision-prompts, 122 people (52%) said they were somewhat aware or very much aware of the point-of-decision-prompts in their workplace. Data indicated that 49% were not at all aware of the point-of-decision-prompts. When respondents were asked to what degree they had changed their behavior due to the point-of-decision-prompts, 182 (77%) said not at all, 49 (21%) said somewhat and 5 (2%) said very much.

The final research question asked, “Would the point-of-decision-prompts cause a change in behavior that would affect overall physical health positively?” Data from the pre-intervention survey indicated that 81 (21%) of respondents engaged in vigorous physical activity less than 1 time per week, 115 (30%) engaged in vigorous physical activity 1 or 2 times per week, 89 (23%) engaged in vigorous physical activity 3 times per week and 99 (26%) engaged in vigorous physical activity 4 or more times per week. For comparison, data from the post-intervention survey indicated that 44 (19%) respondents engaged in vigorous physical activity less than 1 time per week, 61 (26%) engaged in vigorous physical activity 1 or 2 times per week, 52 (22%) engaged in vigorous physical activity 3 times per week and 78 (33%) engaged in vigorous physical

activity 4 or more times per week. There was a significant increase ($p = 0.038$) in vigorous physical activity levels between pre-intervention survey and post-intervention survey (see Figure 3).

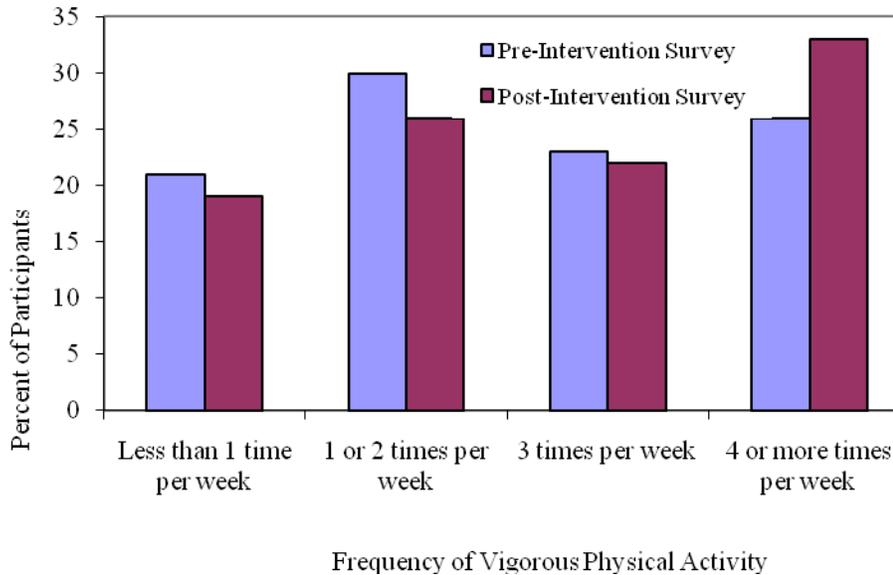


Figure 3. Change in Frequency of Vigorous Physical Activity Performed Weekly By Affinity Health Respondents

In terms of moderate physical activity, the pre-intervention survey data indicated 26 (7%) engaged in no moderate physical activity, 51 (13%) engaged in moderate physical activity 1 day per week, 80 (21%) engaged in moderate physical activity 2 days per week, 117 (31%) engaged in moderate physical activity 3 or 4 days per week, 77 (20%) engaged in moderate physical activity 5 or 6 days per week and 32 (8%) engaged in moderate physical activity 7 days a week. For comparison, data from the post-intervention survey indicated that 11 (5%) of respondents engaged in no moderate physical activity, 27 (11%) engaged in moderate physical activity 1 day per week, 38 (16%) engaged in moderate physical activity 2 days per week, 81 (34%) engaged in

moderate physical activity 3 or 4 days per week, 48 (20%) engaged in moderate physical activity 5 or 6 days per week and 31 (13%) engaged in moderate physical activity per week. There was a significant increase in moderate physical activity levels between the pre-intervention survey and the post-intervention survey ($p = 0.014$) (see Figure 4).

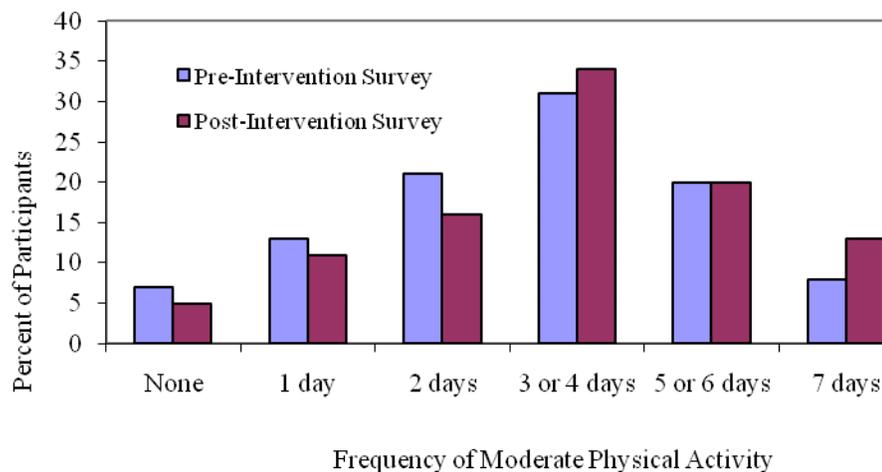


Figure 4. Change in Frequency of Moderate Physical Activity Performed Weekly By Affinity Health Respondents

In relation to overall health status, data from the pre-intervention survey indicated that 1 (0%) respondent classified himself or herself as in poor health, 17 (4%) were in poor-good health, 180 (47%) were in good health, 138 (36%) were in good-excellent health and 48 (12%) were in excellent health. Data from the post-intervention survey indicated that 10 (4%) respondents were in poor-good health, 114 (48%) were in good health, 96 (41%) were in good-excellent health and 16 (7%) were in excellent health.

City of Appleton

The first research question asked, “How would stair use frequency change from pre-intervention to post-intervention?” Based on the data collected from the two surveys, there was not a significant difference ($p = 0.336$) in stair use between the first and second survey (see Figure 5). In the pre-intervention survey, 5 people (14%) indicated they took less than 2 flights of stairs per day, 7 (19%) took 2-4 flights of stairs per day, 10 (27%) took 5-6 flights of stairs per day, 7 (19%) took 7-8 flights of stairs per day and 8 (22%) took 9 or more flights of stairs per day. In the post-intervention survey, 3 (12%) respondents took less than 2 flights of stairs per day, 5 (21%) took 2-4 flights of stairs per day, 3 (12%) took 5-6 flights of stairs per day, 3 (12%) took 7-8 flights of stairs per day and 10 (42%) took 9 or more flights of stairs per day.

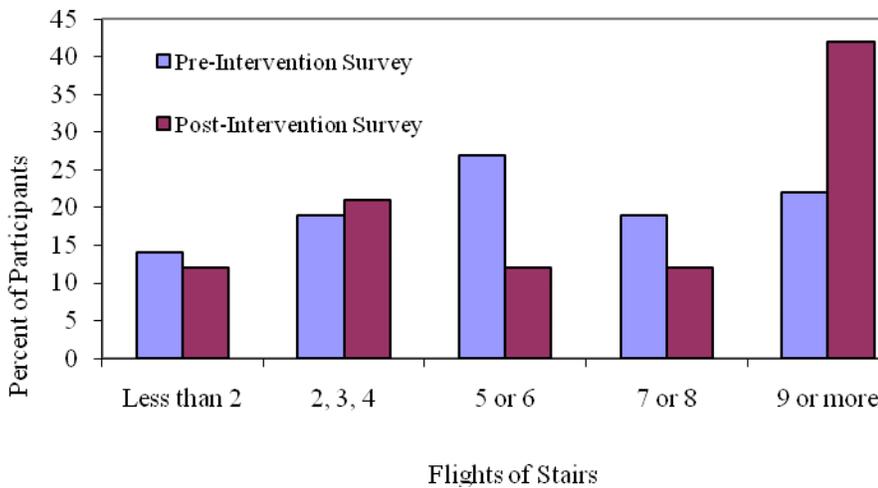


Figure 5. Change in Frequency of Daily Stair Use Among City of Appleton Respondents

