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A Five-Year Evaluation of the Bearfit Worksite Physical Activity Program

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Abstract

Background: Regular participation in physical activity is associated with many health benefits including reduced risk of chronic diseases, premature mortality, and improved mental health. However, many American adults do not engage in enough activity to achieve health benefits. Employers recognize the value of physical activity participation among employees as a means to reduce healthcare costs and increase employee productivity.

Objective: The purpose of this study was to empirically evaluate a four-month worksite wellness program offered to university employees and their spouses over five years that was not originally intended for research purposes. A secondary aim was to add a description of a worksite wellness program to the body of literature that could be replicated by other universities and across other occupational settings.

Methods: Participants enrolled in the BearFIT program received access to exercise facilities, group exercise classes, nutrition counseling, and invitations to special activity events. Weight, BMI, waist circumference, blood pressure, resting heart rate, body fat percentage, and flexibility were measured pre- and post-program.

Results: 802 participants enrolled in the study; 387 of these completed the pre-test only and were removed from analyses. The final sample included 415 participants (79.3% female; mean age of 46.6 [SD=11.86; range 23-70]). Paired samples t-tests revealed statistically significant improvements in weight, BMI, waist circumference, body fat percentage, systolic and diastolic blood pressure, and flexibility in our sample. Resting heart rate decreased on average across participants, but not significantly.

Conclusions: Results indicate the BearFIT program is a cost-effective means of promoting health in an occupational setting. Intervention planners should incorporate applicable methodology from the BearFIT program to future worksite wellness programs, and strengthen evaluations with more accurate measures of program participation and the conduction of cost-benefit analyses. Additional suggestions include emphasizing beginner activities tailored towards overweight and obese participants and seeking strategies to increase male participation.

Keywords: Exercise; Physical activity; Worksite wellness; Health promotion; Intervention; Health behavior

Background

The relationship between health and regular physical activity is well established [1-5]. Benefits of physical activity include weight management, reduced risk of cardiovascular disease, better self-esteem, improved mental health and mood, and increased longevity [6-8]. Alternatively, the least active are at the greatest risk for chronic lifestyle diseases, including type II diabetes, obesity, loss of function, and all-cause mortality [9]. Given this, encouraging physical activity participation across all populations is a major public health priority. The authors of the Physical Activity Guidelines [10] recommend adults engage in a minimum of 150 minutes per week of moderate-intensity aerobic physical activity performed in bouts of at least 10 minutes.

Despite this, many American adults do not meet the physical activity recommendations. In fact, data from the National Health Interview Survey revealed less than half of all adults (43.5%) engaged in the minimum amount of physical activity suggested by the guidelines.

Historically, occupation has been a source of physical activity for many Americans [11]. However, as communication technology and labor-saving devices have become increasingly common, jobs have correspondingly become more sedentary. Specifically, an analysis of energy expenditure by occupation revealed less than 20% of all American jobs require at least moderate-intensity physical activity; decreasing from 50% in the 1960s [12]. In another recent study, researchers measuring step counts in office workers found almost two-thirds (65%) of employee's time at work was spent sitting [13].

Recent research highlights the dangers of sedentary behavior (e.g., increased risk of all-cause mortality, cardiovascular disease, obesity, and some cancers) [14-17] and specifically that sitting for more than 6 hours per day negatively impacts one's health [18-22]. The average American adult works for 7.4 hours per day, or the equivalent of onethird of their life [23]. Given that many American adults do not engage in regular physical activity, exhibit high levels of sedentary behavior, and that both behaviors are associated with negative health consequences, the need for interventions is evident.

In corporate America, many businesses have begun to promote, incentivize and acknowledge the benefits of physical activity among their employees and workplace [24-27]. Companies recognize it is in their best interest to have employees live an active lifestyle, [28,29] which is in line with Healthy People 2020 objectives for educational and community-based programs (e.g., increasing the number of worksites that offer health promotion programming and increase the number of employees who participate in these programs) [30].

Benefits of such programs include increased productivity, happier work environment, and lower healthcare costs [31]. Therefore, many companies, businesses, and institutions have implemented worksite wellness programs to not only promote activity and reduce sedentariness, but also to improve health behaviors, long-term health, and promote a sense of community [32].

The purpose of this study was to describe and evaluate a worksite physical activity intervention program designed to improve the health and wellbeing of faculty, staff, and their spouses employed at a four-year university in Texas. University employees have seldom been included in previous worksite wellness program research [33-35]. Thus, this study sought to evaluate a semester-long physical activity intervention not initially intended for research purposes.

