

A Mixed Methods Comparison of Perceived Benefits and Barriers to Exercise Between Obese and Nonobese Women

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Background: Obese women have lower levels of physical activity than nonobese women, but it is unclear what drives these differences. **Methods:** Mixed methods were used to understand why obese women have lower physical activity levels. Findings from focus groups with obese white women age 50 and older (N = 19) were used to develop psychosocial items for an online survey of white women (N = 195). After examining the relationship between weight group (obese vs. nonobese) and exercise attitudes, associated items ($P < .05$) were tested for potential mediation of the relationship between weight and physical activity. **Results:** Obese women were less likely than nonobese women to report that they enjoy exercise (OR = 0.4, 95% CI 0.2–0.8) and were more likely to agree their weight makes exercise difficult (OR = 10.6, 95% CI 4.2–27.1), and they only exercise when trying to lose weight (OR = 3.8, 95% CI 1.6–8.9). Enjoyment and exercise for weight loss were statistically significant mediators of the relationship between weight and physical activity. **Conclusions:** Exercise interventions for obese women may be improved by focusing on exercise enjoyment and the benefits of exercise that are independent of weight loss.

Keywords: physical activity, disparities, weight, mediation, qualitative

Previous research has shown a negative association between physical activity participation and risk for several diseases, including heart disease, cancer, and diabetes.^{1,2} Unfortunately, the prevalence of physical inactivity in the United States remains high, particularly among certain subgroups.³ Obese adults are more likely than normal and overweight adults to report that they get no leisure-time activity.⁴ Accelerometer data also indicate that obese adults spend 21 minutes less per day engaged in moderate or vigorous intensity activities compared with normal weight adults.⁵ In addition, women report less physical activity than men, with obese women being the most inactive group overall. According to the Behavioral Risk Factor Surveillance Survey, 27.2% of obese men over age 50 are inactive compared with 32.0% of women (23.2% of normal weight and 44.1% of obese women).⁶

The low prevalence of physical activity among obese women is particularly disturbing because being obese increases a woman's risk for several chronic diseases including many forms of cancer; this association is seen regardless of how active they are.⁷ The relationship between physical activity, obesity, and disease risk is complex; research has shown that highly active individuals have lower risk for many diseases, independent of their weight. There is also evidence that being physically active reduces the risk of cardiovascular and all-cause mortality to a greater extent than avoiding obesity.⁸

Given their higher risk for disease and less frequent engagement in physical activity, obese women are an important group to target for physical activity promotion. Understanding the barriers that obese women face to exercise is an important first step in developing interventions and health communication messages for this population. Unfortunately, research exploring why women, particularly obese women, have a lower prevalence of exercise is limited. Our previous work found that obese African American individuals are more likely to report being uncomfortable with how they look while exercising or not having the will power to exercise.⁹ An Australian study found that there was an association between reporting being "too fat" as a barrier to exercise and saying that they were "too shy" or "too lazy" to exercise.¹⁰ Another study found self-efficacy to be more strongly correlated with physical activity for normal and overweight adults than for obese adults. Furthermore, access to exercise facilities was associated with higher activity among normal and overweight, but not obese adults.¹¹

One limitation to studying determinants of exercise behavior among obese women may be that standard questions are not capturing the issues which are most salient to obese individuals. One small study asked overweight women open-ended questions about barriers and found that while time was a frequently cited barrier for both active and inactive overweight women, barriers differed by current activity level. Active overweight women were more likely to cite temporary barriers to exercise (weather, injury, illness) whereas inactive overweight women listed laziness, health, and family as their top

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barriers. Not surprisingly, active women cited more perceived behavioral control for exercise.¹² While this study provides some insight into barriers which might be relevant to overweight women, it did not compare them to nonobese women making it difficult to know if these factors explain the disparities in exercise behavior seen across weight groups. Further research is needed to both explore why obese women chose to exercise and to determine how these reasons differ from those of nonobese women. This information is crucial for designing more effective interventions targeting this vulnerable subgroup.