The second research question asked, “What barriers would be present that would discourage stair use?” Respondents were asked to select all barriers that pertained from a list of choices (see question 10 in the pre-intervention survey and question 14 in the post-

intervention survey in Appendices A and B). Data from the pre-intervention survey indicated that 18 (38%) of the respondents stated they lacked self-motivation, 2 (4%) had a physical injury, 1 (2%) had a health problem or condition, 12 (26%) had a busy work schedule/lack of time, 9 (19%) stated the stairwell was not easily accessible and 5 (11%) indicated the stairwell was not well-lit. In the post-intervention survey, 6 (30%) of the respondents stated they lacked self-motivation, 2 (10%) had a physical injury, 2 (10%) had a health problem or condition, 2 (10%) had a busy work schedule/lack of time, 6 (30%) stated the stairwell was not easily accessible and 2 (10%) indicated the stairwell was not well-lit. In addition to physical barriers, a question was asked to assess a perceived barrier. In The pre-intervention survey, 36 (95%) of respondents felt they could definitely do something to prevent ill health and 2 (5%) felt they could perhaps do something to prevent ill health. In the post-intervention survey, all 24 respondents (100%) of respondents felt they could definitely do something to prevent ill health (see Figure 6).

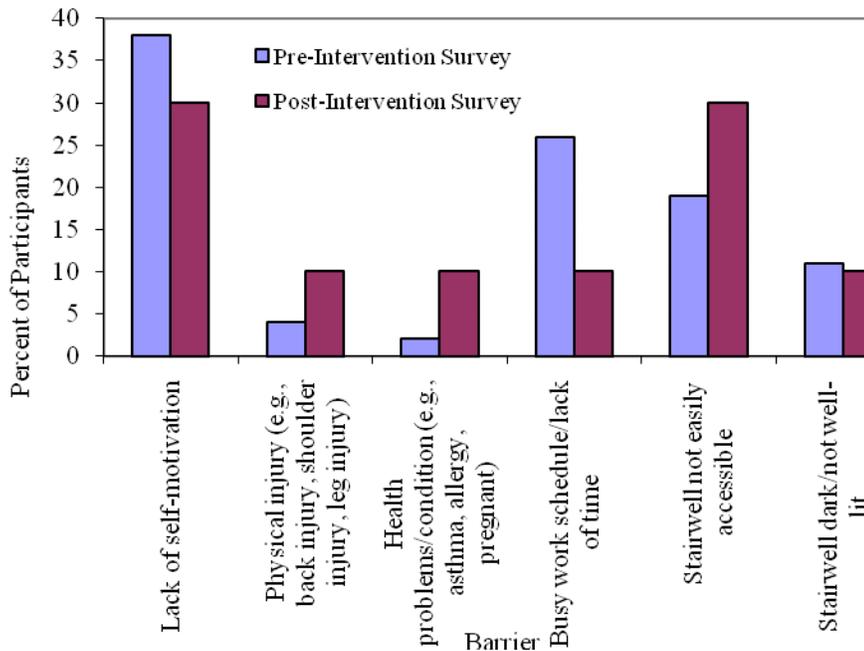


Figure 6. Barriers Toward Stair Use Among City of Appleton Respondents

The third research question asked, “How would the population react to the point-of-decision-prompts (e.g., would they notice the prompts, how would they react emotionally to the prompts, what were the likes and/or dislikes in regards to the signs)?” Data from the post-intervention survey indicated that significantly more people ($p = 0.002$) increased their stair use (42%) after the point-of-decision-prompts were in place compared to those that decreased their stair use (0%). Data indicated that 58% of people’s stair use stayed the same to stair use three months prior. In regards to respondent awareness to the point-of-decision-prompts, all (100%) respondents said they were somewhat aware or very much aware of the point-of-decision-prompts in their workplace. When respondents were asked to what degree they had changed their behavior due to the

point-of-decision-prompts, 12 (50%) said not at all, 9 (38%) said somewhat and 3 (12%) said very much.

The final research question asked, “Would the point-of-decision-prompts cause a change in behavior that would affect overall physical health positively?” Data from the pre-intervention survey indicated that 6 (16%) of respondents engaged in vigorous physical activity less than 1 time per week, 4 (11%) engaged in vigorous physical activity 1 or 2 times per week, 9 (24%) engaged in vigorous physical activity 3 times per week and 19 (50%) engaged in vigorous physical activity 4 or more times per week. For comparison, data from the post-intervention survey indicated that 1 (4%) respondents engaged in vigorous physical activity less than 1 time per week, 4 (17%) engaged in vigorous physical activity 1 or 2 times per week, 6 (25%) engaged in vigorous physical activity 3 times per week and 13 (54%) engaged in vigorous physical activity 4 or more times per week. There was no significant change (0.566) in participation in weekly vigorous physical activity between the pre-intervention survey and the post-intervention survey (see Figure 7).

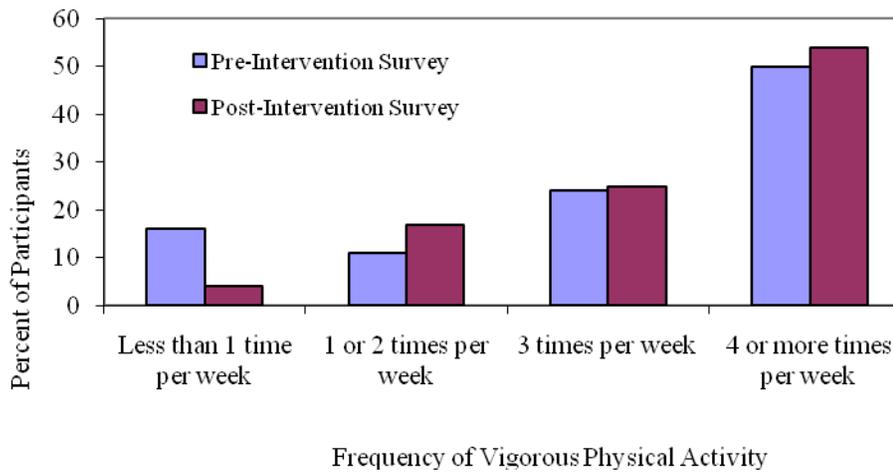


Figure 7. Change in Frequency of Vigorous Physical Activity Performed Weekly By City of Appleton Respondents

In terms of moderate physical activity, pre-intervention survey data indicated 1 (3%) engaged in no moderate physical activity, 2 (5%) engaged in moderate physical activity 1 day per week, 5 (13%) engaged in moderate physical activity 2 days per week, 5 (13%) engaged in moderate physical activity 3 or 4 days per week, 16 (42%) engaged in moderate physical activity 5 or 6 days per week and 9 (24%) engaged in moderate physical activity 7 days a week. For comparison, data from the post-intervention survey indicated that 0 (0%) of respondents engaged in no moderate physical activity, 0 (0%) engaged in moderate physical activity 1 day per week, 3 (12%) engaged in moderate physical activity 2 days per week, 5 (21%) engaged in moderate physical activity 3 or 4 days per week, 12 (50%) engaged in moderate physical activity 5 or 6 days per week and 4 (17%) engaged in moderate physical activity per week. There was no significant difference (0.988) in moderate physical activity levels between the pre-intervention survey and the post-intervention survey (see Figure 8).

