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Addressing Weight Gain in Smoking Cessation Treatment: A Randomized Controlled Trial

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Abstract

Purpose.—To evaluate the effectiveness of a cognitive behavioral treatment (CBT) addressing cessation-related weight concerns delivered via a tobacco quitline that does not address weight concerns.

Design.—Randomized controlled trial, blinded 6-month follow-up.

Setting.—The Oklahoma Tobacco Helpline (OKHL).

Subjects.—All 7998 smokers who called the OKHL were screened; 4240 were eligible; 2000 were randomized to the standard quitline (STD) or the brief version of the CBT weight concerns program (WCP).

Intervention.—Telephone counseling to help people quit smoking and address concerns about cessation-related weight gain.

Measures.—Demographics, weight, tobacco status, weight concerns, self-efficacy in quitting, and quitting without weight gain.

Analysis.—Descriptive statistics and logistic regression.

Results.—Of those randomized, 1002 participants completed the 6-month survey (response rates = 53.2% for STD, 47% for WCP). Compared with STD, WCP led to reduced weight concerns ($p < .01$) and less weight gain among quitters (1.8 vs –3.4 pounds; $p = .01$). Although not significant, participants in the WCP were more likely to report 30-day abstinence (33.3% vs. 36.8%, $p = .24$; intent to treat = 17.7 vs. 17.3).

Conclusion.—The WCP was successfully delivered via a quitline and resulted in improved attitudes about weight and decreased cessation-related weight gain without harming quit rates. Promotion of a quitline focused on addressing weight in conjunction with quitline treatment for

smoking cessation may improve cessation and weight outcomes. Study limitations include use of self-report and survey response.

Keywords

Smoking; Weight Concerns; Quitlines; Effectiveness; Prevention Research

PURPOSE

Smoking and obesity are leading causes of preventable morbidity and mortality.^{1–3} Although effective smoking cessation treatments are available,^{4,5} it is estimated that 80% of smokers gain 6 to 8 pounds after quitting,⁶ and some gain more than 20 pounds.^{7–9} Weight gain resulting from quitting smoking is associated with an increase in the incidence of type 2 diabetes and a 30% increased risk of hypertension.^{10,11} In addition to the potential negative health impact of gaining weight,¹⁰ fear of weight gain can hinder quit attempts, can jeopardize adherence to tobacco cessation programs, and is associated with early relapse.^{12–19} Although women smokers are more likely than men to be concerned about postcessation weight gain, there is evidence that weight concerns are present in men as well.^{18,19} Thus, there is a need for specialized counseling to address smokers' concerns about postcessation weight gain.

Efficacy studies indicate that combined cessation and weight management treatments do not consistently harm quit rates and if delivered after quitting can provide a short-term weight suppressive effect.²⁰ An alternative treatment approach shown to improve cessation rates and, in one report,²¹ reduce weight gain involves cessation counseling combined with cognitive behavioral treatment (CBT) that addresses weight concerns.^{21,22} In this program, sessions covering topics related to weight were interspersed with tobacco cessation counseling and involved education about weight gain associated with quitting and techniques to identify and address maladaptive thoughts about body shape and weight. The program also discouraged restrictive dieting and provided considerable education about the relationship between weight gain and smoking cessation while encouraging an acceptance of moderate weight gain after quitting. Six- and 12-month results showed significantly higher cessation rates and less weight gain among quitters in the CBT group compared with the cessation program alone or a combined intervention focused on weight management. Although efficacy of this approach has been described,²¹ the original CBT program involved ten 90-minute, in-person group counseling sessions delivered over a 7-week period. Such a highly intensive face-to-face treatment is unlikely to be adopted at a population level. Thus, the reach and effectiveness of such a program remains unknown and, to our knowledge, no studies have tested the use of lower intensity or phone-based tobacco cessation counseling to address cessation-related weight concerns.

Telephone quitlines, widely available in the United States, Canada, and Europe and a growing service world-wide, provide an ideal setting for disseminating research to practice.^{4,5} In this study we aimed to translate, implement, and test, in the context of a tobacco quitline, the intensive CBT weight concerns program (WCP).^{21,22} This paper describes the Weigh2Quit study, the first known effectiveness trial of the WCP. We hypothesized that (1) a

brief phone-based version of the WCP would be effectively implemented and acceptable to quitline users; and that, compared with the standard quitline (STD), the WCP would (2) increase quit rates, (3) reduce weight concerns, and (4) decrease cessation-related weight gain. We also explored the impact of the WCP among two high risk groups: those with diabetes and those with coronary heart disease.

