

MULTIPLE HEALTH BEHAVIORS AMONG OVERWEIGHT, CLASS I OBESE, AND CLASS II OBESE PERSONS

Objectives: Recent studies suggest an association between excess weight and increased risk of some cancers. Health disparities are evident for both obesity and cancer, each of which disproportionately affects African American adults. We examine the relationship between weight and selected health behaviors related to colorectal cancer (CRC) prevention (fruit and vegetable consumption, recreational physical activity, and CRC screening). We also examine behavioral psychosocial correlates including knowledge, perceived benefits and barriers, self-efficacy, and social support for these behaviors.

Methods: The WATCH (Wellness for African Americans through Churches) Project was a CRC prevention study implemented in African American churches in rural North Carolina. We analyzed the baseline data of 813 church members who provided information on their height and weight through a telephone-based survey.

Results: Most (78%) respondents were classified as overweight or obese. Self-rated health and level of physical activity were lower at higher weight levels, but little difference in fruit and vegetable consumption was observed among participants. Weight was negatively associated with past-year CRC testing among women but not among men. Levels of knowledge and self-efficacy were similar across weight groups, but some perceived barriers were significantly higher among obese participants.

Conclusions: Obesity was associated with some health behaviors and psychosocial correlates associated with increased cancer risk. Cancer prevention programs in African American populations where overweight is prevalent may wish to specifically address these issues. (*Ethn Dis.* 2008;18:157-162)

Key Words: Colorectal Cancer, Fruit and Vegetable, Physical Activity, African Americans, Overweight, Obesity

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INTRODUCTION

Excess weight is associated with an increased risk for several leading causes of morbidity and mortality, including type 2 diabetes, cardiovascular disease, hypertension, and stroke, as well as certain types of cancer.^{1,2} Of particular interest for the present study is the correlation between weight and risk of colorectal cancer (CRC).³⁻⁵ Further contributing to cancer risk, some research indicates that persons who are overweight or obese are less likely to engage in health-promoting behaviors.⁶⁻¹⁰

Rates of overweight and obesity have climbed rapidly over the last few decades in the United States and abroad,¹¹ and some racial/ethnic groups have disproportionately higher rates of overweight and obesity. For example, obesity rates for African American women are reported to range from 49% to 54%^{12,13} compared to $\approx 30\%$ for non-Hispanic White women.^{13,14} Given the substantial evidence that obesity increases risk for several diseases, obese persons are a high-risk group for many diseases.

The WATCH (Wellness for African Americans through Churches) Project was a CRC prevention intervention study implemented in African American churches in rural North Carolina.¹⁵ Baseline data revealed that 78% of the study sample were overweight or obese. Using data from the WATCH Project,

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we sought to examine whether obesity was associated with CRC screening, fruit and vegetable consumption, and recreational physical activity. Additionally we examined the relationship between weight and selected psychosocial correlates of behavior. We hypothesized that these targeted behaviors would be lower among overweight and obese participants than among participants who had normal weight and that psychosocial factors related to the behavior would vary accordingly (eg, self-efficacy would be lower, perceived barriers higher). A secondary aim was to identify variables that might be important in the development of CRC prevention programs for overweight and obese African Americans in the future.

METHODS

Sample and Data Collection

We describe only baseline data in this paper. Participants ($N=850$) were members of 12 rural North Carolina churches participating in the WATCH Project. Data were collected through telephone interviews. Additional details on study design and recruitment are published elsewhere.^{15,16} The response rate, calculated according to CASRO¹⁷

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(Council of American Survey Research Organizations) guidelines that estimate response patterns for participants who were unable to be contacted, was 66%. The most common reason for nonparticipation was an incorrect, disconnected, or unlisted telephone. The institutional review board at the University of North Carolina approved the study.

Measures

Recreational physical activity was measured by using frequency and duration items previously used by the authors and modified based on pre-intervention focus groups.¹⁸ When tested in a similar population, this measure demonstrated good validity with a modified seven-day recall.¹⁵ Eleven of the 16 activities addressed recreational activity. A metabolic equivalent score for total recreational physical activity was calculated based on frequency, duration, and a metabolic equivalent (intensity) value. Diet was assessed by using a 60-item Block food frequency previously validated in a Southern, African American population.^{19–21} The items assessed frequency and estimated usual serving size of consumption. The Block database was used to calculate daily servings of fruits and vegetables. To measure CRC screening, participants were asked whether they had each screening test and when their last test was completed. Items included a brief explanation of the test. For purposes of analysis, we converted screening to dichotomous yes/no variables.