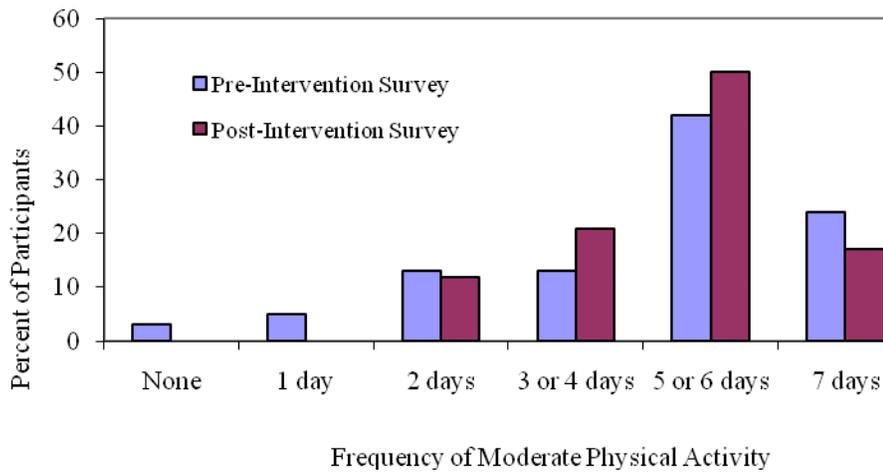


Figure 8. Change in Frequency of Moderate Physical Activity Performed Weekly By City of Appleton Respondents

In relation to overall health status, data from the pre-intervention survey indicated that 1 (3%) respondent classified himself or herself as poor-good health, 18 (47%) were in good health, 12 (32%) were in good-excellent health and 7 (18%) were in excellent health. Data from the post-intervention survey indicated 7 (29%) respondents were in good health, 11 (46%) were in good-excellent health and 6 (25%) were in excellent health.

ThedaCare

The first research question asked, “How would stair use frequency change from pre-intervention to post-intervention?” Based on the data collected from the two surveys, there was not a significant difference ($p = 0.319$) in stair use between the first and second survey (see Figure 9). In the pre-intervention survey, 26 people (32%) indicated they took less than 2 flights of stairs per day, 25 (31%) took 2-4 flights of stairs per day, 16 (20%) took 5-6 flights of stairs per day, 4 (5%) took 7-8 flights of stairs per day and 10 (12%)

took 9 or more flights of stairs per day. In the post-intervention survey, 10 (23%) respondents took less than 2 flights of stairs per day, 14 (33%) took 2-4 flights of stairs per day, 9 (21%) took 5-6 flights of stairs per day, 5 (12%) took 7-8 flights of stairs per day and 5 (12%) took 9 or more flights of stairs per day.

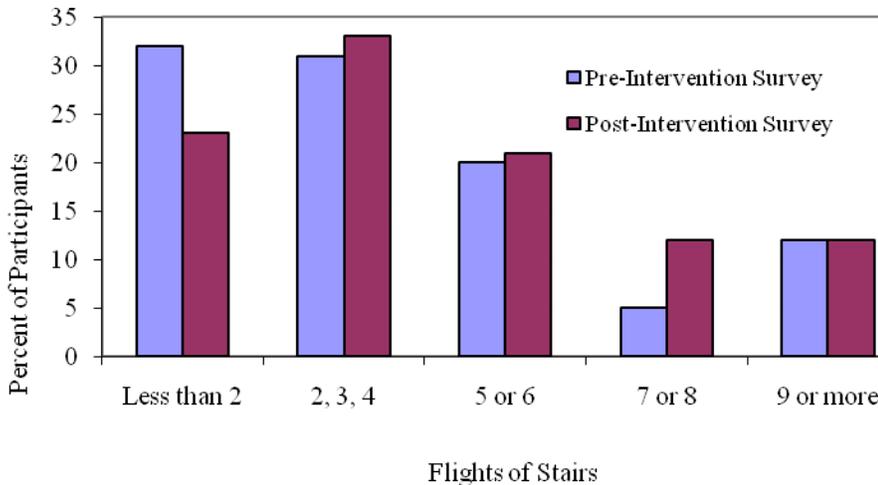


Figure 9. Change in Frequency of Daily Stair Use Among ThedaCare Respondents

The second research question asked, “What barriers would be present that would discourage stair use?” Respondents were asked to select all barriers that pertained from a list of choices (see question 10 in the pre-intervention survey and question 14 in the post-intervention survey in Appendices A and B). Data from the pre-intervention survey indicated that 20 (24%) of the respondents stated they lacked self-motivation, 8 (9%) had a physical injury, 9 (11%) had a health problem or condition, 26 (31%) had a busy work schedule/lack of time, 11 (13%) stated the stairwell was not easily accessible and 11 (13%) indicated the stairwell was not well-lit. In the post-intervention survey, 7 (14%) of the respondents stated they lacked self-motivation, 5 (10%) had a physical injury, 5

(10%) had a health problem or condition, 13 (26%) had a busy work schedule/lack of time, 4 (8%) stated the stairwell was not easily accessible and 16 (32%) indicated the stairwell was not well-lit (see Figure 10). In addition to physical barriers, a question was asked to assess a perceived barrier. In the pre-intervention survey, 76 (94%) of respondents felt they could definitely do something to prevent ill health, 4 (5%) felt they could perhaps do something to prevent ill health and 1 (1%) felt preventing ill health was largely a matter of chance. In the post-intervention survey, 41 (95%) of respondents felt they could definitely do something to prevent ill health, 2 (5%) felt they could perhaps do something to prevent ill health and 0 (0%) felt preventing ill health was largely a matter of chance.

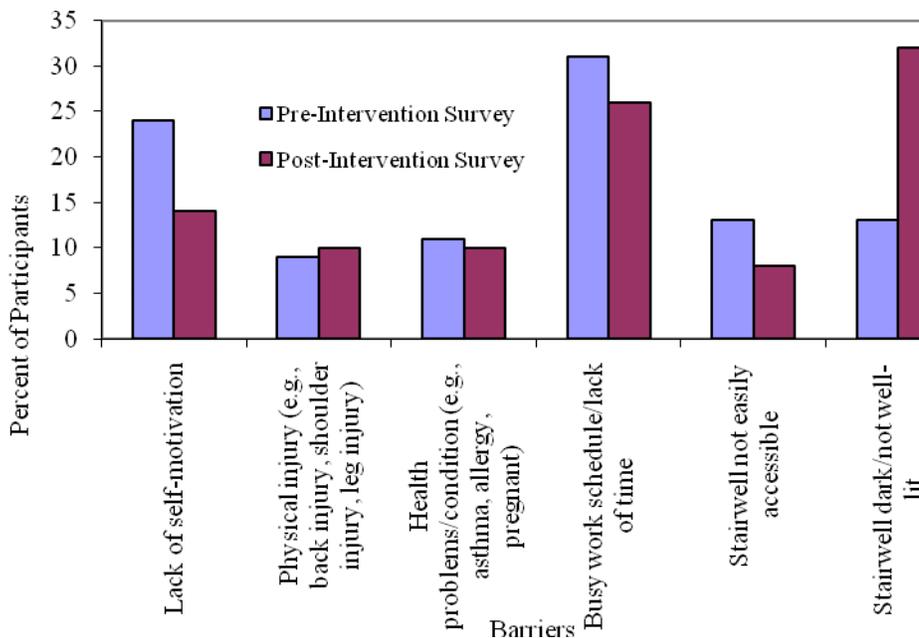


Figure 10. Barriers Toward Stair Use Among ThedaCare Respondents

The third research question asked, “How would the population react to the point-of-decision-prompts (e.g., would they notice the prompts, how would they react emotionally to the prompts, what were the likes and/or dislikes in regards to the signs)?” Data from the post-intervention survey indicated that there was not a significant amount more of people ($p = 0.581$) that had increased their stair use (19%) after the point-of-decision-prompts were in place compared to those that had decreased their stair use (12%). Data indicated that 69% of respondent’s stair use stayed the same to stair use three months prior. In regards to respondent awareness to the point-of-decision--prompts, 10 people (23%) said they were not at all aware of the signs while 33 (77%) of respondents were somewhat aware or very much aware of the point-of-decision-prompts in their workplace. When respondents were asked to what degree they had changed their

behavior due to the point-of-decision-prompts, 23 (53%) said not at all, 19 (44%) said somewhat and 1 (2%) said very much.

