Measuring Wellness in a Staff Health Promotion Program

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Worksite wellness programs can play a significant role in improving employee health. These investigators tracked the effects that one such program had on participants at a VA medical center.

Overweight, obesity, and physical inactivity are significant public health concerns in the United States. In 2005, 61% of the U.S. adult population was overweight and 24% was obese,[1] while physical inactivity was prevalent among 24% of the same population in 2004.[2] As obesity and physical inactivity are both associated with cardiovascular disease, the country's leading cause of morbidity and mortality, programs that encourage healthy eating habits and exercise can play a significant role in improving public health.

Such programs have been common in American workplaces since the 1980s. According to several studies, these programs have improved employee productivity and decreased absenteeism.[3–7] A study of one employee program showed that participants' cardiovascular fitness was enhanced and their percent body fat was reduced.[7] Most studies of workplace wellness programs, however, have focused on the financial benefits they have brought to employers, rather than on the health benefits they have brought to employees.

To investigate the latter type of benefits, we studied the effects that a worksite health promotion program had on participating employees at the San Francisco VA Medical Center (VAMC). We investigated the impact the program had on participants' weight, body mass index (BMI), percent body fat, and health-related quality of life. In addition, we used the program's results in considering the feasibility of similar programs at other VA hospitals.

Before describing our investigation, we briefly discuss programs the federal government has implemented to encourage healthy and active living among U.S. citizens in general and federal employees in particular, as well as the history of staff health programs at the San Francisco VAMC.

FEDERAL HEALTH PROGRAMS

The HHS provides multiple initiatives aimed at improving the health of all U.S. citizens. This agency conducts the President's Council on Physical Fitness and Sports, which strives to make fitness a top national priority by providing motivational tools, competition, and information. Launched in 1956, the council has evolved to include web-based programs. Its President's Challenge, for example, allows enrollees to document their progress toward fitness goals online.[8] The HHS's Healthy People 2010 initiative is intended to increase citizens' longevity and quality of life while eliminating health disparities between diverse populations. The initiative, which was launched in 2000, is organized into 28 focus areas of public health.[9]

Other federal programs focus specifically on the health of government employees. Since 2004, the U.S. Office of Personnel Management's HealthierFeds campaign has worked to educate federal employees and retirees on healthy living. The campaign provides a web-based interactive health information program.[10] In addition, the VA's current Managing Overweight/Obesity for VA Employees (MOVEmployee!) initiative helps VA employees to manage their weight; it was adapted from a similar program aimed at veterans.[11]

HEALTH PROGRAMS AT OUR FACILITY

The San Francisco VAMC began designing worksite wellness programs in 1998 because the hospital administration was concerned about the poor health of the hospital's environmental management service (housekeeping) staff, as evidenced by the growing incidence of diabetes and the increasing occurrence of heart attacks and strokes among them. Nine housekeeping employees participated in the center's first program, and they had a significant decrease in percent body fat at 12 weeks.

Eight employees from the social work service participated in the hospital's second program. Although they had a reduction in weight, BMI, and percent body fat at 12 weeks,

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these reductions did not reach statistical significance.[12,13]

Furthermore, because the two programs involved so few participants, neither had sufficient power to demonstrate significance in the overall San Francisco VAMC staff population. The programs did demonstrate, however, the feasibility of implementing workplace wellness programs at our facility. To optimize outcomes, we offered an improved health promotion program, with a more flexible physical activity requirement, that we hoped would be easier for employees to complete while still maintaining health benefits.

OUR HEALTH PROGRAM

We designed our staff health promotion program as a series of three interventions (nutrition education, physical activity monitoring, and smoking cessation), which would be tested in a nonrandomized, prospective, pilot study. The health program duration was 12 weeks, with an optional nine-month extension for a total duration of one year.

Nutrition component

Participants completed a baseline nutrition questionnaire. At three separate times throughout the program, they kept a diary of their food intake for 24 hours. Food intake analyses for each patient were generated at baseline, at the end of the initial 12-week program, and at the end of one year for those who chose the program's nine-month extension (Table 1). All participants reviewed their food intake analyses during visits with a nutritionist to determine personal nutrition goals.

Participants attended one-hour group sessions covering key nutrition concepts weekly during the 12-week program and monthly during the nine-month program extension. Nutrition topics included discussions about low fat diets; heart healthy eating with cholesterol lowering principles; use of high fiber, antioxidant, calcium, and herbal remedies; butter alternatives; effects of stress on eating; nutritional research updates; cooking tips; food tasting and sharing; recipe exchanges; and the use of the healthy weight food pyramid to guide food choices.