METHODS

Design and Setting

This randomized controlled trial was conducted through the Oklahoma Tobacco Helpline (OKHL). The OKHL is operated by Alere Wellbeing (AW; formerly known as Free & Clear), the largest quitline provider in the United States. Using a preprogrammed, automated randomization procedure, eligible and consenting individuals were randomly assigned in blocks of 20 to receive either the STD or the WCP. Blocking ensured that the numbers of individuals in each cell were equal after every 20th individual was randomized. This prevents the chance of ending enrollment with disproportionate numbers in each cell.

Sample

Between March and November 2008, adult smokers who called the OKHL were screened for weight concerns and invited to participate in the Weigh2Quit Study. Interested individuals were transferred to specially trained staff who collected verbal consent and baseline data. Individuals were eligible for the study if they were 18 or older, smoked at least five cigarettes per day, were willing to quit within 30 days, were not pregnant or nursing, had a body mass index (BMI) of at least 18.5, had concerns about gaining weight with quitting, agreed to be randomized, and agreed to the follow-up interview. The study was approved by the Western Institutional Review Board on February 28, 2008, and the follow-up survey was approved by the University of Oklahoma Health Sciences Center Institutional Review Board on July 30, 2008.

Measures

Baseline assessment included standard registration and assessment variables collected upon enrollment with the OKHL, which consisted of participants' demographic characteristics (e.g., gender, age, ethnicity, race), presence of comorbid chronic conditions (asthma, diabetes, coronary heart disease, chronic obstructive pulmonary disease), level of nicotine addiction (time of first cigarette), and tobacco history (e.g., cigarettes per day, frequency and duration of use, and use of other tobacco). We used validated, reliable measures when possible, and all of the measures have been used in prior trials. BMI (kg/m^2) was calculated from self-reported height and weight.²³ Participants were also asked two questions to assess the presence of cessation-related weight concerns using a scale of 0 to 100 where 0 = not at all concerned and 100 = very concerned: "How concerned are you about gaining weight after quitting?" and "How concerned would you be if quitting smoking caused you to permanently gain 10 pounds?" Individuals were classified as having weight concerns if they reported a score of 50 or higher on either of the two questions.^{19,21,22} Additional baseline questions assessed weight gain in prior quit attempts, perceived weight (underweight, normal, overweight, very overweight), and dieting to lose weight (past, current, or intentions

to lose weight). Standard measures were used to assess self-efficacy in quitting without weight gain (e.g., “How confident are you that you can: Avoid gaining weight while staying quit?”) and other weight concerns (e.g., “How important is losing weight or maintaining your current weight compared with other personal health concerns?”). The self-efficacy and weight concerns scales included six items each. The rating scale for these measures ranged from 1 = “not at all” to 10 = “very much.”¹⁵

Process measures included AW’s computerized records of number of counseling calls completed. At 6 months, participants were also asked about use of cessation medications such as nicotine replacement therapy (NRT).

Blinded outcome assessments were collected 6 months following randomization. The telephone surveys were administered by the University of Oklahoma Public Opinion Learning Laboratory using computer-assisted telephone interviewing technology. Surveys were conducted by trained interviewers following a standard protocol. Participants who were unreachable because of a disconnected phone number were sent a letter offering an online survey. Participants received a \$20 gift card for completing the survey. The primary outcome was 30-day point prevalent abstinence assessed at 6 months. Secondary outcomes were 90-day prolonged abstinence, participant satisfaction, change in maladaptive attitudes about weight, and change in weight among those who were abstinent at 6 months.²¹ Tobacco use was assessed with the question: “When was the last time you smoked a cigarette, even a puff?” Abstinence rates were calculated in two ways: (1) including only participants who completed the survey in the denominator (“respondent analysis”); and (2) using the intent-to-treat methodology (ITT), in which those not completing the survey were assumed to be tobacco users. To measure satisfaction, participants rated their experience with the quit coach (QC) and their overall satisfaction with the OKHL using a four-point rating scale, and whether the OKHL met their expectations (yes or no). Change in weight concerns for each of the six items rated on the 1 to 10 scale was the difference between baseline and 6-month scores. Change in weight was calculated in two ways: (1) by reporting participants’ perceived change in weight (“my weight stayed the same,” “I have lost weight,” “I have gained weight”) and (2) calculated change in weight based on the difference between self-reported weight in pounds at baseline and at 6 months. The mean and standard deviation for perceived weight change was based on data from the probe, “How much weight did you gain/lose?”