The final research question asked, “Would the point-of-decision-prompts cause a change in behavior that would affect overall physical health positively?” Data from the pre-intervention survey indicated that 20 (25%) of respondents engaged in vigorous physical activity less than 1 time per week, 23 (28%) engaged in vigorous physical activity 1 or 2 times per week, 18 (22%) engaged in vigorous physical activity 3 times per week and 20 (25%) engaged in vigorous physical activity 4 or more times per week. For comparison, data from the post-intervention survey indicated that 8 (19%) respondents engaged in vigorous physical activity less than 1 time per week, 15 (35%) engaged in vigorous physical activity 1 or 2 times per week, 10 (23%) engaged in vigorous physical activity 3 times per week and 10 (23%) engaged in vigorous physical activity 4 or more times per week. There was no significant difference ($p = 0.824$) in vigorous physical activity level between the pre-intervention survey and the post-intervention survey (see Figure 11).

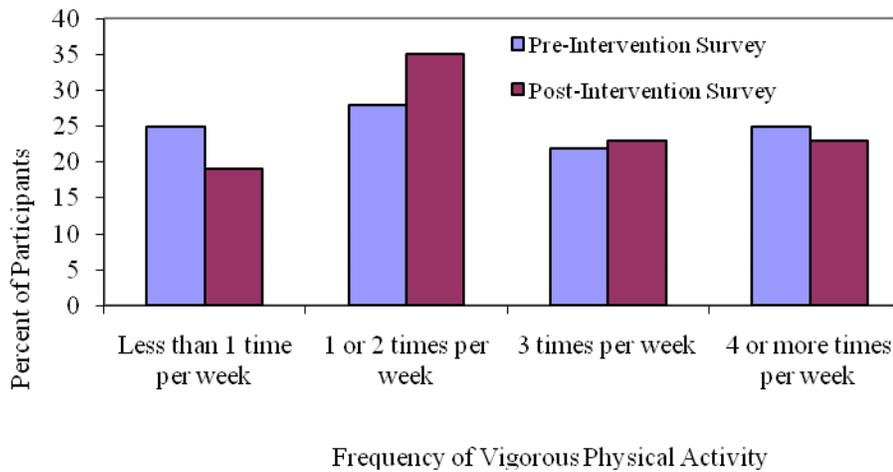


Figure 11. Change in Frequency of Vigorous Physical Activity Performed Weekly By ThedaCare Respondents

In terms of moderate physical activity, pre-intervention survey data indicated 9 (11%) engaged in no moderate physical activity, 11 (14%) engaged in moderate physical activity 1 day per week, 15 (19%) engaged in moderate physical activity 2 days per week, 26 (32%) engaged in moderate physical activity 3 or 4 days per week, 14 (17%) engaged in moderate physical activity 5 or 6 days per week and 6 (7%) engaged in moderate physical activity 7 days a week. For comparison, data from the post-intervention survey indicated that 2 (5%) of respondents engaged in no moderate physical activity, 9 (21%) engaged in moderate physical activity 1 day per week, 6 (14%) engaged in moderate physical activity 2 days per week, 15 (35%) engaged in moderate physical activity 3 or 4 days per week, 9 (21%) engaged in moderate physical activity 5 or 6 days per week and 2 (5%) engaged in moderate physical activity per week. There was not a significant difference ($p = 0.783$) in moderate physical activity levels between the pre-intervention survey and the post-intervention survey (see Figure 12).

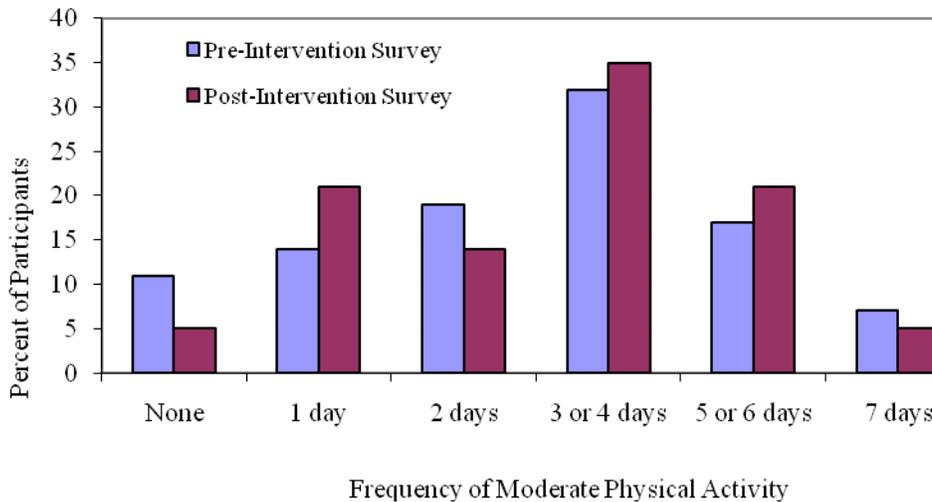


Figure 12. Change in Frequency of Moderate Physical Activity Performed Weekly By ThedaCare Respondents

In relation to overall health status, data from the pre-intervention survey indicated that 1 (1%) respondent classified himself or herself as in poor health, 2 (2%) were in poor-good health, 35 (43%) were in good health, 34 (42%) were in good-excellent health and 9 (11%) were in excellent health. Data from the post-intervention survey indicated that 2 (5%) respondents were in poor health, 3 (7%) were in poor-good health, 18 (42%) were in good health, 19 (44%) were in good-excellent health and 1 (2%) were in excellent health.

A table displaying combined results from all four research questions for each population was created in an effort for future readers to be able to better understand the data results. This table presented a summary of findings in a concise matter (see Table 9).

Table 9. Combined Summary of Data Collected from the Fox Cities, WI, Populations Surveyed

Population	Research Questions			
	RQ1 (Assessed stair use)	RQ2 (Assessed barriers toward stair use)	RQ3 (Assessed reaction to prompts)	RQ4 (Assessed change in overall health status due to prompts)
Affinity Health	Stair use increased significantly	Lack of motivation and busy work schedule most common barriers	Significantly more increased than decreased their stair use. Majority of respondents were aware of prompts.	Frequency of vigorous and moderate physical activity increased significantly.
City of Appleton	Stair use increased	Lack of motivation, busy work schedule and stairwell too dark most common barriers	Significantly more increased than decreased their stair use. Majority of respondents were aware of prompts.	Frequency of vigorous and moderate physical activity increased
ThedaCare	Stair use increased	Lack of motivation, busy work schedule and stairwell too dark most common barriers	Majority of respondents were aware of prompts	Frequency of vigorous physical activity remained unchanged and frequency of moderate physical activity increased

Note. RQ = Research question.

Discussion

Stair use frequency changed during the time from the pre-intervention survey to the post-intervention survey. The stair-use frequency reported on each survey differed significantly for Affinity Health employees. The number of respondents that reported they took less than 2 flights of stairs per day decreased and the number of respondents that reported they took 9 or more flights of stairs per week increased. While the difference in reported stair-use frequency did not differ significantly for City of Appleton and ThedaCare employees, the number of respondents that reported they took less than 2 flights of stairs decreased for both groups of respondents and the number of respondents that reported they took 9 or more flights of stairs per week nearly doubled and stayed the

same respectively. The stair-use frequency among all respondents from the three populations increased significantly between the pre- to post-intervention survey.

When asked what barriers discouraged stair use, the most common responses from Affinity Health respondents in both the pre- and post-intervention were lack of self-motivation and having a busy work schedule/lack of time. City of Appleton respondents also reported lack of self-motivation and having a busy work schedule/lack of time as common barriers in the pre-intervention survey and lack of self-motivation and the stairwell being too dark/not well-lit as common barriers in the post-intervention survey. ThedaCare respondents reported lack of self-motivation and having a busy work schedule/lack of time as common barriers in the pre-intervention survey and having a busy work schedule/lack of time and the stairwell being too dark/not well-lit as common barriers in the post-intervention survey. When the respondents were asked whether they thought a person could do anything to prevent ill health, the majority of respondents from all three employers in both surveys responded that they could definitely do something.

Each population reacted differently to the point-of-decision-prompts. In each of the three populations, the majority of respondents stated in the post-intervention survey that their stair use had not changed. However, in each population, increases in stair use were reported. And importantly, there were significantly more people that increased their stair use compared to those that decreased their stair use among City of Appleton and Affinity Health respondents. In terms of awareness of signs, the majority of respondents from all the locations stated that they were somewhat or very much aware of the signs. When asked to what degree respondents had changed their behavior due to the signs by the stairs, the majority of respondents from Affinity Health reported that the signs did not

cause a change at all. Approximately half of the respondents from the City of Appleton and ThedaCare reported that the prompts had somewhat or very much so caused a change in their behavior.

