Preventive Medicine 82 (2016) 92–98

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

The effect of participation in an incentive-based wellness program on self-reported exercise

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ARTICLE INFO

Available online 11 November 2015

Keywords:
Exercise
Wellness programs
Motivation

ABSTRACT

Employers are increasingly trying to promote healthy behaviors, including regular exercise, through wellness programs that offer financial incentives. However, there is limited evidence that these types of programs affect exercise habits within employee populations. In this study, we estimate the effect of participation in an incentive-based wellness program on self-reported exercise. Since 2008, the University of Minnesota's Fitness Rewards Program has offered a $20 monthly incentive to encourage fitness center utilization among its employees. Using 2006 to 2010 health risk assessments and university administrative files for 2972 employees, we conducted a retrospective cohort study utilizing propensity score methods to estimate the effect of participation in the Fitness Rewards Program on self-reported exercise days per week from 2008 to 2010. On average, participation in the program led to an increase of 0.59 vigorous exercise days per week (95% Confidence Interval: 0.42, 0.78) and 0.43 strength-building exercise days per week (95% Confidence Interval: 0.31, 0.58) in 2008 for participants relative to non-participants. Increases in exercise persisted through 2010. Employees reporting less frequent exercise prior to the program were least likely to participate in the program, but when they participated they had the largest increases in exercise compared to non-participants. Offering an incentive for fitness center utilization encourages higher levels of exercise. Future policies may want to concentrate on how to motivate participation among individuals who are less frequently physically active.

Introduction

A 2012 survey conducted by the RAND Corporation found that 35% of employers with 50 or more employees use financial incentives to encourage participation in wellness programs (Mattke et al., 2013). Through these programs, employers aim to promote behaviors that are associated with worker well-being and lower healthcare costs (James, 2012; Goetzel and Ozminkowski, 2008; Whitmer et al., 2003). Of particular interest is the capacity for these programs to promote regular exercise (Mitchell et al., 2013; Hutchinson and Wilson, 2012), which is associated with increased physical functioning (He and Baker, 2004) as well as decreased risks for type 2 diabetes (Jeon et al., 2007) and cardiovascular disease (Wei et al., 1999).

There is limited evidence that fitness-based wellness programs that offer incentives promote regular exercise. Randomized control trials, typically conducted outside of employer settings, have shown that offering monetary rewards for regular attendance increased participants' fitness center utilization (Acland and Levy, 2010; Royer et al., 2013; Strohacker et al., 2014). Likewise, observational studies have presented evidence of increased physical activity following the launch of a program (Mattke et al., 2013; Neville et al., 2011; Merrill et al., 2011; Poole et al., 2001; Herman et al., 2006; Gomes et al., 2012). However, any conclusion regarding the effect of incentive-based wellness programs on exercise is constrained by methodological limitations in the existing literature (Mattke et al., 2013; Mitchell et al., 2013). Participants in randomized control trials typically received an incentive for only one month with fitness center utilization returning to pre-intervention levels when the incentive period ended (Strohacker et al., 2014). Observational studies have been able to examine longer time periods, but have lacked either a comparison group of non-participants or the data to control for pre-intervention exercise trends. Furthermore, many studies have included concurrent incentives for multiple health behaviors making it difficult to distinguish the effect of participation in the exercise component (Neville et al., 2011; Merrill et al., 2011; Poole et al., 2001).

Launched in 2008, the University of Minnesota's Fitness Rewards Program (FRP) offers employees a monthly incentive if they utilize a fitness center at least eight times. We analyze whether participation in the FRP, defined as enrollment in the program, subsequently had an effect

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http://dx.doi.org/10.1016/j.ypmed.2015.11.001
0091-7435/

on self-reported exercise. Additionally, we investigate if the effect of participation differed by pre-FRP exercise levels. Given the nature of the FRP, we restricted our analysis to exercise that is likely to be done at fitness centers, specifically vigorous exercise and strength-building exercise. We are able to address many of the methodological concerns identified above by leveraging employee-submitted Health Risk Assessments (HRAs) from 2006 to 2010 that captured respondents' exercise levels before and after the program was launched, comparing participants and non-participants, and examining a context that uses a specific fitness-based incentive.

Methods

Study setting

The University of Minnesota is a large, public university with major campuses in Minneapolis, St. Paul, and Duluth. Approximately 95% of the university's employees enroll in its 'UPlan' medical insurance program. On January 1st, 2008, the university launched the FRP to promote regular exercise among the UPlan population. The FRP offers a $20 credit in each month that a participant utilizes a fitness center at least 8 times. Eligibility is dependent on being at least 18 years old and enrolled in the UPlan. Participating fitness centers include university centers, national and local chains, and independent facilities. Individuals are responsible for signing up for the FRP through their fitness centers. The FRP utilizes fitness center membership card swipes to track enrollee visits.

Separately from the FRP, the university offered employees $65 to submit annual HRAs from 2006 to 2010. Employees completed HRAs online and answered questions regarding health behaviors including exercise frequency. We obtained de-identified HRAs as well as FRP and UPlan administrative files from the university's data warehouse after approval by the Office of Human Resources.