Physical activity component

Participants were instructed to perform a physical activity of their choice

Table 1. Schedule of baseline and follow-up procedure times and measures

Procedure/measurement	Baseline	Weekly for 12 weeks	End of 12 weeks	Monthly for nine months	End of one year
Screening for exclusions	X				
Weight	X	X	X	X	X
Height	X				
Blood pressure, pulse	X	X	X	X	X
Body mass index	X		X		X
Percent of body fat	X		X		X
Lipoprotein profile	X		X		X
Quality-of-life survey*	X		X		X
Nutrition consultation and 24-hour food intake analysis	X		X		X
Nutrition classes		X		X	
Physical activity record	X	X	X	X	X
Physical activity expenditure report	X		X		X
Smoking cessation offered	X				

*Survey used was the Veterans SF-36.

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for at least 30 minutes three times a week, as well as to record these sessions in their activity diary. All participants had the flexibility to determine the time, place, and the type of physical activity. If they chose to walk, they were encouraged to walk at their own comfortable speed (which was defined as a speed at which they could still conduct a normal conversation while walking). Other physical activity choices included but were not limited to jogging, swimming, biking, and hiking. Participants reported their physical activity each week during the 12-week program and monthly during the nine-month extension with health clinic staff. Physical activity expenditure reports for each patient were generated at baseline, at the end of the initial 12-week program, and at the end of one year for those who chose the program's nine-month extension.

Smoking cessation component

Smoking cessation was offered to all interested study participants through the VAMC's mental health service. Since none of the participants smoked, none were referred.

STUDY DESIGN

Our study was approved through the local institutional review board. We invited about 500 San Francisco VAMC employees to participate in the health program, using flyers, messages posted on electronic bulletin boards, electronic messages passed on by supervisors, and word of mouth. Participants were required to have a primary care provider's medical clearance and to provide written informed consent.

Once participants consented to the study, along with their physical activity assessment and nutritional analysis, they received a baseline medical examination that took medical history, family and social history, and current medications into account. Employees were excluded from the program—and, thus, the study—if they had undergone any surgery within the last six months or if they had a history of unstable angina, recent cardiac surgery, angioplasty, stroke, unstable diabetes, peripheral vascular disease, chronic obstructive pulmonary disease, or severe asthma. During this examination, participants underwent physiologic measurements and completed a quality-of-life questionnaire to establish baseline values that would be compared with 12-week and one-year follow-up values.

Physiologic measurements

Baseline physiologic measurements included height, weight, blood pressure, pulse, BMI, percent of body fat, and lipoprotein profile. Following the baseline assessment, weight, blood pressure, and pulse were measured on a weekly basis during the first 12 weeks, and then monthly during the nine-month extension, using the same equipment in the VAMC's personnel health clinic. BMI and percent body fat measurements, as well as the lipoprotein profile, were repeated at 12 weeks and one year.

Percent body fat was analyzed using a Futrex (Futrex, Hagerstown, MD) handheld computer with infrared light technology. This type of device is used commonly in ambulatory care settings. The same nutritionist performed body fat analyses on all participants.

Lipoprotein profiles were obtained by the clinical laboratory, using fast-

Table 2. Baseline characteristics of participants who enrolled in the health promotion program (n = 17)

Characteristic	Total
Age (in years)—mean (SD)	50 (9)
Gender—no. (%)	
Male	3 (18)
Female	14 (82)
Race/ethnicity—no. (%)	
White	9 (53)
Black	1 (6)
Asian/Pacific Islander	7 (41)
Medical history—no. (%)	
Hypertension	4 (24)
Current smoker	0(0)
Body mass index—mean (SD)	30 (7)
Overweight* participants—no. (%)	5 (29)
Obese† participants—no. (%)	8 (47)
Percent body fat—mean (SD)	33 (9)
Overweight men‡—no. (%)	2 (67)
Overweight women§—no. (%)	12 (86)

*Body mass index (BMI) of 25.0–29.9 kg/m² = overweight. †BMI of ≥ 30 kg/m² = obese.
‡Percent body fat of ≥ 22% = overweight in men. There were three men in the study.
§Percent body fat of ≥ 25% = overweight in women. There were 14 women in the study.

ing blood specimens. The profiles included total cholesterol, triglyceride, high-density lipoprotein (HDL), and low-density lipoprotein (LDL) levels.

