Background: The effect of weight control concerns on smoking among adults is unclear. We examined the association between smoking behavior and weight control efforts among US adults.

Methods: A total of 17,317 adults responded to the Year 2000 Supplement of the 1995 National Health Interview Survey (83% combined response rate). Respondents provided sociodemographic and health information, including their smoking history and whether they were trying to lose weight, maintain weight, or gain weight.

Results: Rates of smoking were lower among adults who were trying to lose or maintain weight than among those not trying to control weight (25% vs 31%; P < .001). After adjustment for sex, race, education, income, marital status, region of the country, and body mass index, the relationship between trying to lose weight and current smoking varied according to age. Among adults younger than 30 years, those trying to lose weight were more likely to smoke currently (odds ratio, 1.36 [95% confidence interval, 1.09-1.70]), whereas older adults trying to lose weight were as likely or less likely to smoke compared with adults not trying to control weight. After adjustment, smokers of all ages who were trying to lose weight were more likely to express a desire to quit smoking. Results were similar after stratification by sex and body mass index.

Conclusions: Adults younger than 30 years are more likely to smoke if they are trying to lose weight. However, smokers of all ages who are trying to lose weight are more likely to want to stop smoking. Patients’ weight control efforts should not discourage clinicians from counseling about smoking cessation. Education about smoking and healthy weight control methods should target young adults.

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The decline in cigarette smoking prevalence during the past 35 years has been much greater among men than women. Consequently, the sex difference in smoking prevalence has narrowed substantially. Concern about weight control, which is stronger among women than men, has been suggested as one reason for the smaller decline in women’s smoking rates. The hypothesis is that women are more likely to use tobacco as a means of weight control. Over the long term, smoking appears to have a weight suppressant effect, and weight gain is a common consequence of smoking cessation. Several recent studies, however, suggest that this weight suppressant effect may be minimal in the short term. Nevertheless, children and adolescents frequently smoke to control their weight. Furthermore, women smokers are more likely to cite weight gain as a major concern when discussing smoking cessation.

Whether weight concerns affect smoking behavior among adults generally is not established. As public health efforts to address the obesity epidemic heighten awareness of the adverse effects of overweight and obesity, these efforts may lead to a greater use of smoking as a means of weight control and discourage smokers from quitting because of concerns about weight gain. In this context, we studied the relationship between weight control efforts and smoking and smoking cessation behavior among adults in the United States.

Results

Of 17,213 respondents to the Year 2000 supplemental survey who provided information on smoking status, 25% (weighted) of the sample were current smokers and 23% were former smokers. Table 1 provides the characteristics of these respondents. Respondents trying to lose or maintain weight were less likely to smoke.
METHODS

The National Health Interview Survey is an in-person household survey conducted by the Census Bureau for the National Center for Health Statistics. The survey uses a multistage probability design to permit continuous sampling of the civilian noninstitutionalized US population. In 1995, approximately 102,000 persons (including children) from approximately 39,000 households responded to the core survey (94% response rate), which elicited information on sociodemographic factors, basic health status, health care utilization, height, and weight.

In addition, a supplemental survey (Year 2000 Supplement) was administered to 1 randomly selected adult, aged 18 years or older, from one half of the responding households (n=17,317 respondents; 88% response rate). The overall response rate to both the core survey and the supplemental survey was 83%. Respondents were asked whether they were trying to “lose weight, gain weight, stay the same, or not do anything” in the preceding year. They were also asked whether they “smoked at least 100 cigarettes (5 packs) in [their] entire life”; if they “now smoke[d] cigarettes every day, some days, or not at all”; and for those who smoked everyday, how old they were “when [they] started smoking every day.” Current smokers were asked if they “would like to quit smoking cigarettes” and, for those who smoked daily, whether they “stopped smoking for 1 day or longer” during the past 12 months. In addition, questions elicited information about 6 common chronic medical conditions, including cardiac disease, pulmonary disease, and cancer. Respondents were also asked about their participation in an extensive list of leisure or sport activities in the 2 weeks before the interview and the frequency of participation.

