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Does Successful Weight Loss in an Internet-Based Worksite Weight Loss Program Improve Employee Presenteeism and Absenteeism?

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Abstract

Certain risk factors associated with overweight and obesity may lead to reduced productivity in the workforce (i.e., increased absenteeism and presenteeism). Participants in a large, Internet-based worksite weight loss intervention, who were present at follow-up (N = 1,030), completed a self-reported productivity measure (World Health Organization's Health and Work Performance Questionnaire) at baseline and postintervention. Twenty-two percent of the participants lost a clinically meaningful amount of weight (≥5% weight loss). There were no statistically significant ($p < .05$) relationships between weight change from baseline to 12 months and change scores of absolute or relative absenteeism or for absolute or relative presenteeism. Within a modestly successful Internet-based, worksite weight loss intervention, weight loss did not improve self-reported absenteeism or presenteeism. Further studies are needed to explore the sensitivity of the World Health Organization's Health and Work Performance Questionnaire and the long-term effects of weight loss on productivity.

Keywords

productivity; worksite weight loss intervention

One in three adult employees in the United States are overweight or obese (Centers for Disease Control and Prevention, 2013), with negative health outcomes that are often attributed to weight status including obesity, diabetes, hypertension, and cardiovascular disease (Centers for Disease Control and Prevention, 2012). Chronic conditions related to obesity, and obesity itself, are hypothesized to lead to a reduction in productivity at work and

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are a concern for employers, employees, and clients. In fact, obesity-related presenteeism and absenteeism are often associated with lost productivity and health care–related costs including work-site health care premiums (Chapman, 2005). Absenteeism is defined as time away from work because of illness or disability (Schultz, Chen, & Edington, 2009) while presenteeism is defined as the reduction of productivity that does not lead to an absence from work but reduced effectiveness as an employee (Burton, Conti, & Chen, 1999; Loeppke et al., 2003). Together, these concerns underscore the need for comprehensive worksite weight loss programs for overweight/obesity among employees to address both health consequences while also improving productivity (Finkelstein, Linnan, Tate, & Leese, 2009).

A number of studies have demonstrated that participation in worksite weight loss interventions reduces the risk of chronic disease (Centers for Disease Control and Prevention, 2009, 2011; Fletcher et al., 2001; Grundy, Hansen, Smith, Cleeman, & Kahn, 2004) and improves psychological status of the participating employees (Centers for Disease Control and Prevention, 2011; Siervo et al., 2011; Siervo et al., 2012). While worksite weight loss interventions have previously affected body weight, there is paucity in the literature related to secondary benefits on absenteeism and presenteeism of these interventions (Benedict & Arterburn, 2008).

Taken together, overweight and obesity are contributors to lower productivity in worksites; however, there is a lack of information in the literature related to successful weight loss and subsequent improvements in work-based productivity. Therefore, in this exploratory study, we aimed to explore the short-term (postintervention) association between successful participation (≥5% weight loss) in a worksite weight loss intervention and both presenteeism and absenteeism among overweight and obese employees.

Method

An Internet-based worksite intervention (detailed below) was developed to assist in weight loss across a variety of worksite settings and was evaluated using the RE-AIM framework (Glasgow, Vogt, & Boles, 1999; Virginia Tech, 2015). Worksites in Virginia were identified and screened for eligibility ($N = 119$) based on the following criteria: (1) size of worksite (>100 employees and <600 employees), (2) worksite permission for participants to use work hours to read program material, and (3) employee access to the Internet (Almeida et al., 2014). Seventy-three worksites (61%) were eligible to participate, and of those, 28 worksites (24%) enrolled in the study. Seven worksites that enrolled in the program were governmental agencies, six were manufacturing companies, five were considered a professional group, four were small colleges, four were medical facilities, and two were call centers. These proportions were representative of the larger group of eligible worksites contacted for participation (Almeida et al., 2014). Worksites were randomly assigned to either a 12-month Internet delivered intervention ($n = 14$) that included daily emails and modest monetary incentives (i.e., $1/percent weight lost assessed every 3 months over 1 year) or to a 12-month Internet-based newsletter intervention delivered quarterly that contained physical activity and healthy eating content along with access to weigh-ins, recipes, and instructional

workouts. More information about the site recruitment procedure is available elsewhere (Almeida et al., 2014; You et al., 2011).