Methods

The purpose of this study was to 1) describe exercise attitudes and behaviors among obese women using qualitative data, 2) compare attitudes and behaviors of obese and nonobese using self-report survey data, and 3) determine which attitudes may best explain the lower prevalence of physical activity seen among obese women using mediation analysis. Our study was conducted in 3 phases following an exploratory sequential mixed methods design.¹³ The first phase of the study was a qualitative exploration of exercise behavior among obese women using a focus group approach. Focus group findings were used to better understand obese women's exercise attitudes and how these attitudes may affect behavior. They were also used to develop survey items which could be used to measure these attitudes in a larger sample. In the second phase we conducted a survey to confirm focus group findings and compare exercise attitudes of obese and nonobese women. We used these comparisons to develop hypotheses about why obese women are less likely to exercise than nonobese women. In the last phase we tested these hypotheses using the same survey data as in the second phase to determine which attitudes mediate the relationship between weight group and physical activity. This paper will report the findings from all 3 phases of the study to provide a more in-depth picture of the attitudes and beliefs which affect exercise behavior among obese women. The data collection protocol for this study was approved by the Institutional Review Board at the University of North Carolina at Chapel Hill.

Focus Group Data Collection

The first phase of our research consisted of 7 focus groups with older (age 50 and above) obese white and African American women. This phase was necessary because of the limited qualitative data that existed about exercise attitudes and beliefs of obese women. It was our belief that previously used measures might exclude exercise determinants that were specific to obese women thus limiting understanding of their behavior. We wanted to use the focus groups to gain a greater understanding of exercise behavior among obese women and develop survey items which could be useful for differentiating exercise determinants between obese and nonobese women.

Focus groups were conducted as part of a larger study on colon cancer prevention. Women age 50 and older were recruited using mass e-mail, study flyers, and word-of-mouth. Each potential participant was screened for eligibility by our staff. A woman was eligible if she had a body mass index (BMI) ≥ 29 , was 50 or older, reported her race as white or African American/black, and was not currently up to date with colorectal cancer screening recommendations. Because BMI was based on self-reported height and weight, we used a slightly lower cutoff (29 kg/m²) than the traditional obesity cut-off (BMI ≥ 30) since obese women on average tend to underreport their weight and over-report their height leading to an underestimated BMI.¹⁴

The focus groups were structured to be homogeneous with respect to race. We conducted a total of 4 groups with white women and 3 groups with African American women. The moderator led the discussion using a semistructured focus group guide, which was developed using current literature on weight, preventive healthcare, cancer screening, and exercise. For the present analysis, we will only use exercise-related data from the 4 focus groups with white women so as to allow more direct comparison with our quantitative data collected with white women. The focus groups with white women ranged from 3–7 participants each. Questions explored current exercise behaviors and perceived barriers/benefits to exercise. We also discussed the effect of weight on women's exercise behavior. Each focus group lasted between 1.5 and 2 hours total. As an incentive, women were served dinner during the focus group and given a check for \$30.

Focus Group Analysis

Audio recordings of the focus groups were transcribed then checked for accuracy by a note taker who was present at the focus group. Focus group analysis was completed using Atlas.ti 5.2 qualitative analysis software. All coders were trained by the principal investigator. First, we completed a round of deductive coding which consisted of identifying and grouping together all discussion related to a particular construct or topic (eg, perceived benefits/barriers, exercise behavior, effect of weight on behavior). Next, an inductive process was used to uncover themes within each theoretical construct. After themes were identified, we combined similar themes and counted the frequency at which themes occurred. Summaries were made of each construct, noting the most common themes; quotes were selected to illustrate the themes.

Survey Data Collection

Quantitative data were collected using the baseline survey of an online message testing study; data collection procedures are described in detail elsewhere.¹⁵ In brief, eligible women were white, age 50 or older, and not underweight (BMI ≥ 18.5). For this phase of the research we included both obese (BMI ≥ 30) and nonobese (BMI 18.5–29.9)

women so that we could compare their exercise attitudes and beliefs, and better understand why obese women are less likely to engage in exercise. The survey was collected online so that we could test hypotheses generated by the focus groups in a larger, more geographically diverse group of women. Survey items were created or modified based on phase I findings, as described below.

