Minutes in Motion: Motivating a Community to Move

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ABSTRACT

Introduction: "Minutes in Motion" (MIM) was a community-based exercise challenge designed to recruit a large number of people to increase their physical activity for 6 weeks. We examined participant characteristics that improved the likelihood of success.

Methods: This program challenged community members to engage in 30 minutes of physical activity every day for 6 weeks. Participants were asked to submit the number of minutes they exercised at the halfway point of the challenge and again at the end. Those who participated were eligible for prizes. Participants also were asked to complete voluntary pre- and post-surveys that included questions about usual amount of physical activity, perceived improvement from the exercise, and self-efficacy to exercise.

Results: Of the 3505 community members who signed up for MIM, 78% initially participated and 61% met the challenge goal. The program evaluation was completed by 567 participants. As a result of MIM, 41% of subjects reported they were more active, 51% reported weight loss, 44% had improved endurance, and 51% had improved mood. Fifty-eight percent of subjects exercised more per week at the end of the study than they did before, and self-efficacy to exercise increased in 47% of the subjects. Keeping a log, exercising at work, and wearing a pedometer were related to many of these outcomes.

Conclusions: A physical activity challenge targeted at a community can recruit a large number of people to increase their minutes in motion. Outcomes can be enhanced with certain recommended participation elements.

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INTRODUCTION

The prevalence of obese adults is increasing dramatically in the United States. Results from the Behavior Risk Factor Surveillance System (BRFSS) suggest that obesity (body mass index [BMI] of 30.0 kg/m^2 or greater) increased by more than 57% among adults between 1991 and 1999.[1,2] BRFSS data from 2005 showed that 61% of US adults and 62% of Wisconsin adults were overweight or obese (BMI of 25.0 kg/m^2 or greater).[3] According to this survey, 51% of US adults and 43% of Wisconsin adults did not engage in moderate physical activity for 30 minutes or more for 5 or more days per week, nor did they engage in vigorous activity for 20 minutes or more for 3 or more days per week.[3]

In order to slow this rapid increase in obesity, communities need to find creative ways to persuade their members to become more active. They need effective interventions that can be easily applied to a large population at a low cost. Certainly environment and policy play an enormous role in determining the level of physical activity in a community.[4] Examples of environmental strategies that promote physical activity include the availability of safe walking and multipurpose trails. Policy interventions include encouraging physical activity through worksites and schools. Large-scale interventions targeted at worksites have been advanced by the Centers for Disease Control and Prevention (CDC).[5] The Director's Physical Activity Challenge was a program to encourage 30 minutes of exercise each day for 50 days. This challenge recruited 3740 CDC employees, 79% of whom reached the intervention goal. Participants reported increased energy, weight loss, better sleep, and better body image. Other worksite and mass media approaches have been reviewed and found to be effective.[6-8]

"Minutes in Motion" (MIM) was designed to challenge community members to be active at least 30 minutes a day for 6 weeks.[9] It was a free program available to all community members and designed as a fun way to increase participants' minutes in motion. Those participants who met the goal were eligible for prizes awarded at the end of the challenge. We report here on personal and participation characteristics that predict significant improvements among a subset of subjects who completed a pre- and post-program evaluation.

METHODS

The MIM challenge was conducted from April 2, 2007 to May 16, 2007. This was a free program that challenged participants to exercise at least 30 minutes every day for 6 weeks. The program was promoted through the local media as well as by direct mail to major employers in the community. Participants could register by fax, e-mail, or postal mail—either individually or as a team. As an incentive to sign up, the first 1600 registrants received a free pedometer. Throughout the challenge, weekly e-mails were sent to encourage continued participation and offer exercise tips to program participants. Participants were required to submit their times, either individually or as a team, after 3 and 6 weeks. At the end of the challenge, a celebration was organized at an outdoor park, where those who met the goal were eligible for a prize drawing. Attendance at the celebration was not required.

