ICCR Study Proposal
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The relationship between body size perception and change in BMI in obese Hispanic Caribbean Women

Study Purpose/Rationale

Heart disease and stroke are 2 major killers of women (AHA, 2008; Stampfer et al., 2000), and factors such as the metabolic syndrome has been reported to confer a significantly greater stroke and cardiovascular risk factor in women than for men (McNeill et al., 2005; Gami et al., 2007). However, the number of women who know these facts and know of their cardiovascular and personal risks is quite low, particularly amongst minority women, such as the Hispanic – Caribbean women living in the Washington Heights-Inwood (WH-I) area (Yala Fleck, Sciacca, Castro, Joseh & Giardina, 2009).

One study analyzing data from the CARDIA study on women found that obese women with overweight ideal body size gain less weight than those with normal ideal body size and that obese women who perceive themselves as normal weight actually gain more weight over time, while those who perceive themselves as overweight lose weight (Lynch et al., 2008). Lynch et al. (2008) suggest that it is among obese women in particular that perception of one's body size as being obese may act as a motivational trigger for implementing behavioral changes required for weight control. Body size satisfaction (measured in several studies as perceived current weight minus ideal weight) has been shown to be inversely related to previous dieting, current dieting, previous weight loss, and weight loss attempts across BMIs (Riley et al., 1998), with blacks and people of lower SES tending to be more satisfied with their body size. These findings were adjusted for age, education, physical activity, and BMI amongst black women. Other correlates of weight loss amongst adults with metabolic syndrome have been BMIs between 35-39, being informed of overweight status by a health professional, being advised to lose weight for hypertension or diagnosis of diabetes.

These studies also highlight racial differences in perception and many have suggested that the difference in obesity prevalence between African Americans and whites may be partially due to differences in body size perception, with blacks being more likely to underestimate their body shape in comparison to actual BMI (Bhuiyan, Gustat, Srinivasan & Berenson, 2003). In addition, research has also shown that the difference between self perceived and ideal body size judgments are larger in whites than for blacks in all BMI stratified models (Lynch et al., 2006). Higher education and employment led to less underestimation (Bhuiyan, et al.,2003). Like race, lower education has been shown to be associated with a smaller difference between self perceived and ideal body size, particularly in black women (Lynch et al., 2006).

Previous research on perception and weight loss as largely focused on African Americans and nonhispanic whites (NHW), but little has been done in the realm of other minority groups also at high risk for cardiovascular disease in comparison to whites, such as the largely Caribbean Hispanic women residing in WH-I. In fact, CVD is the leading cause of death among women and Hispanics, who have surpassed other racial and ethnic groups to become the largest and

fastest growing U.S. minority (Davidson et al., 2007). In comparison to non-Hispanic whites, Hispanics have a higher incidence of metabolic syndrome, which also occurs more frequently in women with lower education levels, who are on Medicaid, and those living in urban areas (Yala, et al., 2009). Furthermore, Hispanic women are also more likely to have higher waist circumference, HDL, TG, and FBG. These findings stem from the CUMC *Heart Health in Action* study, which found a prevalence of overweight or obesity based n BMI to be 63% amongst Hispanics. Questions about body size perceptions cohort revealed that obese women and Hispanics are also more likely to underestimate their weight and lack essential CV health knowledge in comparison to normal weight and NHW, respectively (Amin et al., 2010; Decolongon et al., 2010).

In summary, the WH-I area of New York City has been shown to have a particularly high incidence of obesity and overweight amongst women, which is concerning because obese women are more likely to have obese children and are often dictate dietary practices in homes. Targeting women has the potential to not only reduce obesity and cardiovascular disease in this subset, but potentially their children and other family members, with preliminary research from CUMC's *Family Centered Approach to Reduce Vascular Risk in Women and Children* showing that half of obese and overweight mothers have overweight or obese children, significantly more than normal weight mothers. Improving the accuracy of body image perception as well as increasing motivation, action and maintenance of action to be healthier and thus reduce morbidity and mortality of vascular disease is integral (NIH, 1998).

In targeting body weight to reduce the incidence of the metabolic syndrome and cardiovascular disease, the concept of body image and image misinterpretation have emerged as possible mediators in effective weight loss promotion and cardiovascular risk reduction, with studies showing that perception can mediate weight loss or gain. No research has been done in this population of Hispanic women to assess whether they too would show a change in weight over time based on their perceptions. Furthermore, it has yet to be determined whether these perceptions not only affect weight and BMI, but potentially chronic disease progression in these women.

