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Knowledge of the Health Consequences of Obesity among Overweight/Obese Black and Hispanic Adults

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Abstract

Objective—To measure knowledge of the health consequences of obesity among overweight/obese Black and Hispanic adults and examine the relationship to prior weight loss.

Methods—Knowledge of the health consequences of obesity was assessed among 410 Black and Hispanic adults with BMI ≥ 25 kg/m² enrolled in a behavior change weight loss study. The relationship between obesity risk knowledge and previous weight loss was also examined.

Results—The majority of participants were knowledgeable of the risk of hypertension (94%), diabetes (96%), high cholesterol (91%), joint pains/arthritis (89%) and sleep apnea (89%) associated with obesity. Among post-menopausal age women, 53% were aware of the increased risk of breast cancer. There was no significant relationship between obesity risk knowledge and previous weight loss of 10 pounds or more (OR= 1.075, 95% CI: [0.808, 1.430]).

Conclusions—We found that knowledge of the health consequences of obesity was high, except for knowledge of the risk of breast cancer. Obesity risk knowledge was not associated with past weight loss.

Practice implications—Further health education is needed regarding the increased risk of breast cancer associated with obesity. Our data suggest that knowledge of the health consequences of obesity is not associated with weight loss success.

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Keywords

obesity; patient education; health education; health behavior; minority populations

1. Introduction

Overweight and obesity have been shown to increase the risk of cardiovascular disease, diabetes and various types of cancer, including cancer of the breast, colon, and endometrium [1]. A limited number of studies have reported race/ethnic differences in knowledge of the health consequences of obesity among U.S. adults, with Black and Hispanic adults having less knowledge compared to White adults [2, 3]. However, there is surprisingly little information regarding knowledge of the health consequences of obesity in race/ethnic minority populations.

According to the Health Belief Model, perceived susceptibility to disease is a key predictor of health behavior change [4]. Based on this model, development of tailored behavior change strategies requires an understanding of patients' perceived risk of disease. Studies have shown an increase in the number of weight loss attempts as perceived susceptibility to chronic disease increases [5, 6]. However, the importance of risk perception in motivating weight loss behavior has been called into question given the high prevalence of overweight/obesity despite growing public health efforts aimed to increase knowledge of the health consequences of obesity [7]. Therefore, the primary aim of this study was to examine knowledge of the health consequences of obesity among Black and Hispanic adults enrolled in the Small Changes and Lasting Effects (SCALE) weight loss trial. A secondary aim was to examine the relationship between knowledge of the health risks of obesity and previous weight loss success. In addition, we assessed demographic and socio-economic factors associated with knowledge of the health consequences of obesity. We hypothesized the following: 1) the majority of participants would be knowledgeable of the cardiovascular and respiratory health risks associated with obesity, and 2) previous weight loss success and education beyond high school would be associated with greater knowledge of the health consequences of obesity.

2. Methods

2.1. Setting and participants

The SCALE trial is a behavior change weight loss intervention scheduled to be complete in March 2014. Participants are Black and Hispanic adults with body mass index (BMI) ≥ 25 kg/m² living in Harlem and the South Bronx, New York. All participants were asked to make small sustained changes in eating behavior coupled with increased physical activity. Participants were randomized to receive a positive affect/self-affirmation intervention in which they were asked to think of positive moments in their lives when faced with obstacles maintaining their eating behavior and physical activity goals. The study was approved by the Institutional Review Boards at Lincoln Medical and Mental Health Center and Weill Cornell Medical College. All participants provided written informed consent.

