

Post-Cessation Weight Concerns Among Women Calling a State Tobacco Quitline

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Background: Obese and overweight women who smoke are more likely to be concerned about weight gain following cessation, impacting ability to quit and relapse.

Purpose: To determine differences in weight concerns for underweight, normal weight, overweight, and obese female smokers by race/ethnicity.

Methods: From March to November 2008, female adult tobacco users calling the Oklahoma Tobacco Helpline were asked questions to determine the prevalence of obesity and concern for cessation-related weight gain. A score of 50 or greater, where 0=*not at all concerned* and 100=*very concerned*, on one of two weight concerns questions defined the outcome. BMI was calculated from self-reported height and weight. For the current analyses in 2013, race, ethnicity, age, education, marital status, and tobacco use history were examined as covariates. Multiple logistic regression was used to calculate ORs and 95% CIs.

Results: A significant interaction between race and BMI was observed; thus, separate models were created for white ($n=3,579$); black ($n=330$); American Indian ($n=441$); and Hispanic ($n=125$) women. BMI was independently associated with weight concerns among all racial/ethnic groups, but the strength of the association varied. For black and Hispanic women, there was a particularly strong association between BMI and weight concerns among obese women (OR=9.55, 95% CI=5.05, 18.07, and OR=8.46, 95% CI=2.57, 27.83, respectively), although sample sizes were small.

Conclusions: State quitlines should consider tailoring promotional efforts and treatment protocols to include concerns about weight gain, especially for obese African American and Hispanic smokers. (Am J Prev Med 2015;48(1S1):S61–S64) © 2015 American Journal of Preventive Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Introduction

Weight gain and weight concerns have been shown to interfere with motivation to quit smoking, adherence to cessation treatment, and quit success in clinical studies.^{1–3} Research^{4,5} also suggests that this relationship does not hold for all racial groups and may differ by gender. Numerous studies^{6–18} have established weight management and body image as influential reasons for smoking among women. Women are more likely than men to gain weight after quitting smoking.⁹

A recent study¹⁰ of smokers who called a tobacco quitline showed that weight concerns varied by baseline weight and gender. Weight concerns were higher among obese smokers, and female smokers were more likely to be obese and more concerned about weight gain than male smokers. However, the study did not assess the relationship between BMI and weight concerns by race and ethnicity.

This brief report focuses on female smokers and examines differences in weight concerns for underweight, normal weight, overweight, and obese smokers by race/ethnicity.

Methods

Study Population

From March to November 2008, adult tobacco users who called the Oklahoma Tobacco Helpline were asked questions at the time of registration to determine the prevalence of obesity and concern for cessation-related weight gain. This screening was conducted for the Weigh2Quit study, a randomized trial to test the feasibility,

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0749-3797/\$36.00

<http://dx.doi.org/10.1016/j.amepre.2014.09.004>

acceptability, and effectiveness of delivering a cognitive behavioral treatment program addressing weight concerns via a tobacco quitline. The results of that study and overall prevalence of weight concerns in the study population have been previously reported.^{11,12} Nearly 8,000 adult smokers called the Helpline during the screening period (N=7,998). Because of differences between men and women in both the distribution of BMI and weight concern scores, this analysis is based on the 4,475 women who provided responses to the screening questions. Analysis of data for this study was completed in 2013. The study was reviewed and approved by the University of Oklahoma IRB (No. 14143).

Measures

During Helpline registration, trained staff collected demographic characteristics (age, education, marital status, and race/ethnicity) and tobacco history (cigarettes per day and time to first cigarette). Self-reported height and weight were used to calculate each woman's BMI. BMI was calculated as weight in pounds divided by the square of height in inches multiplied by a conversion factor of 703.¹³ Women were classified as obese, overweight, normal weight, or underweight according to standard BMI cut-points of >30, 25–29.9, 18.5–24.9, and <18.5, respectively.¹³

Women were asked two questions to assess the presence of weight concerns: *On 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 *On a scale of 0 to 100, where 0=not at all concerned and 100=very concerned, how concerned would you be if quitting smoking caused you to permanently gain 10 pounds?* Consistent with prior studies, individuals were classified as having weight concerns if they reported a score of 50 or higher on one of the two questions.^{14,15}

Statistical Methods

Data were managed and analyzed using SAS, version 9.1. Chi-square tests were used to compare across BMI categories on race/ethnicity and weight concerns. Multiple logistic regression was used to calculate ORs and 95% CIs. Demographic variables and tobacco use history were included as covariates. An interaction between race and BMI was observed; thus, separate models were created for white (n=3,579); black (n=330); American Indian (n=441); and Hispanic (n=125) women.

Table 1. Distribution of weight status among female smokers, by BMI category and race/ethnicity (N=4,475), % (95% CI)

| | Underweight, BMI < 18.5 | Normal, BMI=18.5–24.9 | Overweight, BMI=25–29.9 | Obese, BMI > 30 |
|-------------------------|----------------------------|--------------------------|----------------------------|---------------------|
| White (n=3,579) | 4.0 (3.36, 4.64) | 34.9 (33.34, 36.46) | 26.5 (25.05, 27.95) | 34.7 (33.14, 36.26) |
| American Indian (n=441) | 3.6 (1.86, 5.34) | 32.6 (28.23, 36.97) | 24.7 (20.67, 28.73) | 39.0 (34.45, 43.55) |
| Black (n=330) | 4.2 (2.04, 6.36) | 24.2 (19.58, 28.82) | 25.8 (21.08, 30.52) | 45.8 (40.42, 51.18) |
| Hispanic (n=125) | 4.0 (0.56, 7.44) | 28.0 (20.13, 35.87) | 24.8 (17.23, 32.37) | 43.2 (34.52, 51.88) |

Note: $\chi^2=25.54$ (9 df), $p=0.0024$.