Participants were asked to complete a voluntary electronic survey at the beginning and end of the program. The project evaluation received Institutional Review Board approval; completion of the survey implied consent. Participants were encouraged to include their names on the survey to aid in linking their pre- and post-survey responses; however, they were not required to do so. These surveys included questions regarding current level of activity and perceived improvements in such areas as their usual activity level, weight loss, endurance, and mood. Participants were also asked to rate their self-efficacy regarding exercise at both times. Self-efficacy measures one's belief in his/her ability to become physically active even in the presence of barriers to physical activity or alternative activities.[10] Studies have found that self-efficacy is related to maintaining physical activity in a variety of populations and settings and is a determinant of physical activity.[11]

For this study, the self-efficacy scale developed by Marcus et al[12] was used. Participants were asked to rate their level of confidence that they could exercise in 5 situations such as when they are too tired, in a bad mood, or when the weather is bad. The Marcus scale uses a 7-point Likert scale ranging from 1 (not at all confident) to 7 (very confident) on each item, and total scores range from a low of 5 to a high of 35 points.

The analysis was conducted to examine how personal characteristics, such as age, sex, and baseline level of activity, as well as participation elements, such as wearing a pedometer or keeping a log, were related to program outcomes (see Figure 1). For the categorical outcomes (all of the self-assessed measures), multiple logistic regression models were developed and odds ratios and confidence limits were calculated to predict improvements over time. Reference groups for each variable were predetermined based on a *priori* hypotheses of odds of least improvement (risk). For the continuous outcomes (pre- to post-calculated changes), models were constructed using a stepwise procedure. Data were analyzed using SAS statistical software,[13] and all P values <0.05 were considered significant.

RESULTS

Initially, 3505 people enrolled in the MIM program. Of that number, 2750 (78.4%) participants submitted some minutes and 2134 (60.8% of the total) met the goal of 30 minutes of daily exercise. A summary of demographics of both total MIM program participants and those who met the goal is provided in Table 1. Middle-aged women were more likely to join the MIM program: 78% of all program participants were women, and 31% were 35-50 years old. In addition, approximately one-third of all MIM participants was under age 18 and participated as part of a family team. Comparing those subjects who completed both a pre- and post-survey with the entire study population showed that the survey participants were more likely to be women and older (P values <0.0001).

For the remainder of the results, only the program participants who completed both the pre- and post-survey and whose pre- and post-surveys we were able to match were used (N=567). Survey participants were fairly active even at the beginning of the study; approximately two-thirds were active for 30 minutes or more each day on 5 or more days a week. Seventy-three percent of participants indicated they always kept a daily activity log during the program. Over 60% stated they utilized opportunities to exercise at their work. Finally, 21% of participants indicated they wore a pedometer at all times over the 6-week program.

The first outcome investigated via a multivariate model was a self-assessed measure of an improvement in activity level. Overall, 41% of participants indicated that

