Heart Healthy Online: An Innovative Approach to Risk Reduction in the Workplace

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Abstract

Objectives: To examine whether a Web-based cardiovascular health promotion program was associated with changes in self-reported behaviors, attitudes, and biometric indicators in a population of working adults.

Methods: A total of 210 employees were recruited for participation and randomized into either an Internet-based program or a control condition. Participants completed pre- and posttest self-report assessments on diet, exercise, smoking and mental health and were scheduled for biometric screenings pre and post-intervention to obtain blood pressure, heart rate, weight, and hip/waist circumferences.

Results: The intervention was associated with improvements in dietary attitudes, dietary intentions, dietary self-efficacy, exercise self-efficacy, exercise habits, and the ability to cope with stress and depression.

Conclusions: The program showed promise for promoting behaviors associated with improvements in cardiovascular health. The results are consistent with similar web-based interventions offered at worksites.

Introduction

Approximately one of every four deaths can be attributed to heart disease.[1] Morbidity data on coronary attacks, chest pains, and other cardiac diseases are even higher with an estimated one in every three adults having some form of cardiovascular disease.[2] Cardiac disease, like many medical illnesses, is a chronic condition which can be managed by adherence to medical regimes and the reduction or elimination of risk factors. Despite public health "calls to action" for greater prevention and intervention efforts,[3] the health statistics related to these health behaviors indicate that there remains a great need for intervention.[4]

Studies indicate that people are more likely to initiate health change if they are advised to do so by a health professional.[5] Yet, there are many barriers to health care that prevent this from happening.[6,7] In addition to barriers to care, there are personal barriers such as lack of time, resources, hindrances such as fatigue and depression, and heavy workload.[8] In response, there are numerous studies that cite the need for public health professionals and policy makers to explore alternative methods for promoting behavioral change and risk modification.[9]

One environment in which health promotion programs are offered outside of the more traditional medical settings is workplaces. Workplaces have a keen interest in modifying risks associated with cardiovascular disease. The large majority of American corporations are engaged in some form of health promotion,[10] and there is a substantial body of evidence that supports the belief that such programs can be excellent mechanisms for increasing worker health, decreasing health care costs, and improving productivity.[11-13] Worksites provide access to over 65 percent of the population aged 16 and older, and are ideal settings to implement strategies for reducing the prevalence and burden of obesity, inactivity, and other unhealthy habits.[14] Worksites allow access to adults in an environment controlled through established channels of communication and social support networks. Opportunities are readily available in worksites for setting up programs that utilize environmental and policy changes to modify risk factors related to diet, activity, and other health habits such as smoking.[15]

Computer-based interventions offer unique opportunities for disseminating behavioral health messages and skill enhancement to populations at risk for cardiovascular disease and are positively regarded by workplaces given ease in administration and relatively low costs.[16] Developing a program that is effective, however, requires incorporation of methods that foster and support continuation of behavioral change.[17] Computer-based interventions have been shown effective in enhancing the learning and retention of health-related materials, as well as promoting health behavior change.[18-23]

The Heart Healthy program was designed to provide cardiac health promotion and disease prevention information to working adults in an easily accessible and flexible format. It was also designed to tailor that information to multiple user needs, address issues such as goal setting and monitoring, and provide comprehensive material promoting positive health behavior change across multiple topics, including diet, exercise, weight management, smoking cessation, and mood management.

Study Aims

The central purpose of the web-based Heart Healthy program was to provide working men and women with information on cardiovascular disease as well as behavioral strategies for reducing their personal risk. The program contained modules on heart healthy eating, exercise, stress and mood management, smoking cessation, and general facts on the benefits of adopting a heart healthy lifestyle.

An important aim of the study was to test the effectiveness of the web-based program in motivating individuals to reduce their risk for cardiac disease as well as providing them with the skills to do so. The study hypothesized that employees receiving the program would have greater

knowledge of cardiac risks and the effect of health behaviors on these risks compared to a group receiving treatment as usual; a greater sense of self-efficacy and ability to effectively manage their cardiac health; and would show positive changes in their health behaviors and risk profiles, as measured by weight and blood pressure readings – in addition to self-report indices of exercise, diet, smoking, and mood management.