Interventions

The STD Cessation Program.—The STD cessation program provided through the OKHL included a mailed Quit Guide, five counseling calls with a QC, free NRT (2 weeks for insured, 8 weeks for uninsured participants) and referral to community-based cessation resources. The counseling and materials were based on AW’s effective^{24–30} Quit for Life phone program, which has been commercially available for nearly 25 years. Counseling calls consisted of an assessment and planning call, a target quit date (TQD) call, a follow-up call 7 days after the TQD, and two additional post-TQD calls. The first counseling call lasted about 30 minutes and follow-up calls averaged 15 minutes. The STD program is evidence based and guided by social cognitive theory (SCT).³¹ Coaches assess participant’s

barriers to, and self-efficacy for, key behavior changes related to tobacco and use tools such as motivational interviewing and cognitive-behavioral and relapse-prevention strategies to promote long-term behavior change. Coaches apply SCT through flexible implementation of a standard “call map” that guides the intervention through assessment of participant’s strengths and barriers related to the SCT domains (personal, environmental, and behavioral), education related to self-efficacy gaps, and development of an action plan to move the participant toward quitting for good.

The Integrated WCP: The integrated WCP comprised the STD OKHL program integrated with weight concerns content during each call with a QC plus three additional calls with a weight coach (WC) and specialized support materials. The WCP was adapted from the original intensive, in-person CBT weight concerns intervention^{21,22,32} and delivered via a telephone-based quitline. The goal of the intervention was to provide participants with tools to succeed in quitting tobacco despite their concerns about weight by identifying and targeting maladaptive thoughts and beliefs about smoking and weight.^{32,33} The Weigh2Quit workbook included educational information and exercises on average weight gain associated with quitting, ways to minimize fears of weight gain, suggestions for healthy snacks, and self-monitoring forms for tracking maladaptive thoughts about weight and body image. In all eight calls, coaches identified and addressed weight concerns and cessation efforts, discouraged dieting while quitting, encouraged acceptance of moderate weight gain with quitting, and helped participants to set realistic goals for quitting smoking and reducing unproductive thoughts about weight. In the three weight calls, WCs focused on weight concerns, helped individuals identify maladaptive beliefs about weight gain and smoking cessation, and encouraged use of the self-monitoring forms. WCs also assisted participants with goal setting and education on use of healthy snacks and physical activity. Weight calls were interspersed with the STD calls and both interventions were completed within 4 months of enrollment in the OKHL.

AW QCs have at least a bachelor’s degree or equivalent experience in counseling, addiction studies, or social work. QCs undergo rigorous on-site training exceeding 120 hours plus ongoing supervision, call monitoring, and feedback. The three WC calls were conducted by experienced registered dietitians, masters-level nutritionists, or specially trained weight/QCs. QCs and WCs were trained to deliver components as specified in the intervention manual and to support components targeting both smoking cessation and weight concerns. The training, ongoing supervision, and monitoring of calls ensured consistency of the intervention.

To ensure treatment fidelity, the research team listened to 184 (2.7%) of the 6860 counseling calls delivered. Two members of the research team (blinded to group assignment) scored the calls separately to determine if, and the degree to which, weight content was addressed within groups. Summary scores indicated that the majority of WCP counseling sessions followed the intervention manual (e.g., assessed and discussed weight concerns) and that in only one of the STD counseling calls, the QC delivered some of the WCP. As soon as the QC realized her error, she was able to continue utilizing the STD protocol.