We hypothesized that respondents trying to lose or maintain weight would be more likely to smoke, less interested in smoking cessation, and less likely to have made a “quit attempt” in the previous year. Respondents were categorized as (1) trying to lose weight, (2) trying to maintain weight (“stay the same”), or (3) not trying to control weight (which included trying to gain weight). We defined smoking behavior as current (smoking cigarettes at least on some days), former (smoked at least 100 cigarettes in their entire life but not currently), or never. Among current everyday smokers, respondents who intentionally stopped smoking for at least 1 day in the previous year were classified as having made a “quit attempt.”

We performed bivariate analyses to compare unadjusted rates of smoking behavior across categories of weight control effort and several clinical and demographic factors. We built logistic regression models by means of backward elimination for the various smoking behavior outcomes. For the outcome of current smoking behavior, we considered age (in decades), sex, race or ethnicity, marital status, education, income, region of the country, and body mass index (BMI; calculated as weight in kilograms divided by the square of height in meters) in addition to weight control efforts. We categorized BMI on the basis of standard definitions. We did not include comorbid illnesses in our primary model because most smokers initiate tobacco use at a young age before developing many of the comorbid illnesses elicited by the survey. Moreover, many of these diseases are part of the causal pathway of smoking (ie, complications of smoking); hence, adjustment for these diseases may inappropriately mask important relationships between smoking and other factors of interest. In any case, adjustment for comorbid illness and health status did not alter our results substantially and is not presented. We repeated our primary analyses excluding former smokers, since former smokers are more likely to gain weight after smoking cessation and as a result may develop concerns about their body weight after, rather than before, smoking cessation. To explore the possibility that any association between weight control efforts and smoking was a result of health-seeking behavior, we adjusted our primary model for the interaction between physical activity and weight control efforts. Respondents were categorized into low, moderate, or high physical activity using a validated method described previously.

We performed additional analyses to examine factors associated with the desire to stop smoking among current smokers. In addition to weight control efforts and sociodemographic factors, we considered comorbid illnesses (diabetes, cardiac disease, chronic pulmonary disease, and cancer), BMI, self-reported health status, years smoked, and packs smoked per day. Significant factors were used for adjustment in another model that examined the importance of weight control efforts on quit attempts in the preceding year among current smokers who smoked daily.

To examine whether the relationship between weight control efforts and smoking behavior (current smoking, desire to stop smoking, and having made a quit attempt in the preceding year) was influenced by a person’s sex, BMI, or age, we introduced interaction terms between weight control efforts and these 3 separate factors to our main models. For significant interactions, we then stratified analyses by the factor.

We considered P<.05 to be statistically significant for all analyses. We used sampling weights to correct for nonresponse and to reflect the US population. We used SUDAAN statistical software (Research Triangle Institute, Research Triangle Park, NC) to obtain Taylor series linearization variance estimates.

Currently than those not trying to control their weight. Current smokers had lower BMIs than never or former smokers but were more sedentary than nonsmokers. Men were more likely to smoke than women. Rates of smoking were lowest among respondents older than 70 years. Hispanic and other ethnic groups had lower rates than whites or blacks. Smoking rates also were lower among respondents with higher socioeconomic status. Of the eligible sample, 1673 participants did not provide information about weight control efforts. Of these, only 1% smoked currently; compared with all other respondents, nonrespondents were younger (44 vs 47 years) and had lower BMIs (26.0 vs 26.3) but were similar in sex, race, and socioeconomic status.

After adjustment for sociodemographic factors and BMI, respondents’ weight control efforts were still significantly associated with current smoking. Moreover, there was a statistically significant interaction between age group and weight control efforts (P<.001). Table 2 shows the results of our adjusted model stratified by age group. Among adults trying to lose weight, those younger than 30 years were more likely to smoke currently, whereas older adults were as likely or less likely to smoke than respondents not trying to control weight (Table 2).
To quit smoking. The weighted percentage of respondents (n=3904), 74% (weighted) of the sample reported a desire to quit smoking. The weighted percentages of respondents who would like to quit smoking among those trying to lose weight, trying to maintain weight, or not trying to control weight were 81%, 73%, and 70%, respectively (P<.001). After adjustment for BMI, age, and marital status, respondents trying to lose weight were most likely to express a desire to quit compared with those not controlling weight (odds ratio [OR], 1.72; 95% confidence interval [CI], 1.42-2.07) (Table 3). For those trying to maintain weight, the OR was 1.15 (95% CI, 0.91-1.46). Factors such as age, socioeconomic status, years smoked, number of cigarettes smoked per day, and chronic illness did not confound this relationship. Results did not change substantially when we added interaction terms for weight control efforts and sex. BMI, age, or physical activity.