Study sample

The study population included employees who were FRP-eligible in 2008 and who submitted a HRA in both 2006 and 2007. The latter criterion was needed to establish pre-FRP trends in exercise. In order to assess whether the FRP had a lasting effect over our time period, we further restricted our sample by excluding employees who were first-time participants after 2008. We identified 23,665 FRP-eligible employees in our enrollment data, of which we excluded 19,925 employees who did not submit a HRA in 2006 and 2007. Next, we excluded 534 employees who were first-time participants after 2008. Lastly, we excluded 234 employees because of missing data on one or more measures. Our final sample included 2972 FRP-eligible employees, of which 1044 (35%) participated in the FRP. The overall population participation rate was 28%. The sample was similar to the overall population in terms of age and health, although employees in the sample were more likely to be female (see Appendix Table A1).

Measures

Exercise

We obtained two self-reported measures of exercise from the HRAs, which we used to compare participants and non-participants before and during the program. These measures pertain to exercise we reasonably expect to be done at fitness centers. Our first measure is vigorous exercise days per week. Specifically:

> How many days per week do you participate in 20 min or more of vigorous exercise? Examples include brisk walking, running, fast cycling, swimming, aerobics, racquetball, and stair/ski/rowing machine.

Our second measure is strength-building exercise days per week. Specifically:

> How many days per week do you do strength-building exercises such as curl-ups, push-ups, or using weight-training equipment?

For both questions, respondents indicated the number of days on a 0 to 7 scale. Although the two questions give different examples of exercise, some HRA respondents may have considered their exercise to fall under both the vigorous and strength-building categories and thus we do not assume that the two measures are mutually exclusive.

We also obtained a self-reported binary indicator for having a physical condition that limits the ability to get enough exercise and a binary indicator for whether a respondent reported that he/she had started to "get more exercise" in the 6 months prior to submitting their 2008 HRA to help control for pre-FRP exercise trends.

Participation

We considered a FRP-eligible employee to be a participant if he/she enrolled in the FRP, regardless of whether he/she ever visited a fitness center in conjunction with the program. We allowed this measure to remain constant, such that we compared individuals who ever participated to individuals who never participated. Among our sample of participants, 15% dropped out in either 2009 or 2010. Reasons for discontinuing participation were not collected.

Health status

We used a risk-adjustment algorithm that uses individuals' ICD-9 diagnoses and prescribed medicines from medical claims to calculate employees' health risk (University of California, San Diego, 2012). Larger risk scores signify greater health risk. Additionally, we obtained self-reported Body Mass Index (BMI) from the HRAs.

Demographic attributes

We obtained age, sex, and number of child dependents (i.e. children enrolled in a family's health plan), and campus work location from the UPlan enrollment files.

Statistical analysis

Initial examination of our data revealed substantial differences between the pre-FRP characteristics of participants and non-participants (Table 1). For each characteristic, we considered a standardized difference of the mean between FRP-participants and non-participations that was greater than 0.1 in absolute value to be a meaningful difference (Austin, 2011; Normand et al., 2001). See Appendix B for standardized difference of the mean calculations. In the year prior to the launch of the FRP, participants averaged 0.62 more vigorous exercise days per week and 0.55 more strength-building exercise days per week than non-participants. Participants were also younger and had lower BMIs than non-participants. Furthermore, the baseline characteristics in Table 1 were likely to affect our exercise outcome measures and as such we considered them to be potential confounders. Not controlling for these potential confounders would likely lead to an overestimation of the FRP's impact, particularly because participants were more likely to be frequent exercisers prior to the program relative to non-participants. To control for potential confounding, we used inverse probability of treatment weighting to balance the pre-FRP characteristics of participants and non-participants (Austin, 2011).

We estimated the propensity of being a participant using a probit regression model. We controlled for pre-FRP exercise levels by including vigorous exercise days per week (data from 2006 to 2007), strength exercise days per week (2006 to 2007), an indicator for a self-reported exercise limitation (2007), and an indicator for having started to get more exercise in the 6 months prior to submitting the 2008 HRA. We controlled for health status using the health risk score (2007) and BMI (2007). Demographic controls included age (2007), sex, number of children (2007), and campus work location (2007). Because we expected that the propensity of FRP participation would be non-linear in many of these control variables, we included several of them as polynomial constructs in our model (cubic for the exercise days per week measures and quadratic for health risk score, BMI, and age). The full model specification is available in Appendix Table A2.

We used the results of the probit to predict the probability of being a participant, e. Then, we calculated the inverse probability treatment weight, w, for each FRP-eligible employee i, as $w_i = FRPparticipant_i/e_i - (1 - FRPparticipant_i)/(1 - e_i)$, where $FRPparticipant$ is equal to 1 if the employee ever participated in the FRP and equal to 0 otherwise. By weighting all covariates by w we generated a sample where participants and non-participants had similar distributions of pre-FRP characteristics. To check this property, we calculated the standardized difference of the mean for each weighted covariate. A standardized difference with absolute value less than 0.1 indicates adequate similarity of the mean of a weighted covariate between participants and non-participants (Austin, 2011; Normand et al., 2001).