Research Design

The web-based program, *Heart Healthy: Your Guide for Life!* was field tested in a randomized controlled trial with men and women working in three hospitals. The hospitals were located in Virginia, West Virginia and Ohio. The basic design of the study was a pretest-posttest experimental design in which subjects voluntarily agreed to participate in the program. Those wishing to participate in the study were randomly assigned into either an experimental group that received the URL to the *Heart Healthy* website or to a waitlist control group receiving 'care as usual.' All participants were given access to the web-based program following completion of the post-test questionnaires.

Recruitment and Screening

Recruitment was coordinated through the wellness departments of the participating hospitals. Announcements were placed on the hospital intranet, in the wellness departments, and in the employee cafeteria. Employees interested in participating in the study were told about the nature of the study, and invited to participate in a cardiac risk assessment and screening. To be eligible for the study participants had to have at least one known risk factor for the development of cardiovascular disease and could not be pregnant. Screenings were scheduled at each of the hospitals participating in the study. Nurses were present at the screening and had each potential participant answer a set of demographic and health questions on the screening form prior to having biometric measurements taken. The screening form asked participants for their age, gender and whether they had been diagnosed with: high cholesterol, heart attack, stroke, heart failure, high blood pressure, blockage of arteries, or diabetes. They were also asked whether they took any medications for these same conditions, if they used tobacco products, whether they exercised at least 3 times a week for 30 minutes, and whether they were pregnant. Following completion of the demographic and health questions, each potential participant had their height, weight, waist circumference, hip circumference, blood pressure, and heart rate taken. Individuals with at least one risk for cardiac disease or with a known condition were given details of the study and asked to send an e-mail expressing interest to the Heart Healthy mailbox. Individuals without a risk for cardiac disease and individuals who were pregnant were instructed that they were not eligible for participation in the study, but that they would be given access to the program once the study was completed. Following the screening procedures, the Heart Healthy project staff began responding to e-mails from eligible individuals requesting participation. All eligible individuals were given instructions on the requirements of the study, asked to sign a consent document, and enrolled as a participant. All procedures were reviewed and approved by an Institutional Review Board.

Study Procedures

Employees meeting eligibility criteria and expressing interest in the study were informed that they would be required to complete two on-line surveys asking questions about their health habits, knowledge of cardiac disease, and attitudes toward making health changes. They were also told that they would be assigned to one of two study conditions – (1) reviewing the on-line educational program prior to completion of the second survey or (2) having access to web materials following completion of the second survey. A total of 210 employees completed the pretest survey.

Employees were given two weeks to complete the survey and were sent reminders every few days with information about the deadline and answers to questions raised.

Following completion of the pretest period participants were randomly assigned to either the group viewing the Heart Healthy program (experimental group) or to the waitlist control condition. Employees assigned to the experimental group were allowed access to the web-based program using a unique login and password, which also allowed the project staff to track program utilization by user. Experimental group participants were instructed to view the program independently and to refrain from discussing its contents with co-workers or employees assigned to the control condition. The review period lasted approximately six weeks. Program users were encouraged to view the program over multiple sessions and to view the program in its entirety, if possible. An average of three reminders was sent to participants by the study team during the program review period. The last reminder was sent to individuals who had not entered the program, had spent less than 20 minutes in the program (utilization information was collected from a program tracker), or had viewed a large number of pages in a short period of time (i.e. paging through without reading).

After the program review period, all participants (experimental and control conditions) were asked to complete the posttest survey. Of the 210 employees who completed the pretest survey and were randomized into the study, 188 completed the posttest survey. The relatively low attrition rate (11%) was attributed to frequent contact between the study team and program participants, a cohesive and a well integrated wellness program, and monetary survey incentives ($25 per completed survey, plus a $500 raffle prize)

Sample Characteristics

The sample for analysis included 210 employees working at participating hospitals in Virginia, Ohio, and West Virginia. The study sample was 91.5 percent Caucasian, 3.6 percent African American, 1.8 percent Indian, 1.4 percent Asian, and 1.4 percent Hispanic. Participants ranged in age from 21 to 72. The study sample was heavily female (86%), married (68%), and most had a least some college experience (87%). Table 1 shows the baseline modifiable health characteristics obtained at screenings for study participants. The majority of participants were overweight (BMI > 25) and inactive (active < 30 minutes 3x/wk). A small percentage of participants (8%) were current smokers.