Among respondents who smoked daily (n = 3354), 46% (weighted) of the sample made at least 1 attempt to quit smoking in the preceding year. The weighted percentages of respondents who reported a quit attempt among former smokers from our primary analysis, the results were consistent with our primary results; the interaction between age group and efforts to control weight. OR indicates odds ratio; CI, confidence interval. 

†P<.05

We did not find significant interactions between efforts to control weight and respondent sex or BMI. Our results were not altered substantially after adjustment for the interaction between physical activity level and weight control efforts. When we excluded former smokers from our primary analysis, the results were consistent with our primary results; the interaction between age group and weight control efforts remained statistically significant, showing similar relationships.

Among respondents who smoked currently and who provided information about weight control efforts (n = 3904), 74% (weighted) of the sample reported a desire to quit smoking. The weighted percentages of respondents who would like to quit smoking among those trying to lose weight, trying to maintain weight, or not trying to control weight were 81%, 73%, and 70%, respectively (P<.001). After adjustment for BMI, age, and marital status, respondents trying to lose weight were most likely to express a desire to quit compared with those not controlling weight (odds ratio [OR], 1.72; 95% confidence interval [CI], 1.42-2.07) (Table 3). For those trying to maintain weight, the OR was 1.15 (95% CI, 0.91-1.46). Factors such as age, socioeconomic status, years smoked, number of cigarettes smoked per day, and chronic illness did not confound this relationship. Results did not change substantially when we added interaction terms for weight control efforts and sex, BMI, age, or physical activity.
those trying to lose weight, trying to maintain weight, or not trying to control weight were 54%, 46%, and 41%, respectively (P < .001). After adjustment for BMI, age, and marital status, smokers who were trying to lose or maintain weight were more likely to have made a quit attempt, with respective ORs of 1.66 (95% CI, 1.40–1.96) and 1.33 (95% CI, 1.10–1.66). Interactions between weight control efforts and sex, BMI, and age did not substantially alter our adjusted results.

We found a significant relationship between smoking status and weight control efforts in this representative sample of US adults. After adjustment for sociodemographic factors and BMI, adults younger than 30 years were more likely to smoke cigarettes if they were trying to lose weight. However, adults aged 30 years and older who were actively trying to lose or maintain their body weight were no more likely to smoke cigarettes than those not trying to control their weight. In several age categories, these individuals were actually less likely to smoke currently. Regardless of age, adult smokers trying to lose weight were more likely to express a desire to quit smoking and were more likely to have made an attempt to quit smoking in the preceding year. These relationships did not vary substantially by sex or BMI.

Numerous studies have suggested an association between concern about body weight and higher smoking rates among children and adolescents. Our results suggest that this relationship persists into young adulthood in both sexes. Cross-sectional and prospective studies suggest that children who have misperceptions of their own body weight and dissatisfaction with their appearance are more likely to contemplate smoking, that children are much more likely to experiment with smoking if they are dieting and trying to lose weight, and that they are more likely to smoke explicitly to control weight and appetite.

Concerns about body weight, however, appear to have less influence on smoking behavior among older adults. Previous studies suggest that current smokers are no more concerned about weight than are those who have never smoked. Although smokers, particularly women, do report that weight gain is a major barrier to smoking cessation, several studies show that concerns about weight gain are only weakly or not at all correlated with smoking behavior. Our study is the first, to our knowledge, to support these findings in a nationally representative population, but it clearly suggests a divergence in smoking behavior and weight control efforts between adults younger than 30 years and those 30 years or older. Our study also suggests that adults of all ages who are actively trying to lose weight are more likely to contemplate quitting if they do smoke.

