Effectiveness of contingency contracting: Component of a worksite weight loss program

Gail Landheer Zandee
Calvin University

Marilyn H. Oermann
Wayne State University

Follow this and additional works at: https://digitalcommons.calvin.edu/calvin_facultypubs

Recommended Citation
Zandee, Gail Landheer and Oermann, Marilyn H., "Effectiveness of contingency contracting: Component of a worksite weight loss program" (1996). University Faculty Publications. 564.
https://digitalcommons.calvin.edu/calvin_facultypubs/564

This Article is brought to you for free and open access by the University Faculty Scholarship at Calvin Digital Commons. It has been accepted for inclusion in University Faculty Publications by an authorized administrator of Calvin Digital Commons. For more information, please contact dbm9@calvin.edu.
Effectiveness of Contingency Contracting

COMPONENT OF A WORKSITE WEIGHT LOSS PROGRAM

by Gail Landheer Zandee, MSN, RN, and Marilyn H. Oermann, PhD, RN, FAAN

Abstract

The purpose of this study was to measure weight loss in overweight employees of a large corporation in Western Michigan who all received the same education on how to lose weight, but were randomly assigned to one of three groups: contingency contracting with a partner, contingency contracting alone, or no contingency contracting. A pretest-posttest quasi-experimental design was used and data were collected by a demographic questionnaire and measure of weight at the initial, 10th, and 23rd weeks. A total of 84 subjects completed the 10 week weight loss program and 57 subjects returned for the 23rd week follow up weight. Each group lost a significant amount of weight from pre-program to 10 weeks; however, there were no significant differences across groups. Although the groups were not significantly different from each other, the results support the value of individualizing interventions and offer insight into how demographic variables may affect attrition and methods chosen for weight loss.

Being overweight is a major health problem for many people throughout the United States. It is estimated this country has one of the highest average overweight populations in the world (Jeffery, 1991). The annual economic cost to the United States of having an overweight population is staggering. Colditz (1992) studied the annual costs of five chronic diseases that have overweight as a risk factor and calculated that the United States pays 39.3 billion dollars annually for diseases related to being overweight.

Behavioral risk assessments done by 47 states and the District of Columbia in 1991 revealed that the prevalence rate of being overweight in the United States is 23.4 percent (Michigan Department of Public Health [MDPH], 1993). Of the 47 states, Michigan is the highest in terms of percent of overweight population, with a prevalence rate of 29 percent (MDPH, 1993). This represents a 6.7 percent increase for Michigan since 1987. One of the Year 2000 national health objectives is to have 20 percent or less of the adult population aged 20 years and older overweight (Public Health Service, 1991). To achieve this objective, programs and interventions which assist adults in weight loss are needed.

Worksites have tremendous potential as a setting where weight loss programs can be offered. Worksite weight loss programs can provide health care savings by reducing medical costs, morbidity, and mortality related to overweight; they also can improve productivity, increase job satisfaction of employees, enhance corporate image, and reduce absenteeism (Anderson, 1991; Linnan, 1990; Rogers, 1991). Furthermore, an estimated

ABOUT THE AUTHORS:

Ms. Zandee is Instructor, Hope-Calvin Colleges, Department of Nursing, Grand Rapids, MI; and Dr. Oermann is Associate Professor, College of Nursing, Wayne State University, Detroit, MI.
16.7 million workers are more than 20 percent overweight (Rogers, 1991).

Interventions for effective worksite weight loss programs are evolving. Historically, the typical program was managed by a professional with individual or small group counseling. Recently programs have focused more on using lay persons, emphasizing personal responsibility, providing incentives, and creating a supportive environment (Rogers, 1991). Not only have these latter types of programs assisted in weight loss, but they also have reduced attrition and are more cost-effective. O'Donnell (1991) stresses that a worksite health promotion program will be most effective if it uses three strategies: education, methods for behavior change, and a supportive environment. Nursing interventions for worksite weight loss programs have incorporated these strategies; however, research determining the effect of combining all three strategies in such a program is limited.

The purpose of this study was to measure weight loss in overweight employees of a large corporation in Western Michigan. All participants received the same education on how to lose weight, but were randomly assigned to one of three groups: contingency contracting with a partner, contingency contracting with oneself, or no contingency contracting.

The research hypotheses were:
1. After 10 weeks and at the 23rd week follow-up, adults contracting with a partner will lose more weight than those contracting with themselves.
2. After 10 weeks and at the 23rd week follow-up, adults contracting with a partner and contracting with themselves will lose more weight than those who did not engage in contingency contracting.