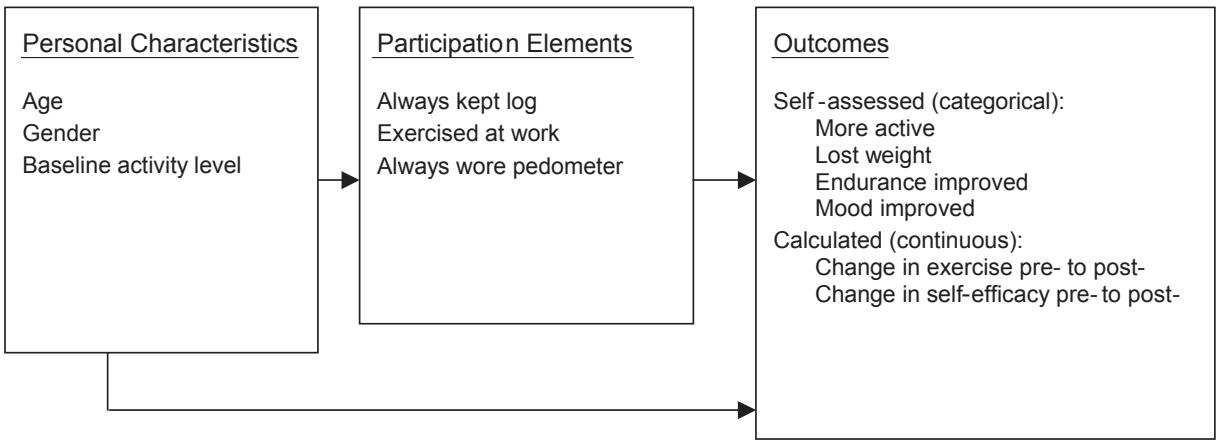

Figure 1. Conceptual model to predict outcomes.

Table 1. Participant Demographics and Participation Elements

	Total Participants[a] %	Study Participants[b] %
Age (years)		
Under 18	31.9	0.5
18-34	19.3	23.4
35-50	30.8	47.5
51-64	15.9	26.4
Over 65	2.1	2.1
Gender		
Men	22.0	9.4
Women	78.0	90.7
Baseline Level of Activity (≥30 min/day)		
1-4 days per week	NA	35.1
5-7 days per week	NA	64.9
Always kept an activity log	NA	72.8
Exercised at work	NA	62.1
Always wore pedometer	NA	21.3

NA = Information not available.
[a] N=3505.
[b] N=567.

MIM definitely made them more active; 50% indicated they were somewhat more active (Table 2). The odds of a baseline sedentary person (exercising less than 30 minutes, 5 days per week) stating they were definitely more active at the end of the study were 1.72 times higher than for a baseline active person (5 or more days). Also, the odds of stating they were more active at the end of the study were higher when participants indicated they kept a log of their activities (odds ratio [OR]=2.02), utilized opportunities to exercise at work (OR=1.46), or wore a pedometer all the time (OR=1.89). The model revealed no differences across gender or age groups.

A second multivariate model was used to predict subjects' perceived weight loss. Overall, 51% of participants reported they had lost weight through the MIM program. The odds of stating they lost weight were higher when the participant kept a log (OR=1.64) or utilized opportunities to exercise at work (OR=1.53). Additionally, participants age 51-64 years were more likely to notice weight loss than those age 35-50 years (OR=1.63). There was no significant difference in perceived weight loss associated with pedometer use, gender, or among participants age 18-34 and 35-50 years.

A self-assessed measure of improved endurance was also modeled, and the results were very similar to the model for weight loss. Throughout the study, 44% of participants reported improved endurance through the MIM program. The odds of reporting improved endurance were higher when the participant kept a log (OR=2.31) or exercised at work (OR=1.52). In addition, the odds of reporting improved endurance were higher for participants age 51-64 years as compared with the baseline group, age 35-50 (OR=1.87). Again, there was no significant difference in improved endurance associated with pedometer use, gender, or between participants age 18-34 and 35-50.

Lastly, a multivariate model was used to predict an improvement in mood. A total of 51% of the survey respondents reported that their mood improved throughout the MIM program. Participants age 18-34 were more likely to notice an improvement in their mood than participants age 35-50 (OR=2.45). Additionally, women were more likely than men to notice an improvement in their mood during the program (OR=2.37). The odds of a baseline sedentary person reporting improved mood were 1.6 times higher than for an active person at baseline, and the odds of reporting improved mood were