No significant differences were found between the 2 groups at baseline using Cochran-Mantel-Haenszel chi-squared and t-test statistics entering demographic and health information by study condition.

Insert Table 1

Measures

Employees participated in screenings to obtain biometric data and were asked to complete a battery of self-rated knowledge, behavioral, and attitudinal indices. The key topical areas for these ratings were understanding of cardiovascular disease, diet, exercise, and mental health. The survey battery included the following questionnaire and content areas:

- *Demographics* Items assessing respondents' age, ethnicity, marital status, education, income, and job category.
- *Nutritional Patterns* An 8-item scale assessing the nutritional content of one's typical daily diet. Included in this scale are questions asking about the number of fruits, vegetables, grains, proteins, dairy and fats typically consumed during the past 30 days. This scale was

adapted from the Block Self-Administered Diet History,[24] and has been used in other studies by our group (Alpha .64).[19,25]

- *Attitudes Toward a Healthy Diet* A 17-item scale assessing one's attitudes toward healthful eating practices, developed by Trenkner and associates,[26] and used in previous studies by our group. [19,25] Questions are answered on a 5-point Likert scale ranging from strongly agree to strongly disagree. (Alpha = .70).
- *Diet Behavioral Intentions* A 5-item scale assessing intention to engage in more healthful eating practices over the next month. Questions are answered on a 5-point Likert scale ranging from 'Definitely No' to 'Definitely Yes'. Scale has been used in other ISA studies (Alpha .85).[19]
- *Diet Behavioral Change Self-Efficacy* A 5-item scale assessing perceived self-efficacy to engage in more healthful eating practices over the next month. Questions are answered on a 5-point Likert scale ranging from 'Not Confident' to 'Extremely Confident'. Developed by Schwarzer and Renner,[27] this scale has been used in other studies by our group (Alpha .83).[19]
- *Physical Activity Habits* This measure included the Godin Leisure-Time Exercise Questionnaire.[28] This questionnaire contains 4 questions that assess the frequency and intensity with which one engages in physical exercise. Questions are answered for a typical 7-day period for activities that are conducted for more than 15 minutes. A total weekly activity rating is calculated and categorized as light, moderate, or strenuous activity (Alpha .76).
- *Exercise Self-Efficacy* An 8-item scale assessing one's confidence in being able to engage in regular exercise. This measure was developed by Kroll and associates, [29] and is answered on a 4 point likert scale ranging from 'Not at All True' to 'Always True'. (Alpha = .89).
- *Cardiac Knowledge Questionnaire* This questionnaire contains 20 items and is divided into subscales: (1) a cardiac facts and understanding of risk scale, and (2) a cardiac lifestyle and behavioral knowledge questionnaire. This questionnaire was developed for this study and is based on content contained in the Heart Healthy program. (Alpha= .67).
- *Coping With Stress* A 12-item scale assessing the type of strategies one uses to cope with difficult situations and events.[30] Two subscales are imbedded in the survey – adaptability and situation mastery. Adaptability measures flexibility in coping strategies and situation mastery measures the ability to recognize when and how to appropriately react to stressors. Questions are answered on a 4-point Likert scale ranging from "never" to "almost always." (Alpha for the scale is .76).
- *Symptoms of Distress* An 8-item scale developed by Orioli and associates,[30] assessing the frequency of specific physical and behavioral symptoms experienced during the past 30 days. The instructions are to think about the symptoms and determine if they never occur, occurred once or twice during the last 30 days, occurred every week, or occurred nearly every day. (Alpha = .80). Also use in past studies by out group.[19,31]

State-Trait Personality Inventory The state-trait personality inventory (STPI) developed by Spielberger,[32] consists of eight subscales: state and trait anxiety, state and trait curiosity, state and trait depression, and state and trait anger. Each subscale consists of 10 items answered on a 4-point Likert scale ranging from 'not at all' to 'very much so'. The questionnaire is designed to measure both transitory and dispositional emotions in adults. (Alphas: .91 anxiety, .90 anger, .91 depression, .93 curiosity).

- *Tobacco Abstinence Self-efficacy Scale* A 9 item scale describing situations that lead some people to smoke or use tobacco. Respondents (for smokers and those who recently quit) are asked to rate how confident they are that they would not smoke in each situation. Items

are answered on a 5-point Likert scale ranging from "not at all confident" to "extremely confident." (Alpha = .87).