Demographic and health variables were measured by using standardized questions such as those used in the Behavioral Risk Factor Surveillance System. These variables included self-report of height, weight, hypertension, physical limitations, and self-rated health. Preintervention health fairs provided the opportunity to directly measure weight in a self-selected subsample of participants. Weight taken at the health fair was highly correlated with baseline self-report ($r=.98$, $P<.001$,

$n=62$). We feel this validates our use of self-reported weight to calculate body mass index (BMI) in this study. BMI was calculated from self-reported height and weight and was categorized as underweight (BMI <18.5 kg/m²), normal weight (BMI = 18.5–24.9 kg/m²), overweight (BMI = 25.0–29.9 kg/m²), obese I (BMI = 30.0–34.9 kg/m²), and obese II (BMI ≥ 35.0 kg/m²).

Psychosocial factors were assessed for each behavior and were drawn from social cognitive theory. Perceived barrier and benefits for each behavior were based on existing literature and pre-intervention focus groups. Response options ranged from “disagree a lot” to “agree a lot” on a four-point scale. Barriers and benefits for each behavior were examined as a scale (sum of items) and individually. Psychometric analyses showed that the scales were internally consistent using Cronbach α coefficient. Self-efficacy was measured by a single-item question for each behavior: “How sure are you that you could [be physically active three to five times a week],” with a five-point scale from “very sure” to “very unsure.”

Analyses

Regression and analysis of variance were used to test hypotheses and examine associations with weight group (normal, overweight, obese I, obese II). For physical activity, we controlled for age, education, sex, and self-reported health. For fruit and vegetable consumption, the inclusion of covariates did not change the results, thus we report unadjusted results. Logistic regression was used to examine the relationship between obesity and CRC screening. Because some studies have suggested that the relationship between screening and weight is different for women and men^{6,7} and because we found a significant association between weight and sex, we stratified our screening analysis by sex. Age, education, self-reported health, and marital status were tested as covariates but were

not significant in the model; thus, unadjusted results are reported. Demographic factors were explored for any association with weight.

RESULTS

Study Sample

At baseline, 3% ($n=27$) declined to answer the height or weight question, and were excluded. BMI for the remaining 823 respondents ranged from 16.8 to 54.9; the mean was 29.4 (standard deviation 6.1). Because of the small proportion categorized as underweight ($n=10$, 1.2%), these participants were also excluded from the remaining analysis.

Nearly all participants were African American and most were female (Table). The average age was 50 years. Thirty-four percent had a high school diploma or equivalent. No significant differences were observed in education or age by weight group; however weight group was associated with marital status. Women had significantly higher BMI (mean = 30.0 kg/m²) than did men (mean = 28.1 kg/m²). Weight group also differed by sex, with more women categorized as obese I and obese II.

Obesity, Health, and Behavior

Several health and behavior variables were associated with weight group (Table). Hypertension rates were highest (46.4%) among obese II participants and decreased with declining BMI ($P<.001$). One third (32.5%) of obese II participants reported that their health limited them from being physically active, compared to 18.9% of obese I, 11.1% of overweight, and 16.7% of normal-weight participants ($P<.001$). As hypothesized, there was also a significant relationship ($P<.001$) between self-rated health and weight group. A higher proportion of the obese II group (33.9%) reported fair or poor health compared to obese I (17.0%),

Characteristics of WATCH (Wellness for African Americans through Churches) Project participants by body mass index