Analyses

Power calculations conducted prior to the study indicated that a sample of 1000 participants per group was sufficient to have 80% power to detect with 95% confidence an 8% difference in 6-month quit rates between groups using ITT estimates and assuming a 30% quit rate in the STD and a 65% response rate to the follow-up survey. Primary analyses (defined *a priori*) compared the WCP with STD in terms of smoking abstinence (respondent and ITT), mean change in weight concerns, and change in weight among participants who were tobacco free at 6 months using 30- and 90-day point prevalence abstinence. Cessation-related weight gain is considered an outcome measure only among abstinent smokers and is consistent with the literature.^{20,22} Comparing weight change for the whole sample would confound the results because smokers tend not to gain weight. Although ITT methodology is appropriate for smoking cessation outcomes, it is not applicable for weight outcomes among quitters because nonresponders would be classified as smokers. We used χ^2 and Fisher's exact tests for categorical data and *t*-tests for continuous data. Missing responses ("Don't know," "Refused") were omitted from the calculation of percentages and statistical tests with the exception of ITT quit rates. We calculated unadjusted and adjusted odds ratios using logistic regression to examine the likelihood that the WCP group would have higher quit rates and less weight gain than the STD group. Baseline variables (measured items known to be associated with cessation) were included as covariates in multivariate analyses of outcomes. These included BMI, age, gender, race, dieting (yes/no), weight gain in prior quit attempts, mean weight concerns, mean self-efficacy in quitting without weight gain, use of NRT, cigarettes per day, and number of counseling calls completed. For secondary outcomes, we conducted multivariate analyses to examine interaction effects between intervention group and BMI, gender, dieting at baseline, and chronic disease. We chose these subgroups because each has been shown to be associated with treatment outcomes in terms of cessation and/or weight gain. Analyses were conducted using version 9.1 of the SAS software package (SAS Institute, Cary, North Carolina).

RESULTS

The Figure shows the study enrollment flow from registration through follow-up. During the recruitment period (March through November 2008), 7998 tobacco users who called the OKHL and enrolled in the cessation program were screened for weight concerns; 4240 (53.0%) were eligible for the study, 2771 (65.4%) were interested, and 2038 (47.2% of eligible smokers) gave verbal consent for participation and were randomized.

Reasons for ineligibility were the absence of weight concerns, BMI below 18.5, or choosing not to answer the screening questions. Among the 1469 who were eligible but declined the study offer, 38.5% wanted to focus only on quitting smoking. Individuals who accepted randomization did not differ from those who were eligible but not randomized on ethnicity, race, marital status, education, or income, but those accepting randomization had a higher mean (SD) BMI (30.4 [7.2] vs. 29.0 [6.7]; $p = .0001$), were more likely to be obese (49% vs. 39%; $p = .0001$), were older (41.3 vs. 39.7; $p = .0001$), and were more likely to be female (77% vs. 71%; $p = .0001$) and uninsured (52% vs. 48%; $p < .01$). Randomized groups did not differ on baseline measures, with three exceptions. Those in the WCP (vs. STD) were

less likely to be white (77% vs. 81%, $p < .01$), less likely to report weight gain in prior quit attempts (83% vs. 88%, $p < .01$), and more likely to be confident in quitting without weight gain (sum of self-efficacy responses 33.7 vs. 32.3, $p < .02$). Most participants used NRT since enrolling in the quitline (90% of STD vs. 89% of WCP). The average number of counseling calls completed was 3.0 for STD vs. 4.1 for WCP. Response rates to the 6-month survey were lower than expected (53.2% of STD and 47.0% of WCP), including 16 who completed the online survey. The primary reason for noncompletion was inability to contact the individual 6 months postregistration (33.4% for STD, 35.9% for WCP). Compared with nonrespondents, survey respondents were older ($p = .0001$); more likely to be married ($p < .02$) and educated beyond high school ($p < .0002$); less likely to be uninsured ($p < .0002$); and more likely to have smoked for 20+ years ($p < .0001$). Those who completed the 6-month assessment did not differ from nonrespondents on weight concerns, mean BMI, or percentage who were normal weight, overweight, or obese. Analyses of process measures for the 1002 who completed the survey indicated that the mean (SD) total number of counseling calls completed was greater in WCP. The higher number of total calls in WCP was due to the offer of three additional calls with a WC. Groups did not differ on mean number of standard QC calls completed (3.6 vs. 3.5, $p = .43$), but differed significantly on mean number of total calls, with 3.6(1.6) calls completed in STD vs. 5.2(2.5) completed calls in WCP, $p < .0001$. The majority of participants completed at least two counseling calls; 89.1% of STD vs. 92.1% of WCP ($p = .22$) completed two or more total calls and 82.3% of the WCP participants completed at least one call with a WC. All of the counseling calls in WCP (QC and WC calls) addressed weight.