- *Blood Pressure Readings* NHLBI clinical guidelines were used to obtain resting systolic and diastolic blood pressure readings. [33]
- *Resting Heart Rate* Heart rate measures were taken at the same time as the blood pressure reading.
- *Weight/BMI/Waist Hip Ratio* NHLBI clinical guidelines (1998) and procedures developed by Lohman,[34] were used to obtain measures of body weight, height, and hip/waist circumference.

Intervention

The web-based Heart Healthy program consisted of five modules presented in an interactive web-based format. The intervention took place over a period of six-weeks and was self-paced based on personal risk factors and interest level. Experimental participants were encouraged to view the program at times convenient to their schedule and participant utilization was tracked by the research team. Reminders to use the program were sent every 2 weeks. Reminders were also sent to those not viewing the program or viewing it for less than 20 minutes.

The website was fully narrated and consisted of flash programming, graphics, and video segments. The five modules included in the intervention were: ***Risk Factors and Reducing Risk*** (overview on heart disease and the medical aspects of heart attacks and stroke; also contained personal risk assessments and tailored suggestions on viewing the Program); ***Diet and Nutrition*** (addressed general principles of weight management and good nutrition as well as medical facts on cholesterol and hypertension); ***Getting Active*** (cardiac-specific information on the benefits of exercise, a Fitness Assessment, and practical guidance on how to begin, increase or maintain one's level of fitness); ***Stress and Cardiovascular Disease*** (addressed how stress and mood states such as depression and anxiety affect cardiac health, and contained segments on skills building for coping with stress); and ***Tobacco Free*** (adapted from our *Pathways to Health* smoking cessation program (Hersch et al., 2003) which focused on tobacco cessation techniques and information on the impact of smoking on cardiovascular health and wellness).

Analysis

Tests of program effectiveness were conducted using Analysis of Covariance (ANCOVA) procedures contained in the SPSS statistical package. For these analyses pretest (baseline) data were entered as the covariate and post-test data as the outcome of interest.

Analyses followed intent-to-treat principles, including all participants irrespective of protocol violations and events arising from post randomization.[35] Specifically, analyses included participants in the treatment condition who had not viewed the program (n=4) or viewed the program for less than 20 minutes (n=1). We also imputed data for 22 (9 control and 13 experimental) participants missing data on all outcome variables, using group mean imputation. Finally, there were some missing data that affected calculation of scaled survey data. For these analyses we applied an 80% completion rule for imputation of missing scaled scores.

Results

Knowledge of Cardiovascular Disease

As shown in Table 2, there were no significant differences between the experimental and control groups on measures of knowledge. The knowledge questions were categorized by: cardiac

facts and understanding of risk scale (Knowledge Physical) and cardiac lifestyle and behavioral knowledge questions (Knowledge Behavioral). The test of difference between groups on Knowledge Physical showed a trend in the desired direction, but it did not reach significance ($F = 2.53$; $p = .113$) The total cardiac knowledge scale was a composite of all the questions contained on the survey. There were a total of 20 questions contained in the measure with a possible total score of 20 for the composite and 10 each for the subscales.

Insert Table 2

Diet

Tests of the differences between the experimental and control groups on dietary attitudes, intentions, and self-efficacy indicated that there were significant intervention effects on all these measures, as shown in Table 3 No difference between the groups was found for nutritional patterns. There were significant differences between groups on dietary attitudes ($p = .003$ and $F=8.83$), dietary intentions ($p = .031$ and $F=4.72$), and dietary self efficacy ($p = .015$ and $F=5.97$).

Insert Table 3

Exercise

In the analyses of exercise, a significant intervention effect was found for exercise self-efficacy and exercise behaviors. The significant change between groups from the pre to post-testing period on exercise self-efficacy was significant at .002 and ($F = 9.51$) and the overall level of exercise was significant at .016 ($F= 5.94$). When looking at specific levels of activity (light, moderate, strenuous) the greatest difference between the groups was noted on strenuous physical activity $p=.004$, $F= 8.68$).