Data collected from participants over the multiple years of the study was analyzed to determine if participation in the program resulted in improvements in various objective health markers across participants (e.g., weight, blood pressure, body composition). A secondary aim of this study is to add a description of a potentially successful intervention program that could be implemented across other worksites to the literature.

Methods

Participants and procedure

Participants were faculty, staff, and spouses (n=415) enrolled in the BearFIT worksite wellness program at a large, private university in Texas between 2008 and 2012. Employees were invited to participate and rejoin the program as often as they would like. Therefore, each semester enrolled, participants took new and unique measurements allowing the researchers to treat them as independent cases.

To participate in BearFIT, employees and spouses paid $50 and were given access to: a weight room not accessible by students during certain hours; group exercise classes (i.e., spin cycling, yoga, etc.); circuit weight training sessions, and use of the university fitness center throughout the semester of enrollment.

The program also offered fitness equipment orientations to ensure safety and proper use, weekend activities once per month (e.g., hike through a local park), wellness presentations and seminars, weekly nutrition counseling from trained senior nutrition majors, and a pre/post assessment. Pre- and post-assessments measured each participants' weight, BMI, blood pressure, waist circumference, body fat percentage, and flexibility. Participants that completed both the pre- and post-assessments received a $40 dollar credit toward their insurance payment from Human Resources (thereby reducing the total cost of the program to $10 per semester).

Measures

Trained fitness employees conducted pre- and post-assessments for all BearFIT participants. Pre-assessments took place in the first month of the semester, and post assessments took place in the final few weeks of the semester. The following measures were collected for each participant:

Weight: Two models of scales were used throughout the duration of the program, an electronic (OHAUS Model SD200, Parsippany, NJ) and non-electronic (Detecto, Web City, MT) model. Participants were fully clothed and were instructed to remove their shoes when their weight was taken. Weight was recorded to the nearest half-pound.

Blood pressure: An automatic blood pressure monitor (Omron, Model HEM-780N, Bannockburn, IL) was used in the program. During testing, the cuff was placed on the seated participant's left arm. If possible, the cuff encircled skin and not clothing. If an "error" message was received, the test was reattempted. Systolic and diastolic blood pressures and heart rate were recorded.

Waist circumference: A standard, non-retractable flexible tape measure was used to determine waist circumference. Participants were asked to slightly raise their shirt during testing so the measurement could be taken directly against the skin. Measurements were taken at the participant's natural waist.

Body fat percentage: Bioelectrical impedance (BIA) was used to determine body fat percentage and body mass index. Testing administrators entered the required information from participants (sex, height to the nearest quarter inch, age, and weight to the nearest half pound) into one of two analyzers (Omron HBF-300 and HBF-306 Body Fat Analyzers, Omron Healthcare, Inc., Vernon Hills, IL).

The participants gripped the analyzers and results were displayed after a few seconds. Although BIA is not as accurate as more costly, laboratory measures such as dual-energy X-ray absorptiometry, it is acceptable for monitoring body composition of groups and for monitoring changes in body composition within individuals over time [36].

Flexibility: Flexibility was assessed using a sit-and-reach protocol with The Flex-Tester instrument (Novel Products, INC., Rockton, IL). Participants were asked to remove their shoes, sit on the floor with their legs stretched out in front of them against the Flex-Tester which was secured against a wall. Participants reached forward (towards their toes) with both of their palms facing downwards and one hand on top of the other, and pushed the moveable marker as far forward as possible. Each participant was given three attempts and the best attempt was recorded to the nearest inch.

Data analysis

A pre/post design was used in this study. Data were collected from participants in the fall and spring semesters between 2008 and 2012. The data was not originally intended for further analysis. Physiological data was originally collected from each participant with the sole intent of highlighting personal health accomplishments (e.g., weight loss) after completing the program, not to evaluate intervention-wide changes and effects.

Analyzing the data from the intervention was deemed low-risk and was exempt from the need for review by the institutional review board at the referent university. All data were stripped of any identifying information, making it impossible for the research team to link data to a person. To evaluate the results of the program, descriptive statistics and paired-samples t-tests were conducted on pre- and post-assessment data. All analyses were computed in SPSS version 21.

Results

A total of 802 participants initially enrolled in the program. Of these, 387 participants completed a pre-assessment, but did not complete a post-assessment, and therefore were not included in the final analysis. The final sample therefore included 415 participants, and was 20.7% male (n=86) male and 79.3% female (n=329). The average age of participants was 46.6 years (SD=11.86; range 23-70).