Intervention Effects on Cessation

Although participants in the WCP reported higher satisfaction ratings and a 3.5% increase in responder's quit rate relative to the STD, these differences did not reach statistical significance (Table 1). The ITT quit rates were also no different (17.1% and 17.8%).

Intervention Effects on Perceived and Calculated Weight Gain

Among participants who reported being quit more than 30 days at 6 months (Table 2), those in the WCP differed significantly from those in STD on perceived weight change; 30.0% of WCP vs. 50.8% of STD said they had gained weight, $p = .0004$. The perceived amount of weight change also was significantly different: -3.4 pounds among the WCP vs. +1.8 pounds among STD ($p = .01$).

Results held after controlling for baseline demographics (e.g., age, gender, weight gain in prior quit attempts), use of cessation medications, and number of calls completed. Although groups did not differ significantly on calculated weight gain, defined as baseline self-reported weight minus follow-up self-reported weight, the effect was in the same direction (Table 2) and the correlation between the two measures (perceived and calculated weight change) was high ($R = .57$, $p < .0001$ overall; $R = .68$, $p < .0001$ for WCP; and $R = .47$, $p < .0001$ for STD). The change in mean BMI was also not different between groups (not shown in tables).

Intervention Effects on Weight Concerns

Groups also differed significantly on change in weight concerns. That is, individuals in the WCP reported decreased concerns about smoking-related weight gain more than did those in STD ($p < .0001$).

For example, ratings on each of the six weight concerns items (the importance of losing weight or maintaining current weight, using cigarettes as a mean to control weight, concerns regarding gaining weight because of quitting tobacco, etc.) were lower at 6 months than baseline for the WCP but not STD.

Secondary Analyses Among Subgroups

There were no treatment effects on 30- or 90-day cessation in the presence of interaction effects of treatment group and the baseline variables of BMI, gender, or dieting to lose weight. For 90-day quit rates, we found a significant interaction between treatment group and having diabetes ($p = .03$) or coronary artery disease (CAD) ($p = .02$). The WCP worked better for those with diabetes; 31.5% of smokers with diabetes in the WCP vs. 19.1% of smokers with diabetes in STD quit smoking for 90+ days (Table 3). The WCP was less successful among those with CAD; 10.5% of CAD participants in WCP quit compared with 25% of CAD participants in STD. As with abstinence rates, we found that those most likely to benefit from the WCP in terms of weight gain prevented were those with diabetes. The average change in weight among diabetics who reported being quit for 30+ days was 24.6 for the WCP versus +2.7 pounds for STD ($p = .1$), and the average change in weight among those who reported being quit for 90+ days was 25.2 for the WCP versus +6.8 pounds for STD ($p = .009$).

DISCUSSION

The Weigh2Quit effectiveness trial demonstrated that an intensive, face-to-face CBT treatment designed to address smokers' concerns about postcessation weight gain can be implemented effectively via a standard state quitline. In addition, this combination of weight concerns and quitline treatment is acceptable to quitline callers, based on the interest and engagement in the program and the high satisfaction ratings. The WCP was associated with a reduction in maladaptive attitudes and beliefs about weight and a reduction in cessation-related weight gain without harming the quit rates (based on perceived but not calculated weight change). More importantly, those in the WCP were more likely to report that they lost weight postquit and were less likely to report having gained weight compared with STD.

In this first effectiveness test of an intervention to address weight concerns, we randomized 25% of adult smokers who called the OKHL and were screened. This is similar to the 22% recruitment rate reported in the original efficacy trial. Unlike the original trial, we found a significant improvement in unproductive weight concerns. In the prior trial, the authors used the two-item screening measure at baseline and follow-up as the measure of change in weight concerns. In our trial we used the six-item validated measure of weight concerns¹⁵ as our change score. We did not re-ask the two-item screening question at follow-up. Differences in study populations may also have contributed to the differences in results

between studies. The prior trial recruited only women and those willing to enroll in group sessions delivered in face-to-face meetings. Our study included both men and women who sought cessation treatment via a phone-based state quitline. Like the original trial, we also found a significant effect on suppressing weight gain in quitters. In our study, although perceived weight change differed significantly between groups, calculated weight gain did not. However, perceived and calculated weight change were highly correlated and we think it relevant to report on findings of perceived weight change because these data provide some initial evidence on the importance of addressing weight in quitline interventions.