Participants were recruited at three clinical sites, three churches and two community organizations in New York City (Lincoln Medical and Mental Health Center, South Bronx; Sydenham Health Center, an ambulatory care clinic in Harlem; Lenox Avenue Health Center, an ambulatory care clinic in Harlem; Abyssinian Baptist Church, Harlem; Congregación Church, South Bronx; Metropolitan Church, Harlem; East Side Settlement community based organization, South Bronx; and a parent-teacher association in the South Bronx). Inclusion criteria were age ≥ 21 years, BMI 25–50 kg/m², and self-identification as Black and/or Hispanic. Exclusion criteria were pregnancy, enrollment in another weight loss program, intention to undergo weight loss surgery within the year, untreated mental illness, untreated thyroid disease, active cancer, advanced chronic obstructive pulmonary disease, renal disease on dialysis or inability to control meal content (for example living in an institutional setting).

2.2. Measures

At enrollment a structured survey was conducted by community health workers. The survey included assessment of age, gender, self-identified race/ethnicity, education, insurance status, country of origin and number of years living in the United States. Education was defined as a dichotomous variable (completed high school or less, and education beyond high school). Participants were asked to answer yes or no to the following questions: 1) ‘Have you ever been successful in losing 10 or more pounds?’; 2) ‘Have you ever been told by a healthcare provider that you should lose weight?’; 3) ‘Have you ever been told by a family member/friend that you should lose weight?’.

In order to assess knowledge of the health risks of obesity, participants were asked if being overweight or obese was associated with either an increased risk, decreased risk or no change in risk of the following health conditions: high blood pressure, diabetes, high cholesterol, joint pains/arthritis, shallow breathing or pauses in breathing while asleep, and breast cancer. Participants could also answer that they did not know. We selected these conditions because they are well known diseases, and it has been well established that overweight/obesity increase the risk of developing these diseases [1]. One point was given for each correct answer, and a health risk knowledge score was calculated as a summation of points (maximum possible score of 6).

Baseline weight was obtained to the nearest 0.5 lb. using the SECA 815 Elegancia digital floor scale. Height was measured to the nearest centimeter using the portable stadiometer SECA model 213. Weight and height values were used to calculate body mass index (weight in kilograms divided by height in meters squared).

2.3. Statistical analysis

Demographic and clinical characteristics were assessed using means for continuous variables and proportions for categorical variables. Knowledge of specific disease risk was assessed using proportions. Since the health risk knowledge score was calculated as a summation of points (maximum possible score of 6) we modeled the risk knowledge score for the individual as a binomial distribution with parameters $(6, p_i)$, where p_i equals a logistic function of a linear combination of independent variables. A generalized linear

model, with a binomial family and logistic link [8], was used to examine the relationship between the health risk knowledge score and the following independent variables: race/ethnicity, BMI at enrollment, age, gender, insurance status, education, the Charlson comorbidity index, advised to lose weight by a healthcare provider, advised to lose weight by a family/friend, and past weight loss of 10 pounds (lbs.) or more. The interaction between race/ethnicity and education was assessed in the fully adjusted model. To account for the dependence within each site robust standard errors were used. No data were imputed. Analyses were performed using SAS version 9.2 and Stata 12.

3. Results

Table 1 shows the demographic and clinical characteristics of the study sample (n=410). The sample was 89% female, 52% Black, 48% Hispanic. The majority of participants reported education beyond high school (62%) and were insured (75%). The majority of participants were advised to lose weight by family/friends (74%) or a healthcare provider (83%).

Table 2 shows data on knowledge of the health consequences of obesity. Most participants reported an increased risk of high blood pressure (94%), diabetes (96%), high cholesterol (91%), joint pains/arthritis (89%) and sleep apnea (89%) associated with overweight/obesity. Only 44% of participants reported an increased risk of breast cancer associated with overweight/obesity, and an equal percent of participants indicated that they did not know. Among women of post-menopausal age (> 50 years), 53% of participants were aware of the increased risk of breast cancer associated with overweight/obesity.

