

Population Health

The ACTIVATE Study: Results From a Group-Randomized Controlled Trial Comparing a Traditional Worksite Health Promotion Program With an Activated Consumer Program

Paul E. Terry, PhD; Jinnet Briggs Fowles, PhD; Min Xi, PhD, MS; Lisa Harvey, RD, MPH

Abstract

Purpose. This study compares a traditional worksite-based health promotion program with an activated consumer program and a control program

Design. Group randomized controlled trial with 18-month intervention.

Setting. Two large Midwestern companies.

Subjects. Three hundred and twenty employees (51% response).

Intervention. The traditional health promotion intervention offered population-level campaigns on physical activity, nutrition, and stress management. The activated consumer intervention included population-level campaigns for evaluating health information, choosing a health benefits plan, and understanding the risks of not taking medications as prescribed. The personal development intervention (control group) offered information on hobbies. The interventions also offered individual-level coaching for high risk individuals in both active intervention groups.

Measures. Health risk status, general health status, consumer activation, productivity, and the ability to evaluate health information.

Analysis. Multivariate analyses controlled for baseline differences among the study groups.

Results. At the population level, compared with baseline performance, the traditional health promotion intervention improved health risk status, consumer activation, and the ability to recognize reliable health websites. Compared with baseline performance, the activated consumer intervention improved consumer activation, productivity, and the ability to recognize reliable health websites. At the population level, however, only the activated consumer intervention improved any outcome more than the control group did; that outcome was consumer activation. At the individual level for high risk individuals, both traditional health coaching and activated consumer coaching positively affected health risk status and consumer activation. In addition, both coaching interventions improved participant ability to recognize a reliable health website. Consumer activation coaching also significantly improved self-reported productivity.

Conclusion. An effective intervention can change employee health risk status and activation both at the population level and at the individual high risk level. However, program engagement at the population level was low, indicating that additional promotional strategies, such as greater use of incentives, need to be examined. Less intensive coaching can be as effective as more intensive, albeit both interventions produced modest behavior change and retention in the consumer activation arm was most difficult. Further research is needed concerning recruitment and retention methods that will enable populations to realize the full potential of activated consumerism. (*Am J Health Promot* 2011;26[2]:e64–e73.)

Key Words: Employee Health, Health Risk Appraisal, Health Behavior, Health Knowledge, Attitudes and Practice, Health Promotion, Health Status, Health Care–Seeking Behavior, Prevention Research. Manuscript format: research; Research purpose: intervention testing/program evaluation; Study design: randomized trial; Outcome measure: behavioral; setting: workplace; Health focus: fitness/physical activity, medical self care, nutrition; Strategy: skill building/behavior change; Target population: adults; Target population circumstances: education/income level, gender

Paul E. Terry, PhD, was with the Park Nicollet Institute, Minneapolis, Minnesota, at the time of the study. Jinnet Briggs Fowles, PhD, and Min Xi, PhD, MS, are with the Health Research Center, and Lisa Harvey, RD, MPH, is with Health Education, Park Nicollet Institute, Minneapolis, Minnesota.

Send reprint requests to Paul E. Terry, PhD, StayWell Health Management, 3000 Ames Crossing Road, Suite 100, St. Paul, MN 55121-2520; Paul.Terry@staywell.com.

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PURPOSE

Employers are increasingly seeking worksite-based health promotion services,¹ yet research demonstrating effective program outcomes for disease prevention and chronic condition management remains limited.^{2–5} Only a few randomized controlled studies of the effectiveness of worksite health promotion programs have been conducted; most reports are derived from studies using quasi-experimental designs with findings that can only be considered suggestive of program effectiveness.^{6,7} Nevertheless, evidence is gradually accumulating that well-designed programs have worked to reduce multiple risk factors,^{2,7–10} increase fitness levels,^{11,12} improve nutrition and cholesterol levels,^{13–15} reduce smoking,^{16–18} and improve stress and coping.¹⁹ These studies employed traditional health education interventions that focus on setting and achieving behavior changes through instruction, goal setting, and social support. Health coaching has become a key component of worksite health promotion programs.²⁰

Though health promotion and health coaching programs have been shown to improve health, it is less clear how such programs impact health care utilization. Educating health care consumers about how to better use the health system has emerged as a new strategy both for improving health and for containing unnecessary medical care utilization. Interventions aimed at reducing health risks by activating

consumers to play a greater role in medical decision making have been demonstrated to improve the use of preventive services^{2,21} and to manage asthma^{22,23} and other chronic conditions, such as human immunodeficiency virus/AIDS,²⁴ heart disease,²⁵ arthritis,^{26,27} and diabetes.^{21,28,29} Coaching for how to better navigate the health care system has been studied in clinical conditions such as cancer³⁰ but is not typically included in worksite interventions. We found no studies that have conducted such consumer education interventions at the workplace. Furthermore, there have been no randomized, controlled studies comparing a traditional approach with an activation approach in worksites.