Unlike the prior trial, we found no significant treatment effects on satisfaction with care or abstinence at 6 months. However, in the original trial, quit rates assessed at 4 weeks and at 12 months were significantly higher for CBT (vs. smoking cessation treatment alone or combined smoking cessation plus weight control). It is possible that had we included additional follow-up surveys, we too may have found significant early (4-week) and late (12-month) treatment effects. In our trial, the lack of significance between groups on cessation might have been due to the high satisfaction ratings in both groups and good cessation outcomes at 6 months for STD (33.3% 30-day respondent quit rate) limiting our ability to detect significant group differences. In other quitline studies, 7-day respondent quit rates at follow-up ranged from 22.5%²⁶ to 34.2%.^{27,28} In addition, the markedly lower treatment intensity in our trial compared with the original face-to-face efficacy trials, as well as the low levels of treatment engagement, may have blunted the capacity to create a large cessation treatment effect. It is important to point out that as in prior combination treatments that addressed weight gain, either an increase in cessation rate or a decrease in cessation-related weight gain is considered to be a positive outcome.

Additionally, the intervention effects did not vary by age, gender, or tobacco status at baseline, but the WCP appears to be more effective than STD among smokers who have diabetes. The finding of an effect among smokers with diabetes is significant given the importance of quitting smoking and avoiding weight gain in this population. The paradoxical effect in participants with cardiovascular disease is difficult to explain but emphasizes the importance of further investigation. Note, however, that the sample sizes were relatively small within the chronic disease population ($n = 141$ with diabetes, 99 with CAD).

The strengths of the study include the large sample size, the use of a randomized trial, the public health significance of the topic of weight gain and smoking, and the potential reach of the program. However, there are several limitations to be considered. One potential limitation is the lack of an attention control group. STD offered five counseling calls with a QC; the WCP offered eight calls (three with a WC). The imbalance in treatment intensity could have affected the results, although the significant reduction in maladaptive weight concerns observed in the WCP but not STD suggests results are more likely due to intervention content. Furthermore, results held even after controlling for number of counseling calls completed.

Another potential limitation is the use of self-reported weight and perceived change in weight. Although measured body weight is ideal, it is not feasible for large phone-based

effectiveness studies that recruit participants over a large geographic area. Further, perceived weight change is an important indicator in terms of impact on quit success, because perceptions are strongly associated with behavior change. Another potential limitation is that those in the WCP were less likely to report weight gain in prior quit attempts (83% vs. 88%, $p < .01$) compared with STD, and this may have given the intervention group an advantage to not gain weight in our study.

We could not rule out the possibility that the significant effects on weight were due to incorrect perceptions of weight change induced by the increased focus on weight in the WCP. In fact, the correlation between perceived and calculated change in weight was stronger for those in the WCP ($R = .68$, $p < .0001$) than for those in STD ($R = .47$, $p < .0001$).

Although response rates to follow-up were lower than expected and lower than efficacy trials, our response rates are comparable to other quitline evaluations and studies. For example, response rates to a 3-month survey of quitline participants offering four proactive counseling calls was 48%.³⁴ The differential response rate (fewer intervention participants completed the survey) that we observed is also consistent with other clinical trials and likely muted the overall treatment effects, because nonresponders were counted as smokers. Analyses of weight outcomes among quitters must also take into consideration the low response rates because nonresponders are considered to be smokers and would not be included in postcessation weight analyses. Other potential limitations include the measures we used and the number of statistical tests conducted. Although all of the measures have been used in prior trials, some of the measures used to assess process and outcomes have not been validated in psychometric testing (e.g., presence of chronic disease, perceived weight, dieting to lose weight, weight gain in prior quit attempts). Finally, the large number of statistical tests undertaken in the secondary analyses may have led to some positive results based on an inflated alpha experiment-wise.