Table 3 shows the multivariate binomial regression model assessing predictors of the health risk knowledge score. There was a significant association between the risk knowledge score and race/ethnicity (OR= 2.029, 95% CI: [1.359, 3.028]). Specifically, the score was higher among Hispanic compared to Black participants. The risk knowledge score increased as age increased (OR= 1.016, 95% CI: [1.005, 1.027]). Women had a higher score compared to men (OR= 0.689, 95% CI: [0.482, 0.986]). The score was higher among participants who had been advised in the past to lose weight by a healthcare provider (OR=1.264, 95% CI: [0.814, 1.965]). There was no significant association between knowledge of the health consequences of obesity and success with weight loss of 10 lbs. or more in the past (OR= 1.075, 95% CI: [0.808, 1.430]).

The relationship between the health risk knowledge score and education differed by race/ethnic group ($p < 0.0001$ for the interaction term). Models were therefore stratified by race/ethnic group. Among Black participants, in the fully adjusted model the risk knowledge score increased as age increased (OR= 1.019, 95% CI: [1.006, 1.033]) and as educational level increased (OR = 2.947, 95% CI: [2.105, 4.126]). In the fully adjusted model including only Hispanic participants, the health risk knowledge score decreased as the Charlson comorbidity index score increased (OR = 0.812, 95% CI: [0.703, 0.937]).

4. Discussion and conclusion

4.1. Discussion

In SCALE, a high percent of participants were knowledgeable of the increased risk of diabetes, hypertension, high cholesterol, arthritis and sleep apnea associated with obesity. Participants were less aware of the increased risk of breast cancer. There was no significant association between knowledge of the health consequences of obesity and past weight loss of 10 lbs. or more. Among Black participants, knowledge was greater among participants with greater than high school education.

To our knowledge, no recent published study has examined knowledge of the health consequences of obesity among overweight/obese Black and Hispanic adults living in urban, low-income communities. This is an important population to examine because it is disproportionately affected by the obesity epidemic [21]. Previous literature has shown that Black and Hispanic adults are less likely than white adults to recognize the link between obesity and hypertension, diabetes and heart disease [2]. Our study is a unique contribution to the literature because a high percent of overweight/obese Black and Hispanic adults were knowledgeable of the increased risk of cardiovascular and respiratory diseases associated with overweight/obesity. We also found that knowledge of the health consequences of obesity was not associated with previous weight loss success. This finding suggests that weight reduction interventions that solely target increasing knowledge of the health consequences of obesity will likely not be efficacious in this adult population.

In our study, 53% of women in the post-menopausal age range were aware of the increased risk of breast cancer associated with obesity. Risk of breast cancer has been shown to increase among post-menopausal women as BMI and waist-hip ratio increase [11–15]. A variety of mechanisms have been proposed for the increased risk of breast cancer associated with obesity, including promotion of breast tissue growth by local increase in estrogen levels, difficulty imaging the tumors, and decreased ability to palpate tumors on exam [12, 16]. Although non-Hispanic White women have a higher prevalence of breast cancer, data indicate that among Black women, breast cancer is diagnosed at a more advanced stage and with more aggressive cancer types [15, 17, 18]. There have been various hypotheses to explain this finding [18], and some data have shown an association between obesity and an advanced stage of breast cancer at diagnosis among Black women [19].

Knowledge of the increased risk of breast cancer associated with obesity among post-menopausal women was examined in two published studies in the United States [3, 20]. Consedine et al. found that knowledge of obesity as a breast cancer risk factor was poor in six race/ethnic groups living in New York City, with Dominicans and Haitians having the lowest knowledge scores [3]. In a second study among 1,545 women recruited in Houston, Texas, 45% of obese women and 49% of overweight women were not knowledgeable of the increased risk of breast cancer associated with obesity [20]. Study investigators found that education and insurance predicted knowledge of breast cancer risk [20]. In our study, participants were less knowledgeable of the risk of breast cancer associated with obesity compared to the cardiovascular risks. While this finding is not novel, it highlights an

ongoing need for public health education regarding the increased risk of breast cancer associated with obesity.