Insert Table 4

Stress, Mood, and Smoking

In the assessment of stress and mood measures, a significant intervention effect was observed for the ability to cope with stressful events and situations ($p=.003$ and $F=8.85$) and the state-trait measure of depression ($p=.036$ and $F=4.46$), as shown in Table 5. Other measures of stress and mood from the Spielberger State-Trait Personality Inventory (anger and anxiety) and the symptoms of distress scale did not show significant intervention effects. A trend for symptoms of distress was observed in the desired direction, but did not reach significance ($F =$

2.43, p = .120) Smoking status showed an intervention effect; however, it should be noted that the number of smokers was quite low (n=18) and results indicate a small effect size (r= 0.07) in relation to the P value. These data are based on 2 participants in the experimental condition changing smoking status to non-smoker at follow-up screening and 2 participants in the waitlist control condition changing smoking status to smoker at follow-up screening. A larger sample is necessary to adequately confirm this preliminary finding. The data on smoking self-efficacy are not reported as the numbers of participants with complete data were too low to run ANCOVA analyses.

Insert Table 5

Biometric Outcomes

Biometric measurements were taken by registered nurses during physical exams scheduled at the time of screening (for admission into the study) and following completion of project activities. Results indicate that there were no significant changes on physical measures between groups from the pre to post-testing period on all measures.

Insert Table 6

Program Utilization

Each time a participant logged into the program using the unique identifier, data were collected on the time the user was active in the program (a time-out happened after 10 minutes of no paging) and on the pages that were accessed. The data indicated that the majority of users viewed the program in 3 to 7 or more sessions. There were 16 subjects in the experimental condition that did not login and 12 of these subjects were study dropouts. The average number of logins was 4. The average amount of time spent in the Heart Healthy program was 100 minutes or 1 hour and 40 minutes. Descriptive data collected on the subjective experience of using the program indicated that 94% of participants 'liked' using the program , 93% found the program to be 'interesting', and 82% planned to make positive health changes as a result of viewing the program.

Insert Table 7

Discussion of Findings

Results of this randomized trial provide evidence of the benefits of using a web-based program to promote cardiac risk reduction in working men and women. Employees receiving the Heart Healthy program showed significant improvements across several outcomes known to play a

central role in reducing the risk of coronary heart disease, including physical activity, diet, stress and mood.

Participants accessing the Heart Healthy program showed significant improvements in the amount of overall physical activity they engaged in on a weekly basis, with particularly strong progress shown in the frequency of strenuous exercise – activities that produce increases in heart rate, such as running or bicycling. The improvements in exercise practices were also accompanied by significant improvements in exercise self efficacy. These findings are especially important, as much research supports the positive role of exercise on cardiovascular health.[36-37] More active individuals tend to develop less coronary heart disease (CHD) than their sedentary counterparts.[38-39] Also, if CHD develops in active or fit individuals, it occurs at a later age and tends to be less severe.[40]

Although there was no significant improvement in the nutritional level of the Heart Healthy group's diet, they exhibited significant improvement in dietary attitudes, intentions and self-efficacy – perhaps laying the foundation for healthier eating practices. Improvements on the measure of dietary attitudes indicates that participants receiving the intervention increased their view of the benefits of healthy eating, while perceiving weakened barriers to healthful eating. The improvements in dietary intentions indicated that these participants planned to engage in more healthful eating practices, such as controlling portion sizes and eating more fruits and vegetables. The significant increases in dietary self efficacy indicate that program group participants gained confidence in their ability to engage in these types of healthy eating practices.

The fact that the program group's improvements in diet and exercise were accompanied by increased self-efficacy for both diet and exercise indicates that the many features of Heart Healthy designed to boost self-efficacy (e.g., video clips of workers who successfully improved their exercise and diet, tips for ways to achieve early success, etc.) were effective, and suggests that the increases in exercise self-efficacy might have contributed to the improvements in their exercise practices, as might be predicted by social cognitive theory (SCT).[41] However, while these findings would seem to underscore the importance of this central SCT construct for achieving health behavior change, whether the relationship between self-efficacy and behavior in this trial is causative – and if so, in what direction – remains unknown.

Because stress and mood states have been associated with cardiovascular morbidity,[42] the significant increases in the program group's ability to cope with stress and achieve lower scores on the measure of depression is also meaningful, and indicates that the stress management module was effective in helping users address stress and mood states. In addition to its role in cardiovascular morbidity, stress has also been linked to over-eating and other harmful health habits.[43] Therefore, gaining the skills to manage stress and mood can be very important, with both direct and indirect implications for cardiovascular health and wellness.