Quality of life

The quality-of-life questionnaire used in this study was the Veterans SF-36 health survey (Medical Outcomes Trust, Waltham, MA). This 36-item, short form survey was developed at the RAND Corporation as part of the Medical Outcomes Study, based on the SF-36 health survey (Medical Outcomes Trust) used for the nonveteran population.[14,15–18] Given that the two surveys are nearly identical, we felt that the Veterans SF-36, which has nationally established norms for veterans, would be the most appropriate tool for our study population, which included both veterans and nonveterans.

The Veterans SF-36 health survey measures eight health-related domains: physical functioning, social functioning, role limitations due to physical problems, role limitations due to emotional problems, mental health, vitality/energy, bodily pain, and general health perceptions. Scores for each of the domains range from 0 to 100, with higher scores reflecting better functioning and less disease burden.[14,15]

Because the use of component summary scale scores has been shown

Table 3. Study participants' mean baseline measurements versus mean 12-week measurements (n = 16)

Measure	Baseline		12 weeks		*t* test	*P* value
	Mean	SD	Mean	SD		
Physiologic variables						
Weight (kg)	81.78	22.27	80.21	21.32	3.21	.006*
Body mass index (kg/m²)	29.56	7.16	29.00	6.83	2.76	.014*
Percent body fat†	32.14	8.43	31.64	7.29	0.81	.431
Total cholesterol (mg/dL)‡	220.80	28.06	213.60	29.51	1.46	.166
Triglycerides (mg/dL)‡	96.40	62.86	106.20	53.50	–1.18	.258
High-density lipoprotein (mg/dL)‡	66.13	18.43	60.60	18.18	2.78	.015*
Low-density lipoprotein (mg/dL)‡	134.87	27.56	131.33	29.34	0.79	.443
Quality-of-life domain scores§						
Physical functioning	89.38	10.63	90.31	15.33	–0.37	.714
Role limitations due to physical problems	70.31	35.61	71.88	36.37	–0.16	.876
Bodily pain	75.06	17.43	72.50	20.97	0.74	.470
General health	79.00	15.84	82.31	17.82	–0.96	.351
Vitality/energy	73.75	13.48	75.63	12.76	–0.86	.404
Social functioning	92.19	12.81	88.28	20.65	0.68	.510
Role limitations due to emotional problems	87.50	26.87	79.17	31.91	1.00	.333
Mental health	88.75	6.57	86.00	9.12	1.30	.214
Quality-of-life component summary scores						
Physical component	48.97	7.73	49.55	8.08	0.39	.700
Mental component	53.41	4.78	54.96	7.59	0.83	.419

**P* value less than .05 was considered significant. †n = 14. ‡n = 15. §Quality-of-life scores were based on the eight domains of the Veterans SF-36.

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Table 4. Study participants' mean baseline measurements versus mean one-year measurements (n = 12)

Measure	Baseline		One year			
	Mean	SD	Mean	SD	*t*-test	*P* value
Physiologic variables						
Weight (kg)	73.41	18.06	72.44	18.81	1.27	.229
Body mass index (kg/m^2)	27.00	5.85	26.50	5.93	1.73	.111
Percent body fat	31.72	8.27	31.89	7.22	–0.20	.844
Total cholesterol (mg/dL)	213.83	21.23	215.00	27.06	–0.17	.869
Triglycerides (mg/dL)	81.00	37.31	93.17	41.87	–1.93	.080
High-density lipoprotein (mg/dL)	65.42	15.75	63.00	20.82	0.87	.401
Low-density lipoprotein (mg/dL)	131.67	24.71	133.17	21.83	–0.26	.800
Quality-of-life domain scores*						
Physical functioning	89.58	11.37	89.17	11.25	0.27	.795
Role limitations due to physical problems	66.67	38.92	68.75	44.11	–0.14	.889
Bodily pain	75.75	16.74	76.50	12.92	–0.13	.898
General health	82.75	15.23	87.17	12.53	–1.39	.191
Vitality/energy	76.67	13.03	75.83	13.11	0.36	.723
Social functioning	90.63	14.23	91.67	20.18	–0.16	.878
Role limitations due to emotional problems	83.33	30.15	86.11	22.29	–0.37	.723
Mental health	85.67	9.87	91.00	6.63	1.67	.120
Quality-of-life component summary scores						
Physical component	49.51	7.91	49.46	7.14	–0.02	.986
Mental component	53.14	5.40	56.77	6.88	1.72	.113

*Quality of life scale scores were based on the eight domains of the Veterans SF-36.

to provide a more accurate view of the combined aspects of function,[16–18] we decided to combine the physical functioning, role limitations due to physical problems, bodily pain, and general health perceptions domains of the Veterans SF-36 into one physical component summary score. Likewise, we combined the social functioning, role limitations due to emotional problems, vitality/energy, and mental health domains into one mental component summary score.