Survey Measures

Physical Activity Behavior. Physical activity was assessed using this self-administered version of the International Physical Activity Questionnaire (IPAQ) short form. This questionnaire is designed to separate individuals into 3 levels of physical activity intensity: low, moderate, and high. The IPAQ has been shown to have reasonable reliability and validity in diverse populations.¹⁶

Demographic Measures. BMI was calculated using self-reported height and weight. Women were classified as obese (BMI ≥ 30) or nonobese (BMI 18.5–29.9). Age was measured as a continuous variable while education (high school/GED, some college/trade school, college graduate, more than college), income (< \$30,000, \$30,000–\$49,999, \$50,000–\$74,999, \$75,000–\$99,999, \$100,000+), and health insurance status (yes/no) were all categorical.

Psychosocial Constructs. Perceived barriers to exercise (6 items) and perceived benefits of exercise (5 items) were measured using a 4-point Likert scale (agree a lot, agree a little, disagree a little, disagree a lot). Items were created based on previous research¹⁷ and prestudy focus groups. New items added based on phase I findings from this study included: “I usually only exercise if I am trying to lose weight,” “I am uncomfortable with how I look while exercising or while wearing exercise clothing,” “My current weight makes it difficult for me to exercise,” and “I enjoy exercising.” Self-efficacy and exercise intentions were measured using a 10-point Likert scale (1 = not at all confident/likely; 10 = very confident/likely).

Statistical Analysis

Chi-square tests were used to test the relationship between weight group and all of the categorical demographic, psychosocial and behavioral variables. Logistic regression was used to calculate odds ratios comparing the likelihood that obese women agreed with a given benefit or barrier compared to nonobese women. Adjusted odds ratios were derived from the model which controlled for education, age and income. Items which were correlated ($P > .05$) with weight group in the adjusted models were selected as potential mediators of the relationship between weight group and physical activity (MET hours/week). A multiple mediation model was used to examine the total and specific indirect effects of each potential mediator. Bootstrap analysis, a nonparametric sampling procedure, was performed using Mplus 6.2 to test the significance

of the indirect effects.¹⁸ This calculation was repeated with 5000 samples to yield a parameter estimate for the specific indirect effects. If the 95% confidence interval for the parameter estimate did not contain 0, then the specific indirect effect was statistically significant and mediation was demonstrated.¹⁸

Results

Qualitative Findings

Participant Characteristics. A total of 19 white women participated in the focus groups with an average age of 55 (range 50–72) and an average BMI of 36.0 (range 28.2–46.6). The participants’ median income was \$50,000–\$74,999 and 52.6% of the women had a college degree or higher. Eight women were divorced, 3 had never been married, 1 was widowed, and 7 were currently married or living with a partner. Women in the focus groups were asked what type of physical activity they currently do. The most common types of current physical activity were walking and doing yard work/outdoor activities. Some women stated that they were always trying to be active (ie, “always moving”). Only 4 women said that they were not currently active, 3 cited injuries as the reason for their lack of activity.

Perceived Barriers. Perceived benefits and barriers to participating in physical activity are shown in Table 1 along with frequencies and illustrative quotes. The most common theme within the barriers construct was weight-related barriers. Weight-related exercise barriers are those which women specifically attributed to their weight. To better illustrate this theme, specific weight-related barriers are listed in the second row of Table 1. Weight-related barriers were both physical (eg, shortness of breath, physical discomfort) and emotional (eg, discomfort with appearance or how others perceive them while exercising). Injury was the second most common barrier to exercise. While many injuries may have been caused or exacerbated by weight they are not considered weight-related barriers for this analysis.

Perceived Benefits. Improving health and managing weight were the most common perceived benefits of exercise. Although women recognized many benefits to exercise other than weight loss, there was still an underlying belief that only women who are trying to lose weight need to exercise.

“I never had to exercise in my young life to stay in shape. It never was even a thought in my head. And so, like I said, it’s not something I’m used to.”