LITERATURE REVIEW

A contingency contract is a written contract signed by the parties involved. It specifies both the behavior to be performed and the desired reinforcer (Boehm, 1989). In early studies, contingency contracting was found to have positive outcomes such as decreased diastolic pressure and increased knowledge for clients with hypertension (Swain, 1981) and improved use of the nursing process by nurses (Stekel, 1976). In a more recent study, contingency contracting increased knowledge of exercise regimens for cardiac rehabilitation clients (Leslie, 1991). Recent research on contingency contracting, however, is limited.

The common variable across these studies is that contracts were negotiated with a health care provider. Early on, Saccone (1978) examined the value of using a partner in the contracting process. Reinforcement by a partner for eating behavior change was found to be significantly more effective for weight loss than a basic education program. In contrast, reinforcement for eating behavior change by a therapist was not found to be significantly more effective than the basic education program. Even though Saccone (1978) used a partner in the contracting process, the goals and reinforcers were still negotiated with the therapist. The partner monitored the client’s behavior and gave the reward. Research evaluating the effect of having clients negotiate their own contracts and using a partner to assist in keeping the contract is lacking. In a review of research on contingency contracting between 1965-1986, Boehm (1989) calls for future studies focusing on the client as the pivotal person capable of negotiating contracts with partners who will then support behavior change.

METHOD

Design

A pretest-posttest quasi-experimental design was used for this study. Weight was measured at the start of the program, at 10 weeks, and at 23 weeks. Initially, subjects were randomly assigned to three groups: contingency contracting with a partner, contingency contracting with oneself, or no contingency contracting. However, when subjects were questioned at the 10 week weigh in on use of the intervention, a total of 17 participants assigned to contingency contract with a partner stated they chose to contract with oneself or not to use contracting. Four participants assigned to contingency contract with oneself chose to not use contracting. The researchers placed these participants in the group with the intervention they used. Thus, while the original groups were randomly assigned, the final grouping was a convenience sample.

Sample

The sample consisted of 119 subjects enrolled in a worksite wellness center weight loss program associated with a large corporation. These subjects volunteered to participate in the research study. Eligibility criteria for the study included being at least 18 years of age and 10% overweight. A height and weight table established by the Metropolitan Life Insurance Company in 1983 was the standard used to establish whether subjects were 10% over their recommended weight.

Instruments

Weight was measured in pounds on a Health-O-Meter balance beam scale. The operating manual claims that the Health-O-Meter scale is accurate to within one-half pound of the actual weight. Repeatability measurements were taken during the initial, 10th, and 23rd week weigh ins to estimate the scale’s reliability. At each weigh in, ten volunteers had their weight repeated immediately after the initial one. A reliability coefficient of 1.00 was established by comparing the two weights obtained on the same individual. Weights were measured by the researcher or corporation nutritionist. Interrater reliability was measured by having both the nutritionist and researcher independently record weights on a trial of 10 subjects. A .99 index of agreement was established between the two observers.

Procedure

During the 10 week program, all participants received weekly handouts on changes in diet and exercise recommended for losing weight. The contingency contracting groups were also taught how to contract as an additional strategy for losing weight.

A contingency contract contains a written behavioral
Comparison of Demographic Characteristics of Total Sample and Those Who Dropped Out

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total Sample (N=84)</th>
<th>Dropped Out (N=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Pre-program exercise habits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not regularly</td>
<td>29</td>
<td>34.5</td>
</tr>
<tr>
<td>Once a week</td>
<td>8</td>
<td>9.5</td>
</tr>
<tr>
<td>Twice a week</td>
<td>7</td>
<td>8.3</td>
</tr>
<tr>
<td>Three times a week</td>
<td>20</td>
<td>23.8</td>
</tr>
<tr>
<td>More than three times a week</td>
<td>20</td>
<td>23.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total Sample (N=84)</th>
<th>Dropped Out (N=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pounds they hope to lose during weight loss program</td>
<td>21.7</td>
<td>9.8</td>
</tr>
</tbody>
</table>

M=median, SD=standard deviation

RESULTS

Of the 119 subjects who volunteered for the study, seven (5.9%) were not eligible to participate because they were less than 10% overweight. In addition, one subject was removed from the study because the subject was unable to weigh in at the wellness center or plant health center. By the 10th week weigh in, 27 (22.7%) subjects had dropped out of the study and the company weight loss program. As a result, a total of 84 (70.6%) subjects completed the first part of the 10 week weight loss program. Fifty-seven subjects (67.9%) returned for the 23rd week follow-up weight.