Biometric measures of BMI, waist circumference and blood pressure showed no significant effects of the web-based program. It may be that the relatively short intervention and brief follow-up period were not sufficient to achieve the desired improvements in physical states reflected by the biometrics.

Although based on only a small group of smokers, the significant program effects on smoking status are promising, deserving of further research with a larger sample of smokers.

Data on the utilization of the program was encouraging. Average utilization was 1 hour 40 minutes and took place over several sessions. It appears that the program had the ability to catch users' attention and that enough interest was maintained to allow the program to promote positive effects for the majority of program users. Together with the low attrition rates (which also compare favorably to those of past studies of workplace-based programs) and high ratings on the usefulness of the program, these data suggest that users find programs like Heart Healthy to be engaging and worthwhile.

Several studies are worth noting as the results are consistent with our findings and add support to the efficacy of web-based interventions in promoting positive health behaviors and attitudes. The web-based Health Connection program showed a similar pattern of findings,[19] with stronger effects for dietary changes than for physical activity. The ExecuPrev program developed by Bennett and colleagues examined whether a web-based health program designed specifically for managers was associated with changes in self-reported and biometric indicators of cardiovascular risk.[44] More recently, a randomized trial conducted by Cook and associates found that older working adults given access to a web-based healthy aging program performed significantly better than the control group on eating practices, diet change self-efficacy, planning healthy eating, overall exercise, mild exercise, and exercise self-efficacy.[45]

Tests by other investigators of web-based-only programs (i.e., interventions that excluded face-to-face contact) have found results similar to the findings of this trial. The multiple trials of the web-based-only Guide to Health (GTH) program have generated impressive results on both dietary and physical behaviors and related social cognitive constructs – although their intervention was not specifically targeting working adults.[46-47] In a causal model, increases in self-efficacy at seven months led to increased physical activity levels at 16 months, leading Anderson-Bill and her associates to suggest that interventions with adults that boost self-efficacy might help older participants become more active.[47] Their findings would seem to lend support to the view increases in self-efficacy during the Heart Healthy trial contributed to the improvements in exercise practices.

There were limitations to these findings. Knowledge of cardiac disease and understanding of risk factors, often thought to be mediating steps to change, did not show improvements in the experimental group. One plausible explanation for the lack of effect on knowledge is that a large percentage of participants were medical professionals or medical-technical professionals who came to the program with considerable knowledge of cardiac disease, resulting in a ceiling effect and, making change more difficult to achieve.

Another limitation was the relatively brief (six-week) intervention period and the fact that follow-up assessments took place only once, approximately one month after the intervention period. Future studies could benefit from both a longer intervention and follow-up period.

Summary and Conclusions

This project developed and tested a comprehensive web-based educational program for employees with at least one risk for cardiovascular disease. The web-based program contained segments on cardiac risk reduction, diet, exercise, stress and mood management, and smoking cessation. Overall, study findings indicate that the *Heart Healthy* web-based program can be an effective means of changing dietary attitudes and intentions, promoting greater self-efficacy in the areas of dietary and exercise habits, increasing physical activity, and promoting positive coping skills for managing stress and depression in a population of employees at risk for cardiovascular disease.

Results of the study hold promise for the use of Heart Healthy (or similar) web-based programs as an important workplace-based intervention for promoting the attitudes and skills necessary for the adoption of positive cardiac behaviors.

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Table 1 Baseline Health Characteristics of Participants

Cardiac Health Risk	*Experimental*	*Control*	*% All Participants*
Behavioral Risk			
Inactivity (<30 min 3x/wk)	60	65	61%
Overweight (BMI > 25)	86	90	84%
Current Smoker	9	9	8%

Table 2 Knowledge Measures by Condition

Measure	**Web Pretest X (SD)**	**Web Posttest X (SD)**	**Control Pretest X(SD)**	**Control Posttest X (SD)**	**F**	**P**
Total Cardiac Knowledge	14.77 (3.02)	15.44 (2.33)	14.85 (2.61)	15.09 (2.78)	1.85	.175
Knowledge Physical	7.26 (1.40)	7.78 (1.13)	7.37 (1.32)	7.60 (1.30)	2.53	.113
Knowledge Behavioral	7.51 (2.11)	7.66 (1.56)	7.47 (1.74)	7.49 (2.06)	.440	.508