“And my grandmother didn’t overeat, she gardened, she led an active farm lifestyle. She didn’t go out . . . to the gym or anything, either. But, uh, she kept an active lifestyle, but, she had a certain physique, and I know I look just like her! (Laughs) So, I agree with what she said about your perception, you

Table 1 Perceived Benefits and Barriers to Physical Activity Among Obese Women

Construct	Common themes and frequencies	Illustrative quotes
Perceived barriers to physical activity (general)*	Weight-related (10)†; Injury or surgery (9); Time (5); Life gets in the way (ie, other priorities) (4); Chronic condition (3); Environment/safety issues (2)	“Well, I’m a diabetic, have been, like I said, for 17 years. And I have 3 degenerative diseases of the spine that’s all in the same area, and before I got this, I used to walk 15 minutes twice a day and I lost, um, 46 pounds, 1 time; another time, 35. And I can’t do it anymore, because I can’t walk like that anymore ‘cause my blood pressure spikes.”
Perceived barriers to physical activity (weight-related)	Weight, general (3); Physically uncomfortable while exercising (3); Uncomfortable with appearance while exercising/don’t want to exercise in front of others (3); Short of breath (1)	“. . . the weight goes down and then I feel better about exercising, because who wants to be, you know, big, fat, tight clothes, that kind of thing, getting out of breather earlier or something like that, although my breath really is pretty good.” “I think the reason I don’t exercise is... I want to exercise by myself, but the only reason I don’t want to join a club, or anything like that is because everybody in there is like a size 2!”
Perceived benefits of physical activity	Improve Mental Health/Quality of life (7); Weight management (6); Disease prevention (6); Improve fitness (5); Treat conditions/ Avoid medication (4); Social/ Fun (2)	“My physical activity drops off as I gain weight. And then it increases as I lose weight. And so, losing weight, seeing the numbers go down on the scale, feeling as though my clothes are fitting better or I get into, you know my smaller size clothes and that sort of thing that motivates me to work out, to be more purposeful in doing physical activity. I also don’t want to hurt I don’t want to have heart disease and so, when I’m doing what I need to be doing, those also help reinforce being active.” “Walking to me is therapeutic, as well as the exercise. I’ve solved a lot of problems walking. I can really tell the difference in everything—my skin, my weight, my temperament and that works for me.”

* Due to high numbers of perceived barriers, only those which were cited 2 or more times are included in the chart.

† Specific weight-related barriers are listed in the second row.

know, and I think weight gain does drive exercise. If I could weigh 110 pounds and never exercise, I’d be very happy.”

Furthermore, women’s personal experiences conflicted with their stated beliefs; while many of them stated that exercise was important for weight loss, they had not had success using exercise to lose weight.

“But for me, I lose more weight if I leave off the carbs. Drop the carbs, I drop the weight. And I think the exercise just helps me feel more confident, makes you feel better. I don’t see a . . . a huge change in my physique when I exercise more.”

Quantitative Findings

Demographics Characteristics. Characteristics for obese ($n = 96$) and nonobese ($n = 99$) women are shown separately in Table 2. We found statistically significant ($P < .05$) differences in all measured demographic variables; nonobese women were older on average and more likely than obese women to report a higher

income, a post graduate education, excellent health, and no comorbidities.

Physical Activity and Weight Loss Behavior. Obese women reported engaging in an average of 20.0 MET-hours/week of moderate or vigorous intensity activity. This was significantly less activity ($P = .003$) than was reported by nonobese women (35.5 MET-hours/week). Similarly, 27.3% of obese women reported having an illness or medical condition that prevented them from exercising, compared with only 11.3% of nonobese women ($P = .005$). Obese women were more likely ($P < .001$) to state that they were actively trying to lose weight (91.1%) than were nonobese women (54.3%). Among women who were trying to lose weight, 42.4% of obese women reported that they were using exercise to help them lose weight, compared with 60.8% of nonobese women ($P = .04$).

