

Concern About Weight Gain Associated With Quitting Smoking Prevalence and Association With Outcome in a Sample of Young Female Smokers

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ABSTRACT

This study investigated the relationship between weight gain concern and outcomes of a large-scale smoking cessation study among 506 young female smokers attending Planned Parenthood clinics. Results of this prospective study did not support the clinical importance of weight gain concerns. Using an index of weight concern that was predictive in previous research, baseline weight concern was unrelated to smoking cessation efforts, whether participants made a quit attempt, reduced the number of cigarettes they smoked, or reported a change in self-efficacy for stopping smoking. Both the overall level of concern expressed in this sample of predominantly White young women and the lack of relationship between weight gain concern and smoking cessation outcomes suggest that weight gain concern may not be a critical factor for cessation programs targeting similar female smokers.

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There has been considerable interest in weight gain associated with stopping smoking and in the construct of weight gain concern, especially among women ([French & Jeffery, 1995](#) ; [Jeffery, Boles, Strycker, & Glasgow, 1997](#) ; [Klesges, Meyers, Klesges, & LaVasque, 1989](#) ; [Klesges, Meyers, Winders, & French, 1989](#) ; [Klesges & Shumaker, 1992](#)). Early work identified concern about weight gain as both an important

predictor of smoking initiation and a barrier to cessation and to making a stop-smoking attempt ([Klesges, Meyers, Klesges, & LaVasque, 1989](#) ; [Klesges, Meyers, Winders, & French, 1989](#) ; [Weekley, Klesges, & Relyea, 1992](#)). These issues appear to be especially important among White women ([Klesges & DeBon, 1994](#)). However, more recent population-based studies ([French & Jeffery, 1995](#) ; [French, Jeffery, Klesges, & Forster, 1995](#) ; [Jeffery et al., 1997](#)) have not found weight gain concern to be a significant predictor of smoking cessation. Thus, a better understanding of the role that weight concern plays in smoking cessation among young women is needed ([Gritz, Nielsen, & Brooks, 1996](#)).

Given the disturbing recent trends regarding increasing smoking prevalence among young persons, especially among young White women of lower socioeconomic status ([King, Borrelli, Black, Pinto, & Marcus, 1997](#)), it seemed important to investigate the role of weight gain concern in such a sample. The primary purposes of this report were to (a) assess the magnitude of weight gain concerns in a clinic-based sample of young female smokers and (b) determine the relationship between a previously validated measure of weight gain concern and smoking cessation outcomes at 6-month follow-up.

Method

Sample

Our sample consisted of the first 506 clients recruited for a low-intensity smoking cessation study delivered as part of routine care at four Planned Parenthood clinics in a Northwestern metropolitan area. ¹As described previously ([Eakin, Glasgow, Whitlock, & Smith, 1998](#)), 76% of the smokers approached participated in the study and there were no demographic or smoking habit differences between those who participated and those who did not.

All participants received usual care, which consisted of advice to quit from their health care provider. Half the women were randomly assigned to brief intervention, which consisted of a short videotape that urged women to stop smoking, brief counseling from a Planned Parenthood staff member, and follow-up support phone calls ([Eakin et al., 1998](#)). Smoking-related weight concerns were addressed in the intervention video.

Baseline patient characteristics were as follows: 89% were white, mean age was 24 years, mean years of smoking was 5.9, mean number of cigarettes smoked per day was 12.0, and mean body mass index (BMI) was 24.

Measures

Using the study by [Heatherton, Kozlowski, Frecker, & Fagerstrom \(1991\)](#) , we created a smoking dependence composite by averaging standardized responses to two questions: "How many cigarettes do you smoke on a typical day?" and "How long after waking do you smoke your first cigarette?"

A composite variable reflecting concern about weight gain was computed as the mean of six items from the Smoking Situations Questionnaire (SSQ; [Weekley et al., 1992](#) ; e.g., "I continue to smoke so that I don't gain weight"), to which patients responded by using a 6-point scale ranging from 1 (*completely disagree*) to 6 (*agree completely*).

Smoking Outcomes

Four smoking-related outcomes were collected. (a) Quit attempt, a categorical variable, was assessed by whether participants reported one or more quit attempts within the past 6 months. (b) Smoking cessation was defined by a report of not smoking for a minimum of 30 days. Patients reporting smoking cessation were paid to complete a saliva cotinine assay for biochemical confirmation, and those lost to follow-up (9%) were counted as smokers. Saliva cotinine results greater than 10 ng/ml were considered to be disconfirmatory. (c) Smoking rate was measured by the mean number of cigarettes smoked per day (among continuing smokers only). (d) Self-efficacy for quitting was measured by the question "If you decided to quit smoking, how confident are you that you could quit?" to which patients responded using a 10-point scale ranging from 1 (*not at all confident*) to 10 (*very confident*).