Overall physical health as estimated by reported amounts of vigorous and moderate physical activity in both surveys differed among the three groups. The level of vigorous and moderate intensity physical activity performed weekly, as reported on the post-intervention survey, among Affinity Health respondents had increased significantly. Among City of Appleton respondents, there was an increase in the percentage of respondents engaging in vigorous intensity physical activity on 1-2, 3, and 4 or more days per week. Also, there was a decrease in the percentage of respondents doing less than 1 day of vigorous intensity physical activity per week. In addition, there was an increase in the percentage of respondents engaging in moderate intensity physical activity 3-4 and 5-6 days per week. The level of vigorous intensity physical activity as reported in the pre- and post-intervention surveys among ThedaCare respondents remained relatively equal. The percentage of respondents engaging moderate intensity physical activity 1 day, 3 or 4 days, and 5 or 6 days a week increased and the percentage of people doing no moderate intensity physical activity decreased. In terms of overall health status, the most common responses among all three populations in both surveys were good or good-excellent.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was to assess reported stair use, reaction to the point-of-decision-prompts, perceived barriers, and in addition provided recommendations regarding stair use at five of the twelve Fox Cities locations through a survey format. The five locations surveyed were the 222 Building (ThedaCare and Affinity Health employees), the City Center (City of Appleton employees) (signs were placed in the three parking ramps used by City of Appleton employees and thus counted as three locations) and St. Elizabeth Hospital (Affinity Health employees). The locations that were surveyed were M&I bank (could not get permission for electronic survey to be sent out), Appleton Medical Center and Theda Clark (these businesses were rolling out separate point-of-decision-prompt interventions on a different timeline), the YMCA parking ramp (did not have point of decision prompts up at time of study), Alta Resources, Kimberly Clark and Plexus (did not have point-of-decision-prompts up at time of study). The pre-intervention survey was implemented before the intervention to gather baseline data. The intervention involved placing point-of-decision-prompts in locations where people had the option of using an elevator or taking the stairs. A follow-up survey was then sent out twelve weeks after the intervention to assess long-term trends in stair use when point-of-decision-prompts were in place. This study provided insight into the AFCT HWLI project and helped to not only assess the success of the intervention through data analysis but also

helped the AFCT recognize strengths and areas for improvement. This assessment was essential because of the fact that the point-of-decision-prompts were left up indefinitely and through this study the AFTC were able to make any necessary adjustments to the project before it was handed over to each location respectively. In addition, the basic need to evaluate the impact of the project was fulfilled. To the researcher's knowledge, there were no studies to date that had examined the results of a point-of-decision-prompt intervention on stair use after a designated amount of time post-intervention when the point-of-decision-prompt was still displayed.

Conclusions

Stair use frequency changed during the time from the pre-intervention survey to the post-intervention survey at each of the locations. The stair-use frequency reported by Affinity Health employees on both surveys differed significantly. Specifically, the number of respondents that reported they took less than 2 flights of stairs per day decreased and the number of respondents that reported they took 9 or more flights of stairs per week increased. While the difference in reported stair-use frequency did not differ significantly between the two surveys for City of Appleton and ThedaCare employees, the number of respondents that reported they took less than 2 flights of stairs decreased in both City of Appleton and ThedaCare respondents and the number of respondents that reported they took 9 or more flights of stairs per week nearly doubled for City of Appleton respondents and stayed the same for ThedaCare respondents. The stair-use frequency among all respondents from the three populations increased significantly between the pre- to post-intervention survey.

When asked what barriers discouraged stair use, the most common responses from Affinity Health respondents in both the pre- and post-intervention were lack of self-motivation and having a busy work schedule/lack of time. City of Appleton respondents also reported lack of self-motivation and having a busy work schedule/lack of time as common barriers in the pre-intervention survey but reported lack of self-motivation and the stairwell being too dark/not well-lit as common barriers in the post-intervention survey. ThedaCare respondents reported lack of self-motivation and having a busy work schedule/lack of time as common barriers in the pre-intervention survey and having a busy work schedule/lack of time and the stairwell being too dark/not well-lit as common barriers in the post-intervention survey. When the respondents were asked whether they thought a person could do anything to prevent ill health, the majority of respondents from all three employers in both surveys responded that they could definitely do something.

Each population reacted differently to the point-of-decision-prompts. In each of the three populations, the majority of respondents stated in the post-intervention survey that their stair use had not changed. However, in each population, increases in stair use were reported. And importantly, there were significantly more people that increased their stair use compared to those that decreased their stair use among City of Appleton and Affinity Health respondents. In terms of awareness of signs, the majority of respondents from all the locations stated that they were somewhat or very much aware of the signs. When asked to what degree respondents had changed their behavior due to the signs by the stairs, the majority of respondents from Affinity Health reported that the signs did not cause a change at all. Approximately half of the respondents from the City of Appleton

and ThedaCare reported that the prompts had somewhat or very much so caused a change in their behavior.

Overall physical health as estimated by reported amounts of vigorous and moderate physical activity in both surveys differed among the three groups. The level of vigorous and moderate intensity physical activity performed weekly, as reported on the post-intervention survey, among Affinity Health respondents had increased significantly. Among City of Appleton respondents, there was an increase in the percentage of respondents engaging in vigorous intensity physical activity on 1-2, 3, and 4 or more days per week. Also, there was a decrease in the percentage of respondents doing less than 1 day of vigorous intensity physical activity per week. In addition, there was an increase in the percentage of respondents engaging in moderate intensity physical activity 3-4 and 5-6 days per week. The level of vigorous intensity physical activity as reported in the pre- and post-intervention surveys among ThedaCare respondents remained relatively equal. The percentage of respondents engaging moderate intensity physical activity 1 day, 3 or 4 days, and 5 or 6 days a week increased and the percentage of people doing no moderate intensity physical activity decreased. In terms of overall health status, the most common responses among all three populations in both surveys were good or good-excellent.

Discussion

The data collected from this study indicated that a simple point-of-decision-prompt intervention was effective in increasing stair use in the workplace. In all three populations, the amount of people taking 7 or 8 flights of stairs or 9 or more flights of stairs, as indicated in the post-intervention survey, either increased or stayed the same compared to the levels indicated in the pre-intervention survey. While not every location

saw a significant increase, the trend in increased stair use may have been indicative of a possibility of a long-term significant increase in daily stair use. In addition, when all three populations were analyzed together, the increase in stair use was significant. Studies by Brownell et al. (1980), Andersen et al. (1998), Boutelle et al. (2001), Northwest Public Health (2006), Kerr, Eves and Carroll (2000), Andersen (2006), Russell et al. (1999), Kerr et al. (2004), Titze et al. (2001) and Blamey et al. (1995) all found that point-of-decision-prompts increased stair use in various locations among various populations. Based on these studies, the data collected in this study were expected by the researcher. The researcher was not able to determine long-term effects of the point-of-decision-prompts for key reasons. First, the ThedaCare respondents received the survey a week later than the Affinity Health and City of Appleton respondents. In addition, the week the ThedaCare respondents took the survey the prompts were also already up in the City Center. Also, the prompts were delayed in getting put up in both the 222 Building and St. Elizabeth Hospital. The prompts were put up on December 22, 2008, and January 7, 2009, in the 222 Building and St. Elizabeth Hospital respectively. Again, while all the data were not significant, the data showed increases in stair use added to the body of research supporting the effectiveness of point-of-decision prompts. Several factors may have played a role in lack of a significant increase in daily stair use at each location. First, because independent samples were used for each survey, not everyone that took the pre-intervention survey also took the post-intervention survey. The data collected may not have been indicative of the actual trends in stair use over time of those exposed to the point-of-decision prompts. In addition, perhaps those that took the stairs more often were also more likely to take the survey. Second, while a timeline was set with each location as

to when the point-of-decision prompts were to be put in place, each location ended up putting the prompts up at different times. The length of time the point-of-decision prompts were in place may also have had an effect on daily stair use. Third, the age of the participants may have played a role in stair use. The average age of each population in both the pre- and post-intervention survey was in the 40's. At this age, respondents are still able to use the stairs with the exception of those with physical limitations or disability. The young average age of the respondent's may be one factor behind the overall increase in stair use among respondents. Finally, the accessibility and lighting of the stairwells may have deterred stair use despite the presence of the point-of-decision prompts. In each population, respondents noted that stairwells not be easily accessible and/or not well lit played prevented them from taking the stairs.