This trial seeks to add clarity to the relationship between perception and BMI/weight in the Hispanic community. We will compare those obese, Hispanic female participants enrolled in the *Heart Health in Action* study, who underestimate their weight to those who have an accurate in terms of change in BMI and change in weight over 5 years.

Study Design and Statistical Analysis

We will conduct a case control cohort prospective study to examine the relation between each body size perception variable and change in BMI (measured as a continuous variable). We will select overweight and obese Hispanic women (n=212), and compare those who underestimate their weight to those who do not in terms change in BMI, weight, lipid profile, FSG, and Framingham risk score over 5 years.

Statistical methods:
We project that n= 81 participants (42 in each group) will be needed for 80% power to detect $p<.05$. We will analyze these as continuous variables with t-tests. Multiple regression analysis will done to explore the relationship between perception of body weight, ideal body size, Framingham risk score, knowledge, education and change in BMI over 5 years. We will also make adjustments for smoking, age, physical activity levels, education, and income.

Measures
Independent variable

1. Perception: Using the Stunkard scale, which has been validated and consists of 9 silhouette figures that increase gradually in size from very thin (a value of 1) to very obese (value of 9) we will divide women into those who underestimate their weight and those who accurately estimate their weight. In previous studies they have been classified into underweight (figures 1 and 2), normal weight (figures 3 and 4) overweight (5-7) and obese (8 and 9) (Bhuiyan, et al., 2003).

Dependent Variables

1. Annual Change in BMI

Multiple Regression Analyses

1. Perception (see above)
2. Knowledge: a) what is the number 1 killer b) what are the signs and symptoms of a heart attack and c) what do you do if you think you are having a heart attack. These questions are from Healthy people 2010 and are validated and used to assess knowledge and awareness.
3. Framingham Risk Score: Low-, moderate-, and high-risk status were defined as <10%, 10–20%, and >20% probability of coronary heart disease in 10 years, based on the Framingham risk algorithm
4. Education level (5 levels)
5. Body Satisfaction Score: perceived weight – ideal weight (-1, 0 is normal, >1)
6. Motivation to lose weight

Study Procedures:
No procedures will be involved in the study but will rely on previous procedures done on this cohort. Baseline body image perceptions of women, their knowledge of vascular risk, demographics, SES, medical history, medications and level of education were obtained at enrollment into the study. Subjects were then referred to their primary care physicians for physical examinations (which included weight, height, waist circumference and blood pressure) as well as fasting plasma glucose levels, lipid profiles within 3 months of enrolling in the study. All of this information will be used as the subjects' baseline information. BMI and weight will be assessed from the most recent available information on the participant.

Study Questionnaires:
Adults in the study previously filled out a survey containing questions about figural stimuli, demographics, level of education, zip code (a surrogate for income), demographics, insurance status, height/weight, their waist circumference, pregnancy status, smoking history, chronic

diseases, knowledge about CV health, methods for losing weight, attempts to lose weight, diet, and nutritional literacy.

Study Subjects

Inclusions	*Exclusions*
• Women enrolled in *Health Heart in Action* study • Overweight or obese (BMI≥25) • Hispanic (self described) • Baseline blood tests, BMI, and blood tests, and physical examination	• Overestimated weight • No follow up lipid panel, BMI, blood tests • Non-Hispanic (self described) • Underweight, Normal weight (BMI<25) • Pregnant

Recruitment: No new recruitment will take place as the participants in the *Heart Health in Action* study will be followed over time, who signed informed consent forms at the time of enrollment in the study.

Participant Requirements: none

Confidentiality of study data
The patient's information will be decoded to find their MRN numbers and follow the most recent lab data available for that patient in the computer system. The information will only be decoded on a private locked computer located in Room PH3-346, 622 West 168th Street, NY, NY (Dr. Giardina's Office)

Potential conflict of interest
None.

Potential risks
None

Alternatives
Those participants who did not wish to enroll in the Heart Health in Action study, had the option to not participate in the past. No new enrollment will be conducted at this time.

Compensation
The women were not compensated monetarily in the past. They will not be directly involved in the study as of now.

References
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