Psychosocial Variables. Mean self-efficacy scores were significantly lower ($P = .005$) for obese women (6.9, 95% CI 6.28–7.58) than nonobese women (5.7, 95% CI 5.1–6.25). However, after adjusting for potential

Table 2 Characteristics of Obese and Nonobese Survey Participants

	Nonobese (n = 96)	Obese (n = 99)	P-value
BMI, mean (SE)	24.3 (0.30)	35.7 (0.53)	<0.0001
Range	18.5–29.9	30.0–53.9	
Median	24.0	33.5	
25th/75th percentile	22.1/26.9	31.6/38.4	
Age, mean (SE)	57.4 (0.55)	55.7 (0.51)	0.02
Income, %			0.05
< \$30,000	7.3	20.2	
\$30,000–\$49,999	17.7	17.1	
\$50,000–\$74,999	25.0	29.3	
\$75,000–\$99,999	22.9	15.2	
\$100,000+	27.1	18.2	
Education, %			0.03
High school/GED	5.2	17.2	
Some college/trade school	26.0	27.3	
College graduate	22.9	24.2	
More than college	45.8	31.3	
Self-reported health, %			0.0004
Excellent	27.7	8.1	
Very good	43.6	39.4	
Pretty good	23.4	38.4	
Fair	5.3	14.1	
Comorbidities, %			0.0006
0	38.3	18.2	
1	31.9	27.3	
2	21.3	27.3	
3+	8.5	27.3	
Unable to exercise, %	11.5	27.3	0.005
Physical activity, %			0.02
Low	25.6	43.2	
Medium	38.4	37.5	
High	36.1	19.3	
Currently trying to lose weight, %	54.7	91.1	<0.0001

confounders, this difference was no longer statistically significant ($P = .41$). Intention to exercise regularly over the next 2 weeks was somewhat higher among nonobese women (7.0, 95% CI 6.3–7.6) compared with obese women (6.1, 95% CI 5.5–6.7); however, this difference was not statically significant in the unadjusted ($P = .06$) or adjusted models ($P = .95$).

Percent agreement with all physical activity benefit and barrier items is listed in Table 3. Agreement with listed benefits was above 95% for all but one benefit: “I enjoy exercising.” A significantly lower percentage ($P =$

.003) of obese women reported that they enjoy exercising (52.5%) compared with nonobese women (72.9%). Lack of energy was the most commonly reported barrier to exercise for both obese (57.8%) and nonobese (41.7%) women. Obese women reported greater agreement with every barrier, except “I don’t have any place to exercise.” More obese women (46.5%) than nonobese women (7.3%) agreed that “my current weight makes it difficult for me to exercise” ($P = .007$). In addition, obese women were more likely to report discomfort with how they look while exercising (44.4% vs. 26.0% for nonobese women,

$P = .007$). They were also more than twice as likely as nonobese women to agree that they usually only exercise when trying to lose weight ($P < .002$).

After adjusting for potential confounders weight group remained significantly associated with exercise enjoyment and 2 exercise barriers; compared with non-obese women, obese women were less likely to report enjoying exercise (OR 0.4, 95% CI 0.2–0.8), more likely to agree that they only exercise when trying to lose weight (OR = 3.8, 95% CI 1.6–8.9) and more likely to agree that their current weight makes it difficult for them to exercise (OR = 10.6, 95% CI 4.2–27.1). There was a borderline significant relationship between weight and the following barrier: “I am uncomfortable with how I look while exercising or wearing exercise clothing” (OR = 1.9, 95% CI 1.0–3.6).

Mediation Analysis. We tested the 3 items that were associated with weight group for potential mediation of the relationship between weight group and MET-hours per week of physical activity (Figure 1). We initially controlled for education, income and age, but removed age and education as covariates as they were not associated ($P < .05$) in any model. The 95% confidence interval for the specific indirect effects of the weight barrier indicated that it was not a statistically significant mediator (Estimate = -11.0 , 95% CI = -33.4 , 0.248). However,

confidence intervals of the specific indirect effects of the other 2 mediators indicated statistical significance: “I only exercise when I’m trying to lose weight” (Estimate = 16.120 , 95% CI: -33.462 , -7.282) and “I enjoy exercising” (Estimate = -4.573 , 95% CI: -13.125 , -1.347).