This study compares a traditional worksite health promotion program with an activated consumer education program, using a personal development education program as a control group. Called *Activating Consumers Toward Health Care Involvement Versus Applying Traditional Health Education (ACTIVATE)*, the study is a group randomized, controlled trial with a 2-year intervention period, funded by the Centers for Disease Control and Prevention. The study was designed to provide both population level interventions for all employees and individualized intervention for high risk individuals. We hypothesized that a consumer education approach would be as effective as a traditional health promotion approach in improving employee health practices and reducing health risks. This hypothesis tests the idea that a well-informed health care consumer with better understanding of medical services and guidelines for care will have health self-management benefits similar to those of a person who is coached about changing habits that reduce risks or improve condition management. This thesis is like the Chinese proverb, "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." The outcomes we report here include composite health risk status, general health status, activation, productivity, and the ability to evaluate health information on the Internet.

METHODS

Design

The study compared two different intervention arms and a control group. One intervention offered traditional worksite-based group health promotion programs and campaigns along with health coaching for high risk employees. The other intervention offered health consumerism communications materials and group programs along with nurse-navigator coaching for high risk employees. The control group received education programs related to personal development such as hobbies and time management. Two companies from the northern Midwest participated. The companies had roughly similar income and educational levels, gender distribution, and receptivity of leadership to employee health education. One employer was a large, integrated health care system with more than 7000 employees; the other was a national airline with about 20,000 employees working regionally. Nine locations identified in the health care system (seven clinics and two business offices housing administrative and management staff) were combined to create three geographically distinct groups. Airline employees were randomly assigned to one of three intervention groups, using the department as the unit of randomization (sales, service, and specialty).

Sample

Employees at each study site were sent invitations to participate, consent forms, and baseline health assessment questionnaires ($n = 1628$; 832 in health care, 796 in airline). They were given a \$15 incentive for attending on-site screenings where study staff obtained their clinical measures, such as blood pressure, cholesterol, and glucose levels. These screenings were encouraged but not required for study participation. More than 80% of employees who completed the baseline questionnaires also completed the clinical screening. Six hundred thirty-one employees completed assessments at baseline and 320 employees completed follow-up assessments 2 years later.

We used the results of the questionnaires and clinical screening information to identify employees who were at high risk for cardiovascular disease or premature mortality. These high risk employees in the two intervention groups were eligible for individualized coaching programs—healthy lifestyle coaching if they were in the traditional health improvement group, and health consumer coaching if they were in the activated consumer group. Individualizing the coaching interactions involved training coaches to assess participants' learning needs, personal values, and priorities and tailoring each coaching session to be guided by the goals and values of participants. High risk employees in the control arm were not offered individualized coaching. Eighty-two participants participated in the healthy lifestyle coaching and 42 participated in the health consumer coaching. More information about recruitment and retention for the ACTIVATE study is in press.³¹

Measures

We collected baseline data in the two companies from March through June 2005. Follow-up screenings and health assessments were conducted 2 years later, from February through June 2007. We report results for five outcomes: health risk status, general health status, activation, productivity, and ability to assess health information on the Internet. The ability to evaluate health information on the Internet was assessed from a single item in the survey: "How much do you disagree or agree with this statement? I know how to recognize a website that has reliable health information: disagree strongly, disagree, agree or agree strongly."

Health risk status was determined from self-reported information and clinical measures. Self-reported health risks were collected using the Personal Wellness Profile (PWP), a 39-item instrument that assesses lifestyle factors such as exercise, nutrition, stress, and tobacco use.³² To provide additional clinical information, study participants also attended an on-site health screening. Blood pressure, height and weight, and blood laboratory values (total cholesterol, high density lipoprotein, and glucose results) were included in the PWP for calculating an overall

health risk score. Health scores are derived from a sum of risk levels that are based on consensus guidelines from agencies such as the U.S. Preventive Services Task Force and the Centers for Disease Control. The health score enables an assessment of baseline to follow-up changes in total number of risks and migration from one risk level to another.