Table 3 Dietary Measures by Condition

Measure	**Web Pretest X(SD)**	**Web Posttest X (SD)**	**Control Pretest X(SD)**	**Control Posttest X (SD)**	**F**	**P**
Nutritional Patterns	25.32(3.21)	26.40(2.67)	25.95(3.16)	26.57 (3.12)	.253	.616
Dietary Attitudes	3.55(.408)	3.78 (.314)	3.70(.385)	3.71 (.426)	8.83	.003*
Dietary Intentions	4.03(.746)	4.30 (.641)	4.07(.723)	4.16 (.700)	4.72	.031*
Dietary Self-Efficacy	3.66(.855)	4.04 (.683)	3.83(.780)	3.88 (.810)	5.97	.015*

Table 4 Exercise Measures by Condition

Measure	**Web**	**Web**	**Control**	**Control**	**F**	**P**

	Pretest X(SD)	Posttest X (SD)	Pretest X(SD)	Posttest X (SD)		
Total Exercise	45.36 (52.82)	48.15 (31.40)	42.45 (36.20)	38.30 (26.97)	5.94	.016*
Mild Exercise	4.23 (2.88)	4.57 (2.90)	4.86 (3.70)	5.27 (5.81)	.786	.377
Moderate Exercise	3.15 (3.30)	3.24 (2.10)	3.29 (3.50)	3.84 (5.55)	1.26	.262
Strenuous Exercise	1.85 (4.37)	1.96 (2.21)	1.26 (1.84)	1.10 (1.35)	8.68	.004*
Exercise Self-Efficacy	2.85 (.565)	3.03 (.475)	2.88 (.663)	2.84 (.624)	9.51	.002*

Table 5 Stress, Mood, and Smoking Measures by Condition

Measure	Web Pretest X(SD)	Web Posttest X (SD)	Control Pretest X(SD)	Control Posttest X (SD)	F	P
Coping with Stress	2.95(.380)	3.06 (.400)	3.00(.376)	2.96 (.435)	8.85	.003*
STPI Anger	1.51(.422)	1.48 (.452)	1.49(.493)	1.45 (.441)	.132	.717
STPI Anxiety	1.88(.533)	1.81 (.533)	1.80(.530)	1.82 (.572)	1.33	.250
STPI Depression	1.80(.532)	1.70 (.527)	1.68(.531)	1.75 (.635)	4.46	.036*
Symptoms of Distress	2.05(.486)	1.94 (.436)	1.98(.482)	1.98 (.526)	2.43	.120
Smoking Status	.09(.284)	.08 (.271)	.09(.283)	.12 (.325)	3.99	.047*

Table 6 Biometric Measurements by Condition

Measure	Web Pretest X(SD)	Web Posttest X (SD)	Control Pretest X(SD)	Control Posttest X (SD)	F	P
Weight	193.64 (46.12)	190.55 (41.97)	193.54 (52.71)	190.22 (49.00)	.015	.903
Systolic BP	124.61 (13.13)	124.65 (10.95)	124.34 (15.27)	126. 99 (15.14)	2.47	.118
Diastolic BP	79.26	78.21	78.47	78.00	.000	.983

	(8.71)	(8.34)	(14.47)	(9.01)		
Heart Rate	75.80 (10.10)	77.59 (10.34)	73.78 (10.34)	75.38 (9.79)	1.28	.260
Hip Measurement	47.07 (5.54)	46.07 (5.34)	46.82 (6.51)	45.76 (6.10)	.093	.761

Table 7 Program Utilization

Program Indicator	***Number***	***Percentage***
Logins		
0	16	15.1%
1	16	15.1%
2	17	16.0%
3-4	31	29.2%
5-6	15	14.2%
7 or more	11	10.4%
Time in Program (For those logging in)		
Less than 20 minutes	17	18.9%
20 to 1 hour	15	16.6%
1 to 2 hours	26	30.1%
Over 2 hours	31	34.4%
Subjective Experience (Program Utilization)		
'*Enjoyed*' using the program	85	94%
Found the program '*Interesting*'	84	93%
Program' *Helped Them'*	82	91%
Planned '*PositiveHealthChange*'	74	82%