Out of total sample of 84 subjects, 36 (42.9%) were male and 48 (57.1%) were female. Seventy-five (89.3%) were employed at the company, while nine (10.7%) were family members of those employed. The mean age of the sample was 40.8 years (SD=8.3) with a range of 25 to 66 years. Subjects were an average of 35.2 (SD=16.5) percent overweight.

Chi square and independent t tests were used to determine if there were significant differences between the sample (N=84) and those who dropped out of the study (N=27). There were statistically significant differences between clients who stayed in the weight loss program and those who dropped out on two variables, pre-program exercise habits and number of pounds one hoped to lose during the 10 week weight loss program (see Table 1). Those who remained in the study reported exercising more pre-program than those who dropped out (X²[4]=15.14, p=.004). In addition, those who dropped out reported wanting to lose significantly more weight than those who remained in the weight loss program (t[109]=3.57, p<.05). Those who dropped out of the study wanted to lose an average of 9.5 pounds more during the 10 week weight loss program than those who remained in the study.

Chi square and ANOVA were done to determine whether the sample (N=84) as it was randomly assigned differed in terms of any demographic variables. No sig-
significant differences were observed across the three groups: contracting with a partner (N=30), contracting with oneself (N=28), and no contracting (N=26). While the groups were originally randomly assigned, 17 subjects assigned to contract with a partner chose to contract alone or not contract at all. In addition, four subjects assigned to use contracting alone decided not to contract. The final groupings were: contingency contracting with a partner (N=13), contingency contracting with oneself (N=34), and no contracting (N=37).

The resulting sample was found to have significant differences in demographic characteristics. Those who remained in the intervention group using a partner were significantly more overweight than the other two groups (F[2,81]=4.54, p=.03). On average, those who contracted with a partner were 47.1% (SD=19.8) overweight, those who contracted with themselves were 32% (SD=12.4) overweight, and those who did not contract were 34% (SD=17.0) overweight.

In addition, those who contracted with themselves were found to be significantly older than those who did not contract (F[2,81]=3.67, p=.03). Those who contracted with themselves were an average of 43 (SD=8.6) years old; those who did not contract were an average of 38.2 (SD=6.0) years old. Those who contracted with a partner were an average of 42.7 (SD=11.2) year old.

### Weight Loss Related to Type of Contract Used

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial Weight</th>
<th></th>
<th>10 Week Weight</th>
<th></th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracting with partner (N=13)</td>
<td>199.8</td>
<td>33.9</td>
<td>192.5</td>
<td>29.9</td>
<td>4.32</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Contracting alone (N=34)</td>
<td>202.7</td>
<td>38.3</td>
<td>193.1</td>
<td>36.0</td>
<td>6.63</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

M=median, SD=standard deviation

### Weight Loss Related to Using Contracting or Not Using Contracting

Using independent and paired t tests, data were analyzed to determine whether using any type of contracting was more effective for weight loss than not using contracting (see Table 3). At 10 weeks, both groups lost a significant amount of weight from their initial average. The group using any type of contracting lost an average of 9.0 pounds. The group with no contracting lost an average of 9.3 pounds. No significant differences were found between the groups. At the 23rd week follow up, both groups lost weight but it was not statistically significant from their 10 week average nor were the groups different from each other. The group using any type of contracting (N=20) from the 10th to 23rd week lost an average of 1.3 pounds. Those who did not use contracting (N=37) lost an average of .23 pounds.

### Additional Findings Influencing Weight Loss

Since the corporation asked subjects to sign up for the program in teams and compete for weight loss, coworker support was analyzed as a potential intervening variable. Of the 57 subjects who remained in the study the entire 23 weeks, 36 (63.2%) stated they received support and encouragement from their coworkers to lose weight during the first 10 weeks. Those who reported support from their coworkers lost an average of 10.9 pounds the first 10 weeks while those who did not report support from their coworkers lost an average of 7.5 pounds. These differences were not statistically significant. Twenty-four (42.1%) people continued to receive support and encouragement from their coworkers to lose weight between the 10th and 23rd week weigh in. Coworker support was associated with weight loss between the 10th and 23rd week (t[55]=2.33, p<.05). Those who reported having support and encouragement between the 10th and 23rd week lost an average of 2.5 pounds while those who did not receive support and encouragement gained an average of .8 pounds.

A correlation was done to determine whether there was a relationship between weight loss and number of pounds one wanted to lose. There was a statistically significant relationship between number of pounds one hoped to lose during the 10 week weight loss program and number of pounds lost (r=.33, p=.003). In fact, 11%
of the variance in number of pounds lost was associated with number of pounds one hoped to lose.