All adult employees (≥18 years old) with a body mass index (BMI) greater than or equal to 25 kg/m^2, not currently pregnant or pregnant in the past 12 months, not currently participating in a weight loss program (e.g., Weight Watchers), free of serious medical conditions (e.g., terminal cancer, recent heart attack), and with access to the Internet at their work location were eligible to participate in the program. Participants (N = 1,790) completed baseline surveys and weigh-ins and 57% (n = 1,030) had completed the postprogram (12 months) assessments of weight, absenteeism, and presenteeism. Study participants were more likely to be female and Caucasian, when compared with their African American and Asian counterparts (You et al., 2011). The study was approved by the Virginia Tech Institutional Review Board (Protocol #07-296) and is registered at clinicaltrials.gov (NCT01880060).

The Internet-delivered worksite weight loss intervention was based on social cognitive theory (Bandura, 1998), long-term weight loss maintenance, and delivering a program that exuded low participant burden interventions (i.e., no required group meetings). In the larger study, there were two conditions: One offered a monetary incentive (e.g., 1% weight loss = $1.00, 2% weight loss = $2.00) for participants' weight loss while the other did not (Almeida et al., 2014). Both programs combined healthful eating, physical activity, and behavioral strategies. The incentivized program was delivered via daily emails over 12 months (365 total emails) while the nonincentivized program was delivered via quarterly e-newsletters throughout the 12 months. To facilitate tailoring to participants' activity level, participants could identify as beginner, intermediate, or advanced within their registration materials. Participants could change their categorization as they advanced throughout the 12-month program.

Measures

The 10-item measure of absenteeism and presenteeism was based on the World Health Organization's Health and Work Performance Questionnaire (WHO HPQ; Kessler et al., 2003). Relative and absolute calculations for absenteeism and presenteeism for employees were based on previous application of the WHO HPQ (Kessler et al., 2003; Pronk et al., 2004). Absenteeism was measured by assessing participant perceptions of work-hour expectations set by their employer and self-report of reasons for absences (seven items). Presenteeism was measured with three items to determine productivity relative to the past year and the past 4 weeks, as well as comparison to other coworkers; see Table 1 for details. Weight was measured on a calibrated scale located at a convenient and confidential location for the participants at each participating worksite.

Analysis

Using the WHO HPQ scoring metrics (Kessler et al., 2003; Kessler et al., 2004), the calculation of absenteeism was scored based on the total number of hours lost per month where a higher score was indicative of more hours lost at work. Absolute absenteeism was based on raw hours of work lost. Relative absenteeism was the proportion of hours worked

and hours expected to work. A negative value indicates the participant worked more than expected, and a value of 1.0 indicates the participant was always absent. Absolute presenteeism was measured based on perceived performance and possible performance on a scale from 1 to 10, 10 being the best possible performance. Relative presenteeism was a ratio of actual performance when compared with other workers in the same occupation at the same worksite. For example (using Question 1 and Question 2 from the Presenteeism section of Table 1): A participant reports that they have the best job performance (10). This same participant indicates their perception of most workers in the same position and gives them a presenteeism score of "5." This individual would have a score of 2.0 (10 divided by 5). However, if a participant felt that they performed at a 5 and others in the same position perform at a 10, the participant's relative presenteeism score would be a 0.5. A higher relative presenteeism score indicates the perception of better performance when compared with others in the same position. Descriptive statistics were calculated for each of these variables at each time-point (Kessler et al., 2003; Kessler et al., 2004).

Change scores were calculated for each of the variables of interest for both their relative and absolute calculations. A general linear mixed-model was conducted to determine if there was a relationship between weight loss from baseline to postprogram and the change in absolute and relative absenteeism as well as absolute and relative presenteeism. Similar to Finkelstein et al. (2009), we excluded those who did not attend the 12-month follow-up.

Results

The data are presented for the entire eligible worksite study participant population, as there were no differences in absenteeism or presenteeism variables by randomization condition or by worksite type ($p > .05$). We, therefore, followed previous protocols (cf. Finkelstein et al., 2009) by pooling two intervention arms into one sample to examine the study purpose by examining the relationship between presenteeism and absenteeism based on successful employee weight loss. The participants in this study sample were on average 46.95 (±10.96) years of age, 73.45% female, and the majority of individuals were White, non-Hispanics (>75%). Participants' BMI levels were on average 32.92 (±6.40). More than 90% of participants had at least a high school education. Participants in the present study worked an average of 43.49 (±12.19) hours the last 7 days. Descriptive statistics can be seen in Table 2.