Despite potential limitations, this study adds to existing evidence that intervening on both cessation and weight does no harm to either smoking cessation or weight outcomes.^{20,35} In fact, it provides the first evidence that a combined tobacco/weight treatment delivered by phone and mail can reduce weight concerns associated with cessation and can prevent cessation-related weight gain. This study has public health implications for a number of reasons. First, postquit weight gain and concerns about weight gain pose a significant barrier to quitting. Second, finding an effective population-based cessation program that can suppress cessation-related weight gain without harming the overall quit rate can have a significant impact on the health hazards associated with excess cessation-related weight gain and can increase motivation to quit. Furthermore, the weight-suppressive effect could have a significant impact on reducing the onset or exacerbation of diabetes, and the WCP could be readily integrated into established diabetes education programs without negatively impacting diabetes care.³⁶ Future research should explore the population impact of promoting the WCP as a proven way to quit without gaining weight to determine if more quit attempts and more calls to quitlines are generated.

Finally, the collaboration between the funders of the OKHL (the Oklahoma Tobacco Settlement Endowment Trust and the Oklahoma Department of Health), the Oklahoma Tobacco Research Center, and AW presents a mechanism for bringing research to practice. Through this collaboration, we were able to produce the first effectiveness trial of a highly intensive but successful “weight concerns” smoking cessation intervention by adapting and integrating the program into a state quitline.

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SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Weight gain and weight concerns related to smoking cessation are common and can undermine a smoker's commitment to quit. Of particular concern are those with a chronic disease who are at elevated risk for adverse medical outcomes if they continue to smoke and also if they gain weight. In fact, problems with weight management have been cited as a significant factor contributing to difficulties in achieving long-term abstinence from smoking in patients with diabetes.

What does this article add?

This study shows that a novel cessation treatment that addresses weight concerns and alleviates maladaptive thoughts about weight can reduce cessation-related weight gain without harming the quit rates.

What are the implications for health promotion practice or research?

A cessation program that has a weight-suppressive effect and is delivered through a widely used and effective delivery system could have a significant public health impact.

Figure.
Study Enrollment

Table 1**Six-Month Outcomes: Satisfaction and Quit Rates**

	Standard Quitline, % (n = 532)	Weight Concerns Program, % (n = 470)	p
Experience with QC [*]			0.29
Excellent	52.7	56.3	
Good	36.2	35.8	
Average	8.1	6.2	
Poor	3.0	1.7	
Overall satisfaction with the Oklahoma Helpline [†]			0.18
Very satisfied	60.1	65.4	
Mostly satisfied	26.4	24.1	
Somewhat satisfied	10.1	8.8	
Not at all satisfied	3.4	1.7	
Oklahoma Helpline met expectations			0.06
Yes	90.6	93.8	
No	9.4	6.2	
Quit Rates			
Quit 30+ days (responders)	33.3	36.8	0.24
Quit 30+ days (intent-to-treat)	17.7	17.3	0.81
Quit 90+ days (responders)	22.2	23.2	0.70
Quit 90+ days (intent-to-treat)	11.8	10.9	0.52

^{*}Four standard quitline participants and 1 weight concerns program participant did not answer the question. QC indicates quit coach.

[†]Six standard quitline participants and 2 weight concerns program participants did not answer the question.

Table 2

Change in Weight at 6 Months Among 30-Day Quitters (N = 350) *

	STD, % (n = 177)	WCP, % (n = 173)	p
Perceived weight change			<0.001
Stayed about the same, %	22.0	29.4	
Lost weight, %	27.1	40.6	
Gained weight, %	50.8	30.0	
Not collected/refused/don't know, No.	0	3	
Perceived average change in weight, pounds	1.8 (18.9)	-3.4 (18.8)	0.01
Calculated average change in weight, pounds	2.2 (18.2)	-1.1 (17.2)	0.09
Calculated average change in BMI, kg/m ²	0.4 (3.0)	-0.1 (2.8)	0.09

* STD indicates standard quintile; WCP, weight concerns program; BMI, body mass index.

Table 3

Group by Chronic Conditions Interaction on 90-Day Abstinence*

Treatment Group	Chronic Condition			
	No		Yes	
	No.	% Abstinent	No.	% Abstinent
Diabetes [†]	861		141	
Standard	464	22.6	68	19.1
Weight concerns	397	21.7	73	31.5
CAD [‡]	903		99	
Standard	480	21.9	52	25.0
Weight concerns	423	24.6	47	10.6

* CAD indicates coronary artery disease.

[†]Interaction effect; $p = 0.03$.[‡]Interaction effect; $p = 0.02$.