Discussion

Focus group findings with obese women provided several insights into how weight could affect exercise behavior and survey data indicated that attitudes toward exercise expressed in the focus groups may be more prominent among obese women and possibly help explain why they exercise less than nonobese women. Obese women most frequently cited weight management as a benefit of exercise participation. Furthermore, some women in the focus groups believed that exercise was more important for women who were overweight or trying to lose weight than it was for normal weight women. However, survey data indicated that obese participants were more than twice as likely as nonobese participants to agree that they exercise only when trying to lose weight. Further examination determined that exercising for weight loss was a strong mediator of the relationship between weight group and physical activity. More than 40% of obese women said they only exercised when trying to

Table 3 Barriers and Benefits of Exercise by Obesity Status

Perceived benefits and barriers (% who agree with the following statements)	Nonobese	Obese	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Exercise benefits				
a. I will have more energy if I exercise	95.9	94.9	0.8 (0.2–3.1)	n/a
b. I will control my weight if I exercise	96.9	95.0	0.6 (0.1–2.6)	0.5 (0.1–2.7)
c. I will improve my health if I exercise	98.9	100	n/a	n/a
d. Exercising will decrease my chances of getting some diseases	97.9	97.0	0.7 (0.1–4.2)	n/a
e. I enjoy exercising	72.9	52.5	0.4 (0.2–0.7)*	0.4 (0.2–0.8)*
Exercise barriers				
a. I usually only exercise if I am trying to lose weight	17.7	42.4	3.4 (1.8–6.6)*	3.8 (1.6–8.9)*
b. I don’t have any one to exercise with	40.6	48.5	1.3 (0.8–2.4)	1.1 (0.6–2.1)
c. I don’t have any place to exercise	12.5	11.1	0.9 (0.4–2.1)	0.5 (0.2–1.4)
d. I don’t have the energy to exercise	41.7	57.8	1.6 (0.9–2.8)	1.2 (0.7–2.4)
e. I am uncomfortable with how I look while exercising or while wearing exercise clothing	26.0	44.4	2.3 (1.2–4.2)*	1.9 (0.96–3.6)
f. My current weight makes it difficult for me to exercise	7.3	46.5	11.0 (4.6–26.2)*	10.6 (4.2–27.1)*

* Statistically significant ($P < .05$) difference between percent of nonobese versus obese women who agree with the statement.

Note. n/a = model did not converge so no odds ratio is calculated.

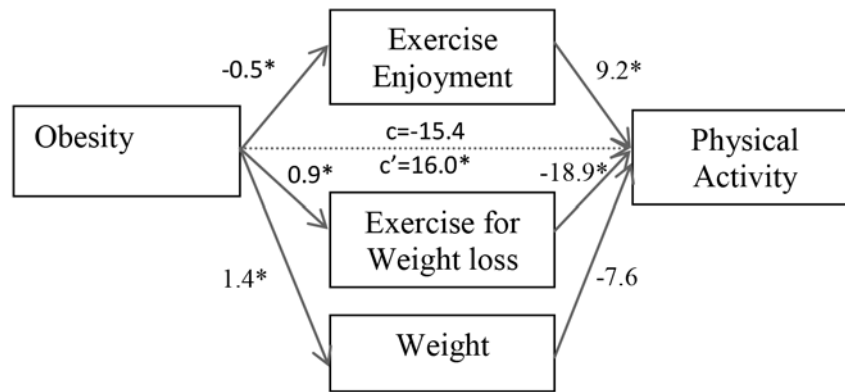


Figure 1 — Coefficients from the multiple mediation model of the relationship between weight group and physical activity *Note.* Coefficients indicate the relative strength and direction of the relationship the variables linked by a given pathway; c = effect of obesity on physical activity controlling for income; c' = residual effect of obesity on physical activity after accounting for income and the indirect effects of the mediators in the multiple mediator model; * $P < .05$.

lose weight. This is an interesting finding given the high endorsement for the other benefits of exercise seen among both focus group and survey participants and may indicate that obese women believe the long-term benefits of exercise are only reaped when weight loss is achieved. Alternatively weight loss may be the only benefit which is desirable enough to motivate obese women to overcome their barriers to exercise.