Variable	Normal Weight <i>n</i> =180	Overweight <i>n</i> =293	Obese I <i>n</i> =213	Obese II <i>n</i> =127	<i>P</i> value
Sex, %					
Male	31.7	33.2	26.5	13.4	<.001
Female	68.3	66.8	73.5	86.6	
Age, years, mean (range)	48.47 (19–86)	50.79 (21–82)	51.05 (19–84)	48.26 (18–87)	.17
Marital status, %					
Married	42.6	57.9	60.9	64.5	<.001
Never married	29.0	14.0	11.1	15.3	
Divorced/separated	15.9	14.0	15.9	11.3	
Widowed	12.5	14.0	12.1	8.9	
Education, %					
Less than high school	19.0	21.3	23.2	22.0	.417
High school/GED	30.7	31.3	37.4	38.6	
Trade/beauty/some college	29.1	27.1	22.7	26.8	
College graduate or higher	21.2	20.3	16.6	12.6	
Hypertensive, %	26.3	31.8	41.7	46.4	<.001
Health Status, %					
Excellent	16.7	14.3	9.4	2.4	<.001
Very good	25.6	31.1	24.1	15.7	
Pretty good	44.4	37.9	49.5	48.0	
Fair	10.3	14.3	13.2	26.8	
Poor	3.3	2.4	3.8	7.1	
Past-year CRC screening†					
Men	45.0	34.8	35.7	33.3	.99
Women	44.8	28.1	22.8	28.9	.05
Past-year FOBT†					
Men	35.0	30.4	28.6	16.7	.91
Women	29.3	20.8	13.9	24.4	.17
On time for CRC screening†					
Men	45.0	47.8	39.3	33.3	.87
Women	39.7	54.2	58.2	51.1	.09
Recreational physical activity, metabolic equivalent hours/week, mean (SE)*	12.35 (.864)	10.28 (.574)	8.74 (.671)	7.64 (.710)	.03*
Fruit and Vegetable Servings/day, mean (SE)	3.42 (.170)	3.31 (.115)	3.29 (.127)	3.00 (.171)	.31

Weight groups were defined as normal weight (body mass index [BMI]=18.5–24.9 kg/m²), overweight (BMI=25.0–29.9 kg/m²), obese I (BMI=30.0–34.9 kg/m²), and obese II (BMI ≥35.0 kg/m²). GED=general equivalency diploma, CRC=colorectal cancer, FOBT=fecal occult blood testing, SE=standard error.

* Determined on the basis of multivariate analysis controlling for age, sex, education, and self-reported health.

† Includes only participants aged ≥50 years, *n*=100 men, 278 women.

overweight (16.7%), and normal-weight participants (13.6%).

CRC Screening and Correlates

Among participants aged ≥50 years (ie, age-eligible for screening, *n*=378), weight group was not associated with ever having a fecal occult blood test (FOBT, *P*=.92), sigmoidoscopy (*P*=.10), or colonoscopy (*P*=.57). Further analyses of CRC screening were stratified by sex (Table, Figure 1). For men, no significant differences by weight group were

observed for past-year FOBT (*P*=.91), on-time screening (ie, any test within the recommended guidelines, *P*=.87) or any past-year screening (*n*=100, *P*=.99). For women, no significant association was seen between weight group and past-year FOBT (*P*=.17) or on-time screening (*P*=.09). However, normal-weight women were more likely to report any past year screening than was any other weight group (*n*=278, *P*=.05). FOBT was the only screening test analyzed independently; the other tests were not reported

frequently enough for us to examine individually.

Perceived screening barriers (F (3, 504)=.44, *P*=.72) and benefits (F (3, 650)=.25, *P*=.86) did not differ by weight group. A significant association (*P*=.02) was observed between weight group and the barrier “colorectal cancer screening tests are too expensive,” for which 42.9% of obese II and only 13.6% of normal-weight participants agreed “a lot.” A significant association (*P*=.04) was also observed between