Using an independent samples t-tests, researchers compared participants that did and did not complete the program. Results showed that pre-test weight was significantly different between the group that completed the program and the group that did not, with the pre-assessment only group weighing more on average than the pre- and post-test group (MΔ=6.10, p=0.048). The two groups did not differ in sex or age.

An additional 72 participants enrolled in and completed the program more than one semester. Each semester of participation was completed as a unique case in the final analyses, where changes in health markers were evaluated separately for each semester enrollment. Paired-samples t-tests were conducted to determine if BearFIT participants' pre- and post-measurements differed significantly.

Results indicated that participant's flexibility significantly increased from pre-test to post-test while their weight, BMI, waist circumference, systolic and diastolic blood pressures, and body fat percentage significantly decreased. Participant's resting heart rate also decreased on average from pre-test to post-test, though this was not statistically significant. Full results are reported in Table 1.

Pre			Post						
Health measure	M	SD	M	SD	MΔ	SDΔ	t	df	p
Flexibility (in)	17.41	3.77	18.75	7.99	1.34	7.65	3.5	398	0.001
Weight (lb)	172.09	43.4	168.71	39.2	-3.39	16.52	-4.16	411	<0.001
BMI	27.52	5.21	27.24	5.12	-0.28	1	-4.37	244	<0.001
Body fat percentage	32.21	7.81	30.5	7.74	-1.71	2.02	-14.3	286	<0.001
Systolic blood pressure	123.34	16.62	122.82	17	-0.52	12.93	-0.8	392	<0.001
Diastolic blood pressure	79.7	9.78	78.85	10	-0.86	8.18	-2.07	392	0.039
Heart rate (Resting)	77.83	35.2	74.93	12	-2.89	34	-1.61	357	0.424
Waist circumference (in)	35.53	5.34	34.76	5.19	-0.77	1.52	-8.22	260	<0.001
N: 415; M: Mean; SD: Standard deviation; MΔ: Mean difference; SDΔ: Standard deviation difference; df: Degrees of freedom; BMI: Body mass index									

Table 1: Comparison of BearFIT participant health measures before and after the program.

Discussion

The aim of the present study was to first empirically evaluate an existing worksite wellness program known as BearFIT that is offered through a university to faculty, staff, and their spouses. The secondary aim was to contribute a description of a university-run health promotion program to the scientific literature. Although this program was not initially intended for research, by evaluating it, it was determined that employees benefitted from their participation in the BearFIT program, and after one semester, participants showed improvements across all objective health markers that were measured.

In this study, both weight and BMI were measured at pre- and post-assessment. Results indicated that participants lost weight and reduced their BMI after one semester of being involved with BearFIT. Although weight loss is typically only recommended for persons who are overweight or obese, given that participants were overweight on average according to pre-test BMI scores, this measure indicates a success of the program [28]. Further, reductions in BMI tend to be a standard metric for successful wellness programs [37,38] because being overweight or obese is related to many chronic diseases, including heart disease, diabetes, gallbladder disease, and cancer [9,39]. Not only can a healthy weight lower risk for these diseases, it is also related to higher self-esteem and better mental health [40,41]. Achieving and maintaining a healthy BMI is the most prominent way to lower health care and insurance costs, as well as boost the well-being of employees [37]. Thus, the empirical evidence of weight loss and BMI reductions in our sample impacts employees at the individual level, by contributing to improved overall health (e.g., improvements in functionality and self-esteem), and at the organizational level, by reducing the risk of the development of preventable, costly diseases that negatively impact productivity and require medical treatment (e.g., heart disease).

The BearFIT program also resulted in statistically significant decreases in body fat percentage and waist circumference measurements. Both measures are related with overall health risks [42,43] which further emphasizes the success of the program. An improved ratio of lean tissue to fat tissue in the body helps prevent chronic disease, contributes to stronger bones [44] helps protect against insulin resistance [45] and is associated with long-term health [46]. Additionally, research on waist circumference measurements suggests that greater levels of fat storage around the waist is associated with a greater risk of the development of heart disease and type II diabetes [42]. Reductions in body fat percentage and waist circumference indicate an improvement in overall health and a reduced risk of disease among participants.