Perceived risk of disease has been shown to be associated with increased engagement in screening behaviors, vaccinations and smoking cessation [4]. However it has been uncertain whether knowledge of the health consequences of obesity leads to greater engagement and success in weight loss efforts. While we did not directly examine self-perceived risk of developing obesity-related diseases, all participants were enrolled in a weight loss intervention and therefore were aware of their need to lose weight. We can therefore postulate that participants had an awareness of their own increased risk of developing the diseases that they indicated were associated with overweight/obesity. Our results suggest a lack of association between perception of the health risks of obesity and successful weight loss behavior. However, it is important to consider that we examined the relationship between past weight loss success and current obesity risk knowledge. Therefore, it is not possible to conclude a causative relationship between the two variables. It is possible that health risk knowledge motivates people to start the weight loss process, but, does not predict success with weight loss. Further research is needed to better understand the factors that motivate success with weight loss among overweight/obese Black and Hispanic adults.

In fully adjusted multivariate models, we found that race/ethnicity was significantly associated with obesity risk knowledge. Among Black participants, knowledge of the health risks of obesity increased as age increased and with education beyond high school. Previous literature has shown an association between higher educational levels and greater knowledge of obesity-related breast cancer risk [20]. Education can be used as a proxy for socio-economic status (SES) and it is possible that participants with higher SES have greater access to health information. In contrast, among Hispanic participants, only the Charlson comorbidity index score was associated with the obesity risk knowledge score. The lack of association between education and obesity risk knowledge among Hispanic participants points to non-formal sources of education regarding the health consequences of obesity among Hispanics. Further examination of sources of health education among overweight/obese Black and Hispanic adults would be helpful in developing culturally tailored public health educational interventions.

4.2. Limitations

It is important to consider study limitations when evaluating our results. First, cancer risk knowledge was limited to questions regarding breast cancer, other forms of cancer such as endometrial and colon cancer were not assessed. Knowledge of the health consequences of overweight/obesity may have been different at the time of participants' previous weight loss attempts. There was no control question included in our assessment of obesity risk knowledge. In addition, exact measurements of prior weight loss were not obtained, therefore it is possible that participants either underestimated or overestimated past weight loss.

Our sample included only overweight/obese adults and results may have differed among participants who were previously obese and had success with sustained weight loss. It should be noted that we examined primarily women and further examination is warranted

among men. Finally, we examined a primarily low SES, urban community sample and these findings may not be generalizable to a higher SES population. While our study included adults from only one large city, New York City is a very ethnically diverse city and this is reflected in our study sample.

4.3. Conclusions

In conclusion, we found that a high percent of Hispanic and Black adults enrolled in the SCALE trial were knowledgeable of the increased risk of cardiovascular disease, diabetes, arthritis and sleep apnea associated with overweight and obese. Knowledge of the increased risk of breast cancer associated with obesity was poor. The lack of association between previous weight loss success and knowledge of the health consequences of obesity indicates that risk knowledge alone was likely not sufficient for successful weight loss in this overweight/obese study sample. Future studies are needed to prospectively examine the relationship between knowledge of the health consequences of obesity and weight loss success among overweight/obese Black and Hispanic adults.

4.4. Practice implications

Our study highlights the need for further public health education regarding the increased risk of breast cancer associated with obesity among post-menopausal women. Study results indicate that knowledge of the health consequences of obesity is not significantly associated with weight loss success. Future weight loss interventions should focus on helping individuals to overcome obstacles to weight loss success so that knowledge can be translated into more effective weight reduction behavior.