General health status was determined from one question in the survey: "In general my overall health is: excellent, very good, good, fair, or poor." Productivity was determined from one item in the Health and Work Performance Questionnaire (short form).³³ "Using a 0 to 10 scale, how would you rate your usual job performance over the past year or two?" Activation was measured using the 13-item Patient Activation Measure (PAM). The recently developed PAM is based on work in conceptualizing, defining, and testing attributes of an activated health consumer.³⁴⁻³⁶ The tool measures the skills, knowledge, beliefs, and behaviors that combine to create an activated patient. Each item had four response options: "disagree strongly," "disagree," "agree," and "agree strongly." The PAM had a theoretical range from 0 to 100. Higher scores are associated with higher activation. We describe the attributes of PAM in greater detail in another recent journal article based on the ACTIVATE study.³⁷

Interventions

Traditional Health Improvement Program.

The theoretical concepts guiding the development of the interventions draw from the PRECEDE-PROCEED framework³⁸ and the Health Belief Model.³⁹ At the population level, the traditional health promotion program included seminars and interactive educational campaigns on topics such as physical activity, nutrition, injury prevention, and stress management. Study staff also worked with site managers to improve environmental health factors such as food service options and maps for walking routes. For those at high risk, traditional healthy lifestyle coaching was offered. The coaching model included 2 face-to-face and 11 telephone visits over 18 months. During

these visits, healthy lifestyle coaches used motivational interviewing techniques to help participants improve and take responsibility for their health.

Activated Consumer Program. The consumer activation intervention was designed to equip participants with knowledge and skills needed to use health services more effectively to manage their health and to improve their level of health activation. At the population level, the activated consumer intervention offered seminars, communications, and campaigns on consumerism on topics such as evaluating sources of health information, choosing a health benefits plan, becoming familiar with preventive service guidelines, and understanding the risks of not taking medications as prescribed. At-risk participants were offered individualized health consumer coaching that emphasized health care decision making. The risk levels used to determine eligibility for the consumerism arm were the same as those used for the traditional arm of the study. Health consumer coaches' interactions were less intensive than those of healthy lifestyle coaches, with participants receiving one face-to-face and six telephone visits over 18 months. Health consumer coaches provided participants with resources to use the health care system wisely and helped them develop a personalized plan to better manage their health. Whereas the tradition coaching intervention involved plans related to improvements in health habits such as reducing dietary fat or engaging in more frequent exercise, the personalized plan for the health consumer participants related more to skill building, such as using a personal health record, finding quality information about providers, or improving communications with a primary care provider.

Control Group Program. At the population level, all control group participants were offered information on personal development topics such as time management, dealing with difficult people, and hobbies such as photography and quilting. No individualized support to high risk individuals was offered in this arm of the study.

Coach Training. A curriculum based on the constructs of awareness, knowledge, and self-efficacy derived from motivational interviewing⁴⁰ and self-efficacy theory⁴¹ was designed to train and educate coaches in key topics. All coaches had clinical experience and were trained in motivational interviewing. Registered nurses were used in the consumer arm and registered dietitians coached in the traditional arm.

Coaches were compensated equally regardless of credentials. Salary was based on market targets. Coaches were assigned to one of the two interventions and remained coaching in that intervention throughout the duration of the study. The coach training included a 16-hour workshop conducted by a certified motivational interviewing trainer and role playing with an experienced coach. Healthy lifestyle coaches were separately trained on lifestyle changes such as physical activity, nutrition, and stress related to diabetes, hypertension, and dyslipidemia. Health consumer coaches were specifically trained on the topics of health benefits, finding health information, preventive services, medical errors, disaster planning, quality care, and medication management. Health consumer coaches also received guidance in how to support participants in accessing community resources. For either coaching modality, coaches tailored information sharing and goal setting to be unique to the health habits, chronic conditions, or illness concerns of each participant. Comprehensive resource guides were developed to support the coaches when guiding participants in decision making and behavior change. Peer-reviewed publications were provided for reference.