Another possible explanation for lower levels of exercise among obese women is that they are less likely than nonobese women to enjoy exercise. Lack of enjoyment may reflect the higher number of barriers obese women have to exercise and/or may be an indicator that obese women have a different physiological experience during exercise than nonobese women. Women in the focus group indicated that they start to exercise more as their weight goes down because exercise gets easier. Ekkekakis et al¹⁹ compared pleasure response of normal, overweight, and obese women during a graduated treadmill test. Obese women gave lower pleasure ratings during the incremental protocol and reported lower energy scores immediately after the protocol. Our analyses indicated that in addition to exercising for weight loss, enjoyment mediated the relationship between weight group and physical activity.

This study is the first to use a mixed methods approach to elucidate specific attitudinal constructs associated with obese women's failure to participate in regular exercise. Taken together, focus group and survey data provide insight into how conflicting views of exercise coupled with high barriers can lead to lower exercise levels among obese women. While weight loss was seen as an important benefit of exercise, some women felt that exercise had not been a successful weight loss tool for them personally. Instead, they believed that increased exercise was actually a result of weight loss rather than a cause. Consistently, obese survey respondents had much greater odds of reporting that their weight was a barrier

to exercise and were less likely to report using exercise as a weight loss strategy than nonobese respondents. It is possible that obese women had attempted using exercise in the past to elicit weight loss, but were unsuccessful because they were not exercising long enough or at a high enough intensity to elicit weight loss. Only 25% of survey participants who said they were exercising to lose weight were classified in the high physical activity category using IPAQ. This category includes people who exercise at least 1 hour per day at a moderate intensity level,²⁰ the minimum amount of exercise recommended for those trying to achieve weight loss.²¹ Women may be unaware of the high volume of activity needed to achieve weight loss. Obese women who exercise mainly for weight loss, but don't see the intended results because they are not exercising at a high enough level may ultimately discontinue exercise altogether. Nonobese women, on the other hand, have higher exercise enjoyment and may continue to exercise even though they are not losing weight.

Despite previous research indicating that fear of weight stigma and poor body esteem are both associated with less frequent participation in exercise,^{22,23} we did not find a significant relationship between weight and being uncomfortable exercising in front of others. While some obese women in the focus groups expressed discomfort exercising in front of others, it is possible that nonobese women have similar concerns. As poor body esteem can occur at any weight, this barrier may not be the best explanation for behavioral disparities between obese and nonobese women. Previous studies looking and body esteem and weight stigma have focused on younger women and may not be generalizable to our older sample.²³ Consistently, several women in the focus group even indicated that their appearance does not concern them the way it did when they were younger.

A limitation of using this focus group data is that women were selected because they were not currently engaging in another health behavior (ie, colorectal cancer

screening).²⁴ These women may be different from other obese women; however, their demographic characteristics were nearly identical to those of the women who completed the survey. To overcome the limitations of using focus group data from a small convenience sample of women we attempted to confirm our findings through quantitative analysis of survey data from a larger group of women. Using focus groups as a first phase proved highly useful as the newly created items turned out to best explain the relationship between weight and physical activity. Using focus groups as a first phase not only helped to shape survey questions, but also aided in the interpretation of the quantitative results. Together the mixed methods approaches provide for a more complete understanding of the research questions. While focus groups originally included both white and African American women, the survey was limited to white women so we only report data from this racial group. While having a homogenous group with respect to race, gender, and age allows us to better isolate the effects of obesity on exercise, it limits the generalizability of our results to white women over the age of 50.

Further research is needed to disentangle women's beliefs about what they think the benefits of exercise should be with their actual experiences of exercise benefits, especially regarding weight loss. It is unclear whether women, especially obese women, understand that the benefits of exercise can be achieved even if they do not lose weight. Both popular media and public health messages often promote physical activity as a weight control strategy rather than emphasizing the benefits of exercise which are independent of weight loss. This may distort women's understanding of the role of exercise in disease prevention and weight control. Physical activity alone, without changes in diet, does not generally produce clinically significant weight loss.^{25,26} As lack of understanding of how exercise improves health may decrease women's exercise intentions, future health communications targeting obese women should not only address weight-related barriers to exercise, but should focus on the benefits of exercise for women of all sizes.

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