

Financial Incentives Lead to Short-Term Weight Loss

Volpp KG, John LK, Troxel AB, et al. Financial incentive-based approaches for weight loss: a randomized trial. *JAMA* 2008;300:2631–7.

Study Overview

Objective. To determine whether financial incentive programs designed according to behavioral economic principles could lead to weight loss.

Design. Randomized controlled trial.

Setting and participants. 57 men and women aged 30 to 70 years with a body mass index (BMI) of 30–40 kg/m² from the Philadelphia Veterans Affairs (VA) Medical Center. Patients were excluded if they were unable to provide consent or could not read, were currently participating in a weight loss program, had a myocardial infarction or stroke within 6 months, were receiving active treatment for drug or alcohol addiction, consumed > 5 alcoholic beverages per day, were currently addicted to prescription or street drugs, or had a serious psychiatric diagnosis. Of the 958 patients who were mailed invitations to participate, 165 responded; of these, 88 were screened and 31 were subsequently excluded.

Intervention. Two incentive programs were studied: a lottery and a deposit contract. Patients in the lottery group were eligible for a daily prize if they met their weight goal and had their number selected at random. Patients in the deposit contract group were given the opportunity to “invest” money at the beginning of each month (ie, from \$0.01–\$3 per day), and money was either gained or lost depending on whether they met their weight loss goal. For both programs, any money accrued during the month was only available to patients who met their weight goal at the end of the month. At the time of enrollment, all participants were given a free scale, scheduled for monthly weigh-ins, and participated in a 1-hour counseling session with a dietician. Patients in the lottery and deposit contract groups were given daily weight goals that corresponded with a weight loss of 16 lb over 16 weeks; they were instructed to call in daily to report their weight and subsequently received text messages with updates on their progress later the same day. Participants who lost at least 11 lb by the end of the 16-week follow-up period were offered the chance to participate in a 6-month maintenance program that involved additional financial incentives; 24 of 57 patients qualified and 18 participated. Patients who

did not participate in the maintenance phase were scheduled to return for weigh-in for a 7-month follow-up.

Main outcome measures. Weight loss at 16 weeks. The secondary outcome was weight loss at 7 months.

Main results. Most participants were male ($n = 54$), had low income (mean across groups, \$24,972–\$34,000), and had a BMI of 33.8 to 35.5 kg/m². There were no baseline differences between groups in demographic characteristics or recognition of the importance of weight loss. After controlling for baseline weight to ensure comparability, mean weight loss was greater in the incentive groups than in the control group at 16 weeks: lottery group, 13.1 lb (95% confidence interval [CI] of the difference in means, 1.95–16.40; $P = 0.02$) and deposit contract group, 14 lb (95% CI of the difference in means, 3.69–16.43; $P = 0.006$) compared with 3.9 lb in the control group. Approximately half of the participants in the incentive groups lost at least 16 lb at 16 weeks, and 36.8% and 26.3% of patients in the deposit contract and lottery groups, respectively, lost at least 20 lb. The odds of losing at least 16 lb was significantly greater in the incentive groups than in the control group. Results were not significantly altered by adjustment for race or stratification by age, baseline BMI, or income. At the end of 7 months, patients in the incentive groups still weighed significantly less than at baseline (lottery group, 95% CI, –15.89 to –2.47; $P = 0.01$; deposit contract group, 95% CI, –11.67 to –0.81; $P = 0.03$), whereas those in the control group did not (95% CI, –9.19 to 0.29; $P = 0.06$). Weight loss at 7 months was no different between those enrolled in the maintenance program and those not enrolled.

Conclusion. Short-term weight loss is increased with financial incentives based in behavioral economic principles but is not maintained over the long term.

Commentary

In this study, Volpp et al provide evidence for novel financial incentive-based weight loss programs. The incentives were designed to align with several well-established behavioral economics principles regarding behavior change: even small

rewards or punishments can influence results if immediate feedback is provided [1]; the experience of past rewards and the possibility of future rewards can motivate [2]; small probabilities of large payoffs can be powerful [3]; and loss aversion or avoidance of the threat of regret motivates change [4,5].

For the lottery program, participants had a 1 in 5 chance of winning \$10 per day and a 1 in 100 chance of winning \$100 per day if they met or exceeded their weight loss goal. The results of any winnings were communicated daily to participants via text message. Likewise, patients who failed to reach their weight goal were informed daily about what their winnings could have been if the goal was met. As further motivation, participants could only collect the money accrued during a given month if they met their weight target at the end of the month.

In the deposit contract program, participants "invested" \$0.01 to \$3 per day of their own money, with the amount determined by the participant at the beginning of each month, and that investment was matched 1:1 with an additional fixed payment of \$3 per day made by the study. Participants accrued money if they met their daily weight goal but lost money if they did not meet their goal, and these results were directly communicated via text message. Similar to the lottery program, patients could only collect the accrued money over the month if they met their weight goal at the end of the month. Patients in the lottery group earned an average of \$272.80 over the 16-week study period, while those in the deposit contract group earned \$378.49.

The results of this small study are compelling in the short term, with significantly increased weight loss in the incentive programs compared with the control program. Nearly half of the patients in the incentive programs met their weight targets. Unfortunately, as with many other behavioral weight loss programs, results weakened over time, and patients regained most of the weight by 7 months. However, patients still had a significantly decreased weight compared with baseline. Another analysis using follow-up of 8 months showed further regression of these results such that weight was no longer significantly lower than baseline. The pilot maintenance phase of the program was unsuccessful, but it was rather small, with only a few of the original participants involved.

Research has demonstrated modest success of financial incentives for patients to comply with medication regimens or appointments [6]. A previous deposit contract study by Jeffrey et al [7] showed some weight loss with a large upfront investment (\$200 in 1978). Volpp et al comment that this prior study was somewhat limited because of this requirement for a large upfront monetary commitment. As a result, this current study required only modest contributions for the deposit contract arm. Volpp et al also allowed for a

recalibration of daily weight loss goals depending on success or failure in the prior month. If a patient had extensive weight loss during a month, daily weight loss goals were lower for the subsequent month. Alternatively, for patients who missed their weight loss goal, daily goals were adjusted to reflect the fact that more weight loss was required in subsequent months to meet the ultimate goal weight. These features were intended to increase compliance throughout the study period; all participants also received \$20 at each monthly office weigh-in to ensure participation. As a result, compliance was rather high in this study (94% and 97.4% for the deposit contract and lottery groups called in daily, respectively).

The obvious limitation of this study is the small sample size and its focus on a narrow population of mostly men from a single VA medical center. Future research must assess these principles in more diverse populations and in multiple sites. The maintenance program designed in this study was very limited, with few results reported on the population that participated. The design of the study also precluded blinding participants and study staff, which could have biased the results.

Applications for Clinical Practice

Clinicians could consider novel incentive-based strategies to encourage weight loss; however, the exact structure and mechanisms of such incentives must be further explored before widespread adoption. Research must focus on identifying maintenance strategies to ensure that short-term success can be sustained over time.

—Review by Jason P. Block, MD, MPH

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