Coaches met monthly to review the concepts of the coaching approach. Specific intervention content was not discussed. Coaches were not allowed to use educational tools from the opposing intervention. Coach notes were reviewed and assessed for compliance to the specific intervention content. Discrepancies were addressed and corrected at an individual level.

Analysis

We compared characteristics of employees who enrolled in the programs

Table 1
Population Level Changes From Baseline to Follow-up (Intervention Results): Multivariate Analysis Controlling for Baseline Differences Among the Study Arms†

Overall Population Level	Traditional Health Promotion (n = 136)				Activated Consumer (n = 85)				Control (n = 99)		
	Baseline	Follow-up	p 1	p 2	Baseline	Follow-up	p 1	p 2	Baseline	Follow-up	p 1
PWP score, mean (SD)	47.8 (18.2)	53.3 (19.3)	0.0006	0.25	47.7 (19.3)	50.2 (19.0)	0.14	0.97	48.8 (20.6)	52.3 (21.6)	0.06
General health status, %											
Excellent	22.6	25.0	0.11	0.42	20.5	14.1	0.78	0.94	24.2	21.2	0.74
Very good	42.1	42.6			39.8	51.8			40.4	47.5	
Good	27.1	27.9			30.1	27.1			27.3	24.2	
Fair/poor	8.3	4.4			9.6	7.1			8.1	7.1	
PAM score, mean (SD)	68.5 (14.4)	73.2 (16.2)	0.0005*	0.21	68.1 (15.2)	74.5 (16.5)	<0.0001*	0.03*	73.5 (17.3)	75.5 (16.1)	0.25
Productivity, mean (SD)	0.73 (0.2)	0.77 (0.18)	0.15	0.69	0.71 (0.22)	0.77 (0.21)	0.005*	0.16	0.71 (0.21)	0.74 (0.22)	0.4
Recognize reliable health website, %											
Disagree strongly	10.3	5.9	<0.0001*	0.53	10.8	7.1	0.0004*	0.37	13.3	8.1	0.0009*
Disagree	39.7	27.9			43.4	24.7			32.6	21.2	
Agree	41.9	50.7			37.4	56.5			44.9	61.6	
Agree strongly	8.1	15.4			8.4	11.8			9.2	9.1	

† Values in p 1 column refer to change from baseline to follow-up within the same group; values in p 2 column refer to changes in outcome measures from baseline to follow-up for each of the intervention groups as compared with the control group. PWP indicates Personal Wellness Profile; PAM, Patient Activation Measure.

* Significant difference, $p \leq 0.05$.

by study arm using χ^2 statistics for categorical variables and *t*-tests for interval-level variables. To account for possible response bias at follow-up, we compared the differences in baseline measures between those who completed follow-up surveys and those who did not. For normal distributed variables, a two-sample *t*-test was used. If the normality assumption was not met or the variable of interest was categorical, a nonparametric test (Mann-Whitney-Wilcoxon) was used to test for differences.

At the overall population level, we used multivariate analyses, which controlled for baseline differences in age, education, and income, to assess changes in outcomes from baseline to follow-up within each study arm. The statistical significance is indicated by *p* value 1 in Table 1. Additional multivariate analyses compared the change in outcome measures from baseline to follow-up for each of the intervention groups as compared with the control

group. The statistical significance is indicated by *p* value 2 in Table 1.

At the individual level for those enrolled in coaching, we used multivariate analyses, again controlling for baseline differences in age, education, and income, to assess changes in outcomes from baseline to follow-up within each study arm. These results are shown in Table 2.

RESULTS

Of the 631 original consented subjects in the study, 320 (51%) participated in the follow-up survey and screening 2 years later. The Figure shows the completion rates for each arm.

Table 3 examines differences among the study arms. The arms differed in mean age, educational attainment, and income. Those in the traditional arm tended to be older, with higher education and income.