Results

There was a significant difference in the distribution of BMI categories by race/ethnicity, but in general, the prevalences of underweight and overweight BMI were similar for women across all four racial/ethnic groups (Table 1). Approximately 4% of women were classified as underweight and 25%–26% of women were overweight based on BMI. Differences were observed in the normal and obese BMI categories. White women had the highest prevalence of normal BMI (35%), and black women had the lowest (24%). A greater proportion of black (46%) and Hispanic (43%) women were obese.

Obese women across all racial/ethnic groups had the highest proportions of weight concerns (>80%, Table 2). Underweight white women were least likely to report weight concerns (27%). Women in each racial/ethnic group reported increasing weight concerns with increasing BMI category.

BMI was associated with cessation-related weight concerns while controlling for other covariates among all racial/ethnic groups, but the strength of the association varied by race/ethnicity. Using normal weight women for all comparisons, among white women, underweight BMI was inversely and significantly related to weight concerns (OR=0.23, 95% CI=0.16, 0.34). The odds of weight concerns among overweight white women were increased 2.4-fold (95% CI=1.96, 2.89), and increased nearly threefold (OR=2.96, 95% CI=2.6, 3.57) among obese white women. For American Indian women, a similar trend was observed. For black and Hispanic women, there was no association between BMI and weight concerns for underweight women, but a strong association among obese women (OR=9.55, 95% CI=5.05, 18.07, for black women and OR=8.46, 95% CI=2.57, 27.83, for Hispanic women), although sample sizes were small.

Discussion

The results of this study support previous findings that obese and overweight women are more likely to be concerned about weight gain as a result of cessation,^{6,7,16}

Table 2. Female smokers with weight concerns and adjusted^a odds ratio for weight concerns by race/ethnicity (N=4,475)

| | Weight concern score > 50 | | Adjusted OR (95% CI) |
|------------------------|---------------------------|---------------|---------------------------|
| | n (%) | p-value | |
| White | | | |
| Underweight | 142 (27.3) | <0.0001 | 0.23 (0.16, 0.34) |
| Normal weight | 1,248 (61.6) | | ref |
| Overweight | 947 (78.7) | | 2.38 (1.96, 2.89) |
| Obese | 1,242 (82.1) | | 2.96 (2.46, 3.57) |
| American Indian | | | |
| Underweight | 16 (31.2) | <0.0001 | 0.27 (0.09, 0.84) |
| Normal weight | 144 (63.2) | | ref |
| Overweight | 109 (76.1) | | 1.87 (1.06, 3.28) |
| Obese | 172 (84.3) | | 3.22 (1.88, 5.52) |
| Black | | | |
| Underweight | 14 (35.7) | <0.0001 | 1.07 (0.32, 3.54) |
| Normal weight | 80 (35.0) | | ref |
| Overweight | 85 (61.2) | | 2.81 (1.48, 5.33) |
| Obese | 151 (83.4) | | 9.55 (5.05, 18.07) |
| Hispanic | | | |
| Underweight | 5 (40.0) | 0.0008 | 0.54 (0.06, 4.99) |
| Normal weight | 35 (57.4) | | ref |
| Overweight | 31 (77.4) | | 2.90 (0.89, 9.50) |
| Obese | 54 (90.7) | | 8.46 (2.57, 27.83) |

Note: Boldface indicates statistical significance ($p < 0.05$).

^aAdjusted for age, education, marital status, cigarettes per day, and time to first cigarette.

but is the first to report an interaction with race/ethnicity. Unlike prior research, this study comprised a relatively large sample of American Indian women ($n=441$); thus, it includes novel findings related to the association between BMI and weight concerns in this population subgroup, which experiences significant disparity in smoking prevalence.

In the present study, weight concerns were significantly related to BMI for women in all racial/ethnic groups, but the relationship was particularly strong among black and Hispanic obese women. The findings are consistent with another recent study of smokers who called a tobacco quitline, which showed that women were more concerned about weight gain during smoking cessation than men, and that weight concerns increased with increasing BMI category.¹⁰ Unlike the present report, that study did not include analyses for the underweight group, and did not assess the

relationship between BMI and weight concerns by race and ethnicity.

There are some limitations to the current report. The sample size for Hispanic women was small ($n=125$) and led to wide CIs in the multivariate modeling. Thus, findings for Hispanic women should be interpreted with caution. However, this is the first paper reporting BMI and weight concerns among female Hispanic and American Indian smokers. Secondly, all data were self-reported. Although weight may be under-reported by telephone,¹⁷ studies suggest reasonable reliability when compared to measured weight.¹⁸

Telephone quitlines have been shown to be an effective treatment for tobacco dependence,^{19,20} and they provide an important route of access to support tobacco cessation for a broad range of smokers.²¹ The results of this study may have implications for quitline and other counseling protocols. Specifically, counselors may selectively address the importance of weight concerns among women of different races/ethnicities who are considering quitting. The findings may

also inform promotion strategies for statewide quitlines, including marketing campaigns that specifically acknowledge concerns about weight gain after quitting among black and Hispanic female smokers who are also obese.

Publication of this article was supported by the Oklahoma Tobacco Research Center (OTRC), with funding from the Oklahoma Tobacco Settlement Endowment Trust (TSET).

This study was funded by TSET, Oklahoma State Department of Health, OTRC, and Alere Wellbeing, Inc.

No financial disclosures were reported by the authors of this paper.

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