Analyses

We computed descriptive statistics for each variable and examined distributions for adequate variability and possible violations of normality assumptions. We computed bivariate correlations (Pearson product—moment correlations, point-biserial correlations, and partial correlation coefficients, as appropriate) to determine relations between body mass and weight gain concern with baseline patient characteristics and 6-month weight and smoking outcomes (quit attempts, cessation status, change in smoking rate, and confidence to quit). Finally, we performed logistic regression analyses to predict outcomes, with women lost to follow-up and cotinine-disconfirmed cases counted as smokers. Intervention status and the interaction between treatment and weight gain concern were also included in the models to determine possible treatment effects on the relationship between weight gain concern and outcomes.

Results

Smoking-related weight concerns were fairly low in this population—an average of 2.4 (between *disagree* and *slightly disagree*) with a standard deviation of 1.1 on a 6-point scale, which is similar to the average of 2.3 reported by [Weekley et al. \(1992\)](#).

[Table 1](#) presents bivariate relationships between BMI, weight gain concern, and other variables. Statistically significant but small positive correlations were found between weight gain concern and smoking rate and dependence at baseline, and a small negative correlation was obtained between weight gain concern and confidence to quit; however, none of these correlations exceeded $r = .17$. BMI had a slight inverse relationship to self-reported weight change from baseline to 6 months ($r = -.13$). Baseline weight gain concern was not related to any of four smoking outcome measures (see [Table 1](#); $r = -.10$ to $.02$).

By the 6-month follow-up, 18% of the women in the experimental group and 14% of the women in the control group reported at least one quit attempt and 10% of the women in the experimental condition and 6% of the women in the control group reported quitting. Six (3%) of these reports were disconfirmed by cotinine assays.

In logistic regression results, weight gain concern was not a significant predictor of whether participants attempted to quit, stopped smoking, decreased (vs. maintained or increased) their smoking rate, or increased (vs. maintained or decreased) their confidence to quit between baseline and 6 months. Of the demographic, biological, and psychological variables included in these models, only three were significant predictors: baseline smoking dependence, which significantly predicted attempt to quit smoking ($p = .005$); age, which was positively related to cessation ($p = .02$); and education, which significantly predicted

positive change in confidence to quit ($p = .01$). Weight gain concern did emerge as a significant predictor of self-reported weight gain (vs. maintenance or loss) over the 6-month period ($p = .004$) in the logistic analyses for both quitters and continuing smokers. Interactions between weight gain concern, body mass, smoking dependence, and treatment condition were not significant predictors in any of the analyses.

Discussion

The results of this study are clear and unambiguous: Weight gain concern was not related to any of several smoking cessation outcomes in this sample. The overall level of weight gain concern was almost identical to that reported for women on this scale by [Weekley et al. \(1992\)](#) in their community sample. This level does not indicate major concern about weight gain for the majority of women in this sample.

Further, despite adequate variability on both smoking for weight control (the SSQ) and various outcomes, a series of comprehensive analyses revealed that the SSQ was not related to any of four smoking outcomes in either bivariate or multivariate analyses. The SSQ was modestly related to self-reported amount of weight gain in a logistic regression (but not in bivariate analyses; $r = .00$). Further, the SSQ was no more predictive among usual-care participants than among intervention-condition participants, who specifically had this issue addressed during the program. These results, along with data from recent large-sample studies ([French & Jeffery, 1995](#); [French et al., 1995](#)), suggest that weight gain concern is not a critical variable to consider in the design of large-scale smoking cessation programs for women. It still may be important within clinic-based volunteer samples ([Meyers et al., 1997](#)) or among adolescents at risk for initiating smoking.

This study had several methodologic strengths that increase confidence in these conclusions. The sample was large and representative of the clinic population from which it was drawn, and attrition was minimal. The analyses were prospective, considered multiple outcomes, and used validated measures for both smoking for weight control reasons (the SSQ) and biochemically validated smoking cessation. Study limitations include the fact that weight changes were self-reported rather than directly measured and that there was no 12-month or longer follow-up. Given the transience of the sample that was studied, we felt that the likely difficulty in tracking participants argued against attempting a longer term follow-up.

Weight gain concerns may still be an important predictor of smoking behavior in other populations, such as higher income White women or adolescents at risk for starting to smoke. However, for many female smokers, our data suggest that the search for important mediators of cessation and cessation attempts may be more productively focused on other factors, such as depression, self-efficacy, and social support.

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Bivariate Relationship (r) Between Baseline Body Mass Index, Weight Gain Concern, and Other Variables

Table 1
Bivariate Relationships (r) Between Baseline Body Mass Index, Weight Gain Concern, and Other Variables

Variable	Body mass index	Weight gain concern
Demographic (Overall)		
Age (years)	.04	.20
Education (years)	-.01	-.08
Income (with education)	-.01	-.08
Smoking and weight gain concern		
Current smoking (no. of cigarettes per day)	.08	.27*
Former smoking (years)	.07	.24*
Psychological Assessment		
Self-efficacy (confidence in quit within 1 mo)	-.01	-.14*
Stage of change	.04	.27*
Change in weight (baseline to 4 months)		
Quit attempt	.00	.41*
Quit smoking	-.04	-.14*
% of cigarettes per day	.03	.35*
Self-efficacy (confidence in quit within 3-6 mo)	-.04	-.12*
Self-reported weight change (kg)	-.17*	.06

Correlations involving only variables at 4 months, pertaining to baseline values.

*p < .05.