Table 4 shows differences at follow-up between respondents and nonrespondents, based on their baseline characteristics. Respondents at follow-up were somewhat older and were more likely to be women, to work in health care, and to have participated in the traditional health promotion intervention. Respondents also had higher mean health risk (PWP) scores, better general health status, and somewhat higher PAM scores. We describe the study sample and our findings concerning program recruitment and retention in another recent journal article based on the ACTIVATE study.³¹

Population Level Results

Table 1 describes changes for all study participants from baseline to follow-up for the two intervention groups and the control group. The traditional health promotion group had an increased PWP score (improved composite health risk status) from 47.8

Table 2
Changes From Baseline to Follow-up (Intervention Results) at the Coaching Level: Multivariate Analysis Controlling for Baseline Differences Among the Study Arms†

	Traditional Health Consumer (n = 82)			Activated Consumer (n = 42)		
	Baseline	Follow-up	<i>p</i>	Baseline	Follow-up	<i>p</i>
PWP score, mean (SD)	40.2 (14.2)	47.3 (17.1)	<0.0001*	37.3 (15.1)	44.0 (15.8)	0.005*
General health status, %						
Excellent	11.2	14.6	0.21	14.6	7.1	0.7
Very good	41.2	40.2		31.7	52.4	
Good	35.0	37.8		39.0	26.2	
Fair or poor	12.5	7.3		14.6	14.3	
PAM score, mean (SD)	65.7 (13.4)	70.2 (15.6)	0.009*	65.7 (15.6)	72.2 (14.9)	0.005*
Productivity, mean (SD)	0.74 (0.19)	0.76 (0.19)	0.49	0.72 (0.22)	0.80 (0.18)	0.03*
Recognize reliable health website, %						
Disagree strongly	11.0	8.5	0.02*	17.1	0.0	<0.0001*
Disagree	41.5	29.3		41.5	33.3	
Agree	41.5	52.4		36.6	59.5	
Agree strongly	6.1	9.8		4.9	7.1	

† *p* values refer to baseline to follow-up change within the same group. PWP indicates Personal Wellness Profile; PAM, Patient Activation Measure.
 * Significant difference, *p* ≤ 0.05.

to 53.3 (*p* < .001), whereas no significant change was seen for the activated consumer group. The control group showed a nonsignificant trend toward improvement (*p* = .06). There were no significant changes in general health status for any of the study groups, whereas consumer activation scores improved for both intervention groups but not for the control group. Self-reported productivity did not improve for either intervention group. All three groups showed improvement in their ability to recognize reliable health websites.

At the population level, when changes from baseline to follow-up in the intervention groups were compared with changes from baseline to follow-up in the control group, only the activated consumer intervention effect on PAM was significant (*p* = .04)

Individualized Coaching Participant Results

Table 2 shows results for those who participated in individualized coaching. There is no control group for this comparison because individualized coaching was not offered in the control group.