The physical barriers to stair use that the respondents indicated were also what the researcher expected. In both surveys for all three populations, lack of self-motivation and a busy work schedule were among the most common responses. Research by Marshall et al. (2002) also found similar results. The Public Health Agency of Canada (2007) noted that taking the stairs is often faster than taking the elevator for the same distance. Perhaps this fact, in addition to the cardiovascular benefits stair use provides, could be used on point-of-decision prompts to increase stair use. Motivation can be a hard barrier to overcome, but responses from respondents from all three populations indicated methods that may work to increase motivation including prompts that would inflict guilt, prompts that were more personal (e.g., "What can you do to improve your health today"), prompts that had more health specific data on them (e.g., calories burned, weight watchers activity points) and prompts that were entertaining (e.g., contained jokes or puzzles). What these

data also indicated was that future efforts needed to focus on providing motivation to take the stairs. That motivation could be in the form of intrinsic motivation through the types of point-of-decision-prompts used or could be extrinsic motivation in the form of a contest or competition, especially in team or partner form. Another barrier, accessibility, played a role in stair use. Several respondents from all three groups expressed a desire to have the stairwells more accessible and stated that if the stairwells were more accessible they would be more likely to use them. In addition, many respondents noted that something as simple as a map of the stairwells in the building would motivate them to take the stairs more often. Many respondents stated that they simply didn't know where the stairs led too.

In both surveys, when respondents were asked whether they felt they could do anything to prevent ill health, the majority of respondents from all three populations indicated that they could definitely do something. What this shows is that, among those surveyed, respondents felt that they could have taken an active role in maintaining their health. This question was meant to address mental barriers to physical activity; however, among these populations, this issue did not seem to present a barrier. Thus indicating that physical barriers presented the biggest challenge to stair use.

There seemed to be mixed results relating to how the populations reacted to the point-of-decision-prompts. The majority of Affinity Health and ThedaCare respondents indicated that their stair use had not changed due to the point-of-decision-prompts. However, there was a significant difference in stair use among Affinity Health respondents between the pre- and post-intervention surveys. This lack of continuity between responses might have been due to some external factors. Perhaps, other factors,

either intrinsic or extrinsic, motivated respondents to take the stairs. Also, not all the respondents that took the pre-intervention survey also took the post-intervention survey. While more City of Appleton respondents indicated their stair use had stayed the same, none of the respondents indicated their stair use decreased and 42% indicated their stair use had actually increased representing a significant difference. It is important to note that while this study was being conducted, there was an internal wellness initiative within the City Center open to all City of Appleton employees that also was focusing on getting people to take the stairs more often while at work. This initiative involved people tallying the number of flights they climbed in an effort to see if they could climb the equivalent of various large skyscrapers throughout the U.S.

In terms of awareness of signs, the majority of respondents from all the locations stated that they were somewhat or very much aware of the signs. All of the City of Appleton and the majority of ThedaCare and approximately half of Affinity Health respondents indicated they were either somewhat aware of very aware of the point-of-decision-prompts. However, many respondents from all three groups indicated in question 19 in the post-intervention survey (see Appendix B) that they would have liked the signs to be more colorful and eye-catching. In addition, many expressed an interest in having more signs put up, placing the signs in elevators and having the signs sent via email in addition to being posted.

The extent to which the point-of-decision-prompts caused a change in stair use was another indicator of how respondents reacted to point-of-decision-prompts. In all three populations, the most common answer was that the prompts did not at all cause a change in stair use frequency. These data may have been due to several different factors.

One factor, among Affinity Health respondents, was that they simply were not aware of the signs, as discussed above. Another factor was that there may have been other motivating factors or reasons that respondents increased stair use. However, again, it was important to note that due to the fact the samples were independent, these data might not have been indicative of the true extent to which point-of-decision-prompts have caused a change in stair use among the three populations.

It is important to note that when examining the three areas used to examine reaction to point-of-decision-prompts (i.e., change in stair use due to the prompt, level of awareness of the prompts and the extent to which the prompts caused the change in stair use) not all the respondents that took the pre-intervention survey also took the post-intervention survey. Therefore, the true reaction to point-of-decision prompts among all that were exposed to them was not known.

The point-of-decision-prompts may have had an effect on overall health but the researcher was not certain whether the intervention specifically or other contributing factors played a role in the data results. Significant increases in weekly vigorous and moderate intensity physical activity were seen among Affinity Health respondents. However, though the effects were small, increases in weekly vigorous and moderate intensity activity were also found among City of Appleton respondents and increases in moderate intensity physical activity were found among ThedaCare respondents. No matter what the cause, it was encouraging to see increases in these frequencies because it indicated more people are meeting the physical activity requirements indicated by the CDC.

Overall, the results gathered from this study added to the body of research relating to community interventions aimed at improving cardiovascular health by increasing physical activity. Due to the change in timing of when the point-of-decision-prompts were placed at each of these locations, the goal of examining the long-term results of a point-of-decision-prompt intervention at each location was not met. In addition, because of the sampling methods used, it was not known whether the data collected were representative of the populations that work at each of these locations.

Community-based research can be quite complex, as this study demonstrated. Often times, unforeseen barriers or limitations play a role in the measured outcomes. For example, the amount of respondents from all three populations that reported lack of accessibility to stairs was a barrier that was not predicted by the researcher. Even though this barrier may have played a role in the data results, it was important that it was identified because it brought forth an issue that needed to be addressed that the AFCT may not have realized was an issue. In addition, seasonality was another barrier that was not predicted by the researcher. Many respondents noted that the cold weather in the outside stairwells in addition to slippery conditions caused by ice and snow were barriers to using the stairs.

Recommendations

Recommendations for Implementation

This study demonstrated the value of community interventions aimed at preventing cardiovascular disease through increasing physical activity. These findings were suggestive of strategies for the design of future intervention studies in community settings.

Strategies to increase stair use in the workplace might involve using point-of-decision-prompts throughout the workplace in an effort to improve cardiovascular health by increasing stair use. In addition, employees at these locations should be made aware, through various means such as emails or other types of announcements, of the prompts.

Another strategy to increase stair use should be reducing common barriers including lack of motivation and having a busy schedule by creating prompts that address these respective barriers. In addition, making the stairwells more appealing might also increase, along with point-of-decision-prompts, the likelihood of increased stair. Research by Boutelle et al. (2001) and Kerr et al. (2004) found that improving the aesthetic quality of stairwells could increase stair use frequency.

Future point-of-decision-prompt interventions should also be more specifically tailored to different constituencies. Examining the demographic characteristics of a population may allow for more appropriate types of signage for a particular group (e.g., women, middle-aged persons or those with high or low education levels). This would allow for a more specific message for that particular group that may be more likely to promote a positive change in behavior. In addition, different fields of work may lend themselves to different types of prompts (i.e., what motivates health professionals may not motivate education professionals and vice versa). Finally, when considering this type of intervention, researchers should carefully examine the age of the population they are working with. Older participants may not be able to take the stairwells as easily as younger participants due to physical limitations and/or disability.

Recommendations for Improving the Research

One primary recommendation for improving this research would be to use a matched-pairs sampling technique. It is hard to know the true extent of significance of a study when the populations are independent. For this the purposes of this study it was difficult to use a matched-pairs sampling technique due to constraints internally with the employers. However, a matched-pairs technique would allow for better comparison of data from the pre- and post-interventions surveys and would allow for an effective analysis of how the point-of-decision-prompts truly affected the population being studied.