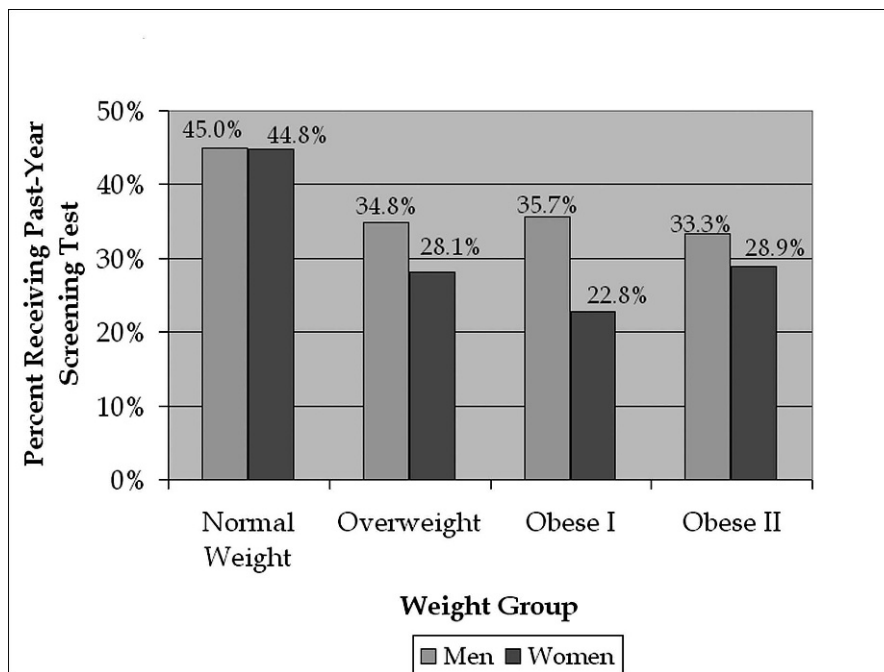


Fig 1. Past year CRC screening rates of men and women age 50 and over; χ^2 tests showed a significant relationship between weight group and past-year screening for women ($P=.05$) but not for men ($P=.87$)

weight and the barrier “my doctor or health care provider has never recommended screening,” for which 52.9% of obese II participants vs 36.4% of normal-weight participants agreed “a lot.”

Physical Activity and Correlates

As hypothesized, weight group was significantly and inversely associated with level of recreational physical activity ($F(12, 793)=14.07, P=.03$; Table). Despite this finding, no significant differences were noted by weight group for physical activity self-efficacy ($F(3, 808)=1.413, P=.24$), social support ($F(3, 804)=.503, P=.68$), or benefits ($F(3, 776)=1.25, P=.29$). Barrier scores were higher at the higher weight groups ($F(3, 777)=3.01, P=.03$). Further exploration revealed differential responses to certain items by weight group. A significant positive association was seen between weight group and agreement with “I don’t have the will power to exercise” ($P=.01$) and “I am uncomfortable with how I look while

exercising or while wearing exercise clothing” ($P<.001$). Conversely, obese and overweight groups were more likely than the normal-weight group to agree that “being physically active would help [them] control [their] weight” ($P=.05$).

Fruit and Vegetable Intake and Correlates

Mean fruit and vegetable intake was ≈ 3.3 servings per day and did not vary by weight group ($F(3, 809)=1.19, P=.31$) (Table). No apparent differences existed by weight group for fruit and vegetable self-efficacy ($F(3, 805)=0.14, P=.94$) or social support ($F(3, 803)=0.99, P=.40$). Significant differences were observed by weight group for perceived barriers ($F(3, 763)=2.81, P=.04$) and perceived benefits ($F(3, 789)=2.95, P=.03$). Both scales increased linearly such that persons in the obese weight groups reported higher barriers and higher benefits.

Individual barrier and benefit statements were explored. A significant

Self-rated health was substantially lower among obese II participants than among other participants.

negative association was observed between weight group and agreement that healthier foods “cost too much” ($P<.001$). A significant association ($P=.002$) was also noted between weight group and the statement that “eating healthier foods will help me control my weight.” Normal-weight participants disagreed with this item more often than did the other groups.

DISCUSSION

We found elevated rates of overweight and obesity among participants in the WATCH Program. Our analysis examined health behaviors and psychosocial correlates for associations with weight. Self-rated health was substantially lower among obese II participants than among other participants. The association between obesity and poorer self-rated health has been noted by other investigators,^{23,24} but our data showed little difference in self-rated health between normal-weight, overweight, and obese I participants. In our data, the decline in self-rated health only became apparent among the most obese group (obese II). This finding may be driven by the rapid increases in co-morbidities apparent at that level of obesity.