As can be seen by the baseline PWP scores, participants in coaching had

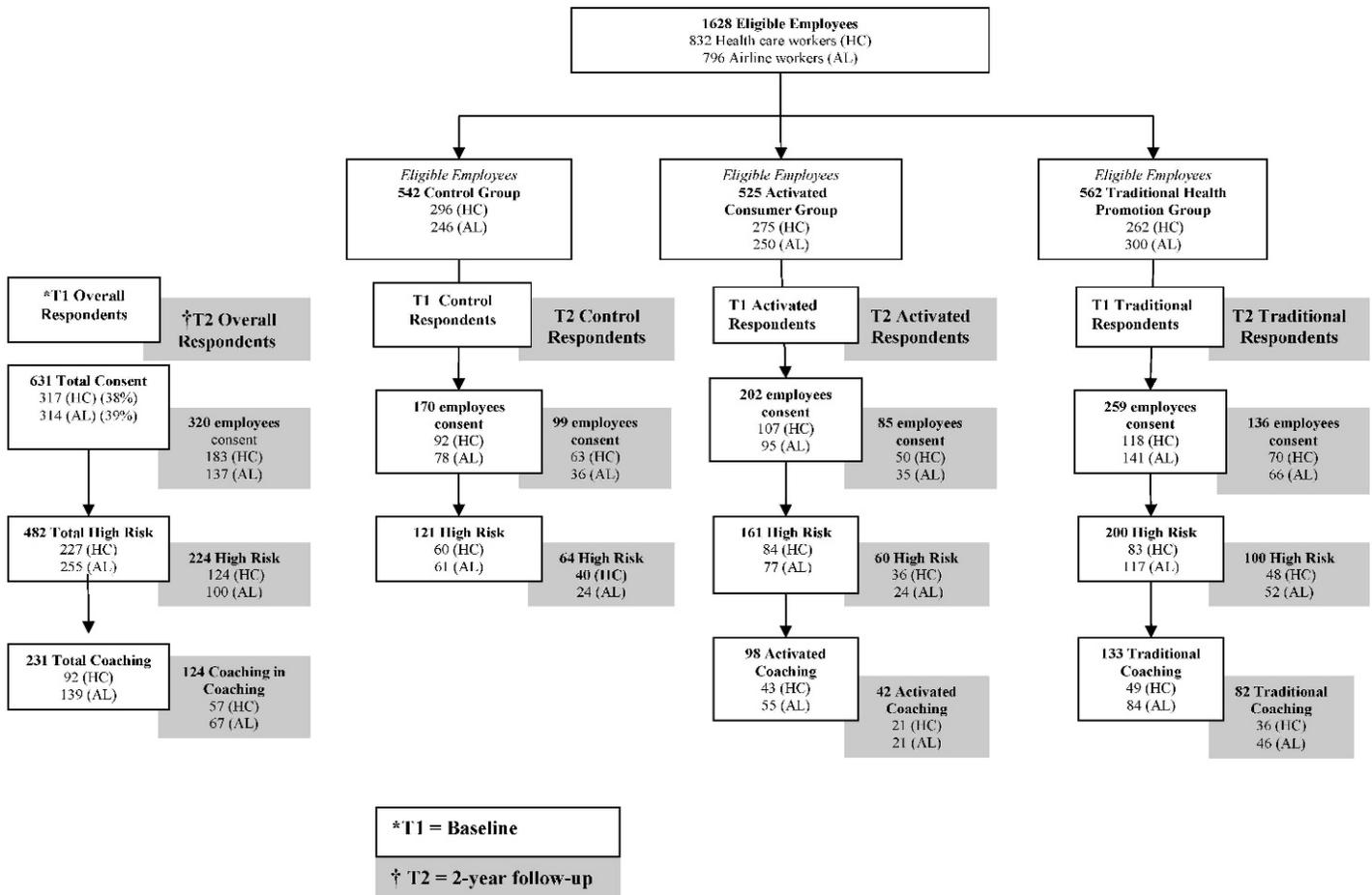
poorer health risk scores than the overall population. Both intervention groups achieved statistically significant improvements in health risks, with the traditional health promotion group moving from a mean score of 40.2 to 47.3 (*p* = .0002) and the activated consumer group improving from a mean score of 37.3 to 44.0 (*p* = .004). Significant improvements were also seen in both coaching intervention groups in their ability to recognize reliable health information on the Internet. Neither general health status nor productivity was significantly affected by either of the intervention groups.

Consumer activation improved from a mean score of 65.7 to 70.2 for those experiencing health lifestyle coaching in the traditional health promotion group (*p* = .008) and from 65.7 to 72.2 for those having health consumer coaching in the activated consumer group (*p* = .005). Statistical tests of the impact of health coaching intensity did not yield significant findings, suggesting that longer bouts of coaching (seven or more sessions) were no more effective than moderate levels of coaching (four to six sessions) in either coaching group (data not shown).

DISCUSSION

The study results indicates that both interventions had beneficial effects on health practices, with the traditional approach having higher engagement rates and better outcomes related to health outcomes. In support of our study hypothesis, the less intensive coaching intervention in the activated consumer arm had equal effects on health risk status (as measured by the PWP) as the traditional health promotion program, and had a somewhat stronger effect on activation and productivity than the traditional program. Neither intervention affected health status during the study time frame. We also demonstrate, for the first time, an effect on consumer activation in a worksite population not only at the high-risk levels and among people coached, but also at the worksite level for those in the activated consumer intervention arm of the study, demonstrating a role for education campaigns to improve health care consumerism throughout an employed population. These findings contribute to the limited number of randomized controlled studies demonstrating the effectiveness of interventions in improving health

Figure
Participant Enrollment in the ACTIVATE Program



ACTIVATE indicates Activating Consumers Toward Health Care Involvement Versus Applying Traditional Health Education.