Recommendations for Future Research

Future studies examining the effects of point-of-decision-prompts should examine the long-term effects of the prompts. In particular, a longer-term study examining may provide valuable insight into the effectiveness of prompts over time. In addition future studies could examine how race/origin and/or gender play a role in reaction to point-of-decision-prompts. In this study, there was not a wide range of diversity. In addition, the majority of respondents were women. Future studies could provide valuable insight into how these subgroups react to prompts.

Finally, future research should examine what types of prompts work best and perhaps with what audiences. Studies examining prompts that have motivational messages, factual messages, race/origin and/or gender specific messages, or just visual messages could also provide insight into the effectiveness of point-of-decision-prompts and would add to the growing body of research in this area.

Implications for Health Professionals

While not all the findings of this study were significant, this study supported the idea that a point-of-decision-prompt intervention was a simple, inexpensive and effective way to prevent cardiovascular disease by encouraging physical activity. As the overweight and obesity crisis affecting the United States continues, interventions such as this one can provide opportunities to target large groups of people at low-cost. Importantly, this study also shows there is synergy when various health professionals and other community members work together to solve a vital community issue. By pooling resources and collaborating ideas, large-scale issues can be addressed with research-based and effective interventions. Health educators can play an important role in addressing these issues by providing education and awareness of vital community issues, such as obesity and overweight. In addition, health educators can provide important knowledge and skills while working in community collaborations and coalitions.

REFERENCES

- Andersen, R. E., Franckowiak, S. C., Snyder, J., Bartlett, S. J., & Fontaine, K. R. (1998). Can inexpensive signs encourage the use of stairs? Results from a community intervention. *Annals of Internal Medicine*, *129*(5), 363-369.
- Bassett, D.R., Vachon, J.A., Kirkland, A.O., Howley, E.T., Duncan, G.E., & Johnson, K.R. (1997). Energy cost of stair climbing and descending on the college alumnus questionnaire. *Medicine & Science in Sports & Exercise*, *29*(9), 1250-1254.
- Behavioral Risk Factor Surveillance System in the Fox Cities. (n.d.). *2005 Key findings summary*. Retrieved March 3, 2009, from <http://www.foxcitieslifestudy.org>
- Blamey, A., Mutrie, N., & Aitchison, T. (1995). Health promotion by encouraged use of stairs. *British Medical Journal*, *311*, 289-290.
- Boreham, C.A.G., Wallace, W.F.M., & Nevill, A. (2000). Training effects of accumulated daily stair-climbing exercise in previously sedentary young women. *Preventive Medicine*, *30*, 277-281.
- Boutelle, K. N., Jeffery, R. W., Murray, D. M., & Schmitz, K. H. (2001). Using signs, artwork, and music to promote stair use in a public building. *American Journal of Public Health*, *91*(12), 2004-2006.
- Brown, L.D., & Kraft, M.K. (2008). Active living, the built environment, and the policy agenda. *Journal of Health Politics, Policy and Law*, *33*(3), 371-386.
- Brownell, K. D., Stunkard, A. J., & Albaum, J. M. (1980). Evaluation and modification of exercise patterns in the natural environment. *American Journal of Psychiatry*, *137*(12), 1540-1545.
- Dunn, A.L., Andersen, R.E., & Jakicic, J.M. ((1998). Lifestyle physical activity interventions: History, short- and long-term effects, and recommendations. *American Journal of Preventive Medicine*, *15*(4), 398-412.
- Healthy People 2010. (n.d.). *Leading Health Indicators: Priorities for Action*. Retrieved March 3, 2009, from <http://www.healthypeople.gov/LHI/Priorities.htm>
- Healthy People 2010. (n.d.). *What are the leading health indicators*. Retrieved March 3, 2009, from <http://www.healthypeople.gov/LHI/lhiwhat.htm>

- Kerr, J., Eves, F., & Carroll, D. (2000). Posters can prompt less active people to use the stairs. *Journal of Epidemiology and Community Health*, 54, 942-943.
- Kerr, N. A., Yore, M. M., Ham, S. A., & Dietz, W. H. (2004). Increasing stair use in a worksite through environmental changes. *American Journal of Health Promotion*, 18(4), 312-315.
- King, A.C., Jeffery, R.W., Fridinger, F., Dusenbury, L., Provence, S., Hedlund, S.A., & Spangler, K. (1995). Environmental and policy approaches to cardiovascular disease prevention through physical activity: Issues and opportunities. *Health Education Quarterly*, 22(4), 499-511.
- Marshall, A. L., Bauman, A. E., Patch, C., Wilson, J., & Chen, J. (2002). Can motivational signs prompt increases in incidental physical activity in an Australian health-care facility? *Health Education Research*, 17(6), 743-749.
- Medical College of Wisconsin. (2008). *Healthy Wisconsin Leadership Institute launches Community Teams Program*. Retrieved June 27, 2008, from Medical College of Wisconsin Web site:
<http://www.mcw.edu/display/docid396/NewsCenter/CollegeWeeklyNews/HealthyWis5.html>
- Minnesota Department of Health. (November, 2004). *2004 Minnesota worksite health promotion survey: Results and recommendations*. Retrieved June 27, 2008, from <http://www.health.state.mn.us/cvh>
- National Coalition for Promotion Physical Activity. (n.d.). *Take Action! National coalition for promoting physical activity*.
- Northwest Public Health. (n.d.). *Wellness in the workplace*. Retrieved June 27, 2008, from <http://www.nwpublichealth.org/archives/f2006/workplace-wellness-initiatives>
- Paffenbarger, R.S., JR., Blair, S. N., Lee, I., & Hyde, R. T. (1993). Measurement of physical activity to assess health effects in free-living populations. *Official Journal of the American College of Sports Medicine*, 60-70.
- Pate, R.R., Pratt, M., Blair, S.N., Haskell, W.L., Macera, C.A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G.W., King, A.C., Kriska, A., Leon, A.S., Marcus, B.H., Morris, J., Paffenbarger, R.S., Jr., Patrick, K., Pollock, M.L., Rippe, J.M., Sallis, J., & Wilmore, J.H. (1995). Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of the American Medical Association*, 273(5), 402-407.

- Public Health Agency of Canada. (February 26, 2007). *Stairway to health*. Retrieved June 27, 2008, from www.phac-aspc.gc.ca/sth-evs/english/more.htm.
- Raynor, D.A., Coleman, K.J., & Epstein, L.H. (1998). Effects of proximity on the choice to be physically active or sedentary. *Research Quarterly for Exercise and Sport*, *69*(1), 99-103.
- Rosenberger, R.S., Sneh, Y., Phipps, T.T., Gurvitch, R. (2005). A spatial analysis of linkages between health care expenditures, physical inactivity, obesity and recreation supply. *Journal of Leisure Research*, *37*(2), 216-235.
- Russell, W. D., Dzewaltowski, D. A., & Ryan, G. J. (1999). The effectiveness of a point-of-decision-prompt in deterring sedentary behavior. *American Journal of Health Promotion*, *13*(5), 257-259.
- Titze, S., Martin, B. W., Seiler, R., & Marti, B. (2001). A worksite intervention module encouraging the use of stairs: Results and evaluation issues. *Social and Preventive Medicine*, *46*, 13-19.
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (October 26, 2001). Increasing physical activity: A report on recommendations of the task force on community preventive services. *Morbidity and Mortality Weekly Report*, *50*(RR-18). Kahn, E.B., Ramsey, L.T., Heath, G.W. & Howze, E.H.
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (2009). *Obesity and overweight: Introduction*. Retrieved February 26, 2009, from <http://www.cdc.gov/nccdphp/dnpa/obesity/>
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (2008). *Obesity and overweight: Trends: U.S. obesity trends*. Retrieved February 26, 2009, from <http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/index.htm>
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (n.d.). *Obesity trends among U.S. adults*. Washington, DC: Department of Health and Human Services.
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (2008). *Physical activity for everyone: How much exercise to you need?* Retrieved July 7, 2008, from <http://www.cdc.gov/nccdphp/dnpa/physical/everyone/recommendations/index.htm>