As expected, recreational physical activity was lower at higher BMIs, even when controlling for age, sex, education and self-rated health. Because our data are cross-sectional, the extent to which weight was a cause or consequence of low physical activity and whether these differences in activity level can be attributed to health issues are not clear. However, our finding that excess body

weight is associated with lower physical activity levels is consistent with the literature.^{25,26}

No apparent differences in fruit and vegetable consumption were observed by weight group. This null finding has several explanations, including the possibility of differential bias in reporting food intake. The value of food frequency measures have been criticized recently,^{27,28} and some studies suggest that obese participants are more likely than others to underreport food consumption.²⁹⁻³¹ If obese participants underreported consumption, this could obscure a true association between weight and dietary intake. Persons with higher BMIs may have eaten similar amounts of fruits and vegetables, but ate more of other foods or prepared them in less healthy methods. More research would be necessary to further examine this finding.

The differences in individual-level barriers and benefits may help tailor psychosocial feedback to persons according to their weight status. Obese I and II participants reported stronger agreement with structural barriers such as time (physical activity) and cost (fruits and vegetables). For physical activity, obese participants also cited barriers such as lack of will power and comfort level more often than did the other participants. Finally, normal-weight participants, compared to every other group, were less likely to agree that engaging in either of these healthy behaviors would help them control their weight.

In regard to CRC screening, we found an association between past-year screening and weight for women but not for men. These findings parallel previous research that obese women are less likely to report on-time CRC screening.^{6,7} One possible explanation for the lower rates can be found in the reported barriers to CRC screening: obese respondents were more likely to agree that screening is too expensive and to report that their doctor did not

recommend CRC screening. Additionally, obese participants in our study were more likely to self-report fair or poor health. Potentially one contributor to the lower screening rates is that obese participants may have more co-morbidities or acute needs, which are prioritized higher than cancer screening tests.^{32,33} Further research is needed to explore these results in more depth with both doctors and patients so that we can better understand the source of these differences in screening.

We did not find an association between on-time screening and weight group, though the trend was similar to that for past-year screening (Figure 1). Past-year screening may have been significant because screening guidelines suggest yearly FOBTs and, in our study, FOBT was the most common test. However, stratifying by sex reduced our power such that we were not able to see a relationship between past-year FOBT and weight when the other tests were not included. Moreover, the low prevalence of colonoscopy and sigmoidoscopy limited our ability to explore associations between being these tests and weight group.

Another explanation for why we did not get a significant result for on-time screening may be because although reports of CRC testing appeared to decrease as weight increased, there was slight jump in screening test rates for obese II participants. At the time of the survey, colonoscopy was primarily used as a diagnostic test, and we were unable to differentiate the purpose of the test (diagnostic or screening) in our data. The increase in on-time screening rates we see for obese II participants may be due to an increase in diagnostic tests for CRC or other gastrointestinal illnesses. Future research should take care to differentiate between screening and diagnostic tests for CRC.

Although this analysis used cross-sectional data, it provides some interesting and useful insight into the relationship between obesity and select-

ed health behaviors in this Southern African American participant sample. One limitation of this study is the use of self-report. This potential for inaccuracies was somewhat mitigated by the use of validated measures. Several studies^{34,35} have found that self-reported CRC screening is fairly accurate compared to chart reviews. We have not found published literature suggesting that screening or physical activity has differential reporting biases among obese persons. Our analyses are also dependent on self-reported height and weight (for calculating BMI). While there are some indications that individuals tend to underreport their weight and overreport their height (artificially deflating BMI), our small validation study confirmed the use of self-reported weight. If BMI were underestimated in this study, associations of obesity with the other variables might have been obscured.

We found that obese persons reported lower levels of recreational physical activity but similar levels of fruit and vegetable intake compared to persons in other weight categories. The relationship between obesity and CRC screening was less clear and warrants further investigation. Obese women were less likely to report having had a CRC screening test in the past year, but this association was not detected for individual tests. In general, these data suggest that obese persons report engaging in behaviors (less physical activity and screening) that may increase their risk for certain cancers. Given that obesity is often considered a risk factor for cancer, we should examine this finding further and develop strategies for changing these behaviors and lowering risk. One direction for future research might be to further explore these differences in barriers and benefits to health behaviors and to assess whether obese persons are more or less likely to participate in, or respond to, intervention efforts aimed at the broader population.

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Manuscript draft: James, Leone, Katz, McNeill, Campbell

Statistical expertise: James, Leone, McNeill

Acquisition of funding: Campbell

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