BearFIT participants also showed a decrease in systolic and diastolic blood pressures after one semester of the program. Blood pressure is a key predisposing factor to cardiovascular disease. One of the best methods of maintaining a healthy blood pressure is participation in physical activity [43]. Research suggests that for people aged 40-89, a 20 mmHg increase in systolic blood pressure and a 10 mmHg increase in diastolic blood pressure doubles the risk of death from ischemic heart disease and stroke [47]. Systolic blood pressure tends to increase with age and is an important risk factor in adults over 50. Though the mean age of this sample was less than 50 (48%) of the participants were 50 years old or older. Programs that are shown to reduce blood pressure in samples of adults are therefore particularly valuable, and this highlights another benefit of the BearFIT program. Although participants did not show a statistically significant improvement in resting heart rate, resting heart rate did decrease on average over the course of the program. Emphasizing and incorporating known methods of reducing resting heart rate (e.g., moderate to vigorous physical activity and stress reduction) is recommended.

Lastly, participants in BearFIT also improved their flexibility levels from pre- to post-assessment. Flexibility contributes to health by reducing the risk of injury, and increasing physical performance and functioning [48] and this becomes increasingly important with increasing age [49]. Although flexibility normally declines throughout the aging process, maintaining flexibility is associated with maintaining mobility, and the ability to complete essential daily tasks such as bathing, walking up and down stairs, getting dressed, and others. Flexibility also plays a role in the prevention of falls, and falls can result in serious and costly injuries that negatively impact a person's quality of life. Programs effective at increasing flexibility in adults are therefore strongly recommended.

There are several limitations to this study worth noting. First, because data was originally collected without the intent of empirical analysis, demographic data beyond sex and age (e.g., race, marital status, income) were not collected. This limited the analyses that were able to be conducted on participants, and could have provided useful information if some subgroups of participants benefitted from the program more than others. Another limitation to the study is that although a multitude of fitness classes, gym access, and other opportunities specifically for program participants were regularly offered, attendance and usage records were not kept and thus, the level of participation in the program for each participant is unknown. Because this program is currently ongoing, researchers have suggested that such records be maintained for the purpose of a more thorough evaluation, and that similar programs implemented elsewhere keep attendance records as well. Participation levels, whether self-reported or tracked, could provide more information about the success of the worksite wellness program (e.g., associations between improvements in health markers and exercise mode or frequency). Additionally, data was not collected on participant's healthcare or insurance costs. Research on the direct healthcare costs of participants would provide interesting data and could further justify program growth from the university's perspective.

Although there were a large number of individuals that enrolled in BearFIT, nearly half did not participate through the post-assessment. Independent samples t-tests revealed a significant difference in pre-test weight when comparing participants who did and did not complete the program (i.e., those who dropped out, on average, weighed more). This is congruent with previous research stating that participants in wellness programs are often those who are more fit. Incorporating and promoting activities and exercises specifically tailored for beginners and or overweight or obese participants could help combat attrition.

Participants in BearFIT were predominately female. This disparity in sex is consistent with previous findings that state women are more likely to participate in exercise programs and health incentives when compared to men [50]. A more in-depth review of ways to involve men in health promotion programming efforts could better inform future worksite wellness program planning.

Despite these limitations, the study presented several strengths. First, the sample size was large, limiting the possibility that outliers skewed our results. Within the sample, 72 participants (17% of the final sample) participated in the program more than once. For these participants, each semester of their involvement was analyzed as a unique case, meaning that improvements were measured from pre- to post-assessment each time they participated. Repeated participation in the program indicates a belief that the program is worthwhile. Lastly, the BearFIT program is an example of a real worksite wellness program that does not require grants or other external funding, and that was implemented by fitness center personnel who did not require special training beyond their normal certifications. This means that a similar program and similar results are attainable at other institutions, corporations, and occupational settings, given access to appropriate facilities and staff.

This study supports previous research demonstrating that worksite wellness programs with physical activity components have the capacity to elicit positive health changes. In just one semester, participants lost weight, improved blood pressure, decreased their total body fat percentage, and trimmed their waist circumference. Future programming should consider including successful components from BearFIT and build upon them, notably through the incorporation of activity tracking and cost-benefit analyses to the institution. This study demonstrates that even a basic worksite wellness program is good practice and can elicit positive results.

In summary, our study suggests worksite wellness programs can be effective in improving critical health measures related to long-term health and lower risk of chronic disease. Other organizations could benefit from similar programs at relatively low cost, resulting in healthier, higher functioning employees. Future research on long-term impacts of worksite wellness programs could further determine the fidelity and benefits of worksite wellness programs.

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