- United States Department of Health and Human Services Centers for Disease Control and Prevention. (2008). *Physical activity for everyone: Physical activity and health*. Retrieved March 3, 2009, from <http://www.cdc.gov/physicalactivity/everyone/health/>
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (August 15, 2003). Prevalence of physical activity, including lifestyle activities among adults-United States, 2000-2001. *Morbidity and Mortality Weekly Report*, 52(32), 764-769.
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (November 23, 2007). Prevalence of regular physical activity among adults-United States, 2001-2005. *Morbidity and Mortality Weekly Report*, 56(46), 1209-1212.
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (May 22, 2007). *Selected references*. Retrieved October 12, 2008, from <http://www.cdc.gov/nccdphp/dnpa/hwi/toolkits/walkability/references.htm>
- United States Department of Health and Human Services Centers for Disease Control and Prevention. (May 22, 2007). *StairWELL to better health*. Retrieved June 27, 2008, from www.cdc.gov/nccdphp/dnpa/hwi/toolkits/stairwell/index.htm
- United Way Fox Cities-Life Study. (2008). *Behavioral Risk Factor Surveillance System*. Retrieved September 19, 2008, from <http://www.foxcitieslifestudy.org/uwfclife/health+survey+results+brfss/default.asp>
- University of Michigan Health Management Research Center. (2008). *Health Assessment*. Scantron Corporation

APPENDIX A
PRE-INTERVENTION SURVEY

1. Informed Consent
2. Who is your employer
 - a. ThedaCare
 - b. Affinity Health System
 - c. City of Appleton
3. What is your job title?
4. Please indicate your highest level of education obtained.
 - a. Some high school
 - b. High school graduate
 - c. Some college
 - d. Associate's Degree (e.g., AA or AS)
 - e. Bachelor's Degree (e.g., BA or BS)
 - f. Master's Degree (e.g., MA or MS)
 - g. Professional Degree (e.g., MD, DDS, JD)
 - h. Doctorate Degree (e.g., PhD or EdD)
5. Please indicate your place of work. Check only one response.
 - a. City Center
 - b. 222 Building
 - c. St. Elizabeth Hospital
6. In the average week, how many times do you engage in physical activity (exercise or work which is hard enough to make you breathe heavily and make your heart beat faster) and is done for at least 20 minutes? (Examples include running, brisk walking or heavy labor, e.g., chopping, lifting, digging, etc... Check only one response.
 - a. Less than 1 time per week
 - b. 1 or 2 times per week
 - c. 3 times per week
 - d. 4 or more times per week
7. How many days per week do you get 30 minutes or more (for at least 10 minutes at a time) of light to moderate physical activity? Examples include walking, mowing (push mower), slow cycling. Check only one response.
 - a. None
 - b. 1 day
 - c. 2 days
 - d. 3 or 4 days
 - e. 5 or 6 days
 - f. 7 days
8. How many flights of stairs do you take each day (1 flight=10 steps). Check only one response.
 - a. Less than 2
 - b. 2-4
 - c. 5-6
 - d. 7-8
 - e. 9 or more
9. Do you think a person of your age can do anything to prevent ill health? Check only one response.

- a. Can definitely do something
 - b. Can perhaps do something
 - c. It is largely a matter of chance
10. Please check any of these barriers that pertain to your use of the stairs in your workplace. Check all that apply.
- Lack of self-motivation
 - Physical injury (e.g., back injury, shoulder injury, leg injury)
 - Health problem/condition (e.g., asthma, allergy, pregnant)
 - Busy work schedule/lack of time
 - Stairwell not easily accessible
 - Stairwell dark/not well-lit
11. Gender. Check only one response.
- a. Male
 - b. Female
12. Age
13. Race/Origin. Check only one response.
- a. White (non-Hispanic origin)
 - b. Black (non-Hispanic origin)
 - c. Hispanic
 - d. Asian or Pacific Islander
 - e. American Indian/Alaskan Native
 - f. Biracial
 - g. Other
14. Health Status. Check only one response.
- a. Poor
 - b. Poor-Good
 - c. Good
 - d. Good-Excellent
 - e. Excellent
15. If you would like to be entered into the drawing associated with this survey, please click here to send an email to the researcher Alyson Luchini <<mailto:luchini.als@students.uwlax.edu?subject=Pointofdecisionpromptsurvey>>luchini.als@students.uwlax.edu. Hit send to submit your name. The drawing will take place on November 21st, 2008

APPENDIX B
POST-INTERVENTION SURVEY

1. Informed Consent
2. Who is your employer?
 - a. ThedaCare
 - b. Affinity Health System
 - c. City of Appleton
3. What is your job title?
4. Please indicate your highest level of education obtained.
 - a. Some High School
 - b. High School Graduate
 - c. Some College
 - d. Associate's Degree (e.g., AA or AS)
 - e. Bachelor's Degree (e.g., BA or BS)
 - f. Master's Degree (e.g., MA or MS)
 - g. Professional Degree (e.g., MD, DDS, JD)
 - h. Doctorate Degree (e.g., PhD or EdD)
5. Please indicate your place of work. Check only one response.
 - a. City Center
 - a. 222 Building
 - b. St. Elizabeth Hospital
6. Did you fill out the survey sent to your workplace in November 2007? Check only one response.
 - a. Yes
 - b. No
7. In the average week, how many times do you engage in physical activity (exercise or work which is hard enough to make you breathe heavily and make your heart beat faster) and is done for at least 20 minutes? (Examples include running, brisk walking or heavy labor, e.g., chopping, lifting, digging, etc... Check only one response).
 - a. Less than 1 time per week
 - b. 1 or 2 times per week
 - c. 3 times per week
 - d. 4 or more times per week
8. How many days per week do you get 30 minutes or more (for at least 10 minutes at a time) of light to moderate physical activity? Examples include walking, mowing (push mower), slow cycling. Check only one response.
 - a. None
 - b. 1 day
 - c. 2 days
 - d. 3 or 4 days
 - e. 5 or 6 days
 - f. 7 days
9. How many flights of stairs do you take each day (1 flight=10 steps). Choose only one response.
 - a. Less than 2
 - b. 3-4
 - c. 5-6

- d. 7-8
 - e. 9 or more
10. Compared to your use of stairs three months ago, has the number of flights of stairs you take each day...
- a. Increased
 - b. Decreased
 - c. Stayed the same
11. Your organization posted signs regarding stair use. How aware are you of the signs?
- a. Not at all aware
 - b. Somewhat aware
 - c. Very much aware
12. To what degree have you changed your behavior due to the signs placed by the stairs at your organization?
- a. Not at all
 - b. Somewhat
 - c. Very much
13. Do you think a person of your age can do anything to prevent ill health?
- a. Can definitely do something
 - b. Can perhaps do something
 - c. It is largely a matter of chance
14. Please check any of these barriers that pertain to your use of the stairs in your workplace. Check all that apply.
- Lack of self-motivation
 - Physical injury (e.g., back injury, shoulder injury, leg injury)
 - Health problem/condition (e.g., asthma, allergy, pregnant)
 - Busy work schedule/lack of time
 - Stairwell not easily accessible
 - Stairwell dark/not well-lit
15. Gender. Check only one response.
- a. Male
 - b. Female
16. Age
17. Race/Origin. Check only one response.
- a. White (non-Hispanic origin)
 - b. Black (non-Hispanic origin)
 - c. Hispanic
 - d. Asian or Pacific Islander
 - e. American Indian/Alaskan Native
 - f. Biracial
 - g. Other
18. Health Status. Check only one response.
- a. Poor
 - b. Poor-Good
 - c. Good
 - d. Good-Excellent

e. Excellent

19. How would you suggest the stairwell signs could be improved so that you would use the stairwell more often?
20. How would you suggest the stairwell could be improved so that you would use the stairwell more often?
21. If you would like to be entered into the drawing associated with this survey, please click here to send an email to the researcher Alyson Luchini [luchini.alys@students.uwlax.edu](mailto:luchini.alys@students.uwlax.edu?subject=Pointofdecisionpromptsurvey). Hit send to submit your name. The drawing will take place on February 21st, 2009.

APPENDIX C
POINT-OF-DECISION-PROMPTS

Figure C1. Examples of point-of-decision-prompts.