Statistical analysis

Data analyses were performed using descriptive statistics for participants' demographic characteristics, physiologic characteristics, and quality-of-life scores. Student's *t* tests were calculated in order to compare baseline values for all variables with both 12-week and one-year values.

OUTCOMES OF THE PROGRAM

Seventeen employees—three men and 14 women—enrolled in the study. The mean age of this group was 50 years (range, 32 to 64 years) (Table 2). One participant withdrew from the study for personal reasons, leaving 16 participants who completed the initial 12-week program. Statistical analyses were performed using only the completed data.

Of those 16 participants, 12 completed the program's nine-month extension. The four participants who completed the 12-week program but withdrew during the extension included two who lost interest and two who left for personal reasons.

Nutrition

All participants completed the nutrition component of the health program, which included maintenance of the 24-hour food and activity diary and consultation with the nutritionist to determine personal goals for a healthy diet. Attendance at weekly (in the 12-week program) and monthly (in the nine-month extension) nutrition classes varied with individuals' schedules and interest levels. Although the benefit of nutrition-focused classes that provided group support was difficult to quantify, it may have contributed to improved outcomes.

Physical activity

Self-reported physical activity demonstrated improvement over the course of the program. At baseline, 11 of 17 participants (65%) reported 30 minutes of physical activity at least three times a week. By the end of 12 weeks, this percentage had climbed to 81% (13 of 16 remaining participants)—and at one year, it remained high at 92% (11 of 12 remaining participants).

Physiologic measurements

In adults, a BMI of 25 to 29.9 kg/m^2 is defined as overweight, and a BMI of 30 kg/m^2 or greater is defined as obese. Of the 16 participants who completed the 12-week program, five (31%) had a baseline BMI that was defined as overweight and seven (44%) had a baseline BMI that was defined as obese.

Between baseline and 12 weeks, there were significant reductions in both mean weight (from 81.8 to 80.2 kg) and mean BMI (from 29.6 to 29 kg/m^2) (Table 3). The 12 participants who completed the nine-month extension continued to lose weight between the end of the 12-week program and the end of the extension—though this additional weight loss was not statistically significant (Table 4).

The percent of body fat defined as overweight is 22% or greater in men and 25% or greater in women. At baseline, the mean value for the entire study group was 33%. Of the 14 participants who chose to complete the body fat analysis at 12 weeks, 12 were women and two were men. Nine of the women and both of the men had percentages of body fat that were defined as overweight. There was no significant change in mean body fat percentage at 12 weeks (31.64%) or at one year (31.89%).

Of the 15 participants who completed lipoprotein profiles, total mean cholesterol levels improved at 12 weeks but did not reach statistical significance. Mean LDL values decreased at 12 weeks—but then increased slightly during the nine-month extension. Neither of these changes were statistically significant. Mean triglyceride levels increased—nonsignificantly—throughout the study. The only lipoprotein change that attained statistical significance was a decrease in mean HDL values between baseline and 12 weeks.

Quality of life

Mean baseline scores on the Veterans SF-36 showed a high level of functioning in all eight health-related domains, with subscale scores ranging from 71 to 92. Over the course of the study, scores remained generally high, with no changes attaining statistical significance.

Some nonsignificant trends were noted, however. At 12 weeks, improvements occurred in the physical functioning, role limitations due to physical problems, vitality/energy, and general health domains. At the same time, mean subscale scores in the bodily pain, role limitations due to emotional problems, social functioning, and mental health domains decreased (indicating worsening or diminished function). When the domains were combined into physical and mental component summary scores, however, increases were seen in both components during the first 12 weeks.

At one year, mean subscale scores among the remaining 12 participants increased from baseline for all domains—except for physical functioning and vitality/energy, which decreased very slightly. The mental component summary score continued to increase, while the physical component summary score remained essentially unchanged (dropping only 0.05 points).