practices in worksite populations.^{3,5,7,9,16,42,43}

Our finding that health risks (combined self-reported and clinical lab values) significantly decreased for the traditional intervention replicates other research indicating that population health campaigns can improve health outcomes.³ Similarly, the improved health practices for those at risk and who participated in coaching demonstrates the benefits of worksite education interventions and the role motivational interviewing can play in attaining health goals. That the consumer and control groups also experienced some gains in health may have been because of intervention contamination given the proximity of the sites

studied, or it may be that the power of the intervention was not great enough to appreciably surpass secular health improvement trends during this study period. Moreover, although we found statistically significant improvements in health practices, they were not sufficient to produce clinically meaningful health outcomes. This may simply mean there is a greater lag time between improvements in habits and changes in outcomes than this intervention interval could capture. More likely, however, the modest gains at the population level may be a function of the relatively modest engagement rates. Our nominal \$15 incentive for participation a few years ago now pales in comparison to the hundreds of

dollars often used by employers to drive higher participation rates in health assessment surveys. Similarly, the attrition of participants from one health assessment to the next suggests that the program intervention lacked the intensity needed to keep the population engaged. Again, worksite health promotion practitioners are responding with increased use of financial incentives and disincentives to improve retention. It remains unclear whether greater extrinsic rewards will yield higher health habit improvement rates, which are so decidedly tied to intrinsic motivation. Hence, understanding the level of program intensity needed to keep participants engaged is a vital topic for further research.

Table 3
Comparison of Employee Characteristics by Enrollment Arm (Traditional, Consumer, Control)

Variable	Traditional Health Promotion (N = 259)	Activated Consumer (N = 202)	Control (N = 170)	p
Age, mean (SD)	47.1 (9.6)	43.8 (10.6)	42.3 (11.2)	<0.0001*
Gender, No. (%)				0.4191
Male	29 (11.2)	31 (15.4)	23 (13.5)	
Female	230 (88.8)	171 (84.6)	147 (86.5)	
Race, No. (%)				0.1846
White	235 (92.2)	174 (87.0)	149 (88.7)	
Nonwhite	0 (7.8)	26 (13.0)	19 (11.3)	
Education, No. (%)				0.0098*
Some high school/graduate	18 (7.0)	14 (7.0)	9 (5.4)	
Some college/vo-tech	109 (42.6)	108 (54.0)	93 (55.4)	
College graduate	87 (34.0)	48 (24.0)	31 (18.4)	
>4-year college graduate	42 (16.4)	30 (15.0)	35 (20.8)	
Family income, No. (%)				0.0004*
<\$34,999	15 (6.3)	33 (17.4)	27 (16.8)	
\$35,000–\$49,999	46 (19.3)	34 (17.9)	22 (13.7)	
\$50,000–\$74,999	46 (19.3)	52 (27.4)	41 (25.5)	
\$75,000–\$99,999	61 (25.6)	42 (22.1)	35 (21.7)	
≥\$100,000	70 (29.4)	29 (15.3)	36 (22.4)	

* Significant difference, $p \leq 0.05$.

Table 4
Differences Between Follow-up Respondents and Nonrespondents According to Their Baseline Characteristics†

Baseline Measure	Respondent (n = 320)	Nonrespondent (n = 311)	p
Age, mean (SD)	45.6 (10.2)	43.9 (10.8)	0.03
Gender, % female	91.2	82.3	0.0009*
Company, %			
Health care	57.2	43.1	0.0004*
Airline	42.8	56.9	
Intervention group			
Traditional health promotion	42.5	39.6	0.006*
Activated consumer	26.6	37.6	
Control	30.9	22.8	
Health risk (PWP) score, mean (SD)	48.1 (19.2)	40.1 (18.1)	<0.0001*
Recognize reliable health website, %			
Disagree strongly	11.4%	9.7%	0.38
Disagree	38.5%	36.4%	
Agree	41.6%	45.1%	
Agree strongly	8.5%	8.8%	
PAM Score, mean (SD)	69.9 (15.7)	67.3 (15.1)	0.04*
General health status, %			
Excellent	22.5	13.0	0.0005*
Very good	41.0	37.1	
Good	27.9	39.1	
Fair or poor	8.6	10.7	
Productivity, mean (SD)	0.72 (0.21)	0.74 (0.19)	0.15

† PWP indicates Personal Wellness Profile; PAM, Patient Activation Measure.

* Significant difference, $p \leq 0.05$.

The significant improvements in consumer activation scores for the intervention groups at all levels of analysis, compared to the nonsignificant change in the control group, adds a new dimension to research that is aimed at identifying what interventions are effective in activating consumers.³⁶ Our findings that coaches using motivational interviewing can improve patient activation is consistent with the findings of others who report that participants need to play a role in selecting which health practices they wish to improve.^{42,44,45} Significant improvements in health consumerism such as more information seeking, greater self-efficacy for managing health inherent in improved PAM scores, and gains in select health practices all suggest that like interventions will better equip health care consumers.