Absenteeism and Presenteeism Scores

At baseline, participants reported losing 5.18 hours (±51.64) over the previous 4 weeks. By postprogram, absolute absenteeism increased to 8.60 hours (±55.90). From baseline to postprogram, relative absenteeism was low ($M < 0.01$), and notably, at the baseline assessment, participants were working more hours than their employer expected ($M = -0.01$).

Absolute presenteeism at baseline was 84.5%, and relative presenteeism was above 1.0. Absolute presenteeism trended toward a decrease at postprogram to 81.5%, although not statistically significant ($p > .05$). Although not statistically significant ($p > .05$), relative presenteeism, however, trended toward an increase from baseline, 1.16 (±0.32), to 1.18

(±0.46) at postprogram. None of these differences were statistically significant ($p > .05$). See Table 3.

Weight and Presenteeism/Absenteeism

Participants lost a mean of 1.8 pounds (±11.55 pounds) and 22% of the participants ($n = 228$) lost 5% of weight or greater during the 12-month intervention. There were no statistically significant ($p < .05$) relationships between weight change from baseline to 12 months and change scores of absolute absenteeism, relative absenteeism, and absolute presenteeism, as seen in Table 4.

Discussion

This study explored the relationship between participation in an Internet-based worksite weight loss program (i.e., ≥5% weight loss) and presenteeism and absenteeism from baseline to the postprogram (12 month) follow-up. The results indicated that there was no significant relationship between weight loss and productivity variables from baseline to postprogram.

The lack of relationship between weight loss and productivity may be related to the sensitivity of the measure and the timeframe of the intervention. With regard to the latter, the detection of an effect on productivity may be delayed (Jackson, Waters, & Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions Taskforce, 2004). The worksite weight loss intervention was marginally successful at achieving clinically significant weight loss within the 12-month program. Therefore, a measure such as the WHO HPQ for presenteeism and absenteeism may not be sensitive enough to detect differences in productivity and absenteeism based on both the time horizon and the achieved weight loss (i.e., 5%). Perhaps this indicates that participants have to lose a greater amount of weight in order to see large-scale improvements on presenteeism and absenteeism recall measures.

Of note, in a recent investigation of the validity of the WHO HPQ, Scuffham, Vecchio, and Whiteford (2014) concluded that this measure is not only valid for measuring employee presenteeism and absenteeism, it is also applicable and practical in the worksite setting. Interestingly, it was previously noted that one of the strengths of this measure include the limitation of recall bias by asking about both absolute (total hours lost or total lost productivity) and relative (compared with others) measures (Brooks, Hagen, Sathyanarayanan, Schultz, & Edington, 2010). However, Scuffham et al.'s (2014) recent analysis found that relative presenteeism is unnecessary as absolute presenteeism correlates most with health indicators. Furthermore, it is recommended that a measure of productivity of an individual with a health problem (in this case overweight or obesity) would best be measured relative to their own work performance prior to the health condition (Zhang et al., 2010). In finding no significant relationship between weight loss and productivity scores in this exploratory study, it is important to note that individuals may still suffer from a health condition. That is, weight loss does not necessarily negate overweight/obesity status and related health conditions. As this is the first randomized control trial work-site weight loss study to employ the WHO HPQ as a measure of productivity, further research is needed to validate this measure in the context of worksite weight loss interventions.

Finkelstein et al.'s (2009) worksite weight loss study corroborates the results presented here in that a clinically significant decrease in weight did not result in immediate significant absenteeism improvements. However, in a recent secondary analysis of a worksite weight loss intervention, Bilger (2013) found a positive relationship related to quality of life and marginally significant absenteeism improvements. Furthermore, in a related body of research, a recent review of wellness programs indicated positive effects on presenteeism in numerous different worksite settings (Cancelliere, Cassidy, Ammendolia, & Cote, 2011), indicating that the promotion of weight loss initiatives may save employers costs and improve employees' quality of life.

The results from the present study contribute to the literature on worksite weight loss interventions in several ways. First, this study directly responds to a potential publication bias with regard to the investigation of worker productivity. That is, findings from a recent meta-analysis concluded that studies with significant changes in productivity were of poorer quality (Rongen, Robroek, van Lenthe, & Burdorf, 2013). Rongen et al. (2013) assessed intervention quality via a nine-item checklist based on selection bias, performance bias, attrition bias, and detection bias. The present study was a randomized control trial that eliminated these three biases by including all overweight and obese participants who were blinded to their treatment allocation. Therefore, this current study helps bridge the gap of rigorous intervention methodology and the use of productivity measures.