**DISCUSSION**

Groups who used a partner in the contracting process did not lose more weight over a period of 10 weeks than those who contracted alone. An explanation of why these groups did not differ may be twofold. First, even though subjects reported using a partner in the contracting process, there was no measure of the amount of support they received from this person to lose weight. Second, it was hard to control the intervening variable of coworker support. Many subjects reported having support and encouragement from their coworkers to lose weight. It was interesting to note, however, that those who reported coworker support continued to lose weight after the corporation weight loss program was done, while those who did not report coworker support gained weight. The implication of this finding is that coworker support may be an effective method in maintaining behavioral change over time. Use of coworker support in promoting and maintaining behavioral change has been supported in the literature (Pender, 1990).

Groups who used any type of contracting as a intervention for weight loss did not lose more weight over a period of 23 weeks than the group with no contracting. One limitation is that the group that did not use contracting consisted of subjects who received education alone plus those who received information on contracting but chose not to use this method.

An important finding, however, is that each group was able to lose a significant amount of weight from initial weigh in to 10 weeks. The actual motivation for this weight loss is difficult to determine because the contracting intervention was confounded with the educational and team competition component of the program.

Nevertheless, it was interesting to note the relationship between demographic variables and type of intervention used. Groups as they were randomly assigned at the outset did not differ on any demographic variables. When subjects were placed in the group according to the intervention they chose to use, however, differences were noted. Those who had used a partner during the first 10 weeks were found to be significantly more overweight than those who contracted with themselves and those who did not contract. Subjects who contracted alone during the first 10 weeks were significantly older than those who did not contract.

These findings hold several implications for occupational health nurses. Percent overweight and age may be associated with the type of intervention clients select and believe they need for weight loss. For some subjects, motivation for weight loss may have been derived from the program alone while others may have perceived a need for contracting. Adult learning theory stresses that adult education should be designed to accommodate past experiences that have affected motivation, needs, and goals (Knowles, 1984). Because not everyone may find contracting valuable, interventions should be individualized as much as possible.

There is a lack of research on the demographic characteristics of those who choose contingency contracting as a method for weight loss compared to those who do not. Neale (1990) examined demographic variables of subjects who signed a treatment contract for exercising versus subjects who did not. In this study, age was not related to signing a contract. More research is needed in this area.

Particularly interesting and unexpected findings were noted when demographic characteristics were analyzed in terms of those who dropped out of the weight loss program. Those who dropped out exercised significantly less before the start of the weight loss program than those who stayed in the program. This finding suggests that exercise habits pre-program may be an indicator for the nurse as to whether or not the client will remain in a weight loss program. Further research is indicated on the relationship between exercise habits and motivation.

In addition, those who dropped out had a significantly higher reported weight they hoped to lose during the 10 week program than those who stayed in the program. Drewnowski (1990) recommends the rate of weight loss not to exceed 2 pounds a week, which would total 20 pounds in 10 weeks. The educational handouts from the corporation encouraged behavioral changes consistent with this slow rate of weight loss. Those who dropped out of the program wanted to lose 30 pounds in 10 weeks, 10 pounds more than the recommended rate of weight loss.

**TABLE 3**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial Weight M</th>
<th>Initial Weight SD</th>
<th>10 Week Weight M</th>
<th>10 Week Weight SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any contracting (N=47)</td>
<td>201.9</td>
<td>36.8</td>
<td>192.9</td>
<td>34.1</td>
<td>7.82</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No contracting (N=37)</td>
<td>204.9</td>
<td>42.9</td>
<td>195.6</td>
<td>40.6</td>
<td>7.58</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*M=median, SD=standard deviation*
Exercise habits and weight loss goals may be an indicator for the occupational health nurse as to whether or not a client will remain in a weight loss program. Age and percent overweight may be associated with whether a client wants to use contracting as a method to assist in weight loss.

These subjects may have become discouraged when the recommended changes in diet and exercise were not resulting in weight loss at the rate they anticipated. An understanding of the recommended rate of weight loss may be needed so subjects do not become discouraged and drop out of a weight loss program when the weight is lost slowly. Furthermore, the study revealed a relationship between number of pounds one hoped to lose and number of pounds lost. These results also support setting realistic and reasonable weight loss goals with clients.

In conclusion, the study raises interesting questions about weight loss programs. Demographic variables of participants is one area needing further research. Demographic variables were found to be related to attrition and whether one contracted with a partner or self or did not contract. By documenting these relationships, occupational health care nurses may be able to better meet the needs of the overweight population. The effect coworker support has on maintaining behavioral change over time is another area needing more research. If a weight loss program helps individuals change behaviors to lose weight, but these behaviors are not maintained over time, the effectiveness of the program needs to be questioned.

REFERENCES