STUDY IMPLICATIONS

Anecdotally, participants in this study reported that they felt better, had more energy, and made better food choices as a direct consequence of participating in this program. None of them sustained work-related injuries that would have imposed light duty (work restrictions) or absences (lost days).

We were surprised to find that mean HDL values of participants decreased over the course of the study—with a significant decline between baseline and 12 weeks. Given the overall increase in participants' exercise levels, one would expect an increase—rather than a decrease—in HDL values. Previous research, however, has shown that a low fat diet, in association with higher levels of dietary carbohydrates, lowers both HDL and LDL levels.[19–22]

Also unexpected was the slight increase in LDL values at one year, after a decline between baseline and

12 weeks. We expected to see a consistent decrease in mean LDL values throughout the study as a result of the nutrition component's use of low fat diets, which have been reported to lower LDL levels.[21] It is possible that the late increase in mean LDL values may have been related to diminished adherence to the recommended diet over time.

While quality-of-life scores were generally high and showed no statistically significant changes during the study, there were slight declines in mean subscale scores for bodily pain, role limitations due to emotional problems, social functioning, and mental health between baseline and 12 weeks. These declines may have reflected the discomfort of one of the study participants, who developed Bell palsy during the last month of the 12-week program. Nevertheless, the mean physical and mental component summary scores for the cohort demonstrated improvements from baseline.

The two previous employee wellness programs offered at our facility had suffered from low attendance, due primarily to the timing of the physical activity component. In designing our program, we eliminated this factor by allowing participants to determine the time, place, and type of physical activity.

Despite this adjustment, however, enrollment remained low for our program—with only 17 employees enrolling initially, and even fewer completing the 12-week and one-year endpoints. Possible contributing factors for this disappointing turnout include the participation requirements of obtaining a medical clearance from a primary care provider; signing an informed consent form; undergoing three lipoprotein profile blood tests (requiring fasting) in one year, as well as weekly blood pressure and weight measurements; and attending weekly nutrition classes at set times. Some San Francisco VAMC employees voiced concerns about joining a staff wellness program during work time, and others were concerned about privacy issues.

Following completion of our study, 260 San Francisco VAMC employees have participated in a 10-week "Active for Life" program, sponsored by the medical center in collaboration with the American Cancer Society. The much higher numbers of enrollees in this program may be related to the fact that this program, unlike ours, was not a research study and did not require informed consent, laboratory testing, or completion of quality-of-life questionnaires. In addition, this program's inclusion of team competition may have added to its overall success.

STUDY LIMITATIONS

There are several limitations to this study. First, we used self-reports for duration and level of physical activity, which may have been biased by individuals' desire to appear more adherent to program recommendations than they actually were. Second, though we anecdotally evaluated the nutrition classes, we could not differentiate between content effectiveness and subjective feelings of support; hence, the impact of either of these factors on goal achievement or improved outcomes is unclear. Third, self-selection of participants may have skewed the results, with healthier employees choosing to join the program. Finally, small sample size limits the generalizability of our findings. Overall, the brevity of this program best demonstrates the feasibility of a staff health promotion program in improving physiologic variables and health-related quality of life and cannot evaluate long-term changes.

IN CONCLUSION

This study showed that participants can lose weight and feel better as a result of participation in a staff health promotion program at a VA health care facility. With a reduction in weight and dietary changes over time, the risks associated with obesity and cardiovascular risks can be reduced.

As health care workers, we are role models for our patients. In the health care setting, workplace wellness programs can introduce staff to healthier lifestyles, boost employee morale, and increase employee loyalty. Employees know when their employer is interested in them and is prioritizing their health. A healthier workforce potentially can translate into decreased costs over time due to fewer injuries, less use of per diem or temporary staff, and less retraining of new staff.

Full administrative support and commitment for this type of program are likely to require data demonstrating these improved financial outcomes. It's difficult, however, to quantify return on investment and cost-benefit ratio for a program, such as this one, that encourages lifestyle changes. Reduction in health risks occurs over time, and the benefits cannot be measured through a short-term study. We recommend future study—in the form of larger, prospective, randomized, clinical trials—to validate our findings and determine additional improved outcomes, such as improved productivity, absenteeism, injury rates, and preventable health factors. ●

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Please review complete prescribing information for specific drugs or drug combinations—including indications, contraindications, warnings, and adverse effects—before administering pharmacologic therapy to patients.

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