Second, the lack of statistically significant relationship between weight loss and productivity could be because of the fact that an individual's perception of their productivity may be influenced by both environmental and personal factors as well as perceptions of worksite culture (Zinn, Schofield, & Hopkins, 2012). That is, these perceptions of productivity may also be related to the nature of work performed and the work environment. Work conditions, the nature of work performed, and the supervisor–employee relationships also influence the impact of an intervention on productivity (Abowd & Kramarz, 2005). Items related to these covariates were not included in the larger trial; providing an area of future investigation. A concerted effort between engagement strategies and evidence-based weight loss strategies may enhance the attraction to and sustainability of worksite weight loss interventions.

Third, this study leads to the need for similar large-scale longitudinal studies in order to determine if these findings are generalizable to other types of worksite weight loss interventions and other types of worksites, including lines of inquiry that test the best measure of productivity in various worksite settings. The recommendation for longitudinal studies is of particular importance as weight loss that leads to improvements in productivity may take longer than a 1- or 2-year period to appear.

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Table 1

Health and Work Performance Measures.

Variable	Items	
Absenteeism	**1**	About how many hours altogether did you work in the past 7 days?
	2	How many hours does your employer expect you to work in a typical 7-day week?
	Now please think of your work experiences over the past 4 weeks (28 days). In the spaces provided below, write the number of days you spent in each of the following work situations.	
	1	How many days did you miss an *entire* workday because of problems with your own physical or mental health?
	2	How many days did you miss an entire workday because of any other reasons?
	3	How many days did you miss *part* of a workday because of problems with your own physical or mental health?
	4	How many days did you miss *part* of a workday because of other reasons?
	5	How many days did you come in early, go home late, or work on an off day?
Presenteeism	**1**	On a scale from 0 to 10, where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate the usual performance of most workers in a job similar to yours?
	2	Rate your usual performance for the past year.
	3	Rate performance in the past 4 weeks when worked.

Table 2

Worksite Weight Loss Intervention Sample Characteristics.

Variable	Weight gainers (*n* = 449)	Weight maintainers (0 < weight loss ≥ 5%) (*n* = 353)	Clinically significant weight loss (weight loss ≥5%) (*n* = 228)
Age	46.96 (±10.70)	47.74 (±10.75)	45.65 (±11.75)
Gender (%)			
Female	76.15	69.86	73.73
Race (%)			
White	83.49	77.03	77.67
Black	14.22	20.06	18.14
Other	2.29	2.91	4.19
Ethnicity (%)			
Hispanic/Latino	1.20	3.00	3.29
Not Hispanic/Latino	93.03	89.79	92.02
Unsure of ethnicity	5.77	7.21	4.69
Baseline BMI status (%)			
Overweight	36.94	43.27	40.97
Obese	31.08	29.8	25.11
Severely obese	17.79	14.61	19.82
Morbidly obese	14.19	12.32	14.1
Education (%)			
Grades 0–8	0.23	0.87	1.38
Grades 9–11	1.61	1.16	0.92
High school	13.99	16.81	13.76
Some college	36.47	28.41	30.28
College graduate	35.32	35.65	39.45
Post college work	12.39	17.1	14.22
Worksite type (%)			
Professional group	18.71	22.1	17.54
Call center	6.01	4.25	7.46
Medical facilities	14.92	20.11	20.61
Government agency	23.16	23.51	21.05
Manufacturing	26.5	20.4	23.68
Small colleges	10.69	9.63	9.65
Hours worked in past 7 days	42.81 (±12.67)	44.5 (±12.20)	43.25 (±11.09)

Note. BMI = body mass index.

Table 3

Baseline to Postprogram Presenteeism and Absenteeism.

Variable	Baseline, *M* (*SD*)	12 Months, *M* (*SD*)
Absolute absenteeism	5.18 (51.64)	8.60 (55.90)
Relative absenteeism	−0.01 (0.50)	0.01 (0.68)
Absolute presenteeism	84.52 (12.96)	81.53 (15.51)
Relative presenteeism	1.16 (0.32)	1.18 (0.46)

Table 4

Weight Loss and Productivity Indicators.

				p value	
Baseline to postprogram	**Weight gainers (*n* = 449)**	**Weight maintainers (*n* = 353)**	**Clinically significant weight loss (*n* = 228)**	**Gainers versus maintainers**	**Gainers versus losers**
Absolute absenteeism	6.517	1.473	6.906	.374	.951
Relative absenteeism	0.053	−0.006	0.09	.369	.55
Absolute presenteeism	−3.17	−4.466	−0.684	.294	.081
Relative presenteeism	0.005	0.008	0.02	.93	.713