Our findings can be interpreted in several ways. Younger adults may use smoking as a means of weight control, as is consistent with studies in adolescents. Alternatively, both smoking and dieting may be related to a broader tendency to engage in unhealthy behaviors. Negative behaviors have been shown to cluster during adolescence and young adulthood. Unhealthy behaviors may be an expression of rebelliousness and independence. Of greater concern, however, is the possibility that this relationship may represent a cohort effect, so that as the young adult population ages, they may continue to use smoking as a means to control weight. On the other hand, adults aged 30 years and older who are trying to lose weight may represent individuals who are generally concerned about health and trying to lose weight to improve overall health. Only a minority of US adults cite improving physical appearance as a reason for losing weight; the majority appear to be motivated by health and fitness reasons.

Our study has several limitations. Although we used data from a nationally representative sample, this generalizability is limited by our exclusion of respondents with missing data; nonrespondents to questions pertaining to weight control efforts had a substantially lower rate of smoking, although the nonresponse rate was reasonably low. Second, information was obtained entirely from self-report and may reflect reporting bias. Our primary outcomes of interest—smoking behavior, desire to stop smoking, and efforts to control weight—however, are unlikely to be affected to a large degree by reporting bias. The cross-sectional nature of the study also precludes us from detecting causal relationships or from concluding that smokers who were not interested in weight control did not at some earlier point initiate smoking to lose weight. Because the weight suppressant effect of smoking may be negligible in the short term, young adults who may have only recently initiated smoking are less likely to have derived much weight-reducing benefit and are more likely to continue to try to lose weight. Over time, however, smoking leads to modest weight reduction and weight gain prevention; long-term smokers, who tend to be older adults, are more likely to achieve sufficient weight reduction over time and are less likely to need further weight control. In our study, these adults would have been classified as not trying to control weight. We also did not actually measure the degree to which the subjects’ weight or potential weight gain was a concern to them. Respondents who may have been concerned about weight but were not actively trying to lose or maintain weight may have described themselves as “not doing anything” about their weight. It is possible that we may not have detected a relationship between these latter respondents and higher tobacco use.

The limitations of this study do not diminish the clinical implications of our findings, however. Our study suggests that young adults may regard smoking as a weight control method. As public health efforts heighten awareness of the adverse consequences of overweight and obesity, our results raise concern that these efforts may lead to a rise in smoking initiation among young adults. Clinicians and public health officials need to target young adults for education about not only the adverse effects of smoking but also healthier methods of weight control.

Furthermore, our findings suggest that smokers who are trying to lose weight may be particularly receptive to advice about smoking and smoking cessation. Contrary to the conventional clinical wisdom of targeting one behavior change at a time, our findings identify adult smokers who are trying to lose weight as potential candidates for discussions about smoking cessation. It remains unclear, however, whether concern about weight affects the effectiveness of smoking cessation efforts. Studies on the subject have...
been conflicting. Some suggest that smokers who have gained weight during quit attempts may be more likely to relapse and less likely to make subsequent attempts, and others find that efforts to control weight and smoking simultaneously may produce lower cessation rates. However, some investigators report that the amount of weight gain after smoking cessation does not increase the likelihood of relapse to smoking. Finally, recent evidence suggests that weight gain after smoking cessation may be transient. In this context, clinicians should help patients understand the greater health benefits of smoking cessation compared with those of weight loss.

In summary, our study suggests that adults younger than 30 years who are trying to lose weight are more likely to smoke and may be smoking to control their weight. However, older adults who are trying to lose or maintain weight are less likely to smoke when compared with those who are not trying to control their weight. Furthermore, adult smokers of all ages who report trying to lose weight are more likely to want to quit smoking. Hence, patients’ concern about body weight should not discourage clinicians from discussing smoking and smoking cessation with these patients. Moreover, public health efforts should target young adults for education about smoking and healthy weight control habits. Further studies are needed to examine the impact of heightened concerns about weight and its impact on smoking initiation, smoking cessation efforts, and the efficacy of combined weight loss and smoking cessation efforts.

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