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Table 1

Demographic and clinical characteristics of participants (n=410)

Characteristics^a	
Age, years, mean (SD)	48.8 (13)
Female, <i>n</i> (%)	364 (89)
Black, <i>n</i> (%)	212 (52)
Hispanic, <i>n</i> (%)	198 (48)
BMI, kg/m ² , mean (SD)	34 (6.0)
BMI category, kg/m ²	
25 BMI < 30, <i>n</i> (%)	104 (25)
30 BMI < 35, <i>n</i> (%)	134 (33)
35 BMI < 40, <i>n</i> (%)	108 (26)
BMI ≥ 40, <i>n</i> (%)	64 (16)
Completed > high school, <i>n</i> (%)	253 (62)
Insured, <i>n</i> (%) ^a	307 (75)
Medicaid	103 (25)
Medicare	29 (7)
Commercial	137 (33)
Medicaid and Medicare	20 (5)
State-funded^b	10 (2)
Other	2 (0.4)
Diabetes, <i>n</i> (%)	89 (22)
Cancer, <i>n</i> (%)	16 (4)
Ever smoker, <i>n</i> (%)	146 (36)
Native language English (%)	240 (59)
Country of Origin, <i>n</i> (%) ^c	
United States	222 (54)
Mexico	22 (5)
South America	14 (3)
Central America	22 (5)
Caribbean Islands	25 (6)
Puerto Rico	28 (7)
Dominican Republic	70 (17)
West Africa	5 (1)
Advised to lose weight by family/friends, <i>n</i> (%)	301 (74)
Advised to lose weight by healthcare provider, <i>n</i> (%)	338 (83)
Lost 10 lbs. or more in the past, <i>n</i> (%)	303 (74)

^aMissing values: Insurance type, n=5; ever smoker, n=1; country of origin, n=2; advised to lose weight by family or friend, n=2; advised to lose weight by healthcare provider, n=1

^bState-funded = family health plus, child health plus or other state-funded program

^cCountry of origin: South America – Columbia, Ecuador, Guyana, Nicaragua, Peru, Venezuela; Central America – Belize, El Salvador, Honduras, Guatemala, Nicaragua; Caribbean Islands – Antigua, Barbados, Dominica, French West Indies, Haiti, Jamaica, St. Kitts, St. Lucia, Trinidad, St. Thomas; West Africa – Senegal, Liberia, Guinea, Cameroon

Table 2

Knowledge of the health risks of overweight/obesity

	Increased risk	Decreased risk	No change in risk	I don't know
High blood pressure, <i>n</i> (%)	384 (94)	2 (0.5)	9 (2)	15 (4)
Diabetes, <i>n</i> (%)	392 (96)	0 (0)	6 (1.5)	12 (3)
High cholesterol, <i>n</i> (%)	374 (91)	1 (0.2)	12 (3)	23 (6)
Joint pains/arthritis, <i>n</i> (%)	364 (89)	2 (0.5)	11 (3)	33 (8)
Sleep apnea, <i>n</i> (%) ^a	365 (89)	2 (1)	9 (2)	34 (8)
Breast cancer, <i>n</i> (%) ^a	179 (44)	4 (1)	44 (11)	181 (44)
Breast cancer, women 50 y ^b , <i>n</i> (%)	101 (53)	2 (1)	17 (9)	70 (37)

^aMissing values: sleep apnea *n*=1; breast cancer *n*=2

^b***n*=190, missing value=1**

Table 3Multivariate binomial regression model assessing predictors of the health risk knowledge score ^a

Variable	Odds Ratio	95% CI
Race	2.029 ^{***}	1.359 – 3.028
BMI, kg/m ²	0.995	0.976 – 1.013
Age, years	1.016 ^{***}	1.005 – 1.027
Gender	0.689 ^{**}	0.482 – 0.986
Insurance	0.770	0.556 – 1.067
Education	1.837 [*]	0.912 – 3.700
Charlson comorbidity index	0.938	0.819 – 1.075
Advised to lose weight by healthcare professional	1.558 ^{**}	1.050 – 2.312
Advised to lose weight by family and/or friend	1.264	0.814 – 1.965
Lost 10 lbs. or more in the past	1.075	0.808 – 1.430

^a
n=407***
p<0.01**
p<0.05*
p<0.1.

Standard errors in the confidence intervals used the sites as clusters. Missing values: advised to lose weight by healthcare professional n=1; advised to lose weight by family/friends n=2.