Table 2. Final Models to Predict Improvement

	More Active (41%)		Noted Weight Loss (51%)		Improved Endurance (44%)		Improved Mood (51%)	
Variable	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Age (years)								
18-34/35-50	1.05	0.67-1.64	1.49	0.97-2.30	1.48	0.96-2.30	2.45[a]	1.56-3.84
51-64/35-50	1.31	0.86-2.01	1.63[a]	1.07-2.47	1.87[a]	1.23-2.86	1.24	0.82-1.88
Gender								
Female/Male	1.59	0.85-3.03	0.57	0.31-1.05	1.67	0.89-3.13	2.37[a]	1.26-4.47
Baseline Level of Activity Per Week								
1-4 days/5-7 days	1.72[a]	1.18-2.51	1.23	0.85-1.77	0.97	0.67-1.41	1.63[a]	1.12-2.34
Kept Log								
Yes/No	2.02[a]	1.32-3.07	1.64[a]	1.10-2.42	2.31[a]	1.52-3.50	1.15	0.77-1.71
Exercised at Work								
Yes/No	1.46[a]	1.00-2.11	1.53[a]	1.07-2.20	1.52[a]	1.05-2.19	1.49[a]	1.04-2.15
Wore Pedometer								
Always/Not Always	1.89[a]	1.23-2.91	1.34	0.88-2.06	1.36	0.89-2.08	1.28	0.83-1.97

OR=odds ratio. CI=confidence interval.
[a] Statistically significant.

higher when the participant utilized opportunities to exercise at work (OR=1.49). There was no difference in the perceived improvement in mood associated with keeping a log, pedometer use, or between participants age 35-50 and 51-64.

In addition to the 4 self-assessed outcomes, 2 calculated change outcomes were considered: change in days active and change in self-efficacy. Overall, 58% of participants increased their number of days active per week from pre- to post-survey. Factors found to be significantly related to a change in exercise level were baseline level of activity ($P<0.0001$) and keeping a log ($P=0.0004$). On average, survey participants who were sedentary at baseline increased the number of days per week in which they were active by 2.5 days, while those who were more active at baseline increased this number by 0.3 days. Also, the number of days per week in which they were active for at least 30 minutes increased by an average of 1.6 days for those who kept a log and 1.2 days for those who did not.

Overall, 47% of participants reported an improvement in their self-efficacy scores from pre- to post-survey. Factors found to be related to a change in self-efficacy included keeping a log ($P=0.0892$) and wearing a pedometer ($P=0.0282$). Self-efficacy increased by an average of 1.2 points for those who always kept a log versus 0.3 point for those who did not. Finally, self-efficacy increased by an average of 1.4 points for those who always wore a pedometer versus 0.1 point for those who did not always wear the device.

DISCUSSION

The rates of obesity and sedentary lifestyle have increased dramatically in the United States and Wisconsin over the past decade. In order to slow the increase in obesity, people need to increase their amount and intensity of activity. Those community efforts that are effective and reach a large audience are likely to slow this trend. The Minutes in Motion program was a unique approach to motivating a large number of community members to become physically active for 6 weeks. Sixty-one percent of those enrolling in the program met the goal of 30 minutes of daily activity over 6 weeks. Among our study participants, over 58% reported an increase in the number of days they exercised per week from pre- to post-survey.

Between 40% and 65% of individuals beginning a new exercise program will drop out within 3 to 6 months.[14,15] While we realize that 6 weeks is not sufficient time for a behavior such as a sedentary lifestyle to become a permanent change,[16] 37% of our survey participants stated they planned to increase their level of activity, and 61% planned to maintain their current level of activity over the next 6 months. Our study participants, despite being fairly active at baseline, reported many significant improvements over the 6 weeks. Over 40% reported they were more active or had improved

endurance as a result of their participation. Over 50% reported notable weight loss and improved mood over the 6 weeks.

We set out to determine if certain personal or participation elements would help predict improvements in our subjects. We were encouraged to find that, for the most part, results were fairly similar for men and women and for people of all ages. This is reassuring because a population-based approach such as this would be advantageous only if it were equally beneficial for all demographics. Our more sedentary participants at baseline were more likely to state at the end of the challenge that they were more active, had improved mood, and had a greater improvement in days exercised each week than those participants already active at baseline. This was encouraging because sedentary community members would be most in need of this intervention.