That health practices improved within the consumerism group without specific coaching to improve health habits suggests that consumerism skills do generalize into self-health management skills. Still, the lower participation rates in the consumerism coaching suggest that it is more difficult to engage populations in a program that focuses on less familiar concepts such as effectiveness in interactions with the health system compared to more popular programs such as managing stress. Clearly, overall program impact is a function of both level of engagement and program effectiveness. Accordingly, further study is needed to determine whether a combination of the consumerism and traditional approaches would be superior in total health management outcomes than either of the separate intervention approaches. Importantly, because the present study demonstrates that results can be monitored, analyzed, and improved at both the population level and the coached level, future research into the scope and sequence of interventions needed to enhance outcomes at both levels is also needed. Resources to conduct worksite-based health improvement programs will always be constrained so greater understanding of the cost benefits of, for example, coaches for individuals versus seminars for the whole population will

better enable program planners to do the greatest good for the greatest number.

Our positive results related to online health information seeking indicates a strong secular trend toward use of the Internet for health information during this study period. This is confirmed by others such as the PEW Internet Project and Harris Interactive, which both estimate that in excess of 75% of Internet users today have looked for health information online.^{46,47}

Self-reported productivity responded well only to the consumer activation intervention, which significantly improved the scores at all three levels. Our findings that some types of interventions can have a positive effect on productivity supports several other studies concerning the relationship between health improvement and productivity. Comprehensive and multisite worksite health promotion interventions have shown significant improvements in absenteeism^{48,49} and productivity,^{50,51} although the preponderance of productivity studies to date are based on quasi-experimental designs.⁵² Given the growing interest in productivity as a key metric in the return on investment of population health improvement programs, further study into the relationship of both health and psychosocial antecedents to improved productivity is needed. We may find, for example, that building confidence and health consumerism skills may have a similar productivity impact as does reducing health risks.

As with other long-term worksite trials, we experienced significant loss to follow-up.⁵ Although both the consumer and traditional interventions produced positive results, all groups lost some high-risk participants to follow-up. This phenomenon means that although the interventions were effective in attracting high-risk populations into the programs, attrition of the highest-risk participants may indicate that programs need to be further adapted to remain relevant for select groups,⁵³⁻⁵⁵ or that the worksite cultural influences outweigh the individual coaching influences.^{56,57}

Related to this, behaviors such as exercise or nutrition practices are more amenable to change over short periods of time than the more intrac-

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Though much has been published concerning the benefits of well-designed population health programs, research is sparse into the comparative benefits of alternative and innovative intervention modalities. Recent research has identified the potential for consumer activation as an essential precursor for health self-management.

What does this article add?

This study pushes the frontier of worksite programs by going beyond traditional health risk to improve the underlying knowledge, beliefs, and skills needed to increase employee engagement in health and health care consumerism.

Because the more modest consumerism intervention tested in this study produced similar health benefits to and greater productivity than a traditional health promotion approach, more study is warranted concerning how to produce the most activated health consumer using the least resources.

What are the implications for health promotion practice or research?

Our finding that these programs benefited the whole population as well as those engaged in the more intensive coaching intervention demonstrates that concomitant interventions can address both secondary and tertiary prevention needs while at the same time providing impetus for improved activation for the overall employee population.

table habits related to weight loss or smoking cessation. Accordingly, the 2-year intervention period may have been insufficient for measuring the longer-term benefits for those relatively large numbers of participants who entered the program at high risk. Conversely, considerable stress and business changes occurred over the course of our 2-year study period, and other researchers have noted the tremendous effect changes in social supports, group norms, or job pressures

can have on retention over this length of time.^{58,59} Our study design itself makes it difficult to ascertain such differences between groups, because we randomized at the group level and there may well be cultural differences within and between these groups that are undetected by the measures we used.

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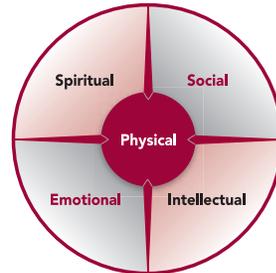
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