Keeping an exercise log is an easy element to add to an exercise program. Our study found that those people who kept a log all the time felt they were more active as a result of the program and were more likely to report weight loss and improved endurance. They also reported a significantly greater improvement in physical activity from pre- to post-survey. Self-monitoring has been shown to increase effectiveness of other physical activity programs, possibly by promoting the participant's sense of accountability. The log serves as a prompt or reminder and provides feedback of the progress the exerciser has made. Prompting and feedback have been shown to be effective in increasing and maintaining physical activity as well as other positive health behaviors.[7,17]

Since we heavily promoted this program through larger employers in the community, we were encouraged to find that so many participants reported being able to exercise at work, and that those who reported doing so had greater success than those who did not. Participants who reported being able to exercise at work also were more likely to report notable weight loss, improved endurance, improved mood, and being more active. Being allowed to exercise at work provides an additional opportunity to exercise, or perhaps removes a barrier to getting some exercise. Support from coworkers may provide additional accountability or may tap into a preexisting social network. Recommendations on effective community strategies to increase physical activity suggest building or using existing social networks to enhance the effectiveness of interventions.[18]

Wearing a pedometer has been shown to improve participant awareness, short-term activity level, and self-efficacy.[7,19] In 2003, Rooney et al[7] conducted a study involving 400 women that was designed to investigate whether wearing a pedometer could make participants more active. They found that goal setting, keeping an exercise log, and wearing a pedometer all the time increased a participant's chance of becoming more active. While the present study was not a pedometer intervention, approximately half of participants received a free pedometer, and 1 in 5 reported wearing it all the time. While we feel that the main benefit of offering the pedometer was increasing overall recruitment, those who wore the pedometer all the time in our study were found to have significant improvements in self-efficacy and were more likely to state that they were more active.

Our study reported on 4 self-reported improvements: being more active, noting weight loss, improved endurance, and improved mood, and on 2 calculated improvements: change in exercise level (days per week) and change in self-efficacy. While several of these appear to be similar constructs, the correlation coefficients between these 6 outcomes ranged from 0.02 to 0.28, with 9 of the 15 coefficients being below 0.2. Relying entirely on self-reported improvements can be suspect; however, we were able to validate 1 of the self-reported improvements: being more active. The calculated improvement in exercise per week based on the difference between pre- and post-survey was 1.55 days higher in those reporting they were more active on post survey (P=0.0001); those who did not indicate they were more active improved 0.93 days on average.

Assuming that our survey respondents represented our overall MIM participants, we were surprised by the level of baseline activity; with nearly two-thirds of those participating in the survey being active at least 5 days a week from the start. This may be because recruitment occurred through many worksites where we might expect people to be less sedentary. Or perhaps the subset of participants who responded to the survey was more likely to be active than the entire group of participants. Despite recruiting fairly active participants, it should be noted that our results adjusted for baseline level of activity and still reported significant improvements for less active individuals.

We didn't gather data on all subjects at enrollment that would help us understand the impact of this study on different subgroups such as those who are sedentary, have a lower education level, may be unemployed, or by ethnic group, nor do we know how well our survey represents the overall participants. We know 1 weakness to our study was that our survey underrepresented some sections of our participant population, such as

those <18 years of age. The survey was completed only by individuals who provided us an e-mail address. It was likely that only 1 person per household completed the survey, though many teams included multiple family members.

Future efforts should focus on reaching unemployed, lower socioeconomic, and higher-risk individuals. As we mentioned above, we promoted this program through a mass mailing to larger employers in the community. There was limited promotion of the program to the general public. Advertisements in local paper, radio, and television, and possible recruitment through other avenues such as churches or community centers would increase recruitment of lower socioeconomic and unemployed individuals. Some additional components could be added to strengthen the impact of the program, such as providing a special log for participants and requiring them to turn these logs in more frequently, or providing a pedometer to all participants and requiring them to also turn in their daily step counts.

Overall, MIM was able to recruit a large number of community members to increase their minutes in motion each day for 6 weeks at a low cost per person. We estimated the overall direct and indirect cost of this project to be about $18,000, or $5.15 per participant. We expect the expenses to decrease over time as we gain efficiencies in staff coordination. Our study found that sedentary as well as active individuals benefited from the program. Other communities should consider implementing a program such as this to motivate a large number of people to be more active.

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